

**Zoning Board of Adjustment**  
**Meeting Agenda**  
City Council Chambers  
1311 Chestnut Street  
Bastrop, TX 78602



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**September 7, 2021 at 6:00 P.M.**

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*City of Bastrop Zoning Board of Adjustment meetings are available to all persons regardless of disability. If you require special assistance, please contact the Board Secretary at (512) 332-8840 or write 1311 Chestnut Street, 78602, or by calling through a T.D.D. (Telecommunication Device for the Deaf) to Relay Texas at 1-800-735-2989 at least 48 hours in advance of the meeting.*

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As authorized by Section 551.071 of the Texas Government Code, this meeting may be convened into closed Executive Session for the purposes of seeking confidential legal advice from the City Attorney on any item on the agenda at any time during the meeting.

The City of Bastrop reserves the right to reconvene, recess, or realign the Regular Session or called Executive Session or order of business at any time prior to adjournment.

- 1. CALL TO ORDER**
  
- 2. CITIZEN COMMENTS**

At this time, comments will be taken from the audience on any topic.

In accordance with the Texas Open Meetings Act, if a citizen discusses any item not on the agenda, the Board cannot discuss issues raised or make any decision at this time. Instead, city Boards are limited to making a statement of specific information or a recitation of existing policy in response to the inquiry. Issues may be referred to the Staff Liaison for research and possible future action.

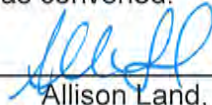
It is not the intention of the City of Bastrop to provide a public forum for the embarrassment or demeaning of any individual or group. Neither is it the intention of the Board to allow a member of the public to slur the performance, honesty, and/or integrity of the Board, as a body or any member or members of the Board, individually or collectively, nor any members of the city's staff. Accordingly, profane, insulting, or threatening language directed toward the Board and/or any person in the Board's presence will not be tolerated.

### 3. ITEMS FOR INDIVIDUAL CONSIDERATION

- 3A. Introduction of new Board member Richard Smarzik.
- 3B. Consider action to approve meeting minutes from the August 4, 2021 Zoning Board of Adjustment Meeting
- 3C. Public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 3, Lots 8 and 9 Preliminary Plat, being 19.46 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.
- 3D. Public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 5 (previously called Section 2) Proposed Preliminary Plat, being 25.9 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.

### 4. ADJOURNMENT

I, the undersigned authority, do hereby certify that this Notice of Meeting as posted in accordance with the regulations of the Texas Open Meetings Act on the bulletin board located at the entrance to the City of Bastrop City Hall, a place of convenient and readily accessible to the general public, as well as to the City's website, [www.cityofbastrop.org](http://www.cityofbastrop.org) and said Notice was posted on the following date and time: Friday, September 3, 2021 at 3:45 p.m. and remained posted for at least two hours after said meeting was convened.



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Allison Land, Senior Planner



# STAFF REPORT

**MEETING DATE:** September 7, 2021

**AGENDA ITEM:** 3A

**TITLE:**

Introduction of new Board member Richard Smarzik

**STAFF REPRESENTATIVE:**

Jennifer C. Bills, Assistant Planning Director

**ATTACHMENTS:**

None





# STAFF REPORT

**MEETING DATE:** September 7, 2021

**AGENDA ITEM:** 3B

**TITLE:**

Consider action to approve meeting minutes from the August 4, 2021 Zoning Board of Adjustment Meeting.

**STAFF REPRESENTATIVE:**

Nicole Peterson, Planning Technician

**ATTACHMENTS:**

Meeting Minutes



# Zoning Board of Adjustments

## August 4, 2021 Meeting Minutes

The City of Bastrop Zoning Board of Adjustments met Friday, August 4, 2021 at 6:00 p.m. in the Council Chambers located at 1311 Chestnut Street, Bastrop, Texas 78602.

### 1. CALL TO ORDER

Patrick Connell called the meeting to order at 6:01 p.m.

Patrick Connell	Present
Gary Moss	Present
Scot Robichaud	Present
Jeff Haladyna	Present

### 2. CITIZEN COMMENTS

There were no comments from citizens.

### 3. ITEMS FOR INDIVIDUAL CONSIDERATION

- 3A. Consider action to approve meeting minutes from the June 25, 2021 Zoning Board of Adjustment Meeting.

Gary Moss made a motion to approve the June 25, 2021 Zoning Board of Adjustment Meeting Minutes. Scot Robichaud seconded the motion and the motion carried unanimously.

- 3B. Consider action to appoint a Vice-Chair for the Zoning Board of Adjustments.

Gary Moss made a motion to appoint Scot Robichaud as Vice-Chair for the Zoning Board of Adjustments. Scot Robichaud seconded the motion and the motion carried unanimously.

- 3C. Public hearing and consider action on a variance request to Section 6.5.003(B) and Section 6.3.008(D) to allow a 220-foot tower with an additional 5-foot lighting rod on a 0.13 acre portion, out of the 223-acre Bastrop Town Tract, Abstract A11 located at 120 East Highway 21, within the City Limits of the City of Bastrop, Texas.

Jennifer Bills presented the information distributed in the Zoning Board of Adjustment Agenda Packet.

She stated the applicant is requesting to build a new 220-foot self-supporting lattice tower, with a 5-foot lighting rod, that will support multiple wireless transmission facilities. She discussed with the Board the notifications City Staff had send out for the public hearing and that no responses had been received for or against the applicant's request.

The decisions were based on the following findings and facts:

1. The Bastrop Building Block (B<sup>3</sup>) Code does not have provisions for Wireless Transmission Facilities (Communication Towers)

# Zoning Board of Adjustments

## August 4, 2021 Meeting Minutes

2. The applicant has a property with restrictions from the Lost Pines Habitat Conservation Plan that requires limits on impervious cover and soil disruptions.
3. The location is adjacent to existing commercial and undeveloped land, which will not be injurious to property in the area.
4. This property is identified in the Comprehensive Plan as Rural Residential adjacent to Local Commercial and Public future land uses. Along with the location near the State Highway 21, providing communication infrastructure is compatible with the existing and future land uses.
5. The hardship exists because the B<sup>3</sup> Code does not account for WTF (towers) in any district.
6. The conditions and circumstances were not created by the property owner or applicant.
7. The applicant has not made any finding of financial hardship.
8. The applicant has provided their findings of fact as attached in the staff report, along with provided exhibits.

Jennifer Bills stated that Staff recommends approval of the variances to Section 6.5.003(B) Building Height and Section 6.3.008(D) Lot Occupation to allow a 220-foot tower with an additional 5-foot lighting rod (225-feet total) on a 0.13-acre portion, out of the 223-acre Bastrop Town Tract, Abstract A11 located at 120 East Highway 21.

Ralph Wyngarden, spoke on behalf of Hemphill LLC with the Board regarding the request. He stated the tower would be able to have other providers and that it wouldn't prevent other companies from using it. Additional discussion commenced between the Board and Ralph regarding the tower request, and the timing of construction on this project along with the uses from other companies and who it would all serve/support.

The presentation and discussion with the applicant's representative concluded.

Patrick Connell opened the public hearing.

There were no comments from the public.

Patrick Connell closed the public hearing.

Gary Moss made a motion to approve a variance request to Section 6.5.003(B) and Section 6.3.008(D) to allow a 220-foot tower with an additional 5-foot lighting rod on a 0.13-acre portion, out of the 223-acre Bastrop Town Tract, Abstract A11 located at 120 East Highway 21, within the City Limits of the City of Bastrop, Texas. Jeffrey Haladyna seconded the motion and the motion carried unanimously.

# Zoning Board of Adjustments

## August 4, 2021 Meeting Minutes

### 4. ADJOURNMENT

Scot Robichaud made a motion to adjourn the meeting at 6:31 pm. Gary Moss seconded the motion and the motion carried unanimously.

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Chair

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Vice-Chair



# STAFF REPORT

**MEETING DATE:** September 7, 2021

**AGENDA ITEM:** 3C

**TITLE:**

Public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 3, Lots 8 and 9 Preliminary Plat, being 19.46 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.

**AGENDA ITEM SUBMITTED BY:**

Jennifer C. Bills, Assistant Planning Director  
Trey Job, Assistant City Manager of Community Development

**ITEM DETAILS:**

Site Address: 600 Block of West State Highway 71, east of State Highway 304 and south of State Highway 71 (Attachment 1)  
Total Acreage: 19.46 acres  
Legal Description: 19.46 acres of land out of the Nancy Blakey Survey, Abstract 98  
Property Owner: 71 Retail Partners/Douglas MacMahon  
Agent Contact: Carlson, Brigance, and Doering/Brendan McEntee  
Existing Use: Vacant/Undeveloped  
Existing Zoning: P-5, Place Type 5 – Core  
Future Land Use: General Commercial

**BACKGROUND/HISTORY:**

The Texas Local Government Code Chapter 245 contains specific language about projects and permits that have been filed with a municipality and establishes the intent of the development projects. Below is a timeline of applications that provide the intent to create a nine-lot commercial subdivision. No other master plan or concept plan has been submitted that further defines the project for the entire subdivision. For Lot 1 and Lot 6, additional site development plans and building permits were submitted and subsequently constructed, completing the projects for those particular lots. However, no plans other than subdivision have been submitted for the remaining seven lots.

With the project information provided to this date, the City determined the appropriate grandfathering date is May 22, 2017, which is the date the applicant submitted the Preliminary Plat that has been moving forward with subsequent permits. The City agrees that the property classification is commercial, and as additional permits are submitted, will review them under the regulations in effect per the grandfathered date for subdivision and specific municipal regulations that informed the subdivision standards, including regulation in effect related to landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions,



lot coverage or building size. All other elements will be reviewed under current regulations (Stormwater Drainage Ordinance and Bastrop Building Block (B<sup>3</sup>) Code, etc.). The timeline below establishes the applications that have been considered during the review.

#### Bastrop Grove Plat Timeline:

- July 24, 2013 – Preliminary Plat for The Grove Application Submitted
  - Eight lot commercial subdivision - Approved by City Council on July 8, 2014
  - Plat expired on March 30, 2015
  
- August 5, 2013 – Final Plat for Bastrop Grove Phase 1 Application Submitted
  - One lot Final Plat – Comments sent September 29, 2013
  - No response from applicant – expired November 13, 2013 (45 days)
  
- May 23, 2014 - Final Plat for The Grove Phase 1 Lot 5 Application Submitted
  - One lot Final Plat approved by City Council August 12, 2014
  - 180-day Extension approved by City Council on July 28, 2015
  - Plat expired February 8, 2016
  
- May 22, 2017 – Preliminary Plat for The Bastrop Grove Application Submitted
  - Approved August 8, 2017, by City Council – replaced expired The Grove Preliminary Plat from July 24, 2013
  
- March 17, 2018 – Final Plat for Bastrop Grove Section 1 Application Submitted
  - 5 lots approved by City Council on July 24, 2018
  - Recorded July 27, 2018
  
- May 23, 2018 – Bastrop Grove Drainage Improvements – Improvements to Lots 1 & 2 and offsite Application Submitted
  - Plans Approved October 1, 2018
  - Completed May 17, 2019
  
- January 3, 2020 – Final Plat for Bastrop Section 2, Lot 6 Application Submitted
  - Approved by Planning & Zoning Commission on November 21, 2019
  - Recorded January 3, 2020

#### Individual lot timelines for Site Development and Building Permits:

- Bastrop Grove, Phase 1, Lot 1
  - Site Development Plan
    - Approved July 27, 2018, Amended September 25, 2019
    - Completed November 19, 2019
  
  - Building Permits
    - Issued August 1, 2018
    - Project/Permit Completed November 19, 2019
  
- Bastrop Grove, Section 2, Lot 6 – Bastrop Medtail (ARC Medical)
  - Final Drainage Plan
    - November 22, 2019 Application
    - Permit Completed on May 7, 2021 with City Engineer Acceptance

- February 27, 2020 – Site Development Plan
  - Submitted February 27, 2020
  - Permit Completed May 7, 2021
- Building Permit
  - Submitted March 3, 2020
  - Project/Permit Completed May 3, 2021

## **Grandfathering Appeal**

The applicant is appealing three aspects of this determination (Attachment 3).

1. They do not agree with the determination that they are grandfathered to the Subdivision Ordinance (Chapter 10 of the Code of Ordinance on May 22, 2017) and the specific regulations that informed the subdivision standards, including regulations in effected related to landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size. (Chapter 14 of the Code of Ordinances as of May 22, 2017).
2. The property classification of commercial.
3. The project is not grandfathered to any regulations exempted by LGC Section 245.004 which includes drainage, zoning, sign regulations, which were updated with the Stormwater Drainage Ordinance and the Bastrop Building Block (B<sup>3</sup>) Code in 2019.

The Grandfathering Determination by the City maintains that the project is Grandfathered to the May 22, 2017, Subdivision Ordinance, and the sections of Chapter 14 – Zoning per LGC 245. The applicant is requesting that the city provide a full analysis of the previous and current code for applicability to any possible permits that may be submitted. The current project is defined by the nine-lot preliminary plat on file and staff agrees that it can continue to process subsequent subdivision applications using the preliminary plat layout. Planning staff is requesting clarification on the project outside of the subdivision improvements to make those determinations.

The appeal also states that since the B<sup>3</sup> Code Place Type Zoning District do not mention use or provide a use table, that it cannot be considered zoning and exempt under Chapter 245. The B<sup>3</sup> Code is a form-based code. Chapter 211 of the Local Government Code does not include “use” as a required element for zoning regulations.

Additionally, the applicant states that new stormwater regulations would only apply in a flood plain established by a federal flood control program. The subdivision was designed using a regional storm channel that directly discharges into Colorado River, thus impacting the floodway and 1 percent annual chance (100-year) flood hazard zone (floodplain). The Bastrop Grove Preliminary Plat for Sections 1-3 is also within the 0.2 percent annual chance (500-year) flood hazard zone (floodplain).

## **Request for Variance**

If the appeal is denied, the applicant is requesting a variance for the Project to be exempt from all B<sup>3</sup> Codes and the Stormwater Drainage Ordinance, and more specifically the requirements of the Code to complete a Neighborhood Regulating Plan, the requirements of the Development Patterns in Chapter 5, and compliance with the Building Placement requirements of Chapter 6, any building size regulation (or regulations that affect building size, including without limitation the Build-to-line and building to

land ratio), and minimum or maximum setbacks, and any other B<sup>3</sup> Code requirements which affects the Project's Vested Rights.

Planning Staff does not recommend a blanket variance to the B<sup>3</sup> Codes without review of a specific project outlining how the variances would affect each site.

**POLICY EXPLANATION:**

V.T.C.A. Local Government Code Chapter 245 ("LGC 245"), provides an opportunity for landowners or developers to lock-in certain government regulations that apply to a particular development by filing a specific permit application. are regulated under Section 212.172 of the Texas Local Government Code.

Bastrop adopted Article 1.20 – Uniformity of Requirements, commonly referred to as the “Grandfathering Development Status Ordinance”. This provides standards and procedures to determine possible grandfathered development status of development projects.

Procedure:

1. Applicant submission of Grandfathering Request with documentation
  - a. April 19, 2021 (Attachment 4)
2. Grandfathering Review Committee (Director of Planning, City Engineer, and Public Works Director) makes determination within 15 business days.
  - a. The Committee determination was made and sent on May 4, 2021. (Attachment 5)
3. Applicant can request reconsideration of the determination by the Grandfathering Review Committee within 15 business days of determination.
  - a. Submitted May 25, 2021 (Attachment 6)
4. Grandfathering Review Committee can either affirm or reverse the determination within 15 business days of request.
  - a. Decision upheld – June 15, 2021 (Attachment 7)
5. If the determination reconsideration is denied, the request is automatically forwarded to the City Manager for determination, which must be completed within 15 business days of reconsideration determination.
  - a. Forwarded on June 16, 2021
  - b. Determination on July 7, 2021 (Attachment 2)
6. Applicant can appeal the City Manager’s determination to the Zoning Board of Adjustment within 15 business days of determination.
  - a. Appeal submitted on July 28, 2021 (Attachment 3)
7. The ZBA must be convened within 30 days after the appeal has been received (or the City Manager, at the request of the appellant can postpone to a date certain), or the appeal is deemed to have automatically been denied.
  - a. Meeting called for September 7, 2021.
8. Should the appellant be dissatisfied with the actions of the ZBA, the appellant may pursue all legal remedies to review the ZBA's decision as set forth in LGC Section 211.011.

**RECOMMENDATION:**

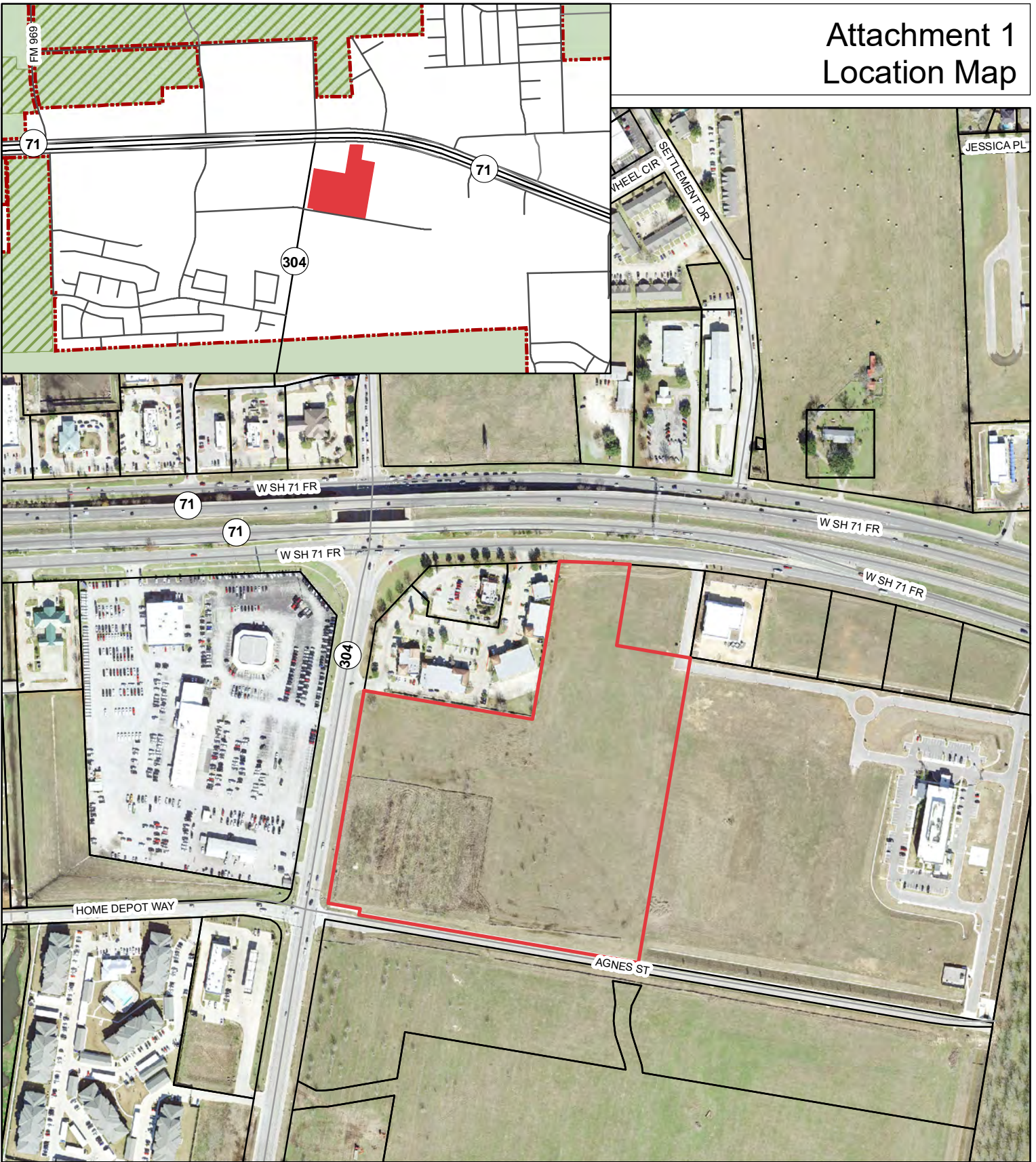
Hold public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 3, Lots 8 and 9 Preliminary Plat, being 19.46 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.

**ATTACHMENTS:**

- Attachment 1 – Location Map
- Attachment 2 – City Manager Reconsideration Determination June 7, 2021
- Attachment 3 – Applicant Appeal to Zoning Board of Adjustment May 7, 2021
- Attachment 4 – Applicant Grandfathering Request for Bastrop Grove, Section 3, Lots 8 & 9 - April 19, 2021
- Attachment 5 – Grandfathering Review Committee Determination May 4, 2021
- Attachment 6 – Applicant GRC Reconsideration Request May 25, 2021
- Attachment 7 – GRC Reconsideration Determination July 7, 2021



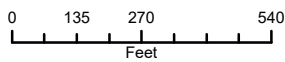
# Attachment 1 Location Map



## Bastrop Grove Lots 8 and 9

Date: 8/13/2021

The accuracy and precision of this cartographic data is limited and should be used for information /planning purposes only. This data does not replace surveys conducted by registered Texas land surveyors nor does it constitute an "official" verification of zoning, land use classification, or other classification set forth in local, state, or federal regulatory processes. The City of Bastrop, nor any of its employees, do not make any warranty of merchantability and fitness for particular purpose, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any such information, nor does it represent that its use would not infringe upon privately owned rights.



1 inch = 400 feet





July 7, 2021

71 Retail Partners LP  
C/O Douglas MacMahon  
8214 Westchester Drive, Suite 550  
Dallas, TX 75225

Dear Mr. MacMahon,

I have reviewed the documents that have been submitted and the previous determinations of the Grandfathering Committee issued by Trey Job, Assistant City Manager (Acting Director of Planning & Development).

This request is to determine which of the previously adopted city codes can be utilized by the current project, not which sections of the current code are applicable. I concur with the determination that the property described as Bastrop Grove, Section 3, Lot 8 & 9 is grandfathered to specific regulations in effect as of May 22, 2017, the date of the submittal of the Bastrop Grove Preliminary Plat, which was approved by City Council on August 8, 2017. This is the controlling document for the approval, disapproval, or conditional approval of future application for subdivision, pursuant to LGC § 245.002(a) and (b), as may be amended.

To this end, the project is grandfathered to the Subdivision Ordinance (Chapter 10 of the Code of Ordinances 2017), and specific municipal regulations that informed the subdivision standards, including regulations in effect related to landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size (Chapter 14 of the Code of Ordinance 2017). As noted in the previous determination, the property classification as of May 22, 2017 was commercial, and the property remains classified as commercial with the Place Type 5 district as rezoned during in the B<sup>3</sup> Code (Attachment 1).

The project is not grandfathered to any regulations exempted by LGC § 245.004, which includes drainage, zoning, and sign regulations, which were updated with the Stormwater Drainage Ordinance and the Bastrop Building Block (B<sup>3</sup>) Code in 2019. The B<sup>3</sup> Code is a unified development code, which includes subdivision, zoning, and sign regulations.

Sincerely,

Paul A. Hofmann  
City Manager

CC: Trey Job, Assistant City Manager  
Jennifer Bills, Assistant Planning Director

Enclosure: Attachment 1

**Notice of Pending Zoning Change  
City of Bastrop  
Planning & Zoning Commission  
And City Council**



Dear Property Owner: 71 RETAIL PARTNERS LP

The **Planning and Zoning Commission** will conduct a public hearing on **Thursday, September 26, 2019 at 6:00 p.m.** and the **City Council** will conduct a public hearing (first reading) **Tuesday, October 8, 2019 at 6:30 p.m.** and a public hearing (second reading) **Tuesday, October 22, 2019 at 6:30 p.m.** in the **City Hall Council Chambers located at 1311 Chestnut Street, Bastrop, Texas** on changing the zoning of all property within the City Limits of Bastrop, Texas.

Property ID/Parcel Number: 126678  
Current Zoning: Commercial-1  
New Zoning (Place Type): P-5 Core

If your property is within a Planned Development District, the change in zoning will not affect your specific Planned Development District standards.

The City will host a Come and Go Open House for citizens on **Thursday, September 19, 2019 from 6:30 p.m. to 8:00 p.m.** in the **City Hall Council Chambers located at 1311 Chestnut Street, Bastrop, Texas.** This is an opportunity to have property-specific questions answered.

Additional information on the Bastrop Building Block Code and a zoning map are available at this website: <https://www.cityofbastrop.org/page/buildingbastrop>

You may also contact the Planning & Development Department at (512) 332-8840, [plan@cityofbastrop.org](mailto:plan@cityofbastrop.org), visit the office at 1311 Chestnut Street, Bastrop, Texas, or mail the response card below to PO Box 427, Bastrop, Texas 78602.



**PROPERTY OWNER'S RESPONSE**

As a property owner within 200 feet: (please check one)

- I am in favor of the change.
- I am opposed to the change.
- I have no objection to the change.

Property Owner Name: \_\_\_\_\_

Property Address: \_\_\_\_\_

Mailing Address (if different than property address): \_\_\_\_\_

Phone (optional): \_\_\_\_\_ Email (optional): \_\_\_\_\_

Property Owner's Signature: \_\_\_\_\_

Additional Comments (Optional): \_\_\_\_\_

Re: Bastrop Building Block Code Zoning Change

PLANNING & DEVELOPMENT

1311 Chestnut Street – PO Box 427 – Bastrop, Texas 78602 – 512.332.8840  
[www.cityofbastrop.org](http://www.cityofbastrop.org)

71 RETAIL PARTNERS, L.P.  
8214 Westchester Drive, Ste 550  
Dallas, TX 75225

July 28, 2021

City of Bastrop  
Zoning Board of Adjustment  
1311 Chestnut Street  
Bastrop, TX 78602

Re: Lots 8 & 9 Bastrop Grove - Grandfathering

Dear Sir or Madam,

71 Retail Partners, L.P. ("**71 RP**") filed a Grandfathering Development Status Application (the "**GDSA Application**") under City Code Art. 1.20 (the "**Ordinance**") on April 19<sup>th</sup>, 2021. The Grandfathering Review Committee (the "**GRC**") issued a determination (the "**GRC Determination**") on May 4<sup>th</sup>, 2021. 71 RP requested reconsideration of the GRC Determination on May 25<sup>th</sup>, 2021 (the "**Reconsideration Request**") and the GRC declined to reconsider on June 15<sup>th</sup>, 2021, which automatically appealed the GRC Determination to the City Manager, who issued his determination (the "**CM Determination**") on July 7<sup>th</sup>, 2021. This is an appeal of the prior determinations, and, in the alternative, a request for a variance.

The GRC Determination is required by the City for the City to make its own determination of its position on the application of Texas Local Government Code ("**LGC**") Chapter 245 ("**LGC 245**"), which provides protections from changes in local regulation as to an ongoing development project (such protections being commonly known as "**vested rights**"). Only LGC 245 determines the applicable vested rights, and to the extent the Ordinance seeks to limit vested rights or to give the City control over the interpretation process (such as, but not limited to, establishing standards and burdens), we protest, and submit the application and this appeal under protest. The GRC Determination and interim administrative appeals are for the benefit of the City and are not binding on 71 RP as to the nature or extent of vested rights. 71 RP reserves all its rights under LGC 245.

Vested Rights defined (emphasis added):

- "If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements *in effect at the time the original application for the first permit in that series is filed shall be the sole basis for consideration of all subsequent permits required for the completion of the project.* All permits required



for the project are considered to be a single series of permits. Preliminary plans and related subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats are considered collectively to be one series of permits for a project.” LGC 245.002(b)

- “Rights to which a permit applicant is entitled under this chapter *accrue on the filing of an original application or plan for development or plat application* that gives the regulatory agency fair notice of the project and the nature of the permit sought.” LGC 245.002(a-1)

## **CM DETERMINATIONS**

The CM Determinations were as follows:

1. The Project is vested under LGC 245 as of May 22<sup>nd</sup>, 2017.
2. “...the project is grandfathered to the Subdivision Ordinance (Chapter 10 of the Code of Ordinances 2017), and specific municipal regulations that informed the subdivision standards, including regulations in effect related to landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size (Chapter 14 of the Code of Ordinances 2017).”
3. “...the property classification as of May 22, 2017 was commercial....”
4. “The project is not grandfathered to any regulations exempted by LGC Sec. 245.004, which includes drainage, zoning and sign regulations, which were updated with the Stormwater Drainage Ordinance and the Bastrop Building Block (B3) Code in 2019.”

71 RP appeals the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> determination above.

## **APPEAL OF GRANDFATHERING DETERMINATIONS**

71 RP hereby appeals to Zoning Board of Adjustment (the “ZBA”) pursuant to the Ordinance, which requires the following:

1. A statement that the appellant sought an appeal from the City Manager, and that the appeal:
  - a. Was denied;
  - b. Yielded an erroneous determination regarding the project's eligibility for grandfathered development status.
2. A statement of the reasons why the determination should be reversed or modified;
3. An explanation of the legal and factual grounds of the appeal; and

4. Payment of the appeal fee established by the City Council, as codified in the city's fee schedule.

For purposes of this appeal request, the word "Project" refers to the development of the 52.68 acre tract that was owned by 71 RP on May 22<sup>nd</sup>, 2017, which is the date 71 RP submitted a Preliminary Plat Application (the "2017 Application") that the City acknowledges is the vesting event for the Project. The Project, as shown on the 2017 application and on the plat applications discussed below, is inclusive of the creation of the lots and related infrastructure and the construction of buildings thereon. Both the land development and the building development are entitled to vested rights. 71 RP has continuously pursued this Project since the 2017 Application, having sold land which has been platted and buildings constructed, such as Seton Hospital and Medtail. The scope and nature of the Project is well known to the City, as suburban retail/commercial development for buildings consistent with the Seton and Medtail developments. Lot 8 is a typical pad site. The elements of the contemplated retail/commercial pad sites are relatively small buildings (usually 1 story), typically centered in each lot, with ample surface parking surrounding the building, and cross access easements shared among the other pad sites. These lots are typically called "commercial reserves". Lot 9 is a larger tract for larger development. Lots 8 & 9 were planned for and contemplated building under the regulations prescribed by the City's ordinances at the time of the 2017 Preliminary Plat application. 71 RP is seeking to finalize the platting of Lots 8 & 9, and to determinate the applicable local development rules.

**Appeal # 1: The Grandfathered Development Status Application process (the "GDSA Process") requires determination of both (1) which of the previously adopted city codes apply to the Project, and (2) which sections of the current code are applicable.**

71 RP believes the CM Determination made an erroneous determination in the following statement, "This request is to determine which of the previously adopted city codes can be utilized by the current project, not which sections of the current code are applicable."

71 RP asserts that the GDSA Process prescribed in the Ordinance should include a determination of both which previously adopted city codes can be utilized as well as which sections of the current code are and are not applicable. Otherwise, the effort has no practical benefit for either the City or the developer. The City seems to rely on Sec. 1.20.004(c) which states "This section shall not apply to permits or regulations listed as exemptions in LGC 245.004, as may be amended." The City acknowledges that the Subdivision Ordinance in effect in 2017 (and "...municipal regulations that informed the subdivision standards...") applies but does not explain its position as to what aspect of the B3 Code (as defined below) are applicable.

It is only fair that the City provide this determination.

71 RP asserts the following in support of its request:

- Section 1.20.003 of the Bastrop City Code states that the purpose of the GDSA Process is to “Provide increased certainty and predictability in the city’s regulatory process.”
- Section 1.20.006 of the Bastrop City Code states “It is the policy of the city that the construction, development, and/or land use permit applications filed with the city are presumed to be governed by then-current regulations.”
- Section 1.20.010 of the Bastrop City Code states “If an applicant contends that certain city regulations do not apply to the project, the applicant is expected to identify, with particularity, all requirements that the applicant contends do not apply to the current application.”
- 71 RP’s GDSA Application stated that the following regulations do not apply to the Project:
  - The Bastrop Building Block Code, the Bastrop Building Block Technical Manual, and the Bastrop Development Manual (collectively the “B3 Code”).
  - 71 RP’s Reconsideration Request requested the City state the City’s position on the applicability of the B3 Code to the Project.

Given the above, if (1) the purpose of the GDSA Process is to provide increased certainty and predictability, (2) the policy of the city is a presumption that the current regulations apply, (3) the city code requires the applicant to specify which regulations in the current code are not applicable to the Project, (4) the GDSA Application states with specificity which regulations 71 RP believes do not apply, (5) the GRC Determination and CM Determination state that certain elements of the B3 Code may apply without specificity, and (6) the Reconsideration Request asked for clarification of the statements in the GRC Determination and CM Determination, 71 RP asserts the following:

- To achieve the stated purpose of providing increased certainty and predictability, the CM Determination should have included a clear determination of which regulations do and do not apply. To say that some regulations apply and others may apply as the GRC Determination and CM Determination did does not achieve the stated purpose of the GDSA Process.
- The City Manager erred in stating that 71 RP’s GDSA Application is not to determine which sections of the current code are applicable. In fact, Section 1.20.010 of the Bastrop City Code requires the applicant to identify which sections of the current code are not applicable under LGC 245, 71 RP did this as part of its application, and the City Manager is required to make a determination of the statements in the GDSA Application with a level of specificity that provides increased certainty and predictability.

**Appeal # 2: The Bastrop Building Block (B3) Code, the B3 Technical Manual, and the Development Manual are NOT “municipal zoning regulations”, thus are not exempted from vesting.**

71 RP believes the CM Determination made an erroneous determination that the B3 Code is exempted by LGC 245.004 as a zoning ordinance. The CM Determination is silent as to the applicability of the B3 Technical Manual and Development Manual that is asserted in the GRC Determination, but for purposes of this appeal, the term B3 Code includes these documents. We request a clear determination of this issue.

The B3 Code does not apply to the Project, because it is not a municipal zoning regulation as defined by State law.

71 RP asserts the following in support of its request and offers the following explanation of the legal and factual grounds of this appeal:

- The B3 Code is a “Form Based Code,” which is not based on use, but rather on the form of building and a required grid street structure and public infrastructure. Without use regulation, the B3 Code cannot be zoning, See *Powell v. City of Houston*, No. 19-0689, 2021 WL 2273976 (Tex. June 4, 2021) holding that use regulation is a critical component for a municipal ordinance to be considered a zoning regulation. Public infrastructure is regulated by the subdivision and platting process, not the zoning process. Zoning focuses on separation of use by geographic district. The City acknowledges that the Project is grandfathered to “municipal regulations which informed the subdivision standards”. Use is not directly regulated by the B3 Code. There are no permitted/prohibited uses, no use table or matrix, and no use definitions. A fair reading of the B3 Code shows it is not zoning regulations, but rather subdivision and platting regulations.
- Additionally, the B3 Code does not comply with the mandatory requirement of TEX. LOC. GOV'T CODE § 211.005(b) that zoning regulations be uniform for each class or type of building in a zoning district, to be adopted with reasonable consideration for each district’s peculiar suitability for particular uses. The form-based code does not consider uses, but blocks, grids, setbacks and building form. Thus, the B3 Code cannot be considered zoning regulations, as Texas municipal zoning regulations may only be adopted in compliance with TEX. LOC. GOV'T CODE § 211. Because the B3 Code is not a “municipal zoning regulation,” it does not qualify for exemption under Texas TEX. LOC. GOV'T CODE § 245.004 and therefore, no portion of the B3 Code applies to the Project and the GRC Determination and the CM Determination erred in asserting that any portion of the B3 Code applies to the Project.

- The B3 Code is not a municipal zoning regulation, but a “form-based code” whose regulations are based on public infrastructure. Public infrastructure is regulated by the subdivision and platting process, not the zoning process. Zoning focuses on separation of use by geographic district. Use is not directly regulated by the B3 Code. There are no permitted/prohibited uses, no use table or matrix, and no use definitions. A fair reading of the B3 Code shows it is not zoning regulations, but subdivision and platting regulations.

Simply put, a zoning regulation regulates use by zone. The B3 Code regulates use by form. This is an important distinction as regulating use by form means that use regulations are based on specific requirements that affect the LGC 245.004 Vested Rights (defined below) and therefore do not qualify for exemption.

**Appeal # 3: The B3 Code affects landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size, thus are not exempt from vesting, even if B3 Code is a municipal zoning regulation as defined by state law.**

LGC 245.004(2) provides an exemption to LGC 245 for “*municipal zoning regulations that do not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size or that do not change development permitted by a restrictive covenant required by a municipality*”. *emphasis added*.

Therefore, in order for a zoning regulation to be exempt under LGC 245.004 (2), such regulation must pass a **two-part test**. It must be a municipal zoning regulation **and** must not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size (collectively the “**LGC 245.004 Vested Rights**”). The word “affect” means “having an effect on”, which is a broad interpretation. The B3 Code impacts every aspect of the LGC 245.004 Vested Rights. 71 RP asserts that the B3 Code fails this test as follows:

- The broad exceptions for LGC 245.004 Vested Rights to the general “municipal zoning regulations” exemption in LGC 245.004 swallow the general exemption when applied to the B3 Code. The “B3 Development Tables” in the Code, which “contain the details necessary to develop using the Code” contain specific requirements for lot sizes, lot dimensions, lot coverage, building sizes, open space and park dedication requirements. Any regulations which have any effect on these areas are subject to vesting as “exceptions to the exemption”. As a form-based code, the core focus is on infrastructure, particularly the street grid and “blocks”. This approach, by its nature, affects the LGC 245.004 Vested Rights. Given that the details necessary to develop using the B3 Code directly affect the

LGC 245.004 Vested Rights, the B3 Code fails the test and does not qualify as exempt under LGC 245.004.

- Page 22 of the B3 Code states “Blocks are the foundation for development in Bastrop.” If Blocks (and therefore street grids/specifications and lot sizes/dimensions) are the foundation of development in Bastrop under the B3 Code, then the B3 Code, without question, fails the test and does not qualify as exempt under LGC 245.004 exemption for “municipal zoning regulations.”
- The B3 Code is a “unified development code” which mixed various types of land use regulations that otherwise would be separate ordinances. It is not “municipal zoning regulations” of the type contemplated when LGC 245 was adopted. This is particularly true for a form-based code. The “Explanation of the Code” on Page 15 of the B3 Code states “Each section of the Code provides Standards that guide development to be holistic to each Building, Street, Block, and neighborhood.” Merriam-Webster defines “holistic” as “relating to or concerned with wholes or with complete systems rather than with the analysis of, treatment of, or dissection into parts”. As a result, the B3 Code cannot be dissected and must be considered in its entirety, where it fails the test to be “municipal zoning regulations” and does not qualify as exempt under LGC 245.004.

In summary, even if the B3 Code (as defined herein to include relating manuals) qualifies as a municipal zoning regulation, it is not exempt from LGC 245 because it fails the second test under LGC 245.004, and therefore, the B3 Code does not apply to the Project.

**Appeal #4: To the extent the Project is subject to any elements of the Bastrop Building Block (B3) Code, the B3 Technical Manual, and the Development Manual, what are they?**

As stated in #2 & #3 above, 71 RP asserts that the entirety of the Bastrop Building Block (B3) Code, the B3 Technical Manual, and the Development Manual are not applicable to the Project. To the extent the ZBA concurs with the City Manager’s determination that the B3 Code is a “municipal zoning regulation”, subject to the LGC 245.004 Vested Rights in LGC 245.004(2), 71 RP asserts that the Project is specifically exempt from the following elements (listed by Chapter) and asks the City to confirm the same:

- Executive Summary- This section is not regulatory in nature and should not be applicable to the Project.
- Chap. 1- Chapter 1: *Subdivisions* is not applicable to the Project. Pursuant to LGC 245, the Project is grandfathered to the subdivision ordinance in effect at the time of the original application and therefore any future subdivision or platting application for the Project

would not be subject to the requirements of Chapter 1. The City response on subdivision regulation is confusing and should be clarified to state that B3 Code Chap. 1 does not apply.

- **Chap. 2-** Chapter 2: *Zoning Procedures* deals with procedural aspects only. It is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety).
- **Chap. 3-** Chapter 3: *Place Type Zoning Districts* cannot be fairly read as “municipal zoning regulations”. There is no focus on use, whether with a hierarchy of uses or separate of uses. But for a gratuitous scattering of the word “zoning” in Chap. 3, it reads like a subdivision or platting regulation, focused on street and block patterns and size. The geographic division is not based on use, but on street block based subdivision/platting standards. The requirement to prepare a Neighborhood Regulating Plan (a “NRP”) is a critical component of the B3 Code and its focus is purely streets and blocks. Each NRP will be unique to each site, thus will not be uniform for each class or type of building in a district, as required by LGC 211.005. The districts and related regulations do not consider each district’s peculiar suitability for particular uses, as required by LGC 211.005, and don’t consider or regulate uses at all. Chapter 2 of the B3 Technical Manual, which describes the NRP process, is titled “Site Planning and Private Realm.” A fair reading of that Chapter shows that it is not part of “municipal zoning regulations”, but rather subdivision and platting regulations. Article 2.3 of the B3 Technical Manual states “Neighborhood Regulating Plans are used as the process to create new complete neighborhoods. Each neighborhood will be made of a series of blocks created for a variety of Street Types, Building Types, and Place Types.” The NRP’s process to create “new complete neighborhoods” requires dedication of land for streets of designated sizes to creates certain block sizes to build specifically designated building types. The NRP is platting and subdivision regulation, not zoning, which is why the NRP is the first step for any owner of greater than 3.4 acres under the B3 Code seeking to subdivide its land. The NRP is a part of the platting process, not the zoning process. The NRP process is subject to vested rights and is not applicable to the Project (and no portion of Chapter 3 of the B3 Code or Chapter 2 of B3 Technical Manual is applicable). As such, the NRP process directly affects the LGC 245.004 Vested Rights, is not exempt under LGC 245.004, and the City should clearly so state.
- **Chap. 4-** Chapter 4: *Character Districts* of the B3 Code can’t be fairly read as “municipal zoning regulations”. There is no focus on use, whether with a hierarchy of uses or separate of uses. The districts and related regulations do not consider each district’s peculiar suitability for particular uses, as required by LGC 211.005, and don’t consider or regulate uses at all. Chapter Four of the B3 Code states that “Character Districts are the

largest regulating geographic boundary in the Code” and “...each character district allows for different Development Patterns.” If this Chapter is “municipal zoning regulations”, it is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety).

- **Chap. 5-** Chapter 5: *Development Patterns* of the B3 Code states “The Development Pattern type will be used to guide the creation of...the Neighborhood Regulating Plan.” Chapter 5 cannot be fairly read as “municipal zoning regulations”. There is no focus on use, whether with a hierarchy of uses or separate of uses. As stated above, the Project is exempt from submitting a NRP and therefore is exempt from Chapter 5 of the B3 Code. In addition, Chapter 5 states the Project is located in the “Meadows” Character District, which solely permits either a Development Pattern of Traditional Neighborhood Development or Village Center Development. Each of these Development Patterns imposes development requirements on the Project that affect LGC 245.004 Vested Rights. If this Chapter is “municipal zoning regulations”, it is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety). If the Project is vested from the NRP process, then it should also be exempt from all of Chapter 5, and the City should clearly so state.
- **Chap. 6-** Chapter 6: *Private Realm* is not applicable to the Project. Chapter 6 states the permitting requirements under the B3 Code for building and site plan approvals, which are pre-requisites under the B3 Code for issuance of a building or construction permit. Chapter 6 clearly affects the LGC 245.004 Vested Rights, including without limitation, lot coverage and building size (as dictated by the Façade Buildout at Build-to-Line minimum percentage requirement), which is shown most clearly in the chart under Sec. 6.5.003 on Page 109. While lot coverage is explicitly regulated by Chapter 6, the use of the minimum “Build-to-Line” percentage requirement affects building size, which is included in the LGC 245.004 Vested Rights by requiring that a building be a minimum length based on the lot dimensions. By imposing a strict requirement on building dimensions, certain building sizes are impossible or impractical to build. Chapter 6 also affects landscaping and tree preservation (Section 6.3.004), which is a LGC 245.004 Vested Right. The Project should be grandfathered from all aspects of Chap. 6, but at least Façade Buildout, Build to Line, Building Placement, building dimensions, landscaping and tree preservation provisions.
- **Chap. 7-** Chapter 7: *Public Realm* is not applicable to the Project. Chapter 7 states the requirements for public dedication of streets and other ROW’s of certain size and design, which impact LGC 245.004 Vested Rights, including without limitation landscaping and tree preservation, open space and park dedication, property classification, lot size, lot dimensions, lot coverage, and building size. Each aspect of Chapter 7 affects the LGC 245.004 Vested Rights and are therefore not exempt under LGC 254.004(2). Instead,



Chapter 7 is a subdivision or platting regulation. In addition, Section 7.4.001 *Intent* states “The Bastrop Building Block is the foundation of Bastrop and of the Code.”. If the foundation of the Code is not exempt under LGC 254.004, then the Code itself cannot be exempt. Furthermore, Article 7.5 requires a specific percentage of any Project to be dedicated to Civic Space, which clearly affects LGC 245.004 Vested Rights and is not exempt under LGC 254.004.

- **Chap. 8-** Chapter 8: Signage is not applicable to the Project. Chapter 8 states the requirements for securing sign permits, which is not a municipal zoning regulation and therefore is not exempt under LGC 254.004. In addition, the Project benefits from an agreement between the City of Bastrop and Hal and Lisa Berdoll dated July 17, 1993, in which the City of Bastrop agrees to issue all permits, variances, and approvals as may be required to construct, own, and operate a sign with a height not to exceed twenty (20) feet higher than any sign, flag pole, or similar structure which may exist within 2500 feet (all as more particularly in described in such agreement). 71 RP reserves any and all rights under such agreement.
- **Chap. 9-** Chapter 9: *Historic Landmark Preservation & The Iredell District* are not applicable to the Project due to the nature of such chapter.
- **Chap. 10-** Chapter 10: *Definitions* is not applicable to the Project to the extent such definitions define terms that affect vested rights under LGC 245, including without limitation the LGC 245.004 Vested Rights or are otherwise used in the sections of the B3 Code that are not applicable to the Project.
- The B3 Technical Manual and the Development Manual (collectively the “Manuals”) simply implement the B3 Code, and to the extent the B3 Code (or any portion thereof) is not applicable, then the Manuals are also not applicable. The Manuals do not stand on their own.

The B3 Code does not comply with the mandatory requirements of LGC 211.005(b) for its regulations to be uniform for each class or type of building in a district, to be adopted with reasonable consideration for each district’s peculiar suitability for particular uses, thus the B3 Code cannot be considered zoning regulations, as Texas municipal zoning regulations may only be adopted in compliance with LGC 211.

In summary, 71 RP asserts the listed provisions of the B3 Code (as defined herein to include all related manuals) are not applicable to the Project. The ZBA should specifically state which provides of B3, if any, the ZBA believes are applicable to the Project.

**Appeal # 5: The Project is vested from changes in the City Stormwater Drainage Ordinance after May 22, 2017.**

The CM Determination that the Stormwater Drainage Code is not exempted by LGC 245 is incorrect.

LGC 245.004 provides that LGC 245 does not apply to “(9) regulations to prevent imminent destruction of property or injury to persons from flooding *that are effective only within a flood plain established by a federal flood control program* and enacted to prevent the flooding of buildings intended for public occupancy...” (*emphasis added*). This is the only exemption relating to stormwater drainage in LGC 245. Lot 7 is not within a flood plain established by a federal flood control program. The City’s Stormwater Drainage Ordinance is not applicable to the Project. This section is interpreted in the manner requested in the *Koppolow* case cited in the Addendum.

**Appeal # 6 – The Project is not limited to Commercial use.**

The CM Determination states: “...the property classification as of May 22, 2017 was commercial, and the property remains classified as commercial with the Place Type 5 district....”

71 RP seeks clarification from the City that the permitted uses for the Project are not limited to “commercial” (whether interpreted as those permitted uses as of May 22, 2017, or otherwise), but is entitled to any use, as permitted by current regulations. LGC 245 permits 71 RP to utilize changes in the City’s regulations to develop the Project for any use, not just commercial. The City seems to say that if 71 RP develops a non-commercial use, then it must accept all the regulations within B3, which is not true. 71 RP may cherry pick any later City regulation for aspects to apply. In this instance, the issue is use regulation by the City. Previously, the City imposed a traditional zoning scheme on use established by geographic district. 71 RP has the right per LGC 245 to have any use permitted as of the May 22, 2017 vesting date, but also to have any use permitted today. Today, any use is permitted at the location of the Project.

**71 RP requests clarification on the City’s position on this point.**

**Summary.**

In summary, 71 RP requests a clear determination that either i) the GDSA Process does not apply to LGC 245.004 exemptions, or ii) if it does, please provide a determination of what regulations are applicable to the Project, as requested below.

### **Note on City Comments about Lack of Information.**

During the previous ZBA hearing for Lot 7 of the Project, the City staff stated that the reason the City could not determine which sections of the B3 Code apply is that 71 RP failed to provide the required information for the City to make this determination. While 71 RP disagrees that the City requires more information to determine whether the B3 Code is subject to exemption under LGC 245.004, 71 RP sent the City Manager a letter on July 13<sup>th</sup>, 2021 (attached hereto as Exhibit "A") offering to provide more information to the City and asking what further information was required. To date, 71 RP has received no response from the City.

Further, section 1.20 of the Ordinance lists in detail the specific information any applicant is required to submit in order to receive a determination, all of which was submitted by 71 RP. The Ordinance also provides the City the ability to request further information from the applicant or request a pre-determination conference to ensure that the nature of the claim is fully and completely understood prior to a determination being rendered. 71 RP has participated at great time and expense in this administrative process required by City Ordinance 1.20 and at no point during the process did the City request more information, request a meeting with 71 RP, or inform 71 RP that the City did not have enough information to make the determination required by the Ordinance. As such, 71 RP contends that the City's statements in the prior ZBA hearing that they did not have enough information to make a proper determination as required by the Ordinance demonstrate the City's lack of interest to genuinely work with 71 RP to determine the extent of its Vested Rights and how to move forward with the Project.

### **REQUEST FOR VARIANCE**

The Ordinance permits the ZBA to grant a variance from the regulations at issue under the same standards governing variances for other matters.

If the appeal is denied, in the alternative, 71 RP requests a variance for Lots 8 & 9 to be exempt from the B3 Code, particularly the requirements for a NRP, the requirements to develop in accordance with the TND or VCD Development Patterns in Chapter 5, compliance with the Building Placement requirements in Chapter 6, any building size regulation (or regulations that affect building size, including without limitation the Build-To-Line and building to land ratio), any minimum or maximum building setback (or "Build-to" requirement), and any other B3 Code requirement which affects the LGC 245.004 Vested Rights. All of the information, documentation and discussion in the City file and in this letter are incorporated as part of the record for this variance.

This variance is based upon hardship, and is not adverse to the public interest (or the interest of any neighboring property), promotes economic development, will promote the availability of market driven providers of goods and services to Bastrop, is due to the unique circumstances of

Lots 8 & 9, is consistent with intent of City Code to encourage reasonable development, and meets the requirements for a variance under state law and city ordinance.

Lot 8 is a small, single lot located in a suburban area of Bastrop impacted by the existence of State Highway 71, a major, heavily trafficked highway bisecting Bastrop. Lot 8's only frontage with a public right-of-way is along State Highway 71 and as far back as 2013 has been shown on plats, plans and schemes to be a "commercial reserve" or "pad site". These reserves/sites are locations for single owners or tenants with retail/office/restaurant/etc. uses who wish to be located on high traffic roadways in front of other developments, sometimes commercial and sometimes residential. Users are typically single story and require ample parking, and often a drive-through window (1 or more). An example is the Medtail project on Lot 6 directly to the east of Lot 7. In almost all instances, the user requires that vehicles can circle the building, and that there are parking spaces immediately at the entrance of the building, for customer convenience.

There are 8 lots planned in a row, including Lot 8. These lots are shown on the 2017 Application. Five lots are owned by Seton Hospital, one by Medtail and Lots 7 & 8 by 71 RP. On the other side of Lot 8 is a fully developed suburban style retail shopping center. Lot 6 and the shopping center have all been developed prior to the B3 Code.

The Hwy 71 and FM 304 frontage around Lots 8 & 9 for a mile each direction are clearly suburban retail/restaurant/commercial developed in a manner which is fundamentally inconsistent with the B3 Code. The following factors are hardships for Lots 8 & 9:

- The size and lot dimensions of Lot 8 & 9 vary significantly from the 330 x 330 preferred Block size for a TND making development under the B3 Code impractical. Lot size is a LGC 245.004 Vested Right and therefore the City cannot require further subdivision of either Lot.
- There is no public right-of-way with frontage on Lot 8 that is conducive to a pedestrian oriented development. State Highway 71 is the only public ROW with frontage on Lot 8. It is doubtful that pedestrians would walk down the frontage road of State Highway 71 to access Lot 8. Lot 9 has frontage along FM 304 (which has the same difficulties as SH 71) and Agnes Road; however given the length of Lot 9's boundary on Agnes Road, it would impractical to construct a building of the size required to meet the build-to line requirements of the B3 Code. The B3 build-to line requirement effectively dictates the building size that could be built on Lot 9 and because building size is a LGC 245.004 Vested Right, the City cannot require compliance with the build-to-line requirement.
- There are no sidewalks as part of the existing development immediately to the east and west along State Highway 71 or north or south along FM 304, which could lead to a potentially dangerous situation if Lots 8 & 9 were forced to develop along the highway frontage.

Requiring Lot 8 & 9 to comply with the B3 Code will prevent the appropriate use of Lot 8 & 9 and create a hardship because the following are unreasonable and unnecessary in the context of Lots 8 & 9 as outlined above and will preclude any market based user:

- compliance with the Building Placement requirements of the B3 Code, including without limitation the “Build Along” requirement requiring a building along a minimum amount of the building to be constructed along the frontage line;
- any regulations requiring building frontage along public rights-of-way;
- any regulations that affect building size (including without limitation the Build-To-Line or building to land ratio);
- any minimum or maximum building setback (or “Build-to” requirement).

Further, a NRP for Lots 8 & 9 will serve no reasonable purpose if the above regulations are not applicable.

Lots 8 & 9 have grandfathered rights under LGC 245, acknowledged by the City to vest Lots 8 & 9 in the City Subdivision Ordinance in effect in 2017, prior to the B3 Code. Such vesting also prevents the application of any portion of the B3 Code to the LGC 245.004 Vested Rights, which is acknowledged by the City, but the City does not agree to the scope of those vested rights. By the nature of the B3 Code, 71 RP reasonably believes that, at a minimum, the B3 Code is subject to all vested rights under LGC 245, including without limitation the LGC 245.004 Vested Rights. If not resolved by the Appeal, those rights will be resolved as provided by law. The confusion regarding the applicability of the B3 Code is a hardship.

71 RP requests a variance in accordance with the foregoing.

In the event the ZBA feels a variance from the B3 Code is too broad for their consideration, then 71 RP requests that the ZBA remand this appeal back to the City Manager to clarify their position on which sections of the previously adopted city codes would need to be utilized by the Project in order to develop proposed site plans for Lots 8 & 9, which 71 RP will present at the ZBA hearing, so that 71 RP may request a more specific variance for the ZBA’s consideration at a future hearing in the hopes of resolving this bona fide dispute between the parties.

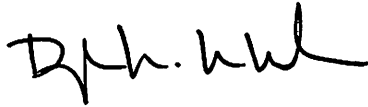
## **LEGAL CITATIONS**

The Ordinance requests legal grounds and seems to want a legal brief on this matter, when 71 RP is simply trying to comply with the City’s requirement to help the City determine its own conclusion on vested rights, and the City has no authority to adjudicate vested rights binding on 71 RP. Nonetheless, we attach Exhibit “B” with reference to LGC 245 and relevant case law. Our primary reliance is on the text of LGC 245, as cited herein and available online to the City.

## **CONCLUSION**

I look forward to presenting this appeal at the upcoming hearing. I would like to request the ZBA hearing for this appeal take place on 8/23, 8/25, 8/26 or 8/27 so that I can personally appear. I will need to make travel plans to attend so any advance notice would be much appreciated. If it is not possible to meet on any of those dates, 71 RP would be willing to extend the timeline prescribed for the hearing by the Ordinance to facilitate my attendance.

Sincerely,

A handwritten signature in black ink, appearing to read "D.M. MacMahon". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

Douglas M. MacMahon  
Manager of the General Partner of 71 Retails Partners, L.P.

**Exhibit "A"**  
**Letter to Paul Hofmann**

71 RETAIL PARTNERS, L.P.  
8214 Westchester Drive, Ste 550  
Dallas, TX 75225

July 13<sup>th</sup>, 2021

Paul Hofmann  
City Manager  
City of Bastrop, Texas  
1311 Chestnut Street  
Bastrop, TX 78602

Dear Paul,

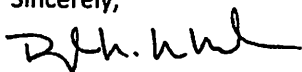
I am the manager of the General Partner of 71 Retail Partners, L.P. ("71 RP"). I understand from testimony given by your staff at the most recent Zoning Board of Adjustment hearing for Lot 7 of Bastrop Grove that the City contends it did not have the information the City requires to make a full determination of 71 RP's vested rights during the Grandfathering Development Status Application process and due to this lack of information the City was unable to determine the applicability of the B3 Code to the Bastrop Grove project.

I note that the Bastrop City Code Ordinance 1.20 lists in detail the information any applicant is required to submit in order to receive a determination, all of which was submitted by 71 RP. The Ordinance also provides the City the ability to request further information from the applicant or request a pre-determination conference to ensure that the nature of the claim is fully and completely understood prior to a determination being rendered.

We find it extremely disappointing that we participated at great time and expense in the administrative process for Lot 7 required by City Ordinance 1.20 and at no point during the process did the City request more information, request a meeting with 71 RP, or inform 71 RP that the City did not have enough information to make the determination required by the Ordinance.

As you know, 71 RP is also processing Lots 8 and 9 of Bastrop Grove through the Grandfather Development Status Application process and we are preparing on our appeal to the ZBA for those properties. While 71 RP disagrees that you require additional information to determine whether the B3 Code is subject to exemption under Texas LGC 245.004, 71 RP would be happy to provide additional information for Lots 8 and 9 if such information is available to 71 RP. **71 RP respectfully requests that the City provide as soon as possible to 71 RP a full list of whatever information the City asserts is required to make a determination as to the applicability of the B3 Code to the Bastrop Grove Project for Lots 8 & 9.**

Sincerely,



Douglas M. MacMahon



## Exhibit "B"

### Relevant Caselaw Supporting this Application

*River City Partners, Ltd v. City of Austin*, NO. 03-19-00253-CV, 2020 WL 3164404 (Tex. App.—Austin, 2020, no pet. h.)- Interpretes the LGC 245.004 Vested Rights and that the term "affecting" means broadly interpreted "to produce an effect on" and is applied to the subject ordinance "as applied" to the project, in this case focused on "building size."

*Hatchett v. West Travis County Public Utility Agency*, 598 S.W.3d 744, (Tex. App—Austin, 2020, pet denied)- Summary of the current state of vested rights under LGC 245.

*FLCT, Ltd. v. City of Frisco*, 49 S.W.3d 238 (Tex. App.—Fort Worth 2016, pet. den.)- The exceptions to the "municipal zoning regulations" except to vested rights under LGC 245.004 as determined on an "as applied" basis to any regulations which "have an effect" on the listed exception issues. The exception for "property classification" means the permissible uses under the regulator scheme when vesting occurs. A project is entitled to all uses permitted when vesting occurs. "Fair notice" of a project incorporates all the city actual knows about the project, not just what the applicate documents. The definition of a "project" is broad.

*City of San Antonio v. Kopplow Development, Inc.*, 441 S.W.3d 436 (Tex. App.—San Antonio 2014, pet. den.)- LGC 245.004(9) does not vest local flood plain regulation, and the local regulation was subject to vested rights under LGC 245..

*City of San Antonio v. Greater San Antonio Builders Ass'n*, 419 S.W.3d 597 (Tex. App.—San Antonio 2013, pet. den.)- A city may not add local limits to vested rights, only LGC 245 determines vested rights.

*Harper Park Two, LP v. City of Austin*, 359 S.W.3d 247 (Tex. App.—Austin 2011, pet. den.)- The entirety of a development project is considered in a "project", not components or phases. The definition of "permit" is very broad. The vesting is considered in the context of the regulatory scheme at the time to determine the scope of the project. The objective intent shown in the permit application is the focus for vested rights, not the subjective intent of the developer at the time of the vesting event.

*Hartsell v. Town of Talty*, 130 S.W.3d 325, 326 (Tex. App.—Dallas 2004, pet. denied)- Vested rights extend to the entire development project, land and buildings. The city tried to separate land development from building development, but that distinction was not permitted.

*City of Austin v. Garza*, 124 S.W.3d 867, 868 (Tex. App.—Austin 2003, no pet.)- LGC 254.002(d) is valid and permits the developer to "cherry pick" between vested regulations and later adopted regulations.

*Powell v. City of Houston*, 580 S.W.3d 391 (Tex. App.—Houston [1<sup>st</sup> Dist.] 2019 pet. granted)- Interprets what it takes to be a zoning ordinance in Texas and holds that the Houston Historic Preservation Ordinance is not zoning. It cites to several cases which state that use is part of zoning, including *N.W. Enterprises, Inc. v. City of Houston*, 27 F. Supp. 2d 754, 797 (S. D. Tex. 1998), aff'd in part, rev'd in part, dism'd in part, 352 F3d 162, (5<sup>th</sup> Cir. 2003) (stating “the ‘ordinary, contemporary, common meaning’ of zoning refers to a comprehensive plan and *encompasses regulations that establish affirmatively what land uses are permissible* for certain geographic districts...”), and *City of Houston v. Johnny Frank’s Auto Parts Co.*, 480 S.W.2d 774, 775 (Tex. App. – Houston [14<sup>th</sup> Dist.] 1972, writ. Ref’d n.r.e.) (stating “The ordinance with which this case is concerned is not a zoning ordinance. It does not establish a comprehensive plan by which *the city is divided into districts wherein property is limited to specified uses...*”) *emphasis added*.



# Carlson, Brigance & Doering, Inc.

Civil Engineering ❖ Surveying

Date: April 19<sup>th</sup>, 2021

Trey Job, Assistant City Manager  
City of Bastrop, TX  
Planning and Development Department  
1311 Chestnut Street  
Bastrop, TX 78602

RE: Grandfather Development Status - Lots 8 and 9 of Bastrop Grove  
Project Description Letter

Bastrop Grove is a multi-lot commercial land development at the SE corner of Hwy 71 and FM 304 in the City of Bastrop. It includes several out-parcels (avg. 1.5 ac. rectilinear lots) with frontage on Highway 71 and access limited to an internal private drive. There are larger parcel(s) behind the out-parcels with direct access to Agnes Street and FM 304 (the western portion). Proposed lot 8 consist of 1.15-acre of land located just south of State Highway 71 and west of the earlier submitted Grandfathering Determination for Lot 7 while Lot 9 is an 18.31-acre tract located behind Lots 7 and 8 and east of (with frontage on) SH304 and north of (with frontage on) Agnes Street. As discussed in numerous meetings with staff regarding this project, it is my belief that the project has vested rights, based on the earlier applications and entitlements and the continued nature of this commercial land development project, and therefore we are submitting this letter and the accompanying documentation for a Grandfathering Determination.

The “Project” is described in the following Project related applications for permits required for the Project, and has been the same Project since inception in 2013:

- Application dated 07-24-2013 for Preliminary Plat for The Grove
- Application dated 08-05-2013 for Final Plat for the Bastrop Grove Phase 1
- Application dated 05-23-2014 for Final Plat for The Grove Phase 1 Lot 5
- Application dated 05-22-2017 for Preliminary Plat for The Bastrop Grove
- Application dated 03-17-2018 for Final Plat for Bastrop Grove Section 1
- Application dated 10-01-2018 for Bastrop Grove Drainage Improvements
- Application dated 11-22-2019 for Drainage Plan for the Bastrop Grove Medtail
- Application dated 02-27-2020 for Site Plan Approval for the Bastrop Grove Medtail
- Application dated 01-03-2020 for Final Plat for Bastrop Grove, Section 2, Lot 6
- Application dated 03-30-2021 for Grandfathering Status for Bastrop Grove, Section 3, Lot 7

It is my understanding that the Project is not subjected to any City of Bastrop regulations except those described in Tx. Loc. Gov’t Code Section 245.004, being those in effect 07-24-2013 and any which are exempt from vesting.

Furthermore, I understand that the zoning provisions of the City's Bastrop Building Block Code (B3) relating to the following are not applicable to the project (as being within the exemptions for the general exception from vested rights as to municipal zoning ordinances), which are all zoning provisions which affect (have an effect on):

- Landscaping or tree preservation
- Open space or park dedication
- Property classification (permitted uses)
- Lot size, dimensions or coverage
- Building size.

Our view is that the B3 isn't zoning so no portion of B3 is exempt from vesting, but to the extent the City says that portions are zoning, then the foregoing are vested.

It is my belief that all provisions in the Bastrop Building Block Technical Manual and the City of Bastrop Development Manual are subject to vesting, and not applicable to the Project. Only the City regulation in effect as of initial September 24<sup>th</sup>, 2013 plat application apply to the Project, including the City Subdivision Ordinance

Based on the above vesting, the following provisions of the City Zoning Ordinance as of April 13<sup>th</sup>, 1991 (1991 Zoning Ord.) apply to the Project, as vested rights:

The permitted uses under Section 28 - C-1 - Commercial-1 District (Light) are listed in the following exhibits.

Exhibit A - Use Regulations Chart, City of Bastrop, 1991,

The permitted lot size, dimensions or coverage for the Project under Section 28.4 - Area Regulations.

Size of Lot:

- Minimum Lot Area - Twelve thousand (12,000) square feet.
- Minimum Lot Width - One hundred feet (100').
- Minimum Lot Depth - One hundred ten feet (110').
- Maximum Lot Coverage: Fifty percent (50%).

The permitted building size under Section 28 (including the related regulations which affect Building Size, such as:

- Setback- Section 28.4
- Height- Section 28.3
- Required Parking- Section 38

Other Regulations: As established in the Development Standards, Sections 37 through 45

Required landscaping or tree preservation in Section 39.5, 39.6 & 39.7

The Project is also vested from changes in flood regulations effective outside the FEMA flood plain.

The Project is not dormant, as progress has been made towards completion of the original contemplated project as follows:

- Plat of Seton Hospital land-Project Name: Bastrop Grove Section 1 Final Plat  
(Approval Date: 03-17-2018)

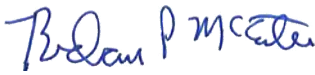
- Construction of the offsite Drainage Channel to the Colorado River- Project Name: Bastrop Grove Drainage Improvements (*Approval Date: 10-01-2018*)
- Medtail Final Plat- Project Name: Bastrop Grove, Section 2, Lot 6 Final Plat (*Approval Date: 01-03-2020*)
- Cost have been incurred for development the project with CBD Engineering, and other professional and legal firms

This application is not intended to waive any vested rights, under Tex. Loc. Gov't Code Ch. 245 or otherwise. My client protests any idea that the City can legally determine or limit the vested rights for the Project, and submits this application only to aid the City is coming to its own internal decision as to the appropriate vested rights for the Project. All rights are reserved.

Should you have any questions or require any additional information, please feel free to call/email.

Sincerely,

Carlson, Brigance & Doering, Inc.  
F-3791



---

Brendan P. McEntee, P.E.  
Branch Manager



# Grandfathered Development Status Application

## Project Information

Legal Description: ABS A98 BLAKEY, NANCY, ACRES 20.520

Project Address(es): Not Addressed

Total Acreage: 19.46 BCAD Property ID: 126678

Was the Project in progress on or after September 1, 1997? After

## Property Owner

Name/Entity/Trustee: 71 RETAIL PARTNERS LP

Mailing Address: 8214 WESTCHESTER DR STE 550, DALLAS, TX 75225

Phone & Fax Numbers: 214-622-6525 E-mail Address dm@morancap.com

## Applicant

Name/Entity/Trustee: Brendan P. McEntee, P.E. - Carlson, Brigance & Doering, Inc.

Mailing Address: 12129 Ranch Road 620 North, Suite 600\* Austin, Texas 78750

Phone & Fax Numbers: (512) 280-5160 E-mail Address bmcentee@cbdeng.com

## Permit Identification

First Permit		
Name: The Grove Preliminary Plat	Application Date: 07-24-2013	
Approval Date:	Expiration Date:	Volume and Page No.:
Additional Permit		
Name: <b>Please see the attached supplement document</b>	Application Date:	
Approval Date:	Expiration Date:	Volume and Page No.:
Additional Permit		
Name:	Approval Date:	
Expiration Date:	Volume No.:	Page No.:
Additional Permit		
Name:	Approval Date:	
Expiration Date:	Volume No.:	Page No.:



# Grandfathered Development Status Application

## Additional Permit

Name:	Approval Date:
Expiration Date:	Volume No.:
	Page No.:

## Additional Permit

Name:	Approval Date:
Expiration Date:	Volume No.:
	Page No.:

APPLICANT:		OFFICIAL USE ONLY		
Included in Submittal	Per Ordinance 2019-10, Additional Submittal Items are:		Meets Standard	Does Not Meet Standard
✓	1	Identification of the "Project," as that term is defined in LGC 245.001(3), as may be amended. Example: Residential Subdivision		
✓	2	Narrative description of the development/construction Project or proposed land use for which the Permit is being sought. Describe which Permits have been completed and which are remaining.		
✓	3	Layout of the site, including locations of buildings, streets, utilities, fences, drives, sidewalks, drainage facilities, and any other permanent or temporary structures which may be present at the time of application		
✓	4	Identification of each City regulation in effect at the time of the original application for the Permit filed that applies to the Project and that the Applicant contends: <ul style="list-style-type: none"> <li>A. Is grandfathered</li> <li>B. Controls the approval, disapproval, or conditional approval of an application for a Permit, pursuant to LGC 245.002(a), as may be amended</li> </ul>		
✓	5	Identification of each current City regulation for which the Applicant seeks an exemption due to the grandfathered development status provided the property owner by LGC 245 or other applicable vesting laws		
✓	6	Explanation of the applicability of any approval expirations and related requests for extension of approvals		
✓	7	Photographs, drawings, maps, and previous approvals that would assist the Grandfathering Review Committee in making its determination		
✓	8	Certified land survey of topography showing existing drainage patterns and structures		
✓	9	Any other information or supportive materials deemed necessary and requested in writing by the Director of Planning and Development		

## Signature and Certification

The applicant certifies that the facts stated herein and exhibits attached hereto are true, correct, and complete.

*Brian P. McCreary*

Project Engineer and Agent

04-17-2021

Signature and Title

Date



# Grandfathered Development Status Application

## Process Overview

1. Complete Application, which includes: Application, Permit Identification, and Additional Submittal Items
  - a. Incomplete submittals will not be accepted.
2. Director of Planning & Development will promptly forward to the Grandfathering Review Committee.
3. Determination made by Grandfathering Review Committee.
  - a. Within 15 days of Application filing, the Committee will issue a written administrative determination approving the application, disapproving the application, or requesting more information.
  - b. Determination shall identify the date the original Permit was filed, which claims have been recognized, and which claims have been rejected.
4. Reconsideration: must be requested in writing within 15 days of the Determination
5. Appeal to City Manager: must be requested in writing within 15 days of the date that the Committee declined to reconsider the Application.
6. Appeal to Zoning Board of Adjustment: must be requested in writing within 15 days of the City Manager's Determination.

## Determination Standards

1. Date of first application
2. Fair notice
3. Consistency
4. Subsequent development
5. Prior vested rights determinations
6. Regulations
7. Expiration of prior applications
8. Exemptions in LGC 245.004
9. Expiration of Project
10. City Code
11. State Law

## Staff Use Only

Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Fees Paid \$ \_\_\_\_\_

Comments: \_\_\_\_\_





Carlson, Brigance & Doering, Inc.

Civil Engineering ❖ Surveying

**Bastrop Grove Lots 8 and 9**  
**Grandfathered Development Status Application**  
***Supplement Document-Permit Identification***

**First Permit**

Name: The Grove Preliminary Plat

Application Date: 07-24-2013

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove Phase 1 Final Plat

Application Date: 08-05-2013

Volume No:

Page No:

**Additional Permit**

Name: The Grove Phase 1 Lot 5 Final Plat

Application Date: 05-23-2014

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove Preliminary Plat

Application Date: 05-22-2017

Approval Date: 08-08-2017

Volume No:

Resolution No: R-2017-62

**Additional Permit**

Name: Bastrop Grove Section 1 Final Plat

Approval Date: 03-27-2018

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove Drainage Improvements

Approval Date: 10-01-2018

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove Medtail - Final Drainage Plan

Approval Date: 11-22-2019

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove Medtail - Site Development plans

Approval Date: 02-27-2020

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove, Section 2, Lot 6 Final Plat

Approval Date: 01-03-2020

Volume No:

Page No:

**Additional Permit**

Name: Bastrop Grove, Section 3, Lot 7 Grandfathering Status

Approval Date: 03-30-2021

Volume No:

Page No:



**Bastrop Grove Lots 8 and 9**  
**Grandfathered Development Status Application**  
***Checklist Supplement***

1. Identification of the “Project,” as that term is defined in LGC 245.001(3), as may be amended.  
Example: Residential Subdivision

[Please see the attached project narrative](#)

2. Narrative description of the development/construction Project or proposed land use for which the Permit is being sought. Describe which Permits have been completed and which are remaining.

[Please see the attached project narrative](#)

3. Layout of the site, including locations of buildings, streets, utilities, fences, drives, sidewalks, drainage facilities, and any other permanent or temporary structures which may be present at the time of application

[Please see the Bastrop Grove Preliminary Plat. No structures or improvements exist on the lots.](#)

4. Identification of each City regulation in effect at the time of the original application for the Permit filed that applies to the Project and that the Applicant contends:
  - a. Is grandfathered
  - b. Controls the approval, disapproval, or conditional approval of an application for a Permit, pursuant to LGC 245.002(a), as may be amended

[Provided in the attached project narrative](#)

5. Identification of each current City regulation for which the Applicant seeks an exemption due to the grandfathered development status provided the property owner by LGC 245 or other applicable vesting laws

[Provided in the attached project narrative](#)

6. Explanation of the applicability of any approval expirations and related requests for extension of approvals

[Explained in the attached project narrative](#)

7. Photographs, drawings, maps, and previous approvals that would assist the Grandfathering Review Committee in making its determination

[Previously approved/submitted plans that are listed in the ‘Permit Identification’ section have been attached.](#)

8. Certified land survey of topography showing existing drainage patterns and structures

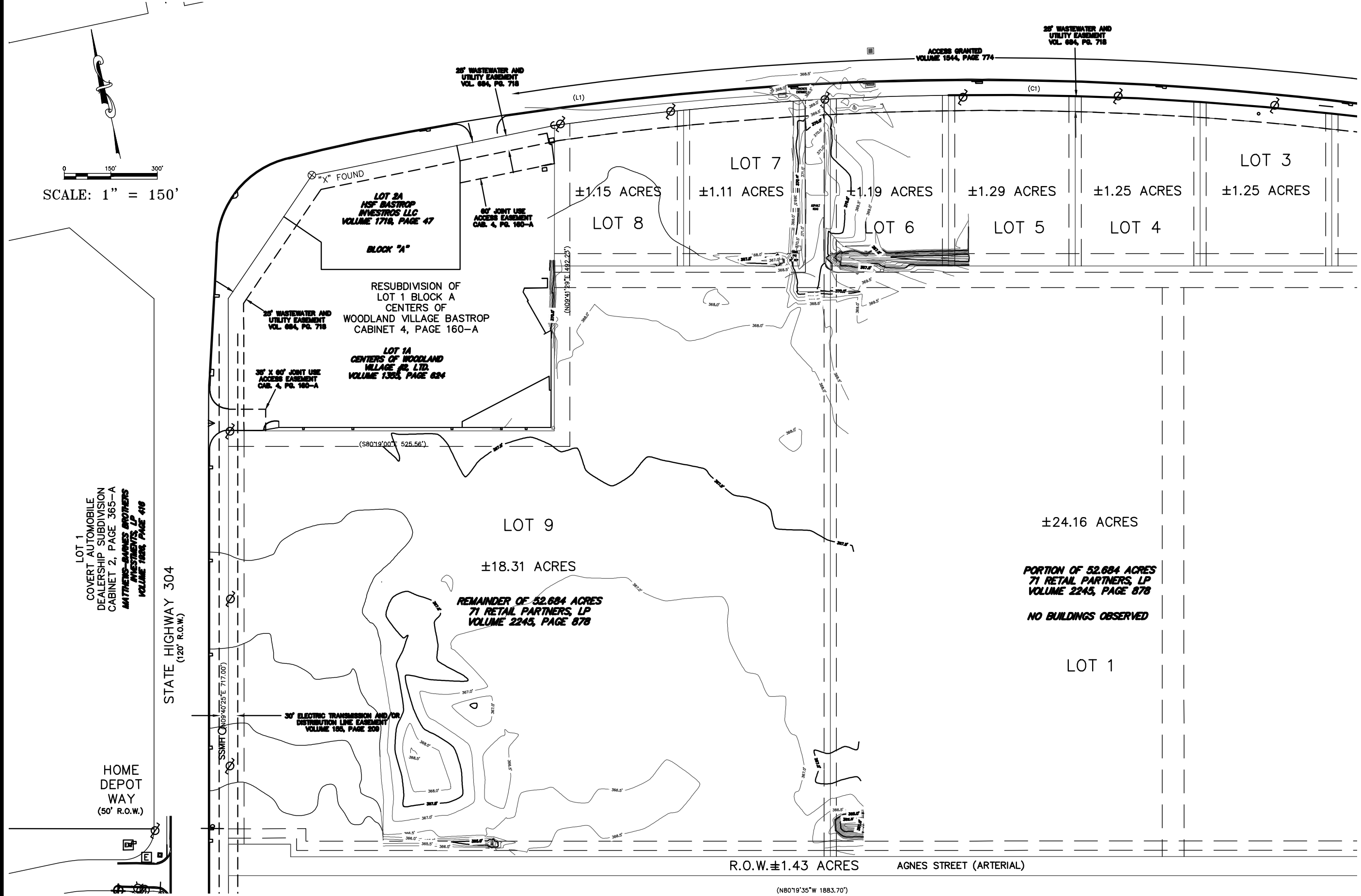
Please see the attached existing conditions plan


9. Any other information or supportive materials deemed necessary and requested in writing by the Director of Planning and Develop

N/A.

FILE PATH: \\AC03\DIS\54\dwg\5349-LOT 8 & 9-DRAINAGE-combined topo.dwg - Apr 19, 2021 - 2:21pm

SCALE: 1" = 150'



DESIGNED BY: NAME:	DRAFTED BY: NAME:
DATE:	
REVISION:	
 <b>Carlson, Brigrance &amp; Doering, Inc.</b> Civil Engineering & Surveying FIRM ID #13791 Main Office: 5501 West William Cannon Dr., Austin, Texas 78750 North Office: 12129 RR 620 N., Ste. 600, Austin, Texas 78750 Phone No. (512) 280-5160 www.cbdring.com	
SHEET NAME:	EXISTING CONDITIONS
JOB NAME:	BASTROP GROVE
PROJECT:	LOTS 8 AND 9
DATE:	04\2021
JOB NUMBER:	5349
SHEET:	OF XX

CASE-NUMBER

**CITY OF BASTROP  
PLANNING DEPARTMENT**

P. O. Box 427 • Bastrop, Texas 78602  
(512) 321-0457

**CASH  
RECEIPT**

DATE

8/5/13

3261

RECEIVED FROM

ADDRESS

American National Bank of Texas  
South West of way me of Hwy 71

DOLLARS \$ 320.00

FOR:

Final Plat

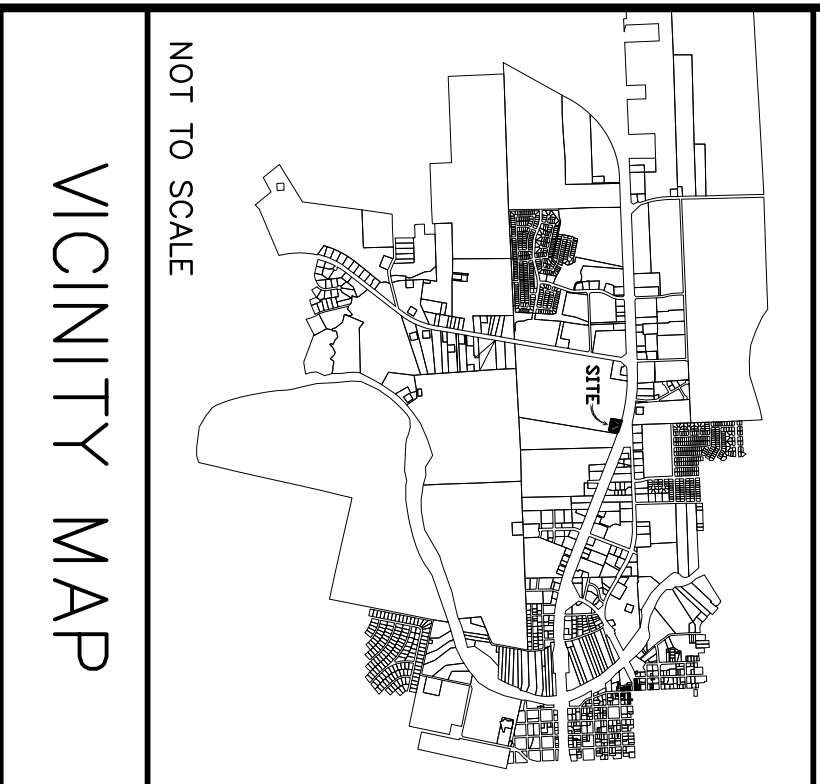
CH# 16993

ACCOUNT		HOW PAID	
AMT. OF ACCOUNT		CASH	
AMT. PAID		CHECK	320
BALANCE DUE		MONEY ORDER	00

BY *[Signature]*

NORTH  
 BEARING BASIS: STATE PLANE COORDINATES NAD83/TEXAS  
 SOUTH CENTRAL ZONE, SCALE FACTOR 0.99998842  
 ICR CONTROL MONUMENTS A753, A279, J806, & SHD2

- LEGEND**
- IRF ● 1/2" IRON ROD FOUND 6/22/11
  - 5/8" IRON ROD W/CAP SET
  - Ⓜ IRON ROD W/CAP FOUND 6/22/11
  - PROPERTY CORNER
  - MNF MAG NAIL FOUND 6/22/11
  - NF SMALL NAIL FOUND 6/22/11
  - BL BUILDING SETBACK LINE
  - POC POINT OF COMMENCING
  - POB POINT OF BEGINNING
  - RECORD INFORMATION
  - ( ) TxDOT STRIP MAP



**VICINITY MAP**

NOT TO SCALE

**CITY NOTE:**  
 This subdivision lies within the limits of the City of Bastrop, Texas.

**PLAT INFORMATION**  
 Total Area: 2.136 Acres  
 Total Number of Lots: 1  
 Number of Residential Lots: 0  
 Number of Commercial Lots: 1  
 Right of Way: 0.00 Acres  
 Average Size of Lots: 2.136 Acres

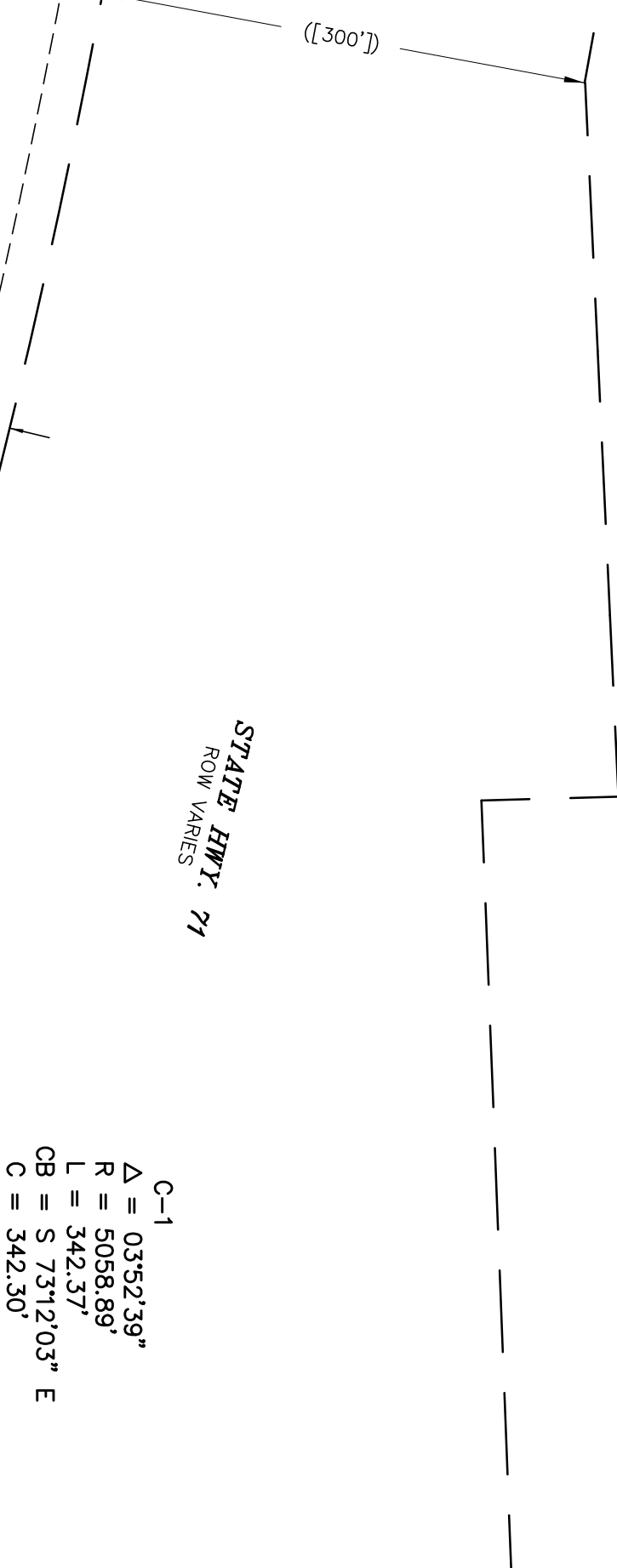
**SCHOOL DISTRICT**  
 This subdivision lies within the Bastrop Independent School District.

**FLOOD PLAIN NOTE**  
 This tract is not within an identified Special Flood Hazard Area inundated by 100-Year Flood as identified by the Federal Emergency Management Agency, Flood Insurance Rate Map for Bastrop County, Texas, and Incorporated Areas, Map Number 480219C0355E dated January 19, 2006.

**PUBLIC UTILITY EASEMENT NOTE:**  
 A Five Foot (5') Wide Public Utility Easement is hereby dedicated along all other property lines

**UTILITY INFORMATION**  
 Electricity: Bluebonnet Electric  
 Telephone: Southwestern Bell Telephone  
 Water: City of Bastrop  
 Wastewater: City of Bastrop

**UTILITY NOTES:**  
 No structure in this subdivision shall be occupied until connected to a public sewer system or to an on-site wastewater system which has been approved and permitted by City of Bastrop.  
 No structure in this subdivision shall be occupied until connected to an individual water supply or a state approved public water system.



Remaining 52.684 Acres  
 71 Retail Partners, L.P.  
 Vol. 2245, Pg. 878, OPRBCT

25' Utility Easement  
 Vol. 684, Pgs. 718-752,  
 OPRBCT

Called 43,112 Acres  
 John Alan Nixon  
 Vol. 1908, Pg. 825,  
 OPRBCT

ACCESS PERMITTED  
 BY TEXAS TRANSPORTATION  
 COMMISSION MINUTE ORDER  
 113104 DATED APRIL 26, 2012

Approved this day \_\_\_\_\_ of \_\_\_\_\_ by the City Council  
 of the City of Bastrop, Texas.

Mayor \_\_\_\_\_ City Secretary \_\_\_\_\_  
 ATTEST BY: \_\_\_\_\_

STATE OF TEXAS  
 COUNTY OF HAYS

I, Rose Pietsch, County Clerk of Bastrop County, Texas, do hereby certify that the foregoing instrument of writing with its certificate of authentication was filed for record in my office on the \_\_\_\_\_ day of \_\_\_\_\_ A.D., 20\_\_\_\_ at \_\_\_\_\_ o'clock \_\_\_\_\_ m., in the Plat Records of Bastrop County, Texas, in Book \_\_\_\_\_ Page \_\_\_\_\_.

WITNESS MY HAND AND SEAL OF OFFICE this the \_\_\_\_\_ of \_\_\_\_\_ A.D., 20\_\_\_\_.

Rose Pietsch  
 County Clerk  
 Bastrop County, Texas

STATE OF TEXAS  
 COUNTY OF BASTROP  
 DESCRIPTION  
 2.136 ACRES  
 NANCY BLAKEY SURVEY, A-98

DESCRIPTION OF A 2.136 ACRE TRACT OF LAND OUT OF THE NANCY BLAKEY SURVEY, A-98, BASTROP COUNTY, TEXAS, AND BEING A PORTION OF THAT CERTAIN TRACT OF LAND CALLED TO BE 52.684 ACRES, DESCRIBED IN A DEED TO JOHN ALAN NIXON, LP, OF RECORD IN VOLUME 2246, PAGE 878, OF THE OFFICIAL PUBLIC RECORDS OF BASTROP COUNTY, TEXAS, SAID 2.136 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING at an iron rod with cap marked "Property Corner" found June 11, 2011, in the south right-of-way line of State Highway 71, at the northwest corner of a tract of land called to be 43.112 acres, described in a deed to John Alan Nixon, of record in Volume 1908, Page 825, of the Official Public Records of Bastrop County, Texas, said iron rod being the northeast corner of said 52.684 acre tract;

THENCE, with the south right-of-way line of said State Highway 71, a curve to the left having a radius of 5058.89 feet, an arc distance of 50.66 feet, a central angle of 00° 34' 25", and a chord which bears, N 70° 58' 30" W, 50.66 feet to a 5/8 inch iron rod with cap set;

THENCE, across said 52.684 acres the following four (4) courses:  
 1) S 09° 40' 46" W, 226.23 feet to a 5/8 inch iron rod with cap set;  
 2) A curve to the right having a radius of 25.00 feet, an arc distance of 39.27 feet, a central angle of 90° 00' 00", and a chord which bears S 54° 40' 46" W, 35.36 feet to a 5/8 inch iron rod with cap set;  
 3) N 80° 19' 14" W, 314.66 feet to a 5/8 inch iron rod with cap set;  
 4) N 09° 40' 46" E, 293.65 feet to a 5/8 inch iron rod with cap set in the south right-of-way line of said State Highway 71;

THENCE, with the south right-of-way line of said State Highway 71, a curve to the right having a radius of 5058.89 feet, an arc distance of 342.37 feet, a central angle of 03° 52' 39", and a chord which bears S 73° 12' 03" E, 342.30 feet to the POINT OF BEGINNING containing 2.136 acres of land within these metes and bounds.

STATE OF TEXAS  
 COUNTY OF

KNOW ALL MEN BY THESE PRESENTS, That we, 71 Retail Partners, LP, a Texas limited partnership, with its home address at 8214 Westchester Drive, Suite 550, Dallas, Texas 75225, owner of 52.684 acres of land being out of the Nancy Blakey Survey, A-98, Bastrop County, Texas, as conveyed to it by deed dated July 3, 2013, and recorded in Volume 2245, Page 878, of the Official Public Records of Bastrop County, Texas, DOES HEREBY SUBDIVIDE 2.14 acres of land out of the Nancy Blakey Survey, A-98, Bastrop County, Texas, to be known as THE GROVE, in accordance with the plat shown hereon, subject to any and all easements or restrictions heretofore granted and do hereby dedicate to the public the use of the streets and easements shown hereon.

IN WITNESS WHEREOF the said 71 Retail Partners, L.P., has caused these presents to be executed by \_\_\_\_\_, thereunto duly authorized.

STATE OF TEXAS  
 COUNTY OF

BEFORE ME, the undersigned authority, on this day personally appeared \_\_\_\_\_, known to me to be the person whose name is subscribed to the foregoing instrument as and acknowledged to me that he executed the same in such capacity as the act and deed of said limited liability company for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the \_\_\_\_\_ day of \_\_\_\_\_ A.D. 2013.  
 Notary Public in and for the State of Texas

THE STATE OF TEXAS  
 KNOW ALL MEN BY THESE PRESENTS

That I, Thomas E. Staudt do hereby certify that I prepare this plat from an actual and accurate on-the-ground survey of the land and that the corner monuments shown thereon were properly placed under my personal supervision, in accordance with the subdivision regulations of the City of Bastrop, Texas.  
 "Preliminary, this document shall not be recorded for any purpose."

Signature and Seal of Registered Public Surveyor with date

<p><b>STAUDT SURVEYING, INC.</b>          Thomas E. Staudt          P.O. Box # 3984          Dripping Springs, Texas 78620          (512)858-2236</p>	<p>SUBDIVISION PLAT OF  <b>THE GROVE</b>          PHASE 1          CITY OF BASTROP          BASTROP COUNTY, TEXAS</p>	Rev.	Date:
		Dr. By: TES	Job #: 13092

CR# 161472

**CASH RECEIPT**

DATE 7-24-13

3256

CITY OF BASTROP  
PLANNING DEPARTMENT  
P. O. Box 427 • Bastrop, Texas 78602  
(512) 321-0457

RECEIVED FROM 71 Retail Partners, LP

ADDRESS The Grove, Prelim. Plat DOLLARS \$ 1120.<sup>00</sup>

FOR: Preliminary Plat - The Grove  
Hwy 71 & 304

ACCOUNT			HOW PAID		
AMT. OF ACCOUNT			CASH		
AMT. PAID			CHECK	1120	00
BALANCE DUE			MONEY ORDER		

BY Maria Murnan



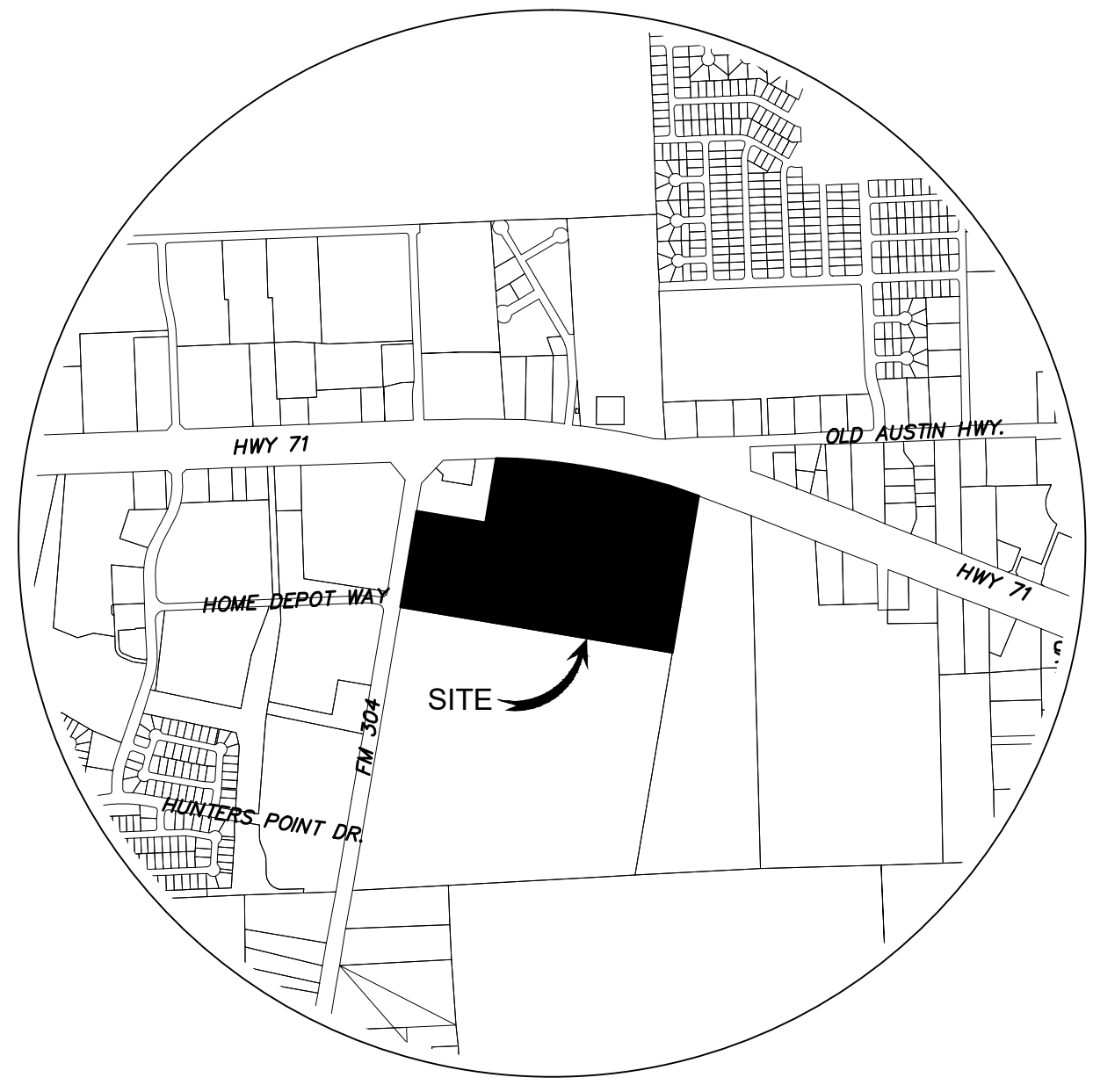
# THE GROVE PRELIMINARY PLAT

**FLOODPLAIN INFORMATION:**  
NO PORTION OF THIS TRACT IS WITHIN THE BOUNDARIES OF THE 100 YEAR FLOODPLAIN PER THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP 48021C0355E, DATED JANUARY 19, 2006.

**LEGAL DESCRIPTION:**  
BEING A 52.68 ACRE TRACT OF LAND OF AND OUT OF AND A PART OF THE NANCY BLAKEY SURVEY NO. 98, BASTROP COUNTY, TEXAS AS RECORDED IN VOLUME PAGE OF THE BASTROP COUNTY OFFICIAL RECORDS.

**UTILITIES:**  
WATER: CITY OF BASTROP  
WASTEWATER: CITY OF BASTROP  
GAS: CENTERPOINT ENERGY  
ELECTRIC: BLUEBONNET ELECTRIC  
TELEPHONE: SOUTHWESTERN BELL TELEPHONE  
CABLE: TIME WARNER CABLE

**ZONING - LAND USE SUMMARY**  
TRACT 1 - 52.68 ACRES  
ZONING: C-1 AND GR-CO  
PROPOSED USE: USES PER C1 ZONING

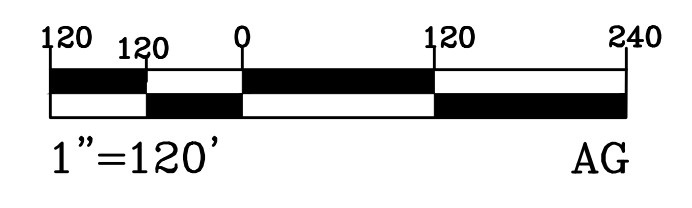


**OWNER:** 71 RETAIL PARTNERS, L.P.  
8214 Westchester Drive, Suite 550  
Dallas TEXAS 75225  
(214) 849-9831  
Douglas MacMahon  
dm@morancap.com

**ENGINEER:** ALDERSON GROUP, INC.  
2525 WALLINGWOOD DR.  
BLDG 6, STE 600  
AUSTIN, TEXAS 78746  
(512) 364-0989  
LYNN ALDERSON, P.E.  
lalderson@aldersongroup.com

**SURVEYOR:** STAUDT SURVEYING, INC.  
P.O. Box 3984  
Dripping Springs, Texas 78620  
(512) 858-2236  
THOMAS STAUDT, RPLS  
smstaudt@austin.rr.com

**LEGEND**  
IRFC IRON ROD FOUND W/ CAP - STAMPED NUMBER NOTED  
IRF IRON ROD FOUND - SIZE NOTED  
IRFC IRON ROD FOUND W/ CAP - BYRN  
OHW OVERHEAD UTILITY WIRE  
OT OVERHEAD TELEPHONE  
UP UTILITY POLE  
GW GUY WIRE  
WF WIRE FENCE  
BL BUILDING LINE  
PUE PUBLIC UTILITY EASEMENT VOL. 8, PG. 73-74, PRHCT  
DE DRAINAGE EASEMENT VOL. 8, PG. 73-74, PRHCT



C-1  
 $\Delta = 17^{\circ}36'16''$   
 $R = 5058.89'$   
 $L = 1554.38'$   
 $CB = S 79^{\circ}29'26''$   
 $EC = 1548.27'$

**NOTES:**

- The Benchmarks used are: LCRA CONTROL MONUMENTS A753, A279, J805, & SHD2.
- All easements of record as indicated on the most recent title run dated: 6-9-2011, conducted by First American Title Company, Title Commitment GF No. 201101334 issued by Heritage Title Company of Austin, for property including property are shown on this Preliminary Plat.
- All subdivision improvement permits shall conform to the City of Bastrop Code of Ordinances, construction standards, and generally accepted engineering practices.
- Construction Plans and Specifications for all subdivision improvements shall be reviewed and accepted by the City of Bastrop prior to any construction within the subdivision.
- Erosion and sedimentation controls constructed in accordance with the Subdivision Ordinance of the City of Bastrop are required for all construction on each lot.
- Building setbacks not shown shall be in accordance with City of Bastrop Subdivision and Zoning Ordinances.
- Prior to construction of any improvements on lots in this subdivision, building permits will be obtained from the City of Bastrop.
- Sidewalks shall be constructed in accordance with the Subdivision Ordinance of the City of Bastrop.
- All utilities will be underground.
- Developer/Owner shall be solely responsible for all relocation and modifications to existing utilities.
- On-site storm water detention facilities will be provided to reduce post-development peak rates of discharge of the 2, 5, 10, 25, 50 and 100-year storm events by structural containment or other approved methods. Discharge of fully developed flows shall require off site conveyance and approval by the City of Bastrop.
- No lot or structure shall be occupied prior to the Applicant submitting to the City of Bastrop documentation of subdivision/site registration with the Texas Department of Licensing and Regulations (TDLR) and provide documentation of review and compliance of the subdivision construction plans with Texas Architectural Barriers Act (TABAA).
- No lot in this subdivision shall be occupied until connected to the approved water distribution and wastewater collection facilities.
- Wastewater and Water systems shall conform to TCEQ (Texas Commission on Environmental Quality).
- The impact fees for this subdivision shall be based on Ordinance No. 213-9.
- Fiscal surety for subdivision construction, in a form acceptable to the City of Bastrop, shall be provided prior to final plat approval by the City.
- The owner of this subdivision, and his or her successors and assigns, assumes sole responsibility for plans for construction of subdivision improvements which comply with applicable codes and requirements of the City of Bastrop. The owner understands and acknowledges that plat vacation or re-plating may be required, at the owner's sole expense, if plans to construct this subdivision do not comply with such codes and requirements. If plans to construct this subdivision do not comply with such codes and requirements.
- By approving this preliminary plat, the City of Bastrop assumes no obligation to construct any infrastructure in connection with this subdivision.
- No buildings, fences, landscaping or other structures are permitted within drainage easements shown, except as approved by the City of Bastrop.
- All drainage easements, storm water facilities / features shall be maintained by the property owner or his or her assigns.

**STAUDT SURVEYING, INC.**  
Thomas E. Staudt  
RPLS # 3984  
P.O. Box 1273  
Dripping Springs, Texas 78620  
(512)858-2236

STATE OF TEXAS  
COUNTY OF HAYS

The undersigned does hereby certify that this survey was this day made on the ground of the property legally described hereon and that to the best of my knowledge and belief is correct, and does declare that on the ground there are no apparent or visible: discrepancies, deed line conflicts, overlapping of improvements, utility easements, or roadways, except as shown hereon, and that said property adjoins a dedicated roadway, except as shown hereon.

"Preliminary, this document shall not be recorded for any purpose."  
Thomas E. Staudt Date  
Registered Professional Land Surveyor No. 3984

Drawing: C:\324\_Moran\_Caplan\01\_Bastrop\_Grove\Drawn\2013\_Preliminary\_Plat.dwg .d.pprint1  
Plot: Jul 24, 2013 11:18:07  
PLOT: Jul 24, 2013 11:18:07

SCALE:	1" = 120'
DATE:	7/23/2013
JOB:	1313-01
DRAWN BY:	LEA
CHECKED BY:	LEA
DATE:	
REVISION:	
#	

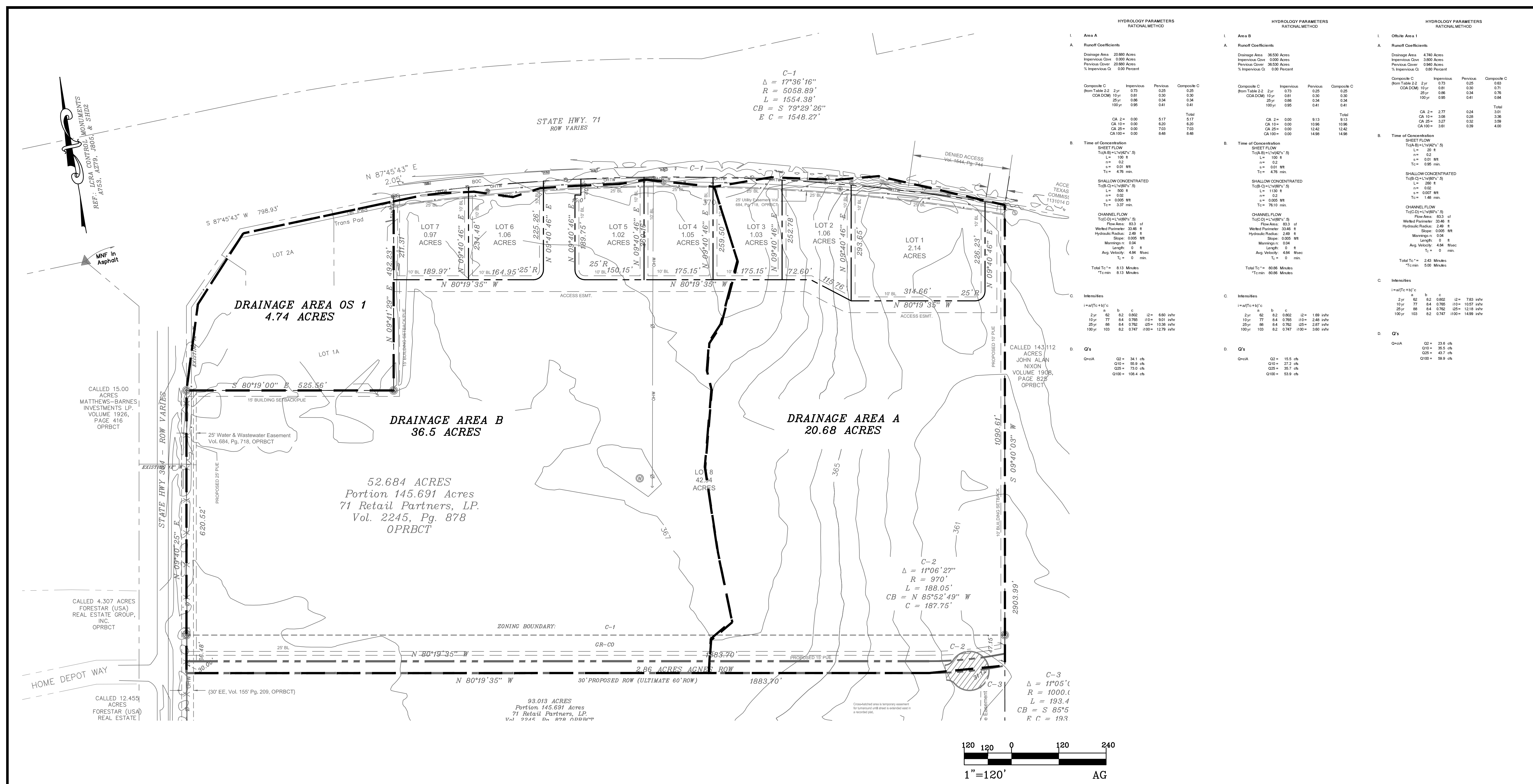
2525 Wallingwood Drive  
Bldg. 6 Ste 600  
Austin, Texas 78746  
(512) 364-0989

**ALDERSON GROUP, INC.**  
ENGINEERING FIRM  
F-11890

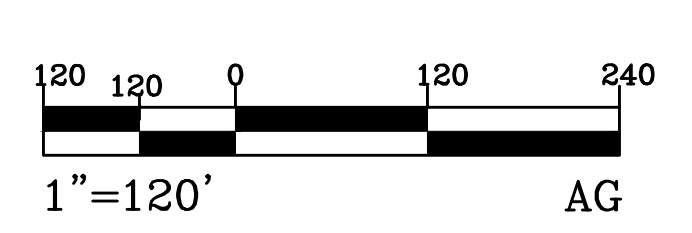
71 RETAIL PARTNERS, LP  
HWY 71 / FM 304  
THE GROVE  
PRELIMINARY PLAT

SHEET  
1 OF 1

Drawing: C:\1324\_Moran\_Caplan\01\_Batrop\_CrownVista\2013\_Drainage\_Plan.dwg Layout1  
 Date: 04/24/13 12:00:07  
 Plotter: AutoCAD



HYDROLOGY PARAMETERS RATIONAL METHOD				HYDROLOGY PARAMETERS RATIONAL METHOD				HYDROLOGY PARAMETERS RATIONAL METHOD			
Area A				Area B				Offsite Area 1			
<b>Runoff Coefficients</b>				<b>Runoff Coefficients</b>				<b>Runoff Coefficients</b>			
Drainage Area: 20.68 Acres				Drainage Area: 36.50 Acres				Drainage Area: 4.74 Acres			
Impervious Cover: 0.00 Acres				Impervious Cover: 0.00 Acres				Impervious Cover: 3.80 Acres			
Previous Cover: 20.68 Acres				Previous Cover: 36.50 Acres				Previous Cover: 0.94 Acres			
% Impervious C: 0.00 Percent				% Impervious C: 0.00 Percent				% Impervious C: 0.80 Percent			
<b>Composite C</b>				<b>Composite C</b>				<b>Composite C</b>			
(From Table 2.2)				(From Table 2.2)				(From Table 2.2)			
2yr	0.73	0.25	0.25	2yr	0.73	0.25	0.25	2yr	0.73	0.25	0.25
10yr	0.81	0.30	0.30	10yr	0.81	0.30	0.30	10yr	0.81	0.30	0.30
25yr	0.86	0.34	0.34	25yr	0.86	0.34	0.34	25yr	0.86	0.34	0.34
100yr	0.95	0.41	0.41	100yr	0.95	0.41	0.41	100yr	0.95	0.41	0.41
<b>Total</b>				<b>Total</b>				<b>Total</b>			
CA 2 =	0.00	5.17	5.17	CA 2 =	0.00	8.13	8.13	CA 2 =	2.77	0.24	3.01
CA 10 =	0.00	5.20	5.20	CA 10 =	0.00	10.98	10.98	CA 10 =	3.08	0.28	3.36
CA 25 =	0.00	7.03	7.03	CA 25 =	0.00	12.42	12.42	CA 25 =	3.27	0.32	3.59
CA 100 =	0.00	8.48	8.48	CA 100 =	0.00	14.98	14.98	CA 100 =	3.61	0.39	4.00
<b>Time of Concentration</b>				<b>Time of Concentration</b>				<b>Time of Concentration</b>			
<b>SHEET FLOW</b>				<b>SHEET FLOW</b>				<b>SHEET FLOW</b>			
$Tc(A) = L^2 / (48.3 \cdot S)$				$Tc(A) = L^2 / (48.3 \cdot S)$				$Tc(A) = L^2 / (48.3 \cdot S)$			
$L = 100'$				$L = 100'$				$L = 200'$			
$n = 0.02$				$n = 0.02$				$n = 0.02$			
$Tc = 4.76$ min				$Tc = 4.76$ min				$Tc = 0.96$ min			
<b>SHALLOW CONCENTRATED</b>				<b>SHALLOW CONCENTRATED</b>				<b>SHALLOW CONCENTRATED</b>			
$Tc(B) = 1.48 \cdot L^{0.55} / S^{0.04}$				$Tc(B) = 1.48 \cdot L^{0.55} / S^{0.04}$				$Tc(B) = 1.48 \cdot L^{0.55} / S^{0.04}$			
$L = 500'$				$L = 1130'$				$L = 1130'$			
$n = 0.02$				$n = 0.02$				$n = 0.02$			
$Tc = 3.37$ min				$Tc = 3.37$ min				$Tc = 1.48$ min			
<b>CHANNEL FLOW</b>				<b>CHANNEL FLOW</b>				<b>CHANNEL FLOW</b>			
$Tc(C) = 1.48 \cdot L^{0.55} / S^{0.04}$				$Tc(C) = 1.48 \cdot L^{0.55} / S^{0.04}$				$Tc(C) = 1.48 \cdot L^{0.55} / S^{0.04}$			
$L = 500'$				$L = 1130'$				$L = 1130'$			
$n = 0.02$				$n = 0.02$				$n = 0.02$			
$Tc = 3.37$ min				$Tc = 3.37$ min				$Tc = 1.48$ min			
<b>Intensity</b>				<b>Intensity</b>				<b>Intensity</b>			
$i = a(Tc + b)^c$				$i = a(Tc + b)^c$				$i = a(Tc + b)^c$			
2yr: 62 82 0.802 12= 680 in/hr				2yr: 62 82 0.802 12= 1.69 in/hr				2yr: 62 82 0.802 12= 7.83 in/hr			
10yr: 77 84 0.782 10= 881 in/hr				10yr: 77 84 0.782 10= 2.48 in/hr				10yr: 77 84 0.782 10= 10.57 in/hr			
25yr: 86 84 0.762 10= 1038 in/hr				25yr: 86 84 0.762 10= 2.87 in/hr				25yr: 86 84 0.762 10= 12.18 in/hr			
100yr: 103 82 0.747 10= 1279 in/hr				100yr: 103 82 0.747 10= 3.60 in/hr				100yr: 103 82 0.747 10= 14.99 in/hr			
<b>Q's</b>				<b>Q's</b>				<b>Q's</b>			
Q <sub>100A</sub> = 34.1 cfs				Q <sub>100A</sub> = 34.1 cfs				Q <sub>100A</sub> = 34.1 cfs			
Q <sub>100B</sub> = 85.8 cfs				Q <sub>100B</sub> = 85.8 cfs				Q <sub>100B</sub> = 85.8 cfs			
Q <sub>100C</sub> = 73.0 cfs				Q <sub>100C</sub> = 73.0 cfs				Q <sub>100C</sub> = 73.0 cfs			
Q <sub>100D</sub> = 104.4 cfs				Q <sub>100D</sub> = 104.4 cfs				Q <sub>100D</sub> = 104.4 cfs			



- LEGEND**
- IRFC IRON ROD FOUND W/ CAP - STAMPED NUMBER NOTED
  - IRF IRON ROD FOUND - SIZE NOTED
  - IRFC IRON ROD FOUND W/ CAP - BYRN
  - OHW OVERHEAD UTILITY WIRE
  - OT OVERHEAD TELEPHONE
  - U UTILITY POLE
  - GUY GUY WIRE
  - W WIRE FENCE
  - BL BUILDING LINE
  - PUE PUBLIC UTILITY EASEMENT
  - DE DRAINAGE EASEMENT

DATE	7/23/2013
REVISION	1313-01
#	1
SCALE:	1" = 120'
DATE:	7/23/2013
JOB:	1313-01
DRAWN BY:	LEA
CHECKED BY:	LEA

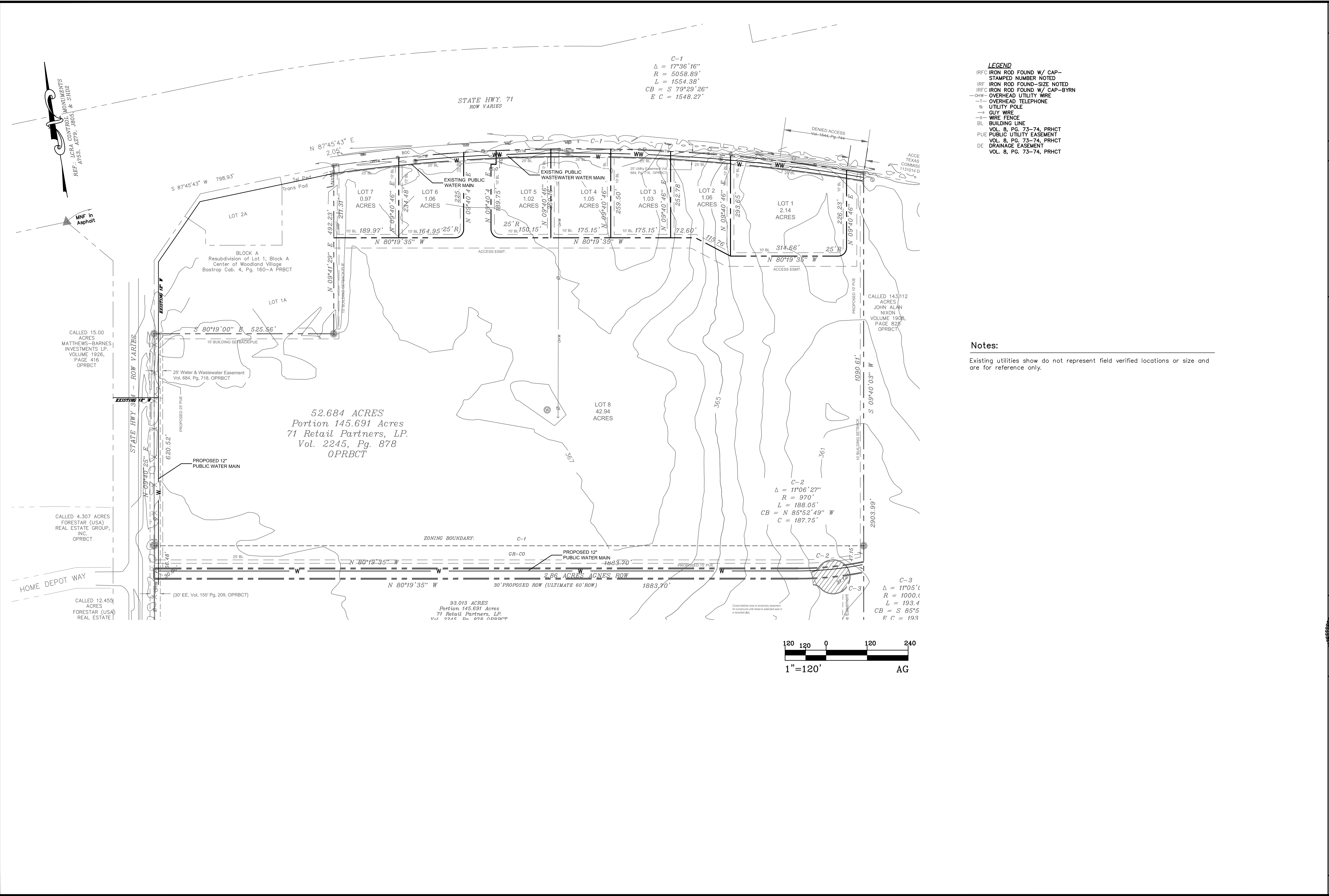
2525 Wallingwood Drive  
 Bldg. 6 Ste 600  
 Austin, Texas 78746  
 (512) 364-0989

**AG ALDERSON GROUP, INC.**  
 ENGINEERING FIRM  
 P-11820

71 RETAIL PARTNERS, LP  
 HWY 71 / FM 304  
**THE GROVE**  
**EXISTING DRAINAGE**

SHEET 1 OF 1

Drawing: CV1324\_Moran\_Capitol01\_Bastrop\_Grove\_Visual2013\_Utility\_Plan.dwg\_Jaymott  
 Date: Jul 24, 11 12:52:59  
 Plot: Jul 24, 11 12:52:59



71 RETAIL PARTNERS, LP  
 HWY 71 / FM 304  
**THE GROVE UTILITIES**

AG ALDERSON GROUP, INC.  
 LYNNE E. ALDERSON  
 PROFESSIONAL ENGINEER  
 No. 96455  
 State of Texas

2525 Walingwood Drive  
 Bldg. 6 Site 600  
 Austin, Texas 78746  
 (512) 364-0989

#	REVISION	DATE

SHEET 1 OF 1





**ADMINISTRATIVE PLAT APPLICATION**  
(For amending plats or minor plats meeting the conditions and requirements in accordance with Local Government Code Section 212.0065)

Please complete all of the following information (type or print):

Project Name: The Grove Phase 1, Lot 5, Block A

Project Address/Location: 1,450' +/- east of FM 304 / Hwy 71 intersection

Legal Description: Nancy Blakey Survey, A-98

Zoning District (if inside city limits): C-1 (Commercial-1)

**Owner / Developer** (applicant):

Contact Person: Douglas MacMahon

Company: 71 Retail Partners LP

Address: 8214 Westchester Drive

City, State Zip: Dallas, Texas 75225

Phone Number: ( 214 ) 622-6525 E-mail Address dm@morancap.com

**Agent:**

Contact Person: Geoff Guerrero

Company Name: Carlson, Brigance & Doering, Inc.

Address: 5501 W. William Cannon Drive

City, State Zip: Austin, Texas 78749

Phone Number: ( 512 ) 280-5160 E-mail Address geoff@cbdeng.com

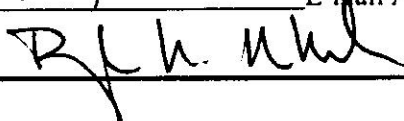
**Engineer / Surveyor** (all plats must be prepared by a licensed engineer or land surveyor):

Contact Person: Tim Holland

Company Name: Carlson, Brigance & Doering, Inc.

Address: 5501 W. William Cannon Dr.

Phone Number: ( 512 ) 280-5160 E-mail Address tim@cbdeng.com

Signature of Owner: 

## ADMINISTRATIVE PLAT APPLICATION

The signature of the Owner authorizes the City of Bastrop and its agents to visit and inspect the property for which this application is being submitted. The signature also indicates that the Owner or his Agent has reviewed the requirements of this checklist and all items on this checklist have been addressed and complied with. **Note: The Owner's signature designates the Agent as the official contact person for this project and the single point of contact. All correspondence and communication will be conducted with the Agent. If no agent is listed, the Owner will be considered the Agent.**

### REQUIRED ITEMS FOR SUBMITTAL PACKAGE:

**The following items are required to be submitted to the Planning Department or included on the subdivision plat in order for the Subdivision Application to be accepted for review.**

- \_\_\_ 1. Completed and signed application/checklist. Provide a brief letter explaining the number of lots you are proposing and if these are residential or commercial lots.
- \_\_\_ 2. Prints of plat--**Collated and Folded, 24" x 36" and one 11" x 17"**. (Submit 6 prints of plat within City, 5 prints when in ETJ- Area A)
- \_\_\_ 3. Two (2) copies **each**: \_\_\_ drainage study and three (3) copies **each**: \_\_\_ utility schematic/plan. If outside the City, three (3) copies.
- \_\_\_ 4. A tax map highlighting the subject property.
- \_\_\_ 5. Copy of deed showing current ownership and a copy of the current tax certificate showing taxes have been paid.
- \_\_\_ 6. Planning Dept. Review Fee: \$450.00  
\*\*Does not include County recording fees.
- \_\_\_ 7. 3 copies of the recorded final plat. Check with Bastrop County Clerk's office to see if this property is part of/within an existing recorded plat.
- N 8. Is this plat a part of an approved Planned Development? Y/N If yes, name of PD:  
n/a
  - a. Provide letter and 3 copies, outlining PD development requirements and how they are addressed on the plat.

Note: No partial submittals will be accepted by this office.

## ADMINISTRATIVE PLAT APPLICATION

The following shall be provided in accordance with the plat details stated in Section 4.40.3 of the subdivision ordinance, unless otherwise approved by the Planning and Development Director in coordination with the City Manager. Note: references to standards required in other sections of the City's development ordinances are provided to facilitate completion of the administrative procedures application. However these references are not inclusive of all regulations applicable to the proposed development, and must conform to the conditions and requirements in accordance with Local Government Code Section 212.0065.

The applicant is encouraged to contact the Planning Department with any questions regarding the required information. Written explanation must be provided for any requirement not submitted with the application or not addressed in accordance with the Zoning and Subdivision Ordinances.

Section 4.40 Administrative Procedures Plat Details					
To Be Completed By Applicant Indicate Below Compliance With The Following.				To Be Completed By Staff	
		Yes	No	Comments	Reviewed By:
Section 4.40.1.C	The topography of the tract and the surrounding lands is such that no regard need be given in such subdivision to drainage. If drainage facilities are required, this administrative process cannot be used.	✓			
Section 4.40.1.D	Each lot meets the minimum lot requirements as set forth in Section 5.50 and 6.110.4 and does not require any variance or exception to regulations. The resubdivision of any lot, tract or parcel of land within a rural subdivision shall not be permitted if the proposed lot (s) size will be less than one (1) acre.	✓			
Section 4.40.1.E	The perimeter of the tract being subdivided has been surveyed and marked on the ground, and each corner of each lot of such proposed subdivision has been marked on the ground, and is tied to a corner of the tract being subdivided. A plat thereof shall be filed with the City as outlined in Section 4.30.2 and 4.30.3.	✓			

**ADMINISTRATIVE PLAT APPLICATION**

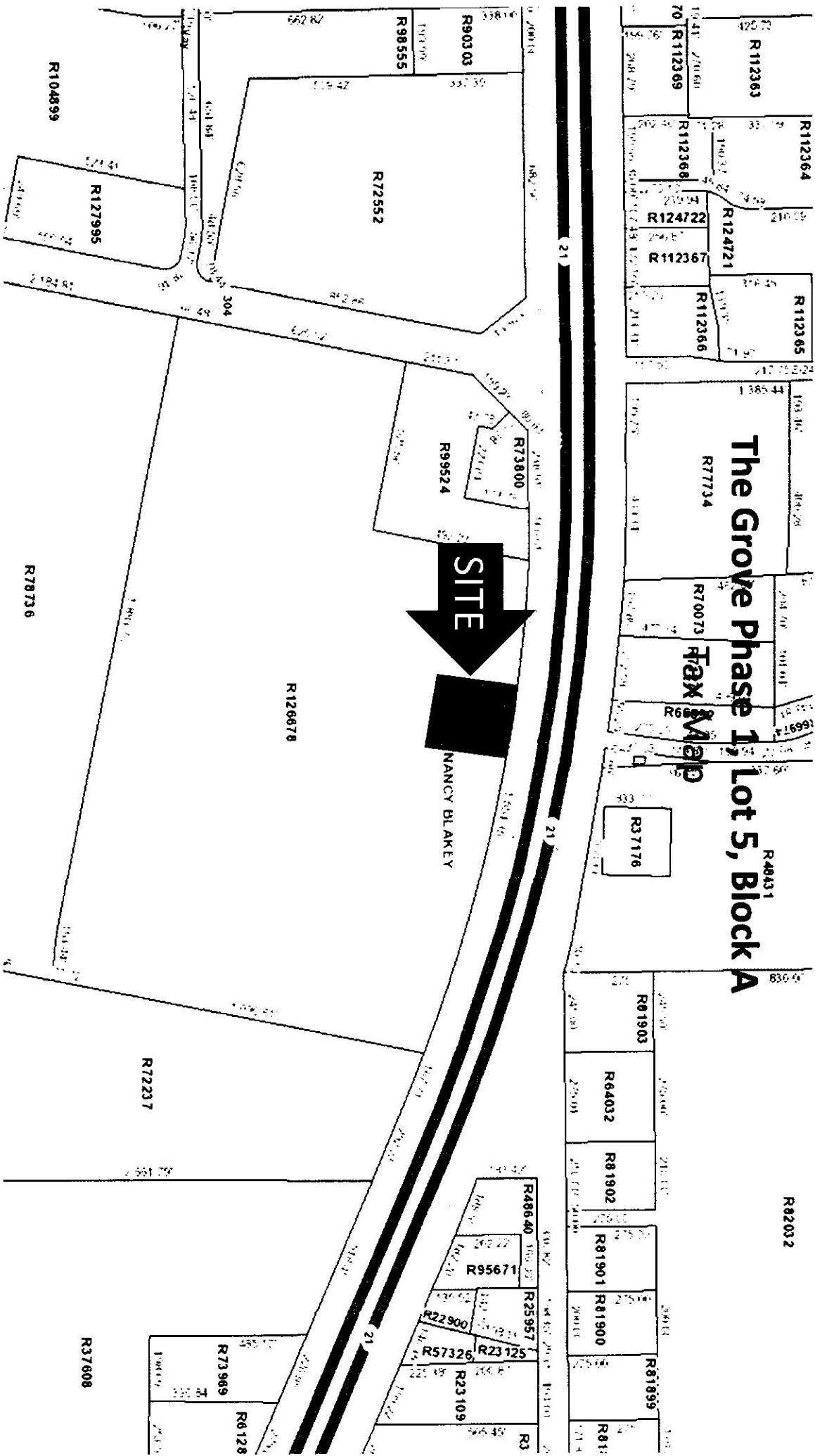
<p><b>Section 4.40.3.A</b></p>	<p>The name of the land owner or owners - the name of the licensed public surveyor responsible for the preparation of the plat; the scale and location of each lot with reference to an original corner of the original subdivision or tract of which said land is a part; the date, north point and total acres in the proposed subdivision or lots.</p>	<p align="center">✓</p>			
<p><b>Section 4.40.3.B</b></p>	<p>The certificate of the licensed public surveyor and/or licensed engineer who surveyed, mapped and monumented the land shall be placed on the face of the plat as described in Section 4.40.3.B</p>	<p align="center">✓</p>			

<p align="center">To Be Completed By Applicant Indicate Below Compliance With The Following.</p>					<p align="center">To Be Completed By Staff</p>
		<p align="center">Yes</p>	<p align="center">No</p>	<p align="center">Comments</p>	<p align="center">Reviewed By:</p>
<p><b>Section 4.40.3.C</b></p>	<p>A certificate of ownership acknowledged before a notary public by the owners and any holders of liens against the land.</p>	<p align="center">✓</p>			
<p><b>Section 4.40.3.D</b></p>	<p>An accurate on-the-ground boundary survey of the property showing bearing and distances and the lines of all adjacent land, streets, easements and alleys with their names and width. (Streets, alleys and lot lines in adjacent subdivisions shall be shown dashed.) All necessary data to reproduce the plat on the ground must be shown on the plat.</p>	<p align="center">✓</p>			
<p><b>Section 4.40.3.E</b></p>	<p>A certificate of approval to be signed by the mayor shall be placed on the face of the plat. See Section 4.20.3.</p>	<p align="center">✓</p>			
<p><b>Section 4.40.3.F</b></p>	<p>The plat shall show all existing features within the area being subdivided, amended or replatted such as existing drainage, easements, width of adjacent streets and alleys</p>	<p align="center">✓</p>			



**ADMINISTRATIVE PLAT APPLICATION**

	and existing utility easements.				
<b>Section 4.40.3.G</b>	<b>Lot lines and numbers of all lots proposed to be created with complete dimensions for front, rear and side lot lines.</b>	✓			
<b>Section 4.40.3.H</b>	<b>Building setback lines shall be shown for each lot created. Refer to Section 5.70 for set back dimensions.</b>	✓			
<b>Section 4.40.3.I</b>	<b>Existing Utilities and Drainage. Five (5) copies of the proposed plat marked to show locations and size of dimensions of existing utilities, drainage and streets.</b>	✓			
<b>Section 4.40.3.J</b>	<b>A receipt showing that all taxes have been paid shall be submitted with the plat.</b>	✓			



ELECTRONICALLY RECORDED  
OFFICIAL PUBLIC RECORDS

*Rose Pietsch*

7/3/2013 3:28 PM

FEE: \$28.00 BOOK: 2245 PAGE: 878

ROSE PIETSCH, County Clerk

Bastrop, Texas

DEED 201308705

**IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

GENERAL WARRANTY DEED

THE STATE OF TEXAS §

§ KNOW ALL MEN BY THESE PRESENTS:

COUNTY OF BASTROP §

MC BASTROP ~~LLP~~, LP, a Texas limited partnership (hereinafter called "Grantor"), in consideration of the sum of TEN AND NO/100 (\$10.00) DOLLARS and other good and valuable consideration in hand paid by 71 RETAIL PARTNERS, LP, a Texas limited partnership, whose address is 8214 Westchester Drive, Suite 550, Dallas, Texas 75225 (hereinafter called "Grantee"), the receipt and sufficiency of which are hereby acknowledged and confessed, has GRANTED, BARGAINED, SOLD AND CONVEYED, and by these presents does hereby GRANT, BARGAIN, SELL and CONVEY unto Grantee, the real property located in Bastrop County, Texas which is more particularly described on Exhibit A attached hereto and made a part hereof for all purposes (the "Land"), together with all right, title and interest of Grantor, if any, in (i) all improvements and fixtures on the Land, (ii) all oil, gas and other minerals in, on or under the Land, (iii) all adjacent and/or contiguous streets, roads, avenues, alleys, and rights of way, (iv) rivers, streams, and strips and gores of land adjoining, adjacent and contiguous thereto, (v) all easements, rights of ingress and egress, rights of way, and covenants appurtenant to the Land, (vi) all riparian rights, surface and underground water rights, and any and all other water rights pertaining to the Land and (vii) all permits, approvals, licenses, rights, and authorizations and exemptions of any kind from governmental authorities related to the ownership, maintenance, use, development or operation of the Land or any improvements thereon (the Land together with such rights, titles, being collectively called the "Property"), subject to, however, those exceptions and encumbrances set forth on Owner's Policy of Title Insurance No. 5019648-0011649c dated October 6, 2011, issued by First American Title Insurance Company (said exceptions and encumbrances being called the "Permitted Exceptions").

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in anywise belonging, unto Grantee, its successors and assigns FOREVER, subject to the Permitted Exceptions, and, subject to the Permitted Exceptions, Grantor does hereby bind itself and its successors and assigns to WARRANT AND FOREVER DEPEND all and singular the Property unto Grantee, its successors and assigns, against every person whatsoever lawfully claiming or to claim the same or any part thereof.

Real property ad valorem taxes and assessments having been prorated to the date hereof, Grantee hereby assumes and agrees to pay when due all such ad valorem property taxes and assessments for the year 2013 and subsequent years.

Executed as of July 3<sup>rd</sup>, 2013

**GRANTOR:**

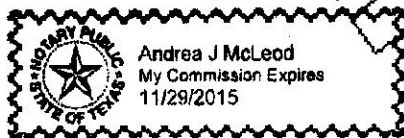
MC BASTROP 71, LP,  
a Texas limited partnership  
By: MC Bastrop 71 GP, LLC,  
a Texas limited liability company,  
its General Partner

By: *Douglas MacMahon*  
Douglas MacMahon, Manager

STATE OF TEXAS

COUNTY OF Dallas

This instrument was acknowledged before me on the 3<sup>rd</sup> day of July, 2013, by Douglas MacMahon, the Manager of MC Bastrop 71 GP, LLC, a Texas limited liability company, the General Partner of MC Bastrop 71, LP, a Texas limited partnership, on behalf of said limited partnership.



*Andrea J McLeod*  
Notary Public in and for the State of Texas  
My Commission Expires: 11/29/2015  
ANDREA J MCLEOD  
Printed Name

STATE OF TEXAS  
COUNTY OF BASTROP

52.684 ACRES  
NANCY BLAKEY SURVEY, A-98

DESCRIPTION

DESCRIPTION OF A 52.684 ACRE TRACT OF LAND OUT OF THE NANCY BLAKEY SURVEY, A-98, BASTROP COUNTY, TEXAS, AND BEING A PORTION OF THAT CERTAIN TRACT OF LAND CALLED TO BE 145.691 ACRES, DESCRIBED IN A DEED TO MC BASTROP 71 CP OF RECORD IN VOLUME 2097, PAGE 241, OF THE OFFICIAL PUBLIC RECORDS OF BASTROP COUNTY, TEXAS, SAID 52.684 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at an iron rod with cap marked "Property Corner" found June 22, 2011, in the south right-of-way line of State Highway 71, at the northeast corner of Lot 1A, Block A, Resubdivision of Lot 1 (Block A) Center of Woodland Village Bastrop, a subdivision of record in Cabinet 4, Page 160-A, of the Plat Records of Bastrop County, Texas, said iron rod being the most northerly northwest corner of said 145.691 acre tract, and the most northerly northwest corner of the herein described tract;

THENCE, with the south right-of-way line of said State Highway 71, the following two (2) courses:

- 1) N 87° 45' 43" E, 2.05 feet to a large hole where concrete with TXDOT Brass Cap found disturbed;
- 2) A curve to the right having a radius of 5058.89 feet, an arc distance of 1554.38 feet, a central angle of 17° 36' 16", and a chord which bears S 79° 29' 26" E, 1548.27 feet to an iron rod with cap marked "Property Corner" found June 11, 2011, at the northwest corner of a tract of land called to be 43.112 acres, described in a deed to John Alan Nixon, of record in Volume 1908, Page 825, of the Official Public Records of Bastrop County, Texas, said iron rod being the northeast corner of said 145.691 acre tract, and the northeast corner of the herein described tract;

THENCE, S 09° 40' 03" W, with the east line of said 145.691 acre tract, and the west line of said 43.112 acre tract, at 1090.61 feet passing a 1/2 inch iron rod found June 22, 2011, and continuing for a total distance of 1168.33 feet to a 5/8 inch iron rod with cap set October 1, 2010, found June 22, 2011, for the southeast corner of the herein described tract;

THENCE, across said 145.691 acre tract, the following two (2) courses:

- 1) A curve to the right having a radius of 1000.00 feet, an arc distance of 193.46 feet, a central angle of 11° 05' 05", and a chord which bears N 85° 52' 07" W, 193.16 feet to a 5/8 inch iron rod with cap set October 1, 2010, found June 22, 2011;
- 2) N 80° 19' 35" W, 1883.70 feet to a 5/8 inch iron rod with cap set October 1, 2010, found, June 22, 2011, in the east right-of-way line of State Highway 304, same being the most westerly west line of said 145.691 acre tract, said iron rod being the southwest corner of the herein described tract;

THENCE, N 09° 40' 25" E, with the east right-of-way line of said State Highway 304, at 96.48 feet passing a ½ inch iron rod found June 22, 2011, and continuing for a total distance of 717.00 feet to a ½ inch iron rod found June 22, 2011, at the southwest corner of said Lot 1A, Resubdivision of Lot 1, Block A, Center of Woodland Village Bastrop, said iron rod being the most westerly northwest corner of said 145.691 acre tract, and the most westerly northwest corner of the herein described tract;

THENCE, S 80° 19' 00" E, with the westerly north line of said 145.691 acre tract, and the south line of said Lot 1A, 325.56 feet to a ½ inch iron rod found June 22, 2011, at the southeast corner of said Lot 1A, said iron rod being an ell corner of said 145.691 acre tract, and an ell corner of the herein described tract;

THENCE, N 09° 41' 29" E, with the northerly west line of said 145.691 acre tract, and the east line of said Lot 1, 492.23 feet to the POINT OF BEGINNING containing 52.684 acres of land within these metes and bounds.

**71 Retail Partners, LP**

**1006**

NAME: City of Bastrop

CHECK DATE: 5/23/2014

Administrative Plat Filing Fee

450.00

American National Ba The Grove Phase 1, Lot 5, Block A

450.00

THIS CHECK IS VOID WITHOUT A TURQUOISE BACKGROUND AND A WATERMARK. HOLD UP TO THE LIGHT TO VERIFY.

**71 Retail Partners, LP**

**8214 Westchester Drive**

**Suite 550**

**Dallas, TX 75225**

American National Bank of Texas


800-837-6584

www.anbt.com

88-151/1119

**1006**

Printed By User: Andrea McLeod 05/23/14 09:51:50 am

	5/23/2014
	450.00

➔ PAY **450.00**  
 ONLY Four Five Zero 00/100

MEMO: The Grove Phase 1, Lot 5, Block A

PAY Four Hundred Fifty and 00/100 Dollars

TO THE City of Bastrop  
ORDER  
OF



CHECK IS PRINTED ON SECURITY PAPER WHICH INCLUDES A MICROPRINT BORDER & FLUORESCENT FIBERS

⑈001006⑈ ⑆111901519⑆4300160514⑈



## Carlson, Brigance & Doering, Inc.

Civil Engineering ❖ Surveying

July 29, 2014

Ms. Yvonne Pritchard  
City of Bastrop  
1311 Chestnut Street  
Bastrop, Texas 78602

Re: *The Grove Phase 1, Lot 5, Block A*  
Comment Response Update #1  
CBD No. 4697

Dear Ms. Pritchard,

Please find attached our itemized responses to comments issued on June 24, 2014.

**Melissa McCollum, AICP, LEED AP-Director of Planning and Development**

1. Zoning of the property has been added to the face of the plat.
2. Rear setback corrected to 20' as required in C1, Commercial.
3. Utility providers added to the face of the plat.

**Wesley Brandon, PE – City Engineer**

1. Lot 5 does not adjoin F.M. 304. No tie added. A tie across Hwy 71 is on the face of the plat.
2. Benchmark information added to the face of the plat.
3. Width of adjacent access easement added to the face of the plat.
4. Revised note 15 to reference Ordinance 2011-21.
5. Revised note 26 to state reciprocal access shall be provided. Language was revised to what was approved via email on June 26, 2014. A reference to note 26 has been added to the face of the plat.
6. Provided a note stating "Development of Lot 5 shall substantially conform to the Preliminary Plat entitled "The Grove" as approved by the Bastrop City Council on July 8, 2014.
7. Access easement not recorded at this time. Will be recorded concurrent with final plat. Easement documentation was previously sent for approval.
8. No new easements recorded at this time.

**Trey Job, Director of Water and Wastewater and Public Works**

1. Comment acknowledged.



**Diane Schulze, PE, Assistant Area Engineer, TxDOT**

1. Comment acknowledged.
2. Comment acknowledged.
3. Comment acknowledged.

**Yvonne Pritchard, Project Coordinator**

1. No other changes made.

If additional information is required, please contact me at 512-280-5160.

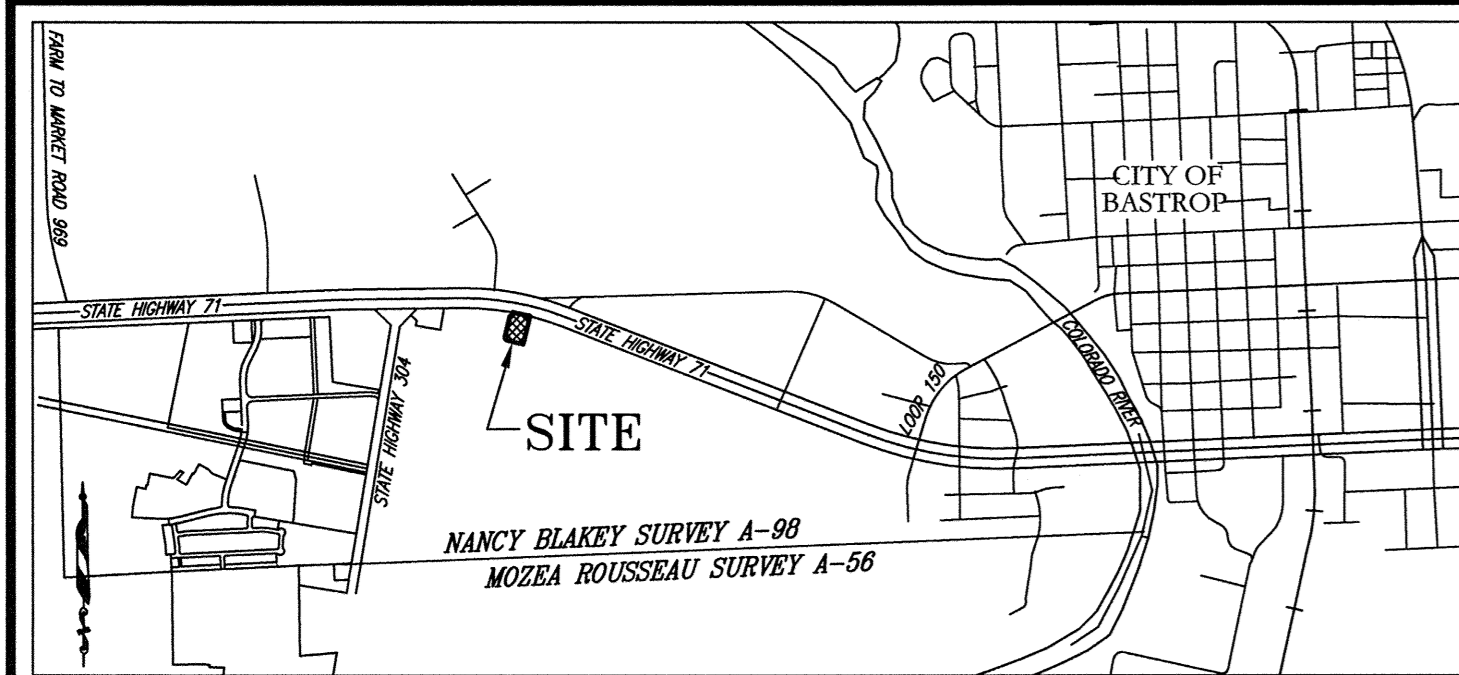
Sincerely,

**CARLSON, BRIGANCE, & DOERING INC.**

A handwritten signature in blue ink, appearing to read 'R. Gertson', with a stylized flourish at the end.

Robert J. Gertson, R.P.L.S.

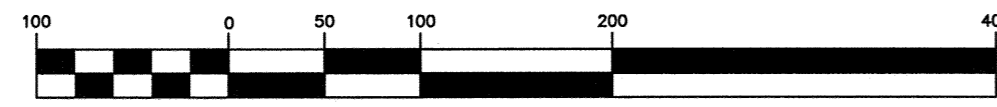
# THE FINAL PLAT OF THE GROVE PHASE 1, LOT 5, BLOCK A



LOCATION MAP  
NOT TO SCALE

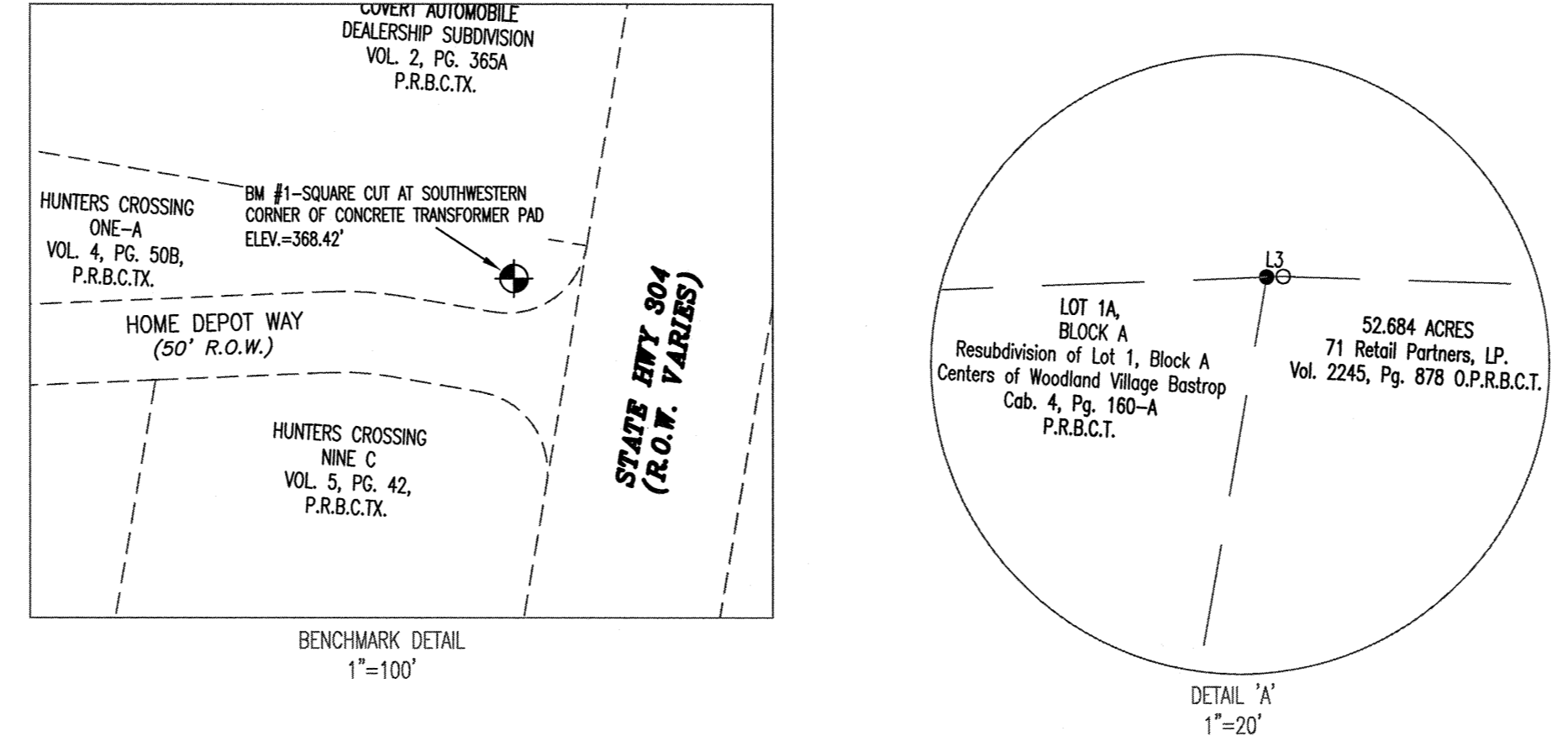
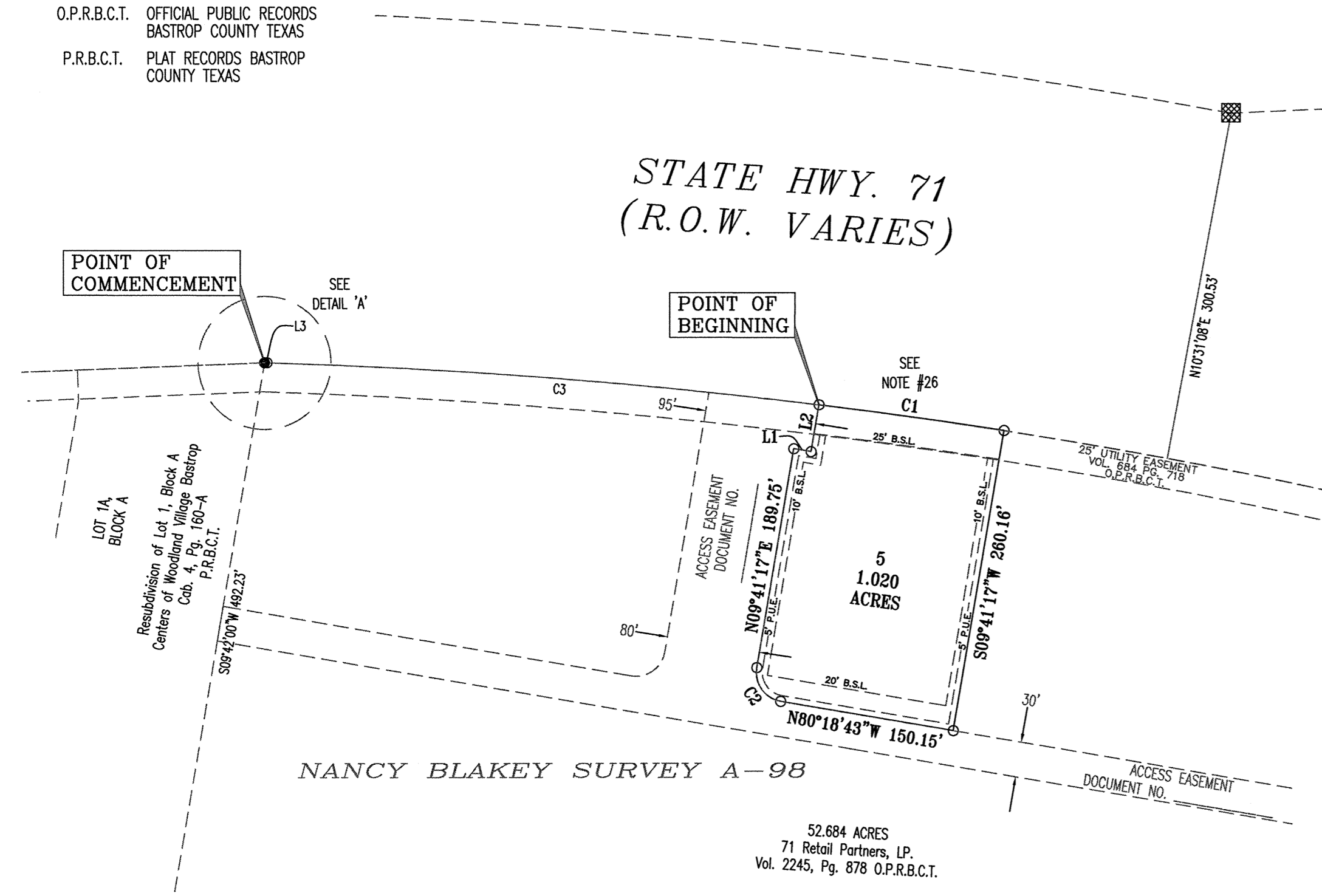
SCALE: 1" = 100'

GRAPHIC SCALE



LEGEND

- CONCRETE MONUMENT FOUND
- CAPPED 1/2" IRON ROD SET
- IRON ROD FOUND
- LOT NUMBER
- BLOCK DESIGNATION
- B.S.L. BUILDING SETBACK LINE
- P.U.E. PUBLIC UTILITY EASEMENT
- O.P.R.B.C.T. OFFICIAL PUBLIC RECORDS BASTROP COUNTY TEXAS
- P.R.B.C.T. PLAT RECORDS BASTROP COUNTY TEXAS



**BENCHMARK:**  
BM#1: SQUARE CUT IN SOUTHWEST CORNER OF A CONCRETE ELECTRIC TRANSFORMER PAD LOCATED ON THE NORTHERN RIGHT-OF-WAY LINE OF HOME DEPOT WAY, APPROXIMATELY 24' NORTH OF THE RETURN AT STATE HIGHWAY NO. 304. ELEV=368.42'

**Curve Table**

Curve #	Length	Radius	Chord Direction	Chord Length	Tangent	DELTA
C1	160.23	5058.89	S81°58'46"E	160.22	80.12	1°46'53"
C2	39.27	25.00	N35°18'43"W	35.36	25.00	90°00'00"
C3	475.05	5058.89	S85°35'39"E	474.88	237.70	5°22'49"

**Line Table**

Line #	Length	Direction
L1	15.00	S80°18'43"E
L2	40.70	N09°41'17"E
L3	2.05	N87°46'14"E

DATE: JUNE 26, 2014

**OWNER:**  
71 REAL ESTATE PARTNERS, LP  
8214 WESTCHESTER DRIVE, SUITE 550  
DALLAS, TX 75225  
PHONE: (214) 849-9831

**ENGINEER & SURVEYOR:**  
CARLSON, BRIGANCE & DOERING, INC.  
5501 WEST WILLIAM CANNON  
AUSTIN, TX 78749  
(512) 280-5160  
(512) 280-5165 fax

**TOTAL ACREAGE:** 1.020 ACRES  
**SURVEY:** NANCY BLAKEY SURVEY, A-98

**COMMERCIAL LOTS:** 1 **TOTAL:** 1.020 ACRES  
**NO. OF BLOCKS:** 1

**FLOODPLAIN INFORMATION:** F.E.M.A. MAP NO. 48021C 0355E  
BASTROP COUNTY, TEXAS DATED: JANUARY 19, 2006

**ZONING:** C1, COMMERCIAL

**UTILITIES:** WATER: CITY OF BASTROP  
WASTEWATER: CITY OF BASTROP  
GAS: CENTERPOINT ENERGY  
ELECTRIC: ELIEBONNET ELECTRIC  
TELEPHONE: SOUTHWESTERN BELL TELEPHONE  
CABLE: TIME WARNER CABLE

FLOOD PLAIN NOTE:

NO PORTION OF THIS TRACT LIES WITHIN A DESIGNATED FLOOD HAZARD AREA, ZONE A, AS SHOWN ON THE FEDERAL FLOOD INSURANCE ADMINISTRATION RATE MAP NO. 48021C 0355E FOR BASTROP COUNTY TEXAS, DATED JANUARY 19, 2006.

GENERAL NOTES:

- BENCHMARK: SQUARE CUT IN SOUTHWEST CORNER OF A CONCRETE ELECTRIC TRANSFORMER PAD LOCATED ON THE NORTHERN RIGHT-OF-WAY LINE OF HOME DEPOT WAY, APPROXIMATELY 24' NORTH OF THE RETURN AT STATE HIGHWAY NO. 304. ELEV=368.42'
- ALL EASEMENTS OF RECORD AS INDICATED ON THE MOST RECENT TITLE RUN DATED: 6-9-2011, CONDUCTED BY FIRST AMERICAN TITLE COMPANY, TITLE COMMITMENT OF NO. 201101334 ISSUED BY HERITAGE TITLE COMPANY OF AUSTIN, FOR PROPERTY INCLUDING THIS PROPERTY ARE SHOWN ON THIS FINAL PLAT.
- ALL SUBDIVISION IMPROVEMENT PERMITS SHALL CONFORM TO THE CITY OF BASTROP CODE OF ORDINANCES, CONSTRUCTION STANDARDS, AND GENERALLY ACCEPTED ENGINEERING PRACTICES.
- CONSTRUCTION PLANS AND SPECIFICATIONS FOR ALL SUBDIVISION IMPROVEMENTS SHALL BE REVIEWED AND ACCEPTED BY THE CITY OF BASTROP PRIOR TO ANY CONSTRUCTION WITHIN THE SUBDIVISION.
- EROSION AND SEDIMENTATION CONTROLS CONSTRUCTED IN ACCORDANCE WITH THE SUBDIVISION ORDINANCE OF THE CITY OF BASTROP ARE REQUIRED FOR ALL CONSTRUCTION ON EACH LOT.
- BUILDING SETBACKS SHOWN SHALL BE IN ACCORDANCE WITH THE CITY OF BASTROP SUBDIVISION AND ZONING ORDINANCES FOR C-1 ZONING DISTRICT.
- PRIOR TO CONSTRUCTION OF ANY IMPROVEMENTS ON LOTS IN THIS SUBDIVISION, BUILDING PERMITS WILL BE OBTAINED FROM THE CITY OF BASTROP.
- SIDEWALKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SUBDIVISION ORDINANCE OF THE CITY OF BASTROP.
- ALL UTILITIES WILL BE UNDERGROUND.
- DEVELOPER/OWNER SHALL BE SOLELY RESPONSIBLE FOR ALL RELOCATION AND MODIFICATIONS TO EXISTING UTILITIES.
- ON-SITE STORM WATER DETENTION FACILITIES WILL BE PROVIDED TO REDUCE POST-DEVELOPMENT PEAK RATES OF DISCHARGE OF THE 2, 5, 10, 25, 50 AND 100-YEAR STORM EVENTS BY STRUCTURAL CONTAINMENT OR OTHER APPROVED METHODS. DISCHARGE OF FULLY DEVELOPED FLOWS SHALL REQUIRE OFF SITE CONVEYANCE AND APPROVAL BY THE CITY OF BASTROP.
- NO LOT OR STRUCTURE SHALL BE OCCUPIED PRIOR TO THE APPLICANT SUBMITTING TO THE CITY OF BASTROP DOCUMENTATION OF SUBDIVISION/SITE REGISTRATION WITH THE TEXAS DEPARTMENT OF LICENSING AND REGULATIONS (TDLR) AND PROVIDE DOCUMENTATION OF REVIEW AND COMPLIANCE OF THE SUBDIVISION CONSTRUCTION PLANS WITH THE TEXAS ARCHITECTURAL BARRIERS ACT (TABA).
- NO LOT IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL CONNECTED TO THE APPROVED WATER DISTRIBUTION AND WASTEWATER COLLECTION FACILITIES.
- WASTEWATER AND WATER SYSTEMS SHALL CONFORM TO TCEQ (TEXAS COMMISSION ON ENVIRONMENTAL QUALITY).
- THE IMPACT FEES FOR THIS SUBDIVISION SHALL BE BASED ON ORDINANCE NO. 2011-21.
- SITE DEVELOPMENT CONSTRUCTION PLANS SHALL BE REVIEWED AND ACCEPTED BY THE CITY OF BASTROP.
- FISCAL SURETY FOR SUBDIVISION CONSTRUCTION, IN A FORM ACCEPTABLE TO THE CITY OF BASTROP, SHALL BE PROVIDED PRIOR TO FINAL PLAT APPROVAL BY THE CITY.

FIELD NOTES

BEING ALL OF THAT CERTAIN TRACT OF LAND OUT OF THE NANCY BLAKEY SURVEY, ABSTRACT 98, SITUATED IN BASTROP COUNTY, TEXAS, BEING MORE PARTICULARLY DESCRIBED AS BEING A PORTION OF THAT CERTAIN 52.684 ACRE TRACT CONVEYED TO 71 RETAIL PARTNERS, LP, IN VOLUME 2245, PAGE 878, OFFICIAL PUBLIC RECORDS OF BASTROP COUNTY, TEXAS, SAID 1.020 ACRE TRACT OF LAND BEING MORE FULLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING, at a capped 1/2" iron rod found for the northeastern corner of Lot 1A, Block A, Resubdivision of Lot 1, Block A, Centers of Woodland Village Bastrop, a subdivision recorded in Cdb. 4, Page 160-A, Plat Records of Bastrop County, Texas, also being in the southern right-of-way line of State Highway 71 (R.O.W. varies), from which a 1/2" iron rod found for the southwestern corner of said Lot 1A, also being an angle corner of said 52.684 acre tract, bears S09°42'00"W, a distance of 492.23 feet, for the POINT OF COMMENCEMENT of the herein described tract,

THENCE, with the common boundary line of said 52.684 acre tract and said southern right-of-way line of State Highway 71, the following three (3) courses and distances, numbered 1 through 3,

- N87°46'14"E, a distance of 2.05 feet to a capped 1/2" iron rod set, at a point of curvature to the right,
- with said curve to the right having a radius of 5058.89 feet, an arc length of 475.05 feet and whose chord bears S85°35'39"E, a distance of 474.88 feet to a capped 1/2" iron rod set, at a point of curvature to the right, for the northernmost northeastern corner and POINT OF BEGINNING of the herein described tract, and
- with said curve to the right having a radius of 5058.89 feet, an arc length of 160.23 feet and whose chord bears S81°58'46"E, a distance of 160.22 feet to a capped 1/2" iron rod set,

THENCE, leaving said common boundary line and crossing said 52.684 acre tract, the following six (6) courses and distances, numbered 1 through 6,

- S09°41'17"W, a distance of 260.16 feet to a capped 1/2" iron rod set,
- N87°18'43"W, a distance of 150.15 feet to a capped 1/2" iron rod set, at a point of curvature to the right,
- with said curve to the right having a radius of 25.00 feet, an arc length of 39.27 feet and whose chord bears N35°18'43"W, a distance of 35.36 feet to a capped 1/2" iron rod set,
- N09°41'17"E, a distance of 180.75 feet to a capped 1/2" iron rod set,
- S87°18'43"E, a distance of 15.00 feet to a capped 1/2" iron rod set, and
- N09°41'17"E, a distance of 40.70 feet to the POINT OF BEGINNING and containing 1.020 acres of land.

STATE OF TEXAS )  
COUNTY OF BASTROP ) KNOW ALL MEN BY THESE PRESENTS:

THAT, 71 RETAIL PARTNERS, LP, ACTING HEREIN BY AND THROUGH DOUGLAS MACMAHON, AND BEING OWNER OF THAT CERTAIN CALLED 52.684 ACRES OF LAND OUT OF THE NANCY BLAKEY SURVEY, ABSTRACT NO. 98, SITUATED IN BASTROP COUNTY, TEXAS, AS CONVEYED TO 71 RETAIL PARTNERS, LP, BY DEED RECORDED IN VOLUME 2245, PAGE 878, OF THE DEED RECORDS OF BASTROP COUNTY, TEXAS, DO HEREBY SUBDIVIDE 1.020 ACRES OF LAND, IN ACCORDANCE WITH THE ATTACHED MAP OR PLAT, TO BE KNOWN AS:

"THE GROVE PHASE 1, LOT 5, BLOCK A",

AND DOES HEREBY DEDICATE TO THE PUBLIC, THE USE OF THE STREETS AND EASEMENTS SHOWN HEREON, SUBJECT TO ANY EASEMENTS AND/OR RESTRICTIONS HERETOFORE GRANTED AND NOT RELEASED.

WITNESS MY HAND, THIS THE \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, A.D.

DOUGLAS MACMAHON, MANAGING MEMBER  
71 RETAIL PARTNERS, LP  
8214 WESTCHESTER DRIVE, SUITE 550  
DALLAS, TEXAS 75225

STATE OF TEXAS )  
COUNTY OF BASTROP ) KNOW ALL MEN BY THESE PRESENTS:

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED DOUGLAS MACMAHON, KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT OF WRITING, AND HE ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSES AND CONSIDERATIONS THEREIN EXPRESSED AND IN THE CAPACITY THEREIN STATED.

WITNESS MY HAND AND SEAL OF OFFICE, THIS THE \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, A.D.

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

STATE OF TEXAS )  
COUNTY OF BASTROP ) KNOW ALL MEN BY THESE PRESENTS:

I, ROSE PIETSCHE, CLERK OF BASTROP COUNTY, DO HEREBY CERTIFY THAT THE FOREGOING INSTRUMENT OF WRITING AND ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECORD IN MY OFFICE ON THE \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, A.D., IN THE PLAT RECORDS OF SAID COUNTY AND STATE IN PLAT CABINET \_\_\_\_\_, PAGE(S) \_\_\_\_\_, FILED FOR RECORD AT \_\_\_\_\_ O'CLOCK \_\_M., THIS \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, A.D.

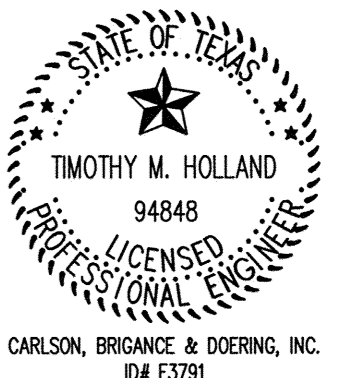
WITNESS MY HAND AND SEAL OF OFFICE OF THE COUNTY CLERK, THIS THE \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, A.D.  
\_\_\_\_\_, COUNTY CLERK, BASTROP COUNTY, TEXAS

BY: DEPUTY

STATE OF TEXAS )  
COUNTY OF TRAVIS ) KNOW ALL MEN BY THESE PRESENTS:

I, TIMOTHY M. HOLLAND, P.E. DO HEREBY CERTIFY THAT THE STREETS AND DRAINAGE DESIGN, AS SHOWN HEREON, COMPLIES WITH THE SUBDIVISION REGULATIONS FOR THE CITY OF BASTROP, AND THAT THE 100 YEAR FLOOD PLAIN IS AS SHOWN AND WILL BE CONTAINED WITHIN THE DRAINAGE EASEMENT AND OR DRAINAGE RIGHT-OF-WAY, AS SHOWN HEREON.

ENGINEERING BY: Timothy M. Holland DATE 7-29-2014  
TIMOTHY M. HOLLAND, P.E. NO. 94848  
CARLSON, BRIGANCE & DOERING, INC.  
5501 WEST WILLIAM CANNON DRIVE  
AUSTIN, TEXAS 78749



CARLSON, BRIGANCE & DOERING, INC.  
ID# 03791

STATE OF TEXAS )  
COUNTY OF TRAVIS ) KNOW ALL MEN BY THESE PRESENTS:

THAT I, ROBERT J. GERTSON, DO HEREBY CERTIFY THAT I PREPARED THIS PLAT FROM AN ACTUAL AND ACCURATE ON-THE-GROUND SURVEY OF THE LAND AND THAT THE CORNER MONUMENTS SHOWN THEREON WERE PROPERLY PLACED UNDER MY PERSONAL SUPERVISION, IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS OF THE CITY OF BASTROP, BASTROP COUNTY, TEXAS. ALL EASEMENTS OF RECORD HAVE BEEN IDENTIFIED ON THIS PLAT TO THE BEST OF MY KNOWLEDGE.

SURVEYED BY: Robert J. Gertson DATE 7-29-14  
ROBERT J. GERTSON ~ R.P.L.S. NO. 6367  
CARLSON, BRIGANCE & DOERING, INC.  
5501 WEST WILLIAM CANNON DRIVE  
AUSTIN, TEXAS 78749



APPROVED THIS THE \_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_, BY THE CITY COUNCIL OF THE CITY OF BASTROP, TEXAS.

APPROVED: \_\_\_\_\_  
KEN KESSELIUS,  
MAYOR OF THE CITY OF BASTROP, TEXAS

ATTEST: \_\_\_\_\_  
CITY SECRETARY, CITY OF BASTROP, TEXAS

SHEET NO. 1 OF 1

**Carlson, Brigance & Doering, Inc.**  
FIRM ID #03791 REG. #10024900  
Civil Engineering Surveying  
5501 West William Cannon Austin, Texas 78749  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

REVISION	DATE	COMMENT

**RESOLUTION NO. R-2017-62**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BASTROP, TEXAS, APPROVING THE PRELIMINARY PLAT KNOWN AS BASTROP GROVE BEING 52.684 ACRES OUT OF THE NANCY BLAKEY SURVEY, LOCATED EAST OF STATE HIGHWAY 304 AND SOUTH OF WEST STATE HIGHWAY 71, WITHIN THE CITY LIMITS OF BASTROP, TEXAS, REPEALING ALL CONFLICTING RESOLUTIONS; AND PROVIDING AN EFFECTIVE DATE.**

**WHEREAS**, pursuant to the Texas Local Government Code Section 212 and the City of Bastrop Subdivision Ordinance, the City Council is required to take action regarding certain plats; and

**WHEREAS**, 71 Retail Partners LP ("the Applicant") has submitted a preliminary plat Bastrop Grove, a commercial subdivision; and

**WHEREAS**, the preliminary plat is consistent with the Comprehensive Plan designation of General Commercial and requirements of the Zoning District, C-1, Commercial-1; and

**WHEREAS**, the preliminary plat is conforms to the Transportation Master Plan and includes right-of-way dedication for the extension of Agnes Street; and

**WHEREAS**, the preliminary plat for Bastrop Grove was recommended for approval by the Planning & Zoning Commission on July 27, 2017; and

**WHEREAS**, the Bastrop Planning and Engineering Department has reviewed the above-referenced final plat and found it is in compliance with the Comprehensive Plan, Zoning Ordinance, and Subdivision Ordinance; and

**WHEREAS**, notice of the subdivision were sent in accordance with the Subdivision Ordinance to notify the public.

**NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BASTROP, TEXAS:**

**Section 1.** The Preliminary Plat known as Bastrop Grove, being 52.684 acres out of the Nancy Blakey Survey, located east of Highway 304 and south of West State Highway 71, attached hereto as Exhibit "A" and incorporated herein for all purposes.

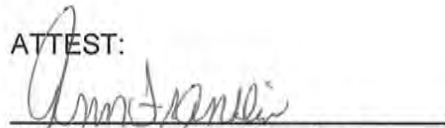
DULY RESOLVED AND ADOPTED by the City Council of the City of Bastrop this 8<sup>th</sup> day of August, 2017.

CITY OF BASTROP, TEXAS

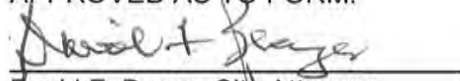
APPROVED:

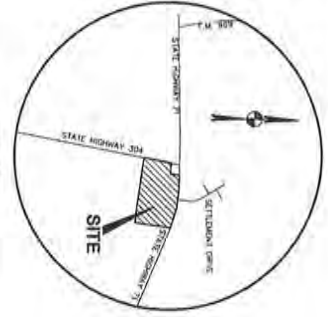
  
\_\_\_\_\_  
Bonnie B. Schroeder, Mayor

ATTEST:

  
\_\_\_\_\_  
Ann Franklin, City Secretary

APPROVED AS TO FORM:

  
\_\_\_\_\_  
David F. Bragg, City Attorney



VICINITY MAP

# BASTROP GROVE PRELIMINARY PLAT

**OWNER:** TI RETAIL PARTNERS LP  
8214 WESTCHESTER DRIVE, SUITE 590  
DALLAS, TEXAS 75225

**ENGINEER:** STANTEC CONSULTING SERVICES, INC.  
221 WEST SMITH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

**SUPERVISOR:** STANTEC CONSULTING SERVICES, INC.  
221 WEST SMITH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

**WATERSHED STATUS:**  
THIS SITE IS LOCATED WITHIN THE LOWER COLORADO RAIN FOREST WATERSHED.

**FLOODPLAIN INFORMATION:**  
A PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN THE BOUNDARIES OF THE 500-YEAR FLOODPLAIN AS DETERMINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FEDERAL CITY OF BASTROP. FLOODPLAIN INFORMATION FROM FEMA RECORDS, EFFECTIVE DATED JANUARY 19, 2009 FOR BASTROP COUNTY, TEXAS PER VOLUME 208 PLAT 04.

**LEGAL DESCRIPTION:**  
6.641 ACRES OF THE UNIMPROVED TRACT, TRACT NO. 48, 50, 51 WITHIN THE CITY OF BASTROP, BASTROP COUNTY, TEXAS PER VOLUME 208 PLAT 04.

**UTILITY PROVIDERS:**  
WATER SERVICE: CITY OF BASTROP  
SEWER SERVICE: CITY OF BASTROP  
ELECTRIC SERVICE: BASTROP ELECTRIC COOPERATIVE  
TELEPHONE: AT&T



Austin, Texas 78701  
221 West Smith Street, Suite 600  
Austintx.com  
Phone: 512.328.0011  
Fax: 512.328.0011  
Copyright © 2017

**BASTROP GROVE**  
ZONING: COMMERCIAL-1  
NO. OF LOTS: 9  
LOT PORCENT: 51.25 ACRES  
TOTAL PORCENT: 32.88 ACRES  
TOTAL ACRES: 32.88 ACRES

**SUBMISSION NO.:**  
**ADDRESS:**

**SUBMITTED DATE:** MAY 22, 2017

**SUBMITTED BY:**

*Joseph Farris*  
JOSEPH FARRIS, P.E., P.E.  
STANTEC CONSULTING SERVICES, INC.  
221 WEST SMITH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

07/12/2017  
DATE



APPROVED FOR ACCEPTANCE:

CITY ENGINEER

DATE

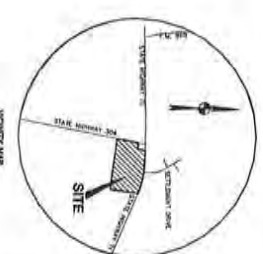
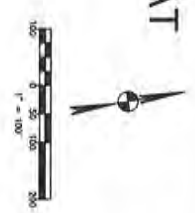
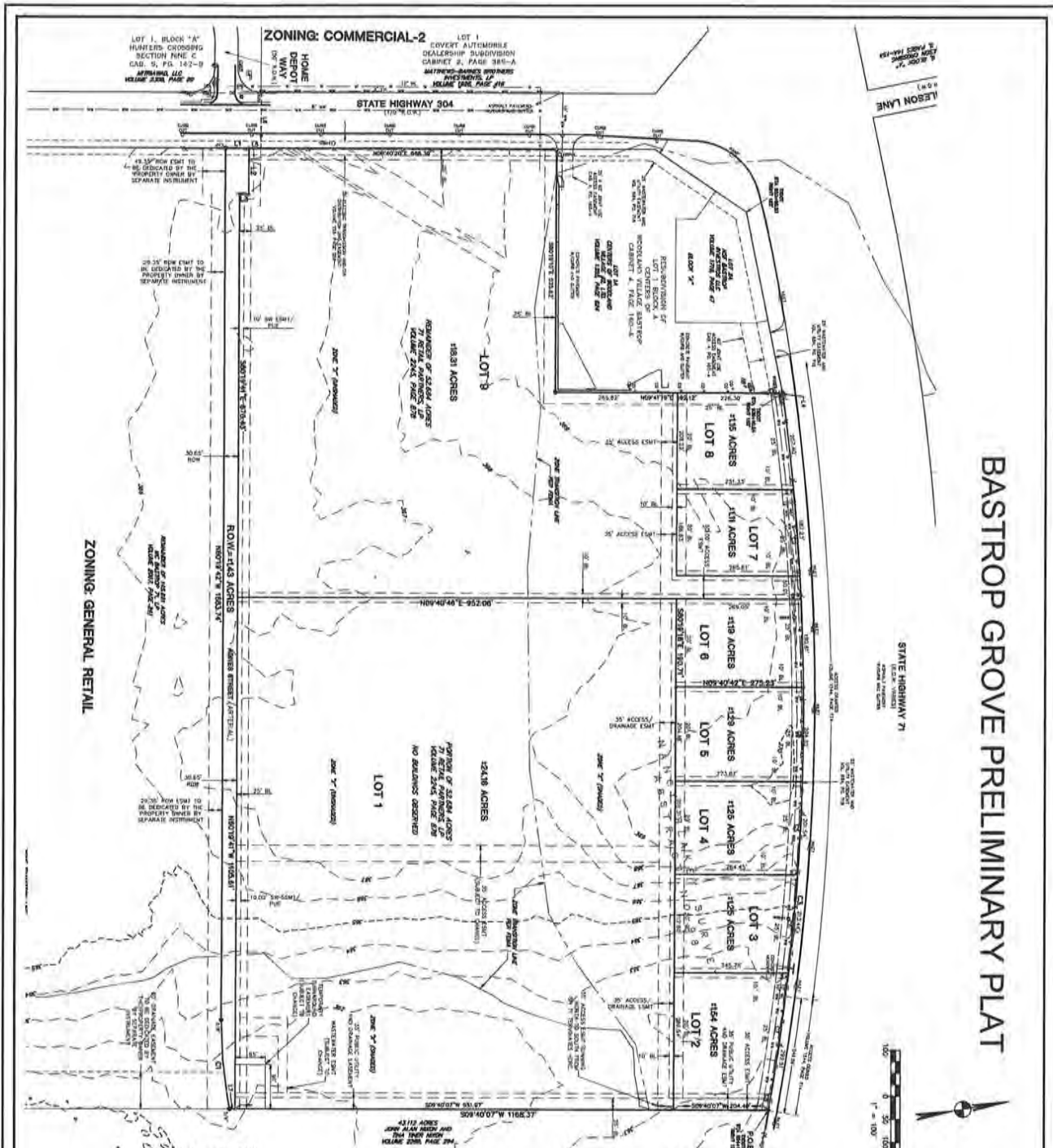
SHEET NO.	DESCRIPTION
1	OWNER PRELIMINARY PLAT
2	PRELIMINARY PLAT
3	GENERAL NOTES
4	GENERAL NOTES

SHEET INDEX

NO.	DESCRIPTION	REVISION (NO. & DATE)	REASON FOR CHANGE (NO. & DATE)	DATE

ALL RESPONSIBILITY FOR THE ACCURACY OF THESE PLANS REMAINS WITH THE SUBMITTER. THE CITY OF BASTROP DOES NOT WARRANT THAT THESE PLANS WILL BE CONSIDERED AS A GUARANTEE OF ANY KIND. THE CITY OF BASTROP DOES NOT WARRANT THAT THESE PLANS WILL BE CONSIDERED AS A GUARANTEE OF ANY KIND. THE CITY OF BASTROP DOES NOT WARRANT THAT THESE PLANS WILL BE CONSIDERED AS A GUARANTEE OF ANY KIND. THE CITY OF BASTROP DOES NOT WARRANT THAT THESE PLANS WILL BE CONSIDERED AS A GUARANTEE OF ANY KIND.

# BASTROP GROVE PRELIMINARY PLAT



## ZONING COMMERCIAL-1

PRINCIPAL USE	PERMITTED
1.1 OFFICE BUILDING	PERMITTED
1.2 BUSINESS SERVICE BUILDING	PERMITTED
1.3 SERVICE BUILDING	PERMITTED
1.4 SERVICE BUILDING	PERMITTED
1.5 SERVICE BUILDING	PERMITTED
1.6 SERVICE BUILDING	PERMITTED
1.7 SERVICE BUILDING	PERMITTED

OWNER	ACRES	SECTION	COMMENTS
1.1	146.8	1	COMMERCIAL-2
2.1	118.9	2	COMMERCIAL-2
3.1	118.9	3	COMMERCIAL-2
4.1	118.9	4	COMMERCIAL-2
5.1	118.9	5	COMMERCIAL-2
6.1	118.9	6	COMMERCIAL-2
7.1	118.9	7	COMMERCIAL-2
8.1	118.9	8	COMMERCIAL-2
9.1	118.9	9	COMMERCIAL-2

**FLOOD NOTE:**  
 THE FLOOD ZONE DESIGNATION IS BASED ON THE FLOOD ZONE MAP OF THE COUNTY OF TARRANT, TEXAS, AS OF THE DATE OF THE PLAT. THE FLOOD ZONE DESIGNATION IS SUBJECT TO CHANGE WITHOUT NOTICE. THE FLOOD ZONE DESIGNATION IS NOT A GUARANTEE OF THE ACCURACY OF THE FLOOD ZONE MAP. THE FLOOD ZONE DESIGNATION IS NOT A GUARANTEE OF THE ACCURACY OF THE FLOOD ZONE MAP. THE FLOOD ZONE DESIGNATION IS NOT A GUARANTEE OF THE ACCURACY OF THE FLOOD ZONE MAP.

**RECORDING NOTE:**  
 THIS PLAT IS SUBJECT TO THE RECORDING ACT OF THE STATE OF TEXAS. THE RECORDING ACT OF THE STATE OF TEXAS PROVIDES THAT A PLAT IS NOT VALID UNLESS IT IS RECORDED IN THE PUBLIC RECORDS OF THE COUNTY OF TARRANT, TEXAS. THIS PLAT IS BEING RECORDED IN THE PUBLIC RECORDS OF THE COUNTY OF TARRANT, TEXAS.

**NOTES:**  
 1. THE CONTAINMENT, LOT SHALL, NOT HAVE DIRECT ACCESS TO THE SH 71.  
 2. THE SH 71 ACCESS SHALL BE PROVIDED BY THE ADJACENT PROPERTY OWNERS.  
 3. THE SH 71 ACCESS SHALL BE PROVIDED BY THE ADJACENT PROPERTY OWNERS.  
 4. THE SH 71 ACCESS SHALL BE PROVIDED BY THE ADJACENT PROPERTY OWNERS.  
 5. THE SH 71 ACCESS SHALL BE PROVIDED BY THE ADJACENT PROPERTY OWNERS.

DATE	NO.	REVISION	APPROVAL

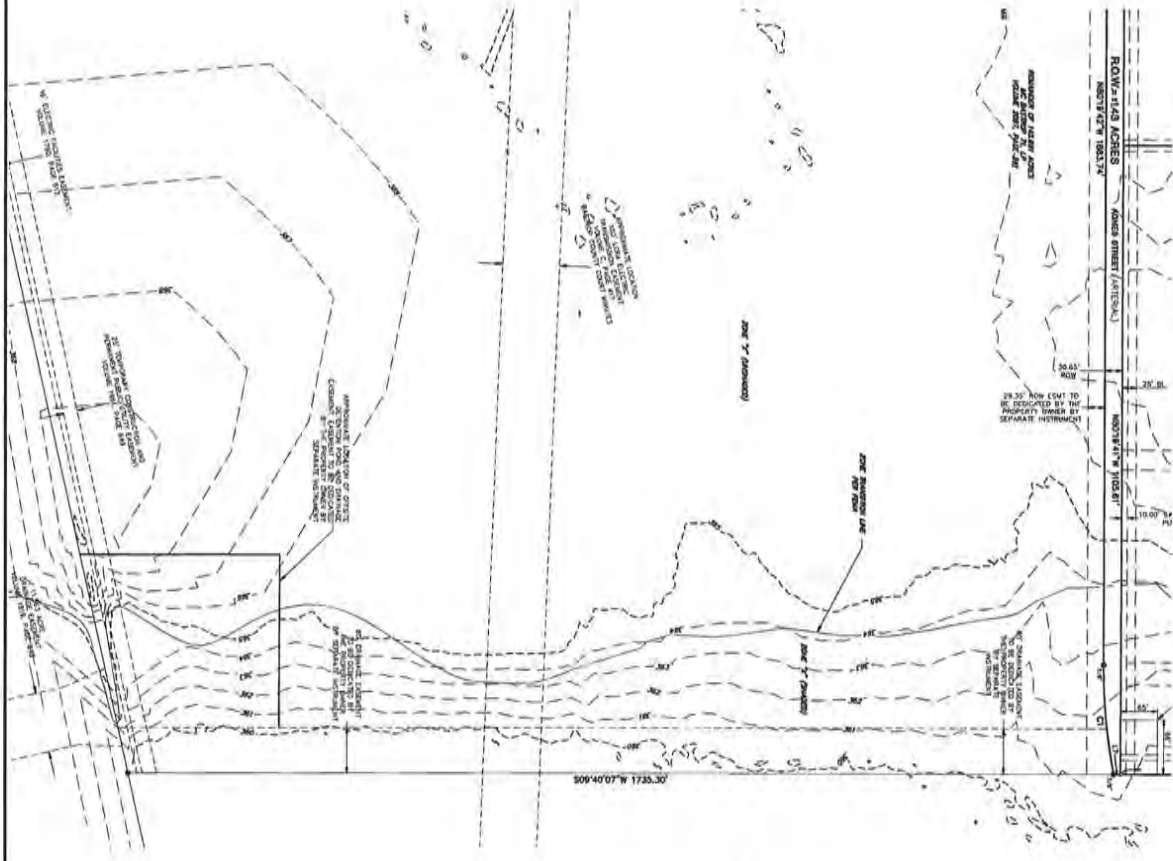
DRAWN BY: JAMPED  
 DESIGNED BY: 1980  
 SA / DC: JF  
 PROJECT NO.: 28201077

**BASTROP GROVE PRELIMINARY PLAT**  
 SH 71 AT SH 304, BASTROP, TX 78602  
**71 RETAIL PARTNERS LP**

**PRELIMINARY PLAT**

**Stantec**  
 821 West Sixth Street, Suite 600  
 Austin, Texas 78701  
 Tel: 512-328-0411 Fax: (512) 328-8811  
 TDD: (512) 328-0411 TDD: (512) 328-8811  
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# BASTROP GROVE PRELIMINARY PLAT



**NOTES**  
 1. Contouring shown with 1/4" to 10' contour interval.  
 2. Contouring of water bodies shown with 1' contour interval.  
 3. Contouring of roads shown with 1' contour interval.  
 4. Contouring of other features shown with 1' contour interval.

- LEGEND**
- 1/4" ROAD RIGHT OF WAY (LIMITS)
  - 1/2" ROAD RIGHT OF WAY (LIMITS)
  - 1" ROAD RIGHT OF WAY (LIMITS)
  - 2" ROAD RIGHT OF WAY (LIMITS)
  - 3" ROAD RIGHT OF WAY (LIMITS)
  - 4" ROAD RIGHT OF WAY (LIMITS)
  - 5" ROAD RIGHT OF WAY (LIMITS)
  - 6" ROAD RIGHT OF WAY (LIMITS)
  - 7" ROAD RIGHT OF WAY (LIMITS)
  - 8" ROAD RIGHT OF WAY (LIMITS)
  - 9" ROAD RIGHT OF WAY (LIMITS)
  - 10" ROAD RIGHT OF WAY (LIMITS)
  - 11" ROAD RIGHT OF WAY (LIMITS)
  - 12" ROAD RIGHT OF WAY (LIMITS)
  - 13" ROAD RIGHT OF WAY (LIMITS)
  - 14" ROAD RIGHT OF WAY (LIMITS)
  - 15" ROAD RIGHT OF WAY (LIMITS)
  - 16" ROAD RIGHT OF WAY (LIMITS)
  - 17" ROAD RIGHT OF WAY (LIMITS)
  - 18" ROAD RIGHT OF WAY (LIMITS)
  - 19" ROAD RIGHT OF WAY (LIMITS)
  - 20" ROAD RIGHT OF WAY (LIMITS)



DATE	BY	REVISION	APPROVAL

OF <b>3</b> SHEET 4	DRAWN BY: JAMPSO
	DESIGNED BY: PISO
	QA/QC #:
	PROJECT NO.: 222010772

**BASTROP GROVE PRELIMINARY PLAT**  
 SH 71 AT SH 304, BASTROP, TX 78602  
**71 RETAIL PARTNERS LP**

PRELIMINARY PLAT



  
 221 West Sixth Street, Suite 400  
 Austin, Texas 78701  
 Tel: (512) 536-9511 Fax: (512) 538-0535  
 TWP: # F-4334 TWP: # F-10142H  
 Copyright © 2017

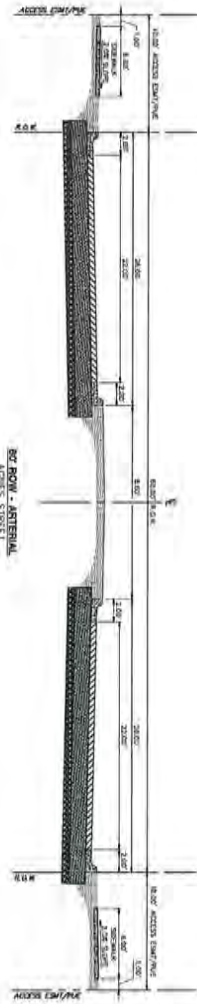
# BASTROP GROVE PRELIMINARY PLAT

**PRELIMINARY PLAT NOTES**

1. ALL DIMENSIONS OF ACCESS TO BE LOCATED ON THE MOST RECENT PLAT FOR THE SITE. REVISION 1, 2013, CONSIDERED BY 2/22/2016. ALL DIMENSIONS OF ACCESS TO BE LOCATED ON THE MOST RECENT PLAT FOR THE SITE.
2. THE OWNER OF THE SUBDIVISION, AND HIS OR HER SUCCESSORS AND ASSIGNS, ASSUMES SOLE RESPONSIBILITY FOR THE PROVISION OF ALL UTILITY SERVICES TO THE SUBDIVISION. THE CITY OF BASTROP WILL NOT BE RESPONSIBLE FOR THE PROVISION OF ANY UTILITY SERVICES TO THE SUBDIVISION.
3. THE OWNER OF THE SUBDIVISION, AND HIS OR HER SUCCESSORS AND ASSIGNS, ASSUMES SOLE RESPONSIBILITY FOR THE PROVISION OF ALL UTILITY SERVICES TO THE SUBDIVISION. THE CITY OF BASTROP WILL NOT BE RESPONSIBLE FOR THE PROVISION OF ANY UTILITY SERVICES TO THE SUBDIVISION.
4. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.
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22. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.
23. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.
24. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.
25. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.

**GENERAL NOTES**

1. ALL DIMENSIONS OF ACCESS TO BE LOCATED ON THE MOST RECENT PLAT FOR THE SITE.
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24. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.
25. ALL UTILITY SERVICES TO BE PROVIDED BY THE CITY OF BASTROP.



**GENERAL NOTES**

DATE	NO.	REVISION	APPROVAL

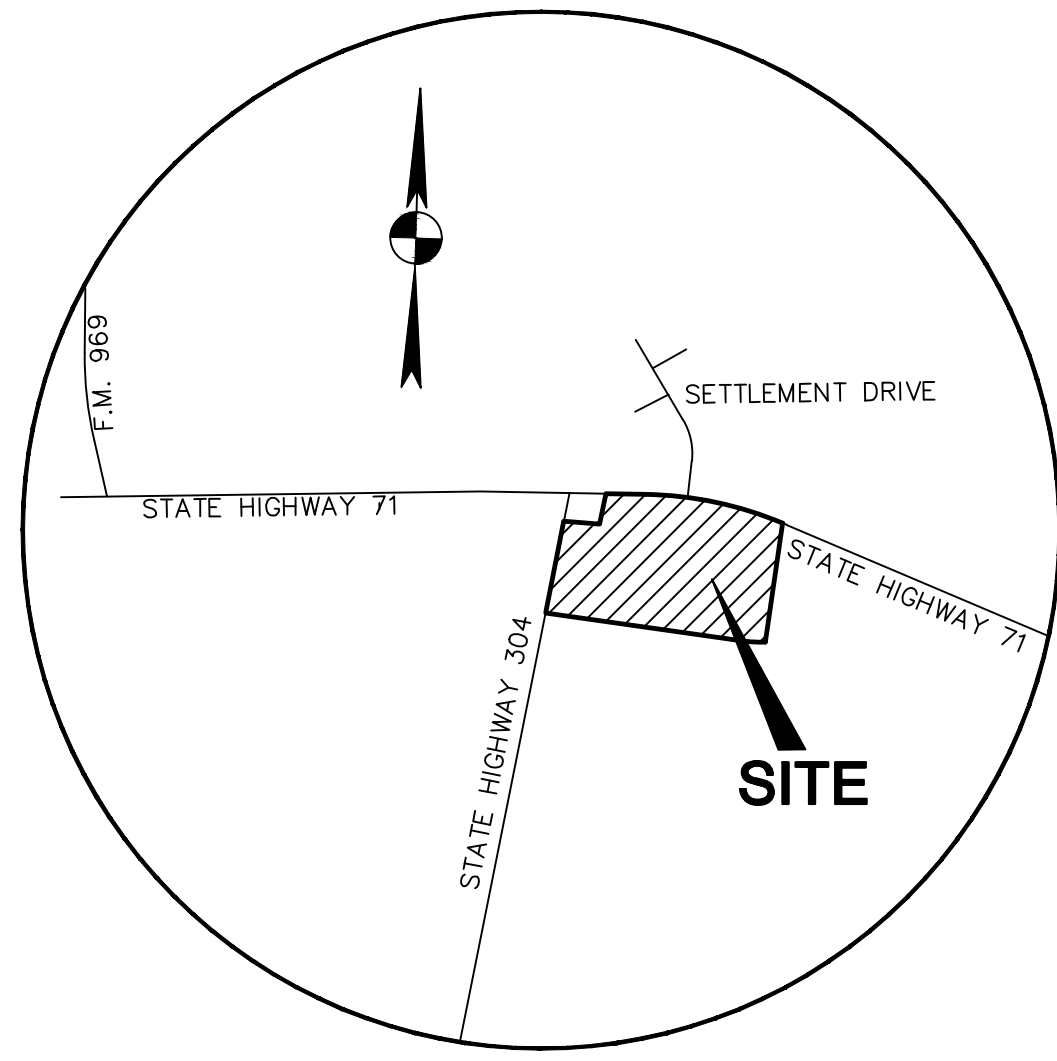


**Stantec**

221 West Dallas Street, Suite 600  
Aurora, Texas 78701  
Tel: (512) 336-6001 Fax: (512) 336-6033  
TELE # 71-6314 TRS# R-10184000  
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SHEET <span style="font-size: 2em;">4</span> OF 4	DRAWN BY: JAMESB DESIGNED BY: RSD QA/QC: JF PROJECT NO.: 225010772	<b>BASTROP GROVE PRELIMINARY PLAT SH 71 AT SH 304, BASTROP, TX 78602</b>  <b>71 RETAIL PARTNERS LP</b>
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VICINITY MAP  
N.T.S.

SHEET INDEX	
SHEET NO.	DESCRIPTION
1	COVER
2	PRELIMINARY PLAT
3	PRELIMINARY PLAT
4	GENERAL NOTES

# BASTROP GROVE PRELIMINARY PLAT

**OWNER:** 71 RETAIL PARTNERS LP  
8214 WESTCHESTER DRIVE, SUITE 550  
DALLAS, TEXAS 75225

**ENGINEER:** STANTEC CONSULTING SERVICES, INC.  
221 WEST SIXTH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

**SURVEYOR:** STANTEC CONSULTING SERVICES, INC.  
221 WEST SIXTH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

**BASTROP GROVE**  
ZONING: COMMERCIAL-1  
NO. OF LOTS: 9  
LOT ACREAGE: 51.25 ACRES  
ROW ACREAGE: 1.43 ACRES  
TOTAL ACREAGE: 52.68 ACRES

**WATERSHED STATUS:**

THIS SITE IS LOCATED WITHIN THE LOWER COLORADO-CUMMINS WATERSHED.

**FLOODPLAIN INFORMATION:**

A PORTION OF THE SUBJECT PROPERTY IS LOCATED WITHIN THE BOUNDARIES OF THE 500 YEAR FLOODPLAIN, AS IDENTIFIED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FEDERAL INSURANCE ADMINISTRATION, SHOWN ON MAP NO. 48021C0355E, DATED JANUARY 19, 2006 FOR CITY OF BASTROP.

**LEGAL DESCRIPTION:**

52.684 ACRES OF THE NANCY BLAKEY ABSTRACT NO. 98 SITUATED IN THE CITY OF BASTROP IN BASTROP COUNTY, TEXAS PER VOLUME 2245, PAGE 828.

**UTILITY PROVIDERS:**

WATER SERVICE: CITY OF BASTROP  
WASTEWATER SERVICE: CITY OF BASTROP  
ELECTRIC: BLUEBONNET ELECTRIC  
GAS: CENTERPOINT ENERGY  
TELEPHONE: AT&T

SUBDIVISION NO. :

ADDRESS :

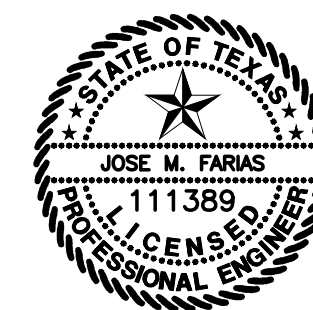
SUBMITTAL DATE : MAY 22, 2017

SUBMITTED BY :

07/07/2017

JOSE M. FARIS, P.E., P.E.  
STANTEC CONSULTING SERVICES, INC.  
221 WEST SIXTH STREET, SUITE 600  
AUSTIN, TEXAS 78701  
(512) 328-0011

DATE



APPROVED FOR ACCEPTANCE:

CITY COUNCIL

DATE

NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V) SHEET NO.'S	TOTAL # SHEETS IN PLAN SET	NET CHANGE IMP. COVER (sq. ft.)	TOTAL SITE IMP. COVER (sq. ft.) [%]	CITY OF AUSTIN APPROVAL/DATE	DATE IMAGED

I, JOSE M. FARIS, P.E., P.E. AM AUTHORIZED UNDER THE LAWS OF THE STATE OF TEXAS TO PRACTICE THE PROFESSION OF ENGINEERING, AND HEREBY CERTIFY THAT THIS PRELIMINARY PLAN IS FEASIBLE FROM AN ENGINEERING STANDPOINT AND COMPLIES WITH THE ENGINEERING RELATED PORTIONS OF CHAPTER 10 OF THE BASTROP CITY CODE AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. I CERTIFY THAT THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE, AND ADEQUATE FOR THE INTENDED PURPOSES, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.

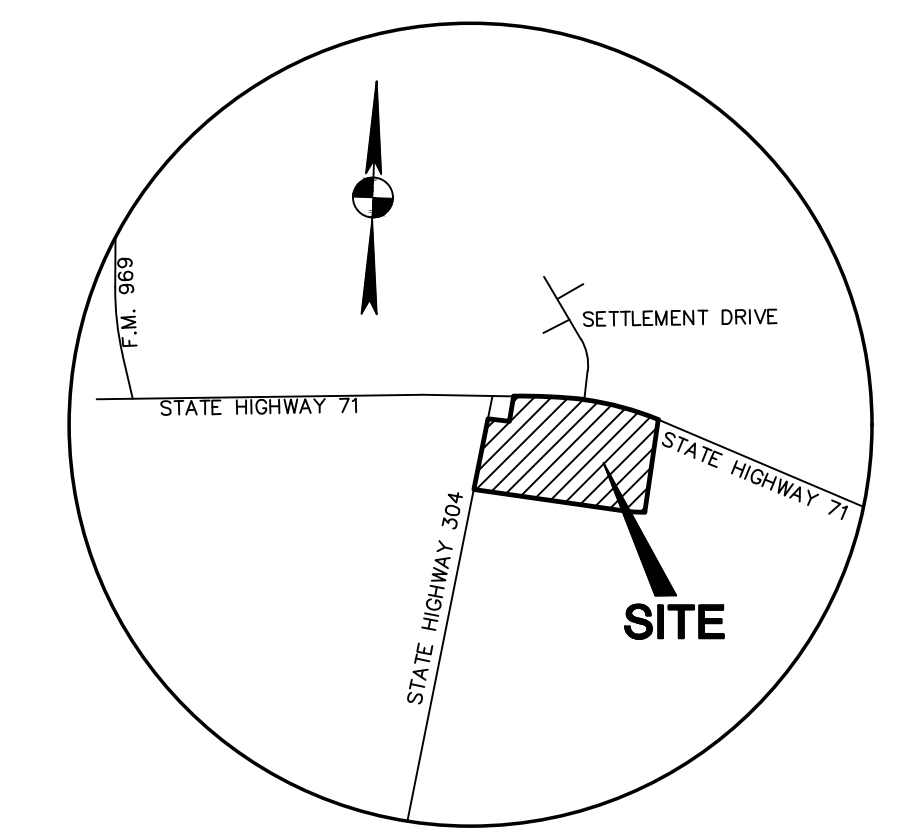
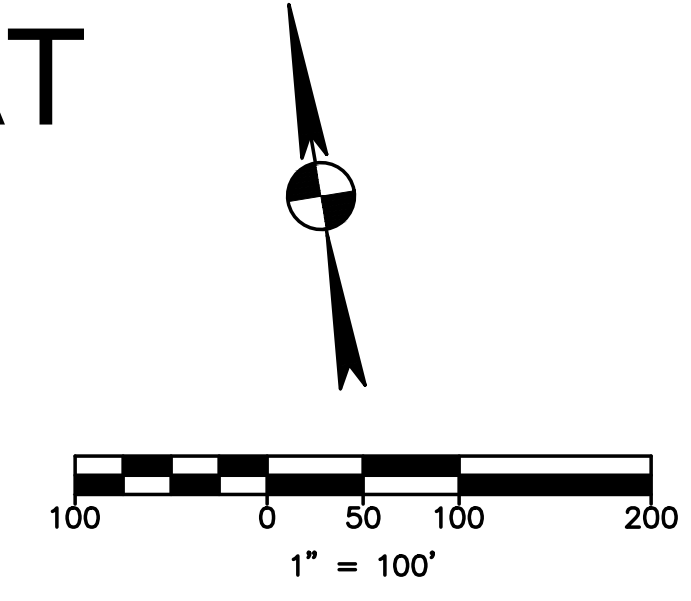
ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN APPROVING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER. THE PLANS WERE PREPARED IN ACCORDANCE WITH CHAPTER 10, BASTROP CITY CODE.

FILE: V:\2220\active\222010772\civil\cad\prelim plat\222010772T12.dwg



221 West Sixth Street, Suite 600  
Austin, Texas 78701  
Tel. (512) 328-0011 Fax (512) 328-0325  
TBPE # F-6324 TBPLS # F-10194230  
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# BASTROP GROVE PRELIMINARY PLAT



**STATE HIGHWAY 71**  
(R.O.W. VARIES)  
ASPHALT PAVEMENT  
W/CURB AND GUTTER

**VICINITY MAP**  
N.T.S.

**LEGEND**

- 1/2" IRON ROD FOUND (UNLESS NOTED)
- 1/2" IRON ROD WITH "STANTEC" CAP SET
- LIGHT POLE
- POWER POLE
- DOWN CUY
- FIRE HYDRANT
- WATER VALVE
- CABLE TV RISER
- ELECTRIC BOX
- ELECTRIC METER
- OVERHEAD ELEC. LINE
- WASTEWATER MANHOLE
- STORMSEWER MANHOLE
- WASTE WATER CLEANOUT
- WASTE WATER LINE
- UNDERGROUND CABLE MARKER
- SIGN
- (XXX) RECORD INFORMATION
- P.O.B. POINT OF BEGINNING

**ZONING: COMMERCIAL-1**

PARCEL LINE DATA		
LINE #	BEARING	DISTANCE
L1	N9°40'20"E	50.65'
L2	S80°19'41"E	100.00'
L3	S9°40'19"W	20.00'
L4	N87°43'09"E	2.31'
L5	N9°40'21"E	25.69'
L6	S80°19'40"E	120.01'
L7	S9°40'07"W	12.00'

PARCEL CURVE DATA					
CURVE #	LENGTH	RADIUS	DELTA	CHORD LENGTH	BEARING
C1	193.51'	1000.00'	11°05'14"	193.21'	N85° 51' 54.79"W
C2	635.52'	5058.31'	7°11'55"	635.10'	S84° 41' 47.98"E
C3	918.69'	5058.31'	10°24'22"	917.43'	S75° 53' 39.54"E
C4	204.20'	5058.31'	2°18'47"	204.19'	N79° 56' 27.16"W
C5	201.55'	5058.31'	2°16'59"	201.53'	N77° 38' 34.52"W
C6	213.44'	5058.31'	2°25'03"	213.42'	N75° 17' 33.57"W
C7	248.84'	5058.31'	2°49'07"	248.81'	N72° 40' 28.42"W
C8	50.67'	5058.31'	0°34'26"	50.67'	N70° 58' 41.75"W

**BEARING BASIS NOTE:**

THE BASIS OF BEARING OF THE SURVEY SHOWN HEREON IS TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83(96), UTILIZING WESTERN DATA SYSTEMS CONTINUALLY OPERATING REFERENCE STATION (CORS) NETWORK.

**FLOOD NOTE:**

THE TRACT SHOWN HEREON LIES WITHIN ZONE "X" (UNSHADED), (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AND ZONE "X" (SHADED), (AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD), AS IDENTIFIED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FEDERAL INSURANCE ADMINISTRATION, AS SHOWN ON MAP NO. 4802100355E, DATED JANUARY 19, 2006, FOR BASTROP COUNTY, TEXAS AND INCORPORATED AREAS. IF THIS SITE IS NOT WITHIN AN IDENTIFIED SPECIAL FLOOD HAZARD AREA, THIS FLOOD STATEMENT DOES NOT IMPLY THAT THE PROPERTY AND/OR THE STRUCTURES THEREON WILL BE FREE FROM FLOODING OR FLOOD DAMAGE. THIS FLOOD STATEMENT SHALL NOT CREATE LIABILITY ON THE PART OF THE SURVEYOR.

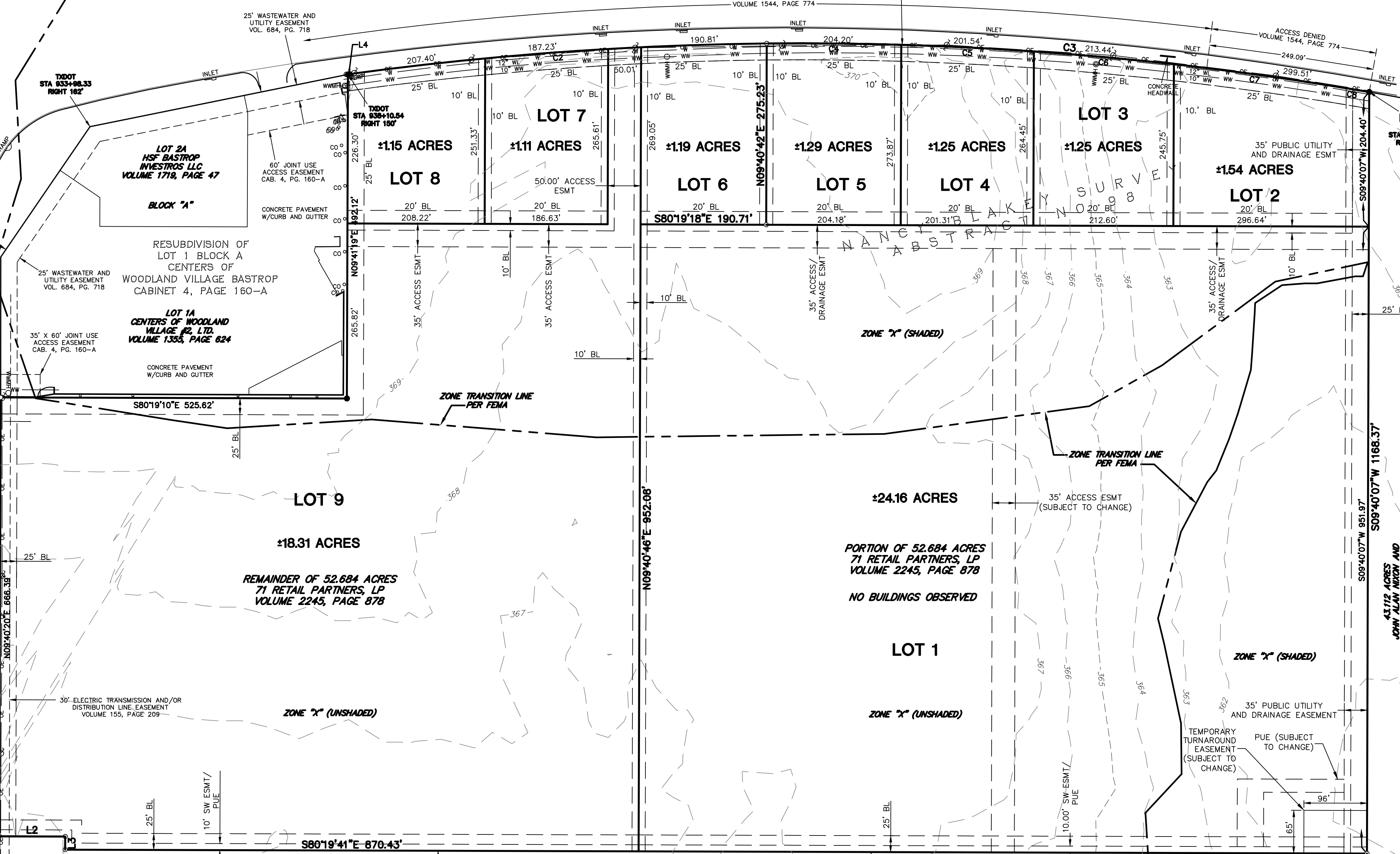
**NOTES:**

1. THE OUT-PARCEL LOTS SHALL NOT HAVE DIRECT ACCESS TO THE SH 71.
2. THE 18.31 ACRE LOT SHALL NOT HAVE DIRECT ACCESS TO SH 304.
3. THE OWNERS OF THE 18.31 ACRE LOT AND THE 24.4 ACRE LOT ARE RESPONSIBLE FOR PROVIDING PUBLIC ACCESS BETWEEN SH 71 AND AGNES ST. AT THE TIME OF THEIR DEVELOPMENT.
4. TOPOGRAPHY SHOWN WITHIN LOTS 1-6 AND AGNES STREET IS BASED ON A GROUND SURVEY.
5. TOPOGRAPHY SHOWN WITHIN LOTS 7-9 IS BASED ON 2008 CAPOCG 5' CONTOUR GIS DATA.

LOT 1, BLOCK "A"  
HUNTERS CROSSING  
SECTION NINE C  
CAB. 5, PG. 142-B  
VOLUME 2389, PAGE 88

LOT 1, BLOCK "A"  
CONVERT AUTOMOBILE  
DEALERSHIP SUBDIVISION  
CABINET 2, PAGE 365-A  
MATHIAS-BARNES PROPERTIES  
INVESTMENTS LP  
VOLUME 1698, PAGE 419

LOT 1, BLOCK "A"  
HUNTERS CROSSING  
SECTION NINE C  
CAB. 5, PG. 142-B  
VOLUME 2389, PAGE 88



**ZONING: GENERAL RETAIL**

**Stantec**  
221 West Sixth Street, Suite 600  
Austin, Texas 78701  
Tel: (512) 338-0011 Fax: (512) 338-0325  
TBP# F-6324 TBP# F-10194230  
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APPROVAL: [Signature]  
REVISION: [Table]  
DATE: 07/07/2017

**PRELIMINARY PLAT**

STATE OF TEXAS  
COUNTY OF TARRANT  
REGISTERED PROFESSIONAL ENGINEER  
NO. 11389  
07/07/2017

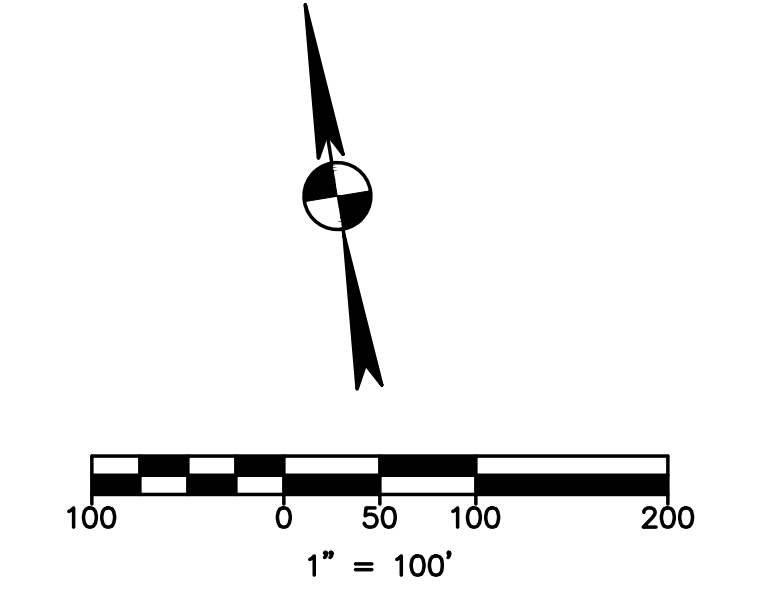
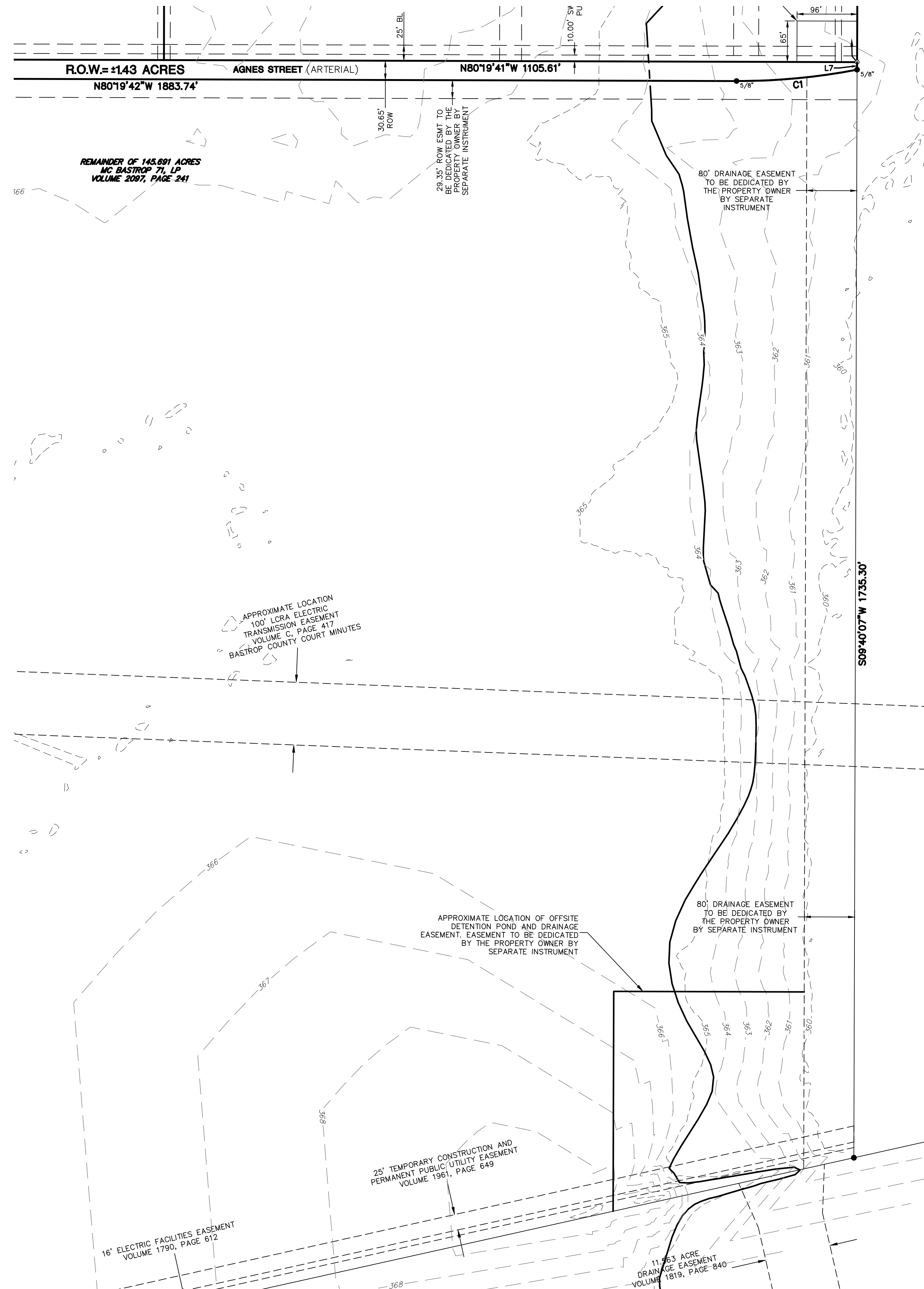
**BASTROP GROVE PRELIMINARY PLAT**  
SH 71 AT SH 304, BASTROP, TX 78602

71 RETAIL PARTNERS LP

DRAWN BY: JAMPFSD  
DESIGNED BY: PSD  
QA / OC: JF  
PROJECT NO.: 222010772

SHEET  
**2**  
OF 4

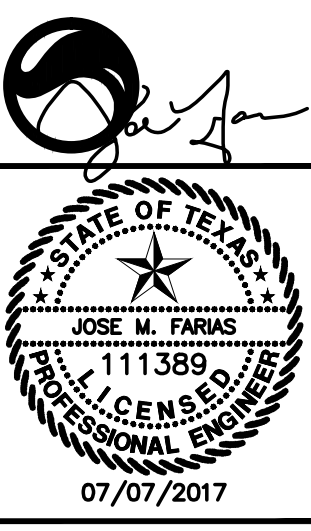
# BASTROP GROVE PRELIMINARY PLAT



- LEGEND**
- 1/2" IRON ROD FOUND (UNLESS NOTED)
  - 1/2" IRON ROD WITH "STANTEC" CAP SET
  - ⊙ LIGHT POLE
  - ⊕ POWER POLE
  - ⊖ DOWN GUY
  - ⊕ FIRE HYDRANT
  - ⊕ WATER VALVE
  - ⊕ CABLE TV RISER
  - ⊕ ELECTRIC BOX
  - ⊕ ELECTRIC METER
  - oe — OVERHEAD ELEC. LINE
  - WMHO WASTEWATER MANHOLE
  - SMHO STORMSEWER MANHOLE
  - co ° WASTEWATER CLEANOUT
  - ww — WASTE WATER LINE
  - ⊕ UNDERGROUND CABLE MARKER
  - SIGN
  - (XXX) RECORD INFORMATION
  - P.O.B. POINT OF BEGINNING

- NOTES:**
- TOPOGRAPHY SHOWN WITHIN THE MC BASTROP 71, LP TRACT OF LAND IS BASED ON 2008 CAPCOG 5' CONTOUR GIS DATA.
  - OFFSITE DETENTION POND BEING PROVIDED WILL PROVIDE DETENTION FOR LOTS 1-9 AND THE SECTION OF AGNES STREET (ARTERIAL) SHOWN ON THIS PLAT.

DATE	NO.	REVISION	APPROVAL



**Stantec**  
 221 West Sixth Street, Suite 600  
 Austin, Texas 78701  
 Tel. (512) 338-0011 Fax (512) 338-0325  
 TBPE # F-6324, TBPLS # F-10194230  
 Copyright © 2017

## PRELIMINARY PLAT

BASTROP GROVE PRELIMINARY PLAT  
 SH 71 AT SH 304, BASTROP, TX 78602

71 RETAIL PARTNERS LP

DRAWN BY: JAMPFSD  
 DESIGNED BY: PSD  
 QA / QC: JF  
 PROJECT NO.: 222010772

SHEET  
**3**  
 OF 4

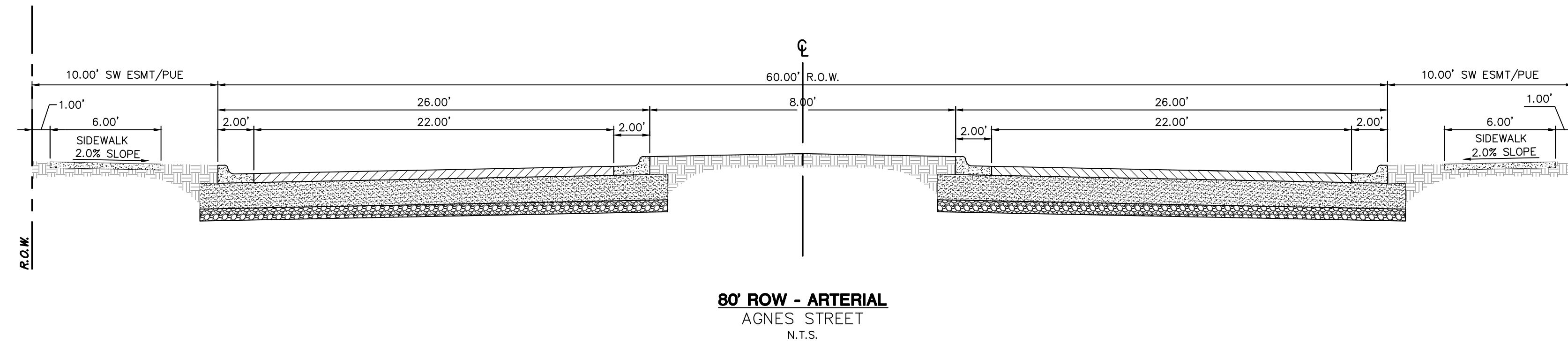
# BASTROP GROVE PRELIMINARY PLAT

## PRELIMINARY PLAN NOTES:

1. ALL EASEMENTS OF RECORD AS INDICATED ON THE MOST RECENT TITLE RUN (DATED: FEBRUARY 7, 2017, CONDUCTED BY \_\_\_\_\_) FOR THIS PROPERTY ARE SHOWN ON THIS PLAT.
2. FISCAL SURETY FOR SUBDIVISION CONSTRUCTION, IN A FORM ACCEPTABLE TO THE CITY OF BASTROP, SHALL BE PROVIDED PRIOR TO PLAT APPROVAL BY THE CITY.
3. THE OWNER OF THIS SUBDIVISION, AND HIS OR HER SUCCESSORS AND ASSIGNS, ASSUMES SOLE RESPONSIBILITY FOR PLANS FOR CONSTRUCTION OF SUBDIVISION IMPROVEMENTS WHICH COMPLY WITH APPLICABLE CODES AND REQUIREMENTS OF THE CITY OF BASTROP. THE OWNER UNDERSTANDS AND ACKNOWLEDGES THAT PLAT VACATION OR RE-PLATTING MAY BE REQUIRED, AT THE OWNER'S SOLE EXPENSE, IF PLANS TO CONSTRUCT THIS SUBDIVISION DO NOT COMPLY WITH SUCH CODES AND REQUIREMENTS.
4. WATER SERVICE IS PROVIDED BY THE CITY OF BASTROP.
5. WASTEWATER SERVICE IS PROVIDED BY THE CITY OF BASTROP.
6. ELECTRIC SERVICE IS PROVIDED BY THE BLUEBONNET ELECTRIC COOPERATIVE.
7. ALL UTILITIES WILL BE UNDERGROUND.
8. NO LOT IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL CONNECTED TO THE APPROVED WATER DISTRIBUTION AND WASTEWATER COLLECTION FACILITIES.
9. A PORTION OF THIS TRACT IS WITHIN A FLOOD HAZARD AREA AS SHOWN ON THE FLOOD INSURANCE RATE MAP PANEL # 4802100355E FOR BASTROP CO., EFFECTIVE JANUARY 19, 2006 COMMUNITY # 480022 AND IS ON ZONE X.
10. OFF-SITE STORM WATER DETENTION FACILITIES WILL BE PROVIDED TO REDUCE POST-DEVELOPMENT PEAK RATES OF DISCHARGE OF THE 5, 10, 25, 50 AND 100-YEAR STORM EVENTS.
11. PROPERTY OWNER SHALL PROVIDE FOR ACCESS TO ALL EASEMENTS AS MAY BE NECESSARY AND SHALL NOT PROHIBIT ACCESS BY GOVERNMENTAL AUTHORITIES.
12. NO BUILDINGS, FENCES, LANDSCAPING OR OTHER STRUCTURES ARE PERMITTED WITHIN DRAINAGE EASEMENTS SHOWN, EXCEPT AS APPROVED BY THE CITY OF BASTROP AND/OR BASTROP COUNTY.
13. ALL EASEMENTS ON PRIVATE PROPERTY SHALL BE MAINTAINED BY THE PROPERTY OWNER OR HIS OR HER ASSIGNS.
14. SIDEWALKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SUBDIVISION ORDINANCE OF THE CITY OF BASTROP.
15. THE OWNER SHALL BE RESPONSIBLE FOR INSTALLATION OF TEMPORARY EROSION CONTROL, RE-VEGETATION AND TREE PROTECTION FOR ELECTRIC UTILITY WORK REQUIRED TO PROVIDE ELECTRIC SERVICE TO THIS PROJECT.
16. OUT-PARCEL LOTS SHALL HAVE NO DIRECT ACCESS TO SH 71.
17. LOT 9 SHALL HAVE NO DIRECT ACCESS TO SH 304.
18. OWNERS OF LOT 1 AND LOT 9 ARE RESPONSIBLE FOR PROVIDING PUBLIC ACCESS BETWEEN SH 71 AND AGNES STREET AT THE TIME OF THEIR DEVELOPMENT.
19. UTILITY IMPACT FEE SHALL BE BASED ON THE CITY OF BASTROP IMPACT FEE ORDINANCE IN EFFECTS AT THE TIME OF FINAL PLATTING FOR EACH LOT.
20. 35-FOOT ACCESS EASEMENT RUNNING NORTH TO SOUTH WITHIN LOT 9 MAY BE RELOCATED WITHIN LOT 9 SO LONG AS IT PROVIDES ACCESS BETWEEN SH 71 AND AGNES STREET.
21. DETENTION FOR LOTS 1-9 AND AGNES STREET WILL BE PROVIDED OFFSITE WITHIN THE ADJACENT TRACT OF LAND LOCATED SOUTH OF AGNES STREET. PLEASE REFERENCE SHEET 3 FOR APPROXIMATE LOCATION OF DETENTION IMPROVEMENTS. FOR DETENTION POND ENGINEERING CALCULATIONS, PLEASE REFERENCE ENGINEERING AND DRAINAGE REPORT PREPARED BY CARLSON, BRIGANCE, AND DOERING.
22. PRIOR TO A SITE DEVELOPMENT PERMIT BEING ISSUED, A DECLARATION OF CONDITIONS, COVENANTS, AND RESTRICTIONS MUST BE RECORDED THAT DEFINES THE PARTY OR PARTIES RESPONSIBLE FOR THE MAINTENANCE OF SHARED/COMMON INTERNAL PRIVATE IMPROVEMENTS SUCH AS DRIVES AND FACILITIES USED IN CONNECTION WITH PRIVATE WATER, SEWER, GAS, ELECTRIC, TELEPHONE, OR OTHER UTILITIES.
23. UTILITY IMPACT FEES SHALL BE BASED ON THE CITY OF BASTROP IMPACT FEE ORDINANCE IN EFFECT AT THE TIME OF FINAL PLATTING FOR EACH LOT.

## GENERAL NOTES:

- 1) ONLY VISIBLE EVIDENCE OF IMPROVEMENTS AND UTILITIES IS SHOWN HEREON.
- 2) A FIELDNOTE DESCRIPTION HAS BEEN PREPARED TO ACCOMPANY THE SURVEY SHOWN HEREON AND IS IDENTIFIED AS STANTEC CONSULTING SERVICES, INC FIELDNOTE FILE FN. NO. 17-048(MJJ)
- 3) AT THE TIME OF SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS IN RECENT MONTHS.
- 4) AT THE TIME OF SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF RECENT CHANGE IN STREET RIGHTS-OF-WAY OR RECENT CONSTRUCTION OR REPAIRS OF STREETS, SIDEWALKS OR OTHER INFRASTRUCTURES.
- 5) THERE IS AN UNDERGROUND WASTEWATER LINE ALONG THE SOUTHERLY RIGHT-OF-WAY LINE OF STATE HIGHWAY 71. NO OTHER VISIBLE ABOVE-GROUND EVIDENCE OF OTHER UTILITIES WERE NOTED.



## GENERAL NOTES


BASTROP GROVE PRELIMINARY PLAT  
SH 71 AT SH 304, BASTROP, TX 78602

71 RETAIL PARTNERS LP


DRAWN BY: JAMFSD  
DESIGNED BY: PSD  
QA / QC: JF  
PROJECT NO.: 222010772

SHEET  
**4**  
OF 4

DATE	NO.	REVISION	APPROVAL



**Stantec**  
221 West Sixth Street, Suite 600  
Austin, Texas 78701  
Tel: (512) 328-0011 Fax: (512) 328-0325  
TBPE # F-6324, TBPLS # F-10194230  
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**Notice of Pending Subdivision Approval  
City of Bastrop  
City Council**



Dear Property Owner:

The **City Council** will conduct a meeting on **March 27, 2018 at 6:30 p.m.** in the **City Hall Council Chambers located at 1311 Chestnut Street, Bastrop, Texas** on the request for Final Plat for **Bastrop Grove, Section 1**, being 30.970 acres out of the Nancy Blakey Survey, Abstract 98.

Owner/Applicant: Ascension Texas/Scott Fuller

Address: South of the State Highway 71 and north of the extension of Agnes Street, located in the city limit of Bastrop, Texas

Legal Description: 30.970 acres out of the Nancy Blakey Survey, Abstract 98.

**The site location map and Final Plat is attached for reference.**

As a property owner within 200 feet of the above referenced property, you are being notified of the upcoming meetings per the Bastrop Code of Ordinances Subdivision Regulations.

Property owners wishing to subdivide land must follow the rules within the City Subdivision Regulations, which can be found online at:

[https://library.municode.com/tx/bastrop/codes/code\\_of\\_ordinances](https://library.municode.com/tx/bastrop/codes/code_of_ordinances).

The city must approve plats in accordance with the process outlined in the Texas Local Government Code, Section 212.

For more information on this project, you can contact the Planning & Development offices at (512) 332-8840, [plan@cityofbastrop.org](mailto:plan@cityofbastrop.org), or visit the office at 1311 Chestnut Street, Bastrop, Texas.



Location Map  
Final Plat  
Bastrop Grove Section 1

1 inch = 360.35 feet



The accuracy and precision of this cartographic data is limited and should be used for information/planning purposes only. This data does not replace surveys conducted by registered Texas land surveyors nor does it constitute an "official" verification of zoning, land use classification, or other classification set forth in local, state, or federal regulatory processes. The City of Bastrop, nor any of its employees, do not make any warranty of merchantability and fitness for particular purpose, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any such information, nor does it represent that its use would not infringe upon privately owned rights.

Date: 3/13/2018

# BASTROP GROVE SECTION 1 - FINAL PLAT

## CITY OF BASTROP, BASTROP COUNTY, TEXAS

JUNE 2017

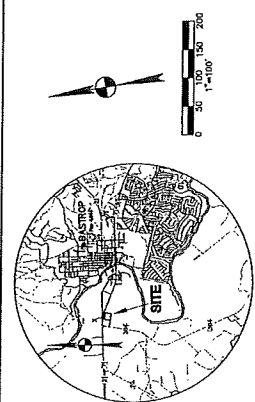
**LEGEND**

- 0 1/2" (BIO 100 SWI "THINSET" CAP SET)
- 0 1/2" (BIO 100 SWI (UNDER PAVED))
- 0 1/2" (BIO 100 SWI "THINSET" CAP FOUND)
- 0 1/2" (BIO 100 SWI "THINSET" CAP FOUND)
- 0 1/2" (BIO 100 SWI)
- 0 1/2" (CONCRETE SWATHOUT FINDER)
- 0 1/2" (BIO 100 SWI)
- 0 1/2" (BIO 100 SWI)
- 0 1/2" (BIO 100 SWI)
- 0 1/2" (BIO 100 SWI)
- 0 1/2" (BIO 100 SWI)

**OWNER**  
SEVEN MICHAELS PARK  
7203 WYTHE PARK STREET  
AUSTIN, TX 78755

**SUBDIVISOR**  
SEVEN MICHAELS PARK, INC.  
7203 WYTHE PARK STREET, SUITE 300  
AUSTIN, TX 78755

**ENGINEER**  
MATHIAS-BARKES INVESTMENTS, LLC  
7203 WYTHE PARK STREET, SUITE 300  
AUSTIN, TX 78755



**BENCHMARK NOTE**  
THE BENCHMARK POINTS SHOWN ON THIS PLAT WERE OBTAINED FROM THE TEXAS STATE PUBLIC COMMISSION'S BENCHMARK SURVEY. THE BENCHMARK POINTS WERE SURVEYED BY THE TEXAS STATE PUBLIC COMMISSION AND CONTINUALLY MONITORED FOR ANY MOVEMENT. DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. ALL DISTANCES TO BE CONVERTED TO METERS TO CONFORM TO THE NATIONAL SYSTEM OF UNITS.

**LINE TABLE**

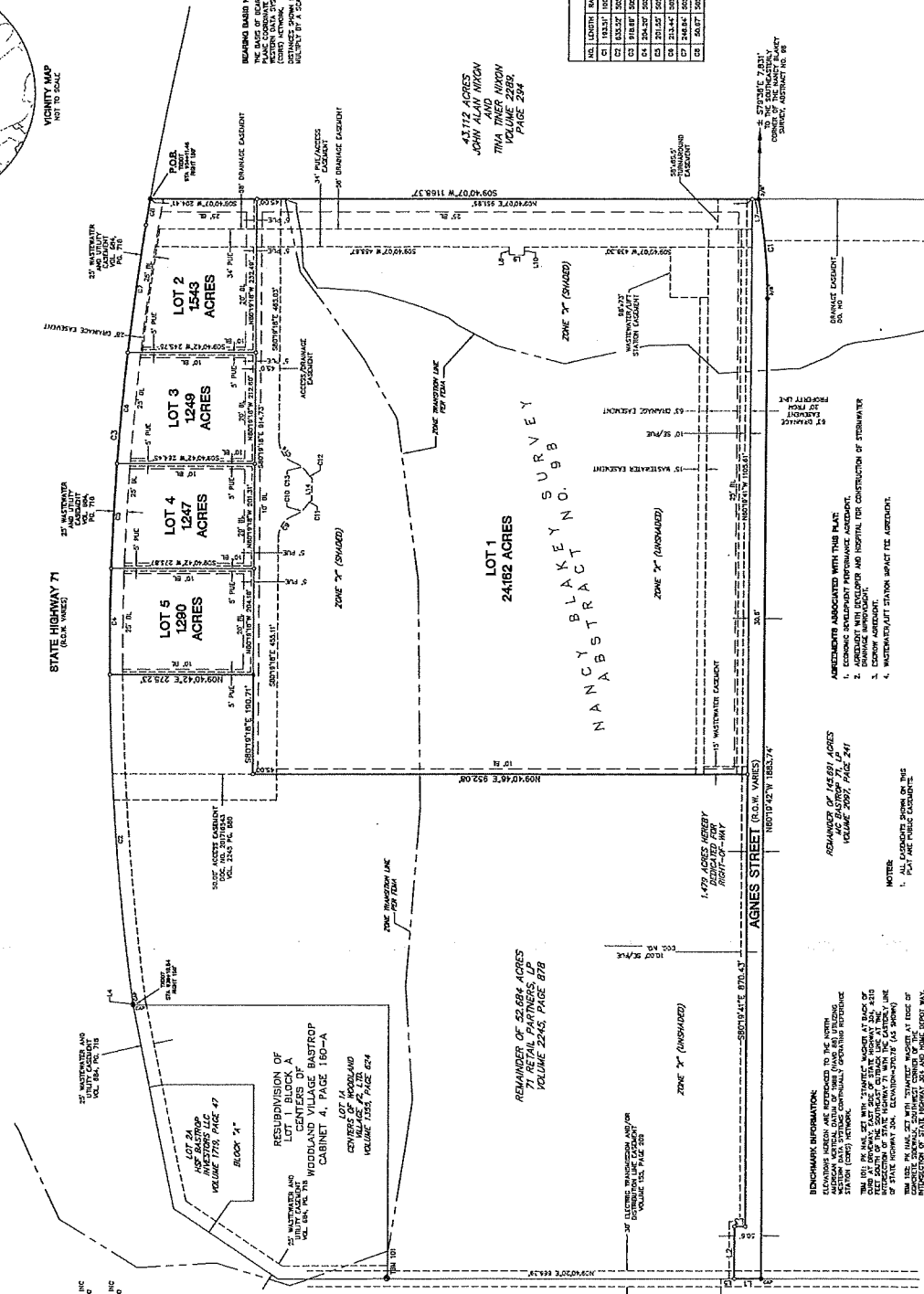
LINE NUMBER	START POINT	END POINT	DISTANCE
1	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
2	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
3	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
4	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
5	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
6	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
7	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
8	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
9	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00
10	509.4207 N 1163.37 E	509.4207 N 1163.37 E	0.00

**CLIPPER TABLE**

NO.	LENGTH	RADIUS	DEGREE	CHORD BEARING	CHORD DISTANCE	AREA
C1	18.841	180.000	180.000	N45.000°E	18.841	0.000
C2	63.532	1083.317	71.105	S84.000°E	63.532	207.257
C3	61.887	1083.317	108.893	S75.000°E	61.887	207.257
C4	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C5	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C6	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C7	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C8	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C9	25.257	1083.317	21.897	S75.000°E	25.257	207.257
C10	25.257	1083.317	21.897	S75.000°E	25.257	207.257

**AREA SUMMARY**

NO.	AREA
1	24,162.000
2	15,435.000
3	12,945.000
4	1,249.000
5	1,290.000
6	1,290.000
7	1,290.000
8	1,290.000
9	1,290.000
10	1,290.000
TOTAL	63,746.000



**AGREEMENTS ASSOCIATED WITH THIS PLAT:**

- COASTAL DEVELOPMENT AGREEMENT.
- CRITICAL HAZARDOUS WASTE AND HOSPITAL FOR CONSTRUCTION OF STORMWATER TREATMENT PLANT.
- SEWER AGREEMENT.
- WATER TREATMENT PLANT AGREEMENT.

**REMARKS:**

- LOT 1: PUBLIC RECORD NO. 2017-00001.
- LOT 2: PUBLIC RECORD NO. 2017-00002.
- LOT 3: PUBLIC RECORD NO. 2017-00003.
- LOT 4: PUBLIC RECORD NO. 2017-00004.
- LOT 5: PUBLIC RECORD NO. 2017-00005.

**Stantec**  
Professional Seal  
Austin, TX 78701  
www.stantec.com





# BASTROP GROVE

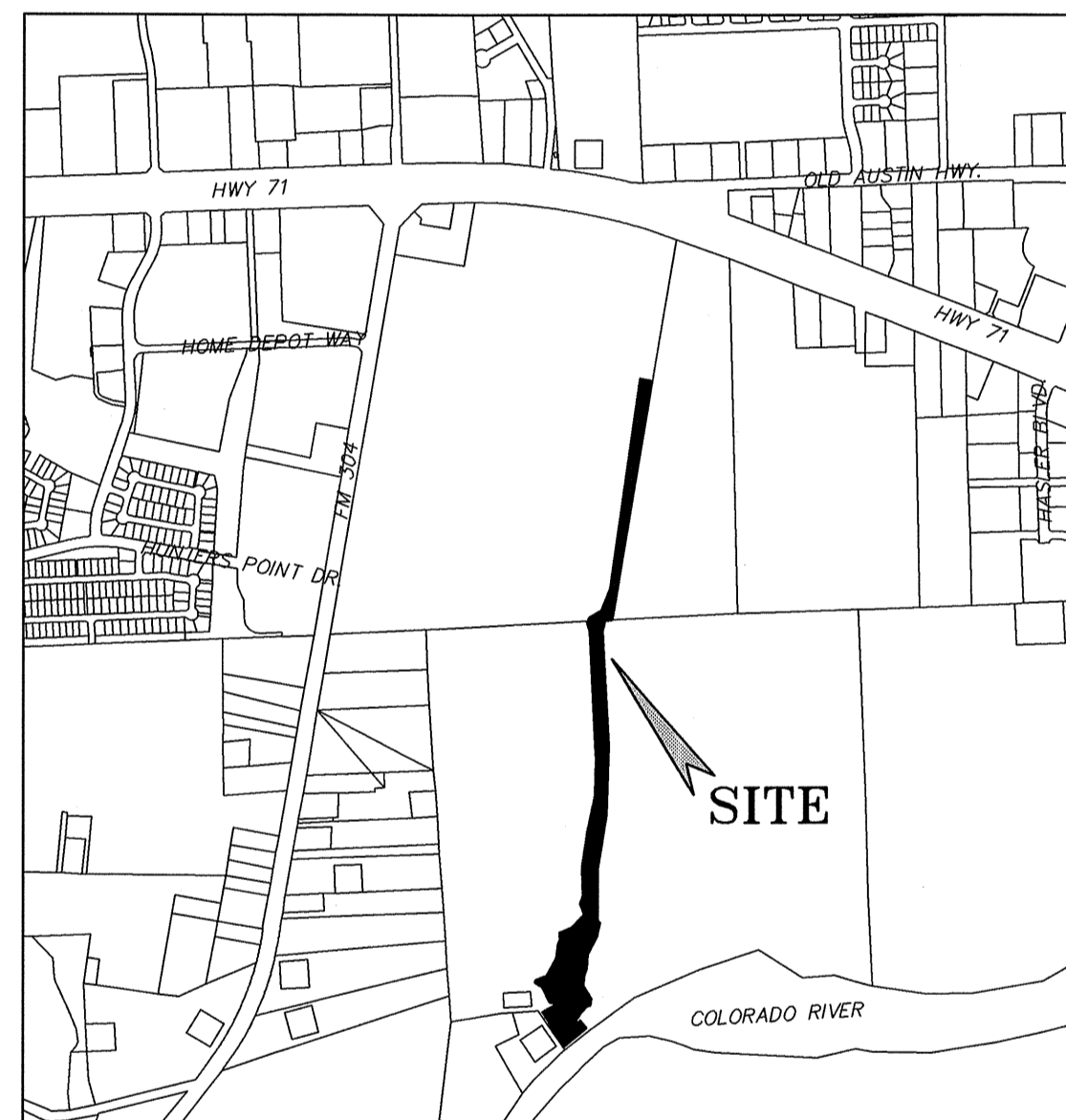
## DRAINAGE IMPROVEMENTS

### AGNES ROAD TO COLORADO RIVER

### BASTROP COUNTY, TEXAS

#### SHEET INDEX

Sheet Number	Sheet Title
1	COVER
2	GENERAL NOTES & DETAILS
3	DETAILS - EROSION CONTROL MATTING
4	DETAILS - BOX CULVERTS
5	EROSION CONTROL PLAN
6	EXISTING DRAINAGE AREA MAP
7	PROPOSED DRAINAGE AREA MAP
8	CHANNEL - STA. 0+00 TO 6+00
9	CHANNEL - STA. 6+00 TO 10+50
10	CHANNEL - STA. 10+50 TO 20+50
11	CHANNEL - STA. 20+50 TO 30+50
12	CHANNEL - STA. 30+50 TO 41+50
13	CHANNEL - STA. 41+50 TO END
14	CHANNEL X-SECTIONS



**LOCATION MAP**

MAPSCO PAGE #:	N.T.S.	MAPSCO GRID #:
468S		Q34
468N		Q35
468P		Q35

**NOTES:**

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER.

THIS PROJECT IS LOCATED IN THE COLORADO RIVER WATERSHED AND WITHIN THE BOUNDARIES OF THE 100-YEAR FLOOD PLAIN AS PER FEDERAL FLOOD INSURANCE ADMINISTRATION FIRM MAP NO. 48021C0335E, DATED JANUARY 19, 2006, BASTROP COUNTY, TEXAS. BASTROP COUNTY COMMUNITY NO. 481193.



SUBMITTED BY:

*Madeline Bulant* 09/28/2018  
CARLSON, BRIGANCE, & DOERING, INC.

REVIEWED BY:

*Jerry P. Lady* 10/1/2018  
CITY OF BASTROP ENGINEER

OWNER: 71 RETAIL PARTNERS, L.P.  
DOUGLAS MACMAHON  
8214 WESTCHESTER DRIVE  
DALLAS, TEXAS 75225  
(214) 622-6565

ENGINEER: CARLSON, BRIGANCE & DOERING, INC.  
CIVIL ENGINEERING & SURVEYING  
MR. BRENDAN P. MCENTEE, P.E.  
5501 WEST WILLIAM CANNON  
AUSTIN, TEXAS 78749  
(512) 280-5160

UTILITY PROVIDERS:

ELECTRIC: BLUEBONNET ELECTRIC  
(979) 542-3151

GAS: CENTER POINT ENERGY  
(830) 643-6936

PHONE: AT&T  
(512) 870-1450

WATER: CITY OF BASTROP  
(512) 332-8960

WASTEWATER: CITY OF BASTROP  
(512) 332-8960

CABLE: SPECTRUM  
(800) 418-8848

NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V)	CITY OF BASTROP APPROVAL/DATE	APPROVED BY



CARLSON, BRIGANCE & DOERING, INC.  
DESIGNED BY: *Brendan P. McEntee* 09/28/2018

DATE	DESIGNED BY	DRAFTED BY
	BM	IV

Carlson, Brigance & Doering, Inc.  
FIRM ID #E3791

Civil Engineering & Surveying  
5501 West William Cannon Dr. • Austin, Texas 78749  
Phone No. (512) 280-5160 • Fax No. (512) 280-5165

COVER

BASTROP GROVE

DRAINAGE IMPROVEMENTS

SHEET NAME: COVER

JOB NAME: BASTROP GROVE

PROJECT: DRAINAGE IMPROVEMENTS

DATE: APRIL 2018

JOB NUMBER: 4697

SHEET: 1 OF 14

SHEET NO.: 1

GENERAL NOTES:

- 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF BASTROP DESIGN AND CONSTRUCTION STANDARDS MANUAL.
2. ANY EXISTING UTILITIES, PAVEMENT, CURBS, SIDEWALKS, STRUCTURES, TREES, ETC., NOT PLANNED FOR DEMOLITION THAT ARE DAMAGED OR REMOVED SHALL BE REPAIRED OR REPLACED AT THE APPLICANT'S EXPENSE.
3. THE CONTRACTOR SHALL VERIFY ALL DEPTHS AND LOCATIONS OF EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCIES WITH THE CONSTRUCTION PLANS FOUND IN THE FIELD SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER WHO SHALL BE RESPONSIBLE FOR REVISING THE PLANS AS APPROPRIATE.
4. ALL AREAS DISTURBED OR EXPOSED DURING CONSTRUCTION SHALL BE RE-VEGETATED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. RE-VEGETATION IS TO TAKE PLACE WITHIN 14 DAYS OF CONSTRUCTION INACTIVITY. RE-VEGETATION OF ALL DISTURBED OR EXPOSED AREAS SHALL CONSIST OF SOEDING OR SEEDING, AT THE CONTRACTOR'S OPTION. HOWEVER, THE TYPE OF RE-VEGETATION MUST EQUAL OR EXCEED THE TYPE OF VEGETATION PRESENT BEFORE CONSTRUCTION.
5. PRIOR TO ANY CONSTRUCTION, THE APPLICANT'S ENGINEER SHALL CONVENE A PRECONSTRUCTION CONFERENCE BETWEEN HIMSELF, THE CITY OF BASTROP, THE CONTRACTOR, UTILITY COMPANIES, ANY AFFECTED PARTIES AND ANY OTHER ENTITY THE CITY OR THE ENGINEER MAY REQUIRE. REFERENCE DEVELOPMENT PACKET FOR GUIDANCE ON HOW TO SCHEDULE A PRECONSTRUCTION CONFERENCE.
6. THE CONTRACTOR AND THE ENGINEER SHALL KEEP ACCURATE RECORDS OF ALL CONSTRUCTION THAT DEVIATES FROM THE PLANS. THE ENGINEER SHALL FURNISH THE CITY OF BASTROP ACCURATE "AS-BUILT" DRAWINGS FOLLOWING COMPLETION OF ALL CONSTRUCTION.
7. WHEN CONSTRUCTION IS BEING CARRIED OUT WITHIN EASEMENTS, THE CONTRACTOR SHALL CONFINE HIS WORK TO WITHIN THE PERMANENT AND ANY TEMPORARY EASEMENTS. PRIOR TO FINAL ACCEPTANCE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL TRASH AND DEBRIS WITHIN THE PERMANENT AND TEMPORARY EASEMENTS.
8. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL PROPER PERMITS FROM THE APPROPRIATE AUTHORITIES.
9. ALL STORM SEWER FITTINGS MUST BE PRE-CAST.
11. AVAILABLE BENCHMARKS THAT MAY BE UTILIZED FOR THE CONSTRUCTION OF THIS PROJECT ARE DESCRIBED AS FOLLOWS:

BENCHMARKS:

BM #1: SOUTHWEST CORNER OF CONCRETE OF ELECTRIC TRANSFORMER 10015646.4860 N, 3239451.2111 E ELEVATION: 368.42'
BM #2: 1/2" IRON ROD AT THE NORTHEASTERN CORNER 145.691 ACRE TRACT OUT OF THE NANCY BLAKEY SURVEY (ABSTRACT NO. 98) CONVEYED TO MC BASTROP 71, LP. (V 2097, P 241, O.P.R.B.C.T.X.), AND THE SOUTHEASTERN CORNER OF 52.684 ACRES TRACT CONVEYED TO 71 RETAIN PARTNERS, PL. (V 2245, P 878, O.P.R.B.C.T.X.), WITHIN WESTERN BOUNDARY LINE OF 43.112 ACRE TRACT CONVEYED TO JOHN ALAN NIXON AND TINA TINER NIXON (V 2289, P 294, O.P.R.B.C.T.X.), THIS IS THE NORTHEASTERN CORNER OF THE 3.653 ACRE DRAINAGE EASEMENT. 10015318.2455 N, 3241663.8667 E ELEVATION: 361.00'
BM #3: 1/2" CAPPED IRON ROD WITHIN NORTHERN BOUNDARY OF 194.92 ACRE TRACT IN DEED TO JO ANN GRIESENBEEK CANTRELL (V 445, P 684, O.P.R.B.C.T.X.) OUT OF THE MAZEA ROUSSAUE SURVEY NO. 56, AT THE SOUTHEAST CORNER OF 145.697 ACRE TRACT IN DEED TO BASTROP GROVE PARTNERS, LTD. (V 1688, P 245, O.P.R.B.C.T.X.), AND SOUTHWEST CORNER OF 43.112 ACRE TRACT IN DEED TO CHIP PROPERTIES, LTD. (V 1413, P 857, O.P.R.B.C.T.X.). 10013530.9814 N, 3241359.4032 E ELEVATION: 360.03'

CONSTRUCTION SEQUENCE:

- 1. HOLD PRE-CONSTRUCTION CONFERENCE.
2. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND STABILIZED CONSTRUCTION ENTRANCE AS SHOWN ON THE PLANS.
3. WITH THE APPROVAL OF ALL AFFECTED PARTIES, THE CONTRACTOR MAY BEGIN CLEARING AND GRUBBING.
4. COMPLETE ALL ROUGH GRADING AND UNDERGROUND INSTALLATION WITHIN THE LIMITS OF CONSTRUCTION.
5. COMPLETE FINAL GRADING WITHIN LIMITS OF CONSTRUCTION ALONG AREAS DESIGNATED, RESTORE CONSTRUCTION SPOILS & STAGING AREA TO NATURAL GRADE.
6. COMPLETE PERMANENT EROSION CONTROL AND RESTORATION OF SITE VEGETATION.
7. PROJECT ENGINEER OBSERVES CONSTRUCTION AND WRITES CONCURRENCE LETTER TO THE CITY OF BASTROP.
8. AFTER FINAL INSPECTION AND ACCEPTANCE OF CONSTRUCTION, COMPLETE ANY NECESSARY FINAL DRESS UP OF DISTURBED AREAS AND REMOVE/ DISPOSE OF TEMPORARY EROSION CONTROLS IN AN APPROVED MANNER.

EROSION AND SEDIMENTATION CONTROL:

- 1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND FENCING FOR AREAS OUTSIDE OF THE CONSTRUCTION AREA PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE CONTRACTOR IS REQUIRED TO INSPECT THE CONTROLS AND FENCES AT WEEKLY INTERVALS, AND AFTER SIGNIFICANT RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES.
3. PRIOR TO FINAL ACCEPTANCE, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
4. ANY METHODS, STREET MARKINGS AND SIGNAGE NECESSARY FOR WARNING MOTORISTS, WARNING PEDESTRIANS OR DIVERTING TRAFFIC DURING CONSTRUCTION SHALL CONFORM TO THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITION.
5. ALL PAVEMENT MARKINGS, MARKERS, PAINT, TRAFFIC BUTTONS, TRAFFIC CONTROLS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, BRIDGES, AND THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITIONS.
6. EROSION CONTROL MEASURES, SITE WORK AND RESTORATION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF BASTROP CODE OF ORDINANCES.
7. ALL SLOPES SHALL BE SOODED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY WERE APPLIED.
8. SILT FENCES, ROCK BERMS, SEDIMENTATION BASINS AND SIMILARLY RECOGNIZED TECHNIQUES AND MATERIALS SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADING OF DOWNSTREAM FACILITIES. SUCH INSTALLATION SHALL BE REGULARLY INSPECTED BY THE CITY OF BASTROP FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF, IN THE OPINION OF THE CITY ENGINEER, THEY ARE WARRWANTED.
9. ALL TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL FINAL INSPECTION AND APPROVAL OF THE PROJECT BY THE CITY INSPECTOR. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL TEMPORARY EROSION CONTROL STRUCTURES AND TO REMOVE EACH STRUCTURE AS APPROVED BY THE CITY INSPECTOR.
10. ALL MUD, DIRT, ROCKS, DEBRIS, ETC., SPILLED, TRACKED OR OTHERWISE DEPOSITED ON EXISTING PAVED STREETS, DRIVES AND AREAS USED BY THE PUBLIC SHALL BE CLEANED UP IMMEDIATELY.
11. PERMANENT EROSION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED BELOW:
A. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL SHALL BE PLACED IN ALL DRAINAGE CHANNELS (EXCEPT ROCK), AND BETWEEN THE CURB AND RIGHT-OF-WAY.
B. THE SEEDING FOR PERMANENT EROSION CONTROL SHALL BE APPLIED OVER AREAS DISTURBED BY CONSTRUCTION AS FOLLOWS:

BROADCAST SEEDING:

- (i) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA OR THREE (3) POUNDS PER 1,000 SQUARE FEET OF WINTER RYE, WITH A PURITY OF 95% WITH 85% GERMINATION.
(ii) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, WITH A PURITY OF 95% WITH 85% GERMINATION.
FERTILIZER SHALL BE SLOW RELEASE GRANULAR OR PALETTE TYPE, AND SHALL HAVE AN ANALYSIS OF 15-15-15, AND SHALL BE APPLIED AT THE RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, ONCE AT THE TIME OF PLANTING, AND AGAIN ONCE DURING THE TIME OF ESTABLISHMENT.

MULCH TYPE USED SHALL BE STRAW OR HAY APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET.

HYDRAULIC SEEDING:

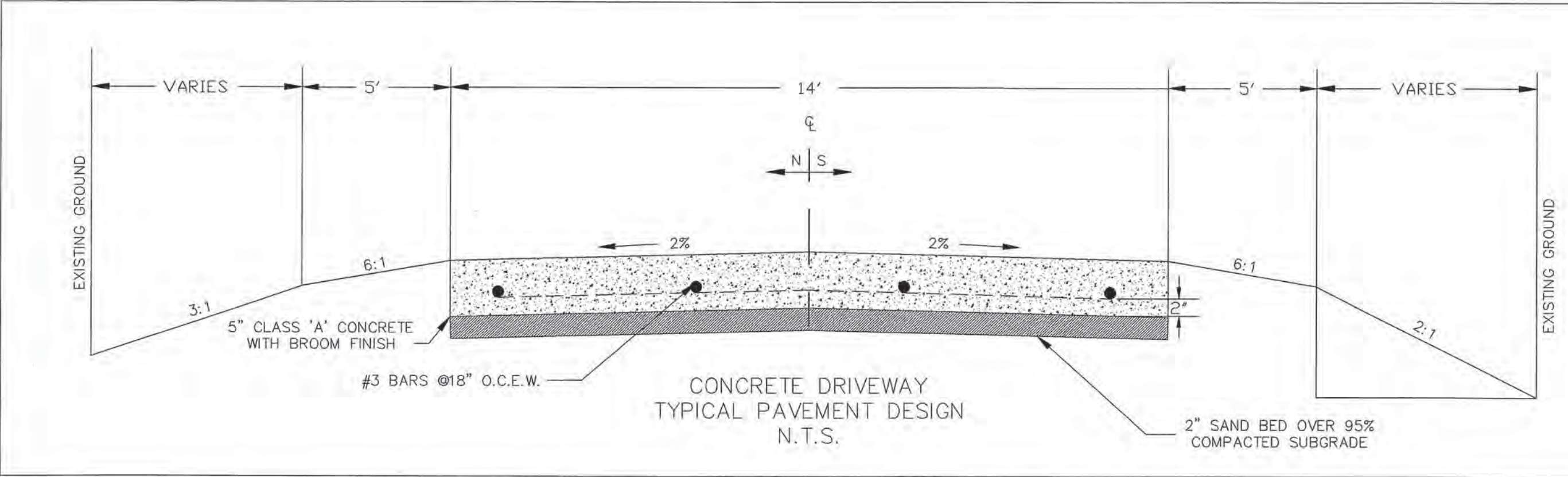
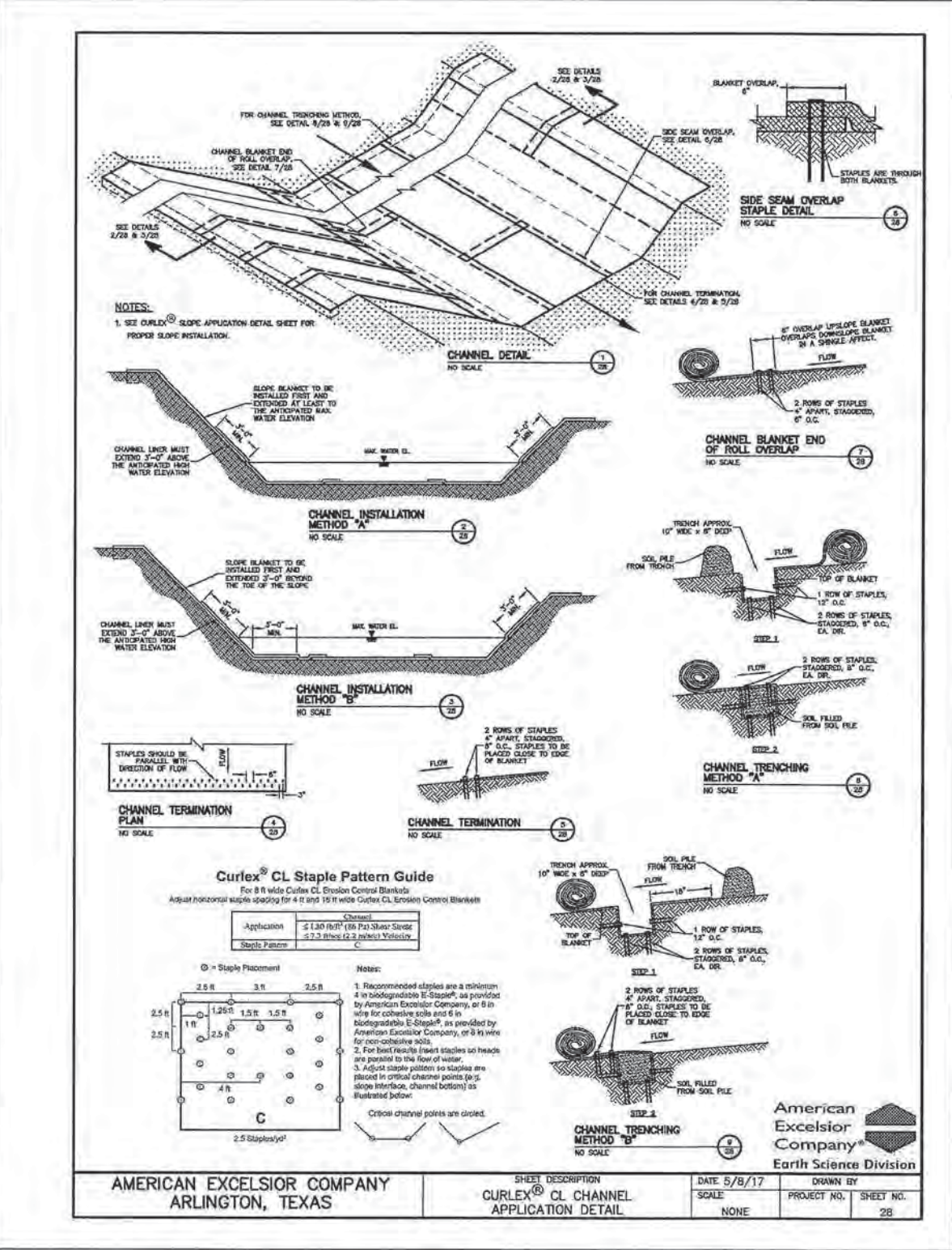
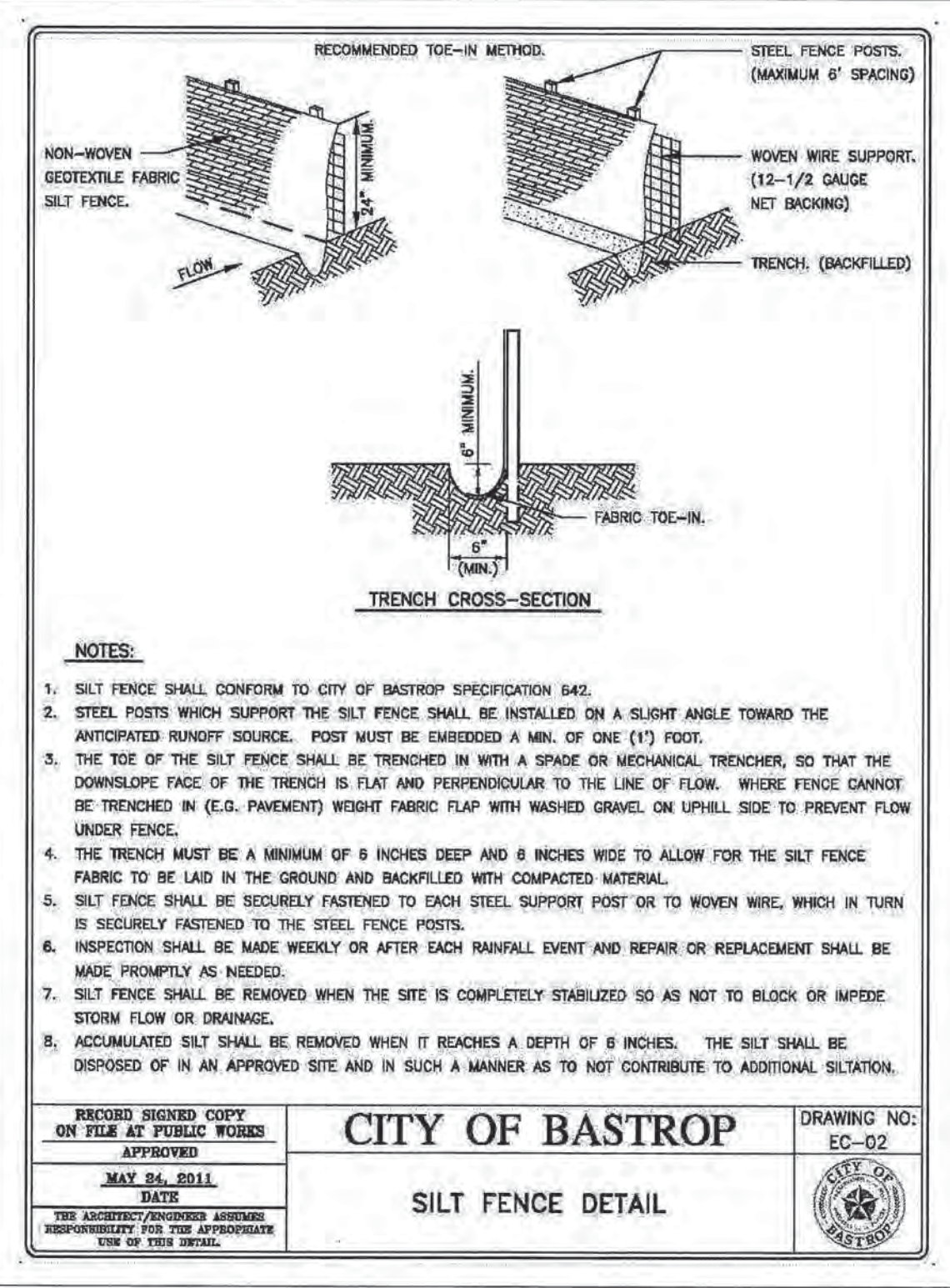
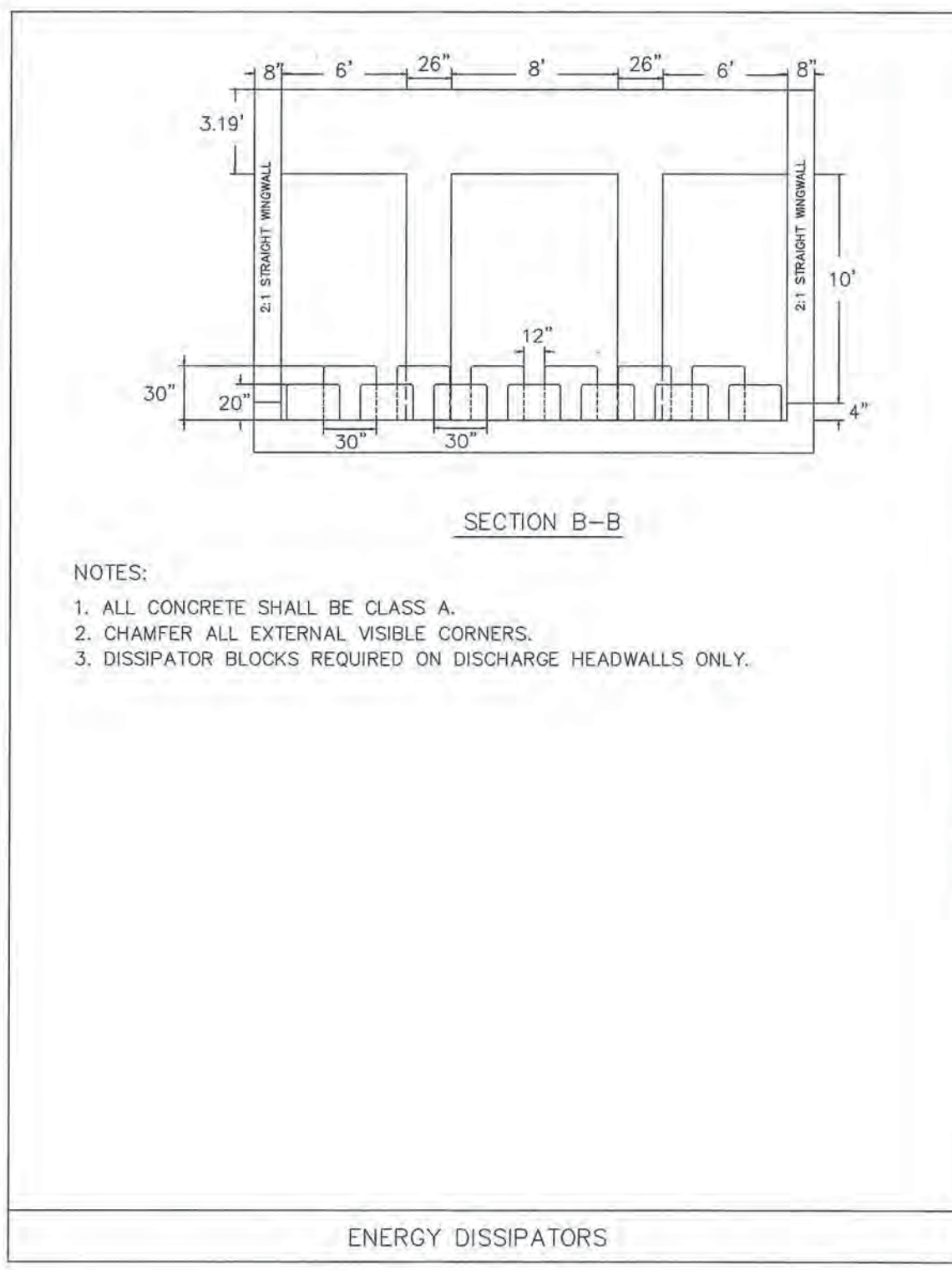
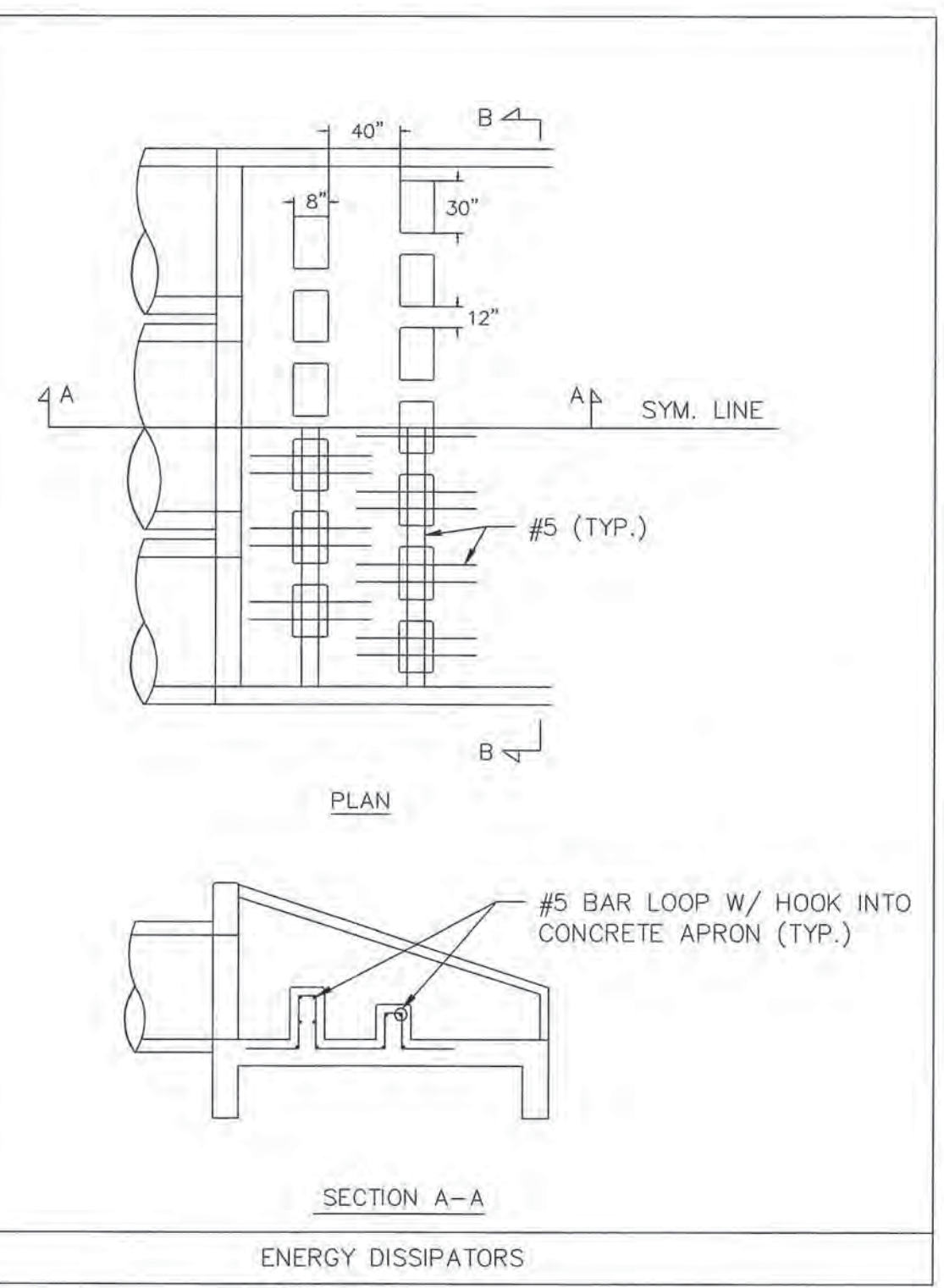
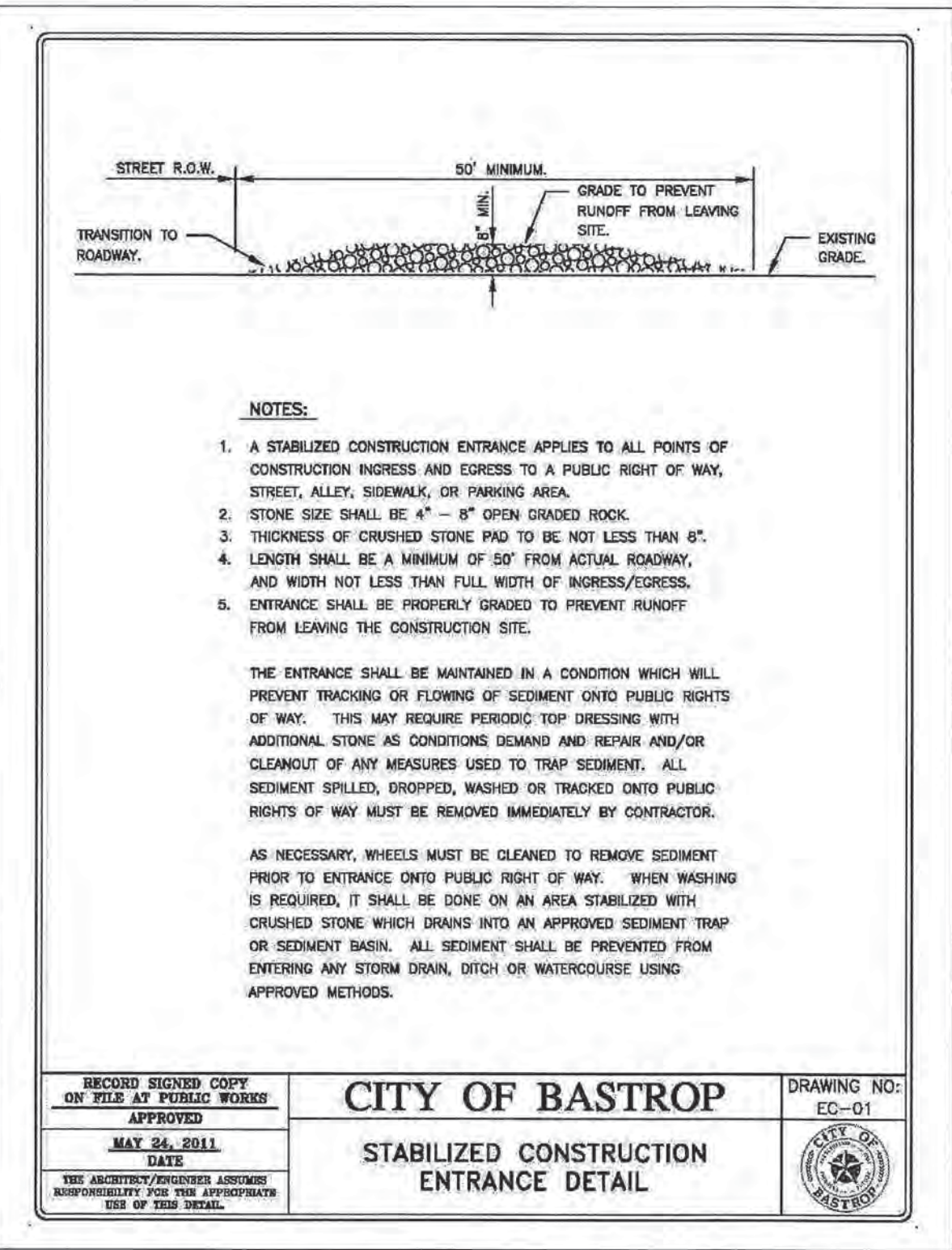
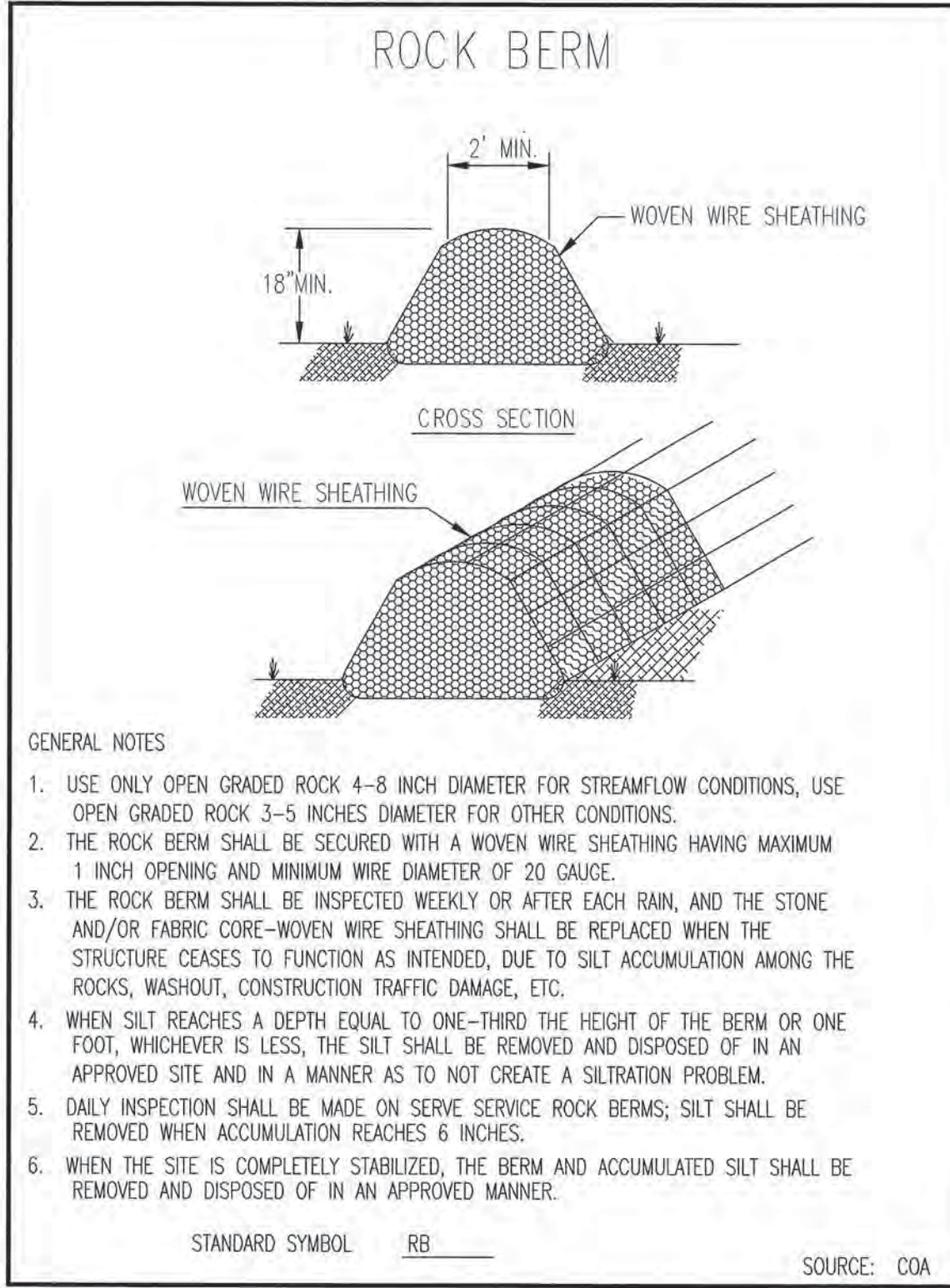
- (i) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA, OR THREE (3) POUNDS PER 1,000 SQUARE FEET OF WINTER RYE, WITH A PURITY OF 95% WITH 90 % GERMINATION.
(ii) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET WITH A PURITY OF 95% WITH 95% GERMINATION.

FERTILIZER SHALL BE A WATER SOLUBLE FERTILIZER WITH AN ANALYSIS OF 15-15-15 AT A RATE OF 1.5 POUNDS PER 1,000 SQUARE FEET.

MULCH TYPE SHALL BE HAY, STRAW OR MULCH APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET, WITH A SOIL TACKIFIER AT A RATE OF 1.4 POUNDS PER 1,000 SQUARE FEET.

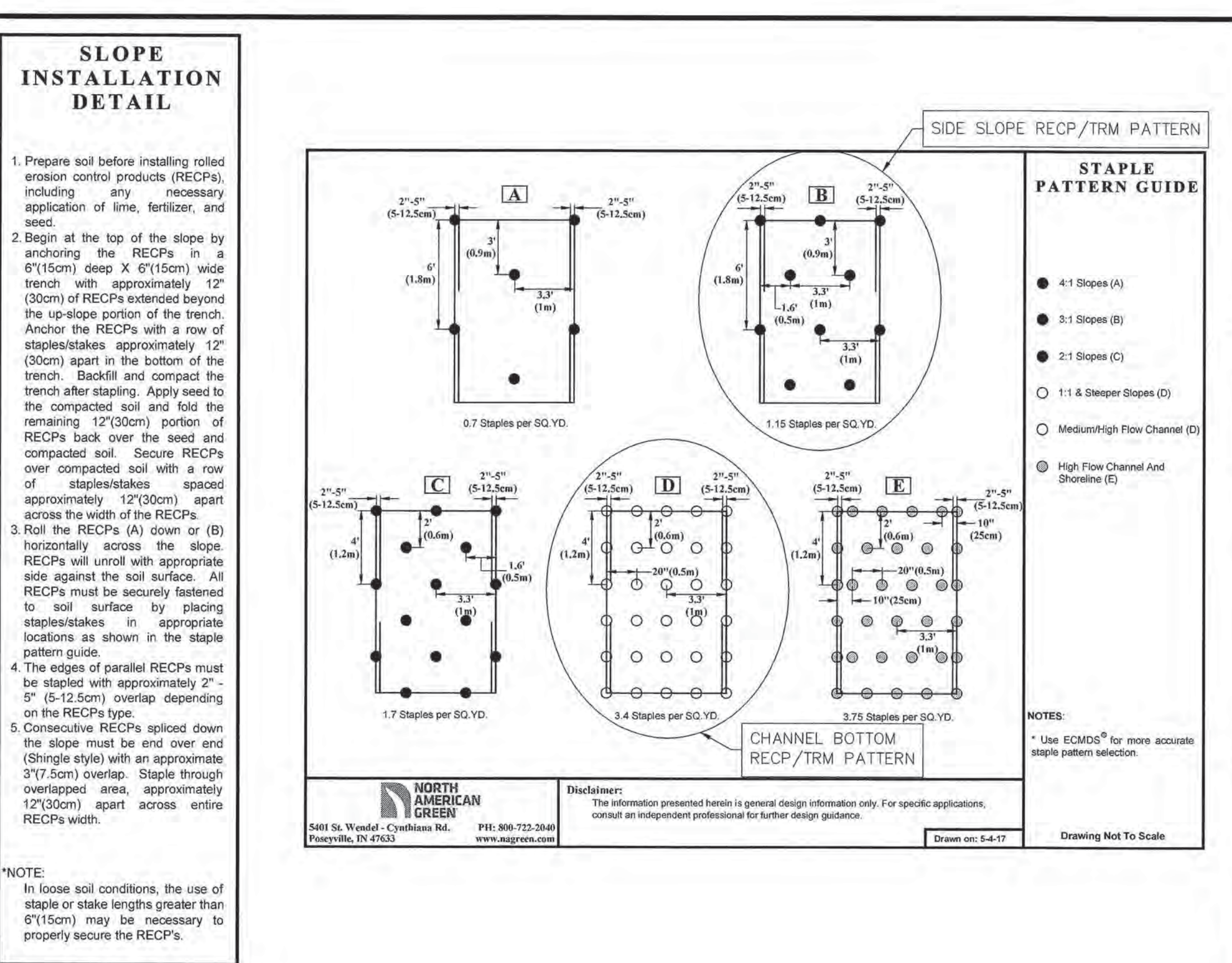
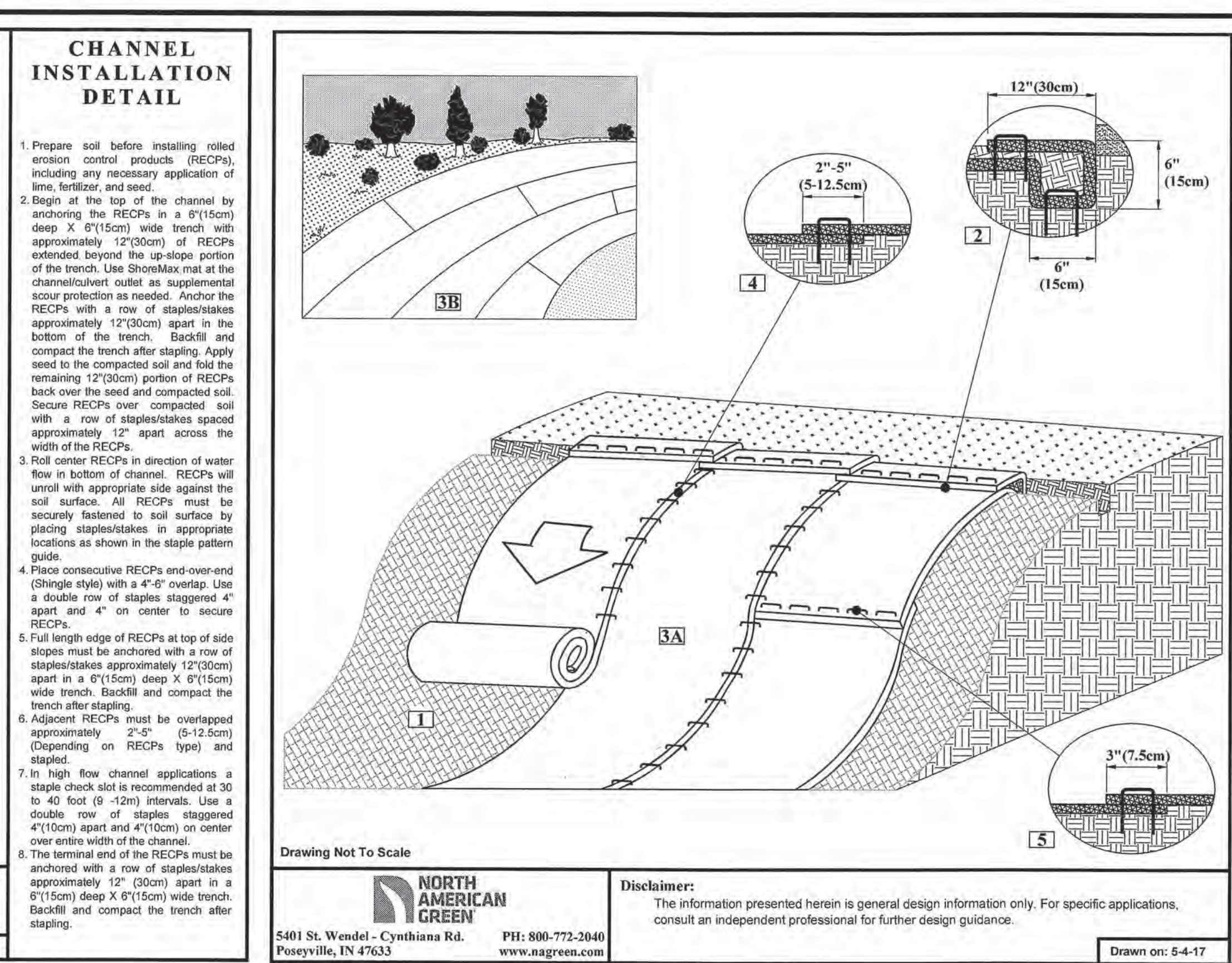
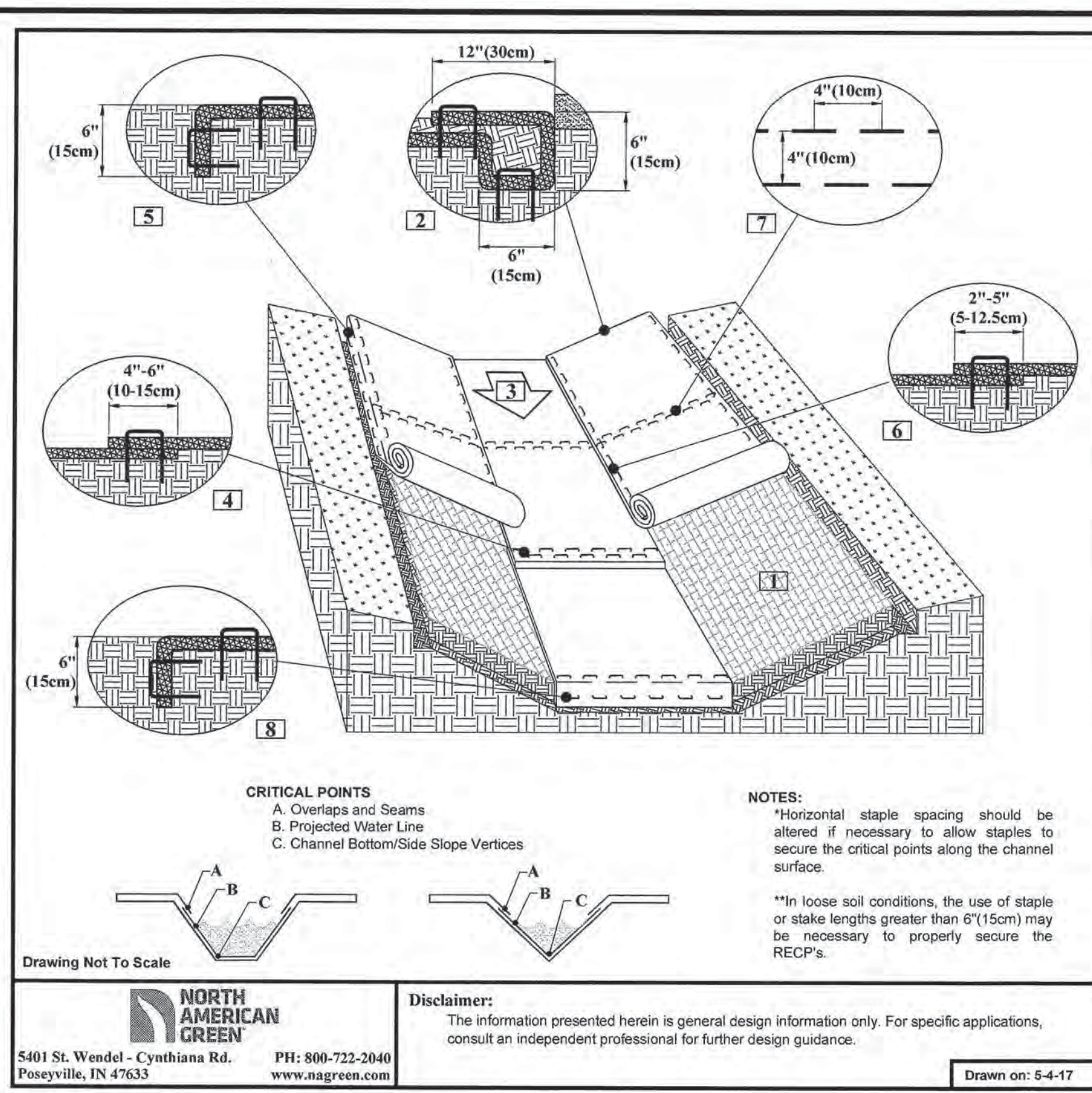
- C. THE PLANTED AREA SHALL BE IRRIGATED OR SPRINKLED IN A MANNER THAT WILL NOT ERODE THE TOPSOIL, BUT WILL SUFFICIENTLY SOAK TO A DEPTH OF SIX (6) INCHES. THE IRRIGATION SHALL OCCUR AT 10-DAY INTERVALS DURING THE FIRST TWO (2) MONTHS. RAINFALL OCCURRENCES OF 1/2 INCH OR MORE SHALL POSTPONE THE WATERING SCHEDULE FOR TEN (10) DAYS.

- D. RESTORATION SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1 INCH HIGH WITH 85% COVERAGE, PROVIDED NO BARE SPOTS LARGER THAN 20 SQUARE FEET EXIST.



FILE PATH: J:\AutoCad\2004 Land Projects\4697.dwg Channel\4697 - GENERAL NOTES.dwg - May 14, 2018 - 4:24pm

Professional seal and title block for Carlson, Brigrance & Doering, Inc. Includes project name 'BASTROP GROVE DRAINAGE IMPROVEMENTS', sheet number '2 OF 14', and date 'APRIL 2018'. The seal is for Brendan P. McEntee, License No. 96200, State of Texas.

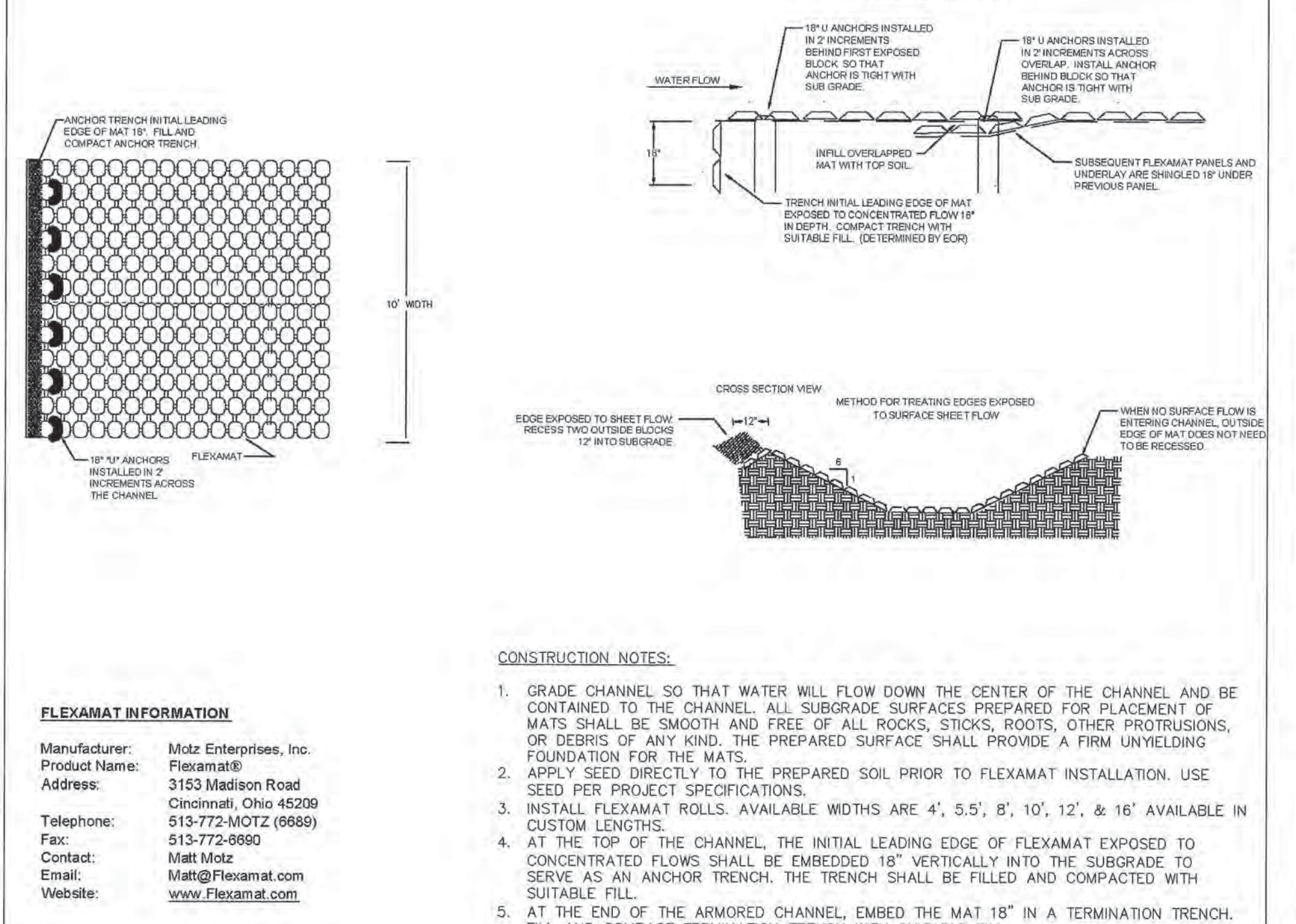
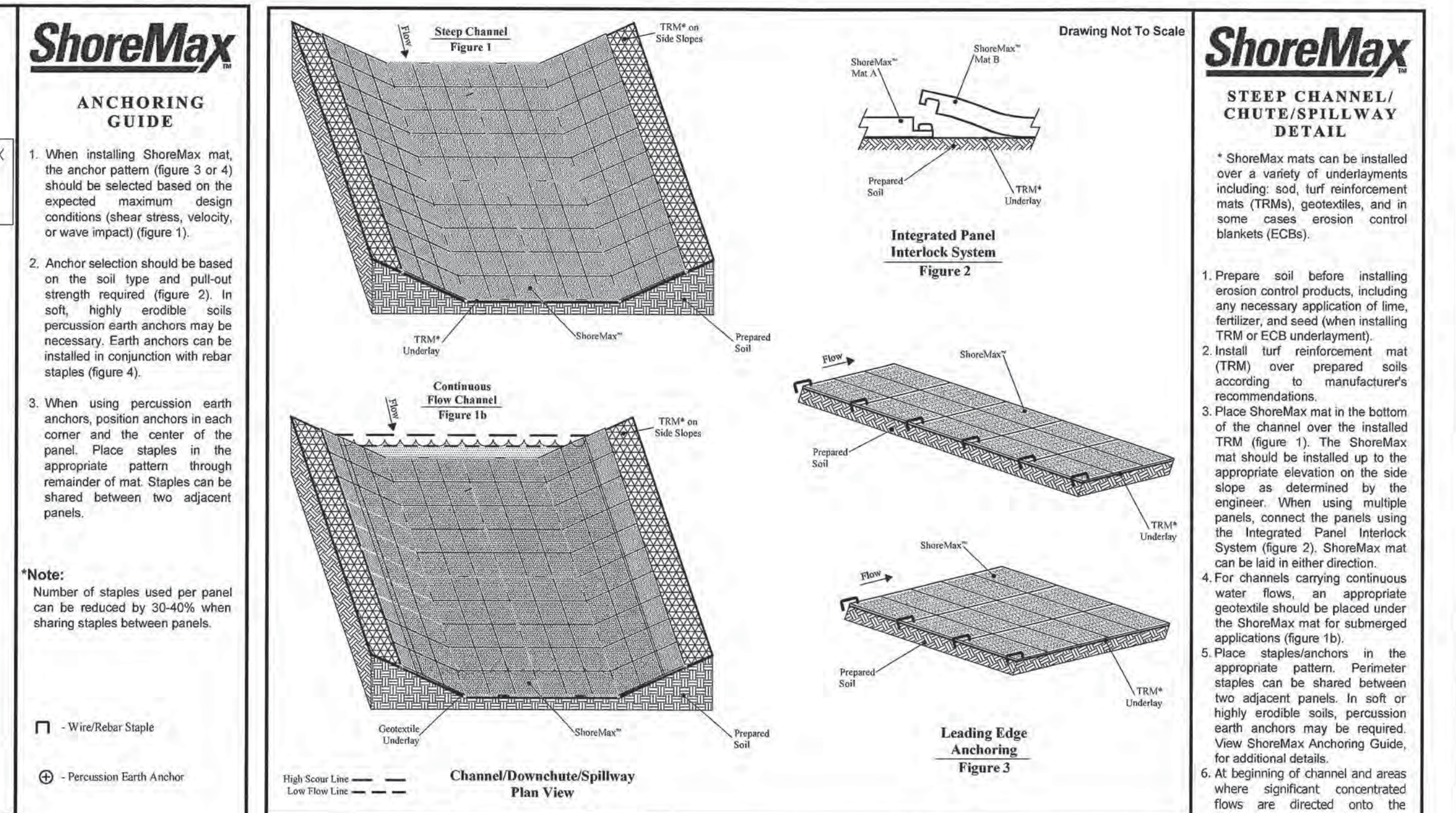
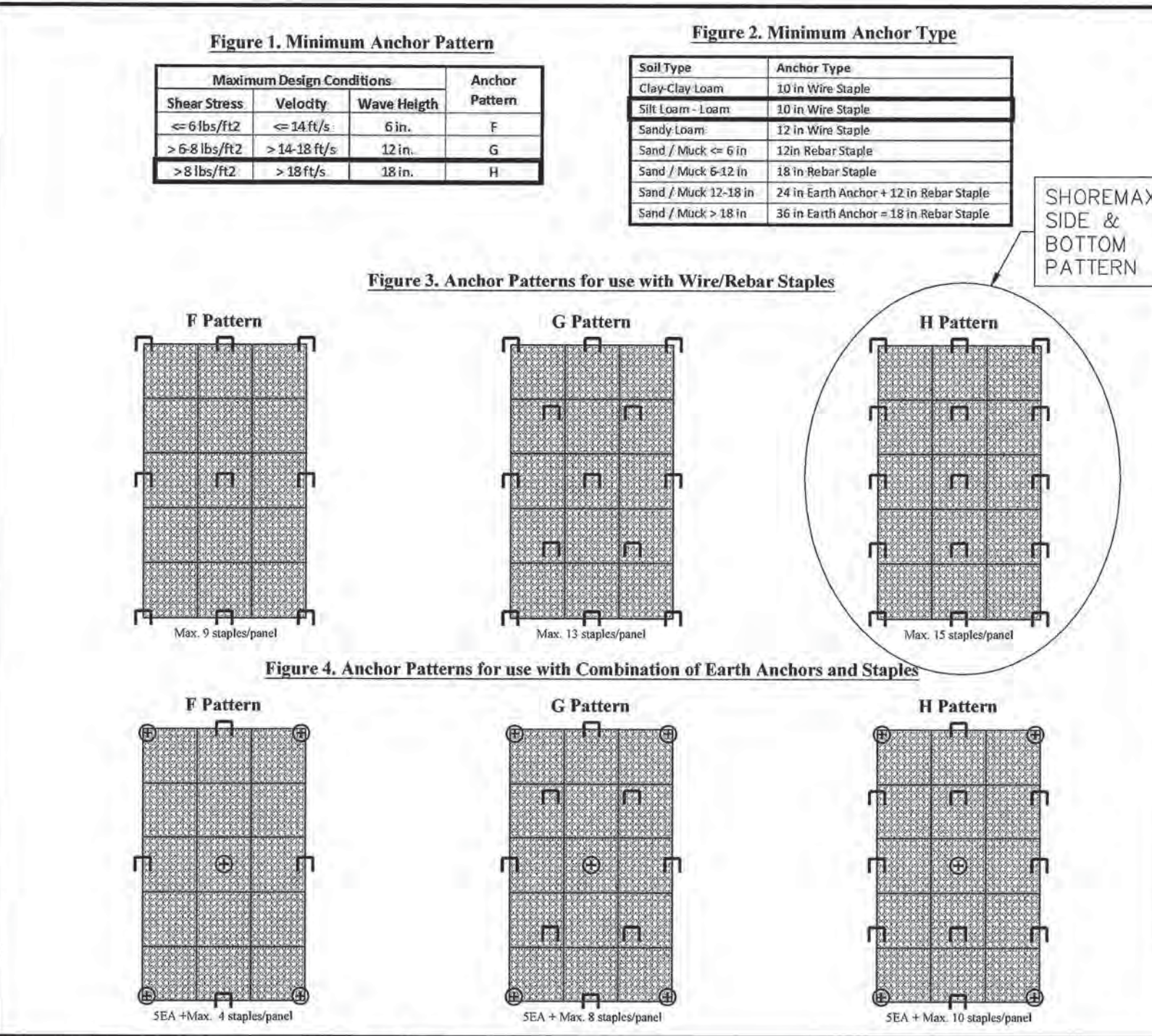


STATE OF TEXAS  
 BRIGANCE & DOERING, INC.  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 #13791  
 Carlson, Brigance & Doering, Inc.  
 05/15/2018

DESIGNED BY: BM  
 DRAFTER BY: TW

DATE: \_\_\_\_\_  
 REVISION: \_\_\_\_\_

Carlson, Brigance & Doering, Inc.  
 FIRM ID: #13791  
 Civil Engineering  
 5501 West William Cannon Dr. Austin, Texas 78749  
 Phone No. (512) 280-5160 Fax No. (512) 280-5165



5401 St. Wendel - Cynthiana Rd. Poseyville, IN 47633  
 PH: 800-772-2040  
 www.nagreen.com  
 Drawn on: 5-4-17

5401 St. Wendel - Cynthiana Rd. Poseyville, IN 47633  
 PH: 800-772-2040  
 www.nagreen.com  
 Drawn on: 5-4-17

FLEXAMAT @ CHANNEL DETAIL - LOW WATER CROSSING

5401 St. Wendel - Cynthiana Rd. Poseyville, IN 47633  
 PH: 800-772-2040  
 www.nagreen.com  
 Drawn on: 5-4-17

SHEET NAME: DETAILS - EROSION CONTROL MATTING  
 JOB NAME: BASTROP GROVE  
 PROJECT: DRAINAGE IMPROVEMENTS

DATE: APRIL 2018  
 JOB NUMBER: 4697  
 SHEET: 3 OF 14  
 SHEET NO.: 3

FILE PATH: \\hdc\csl\2014\Lead\Projects\4697\4697\_Channel\4697\_GENERAL\_NOTES.dwg - May 15, 2018 - 9:12am



DESIGNED BY:	BM	DRAWN BY:	IV
DATE:	10/18/18		
REVISION:			
	RELOCATED SPOIL PILES		

Carlson, Brigance & Doering, Inc.  
 FIRM ID #E791  
 Civil Engineering  
 5801 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5168 • Fax No. (512) 280-5165

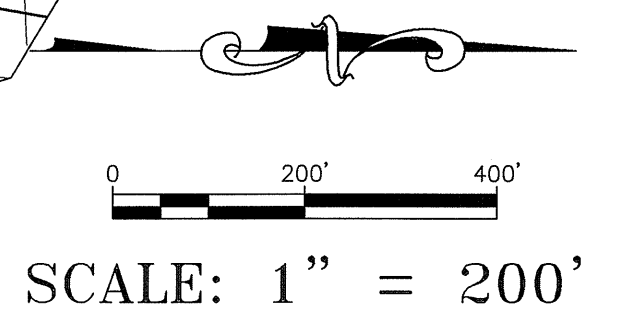
**EROSION CONTROL PLAN**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:  
 JOB NAME:  
 PROJECT:

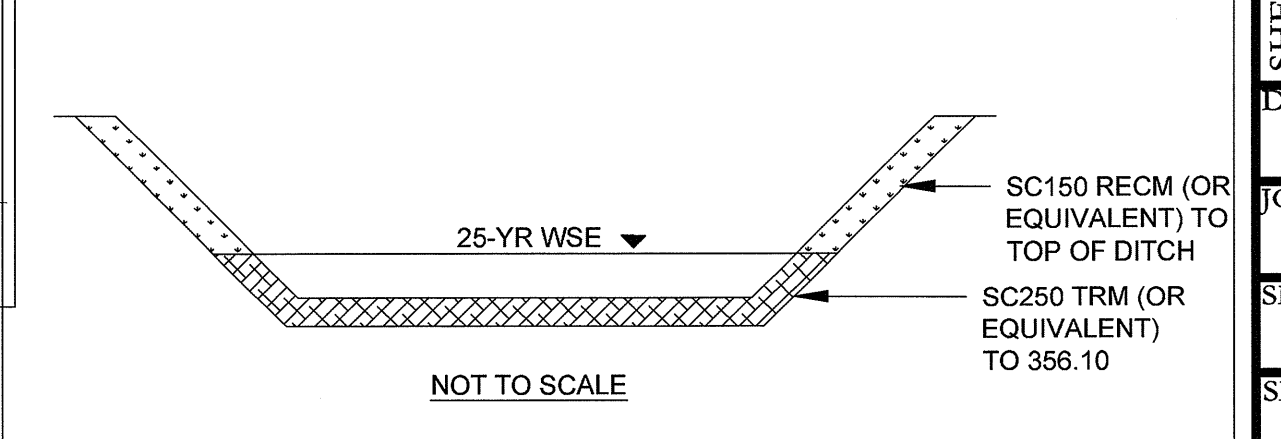
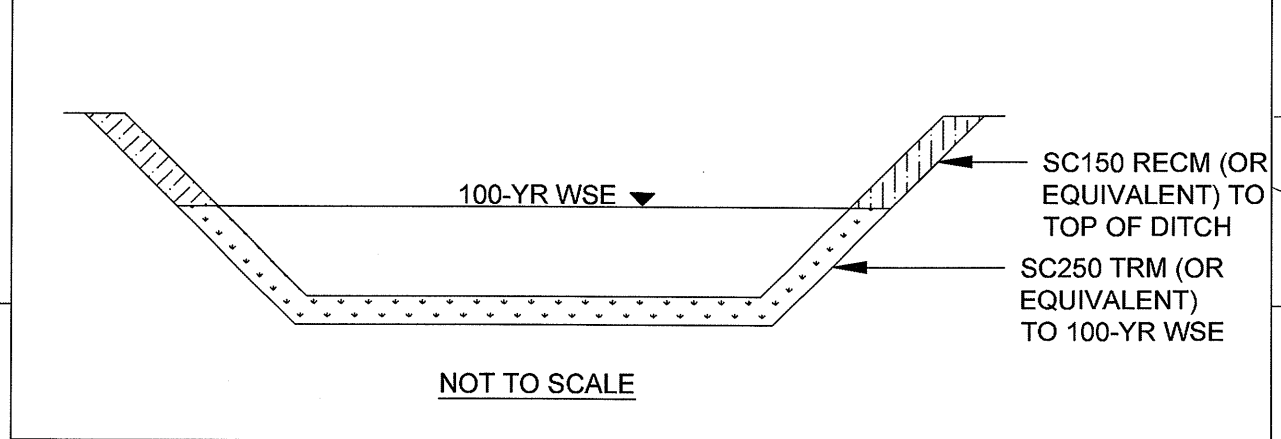
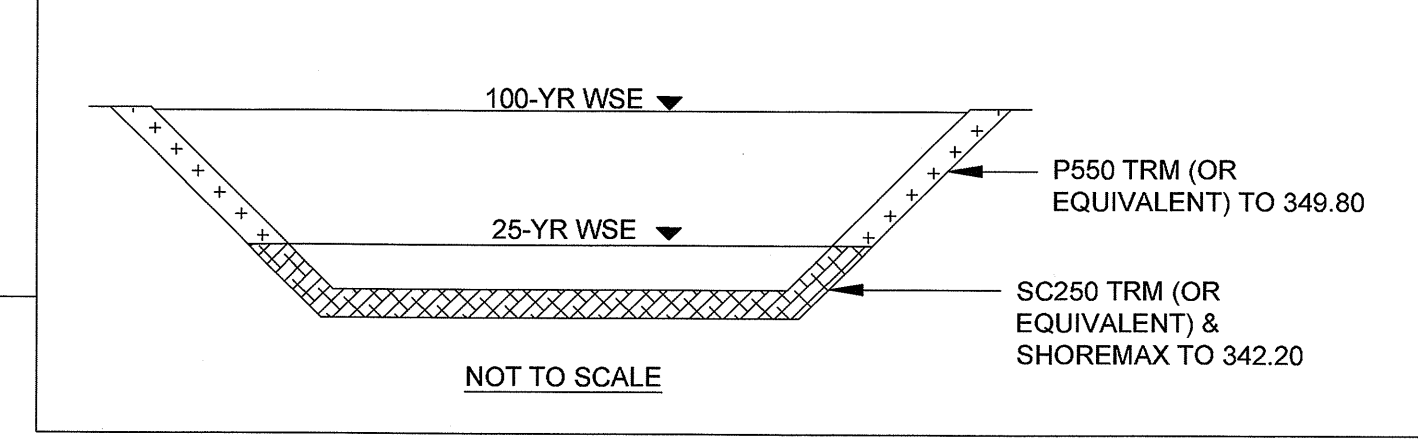
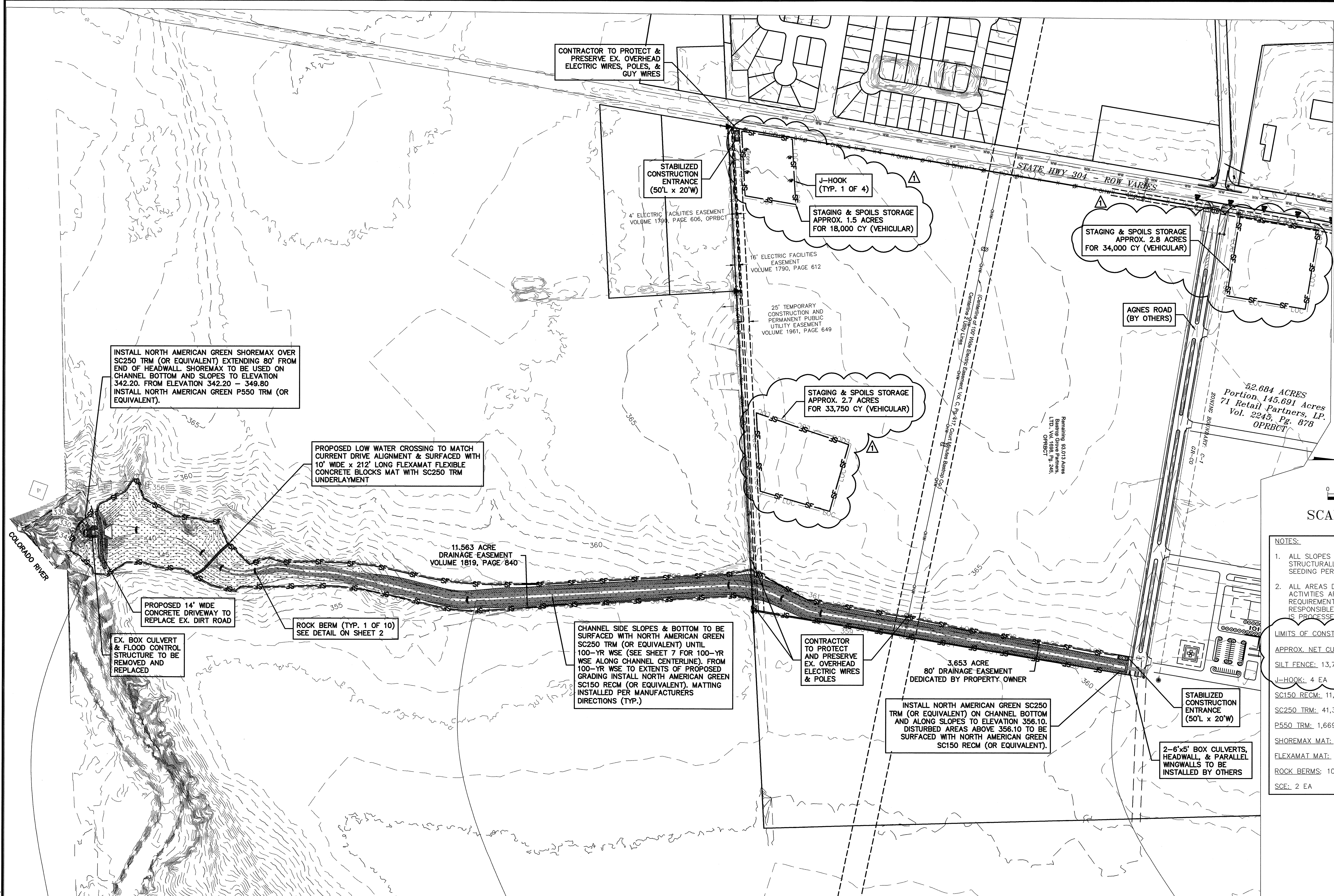
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 JOB NUMBER: 4697  
 SHEET: 5 OF 14  
 SHEET NO. 5

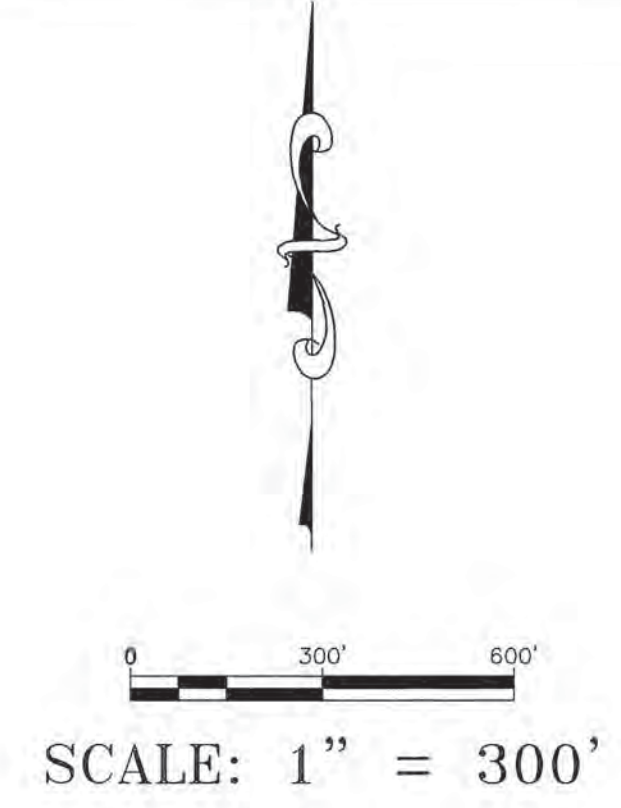
**LEGEND**

SF	SILT FENCE
LOC	LIMITS OF CONSTRUCTION
IP	INLET PROTECTION
RB	ROCK BERM
JH	J-HOOK
SCE	STABILIZED CONSTRUCTION ENTRANCE
[Pattern]	NORTH AMERICAN GREEN SHOREMAX OVER SC250 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN P550 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN SC250 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN SC150 RECM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)



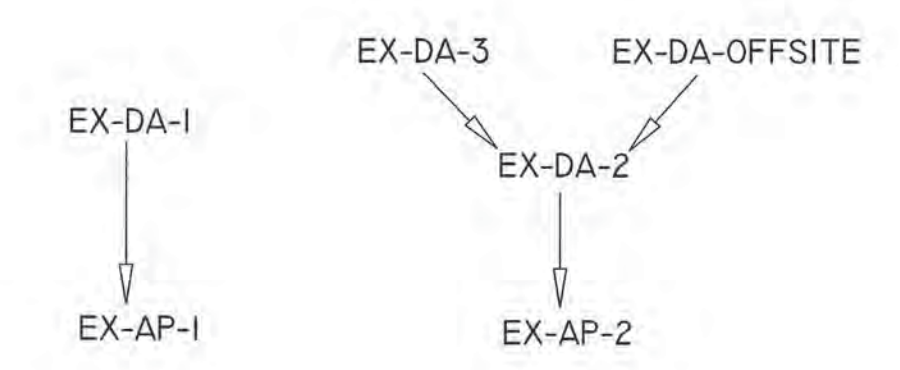
- NOTES:**
- ALL SLOPES 3:1 OR GREATER SHALL BE STRUCTURALLY STABILIZED WITH TRM, SOIL, AND SEEDING PER GENERAL NOTES.
  - ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES ARE TO BE REVEGETATED PER TPDES REQUIREMENTS. CONTRACTOR WILL BE RESPONSIBLE TO MAINTAIN BMPs UNTIL A N.O.T. IS PROCESSED FOR THE SITE.
- LIMITS OF CONSTRUCTION: 958,599 SF / 22.01 AC  
 APPROX. NET CUT: 63,500 CY (NET SECTION)
- SILT FENCE: 13,740 LF  
 J-HOOK: 4 EA  
 SC150 RECM: 11,221 SY  
 SC250 TRM: 41,367 SY  
 P550 TRM: 1,669 SY  
 SHOREMAX MAT: 738 SY  
 FLEXAMAT MAT: 236 SY  
 ROCK BERMS: 10 EA  
 SCE: 2 EA





LEGEND	
---	DRAINAGE EASEMENT BOUNDARY
- - -	DRAINAGE BOUNDARY LINE
AI	DRAINAGE AREA LABEL
●	ANALYSIS POINT (AP)
---	EXISTING CONTOUR MAJOR
- - -	EXISTING CONTOUR MINOR
→	FLOW ARROW
TcFP	TIME OF CONCENTRATION FLOW PATH

**HYDROLOGY FLOW CHART**



**TIME OF CONCENTRATION CALCULATIONS EXISTING CONDITIONS**

Drainage Area #	Sheet Flow				Shallow Conc. Flow				Channel Flow				Tc (Min.)		
	n	Slope	L	Tc	Paved/Unpaved	Slope	L	Tc	n	Slope	L	A <sub>cross</sub>		WP	Tc
EX-DA-1	0.15	0.30%	100	19.73	U	0.19%	3154.97	74.77							94.5
DA-OFFSITE	0.011	0.50%	100	1.99	U	0.50%	2336	34.13	0.013	0.50%	1793	18	18	3.69	39.8
EX-DA-2	0.15	0.56%	100	15.37	U	0.34%	3712.93	65.78	0.026	1.58%	2631.64	200	60	2.72	83.9
EX-DA-3	0.15	0.36%	100	18.34	U	0.76%	1684.2	19.96							38.3

**RESULTS TABLE - EXISTING CONDITIONS**

SUB-BASIN	AREA (AC.)	% IC	CN	Q <sub>10</sub> (CFS)	Q <sub>25</sub> (CFS)	Q <sub>100</sub> (CFS)
EX-DA-1 / EX-AP-1	101.79	0	57	59.56	97.12	167.35
DA-OFFSITE	69.84	28	71	127.94	181.31	273.3
EX-DA-2	193.08	0	60	140.32	219.91	366.23
EX-DA-3	50.91	0	52	36.56	64.3	117.99
EX-AP-2				257.24	395.87	648.66

**NOTES:**

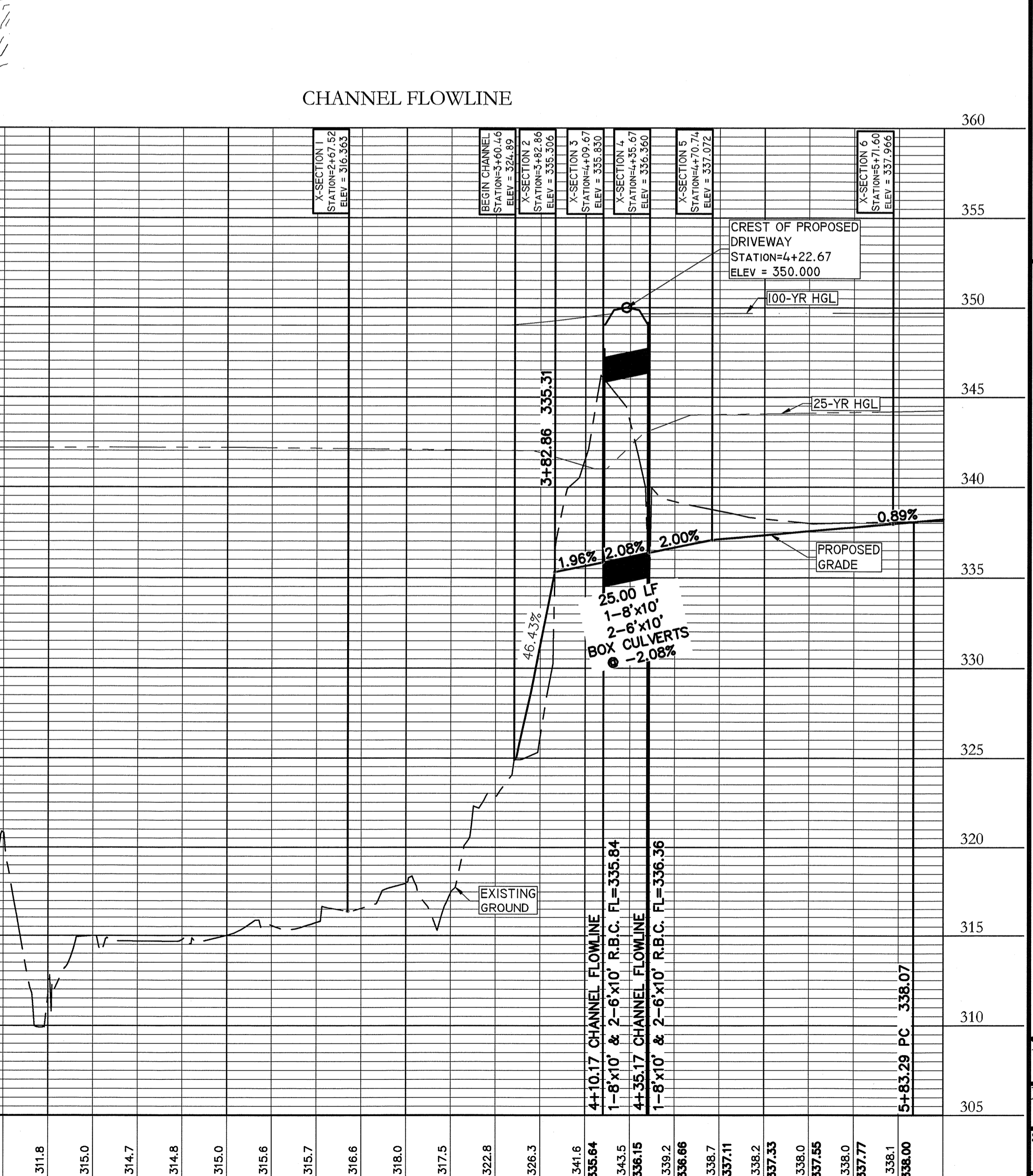
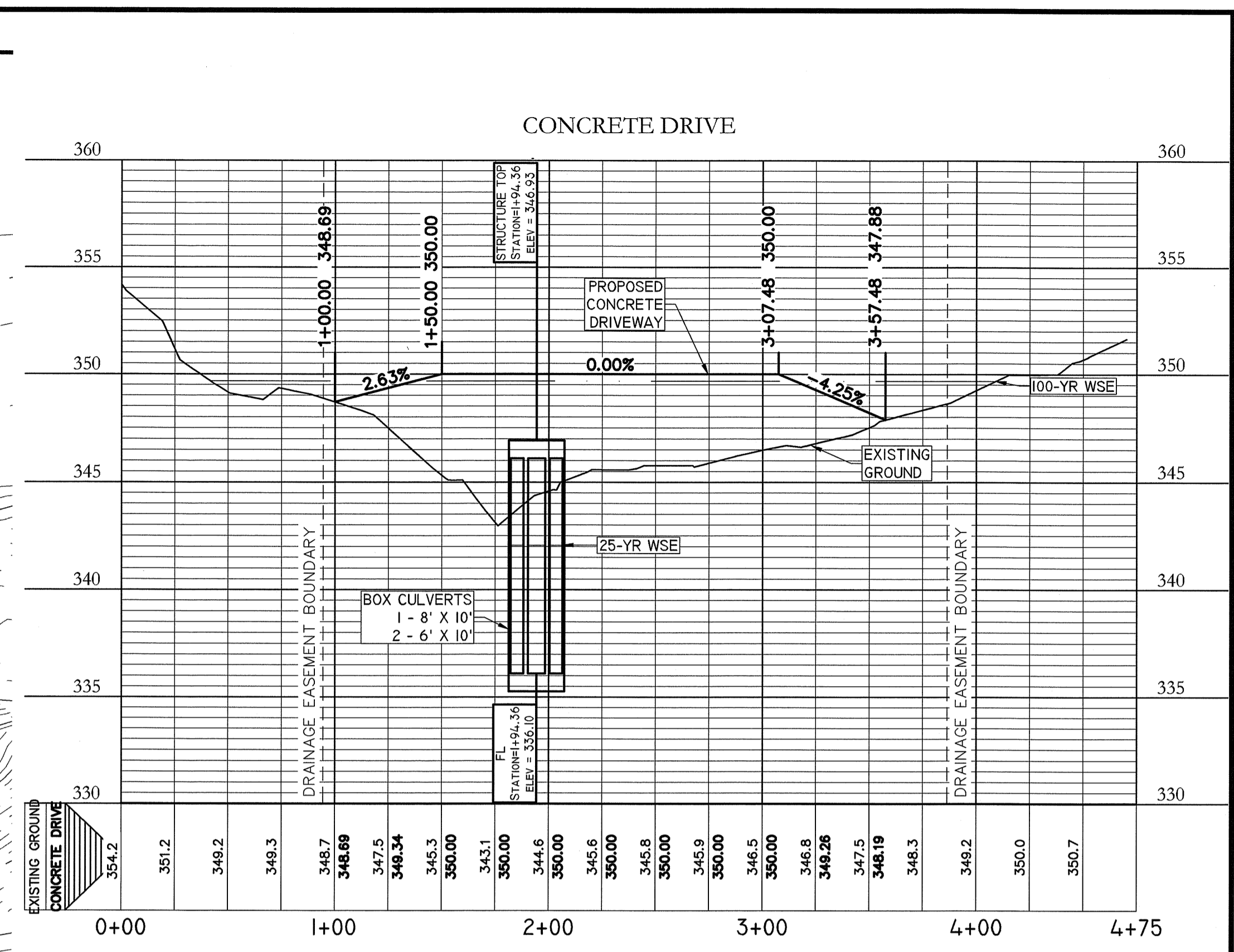
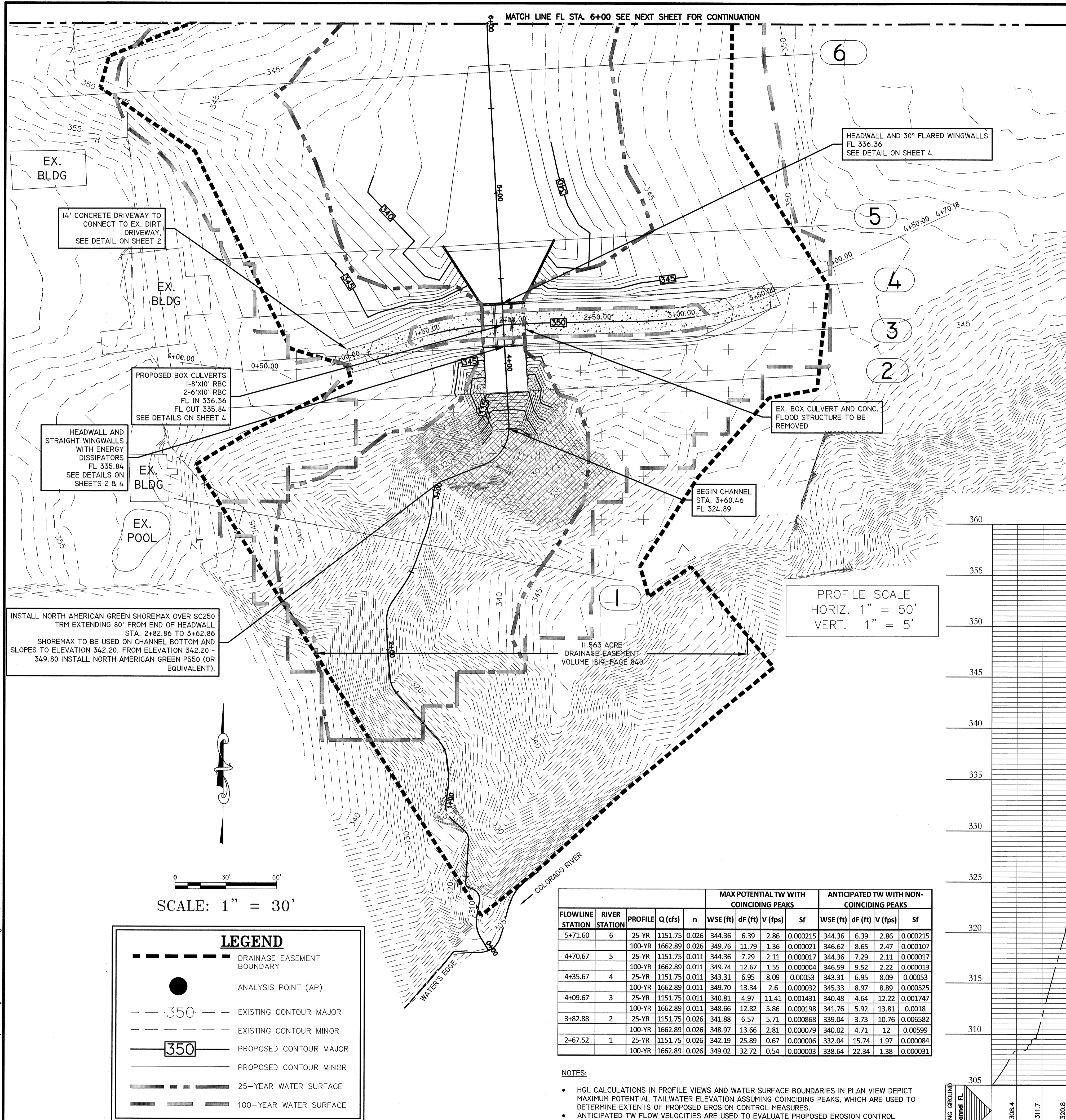
- SCS WAS USED AS DRAINAGE CALCULATION METHOD
- RAINFALL INTENSITIES DATA FOR DESIGN STORMS WERE PROVIDED BY BASTROP COUNTY'S CODE OF ORDINANCES (10.1.40 & 10.5.90)
- CN'S ARE BASED ON EXISTING TYPE A & B SOILS AND REFLECT VALUES PER THE USDA WEB SOIL SURVEY
- TOC CALCULATIONS ARE BASED ON ASSUMED EXISTING CONDITIONS & TR-55
- MANNING'S N VALUES FROM TR-55:
  - PIPE/CHANNEL FLOW
    - PIPES - REINFORCED CONCRETE = 0.013
    - NATURAL CHANNELS - EARTH, STRAIGHT, SOME GRASS = 0.026
  - OVERLAND FLOW
    - SMOOTH SURFACE (CONCRETE, ASPHALT, BARE SOIL) = 0.011
    - SHORT GRASS = 0.015
- OFFSITE IMPERVIOUS COVERS ARE APPROXIMATE BASED ON AERIAL IMAGERY

DESIGNED BY: BM	DRAFTED BY: TW
DATE: _____	REVISION: _____
<b>Carlson, Brigrance &amp; Doering, Inc.</b> FIRM ID #F3791 Civil Engineers & Surveyors 5501 West William Cannon Dr. • Austin, Texas 78749 Phone No. (512) 280-5160 • Fax No. (512) 280-5165	
<b>EXISTING DRAINAGE AREA MAP</b> <b>BASTROP GROVE</b> <b>DRAINAGE IMPROVEMENTS</b>	
SHEET NAME: _____	
JOB NAME: _____	
PROJECT: _____	
DATE: <b>APRIL 2018</b>	
JOB NUMBER: <b>4697</b>	
SHEET: <b>6 OF 14</b>	
SHEET NO. <b>6</b>	

FILE PATH: \\uacbz004\Land Projects\4697\Eng\Channels\4697 - DRAINAGE - reworking - May 15, 2018 - 1:34pm



FILE PATH: \\hmc\c4\2004 Land Projects\4697.dwg\Channel\4697 - DRAINAGE.dwg - Jun 25, 2018 - 7:00am



PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'

FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
5+71.60	6	25-YR	1151.75	0.026	344.36	6.39	2.86	0.000215	344.36	6.39	2.86	0.000215
		100-YR	1662.89	0.026	349.76	11.79	1.36	0.000021	346.62	8.65	2.47	0.000107
4+70.67	5	25-YR	1151.75	0.011	344.36	7.29	2.11	0.000017	344.36	7.29	2.11	0.000017
		100-YR	1662.89	0.011	349.74	12.67	1.55	0.000004	346.59	9.52	2.22	0.000013
4+35.67	4	25-YR	1151.75	0.011	343.31	6.95	8.09	0.00053	343.31	6.95	8.09	0.00053
		100-YR	1662.89	0.011	349.70	13.34	2.6	0.000032	345.33	8.97	8.89	0.000525
4+09.67	3	25-YR	1151.75	0.011	340.81	4.97	11.41	0.001431	340.48	4.64	12.22	0.001747
		100-YR	1662.89	0.011	348.66	12.82	5.86	0.000198	341.76	5.92	13.81	0.0018
3+82.88	2	25-YR	1151.75	0.026	341.88	6.57	5.71	0.000868	339.04	3.73	10.76	0.006582
		100-YR	1662.89	0.026	348.97	13.66	2.81	0.000079	340.02	4.71	12	0.00599
2+67.52	1	25-YR	1151.75	0.026	342.19	25.89	0.67	0.000006	332.04	15.74	1.97	0.000084
		100-YR	1662.89	0.026	349.02	32.72	0.54	0.000003	338.64	22.34	1.38	0.000031

NOTES:  
 • HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.  
 • ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

**BRENDAN P. MENTZER**  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 09/28/2018

CARLSON, BRIGANCE & DOERING, INC.  
 5801 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

DESIGNED BY: BM  
 DRAFTED BY: IW

DATE: \_\_\_\_\_  
 REVISION: \_\_\_\_\_

**Carlson, Brigance & Doering, Inc.**  
 FIRM ID: #F9791  
 Civil Engineering  
 5801 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

**CHANNEL - STA. 0+00 TO 6+00**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

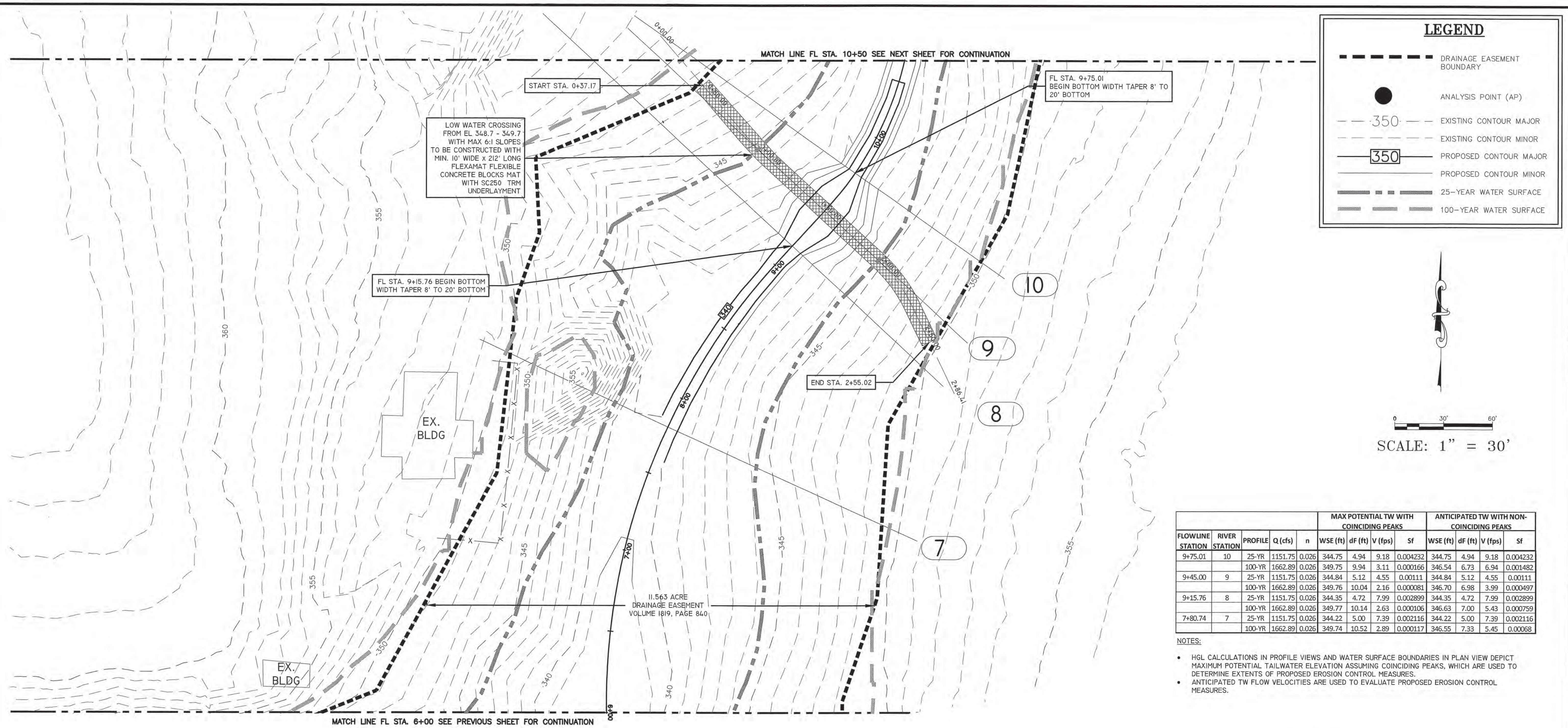
SHEET NAME:  
 JOB NAME:  
 PROJECT:

DATE: **APRIL 2018**  
 JOB NUMBER: **4697**

SHEET: **8** OF **14**  
 SHEET NO. **8**



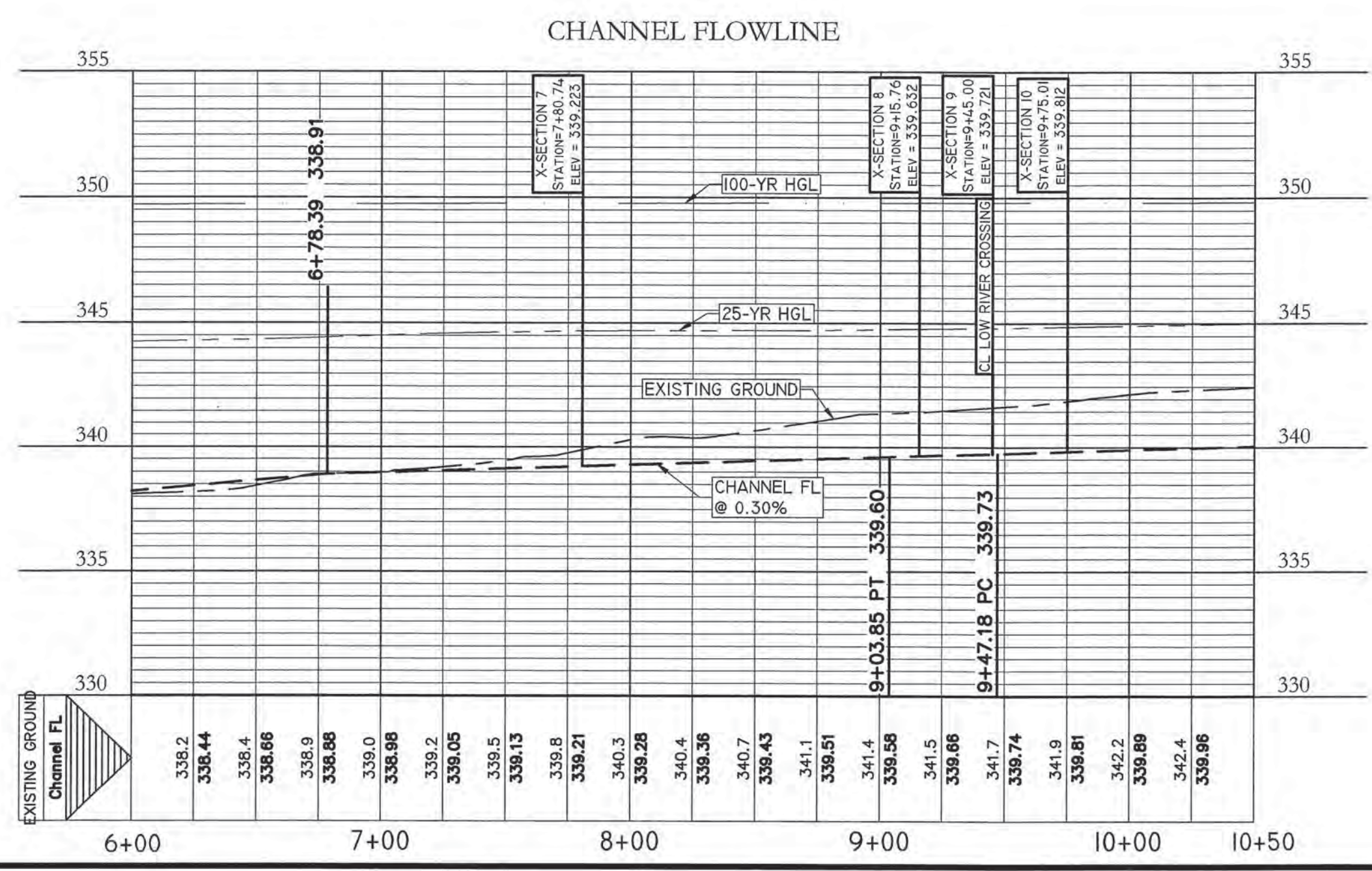
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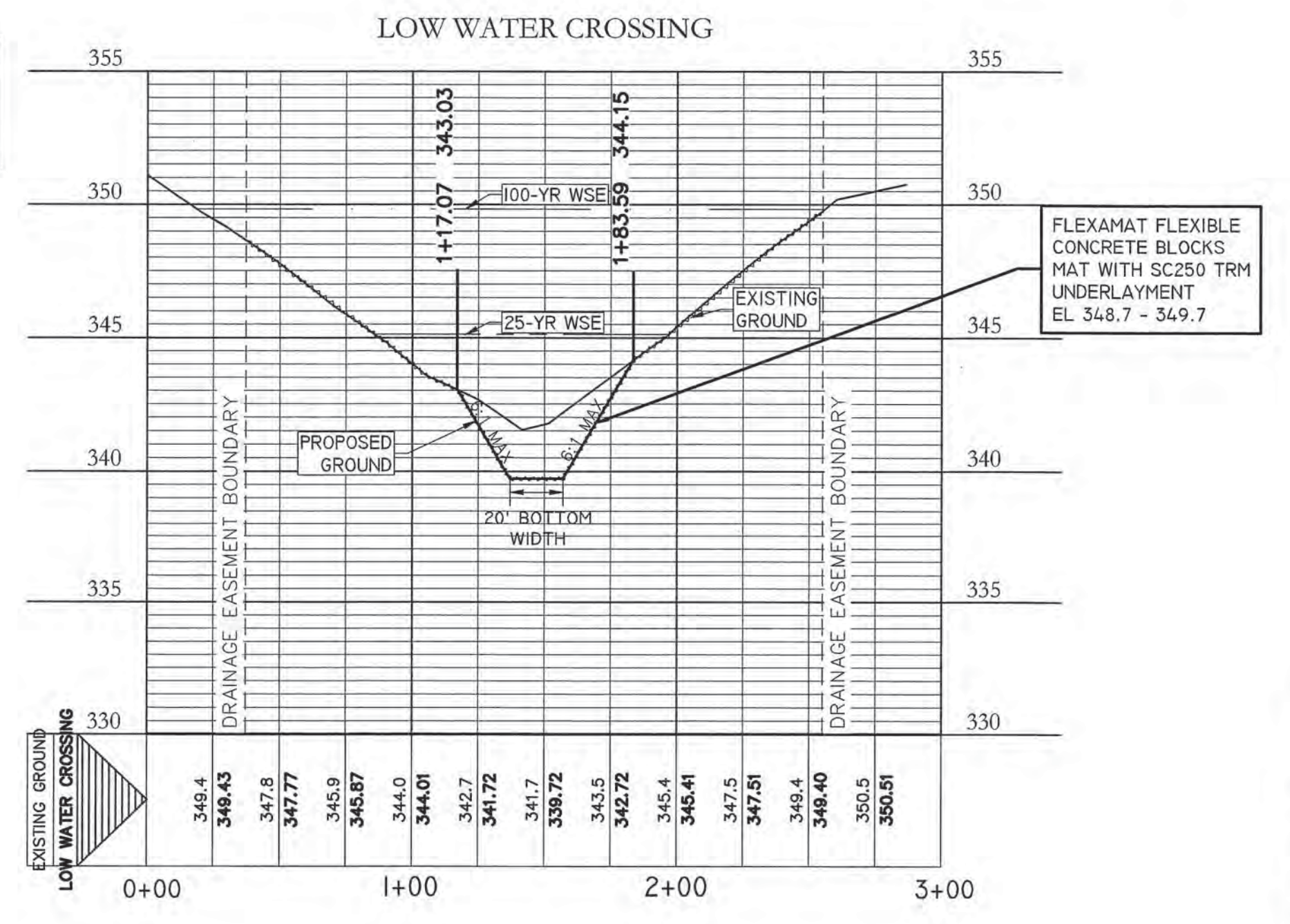
FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
9+75.01	10	25-YR	1151.75	0.026	344.75	4.94	9.18	0.004232	344.75	4.94	9.18	0.004232
		100-YR	1662.89	0.026	349.75	9.94	3.11	0.000166	346.54	6.73	6.94	0.001482
9+45.00	9	25-YR	1151.75	0.026	344.84	5.12	4.55	0.00111	344.84	5.12	4.55	0.00111
		100-YR	1662.89	0.026	349.76	10.04	2.16	0.000081	346.70	6.98	3.99	0.000497
9+15.76	8	25-YR	1151.75	0.026	344.35	4.72	7.99	0.002899	344.35	4.72	7.99	0.002899
		100-YR	1662.89	0.026	349.77	10.14	2.63	0.000106	346.63	7.00	5.43	0.000759
7+80.74	7	25-YR	1151.75	0.026	344.22	5.00	7.39	0.002116	344.22	5.00	7.39	0.002116
		100-YR	1662.89	0.026	349.74	10.52	2.89	0.000117	346.55	7.33	5.45	0.00068

NOTES:

- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
- ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.



PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'



BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
STATE OF TEXAS

CARLSON, BRIGANCE & DOERING, INC.  
107 F 3791  
Austin, TX 78704  
as/15/2018

DESIGNED BY: BM	DRAFTED BY: JW
DATE:	
REVISION:	

Carlson, Brigrance & Doering, Inc.

FIRM ID #F3791

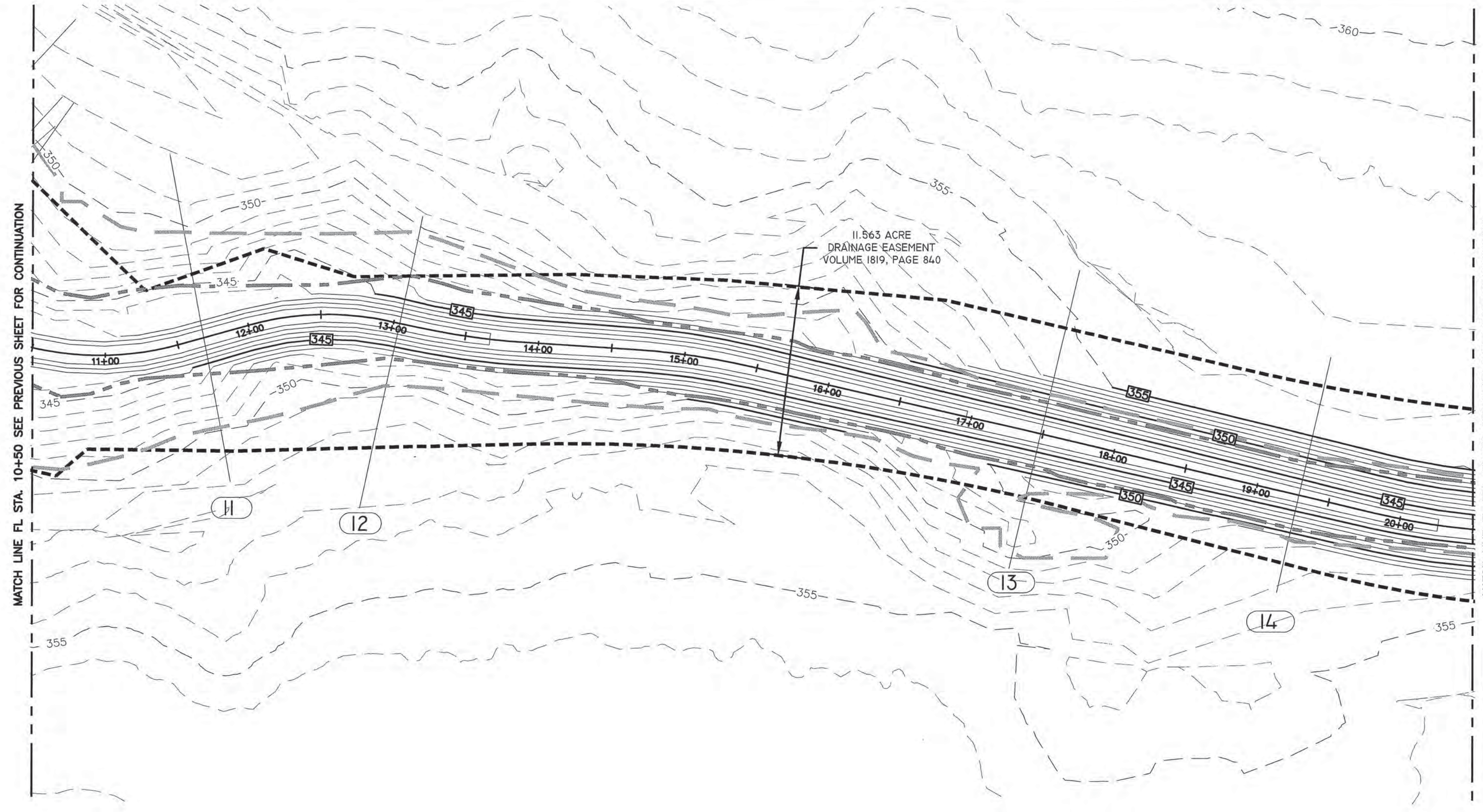
Civil Engineering    Surveying    Texas 382.69  
6501 W. Loop    Phone No. (512) 286-5160    Fax No. (512) 286-5165

**CHANNEL - STA. 6+00 TO 10+50**

**BASTROP GROVE**

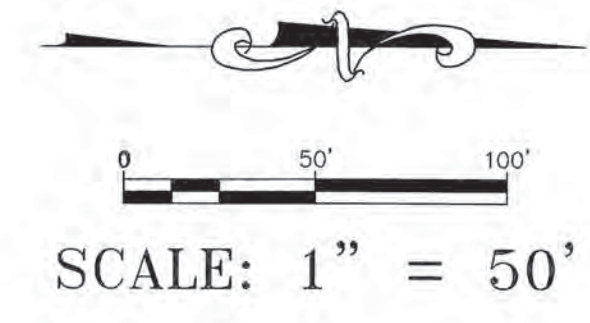
**DRAINAGE IMPROVEMENTS**

SHEET NAME:	DATE:
JOB NAME:	APRIL 2018
PROJECT:	JOB NUMBER:
	4697
	SHEET:
	9 OF 14
	SHEET NO.:
	9



**LEGEND**

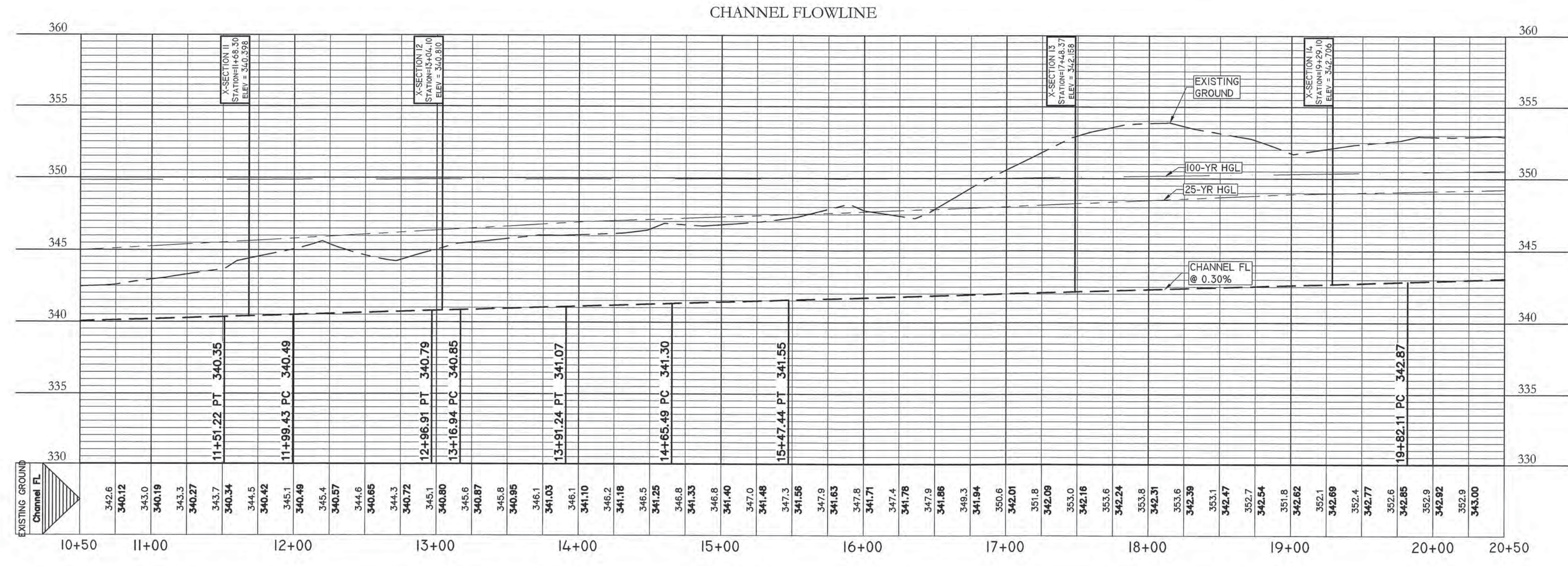
- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- - - 350 - - - EXISTING CONTOUR MAJOR
- - - EXISTING CONTOUR MINOR
- 350 PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE



FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
19+29.1	14	25-YR	868.31	0.026	349.06	6.35	5.05	0.001429	349.06	6.35	5.05	0.001429
		100-YR	1234.19	0.026	350.55	7.84	4.99	0.001095	350.18	7.47	5.43	0.001371
17+48.37	13	25-YR	1151.75	0.026	348.21	6.05	7.26	0.003155	348.21	6.05	7.26	0.003155
		100-YR	1662.89	0.026	350.09	7.93	6.28	0.001586	349.23	7.07	7.96	0.003064
13+04.1	12	25-YR	1151.75	0.026	346.61	5.80	7.44	0.004251	346.61	5.80	7.44	0.004251
		100-YR	1662.89	0.026	349.70	8.89	4.78	0.000681	347.22	6.41	8.83	0.004786
11+68.3	11	25-YR	1151.75	0.026	345.46	5.06	9.46	0.005489	345.46	5.06	9.46	0.005489
		100-YR	1662.89	0.026	349.71	9.31	4.44	0.000416	346.47	6.07	9.83	0.004214

- NOTES:
- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
  - ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

PROFILE SCALE  
 HORIZ. 1" = 50'  
 VERT. 1" = 5'



BRENDAN P. McENTEE  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 STATE OF TEXAS

DESIGNED BY: *BPM* DRAFTED BY: *IVW*

DATE: \_\_\_\_\_ REVISION: \_\_\_\_\_

Carlson, Brigrance & Doering, Inc.  
 FIRM ID #F3791  
 Civil Engineering  
 5501 Westpark Center Dr.  
 Houston, Texas 77049  
 Phone No. (512) 280-5160 Fax No. (512) 280-5165

**CHANNEL - STA. 10+50 TO 20+50**

**BASTROP GROVE**

**DRAINAGE IMPROVEMENTS**

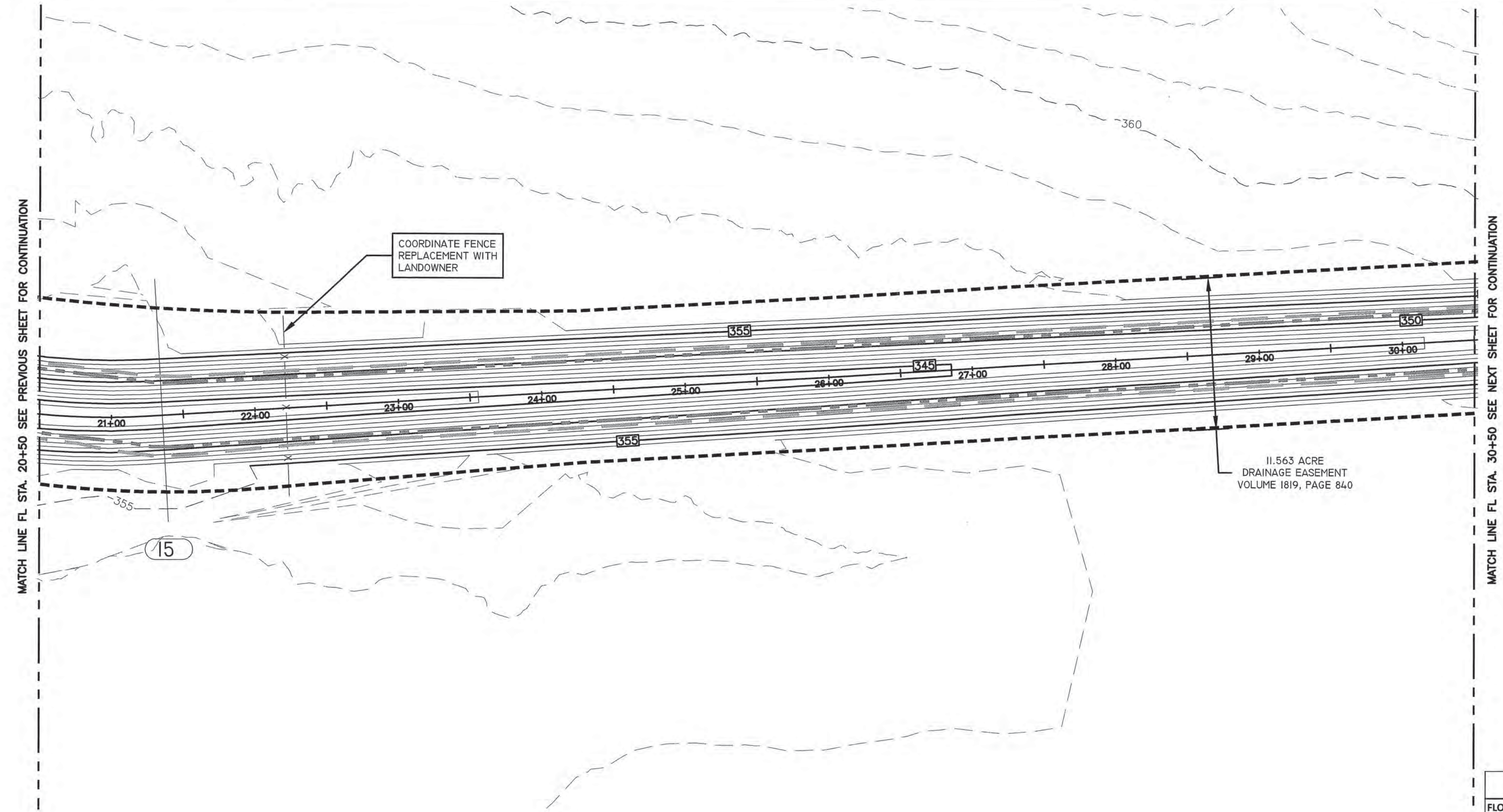
SHEET NAME: \_\_\_\_\_ DATE: **APRIL 2018**

JOB NAME: \_\_\_\_\_ JOB NUMBER: **4697**

PROJECT: \_\_\_\_\_ SHEET: **10** OF **14**

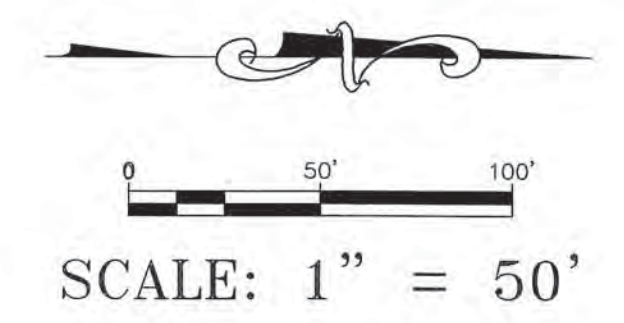
SHEET NO. **10**

FILE PATH: \\nuc04\2004\_Land Projects\697\eng\Channel\697\_DRAINAGE\_revised.dwg - May 15, 2018 - 1:27pm



**LEGEND**

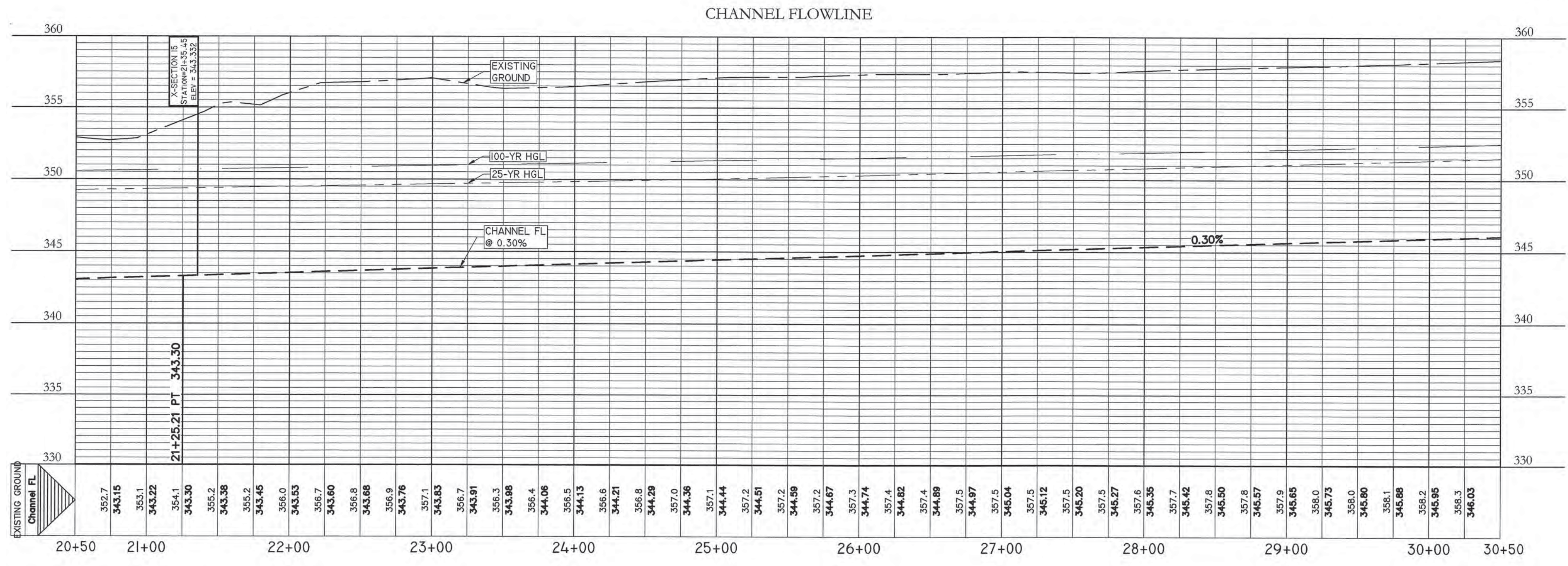
- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- - - 350 - - - EXISTING CONTOUR MAJOR
- - - 355 - - - EXISTING CONTOUR MINOR
- 350 — PROPOSED CONTOUR MAJOR
- 355 — PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE



PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'

FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
21+35.45	15	25-YR	868.31	0.026	349.34	6.01	5.56	0.001849	349.34	6.01	5.56	0.001849
		100-YR	1234.19	0.026	350.75	7.42	5.5	0.001418	350.43	7.10	5.93	0.001734

- NOTES:
- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
  - ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.



BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
STATE OF TEXAS

CARLSON, BRIGANCE & DOERING, INC.  
ID# F3791

*Brendan P. McEntee*  
05/15/2018

DESIGNED BY: BM	DRAWN BY: TW
DATE:	
REVISION:	

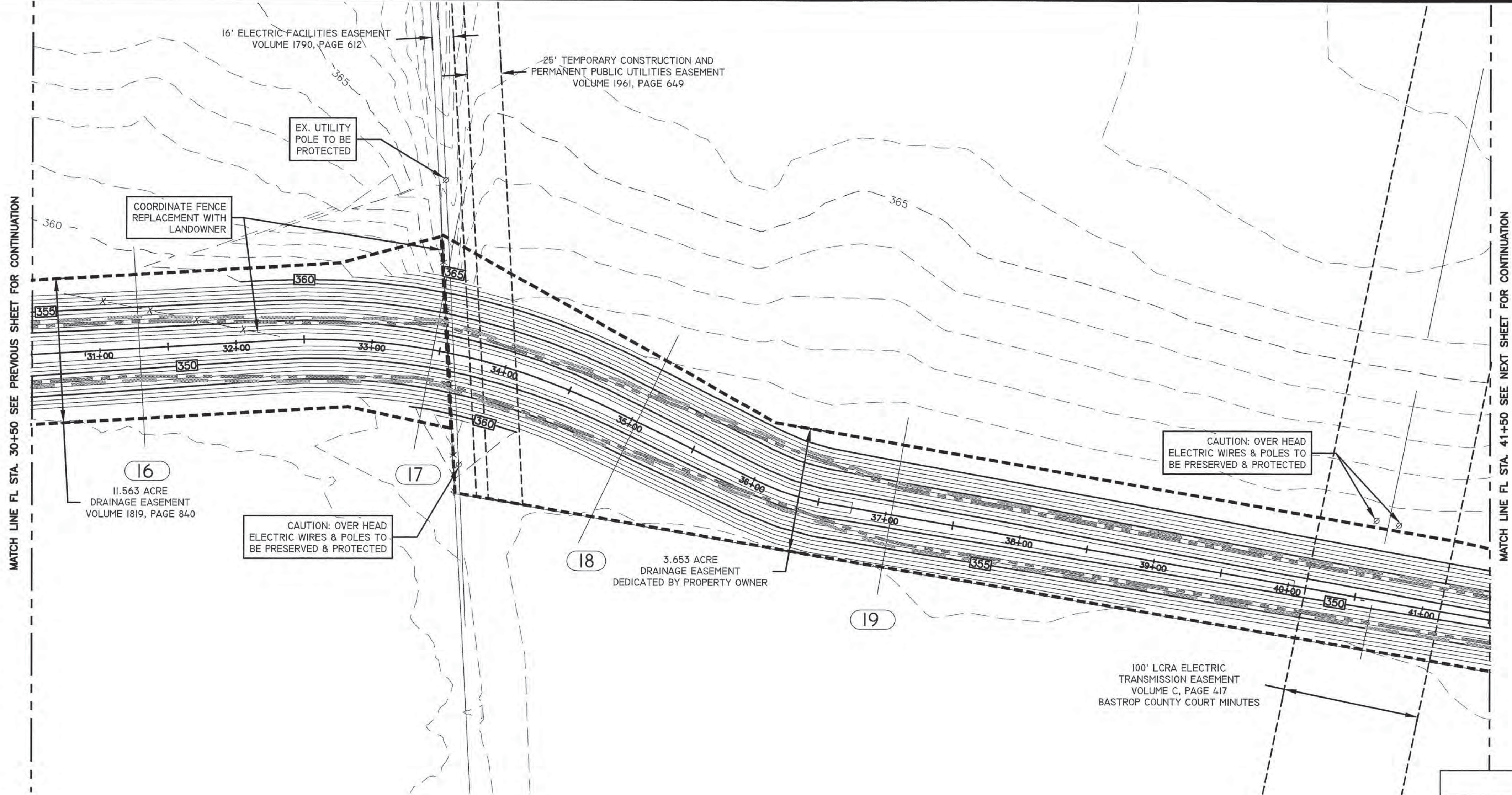
**Carlson, Brigrance & Doering, Inc.**  
FIRM ID #F3791

Civil Engineering    Surveying    Texas Reg'd  
5501 West Loop South, Suite 1000    Houston, Texas 77049  
Phone Nos. (817) 280-5160    Fax No. (817) 280-5165

<b>CHANNEL - STA. 20+50 TO 30+50</b>	
<b>BASTROP GROVE</b>	
<b>DRAINAGE IMPROVEMENTS</b>	

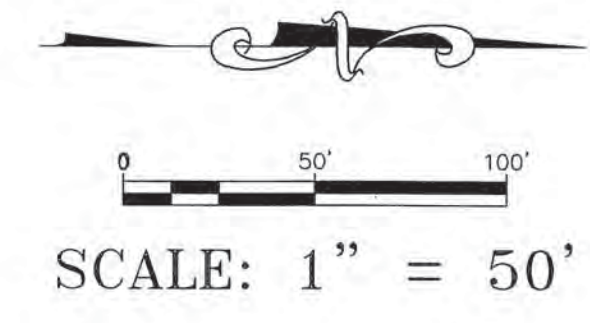
SHEET NAME:	DATE:
JOB NAME:	APRIL 2018
PROJECT:	JOB NUMBER:
	4697
	SHEET:
	11 OF 14
	SHEET NO.:
	11

FILE PATH: \\hmc\cadd\2004 Land Projects\4697\mg\Channel\697 - DRAINAGE.mxd - July 15, 2018 - 1:29pm



### LEGEND

- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE

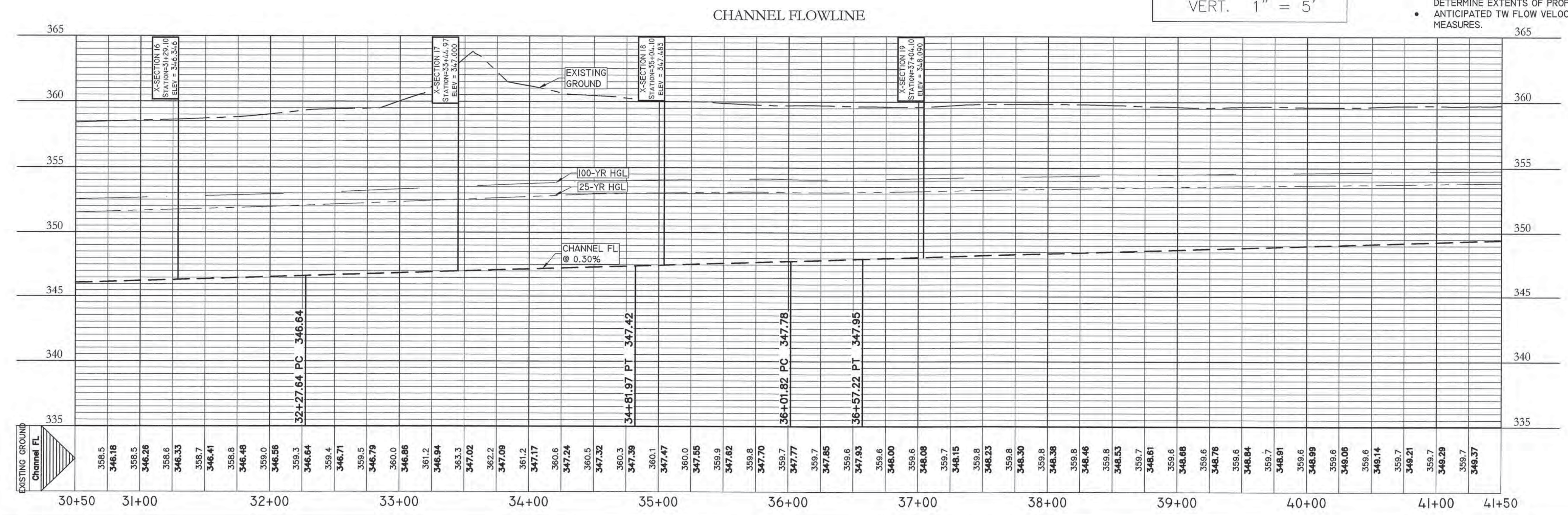


FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
37+04.1	19	25-YR	414.96	0.026	353.33	5.24	3.34	0.000782	353.33	5.24	3.34	0.000782
		100-YR	587.02	0.026	354.36	6.27	3.49	0.000694	354.35	6.26	3.5	0.000698
35+04.1	18	25-YR	414.96	0.026	353.24	5.76	2.85	0.000513	353.24	5.76	2.85	0.000513
		100-YR	587.02	0.026	354.28	6.80	3.04	0.00048	354.27	6.79	3.05	0.000483
33+44.97	17	25-YR	868.31	0.026	352.39	5.39	6.66	0.003008	352.39	5.39	6.66	0.003008
		100-YR	1234.19	0.026	353.34	6.34	7.2	0.002937	353.32	6.32	7.24	0.002981
31+29.1	16	25-YR	868.31	0.026	351.75	5.40	6.65	0.002991	351.75	5.40	6.65	0.002991
		100-YR	1234.19	0.026	352.72	6.37	7.14	0.00285	352.68	6.33	7.22	0.002935

NOTES:

- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
- ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'



BRENDAN P. McENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
STATE OF TEXAS

CARLSON, BRIGANCE & DOERING, INC.  
10473 FM 7379  
HOUSTON, TEXAS 77056  
Brendan P. McEntee  
05/15/2018

DESIGNED BY: BM	DRAFTED BY: JSW
DATE:	
REVISION:	

**Carlson, Brigrance & Doering, Inc.**  
FIRM ID #P791

Civil Engineering  
5501 Westport Dr.  
Houston, Texas 78249  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

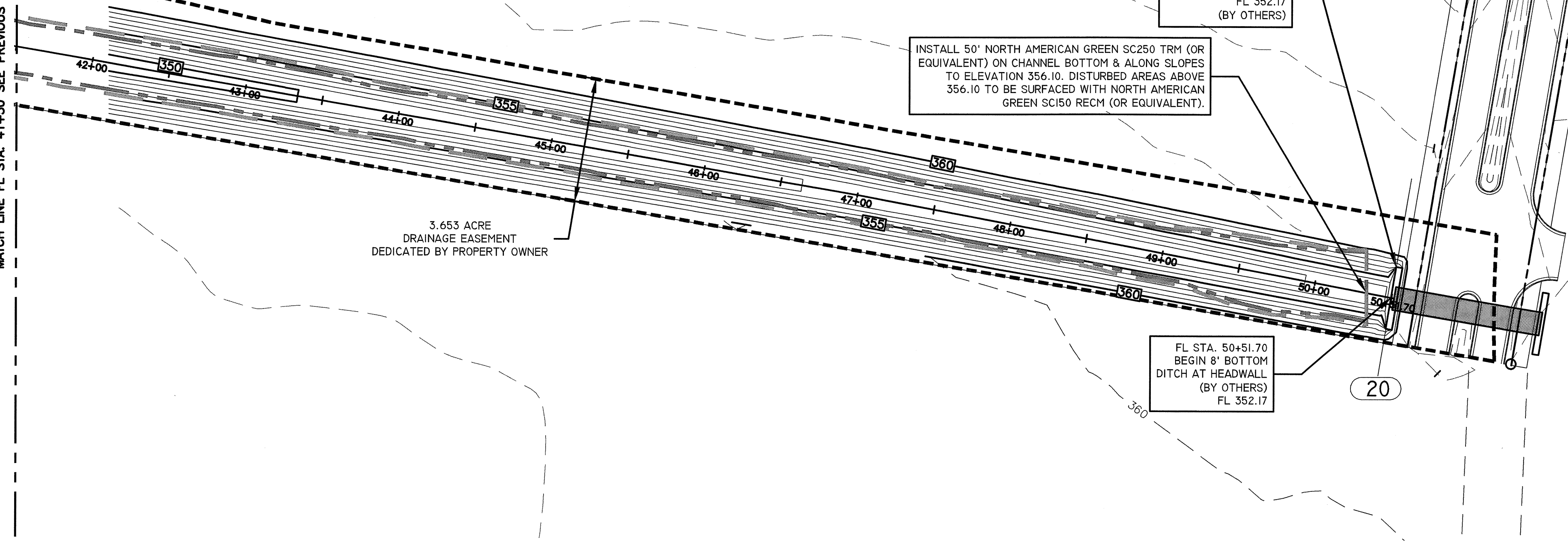
**CHANNEL - STA. 30+50 TO 41+50**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:  
JOB NAME:  
PROJECT:

DATE: APRIL 2018  
JOB NUMBER: 4697  
SHEET: 12 OF 14  
SHEET NO. 12

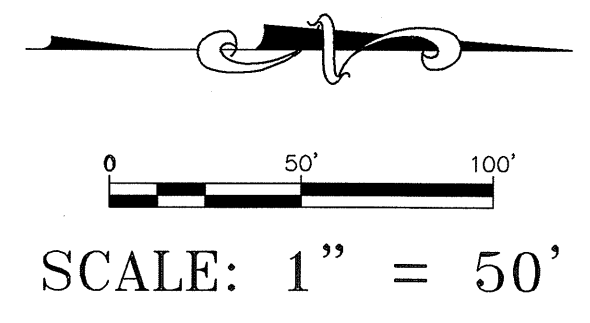
100' LCRA ELECTRIC TRANSMISSION EASEMENT VOLUME C, PAGE 417 BASTROP COUNTY COURT MINUTES

MATCH LINE FL STA. 41+50 SEE PREVIOUS SHEET FOR CONTINUATION



**LEGEND**

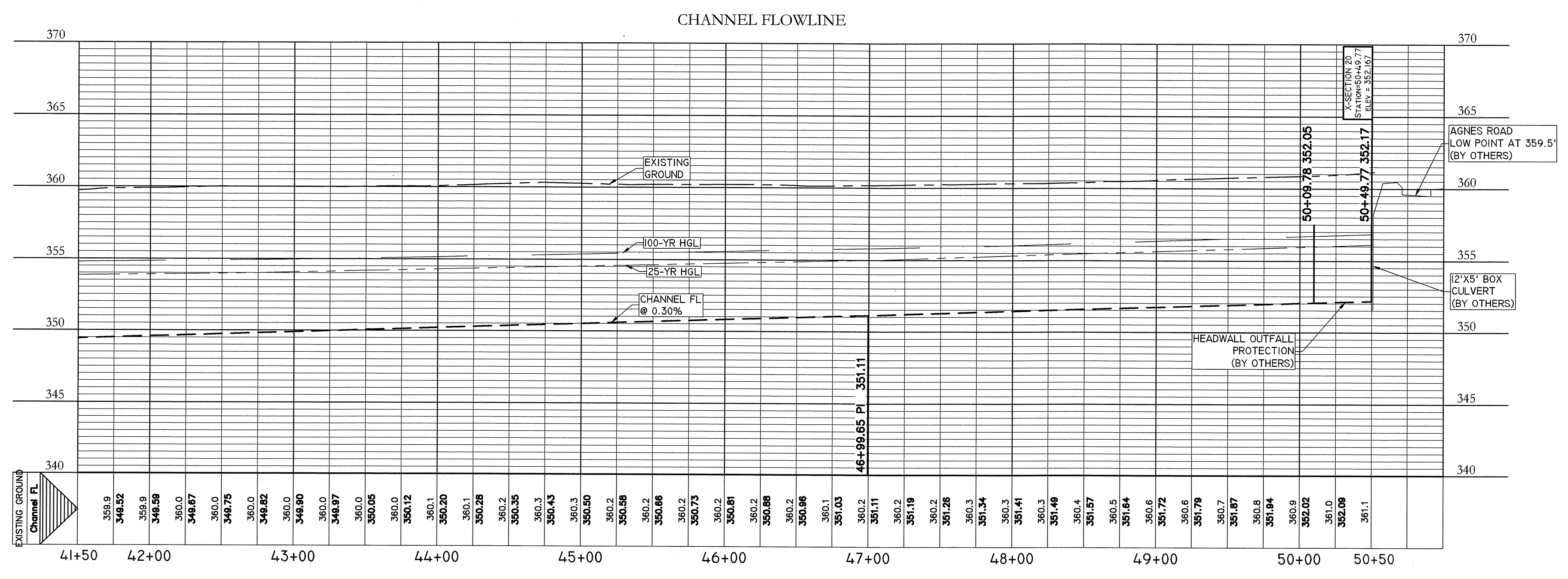
- DRAINAGE EASEMENT BOUNDARY
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FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
50+49.7	20	25-YR	414.96	0.026	356.13	3.13	3.31	0.000888	356.13	3.13	3.31	0.000888
		100-YR	587.02	0.026	356.87	3.87	3.79	0.000918	356.87	3.87	3.79	0.000918

- NOTES:
- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
  - ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'



STATE OF TEXAS  
BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
CARLSON, BRIGANCE & DOERING, INC.  
09/20/2010

DESIGNED BY: BM  
DRAWN BY: JW

DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_

Carlson, Brigance & Doering, Inc.  
FIRM ID: #E7991  
Civil Engineering  
5901 West William Cannon Dr., Austin, Texas 78749  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

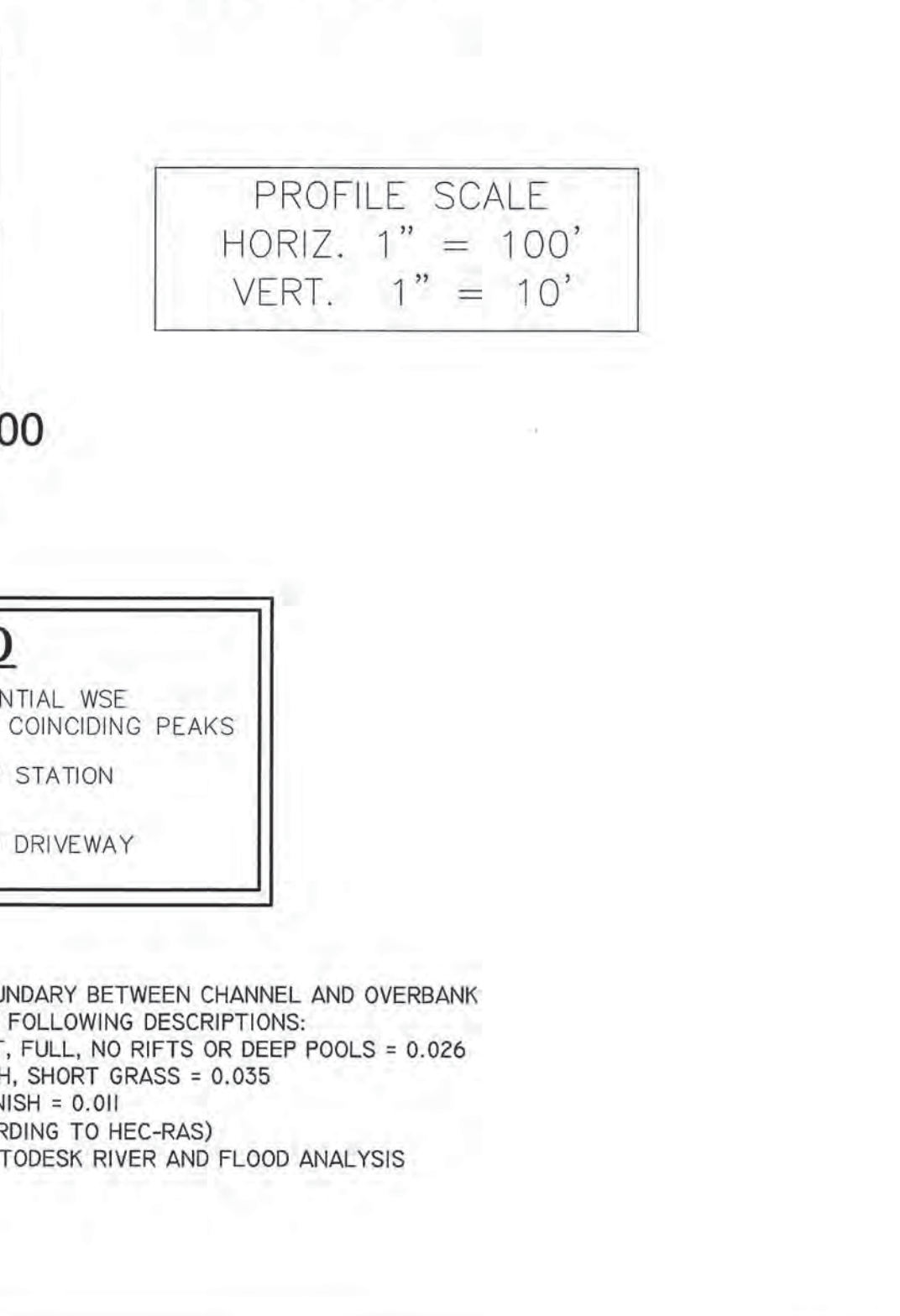
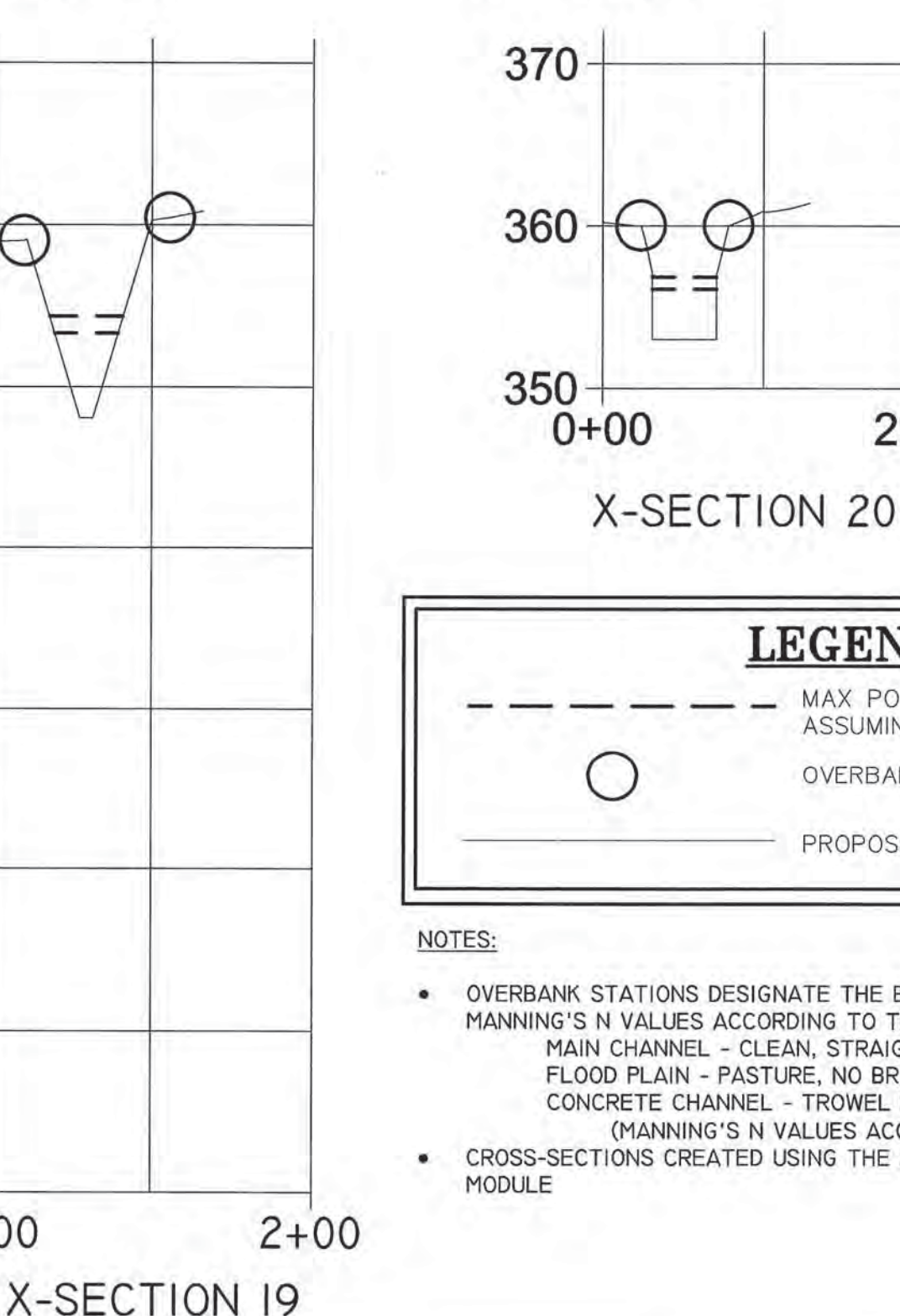
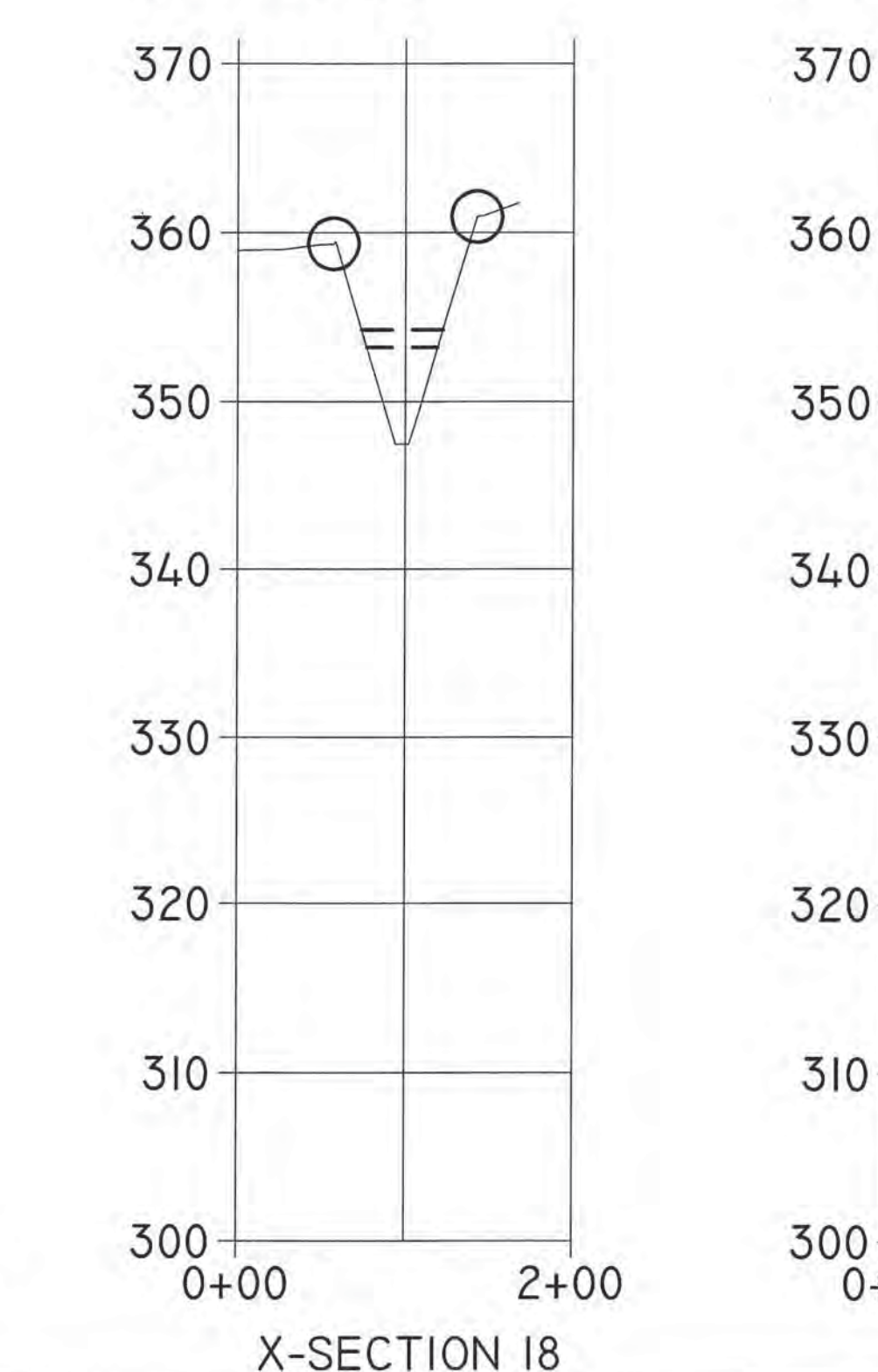
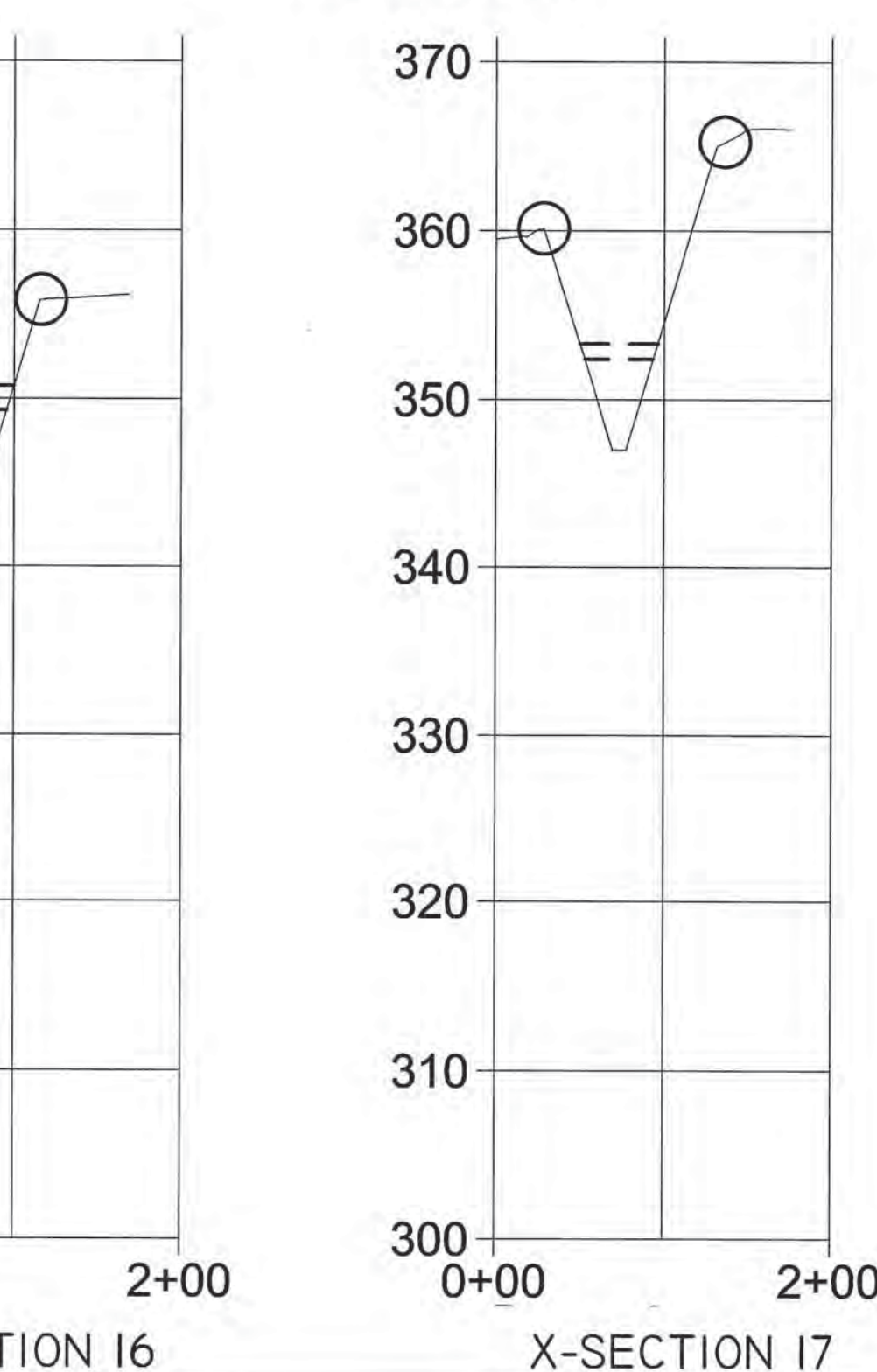
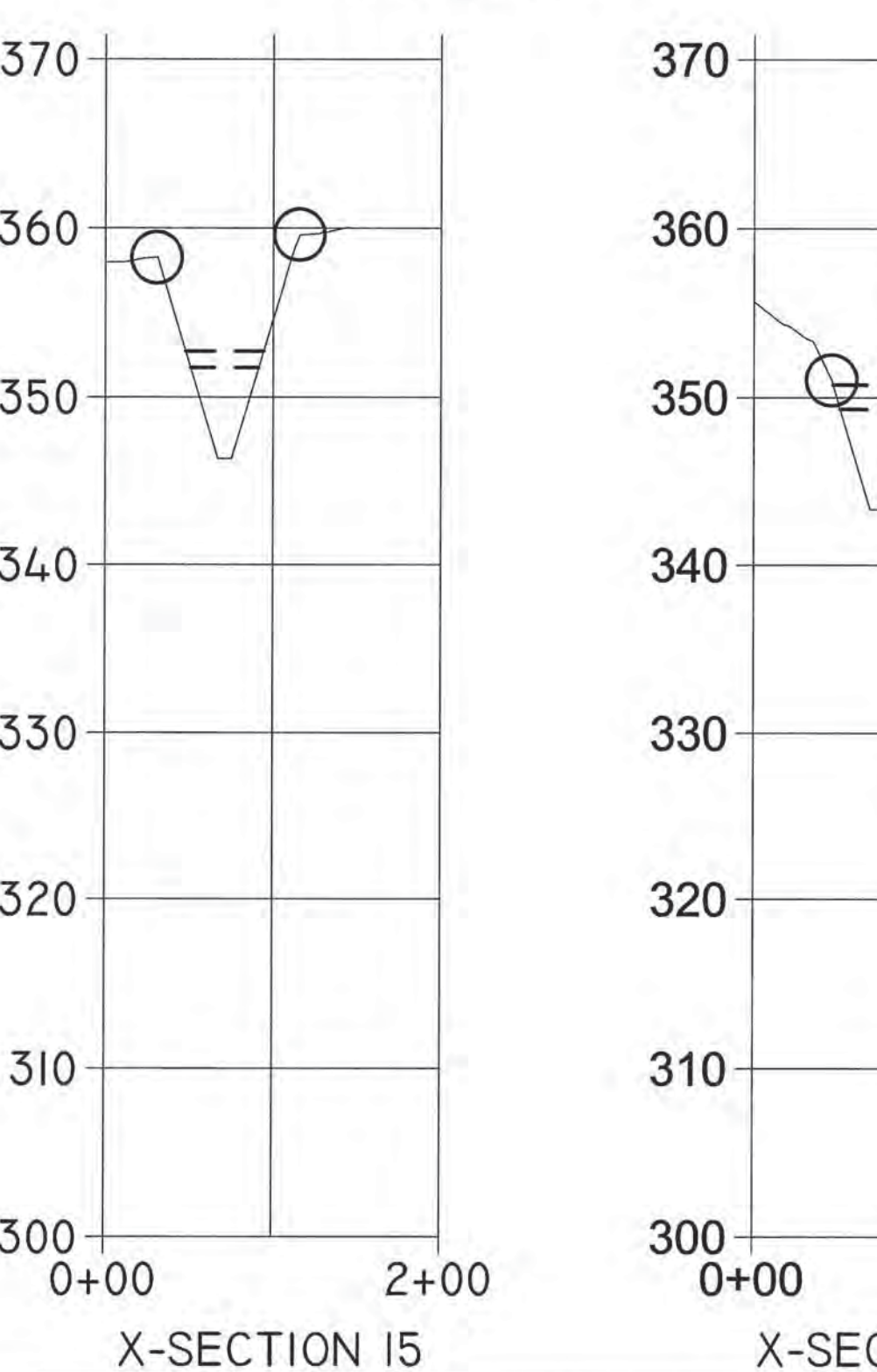
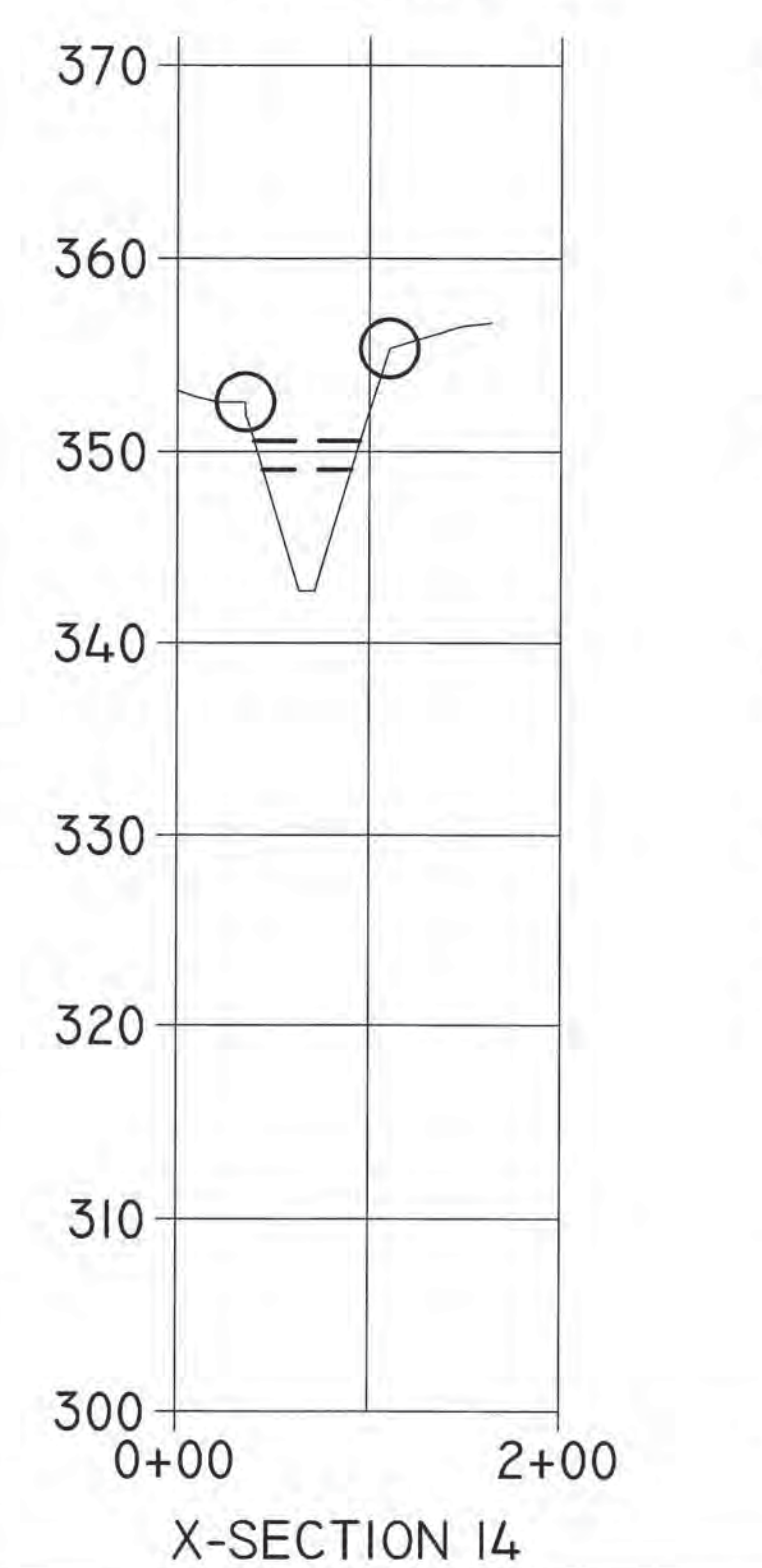
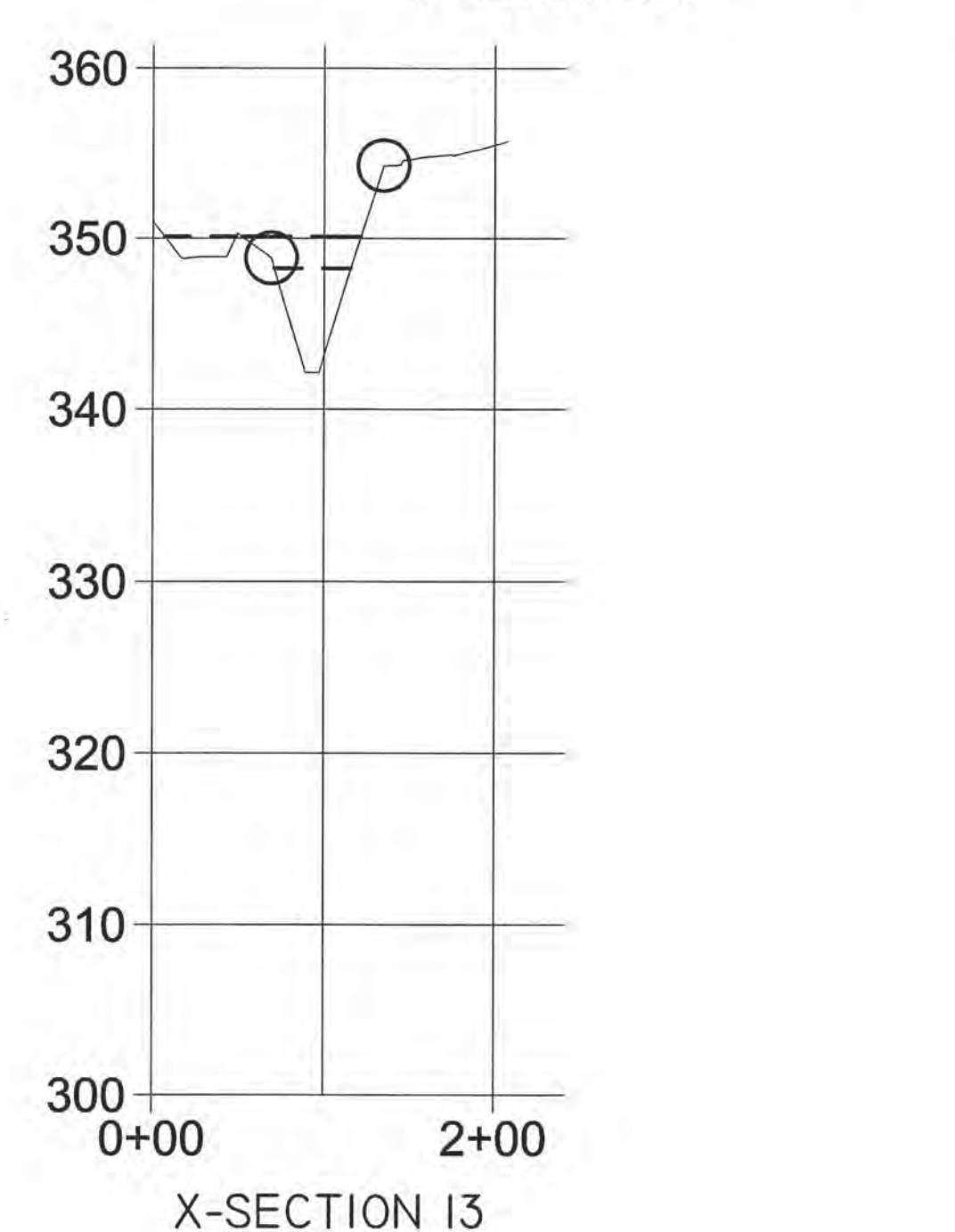
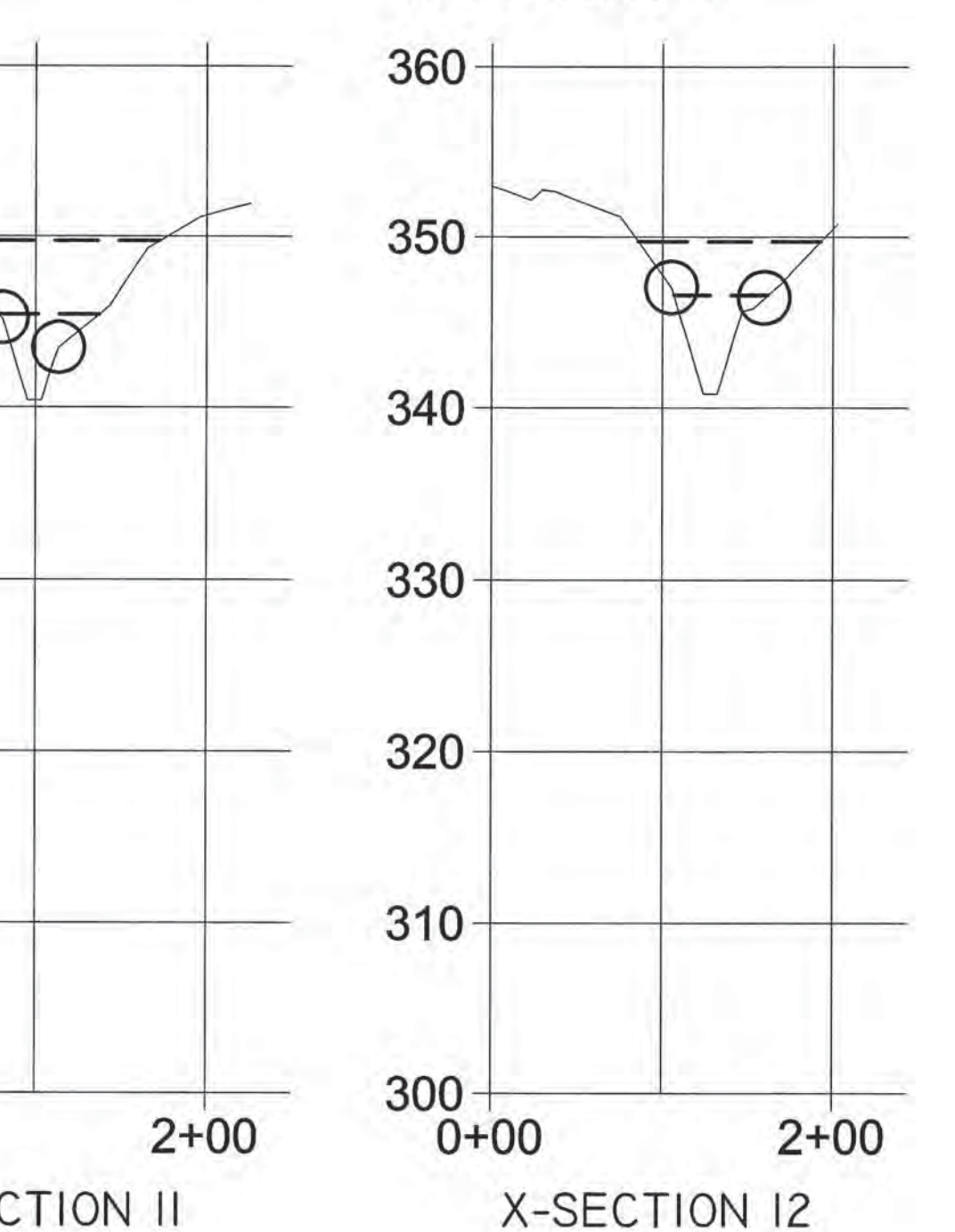
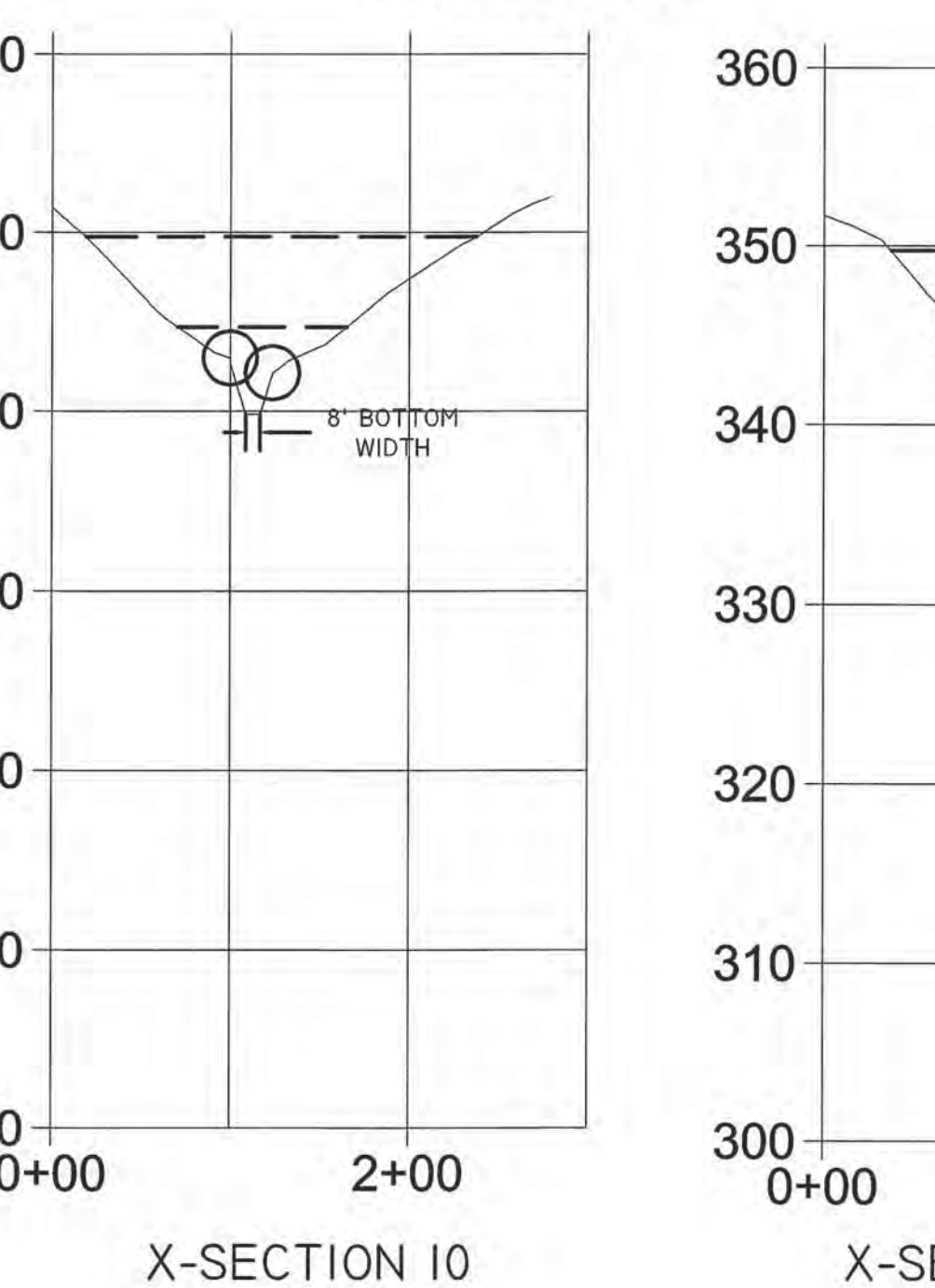
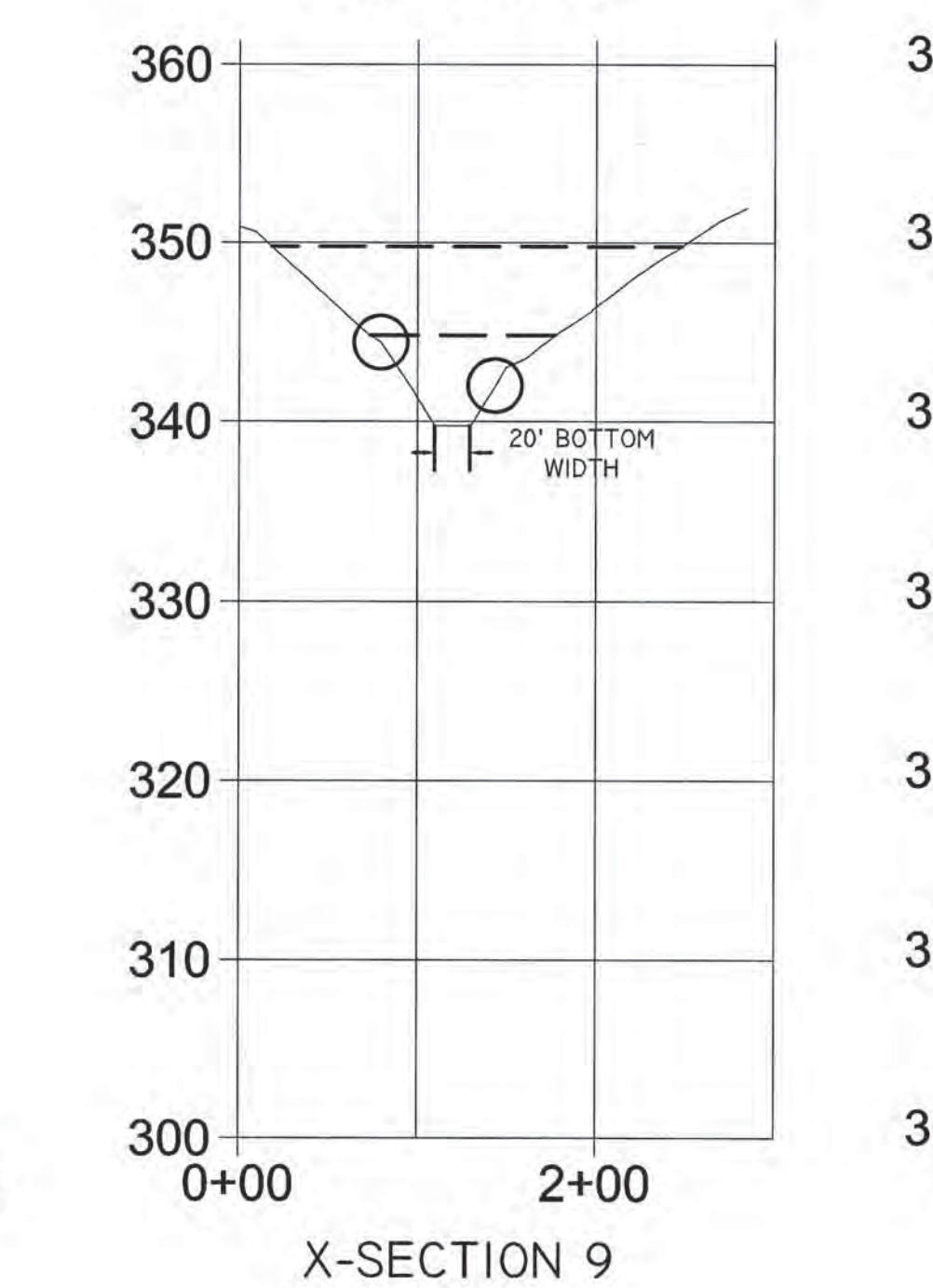
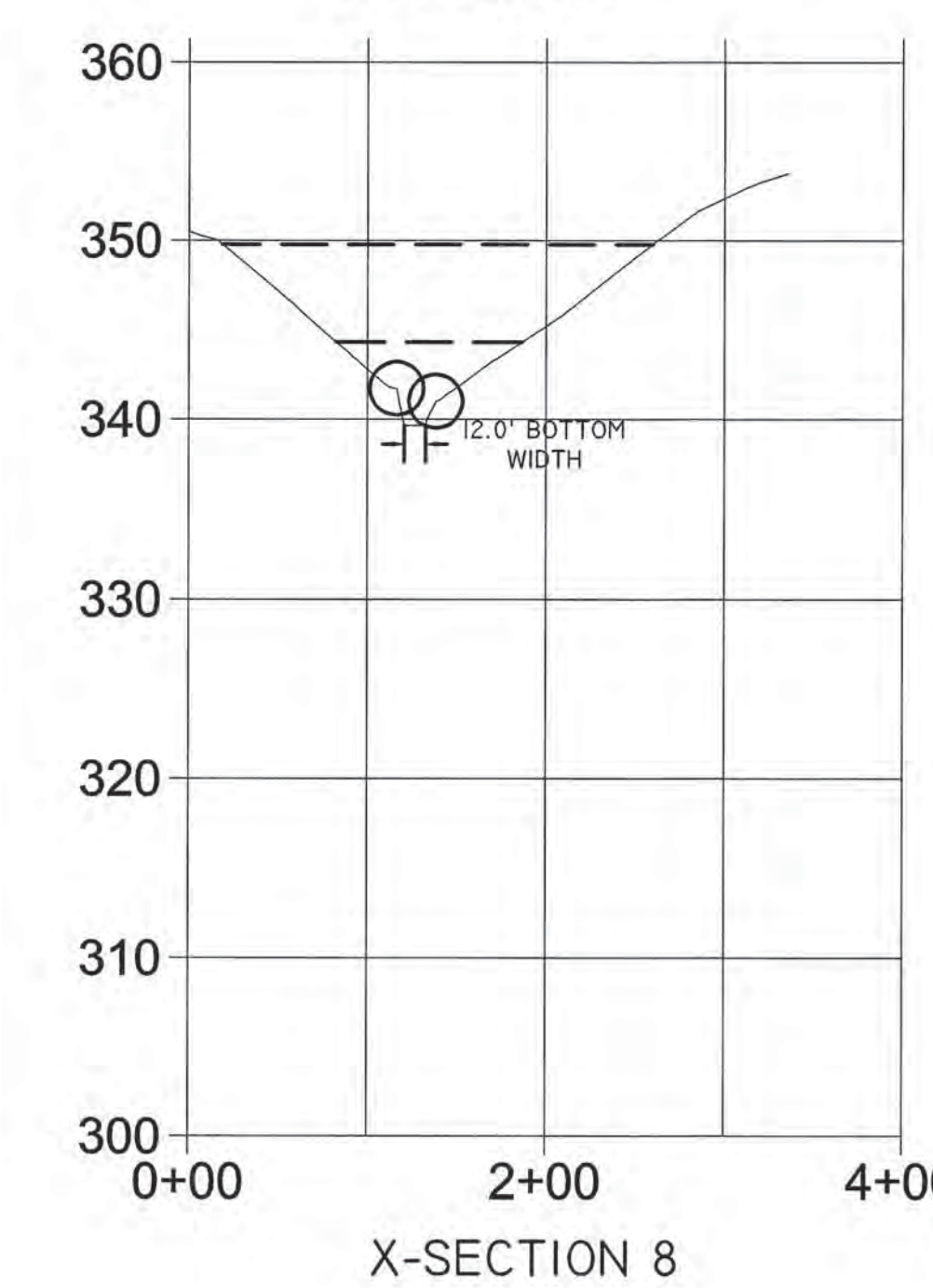
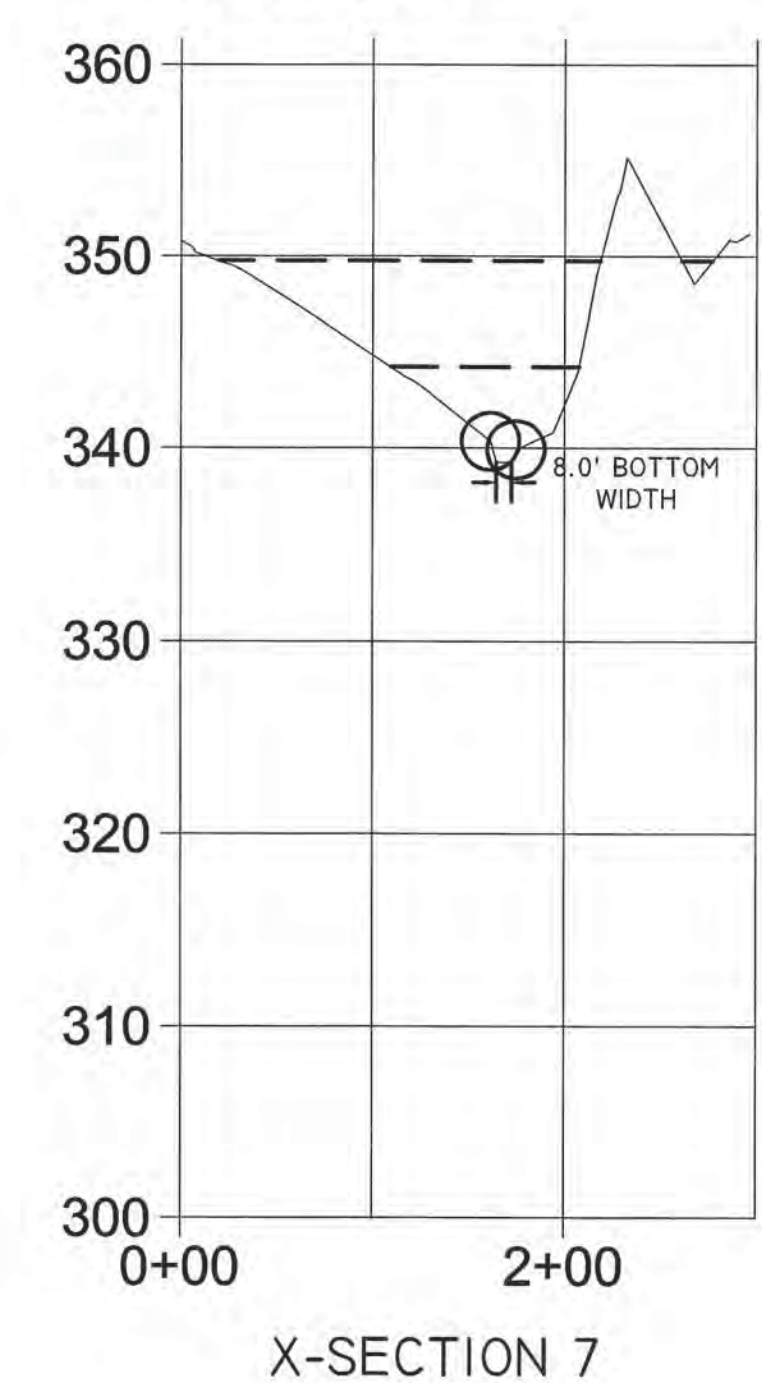
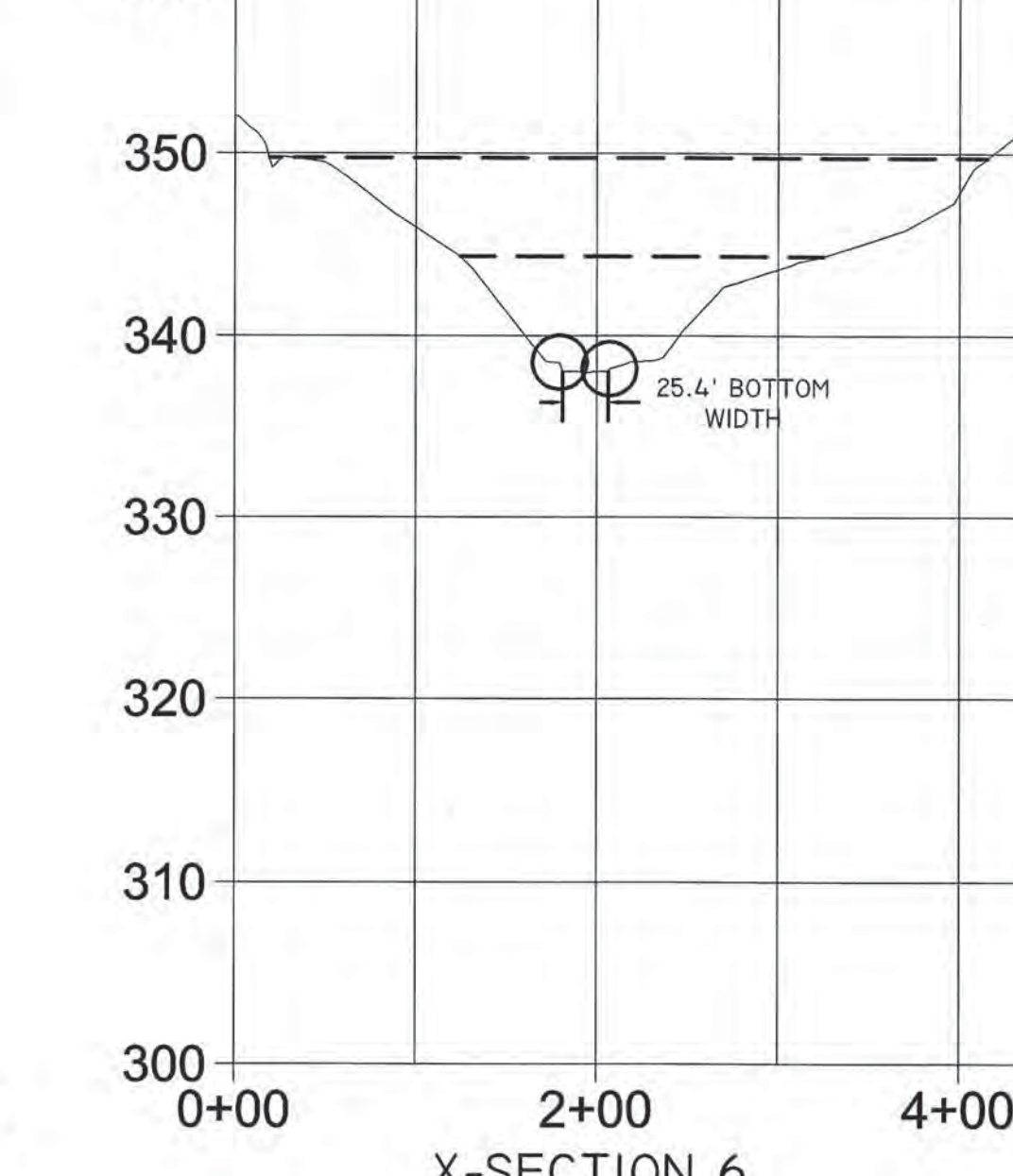
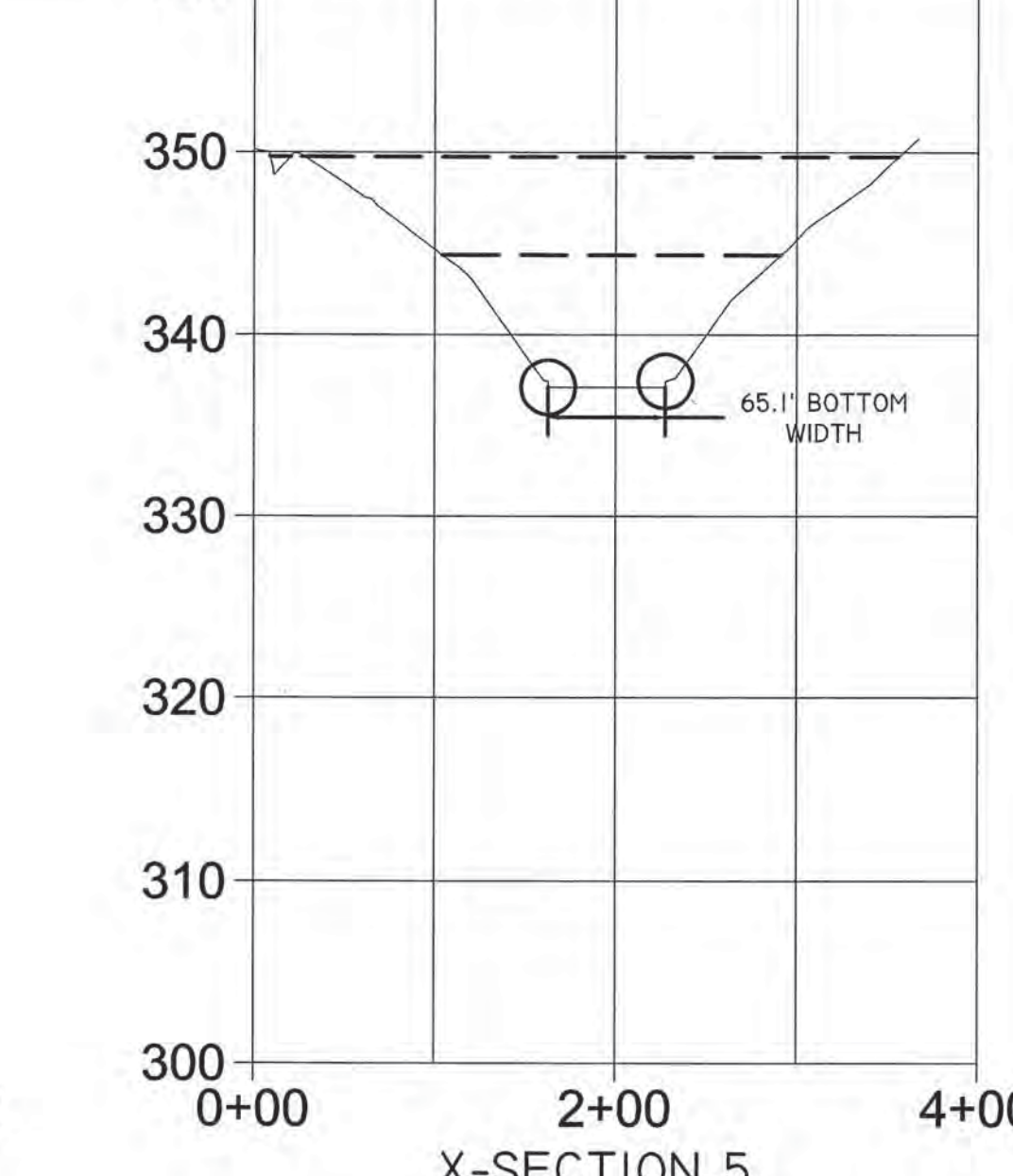
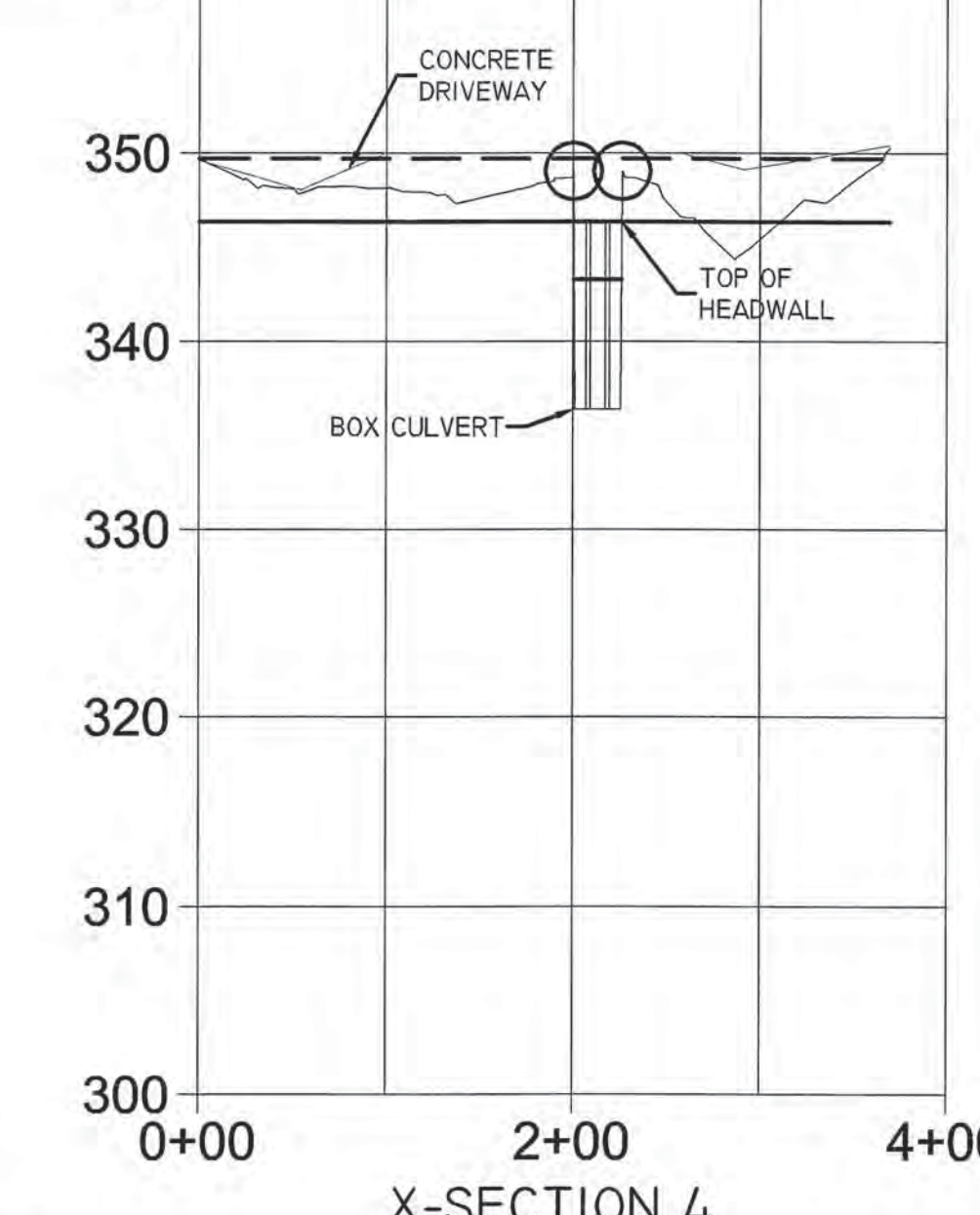
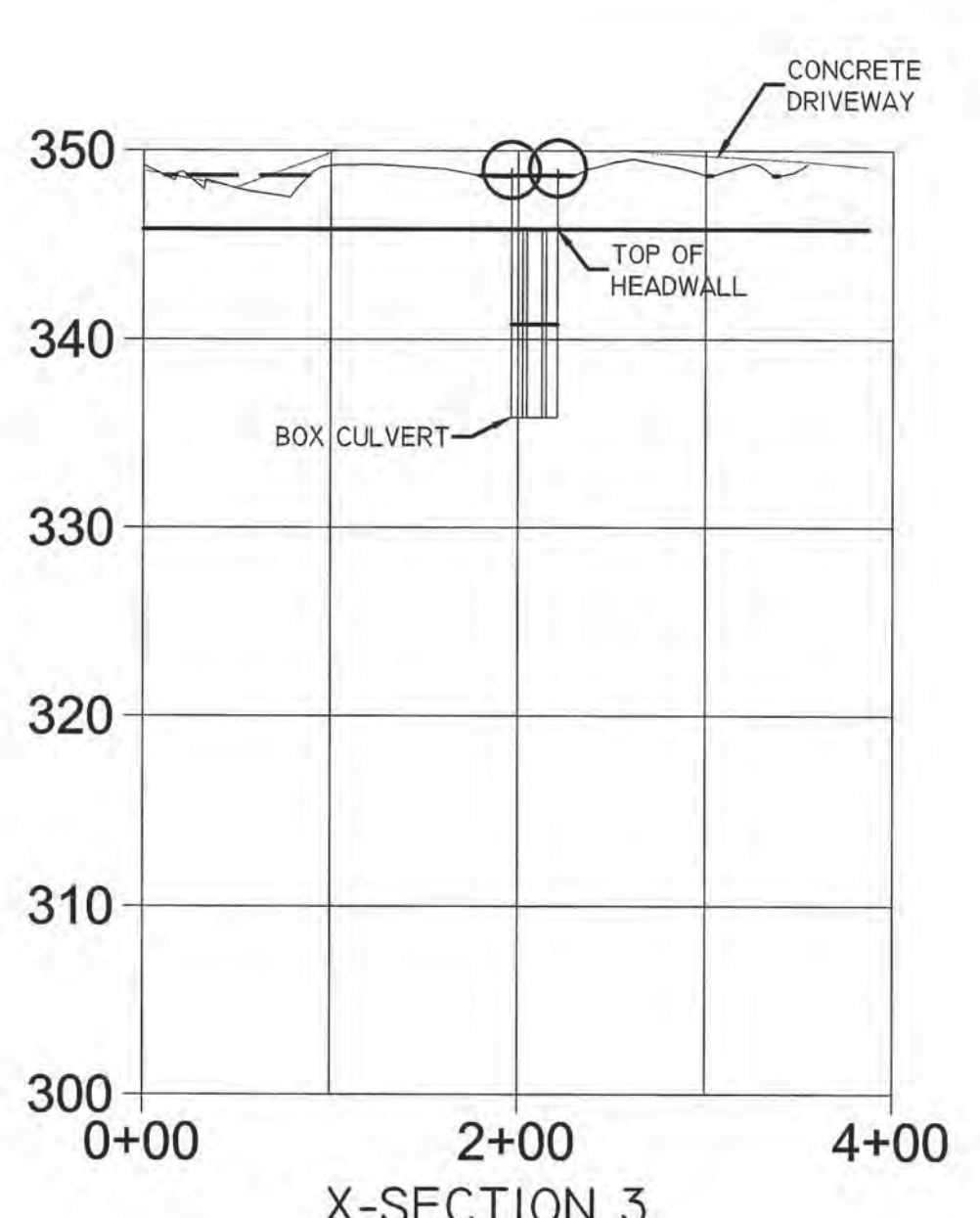
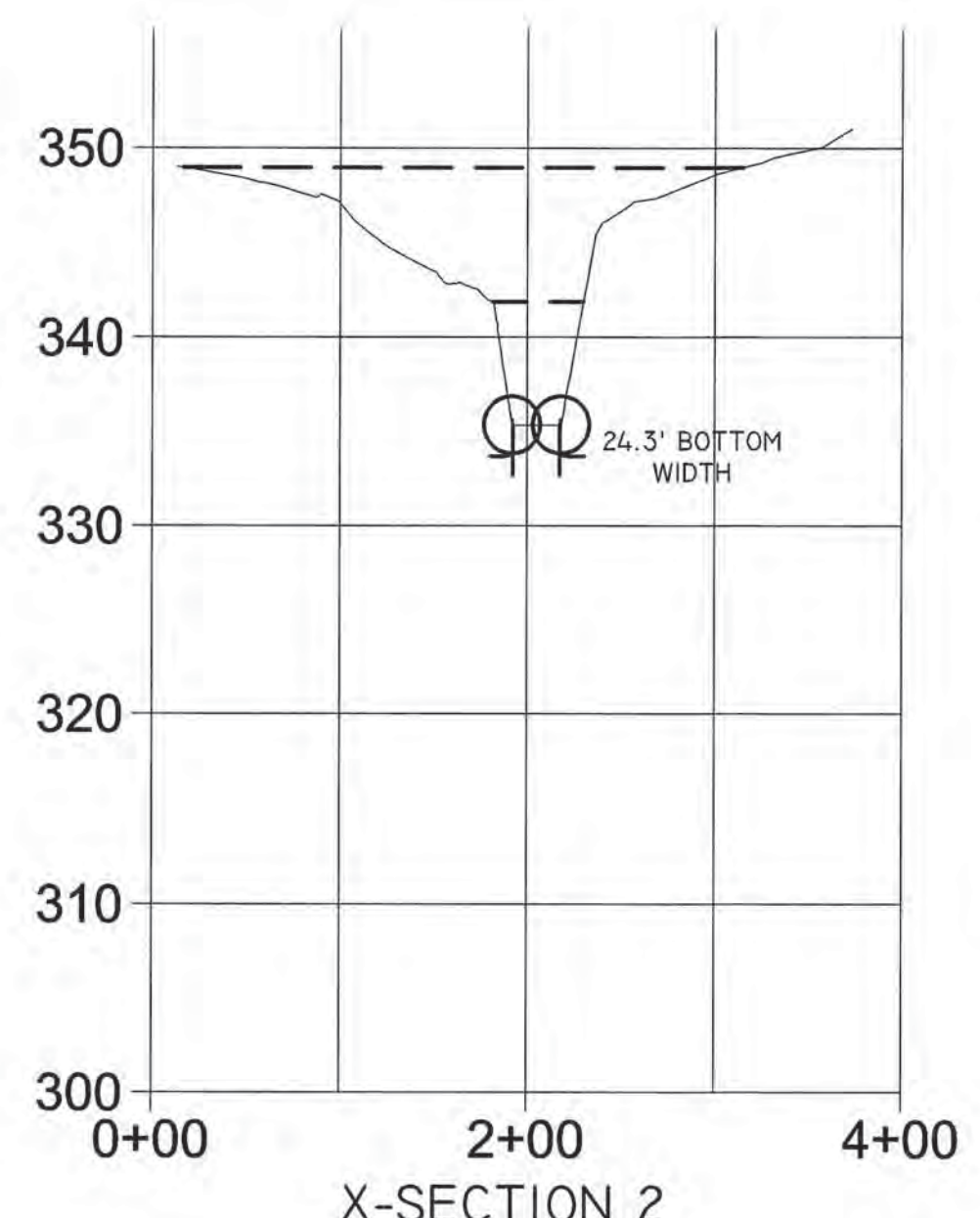
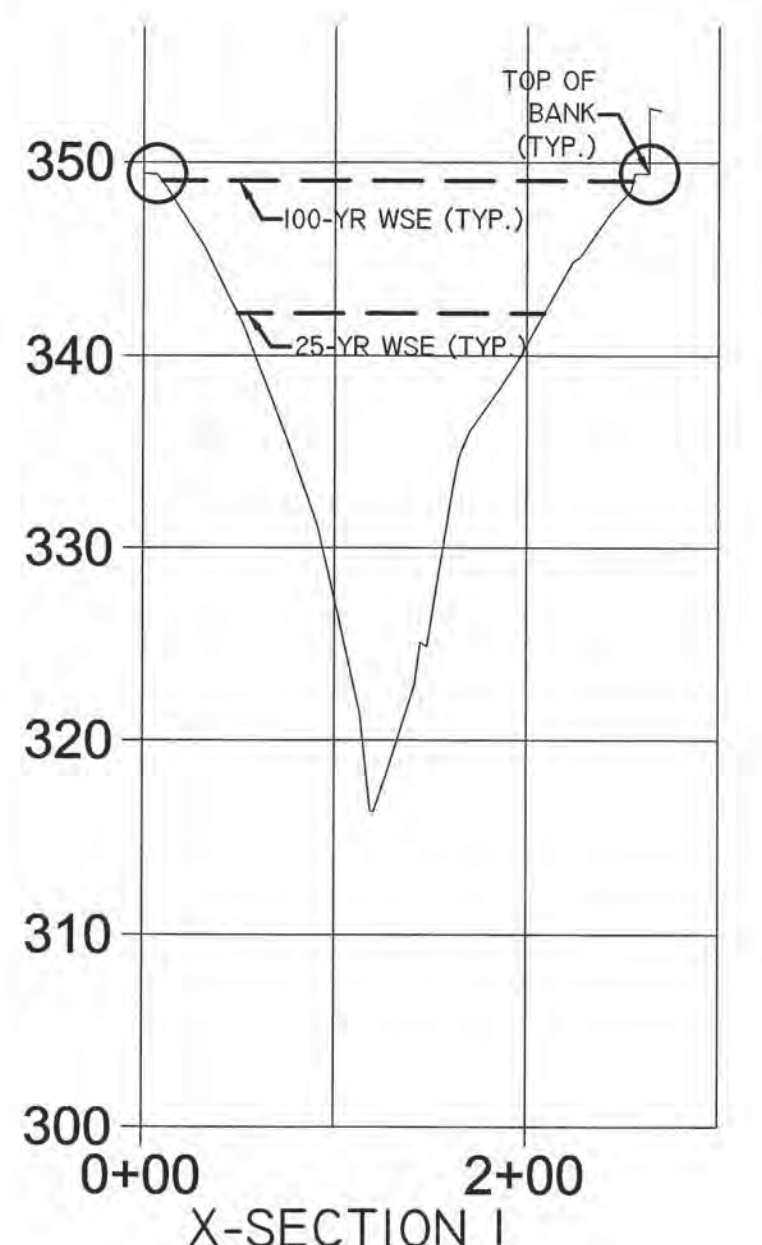
**CHANNEL - STA. 41+50 TO END**

**BASTROP GROVE**

**DRAINAGE IMPROVEMENTS**

SHEET NAME: \_\_\_\_\_  
JOB NAME: \_\_\_\_\_  
PROJECT: \_\_\_\_\_

DATE: **APRIL 2018**  
JOB NUMBER: 4697  
SHEET: 13 OF 14  
SHEET NO. 13



PROFILE SCALE  
 HORIZ. 1" = 100'  
 VERT. 1" = 10'

**LEGEND**

- MAX POTENTIAL WSE ASSUMING COINCIDING PEAKS
- OVERBANK STATION
- PROPOSED DRIVEWAY

- NOTES:**
- OVERBANK STATIONS DESIGNATE THE BOUNDARY BETWEEN CHANNEL AND OVERBANK MANNING'S N VALUES ACCORDING TO THE FOLLOWING DESCRIPTIONS:  
 MAIN CHANNEL - CLEAN, STRAIGHT, FULL, NO RIFTS OR DEEP POOLS = 0.026  
 FLOOD PLAIN - PASTURE, NO BRUSH, SHORT GRASS = 0.035  
 CONCRETE CHANNEL - TROWEL FINISH = 0.011  
 (MANNING'S N VALUES ACCORDING TO HEC-RAS)
  - CROSS-SECTIONS CREATED USING THE AUTODESK RIVER AND FLOOD ANALYSIS MODULE



CARLSON, BRIGANCE & DOERING, INC.  
 104 F3791  
 5501 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

DESIGNED BY:	DRAWN BY:
BM	IV
DATE	
REVISION	

**Carlson, Brigrance & Doering, Inc.**  
 FIRM ID #F3791  
 Civil Engineering  
 5501 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

<b>CHANNEL X-SECTIONS</b>	
<b>BASTROP GROVE</b>	
<b>DRAINAGE IMPROVEMENTS</b>	
SHEET NAME:	
JOB NAME:	
PROJECT:	
DATE:	APRIL 2018
JOB NUMBER:	4697
SHEET:	14 OF 14
SHEET NO.:	14

FILE PATH: J:\AutoCad 2004\Land\Projects\4697.dwg\CrossSection\4697 - DRAINAGE.dwg - May 14, 2018 - 5:55pm

# BASTROP GROVE MEDTAIL DEVELOPMENT

LOT 6 - BASTROP GROVE

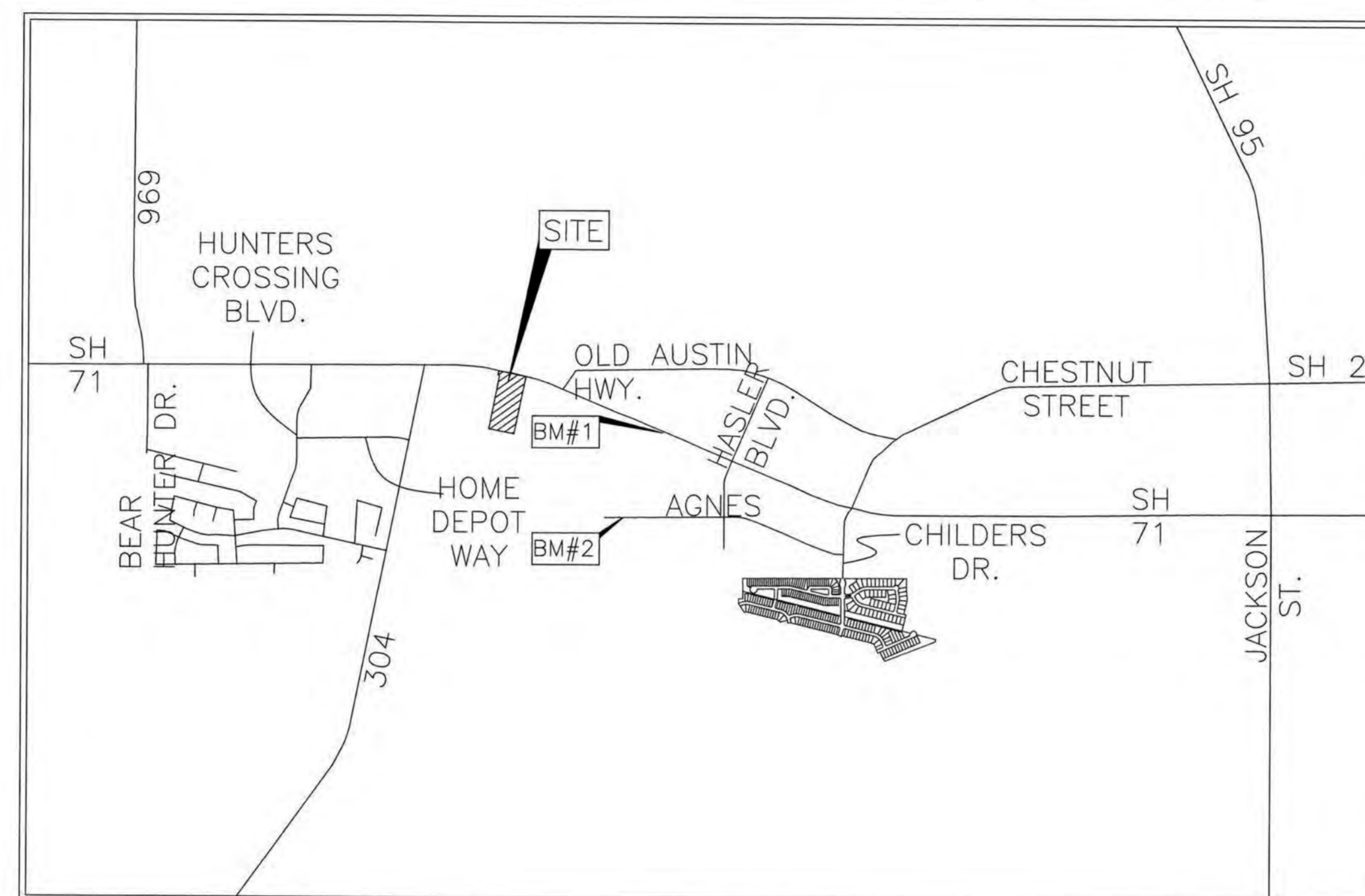
CITY OF BASTROP

FINAL MASTER DRAINAGE PLAN SUBMITTAL

BASTROP COUNTY, TEXAS

## SHEET INDEX

SHEET #	SHEET TITLE
01	COVER SHEET
02	HYDROLOGY SHEET
03	GRADING SHEET
04	STORM PROFILE
05	EROSION CONTROL
06	EROSION CONTROL DETAILS



LOCATION MAP  
(NOT TO SCALE)

**BENCHMARKS:**  
 #1 TXDOT MON. BRASS DISC IN CONCRETE, 44' WEST OF THE NORTH-EASTERN PROPERTY CORNER.  
 #2 MAG NAIL IN PAVEMENT ON AGNES ST. 500' SOUTH OF THE PROPERTY BOUNDARY

**GENERAL NOTES:**  
 ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED WITH THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

THIS PROJECT IS LOCATED IN THE COLORADO RIVER WATERSHED.

NO PORTION OF THIS TRACT IS WITHIN THE BOUNDARIES OF THE 100-YEAR FLOOD PLAIN OF ANY WATERWAY THAT IS WITHIN THE LIMITS OF STUDY OF THE FEDERAL FLOOD INSURANCE ADMINISTRATION FIRM MAP NO. 48021C0335E, DATED JANUARY 19, 2006, BASTROP COUNTY, TEXAS. BASTROP COUNTY COMMUNITY NO. 481193.



REVIEWED BY: \_\_\_\_\_ DATE \_\_\_\_\_  
 CITY OF BASTROP ENGINEER

APPROVED BY: \_\_\_\_\_ DATE \_\_\_\_\_  
 CITY OF BASTROP PLANNING

DATE \_\_\_\_\_

**OWNER:** KPG COMMERCIAL-TYLER DUTTON  
 3809 S. 2ND STREET, D-200  
 AUSTIN, TEXAS 78704  
 512 437-6404

**ENGINEER:** CARLSON, BRIGANCE & DOERING, INC.  
 CIVIL ENGINEERING & SURVEYING  
 C/O MR. BRENDAN P. MCENTEE, P.E.  
 12129 RANCH ROAD 620 NORTH, SUITE 600  
 AUSTIN, TEXAS 78750  
 (512) 280-5160

**UTILITY PROVIDERS:**

**ELECTRIC:** BLUEBONNET ELECTRIC  
 (979) 542-3151

**GAS:** CENTER POINT ENERGY  
 (830) 643-6936

**PHONE:** AT&T  
 (512) 870-1450

**WATER:** CITY OF BASTROP  
 (512) 332-8830

**WASTEWATER:** CITY OF BASTROP  
 (512) 332-8830

**CABLE:** SPECTRUM  
 (855) 243-8892



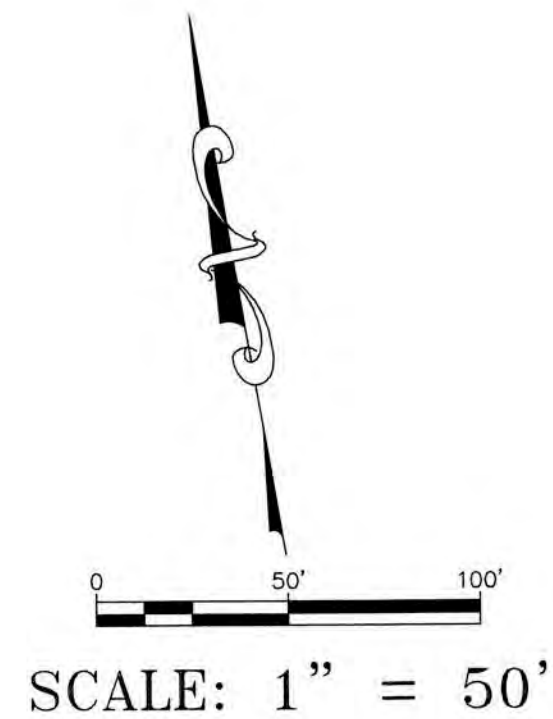
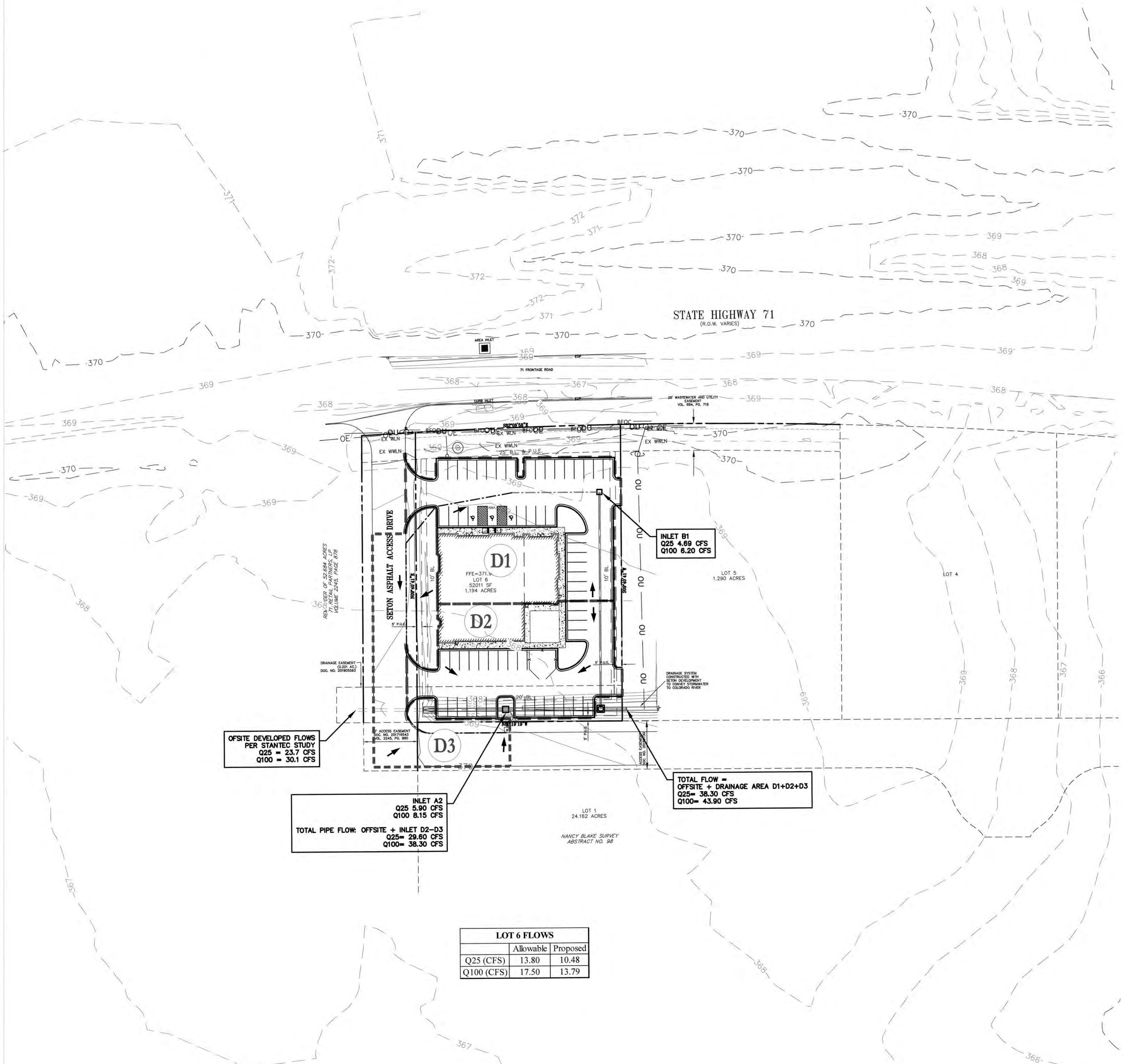
Final Drainage  
Plan Approved

11/22/19

NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V)	CITY OF BASTROP APPROVAL/DATE	APPROVED BY

DESIGNED BY:	DRAFTED BY:
DATE	DATE
REVISION	REVISION
Carlson, Brigance & Doering, Inc. Civil Engineering & Surveying FIRM ID #E3791 Main Office: 5501 West William Cleburn Dr., Austin, Texas 78750 North Office: 12129 RR 620 N., Suite 600, Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
SHEET NAME: COVER JOB NAME: BASTROP GROVE MEDTAIL DEVELOPMENT PROJECT: FINAL MASTER DRAINAGE PLAN SUBMITTAL	
DATE	9/16/2019
JOB NUMBER	5135
SHEET	01 OF 6
SHEET NO.	01

FILE PATH: \\C:\3D\MS155\dwg\155-DRAINAGE.dwg - Sep 14, 2019 - 8:38am



**LEGEND**

- D3** DRAINAGE AREA #
- DRAINAGE BNDY
- - - - TIME OF CONCENTRATION SHALLOW FLOW
- - - - TIME OF CONCENTRATION SHEET FLOW
- - - - TIME OF CONCENTRATION CHANNEL FLOW
- FLOW ARROW

**Rainfall Intensity,  $I = b/(T+d)^a$**

Design Year	b	d	a
2-yr	67	13.3	0.841
10-yr	87	11.1	0.805
25-yr	100	10.8	0.793
100-yr	130	11.3	0.784

Source: Table 2-3, City of Bastrop Drainage Design Manual

Surface Description	Design Year			
	2-year	10-year	25-year	100-year
Asphaltic	0.95	0.95	1	1
Concrete/Roof	0.95	0.95	1	1
Lawns/Sandy Soil				
Flat (0-2%)	0.1	0.11	0.12	0.125
Average (2-7%)	0.15	0.165	0.18	0.1875
Steep, (over 7%)	0.2	0.22	0.24	0.25
Commercial/Industrial				
Light areas	0.7	0.77	0.84	0.875
Heavy areas	0.8	0.88	0.96	1
Parks, cemeteries	0.25	0.275	0.3	0.3125

Source: City of Bastrop Stormwater Drainage Design Manual

**Time of Concentration Computations**

		Existing			Developed		
		D1	D2	D3	D1	D2	D3
Sheet flow [Tc1 = 0.007*(L1 * n1)^0.8 / (P2^0.5 * s^1 * 0.4)]	L1	100	100	43	44		
	n1	0.2	0.011	0.011	0.011		
	S1	0.010	0.011	0.012	0.012		
Shallow Flow: Unpaved [Tc3= L3 / (60(16.1345) * s^3 * 0.5)] Paved [Tc3= L3 / (60(20.3282) * s^3 * 0.5)]	Time (min)	15.70	1.46	0.73	0.74		
	L2	87	79	209	0		
	n2	0.2	0.011	0.011	0.2		
Channel Flow	S2	0.015	0.011	0.013	0.011		
	Time (min)	0.74	0.61	1.50	0.00		
	L3	151	0	0	284		
Channel Flow	Assumed V	6	0	0	6		
	S3	0.008	0	0	0.012		
	Time (min)	0.42	0.00	0.00	0.73		
<b>Total Time of Concentration</b>		<b>16.86</b>	<b>10.00</b>	<b>10.00</b>	<b>10.00</b>		

**Run-off Computation Summary**

Design Storm	Area Desc.	Existing	Developed				
			D1	D2	D3	D2+D3	D1+D2+D3
2-year	Drainage Area	1.194	0.534	0.422	0.358	0.780	1.315
	Tc (min)	16.86	10.00	10.00	10.00	10.00	10.00
	Intensity (in/hr)	3.82	4.74	4.74	4.74	4.74	4.74
	C	0.10	0.93	0.65	0.89	0.76	0.84
	Q (cfs)	0.5	2.3	1.3	1.5	2.82	5.23
10-year	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
	Intensity (in/hr)	5.96	7.47	7.47	7.47	7.47	7.47
	C	0.10	0.93	0.65	0.89	0.84	0.84
	Q (cfs)	0.7	3.7	2.1	2.4	4.89	8.24
	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
25-year	Intensity (in/hr)	7.19	9.01	9.01	9.01	9.01	9.01
	C	0.11	0.97	0.69	0.93	0.84	0.88
	Q (cfs)	0.9	4.69	2.63	3.02	5.90	10.48
	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
	Intensity (in/hr)	9.49	11.82	11.82	11.82	11.82	11.82
100-year	C	0.13	0.98	0.70	0.94	0.88	0.89
	Q (cfs)	1.4	6.2	3.5	4.0	8.15	13.79

**BASTROPTX**  
Heart of the Lost Pines  
Est. 1832

Final Drainage Plan Approved

*[Signature]*  
11/22/19

**GRATE INLET CALCULATIONS**

Orifice equation:  $Q_1 = Q_0 = C A \sqrt{2gh}$  (Equation 10-31, TxDOT Hydraulic Design Manual)

Opening Area of the Grate,  $A_g = \text{Area X Clogging Factor X Grate Factor}$

Orifice Coefficient,  $C = 0.67$

$g = 32.17 \text{ ft/s}^2$

P-1-7/8-4 Grate Opening Ratio = 0.8 (Fig: 4-13, Austin, TX Drainage Criteria Manual)

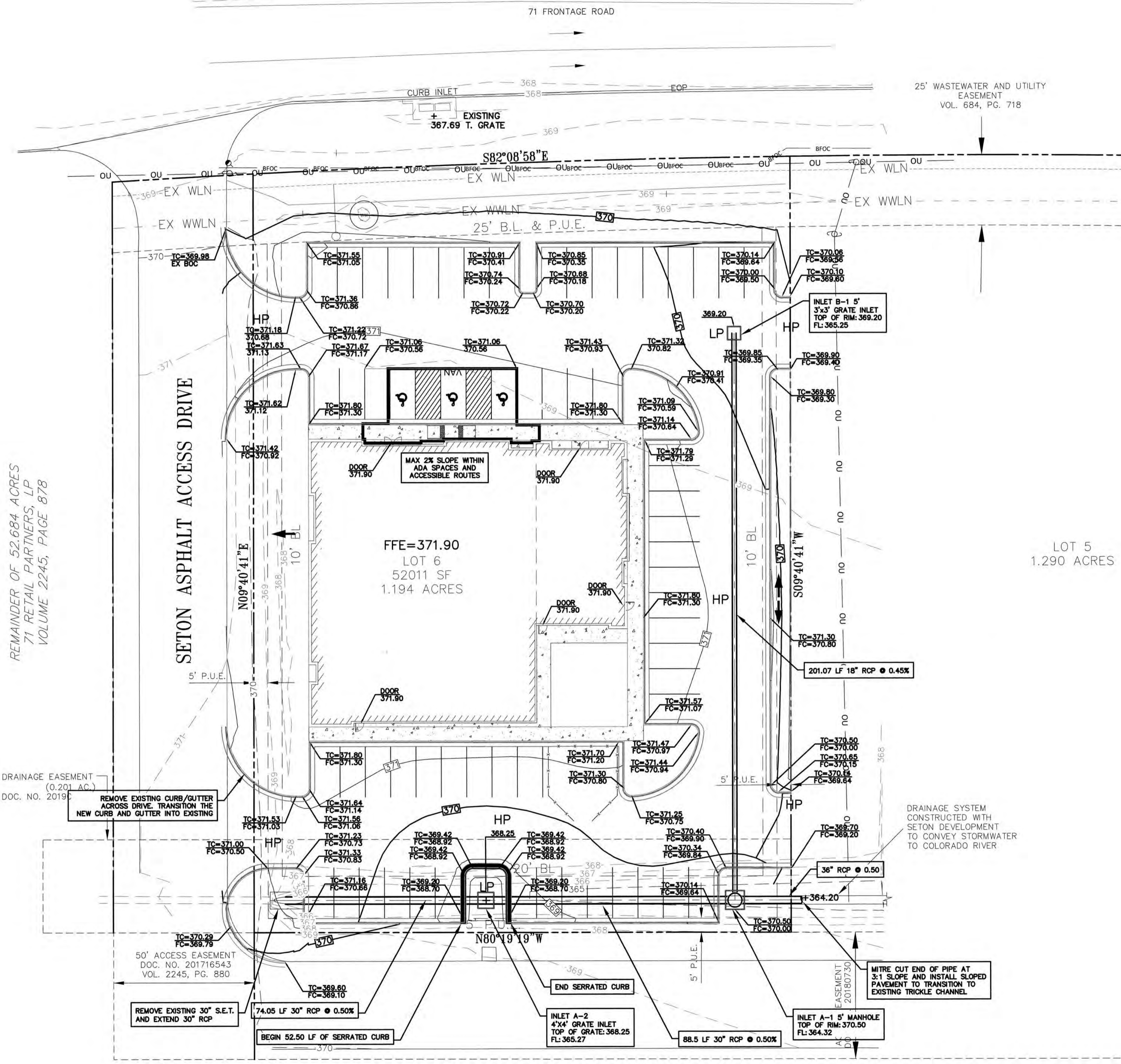
Inlet Name	Design Q <sub>25</sub> (CFS)	Design Q <sub>100</sub> (CFS)	Inlet Size	Clogging Factor	Grate Factor	A <sub>g</sub> (sq. ft.)	Grate EL	h <sub>25</sub>	Head <sub>25</sub>	h <sub>100</sub>	Head <sub>100</sub>	Allowable h (ft)	Inlet Capacity, Q <sub>max</sub> (CFS)
B1	4.69	6.16	3' x 3'	0.5	0.8	3.6	369.2	0.059	369.26	0.10	369.30	0.5	13.68
A2	5.90	8.15	4' x 4'	0.5	0.8	6.4	368.25	0.029	368.28	0.06	368.31	0.5	24.32

**LOT 6 FLOWS**

	Allowable	Proposed
Q <sub>25</sub> (CFS)	13.80	10.48
Q <sub>100</sub> (CFS)	17.50	13.79

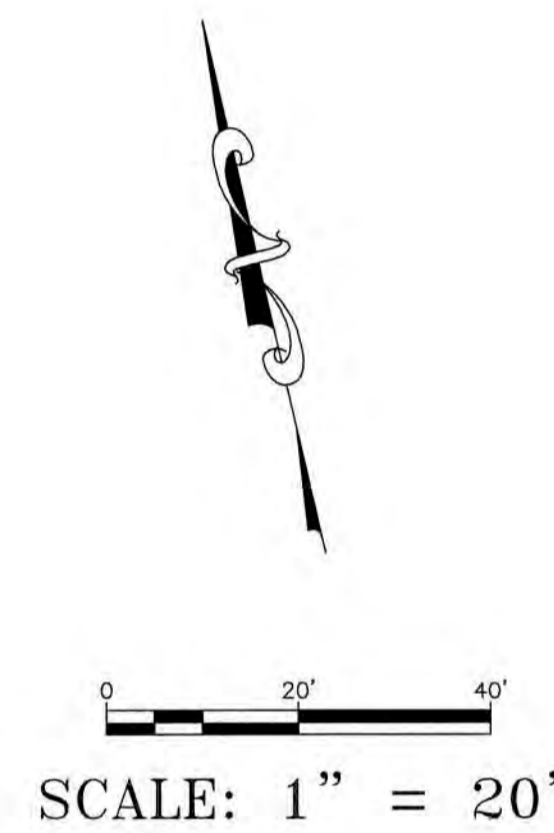
DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	
<p>Carlson, Brigrance &amp; Doering, Inc. Civil Engineering &amp; Surveying FIRM ID #E3791 Main Office: 12129 RR 620 N., Ste. 600 Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165</p>	
<p><b>HYDROLOGY SHEET</b></p> <p><b>BASTROP GROVE MEDTAL DEVELOPMENT</b></p> <p>FINAL MASTER DRAINAGE PLAN SUBMITTAL</p>	
<p>SHEET NAME: HYDROLOGY SHEET JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT PROJECT: FINAL MASTER DRAINAGE PLAN SUBMITTAL</p>	
<p>DATE: 9/16/2019 JOB NUMBER: 5135 SHEET: 02 OF 6 SHEET NO.: 02</p>	





### LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- FLOW ARROW
- TOP OF CURB ELEVATION  
FACE OF CURB ELEVATION
- PROPOSED GRATE INLET
- PROPOSED STORM MANHOLE
- HIGH POINT
- LOW POINT
- PROPOSED STORM SEWER
- PROPOSED 24" CURB & GUTTER



REMAINDER OF 52.684 ACRES  
71 RETAIL PARTNERS, LP  
VOLUME 2245, PAGE 878

LOT 5  
1.290 ACRES



Final Drainage  
Plan Approved

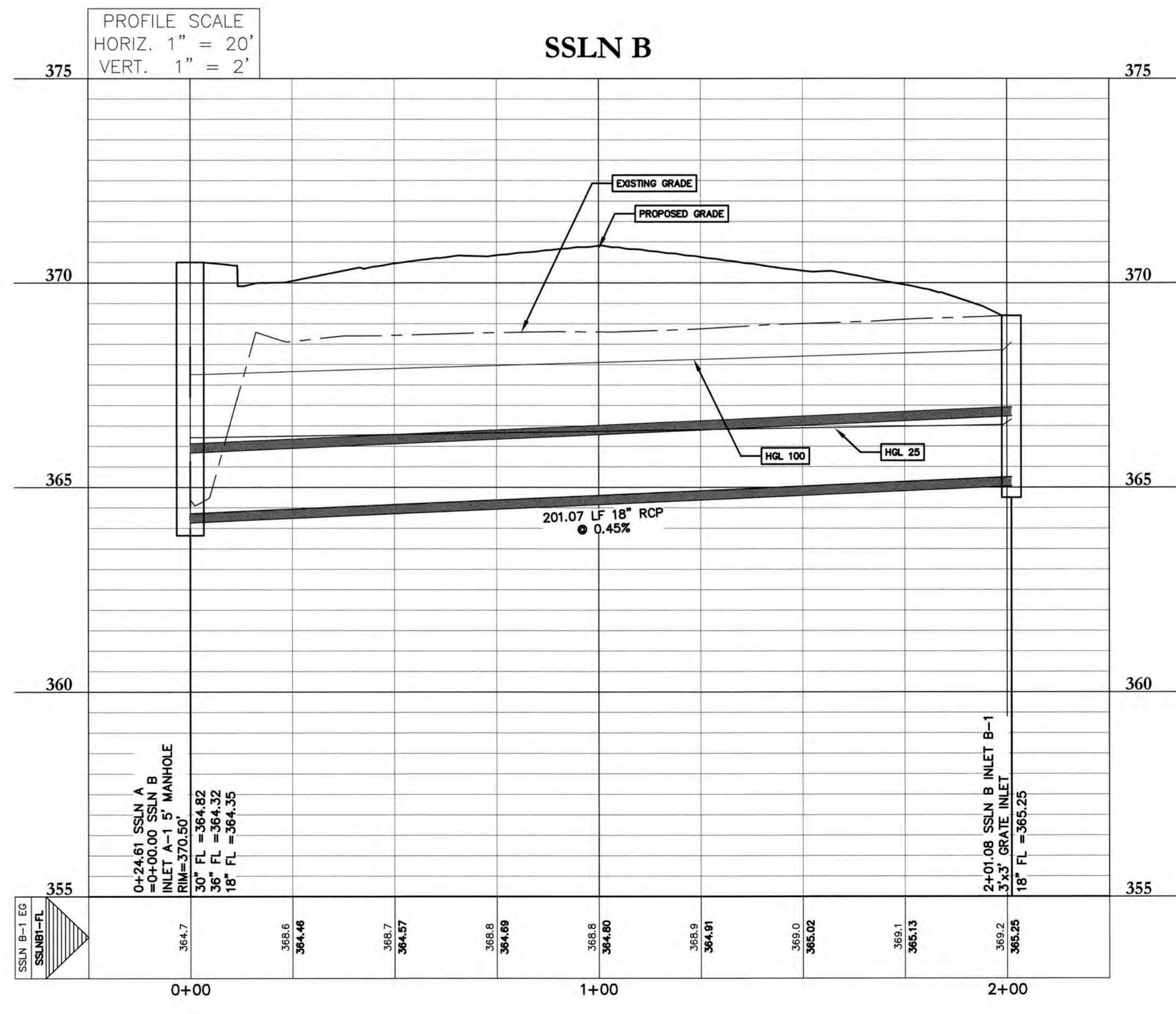
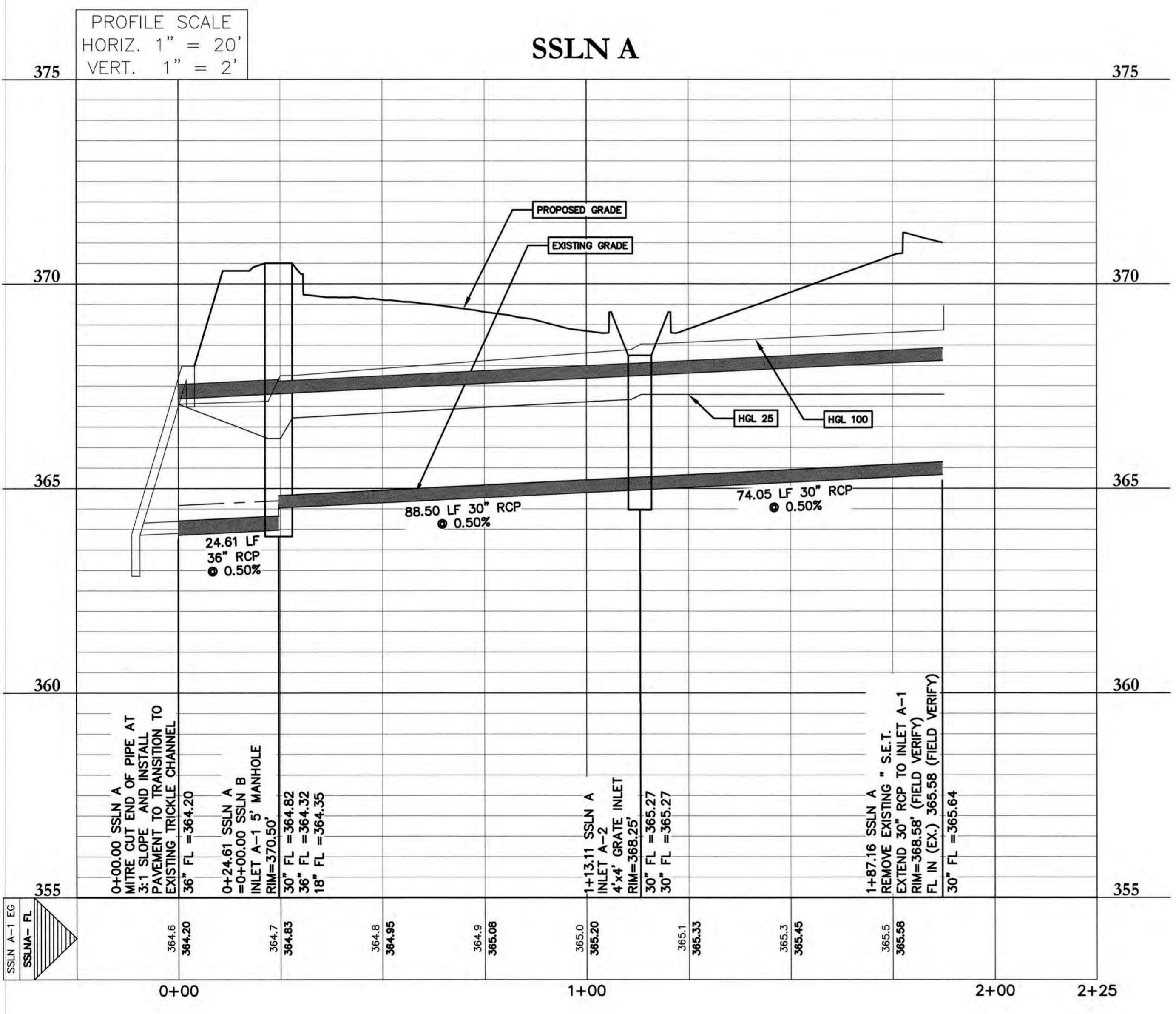
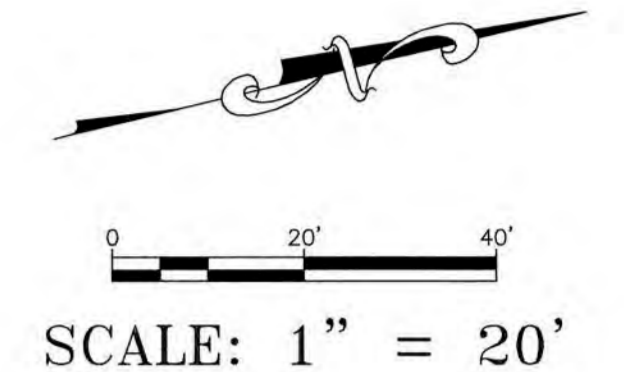
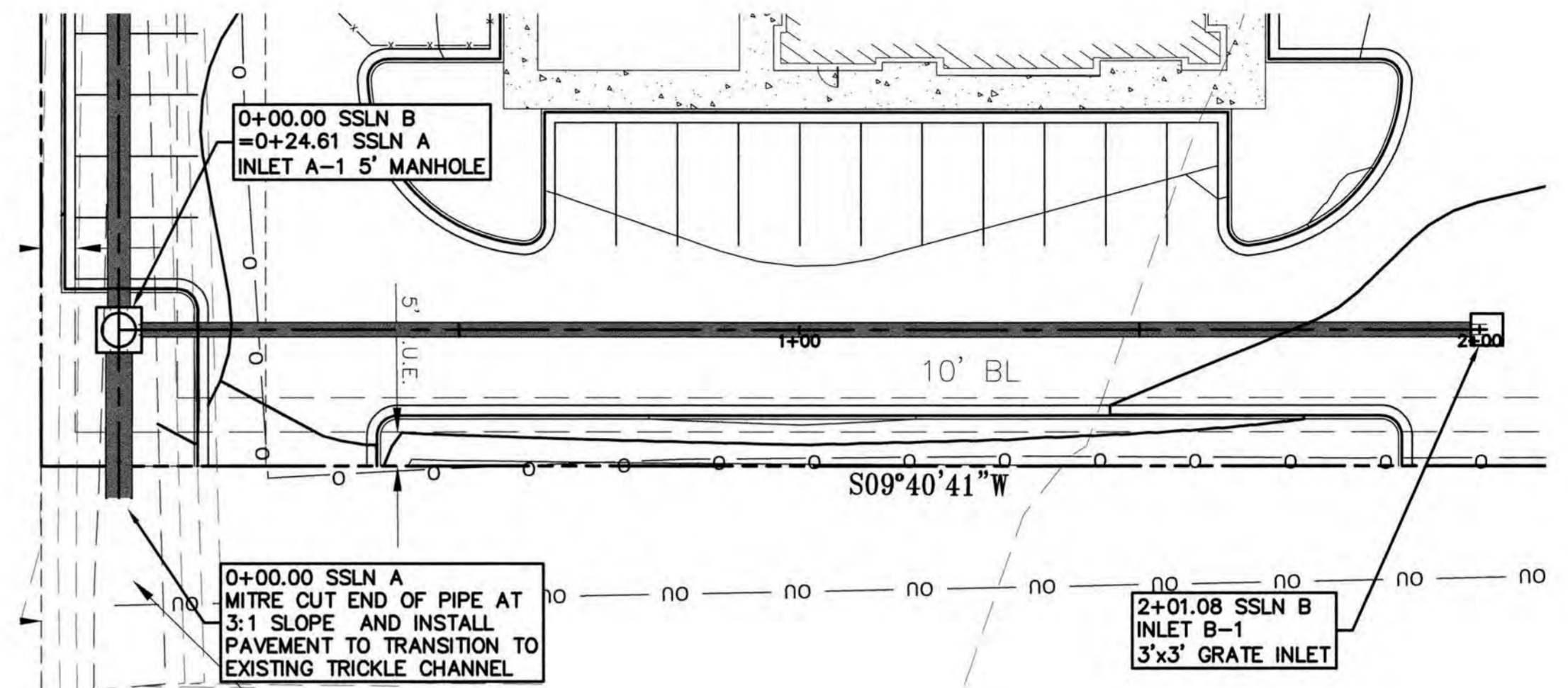
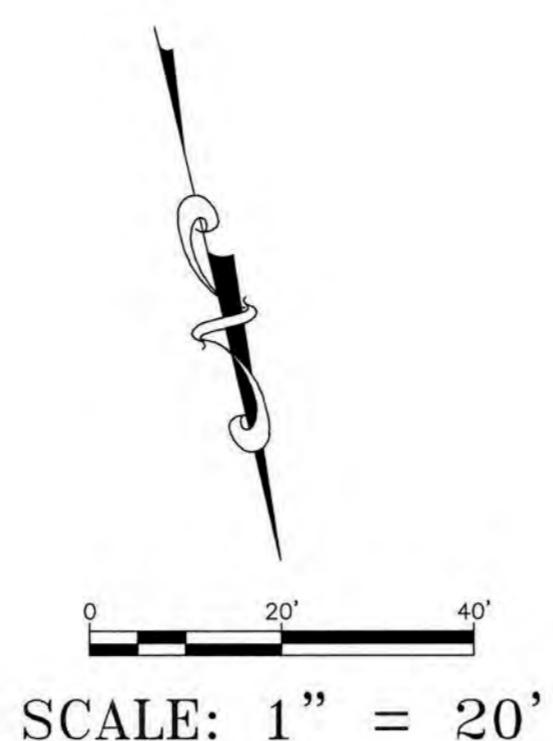
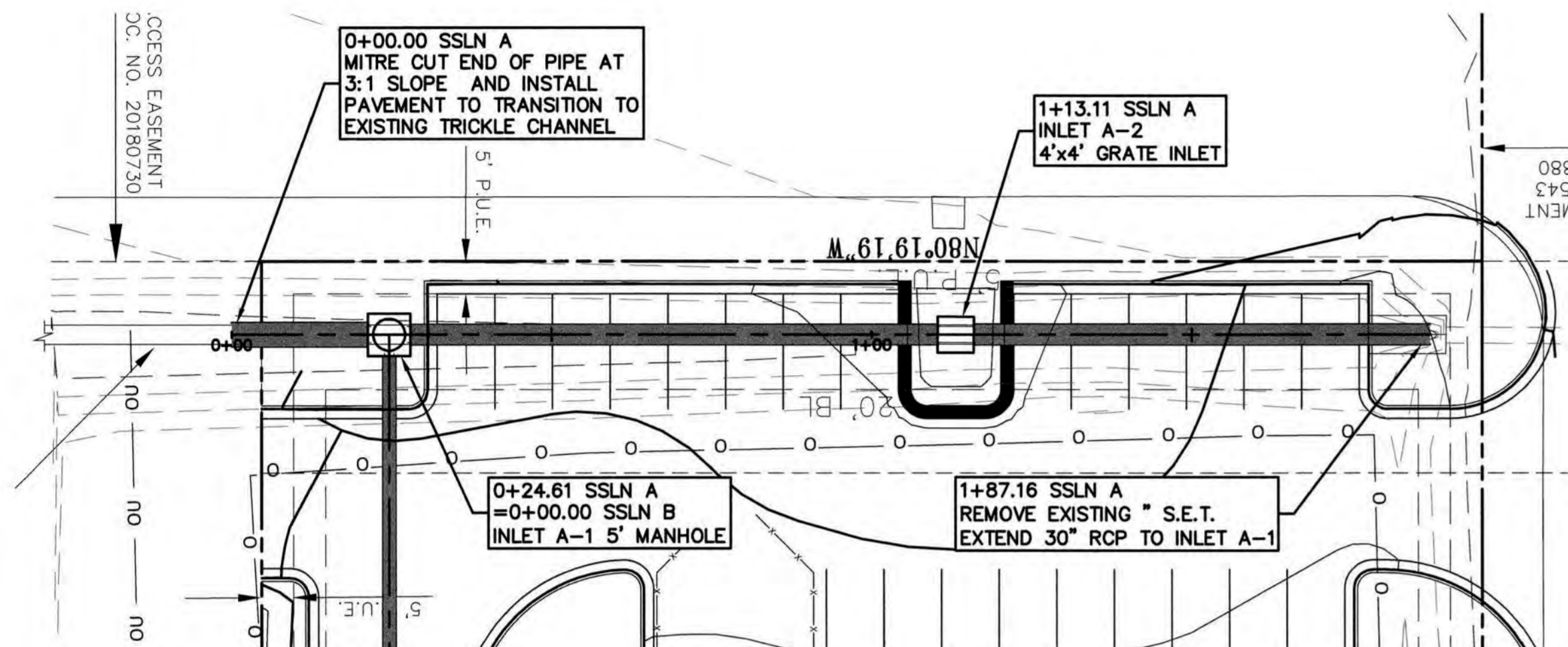
*[Signature]*  
11/22/19

- #### GRADING NOTES:
- UNLESS OTHERWISE SPECIFIED, ALL FINISHED EARTHEN SLOPES ARE TO BE FINE GRADED TO PROVIDE A RELATIVELY UNIFORM SURFACE WITH NO ROCKS GREATER THAN 1-INCH IN DIAMETER, NO CLOS OF SOIL GREATER THAN 1-INCHES IN DIAMETER, AND DEVIATIONS FROM AN OTHERWISE SMOOTH SURFACE GREATER THAN 4 INCHES IN HEIGHT OR DEPTH WITH NO AREAS OF STANDING WATER
  - ALL FINISHED SLOPES OF A GRADE OF 3:1 OR GREATER ARE TO BE COVERED WITH A JUTE MAT, CURLEX MATTING, OR SIMILAR PRODUCT AFTER SEEDING WITH HYDROMULCH AND THE JUTE ANCHORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
  - ALL DRAINAGE COMPONENTS ARE TO BE PRECAST CONCRETE. STORM DRAIN PIPE TO BE RCP OR RCPA, CLASS III, PER ASTM C78 AND INLETS TO BE ASTM C913 PER TxDOT STANDARDS WITH GALVANIZED GRATES. INLETS IN PAVED AREAS SHALL INCLUDE PEDESTRIAN GRATES.
  - REFER TO LANDSCAPE PLAN FOR PLANTING, IRRIGATION, AND TOPSOIL REQUIREMENTS.

DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	
Carl Engineering & Surveying <b>Carlson, Brigrance &amp; Doering, Inc.</b> FIRM ID #F3791 Main Office: 5501 West William Cannon Dr., Austin, Texas 78750 North Office: 12129 RR 020 N., Ste. 600, Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
<b>GRADING SHEET</b> <b>BASTROP GROVE MEDTAL DEVELOPMENT</b> FINAL MASTER DRAINAGE PLAN SUBMITTAL	
SHEET NAME:	
JOB NAME:	
PROJECT:	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	03 OF 6
SHEET NO.:	03

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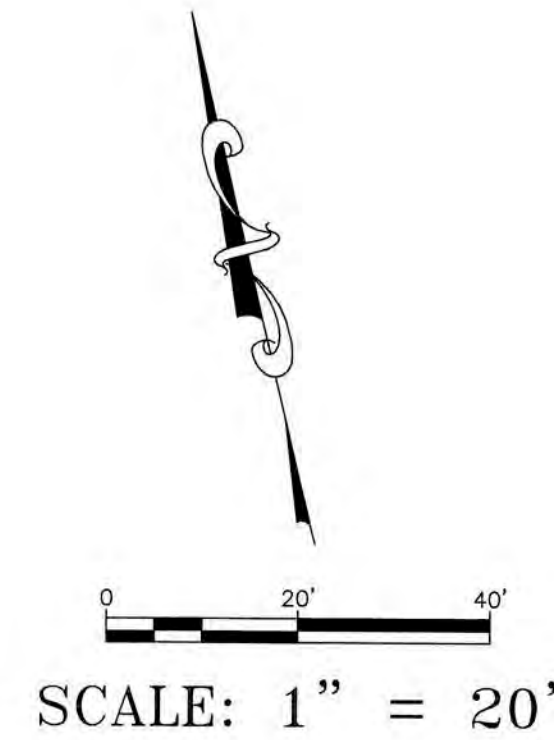
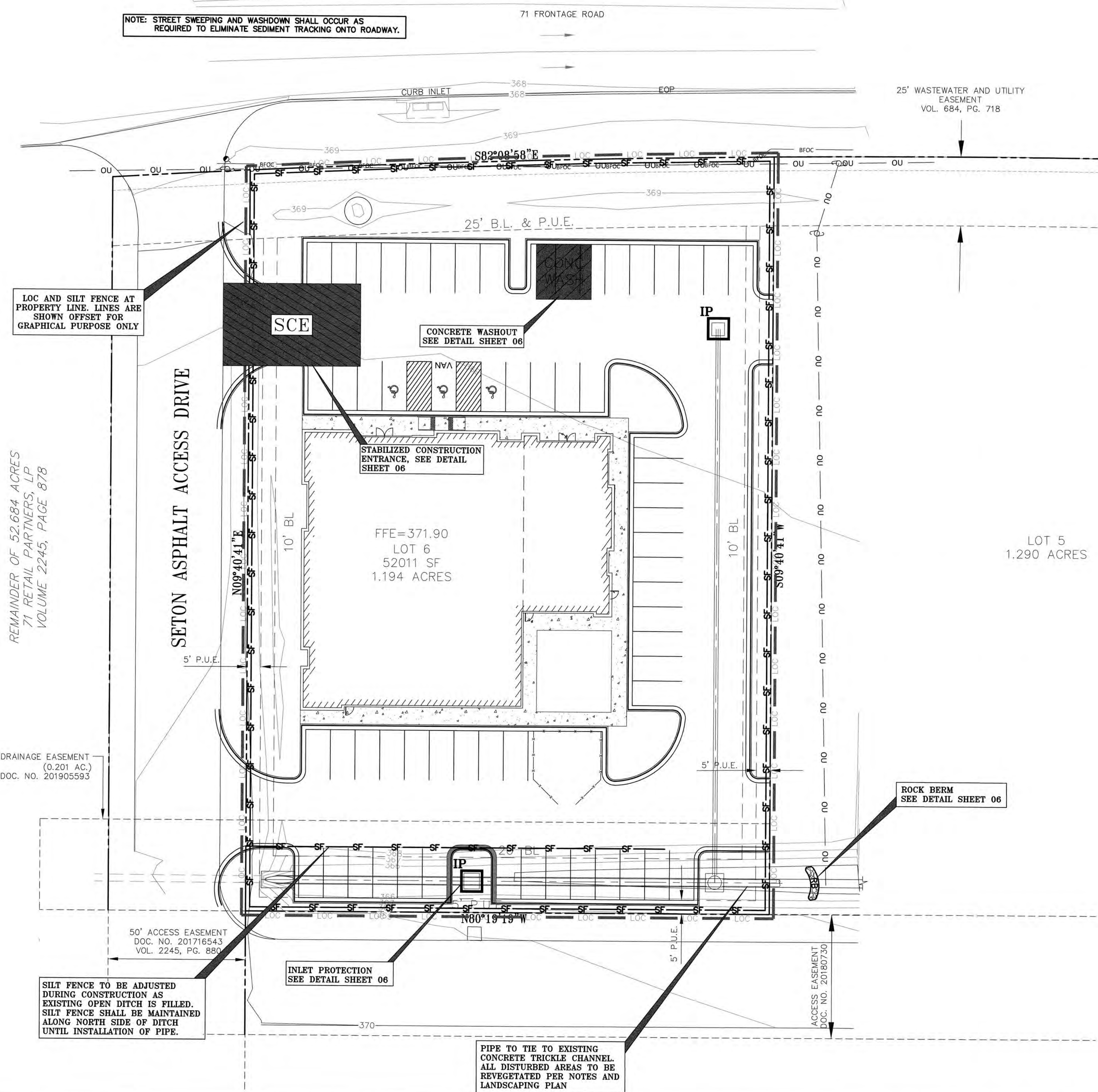
Final Drainage Plan Approved

11/22/19

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DATE:	
REVISION:	
<b>Carlson, Brigrance &amp; Doering, Inc.</b> Civil Engineering & Surveying FIRM ID #F3791 Main Office: 5501 West William Cannon Dr., Suite 600, Austin, Texas 78749 North Office: 12129 RR 620 N., Suite 600, Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
<b>SHEET NAME:</b> STORM SEWER PROFILE <b>JOB NAME:</b> BASTROP GROVE MEDICAL DEVELOPMENT <b>PROJECT:</b> FINAL MASTER DRAINAGE PLAN SUBMITTAL	
BRENDAN P. MCENTEE 09/16/2019	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	04 OF 6
SHEET NO.:	04

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NOTE: STREET SWEEPING AND WASHDOWN SHALL OCCUR AS REQUIRED TO ELIMINATE SEDIMENT TRACKING ONTO ROADWAY.



LEGEND	
	SILT FENCE
	LIMITS OF CONSTRUCTION
	INLET PROTECTION
	ROCK BERM
	J-HOOK
	STABILIZED CONSTRUCTION ENTRANCE
	CONCRETE WASHOUT

WARNING!!!  
REVIEW THE SEQUENCE OF CONSTRUCTION ON THE GENERAL NOTES SHEET PRIOR TO BEGINNING CONSTRUCTION

!!! WARNING !!!  
UNDERGROUND UTILITIES SHOWN ON THESE PLANS IS A BEST ESTIMATE BASED ON RECORDS THAT COULD BE OBTAINED AND PHYSICAL FEATURES VISIBLE AT THE GROUND LEVEL. THE ENGINEER MAKES NO ASSERTIONS BEYOND THAT THEY ARE A BEST ESTIMATE AND AN ATTEMPT TO HELP IDENTIFY POSSIBLE UTILITIES IN THE AREA. THE CONTRACTOR MUST CALL ONE CALL IN ACCORDANCE WITH THE NOTES TO BETTER LOCATE ANY UNDERGROUND UTILITIES.

- GENERAL EROSION CONTROL NOTES:**
- 1) CONTRACTOR TO FIELD LOCATE DIVERSION, INTERCEPTOR, AND PERIMETER DIKES/DITCHES AS REQUIRED BASED ON THE DRAIN SEQUENCE OF CONSTRUCTION.
  - 2) IF DISTURBED AREA IS NOT WORKED FOR MORE THAN 14 DAYS THEN DISTURBED AREA NEEDS TO BE STABILIZED BY REVEGETATION, MULCH, TARP, OR MATTING.
  - 3) THE ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN-COMPLIANCE WITH THE CITY OF BASTROP RULES AND REGULATIONS.
  - 4) THE CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING SITE CONSTRUCTION SUCH AS WATERING WITH IRRIGATION TRUCKS AND MULCHING AS PER CITY REQUIREMENTS, OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
  - 5) SILT FENCE TYPE AND INSTALLATION SHALL COMPLY WITH CITY OF BASTROP RULES AND REGULATIONS.
  - 6) CONTRACTOR WILL CHECK AND IF NECESSARY CLEAN UP SPOILS THAT MIGRATE ONTO THE ROADS A MINIMUM OF ONCE DAILY.
  - 7) CONTRACTOR IS SOLELY RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING COMPLIANCE WITH SWPPP INSPECTION, REPORTING, NOI, AND NOT FILING. THE PLAN SHOWN IS THE MINIMUM REQUIRED AND THE CONTRACTOR SHALL MODIFY THE PLAN AS REQUIRED TO ELIMINATE SEDIMENT FROM LEAVING THE SITE.
  - 8) ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY ARE TO BE REVEGETATED IN ACCORDANCE WITH THIS SHEET AND THE LANDSCAPING PLAN. REFER TO SHEET 06 FOR EROSION CONTROL DETAILS AND ADDITIONAL NOTES REGARDING REVEGETATION.

Final Drainage  
Plan Approved

11/22/19

DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	
<b>EROSION CONTROL</b> <b>BASTROP GROVE MEDTAL DEVELOPMENT</b> FINAL MASTER DRAINAGE PLAN SUBMITTAL	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	05 OF 6
SHEET NO.:	05

Carlson, Brigrance & Doering, Inc.  
Civil Engineering & Surveying  
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DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	

Carlson, Brigrance & Doering, Inc.  
Civil Engineering & Surveying  
FIRM ID #F3791  
Main Office: 12129 RR (230 N. St. 600)  
Austin, Texas 78749  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

EROSION CONTROL DETAILS

BASTROP GROVE MEDIAL DEVELOPMENT

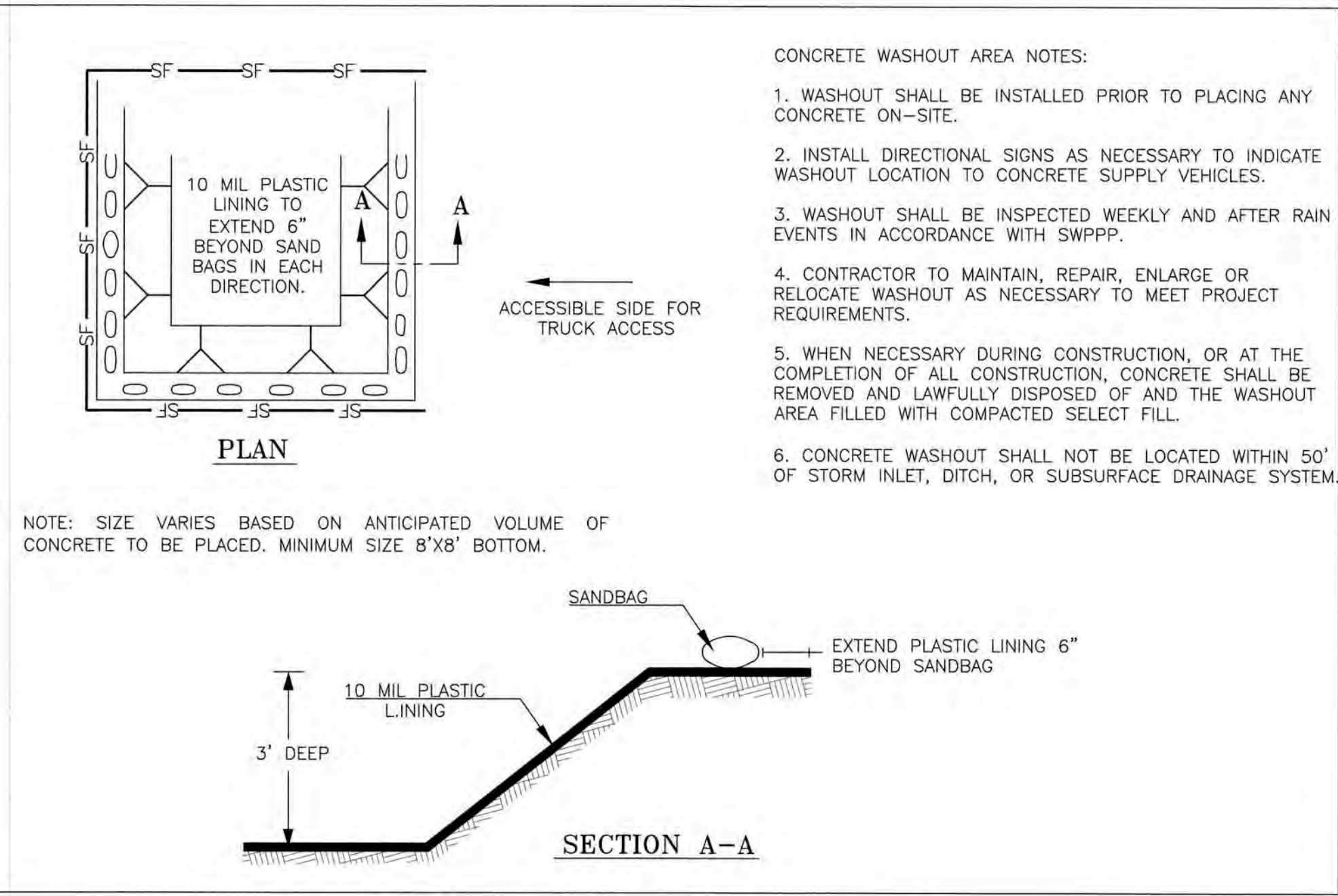
FINAL MASTER DRAINAGE PLAN SUBMITTAL

SHEET NAME: EROSION CONTROL DETAILS  
JOB NAME: BASTROP GROVE MEDIAL DEVELOPMENT  
PROJECT: FINAL MASTER DRAINAGE PLAN SUBMITTAL

STATE OF TEXAS  
BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER

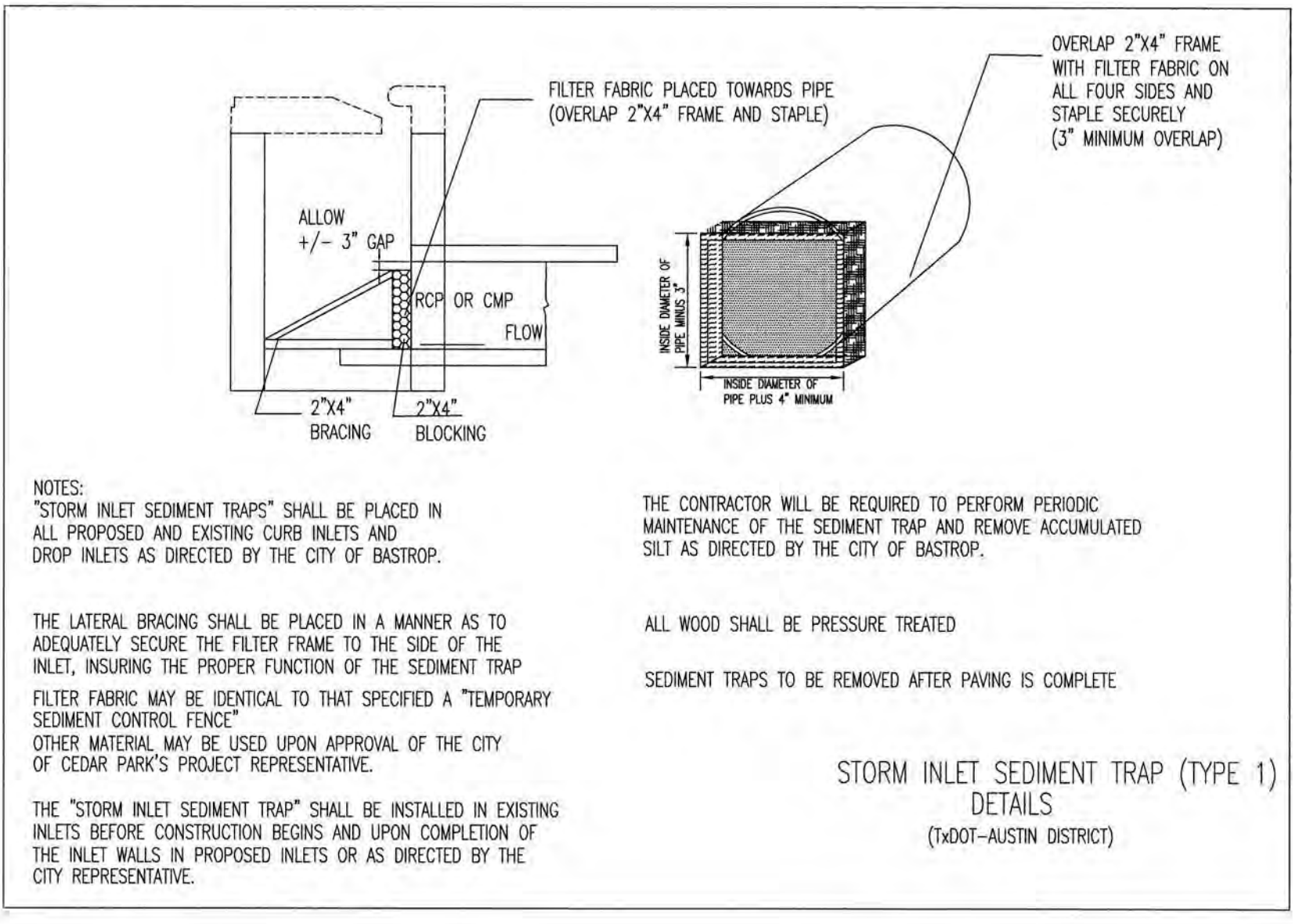
Carlson, Brigrance & Doering, Inc.  
BPM  
Brendan P. McEntee  
09/16/2019

DATE: 9/16/2019  
JOB NUMBER: 5135  
SHEET: 06 OF 6  
SHEET NO.: 06



CONCRETE WASHOUT DETAIL  
N.T.S

- CONCRETE WASHOUT AREA NOTES:
1. WASHOUT SHALL BE INSTALLED PRIOR TO PLACING ANY CONCRETE ON-SITE.
  2. INSTALL DIRECTIONAL SIGNS AS NECESSARY TO INDICATE WASHOUT LOCATION TO CONCRETE SUPPLY VEHICLES.
  3. WASHOUT SHALL BE INSPECTED WEEKLY AND AFTER RAIN EVENTS IN ACCORDANCE WITH SWPPP.
  4. CONTRACTOR TO MAINTAIN, REPAIR, ENLARGE OR RELOCATE WASHOUT AS NECESSARY TO MEET PROJECT REQUIREMENTS.
  5. WHEN NECESSARY DURING CONSTRUCTION, OR AT THE COMPLETION OF ALL CONSTRUCTION, CONCRETE SHALL BE REMOVED AND LAWFULLY DISPOSED OF AND THE WASHOUT AREA FILLED WITH COMPACTED SELECT FILL.
  6. CONCRETE WASHOUT SHALL NOT BE LOCATED WITHIN 50' OF STORM INLET, DITCH, OR SUBSURFACE DRAINAGE SYSTEM.

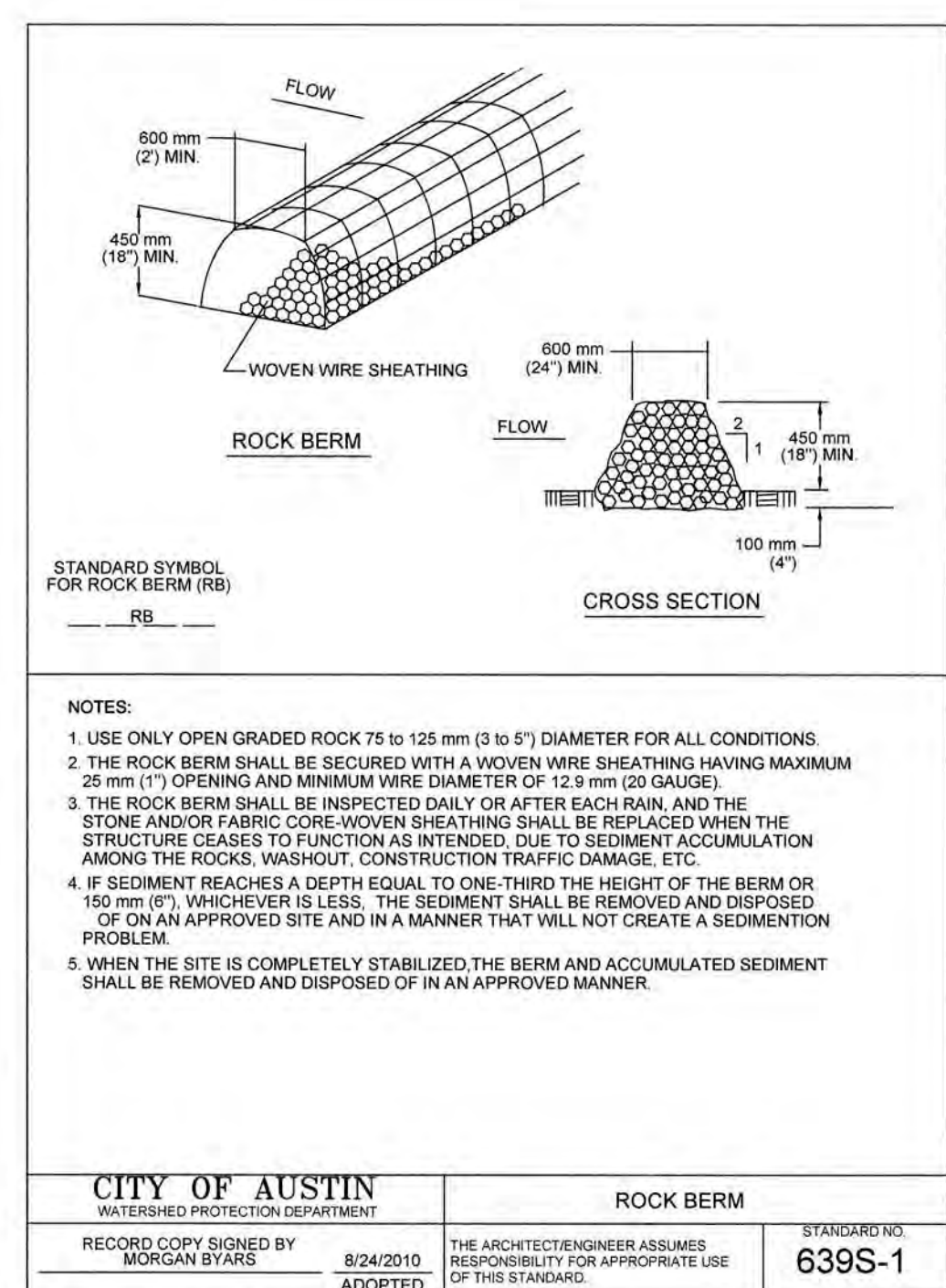


STORM INLET SEDIMENT TRAP (TYPE 1)  
DETAILS  
(TxDOT-AUSTIN DISTRICT)

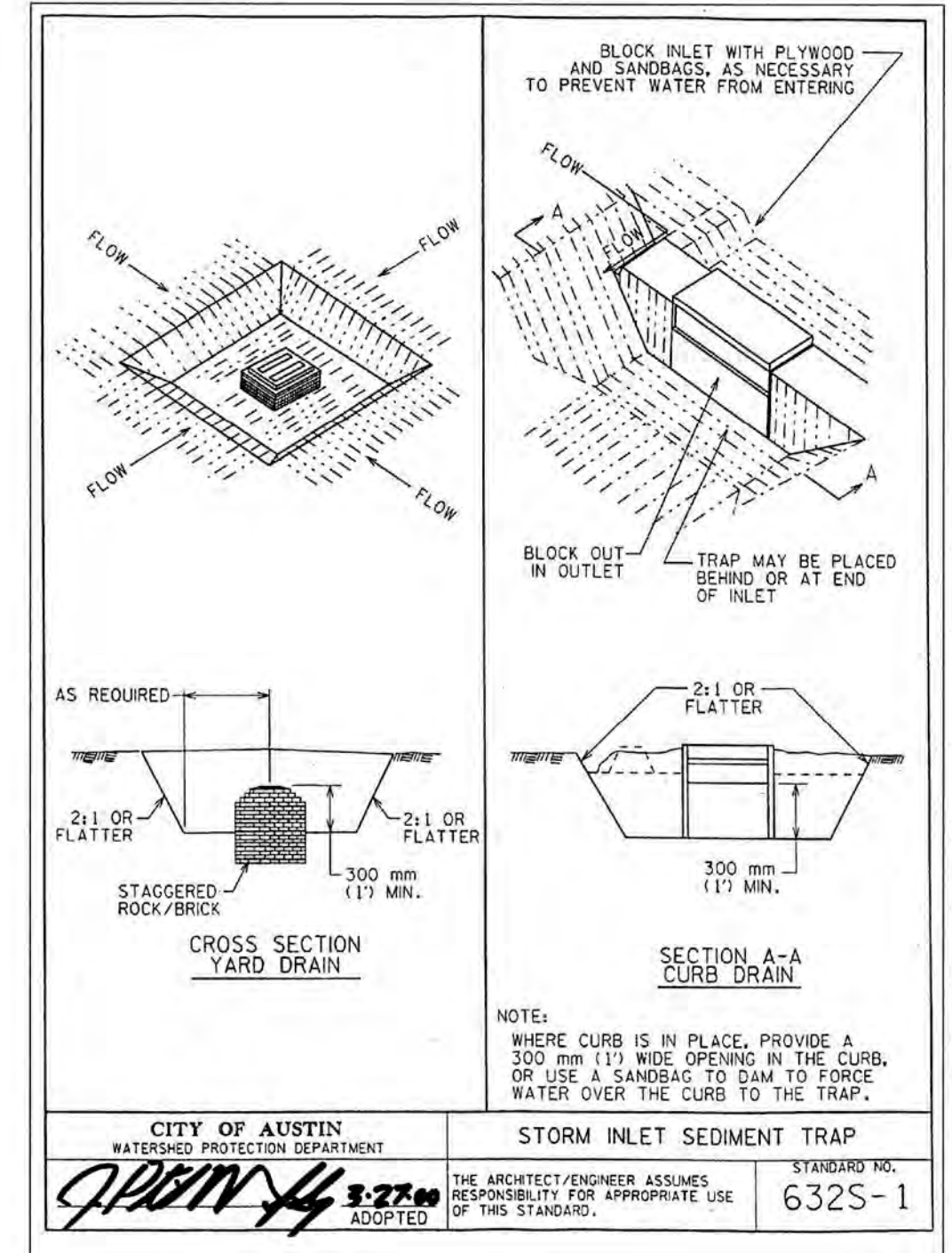
EROSION AND SEDIMENTATION CONTROL:

1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND FENCING FOR AREAS OUTSIDE OF THE CONSTRUCTION AREA PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE CONTRACTOR IS REQUIRED TO INSPECT THE CONTROLS AND FENCES AT WEEKLY INTERVALS, AND AFTER SIGNIFICANT RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES.
3. PRIOR TO FINAL ACCEPTANCE, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
4. ANY METHODS, STREET MARKINGS AND SIGNAGE NECESSARY FOR WARNING MOTORISTS, WARNING PEDESTRIANS OR DIVERTING TRAFFIC DURING CONSTRUCTION SHALL CONFORM TO THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITION.
5. ALL PAVEMENT MARKINGS, MARKERS, PAINT, TRAFFIC BUTTONS, TRAFFIC CONTROLS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, BRIDGES, AND THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITIONS.
6. EROSION CONTROL MEASURES, SITE WORK AND RESTORATION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF BASTROP CODE OF ORDINANCES.
7. ALL SLOPES SHALL BE SODED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY WERE APPLIED.
8. SILT FENCES, ROCK BERMS, SEDIMENTATION BASINS AND SIMILARLY RECOGNIZED TECHNIQUES AND MATERIALS SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADING OF DOWNSTREAM FACILITIES. SUCH INSTALLATIONS SHALL BE REGULARLY INSPECTED BY THE CITY OF BASTROP FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF, IN THE OPINION OF THE CITY ENGINEER, THEY ARE WARRANTED.
9. ALL TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL FINAL INSPECTION AND APPROVAL OF THE PROJECT BY THE CITY INSPECTOR. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL TEMPORARY EROSION CONTROL STRUCTURES AND TO REMOVE EACH STRUCTURE AS APPROVED BY THE CITY INSPECTOR.
10. ALL MUD, DIRT, ROCKS, DEBRIS, ETC., SPILLED, TRACKED OR OTHERWISE DEPOSITED ON EXISTING PAVED STREETS, DRIVES AND AREAS USED BY THE PUBLIC SHALL BE CLEANED UP IMMEDIATELY.
11. PERMANENT EROSION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED BELOW:
  - A. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL SHALL BE PLACED IN ALL DRAINAGE CHANNELS (EXCEPT ROCK), AND BETWEEN THE CURB AND RIGHT-OF-WAY.
  - B. THE SEEDING FOR PERMANENT EROSION CONTROL SHALL BE APPLIED OVER AREAS DISTURBED BY CONSTRUCTION AS FOLLOWS:
    - (I) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA OR THREE (3) POUNDS PER
    - (II) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, WITH A PURITY OF 95% WITH 85% GERMINATION.

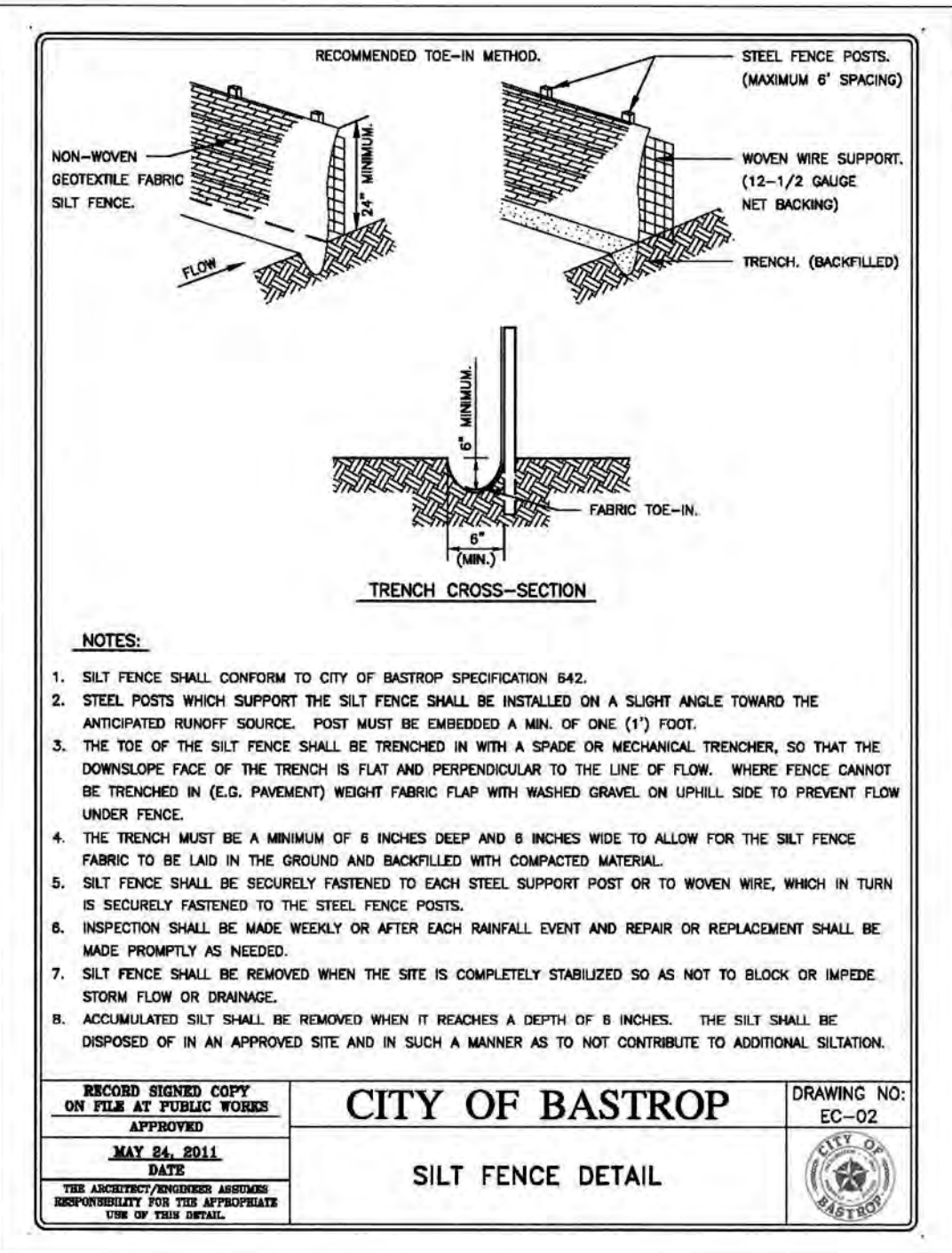
- FERTILIZER SHALL BE SLOW RELEASE GRANULAR OR PALETTE TYPE, AND SHALL HAVE AN ANALYSIS OF 15-15-15, AND SHALL BE APPLIED AT THE RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, ONCE AT THE TIME OF PLANTING, AND AGAIN ONCE DURING THE TIME OF ESTABLISHMENT.
- MULCH TYPE USED SHALL BE STRAW OR HAY APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET.
- HYDRAULIC SEEDING:
- (I) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA, OR THREE (3) POUNDS PER 1,000 SQUARE FEET OF WINTER RYE, WITH A PURITY OF 95% WITH 90% GERMINATION.
  - (II) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET WITH A PURITY OF 95% WITH 95% GERMINATION.
- FERTILIZER SHALL BE A WATER SOLUBLE FERTILIZER WITH AN ANALYSIS OF 15-15-15 AT A RATE OF 1.5 POUNDS PER 1,000 SQUARE FEET.
- MULCH TYPE SHALL BE HAY, STRAW OR MULCH APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET, WITH A SOIL TACKIFIER AT A RATE OF 1.4 POUNDS PER 1,000 SQUARE FEET.
- C. THE PLANTED AREA SHALL BE IRRIGATED OR SPRINKLED IN A MANNER THAT WILL NOT ERODE THE TOPSOIL, BUT WILL SUFFICIENTLY SOAK TO A DEPTH OF SIX (6) INCHES. THE IRRIGATION SHALL OCCUR AT 10-DAY INTERVALS DURING THE FIRST TWO (2) MONTHS. RAINFALL OCCURRENCES OF 1/2 INCH OR MORE SHALL POSTPONE THE WATERING SCHEDULE FOR TEN (10) DAYS.
  - D. RESTORATION SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1 INCH ± 85% COVERAGE, PROVIDED NO BARE SPOTS LARGER THAN 20 SQUARE FEET EXIST.



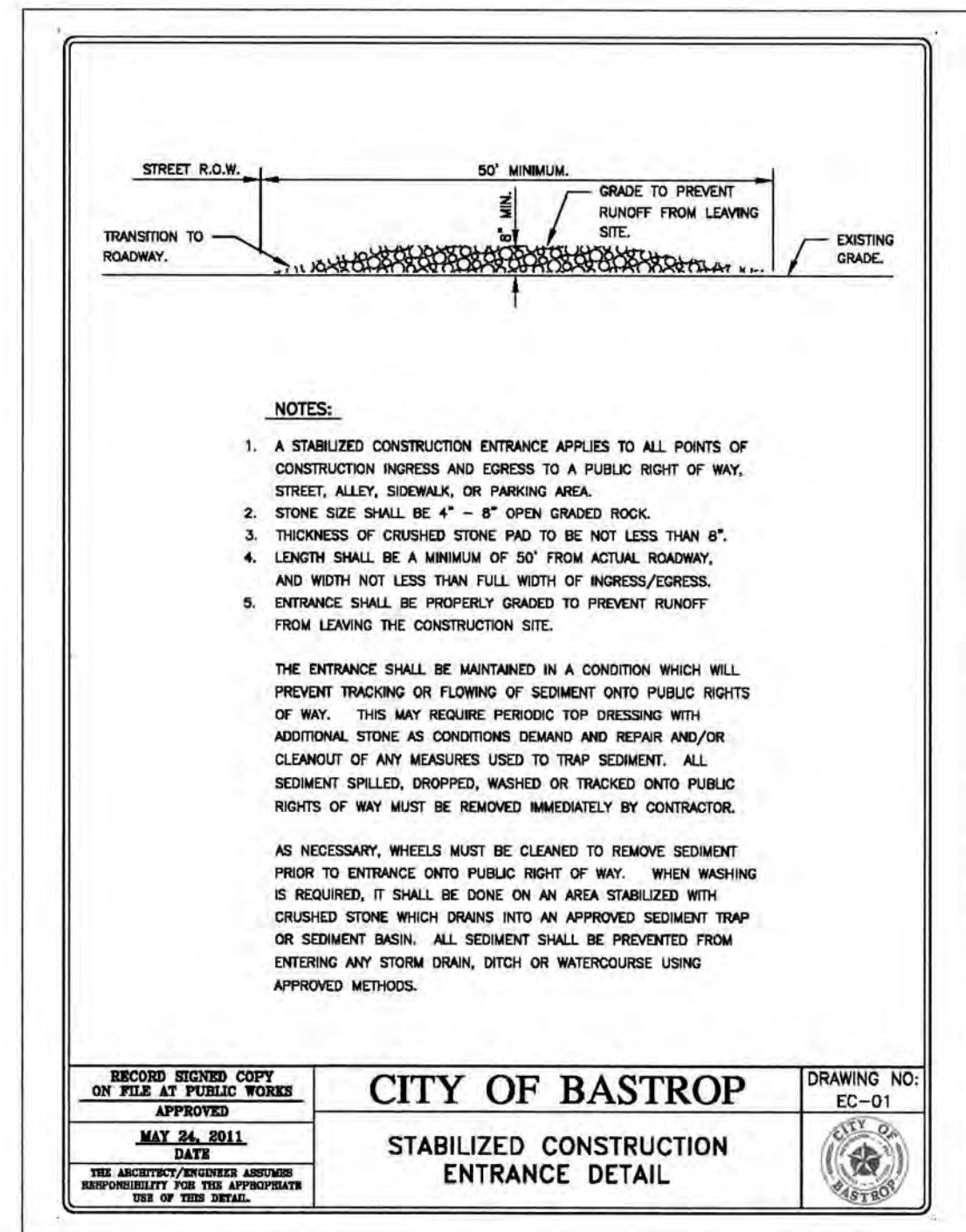
ROCK BERM  
STANDARD NO. 639S-1



STORM INLET SEDIMENT TRAP  
STANDARD NO. 632S-1



SILT FENCE DETAIL  
STANDARD NO. EC-02



STABILIZED CONSTRUCTION ENTRANCE DETAIL  
STANDARD NO. EC-01

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**PLANT SCHEDULE**

SHADE TREES	QTY	COMMON / BOTANICAL NAME	CONT	CALIPER	HEIGHT	SPREAD
	8	CEDAR ELM ULMUS CRASSIFOLIA	65 GAL	3" CAL.	10'-12' HT.	5-6' SPR.
	5	CHINQUAPIN OAK QUERCUS MULLENBERGII	65 GAL	3.25-3.5" CAL.	11-13' HT.	5'6" SPR.
	1	SOUTHERN LIVE OAK QUERCUS VIRGINIANA	65 GAL	3" CAL.	10' HT.	6' SPR.

SHRUBS	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
GM	12	GULF MUHLY MULLENBERGIA CAPILLARIS 'REGAL MIST'	3 GAL	36" o.c.
RY	81	RED YUCCA HESPERALOE PARVIFLORA	5 GAL	36" o.c.
DW	98	DON'S DWARF WAXMYRTLE MYRTICA CERIFERA 'DON'S DWARF'	5 GAL	36" o.c.
DY	124	DWARF YALPON ILEX VOMITORIA 'NANA'	5 GAL	36" o.c.

GROUND COVER	CODE	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
	NG	66	LANTANA 'NEW GOLD' LANTANA X 'NEW GOLD'	1 GAL	24" o.c.
	ZX	84	ZEXMANIA ZEXMANIA HISPIDA	1 GAL	12" o.c.

TURF	CODE	QTY	COMMON / BOTANICAL NAME	CONT
	SEG	AS SHOWN	SAHARA BERMUDA GRASS CYNODON DACTYLON 'SAHARA'	HYDRO

**STREET YARD**

REQUIRED	PROVIDED
TOTAL SITE AREA	52,011 S.F.
TOTAL STREET YARD AREA	18,131 S.F.
STREET YARD LANDSCAPE (15% OF STREET YARD REQUIRED)	2,811 S.F.      2,811 S.F.

**LANDSCAPE BUFFER**

10' LANDSCAPE BUFFER ADJACENT TO RIGHT-OF-WAY OF ANY MAJOR THOROUGHFARE STREET IS REQUIRED. 1 LARGE TREE PER FORTY LINEAR FEET.

REQUIRED	PROVIDED
230 LF = 6 TREES	6 TREES

**SHRUBS**

SHRUBS MUST BE PLANTED ALONG THE SIDE PROPERTY LINE FROM THE FRONT PROPERTY LINE TO THE REAR. SHRUBS MUST BE PLANTED IN SUCH A MANNER TO CREATE A DENSE HEDGE OF AT LEAST THREE FEET AT MATURITY.

**PARKING LOT LANDSCAPING**

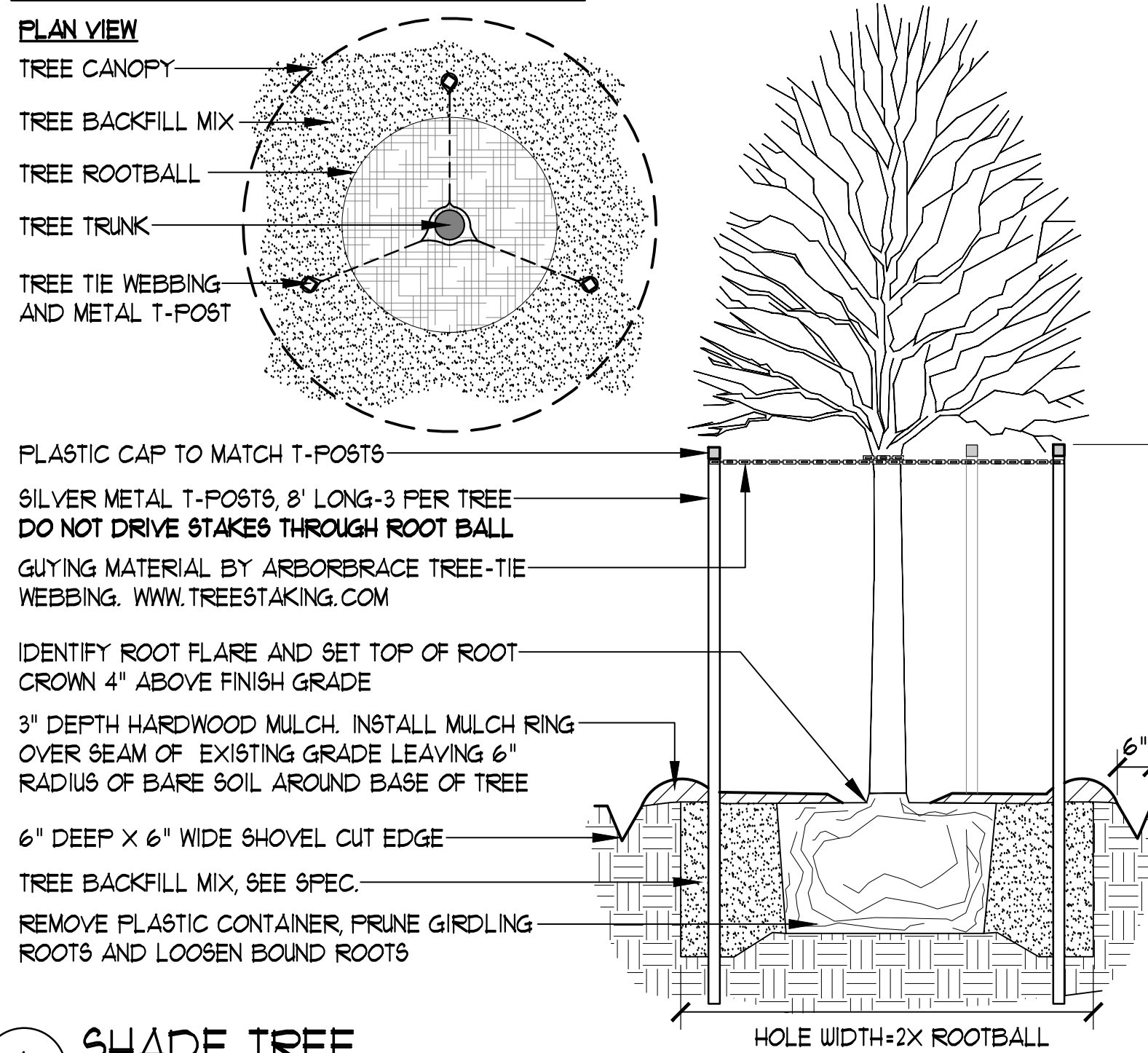
THERE SHALL BE A LANDSCAPED AREA WITH AT LEAST ONE (1) TREE WITHIN SIXTY FEET (60') OF EVERY PARKING SPACE. THERE SHALL BE A MINIMUM OF ONE (1) TREE PLANTED IN THE PARKING AREA FOR EVERY TEN (10) PARKING SPACES WITHIN PARKING LOTS WITH MORE THAN TWENTY (20) SPACES. WITHIN PARKING LOTS, LANDSCAPE AREAS SHOULD BE LOCATED TO DEFINE PARKING AREAS AND ASSIST IN CLARIFYING APPROPRIATE CIRCULATION PATTERNS. A LANDSCAPE ISLAND SHALL BE LOCATED AT THE TERMINUS OF ALL PARKING ROWS, AND SHOULD CONTAIN AT LEAST ONE (1) TREE. ALL LANDSCAPE AREAS SHALL BE PROTECTED BY A MONOLITHIC CURB OR WHEEL STOPS AND REMAIN FREE OF TRASH, LITTER, AND CAR BUMPER OVERHANGS.

**SITE DEVELOPMENT PERMIT**

**LANDSCAPE NOTES:**

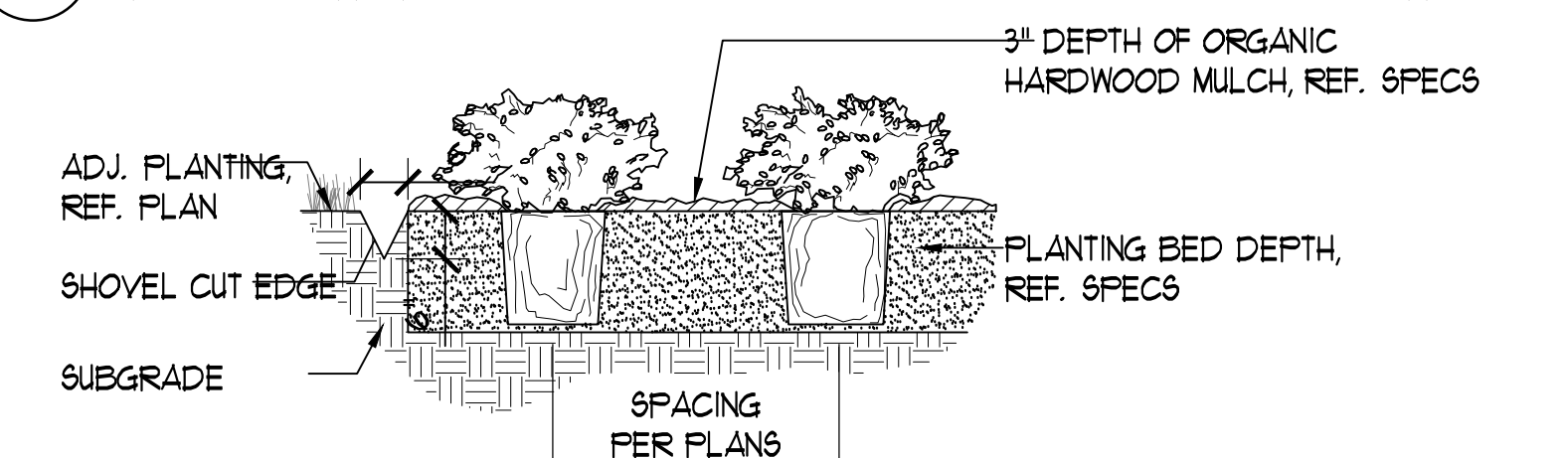
- ALL LANDSCAPED AREAS TO BE PROTECTED BY 6" INCH CURBS, WHEEL STOPS OR OTHER APPROVED BARRIERS AS PER ECM 2.4.1(A).
- THE OWNER WILL CONTINUOUSLY MAINTAIN THE REQUIRED LANDSCAPING IN ACCORDANCE WITH LDC 25-2-384.
- EXISTING TREES TO BE SAVED SHALL BE PROTECTED BY FENCING BEFORE CONSTRUCTION BEGINS. NO EQUIPMENT OR MATERIALS SHALL BE STORED OR OPERATED WITHIN THE FENCED-IN AREAS. FENCES SHALL BE AT THE DRIP LINE AND COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES. NO BURNING OF DEBRIS, CLEANING FLUIDS, CONCRETE SPILLS, ETC. WILL BE ALLOWED WITHIN THESE AREAS.
- BUFFERING OF THE STREET YARD WILL BE ACCOMPLISHED THROUGH THE COMBINATION OF TREES, SHRUBS, GRADE CHANGES, AND FENCES.
- GRADE CHANGES THAT DO NOT APPEAR ON THE SITE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT BY THE GENERAL CONTRACTOR PRIOR TO CONSTRUCTION.
- TRENCHING SHALL NOT OCCUR WITHIN THE FENCED DRIP LINE AREAS OF EXISTING TREES.
- SHRUB MATERIAL NOT TO EXCEED 36" O.C. UNLESS OTHERWISE SPECIFIED. GROUNDCOVERS NOT TO EXCEED 18" O.C. DURING THE TIME OF MARCH 15-OCTOBER 15 INSTALLATION OF HYDROMULCH SHALL BE COMMON BERMUDA OR SAHARA BERMUDA FOR OCTOBER 16 -MARCH 14 INSTALLATION OF HYDROMULCH SHALL BE ANNUAL OR PERENNIAL RYE WITH A SPRING APPLICATION OF COMMON BERMUDA OR SAHARA BERMUDA.
- ALL LAWN AREAS WITHIN THE LIMITS OF CONSTRUCTION SHALL BE RE-VEGETATED WITH BERMUDA SOD OR RYE UNLESS NATIVE RESTORATION MIX IS SPECIFIED.
- NOT MORE THAN 50% OF THE TREES AND 50% OF SHRUBS PROPOSED WILL BE OF THE SAME SPECIES.
- AN AUTOMATIC IRRIGATION SYSTEM SHALL BE INSTALLED. SEE IRRIGATION NOTES IN THESE DRAWINGS FOR REQUIREMENT.
- IF ESTABLISHING VEGETATION DURING ANY STAGE OF DROUGHT, SECTION 6-4-30 MAY REQUIRE A VARIANCE. CONTACT BASTROP WATER CONSERVATION STAFF.

**NOTES:**  
1. PRUNE DEAD OR BROKEN BRANCHES ONLY. BRANCHES TO BE 80" AFF AT ACCESSIBLE AREAS.  
2. ALIGN STAKING OF TREES IDENTICALLY WHEN IN LINES OR GROUPS.



**1 SHADE TREE**

SECTION / SINGLE TRUNK



**2 SHRUBS / SHOVEL CUT EDGE**

SECTION

**BASTROPTX**  
Heart of the Lost Pines  
Est. 1932

Final Drainage  
Plan Approved

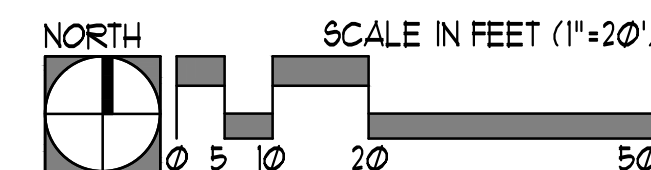
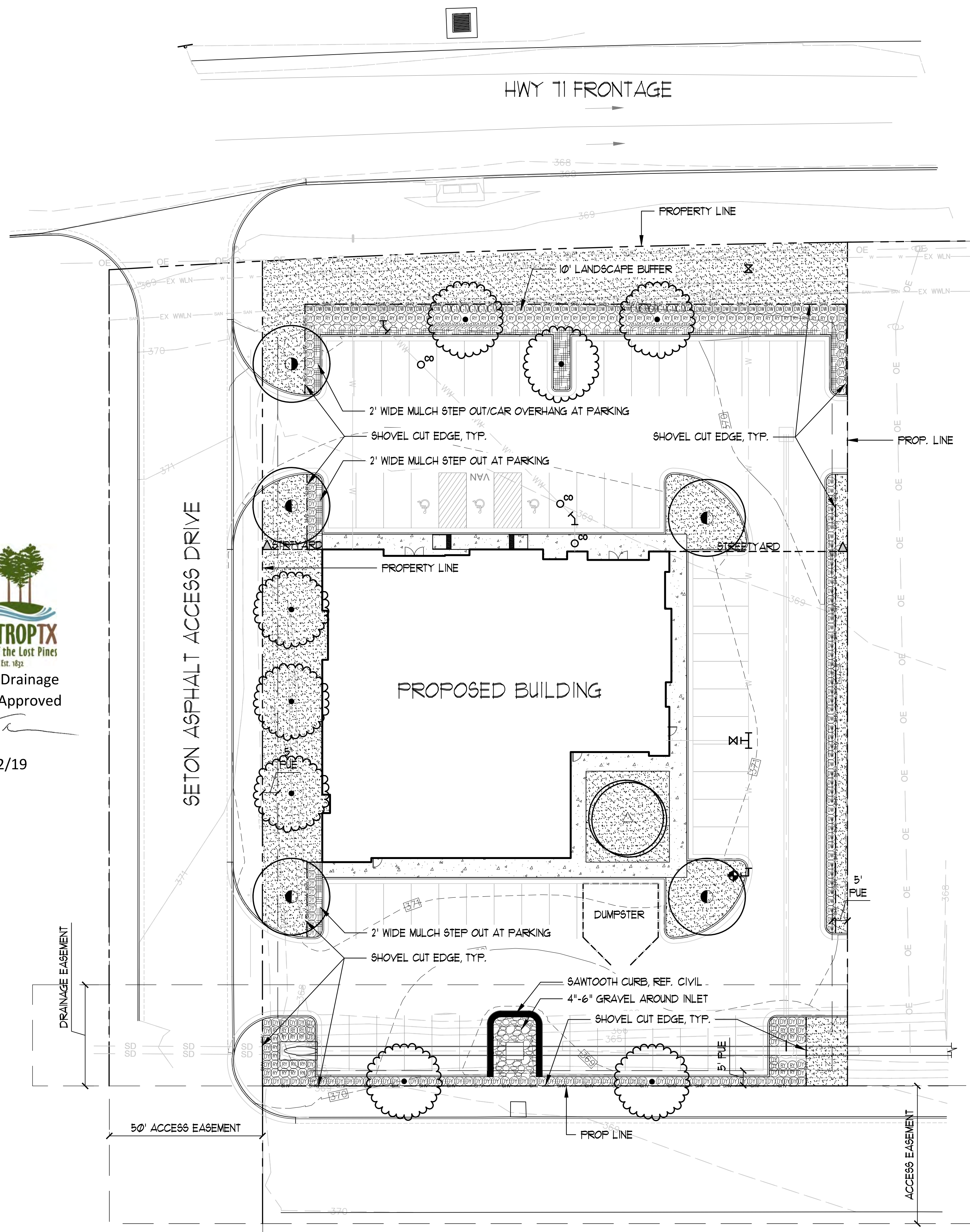
11/22/19

**LANDSCAPE CERTIFICATION**

I, AAN G. COLEMAN, DO HEREBY CERTIFY THAT THE PLANS FOR THE DEVELOPMENT PROJECT LOCATED AT HWY 71 EAST OF 304, SATISFY THE REQUIREMENTS OF THE BASTROP CODE OF ORDINANCES, SECTION 39 AND ALL AMENDMENTS

*MariSSa McKinney*  
MARISSA MCKINNEY  
COLEMAN & ASSOCIATES  
ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE LANDSCAPE ARCHITECT WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY ON THE ADEQUACY OF THE WORK OF THE LANDSCAPE ARCHITECT.

10/14/19 DATE

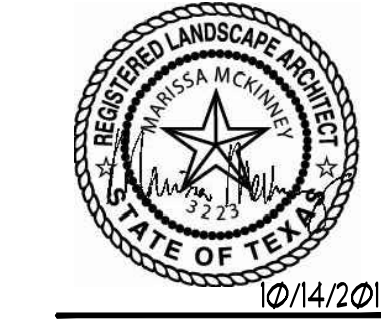


**COLEMAN & ASSOCIATES**  
Landscape Architecture  
Environmental Design

9890 Silver Mountain Drive  
Austin, Texas 78737  
Ph: 512-476-2090  
F: 512-476-2099

1926 Cambria  
San Antonio, Texas 78258  
Ph: 210-492-4550  
F: 210-492-9930

9511 Modesto Ave. NE  
Albuquerque, New Mexico 87122  
Ph: 505-433-3426



LANDSCAPE PLAN AND DETAILS  
CITY SUBMITTAL

BASTROP GROVE MEDTAL DEV.  
CITY OF BASTROP  
BASTROP COUNTY, TEXAS

REVISIONS

NO.	DATE	DESCRIPTION

SCALE: AS SHOWN  
DRAWN BY: MAM  
CHECKED BY: MAM  
APP. BY: MAM  
PROJECT NO.  
DATE: 10/14/2019



SHEET:

14

OF

LEGEND

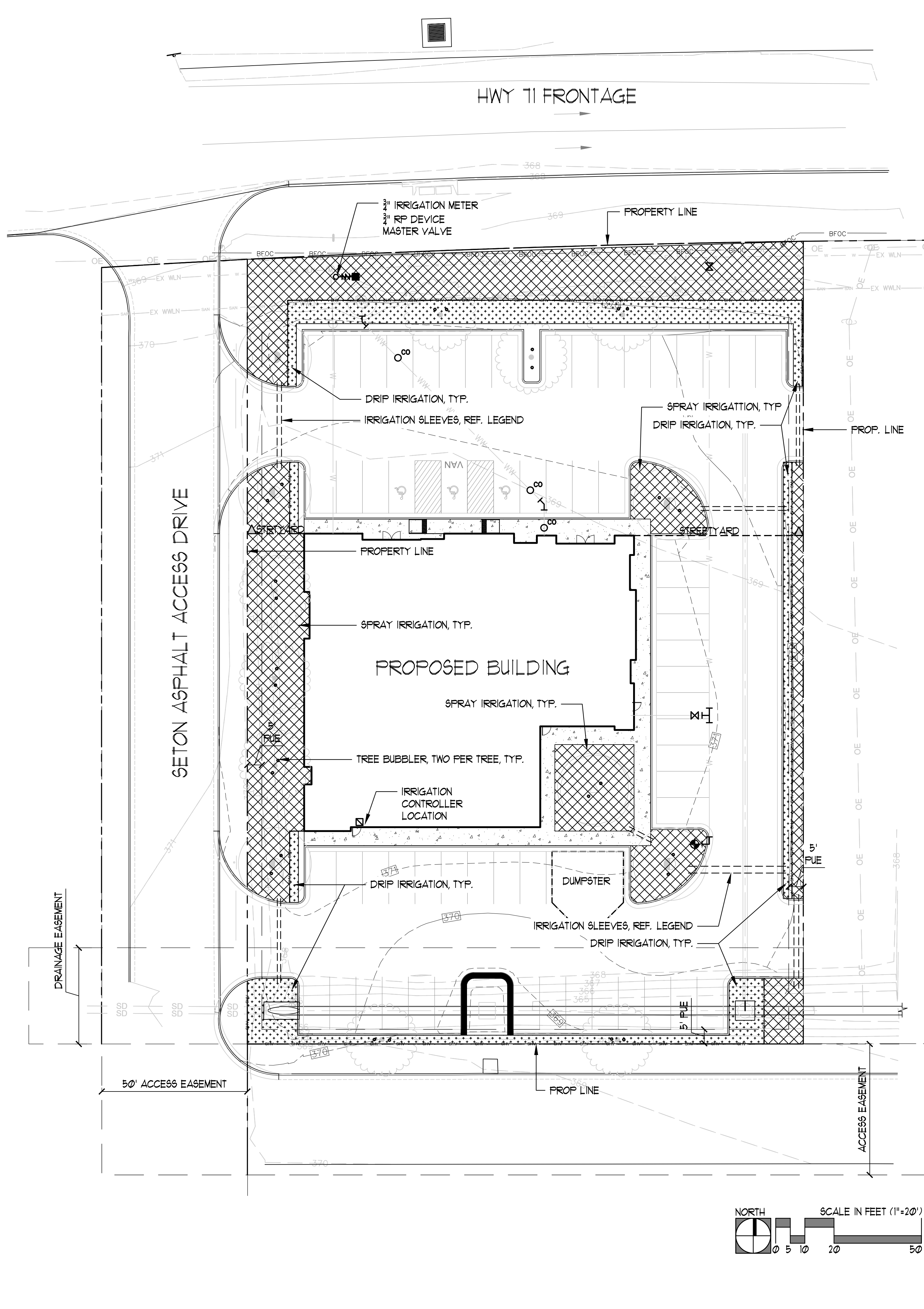
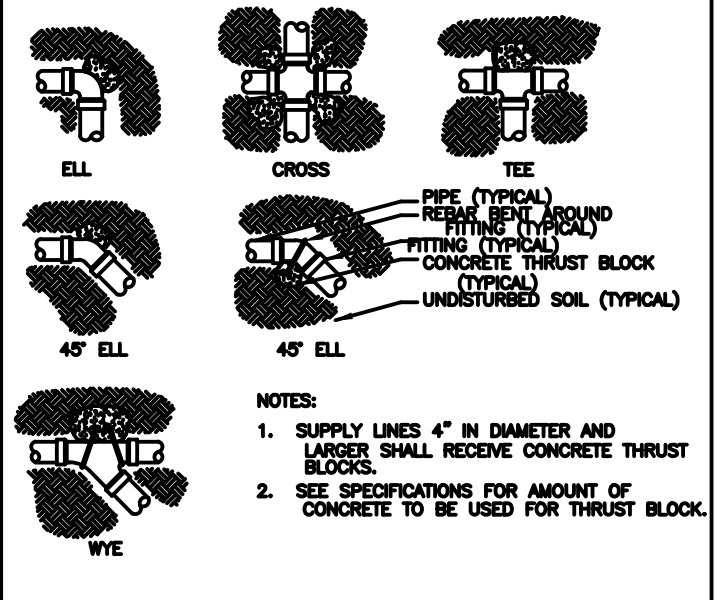
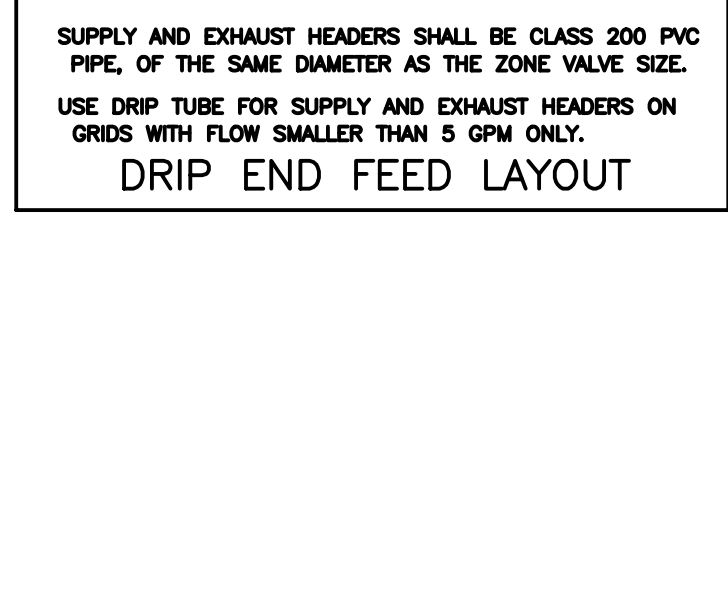
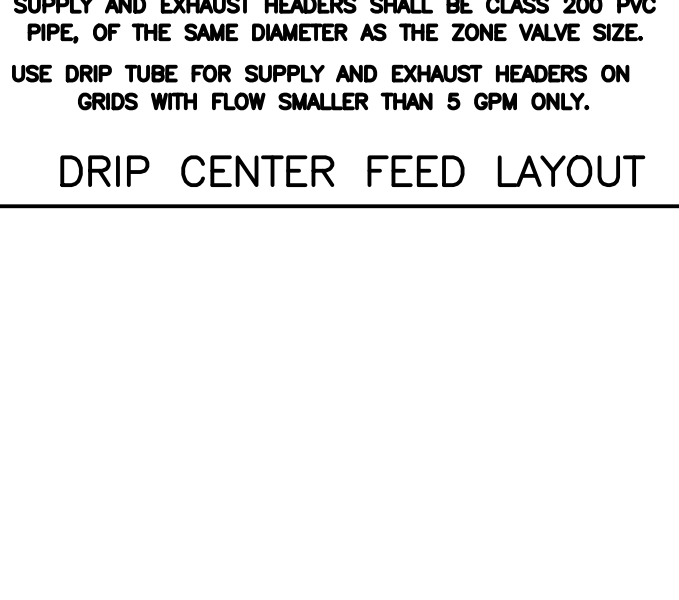
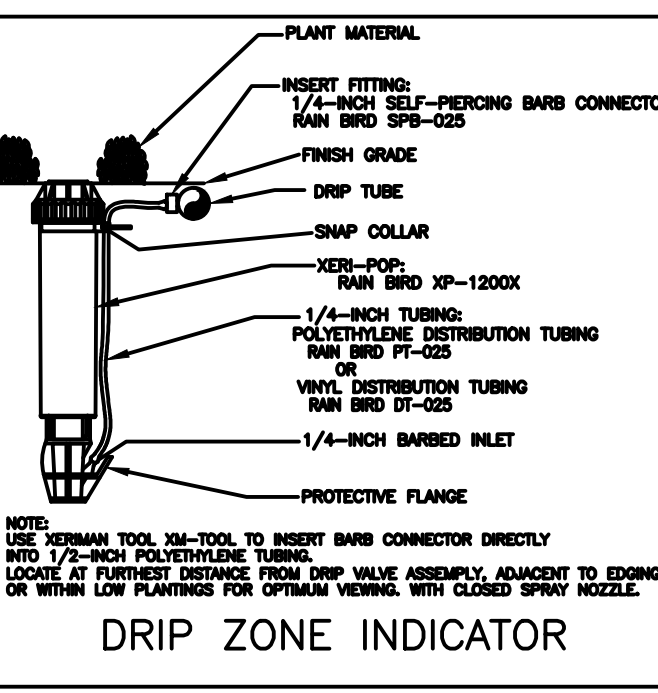
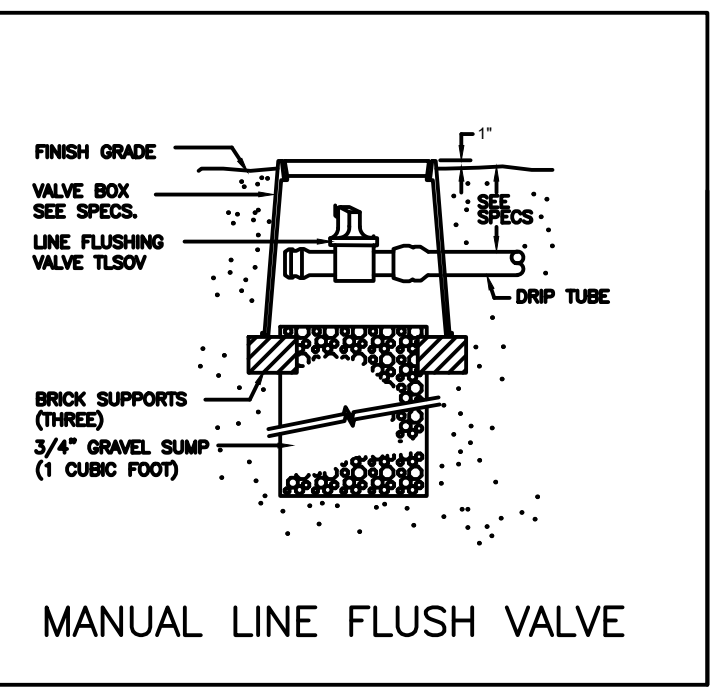
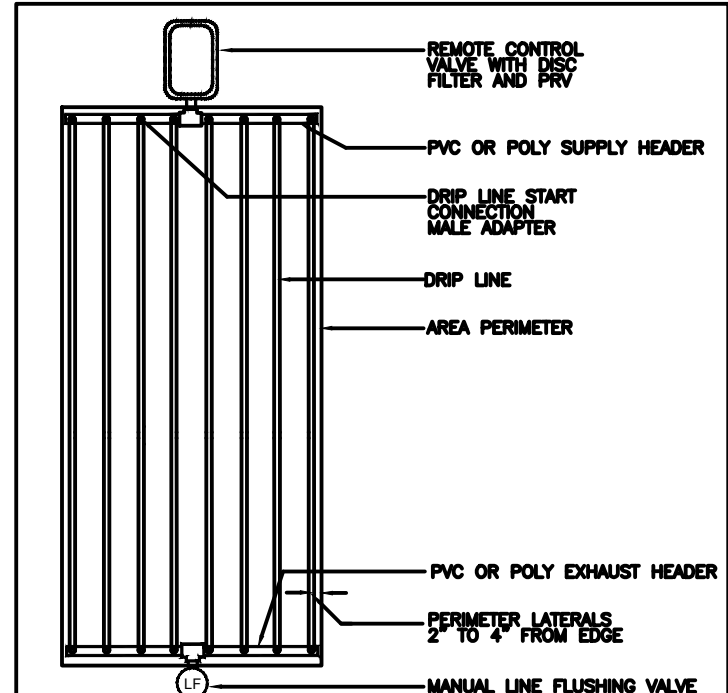
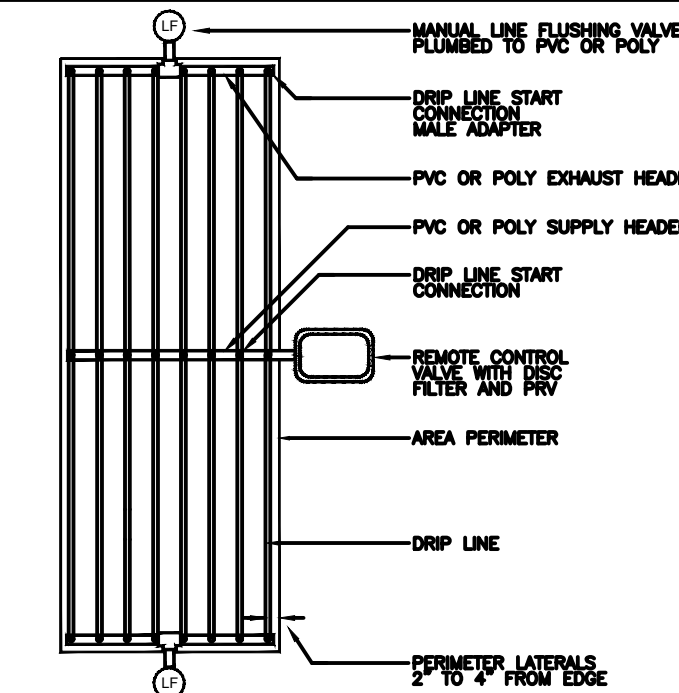
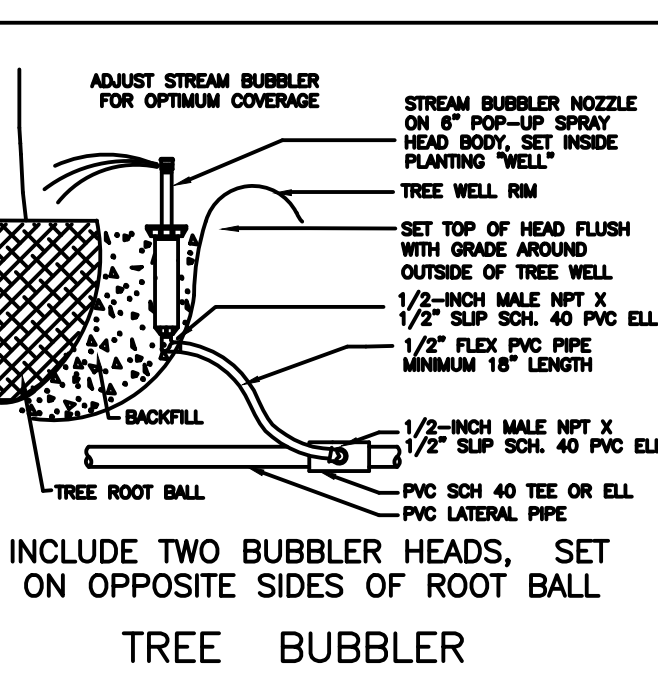
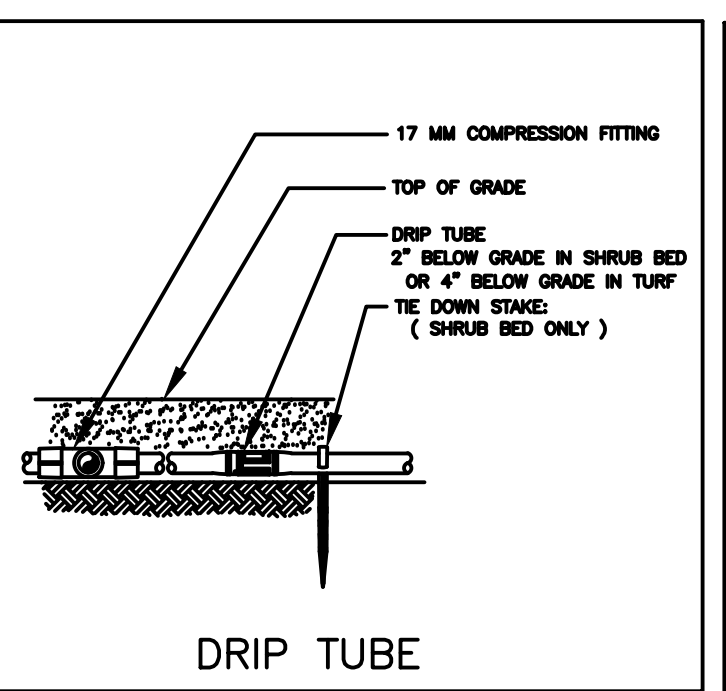
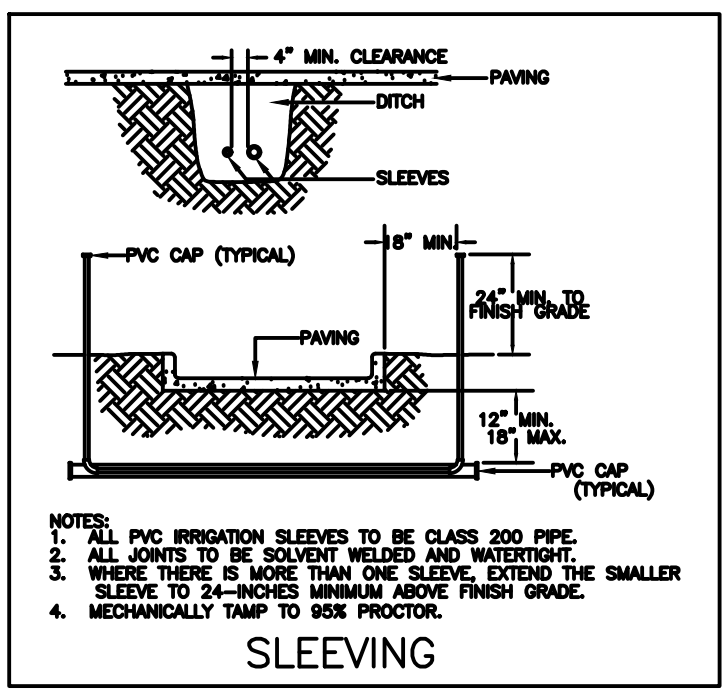
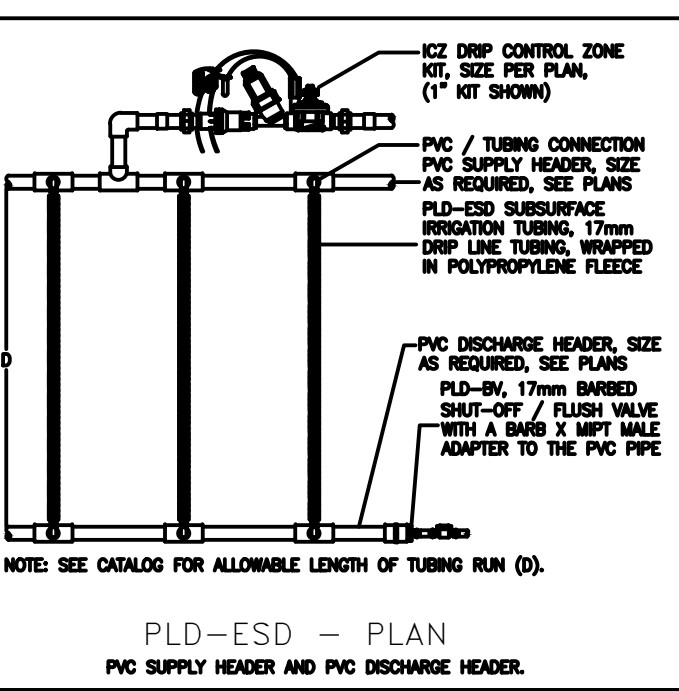
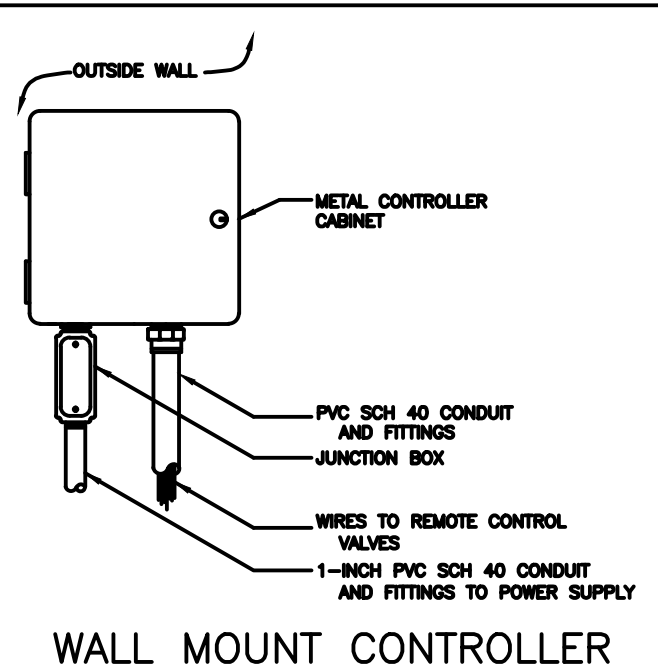
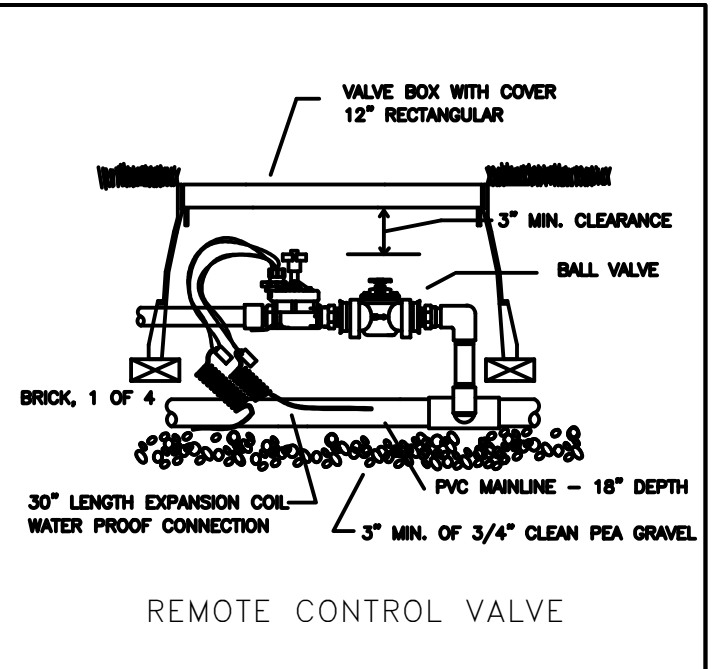
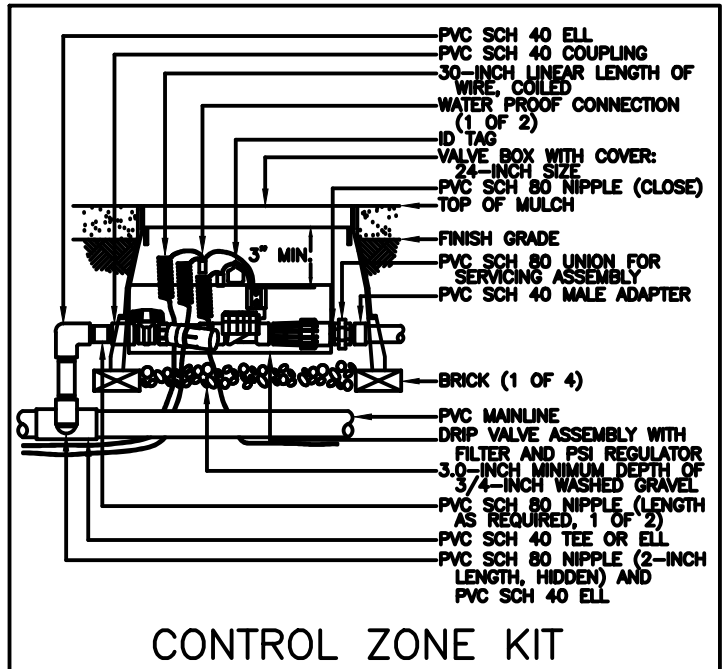
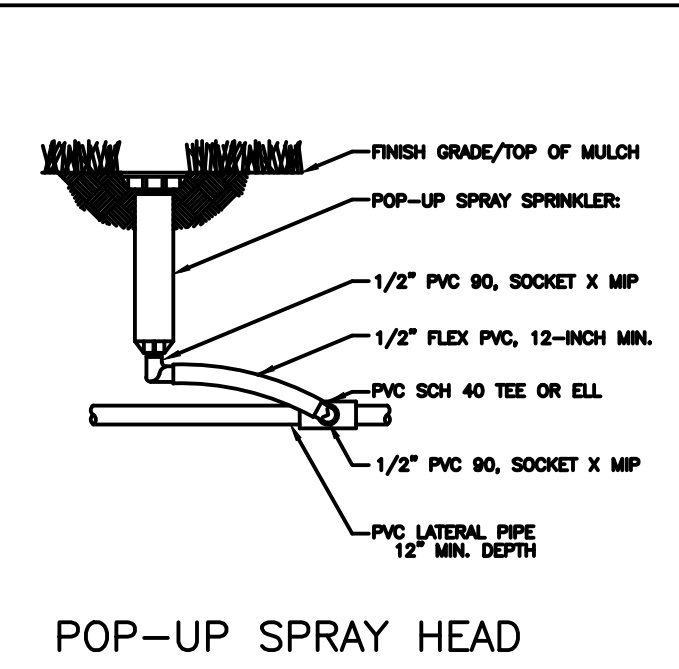
- HUNTER PROS-06-PRS30 SERIES POP UP SPRAY HEADS WITH HUNTER MSBN-50H STREAM BUBBLER NOZZLES. ( TWO PER TREE ) SEE INSTALLATION NOTE #13 REGARDING TREE BUBBLER LATERAL PIPE
● HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH SS / ES SERIES STRIP NOZZLE UNLESS NOTED OTHERWISE.
● HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH PRO SPRAY SERIES NOZZLE AS NOTED BELOW
--- NETAFIM TECHLINE TLHCVKR5-12 SERIES DRIP TUBE IN NARROW TURF AREAS INSTALLED AT 4" DEPTH SEE INSTALLATION NOTE #17 REGARDING DRIP TUBE LAYOUT IN TURF.
⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL VALVE WITH ICD-100 SERIES DECODER
⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL, "TREE BUBBLER ZONE" VALVE WITH ICD-100 SERIES DECODER SEE INSTALLATION NOTE #12 REGARDING TREE BUBBLER LATERAL PIPE
⊕ NETAFIM LVCZ SERIES DRIP VALVE ASSEMBLY WITH PRESSURE REGULATOR AND 140 MESH FILTER USE MODEL LVCZS8010075-LF FOR DRIP ZONES WITH .25 TO 4.4 GPM FLOW RATE WITH PRESSURE REGULATOR MODEL #PRV075LF42V2K USE MODEL LVCZ10075-HFHP FOR DRIP ZONES WITH 4.5 TO 17.6 GPM FLOW RATE PRESSURE REGULATOR MODEL #PRV075HF45V2K
⊕ WILKINS 375 SERIES REDUCED PRESSURE TYPE BACKFLOW PREVENTOR INSTALLED PER CITY CODE WITH SAME SIZE BRONZE BALL VALVE AND HEATED / INSULATED ENCLOSURE INSTALLED ON THE UP-STREAM SIDE.
○ IRRIGATION WATER METER AND TAP, SIZE AS NOTED ON THE PLAN
□ CONTROLLER "A" HUNTER ACC2 DECODER SERIES TWO-WIRE CONTROLLER MODEL A2C-75D-M WITH TWO A2C-D75 MODULES AND WIRELESS SOLAR SYNC SENSOR LOCATE SENSOR AS FIELD DIRECTED BY THE LANDSCAPE ARCHITECT SURGE PROTECTION DEVICE WITH GROUNDING DEVICE TO BE SPACED NO MORE THAN 500 FEET APART ALONG PATH
■ BERMAID 310 RAM SERIES "MASTER" VALVE, ICD-100 DECODER, HFS SERIES FLOW METER WITH FCT AND ICD-SEN SENSOR DECODER

MAINLINE PIPE 3" DIAMETER AND SMALLER SHALL BE SCHEDULE 40 PVC SOLVENT-WELD TYPE 4" DIAMETER AND LARGER SHALL BE CLASS 200 PVC O-RING GASKET TYPE WITH DUCTILE IRON GASKET FITTINGS 4" EQUALIZER LINE BETWEEN TANKS SHALL BE SCHEDULE 40.

CLASS 200 ( EXCEPT 1/2 INCH #315 ) PVC LATERAL PIPE ONE 4" CLASS 200 SLEEVE PIPES TWO 4" CLASS 200 SLEEVE PIPES AT PAVEMENT CROSSINGS WITH 2 1/2" MAINLINE OR SMALLER UNLESS NOTED OTHERWISE ONE 8" AND ONE 4" CLASS 200 SLEEVE PIPE AT PAVEMENT CROSSINGS WITH 4" MAINLINE UNLESS NOTED OTHERWISE

L.I.C. SHALL SELECT SPRAY NOZZLES FOR "HEAD-TO-HEAD" COVERAGE, ADJUSTED FOR NO OVERSPRAY ONTO WALLS AND WALKS. NO OVERSPRAY INTO STREETS IS PERMITTED.

ALL PIPES SHALL BE SIZED TO ALLOW A MAXIMUM FLOW VELOCITY OF 5 FEET PER SECOND



IRRIGATION PLAN AND DETAILS CITY SUBMITTAL BASTROP GROVE MEDTAL DEV. CITY OF BASTROP BASTROP COUNTY, TEXAS

Table with 2 columns: REVISIONS and SCALE. SCALE is listed as AS SHOWN. Below are fields for DRAWN BY (MAM), CHECKED BY (MAM), APP. BY (MAM), PROJECT NO., and DATE (10/14/2019).

# BASTROP GROVE MEDTAIL DEVELOPMENT

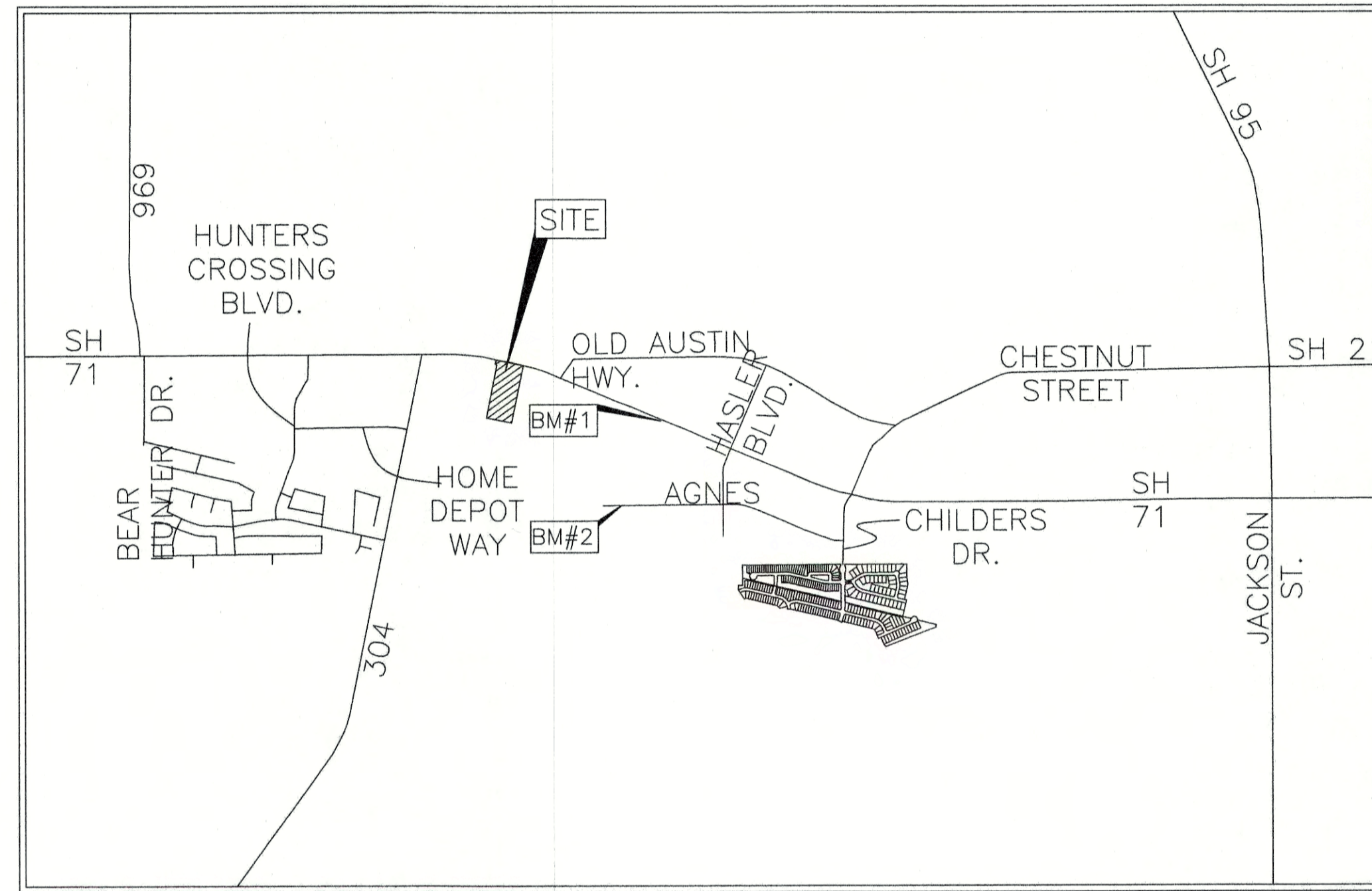
## CIVIL SITE DEVELOPMENT PLANS

### CITY OF BASTROP

### BASTROP COUNTY, TEXAS

SHT#	SHEET TITLE
01	COVER SHEET
02	FINAL PLAT SHEET
03	OVERALL SITE PLAN SHEET
04	LANDSCAPE PLAN AND DETAILS (1 OF 2)
05	IRRIGATION PLAN AND DETAILS (2 OF 2)
06	BUILDING ELEVATIONS SHEET (1 OF 2)
07	BUILDING ELEVATIONS SHEET (2 OF 2)
08	DUMPSTER ENCLOSURE DETAILS
09	FIRE ACCESS AND CONTROL PLAN SHEET
10	LIGHTING PLAN SHEET
11	TRAFFIC CONTROL & PEDESTRIAN SAFETY SHEET
12	FINAL MASTER DRAINAGE PLANS (1 OF 8)
13	FINAL MASTER DRAINAGE PLANS (2 OF 8)
14	FINAL MASTER DRAINAGE PLANS (3 OF 8)
15	FINAL MASTER DRAINAGE PLANS (4 OF 8)
16	FINAL MASTER DRAINAGE PLANS (5 OF 8)
17	FINAL MASTER DRAINAGE PLANS (6 OF 8)
18	FINAL MASTER DRAINAGE PLANS (7 OF 8)
19	FINAL MASTER DRAINAGE PLANS (8 OF 8)
20	GENERAL NOTES
21	CONSTRUCTION NOTES
22	EROSION CONTROL PLAN
23	EROSION CONTROL NOTES & DETAILS
24	GRADING AND DRAINAGE PLAN
25	UTILITY PLAN
26	STORM SEWER PROFILES
27	CONSTRUCTION DETAILS (1 OF 3)
28	CONSTRUCTION DETAILS (2 OF 3)
29	CONSTRUCTION DETAILS (3 OF 3)

BASTROP FIRE DEPARTMENT	
FIRE DESIGN CODES	2018 INTERNATIONAL FIRE CODE WITH APPENDICES AND LOCAL AMENDMENTS
FIRE FLOW DEMAND @ 20 psi	2,250 gpm - 2 hr DURATION
INTENDED USE	BUSINESS (GROUP B)
CONSTRUCTION CLASSIFICATION	TYPE II-B
BUILDING FIRE AREA (S.F.)	10,237 sf
AUTOMATIC FIRE SPRINKLER SYSTEM TYPE (IF APPLICABLE)	NFPA 13
REDUCED FIRE FLOW DEMAND @ 20 psi FOR HAVING A SPRINKLER SYSTEM (gpm) (IF APPLICABLE)	1,500 gpm - 2 hr DURATION
FIRE HYDRANT FLOW TEST DATE	12/05/2019
FIRE HYDRANT FLOW TEST LOCATION	ONE MAIN FINANCIAL 696 HIGHWAY 71
ALTERNATIVE METHOD OF COMPLIANCE AMOC (IF APPLICABLE)	N/A



**LOCATION MAP**  
(NOT TO SCALE)

**BENCHMARKS:**

- #1 TXDOT MON. BRASS DISC IN CONCRETE, 44' WEST OF THE NORTH-EASTERN PROPERTY CORNER.
- #2 MAG NAIL IN PAVEMENT ON AGNES ST. 500' SOUTH OF THE PROPERTY BOUNDARY.

**GENERAL NOTES:**

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED WITH THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

THIS PROJECT IS LOCATED IN THE COLORADO RIVER WATERSHED.

NO PORTION OF THIS TRACT IS WITHIN THE BOUNDARIES OF THE 100-YEAR FLOOD PLAIN OF ANY WATERWAY THAT IS WITHIN THE LIMITS OF STUDY OF THE FEDERAL FLOOD INSURANCE ADMINISTRATION FIRM MAP NO. 48021C0335E, DATED JANUARY 19, 2006, BASTROP COUNTY, TEXAS. BASTROP COUNTY COMMUNITY NO. 481193.

FINAL PLAT APPROVED ON 11/21/2019 BY PLANNING & ZONING COMMISSION

FINAL MASTER DRAINAGE PLAN APPROVED ON 10/31/2019 BY CITY OF BASTROP

**LEGAL DESCRIPTION:**

A 1.194 ACRE (52,024 SQUARE FEET) TRACT OR PARCEL OF LAND, MORE PARTICULARLY DESCRIBED AS LOT 6 OF THE FINAL PLAT OF BASTROP GROVE, SECTION 2 RECORDED IN CABINET 7, PAGE 12-B OF THE OFFICIAL PUBLIC RECORDS OF BASTROP COUNTY, TEXAS.

**ORDINANCES CODES:**

- \* CITY OF BASTROP STORMWATER DRAINAGE DESIGN MANUAL
- \* CITY OF BASTROP SUBDIVISION REGULATIONS
- \* CITY OF BASTROP ZONING CODE
- \* 2018 INTERNATIONAL FIRE CODE WITH APPENDICES AND LOCAL AMENDMENTS

**JURISDICTION CODES:**

- \* CITY OF BASTROP, TEXAS

**UTILITY PROVIDERS:**

- ELECTRIC: BLUEBONNET ELECTRIC (979) 542-3151
- GAS: CENTER POINT ENERGY (830) 643-6936
- PHONE: AT&T (512) 870-1450
- WATER: CITY OF BASTROP (512) 332-8830
- WASTEWATER: CITY OF BASTROP (512) 332-8830
- CABLE: SPECTRUM (855) 243-8892

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN ACCEPTING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.

ACCEPTED FOR CONSTRUCTION:

*[Signature]* 2/27/20  
DIRECTOR OF PLANNING AND DEVELOPMENT DATE

*[Signature]* 2/27/2020  
CITY OF BASTROP ENGINEER DATE

*[Signature]* 27Feb2020  
THE CITY OF BASTROP FIRE DEPARTMENT DATE

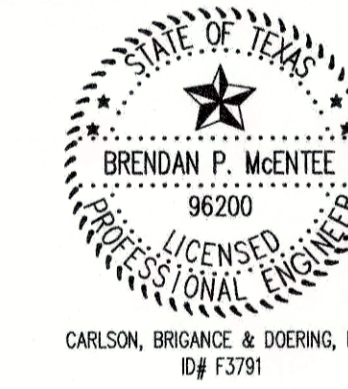
AS OWNER OF THIS PROPERTY, I PROMISE TO DEVELOP AND MAINTAIN THIS PROPERTY AS DESCRIBED BY THIS PLAN.

*[Signature]* 2/6/2020  
TYLER DUTTON, GROVE 71 PARTNERS, LP DATE

SIGNED AND SEALED CERTIFICATION OF THE LICENSED ENGINEER WHO PREPARED THE SITE DEVELOPMENT PLAN:

I BRENDAN McENTEE, DO HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE, AND ADEQUATE FOR THE INTENDED PURPOSES, INCLUDING CONSTRUCTION, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.

*[Signature]* 02/06/2020  
BRENDAN McENTEE, P.E. DATE



OWNER: GROVE 71 PARTNERS, LP-TYLER DUTTON  
3809 S. 2ND STREET, D-200  
AUSTIN, TEXAS 78704  
512 437-6404

ENGINEER: CARLSON, BRIGANCE & DOERING, INC.  
CIVIL ENGINEERING & SURVEYING  
C/O MR. BRENDAN P. McENTEE, P.E.  
12129 RANCH ROAD 620 NORTH, SUITE 600  
AUSTIN, TEXAS 78750  
(512) 280-5160

ARCHITECT: LEVY ARCHITECTS  
MICHAEL D. GIN, ARCHITECT  
2438 WEST ANDERSON LANE, SUITE B-2  
AUSTIN, TEXAS 78757  
(512) 342-9177

LANDSCAPE ARCHITECT: COLEMAN & ASSOCIATES  
MARISSA MCKINNEY, RLA  
9890 SILVER MOUNTAIN DRIVE  
AUSTIN, TEXAS 78737  
(512) 476-2090



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NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V)	CITY OF BASTROP APPROVAL/DATE	APPROVED BY

DESIGNED BY:	DRAFTED BY:	DATE:	REVISION:						
					Carlson, Brigance & Doering, Inc. Civil Engineering & Surveying FIRM ID #F3791 Main Office: 13120 N. Lamar Dr., Austin, Texas 78750 North Office: 5601 Westwood Dr., Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165				
COVER SHEET					BASTROP GROVE MEDTAIL DEVELOPMENT				
SHEET NAME:					CIVIL SITE DEVELOPMENT PLANS				
JOB NAME:					PROJECT:				
DATE:					11/25/2019				
JOB NUMBER:					5135				
SHEET:					01 OF 29				
SHEET NO.:					01				



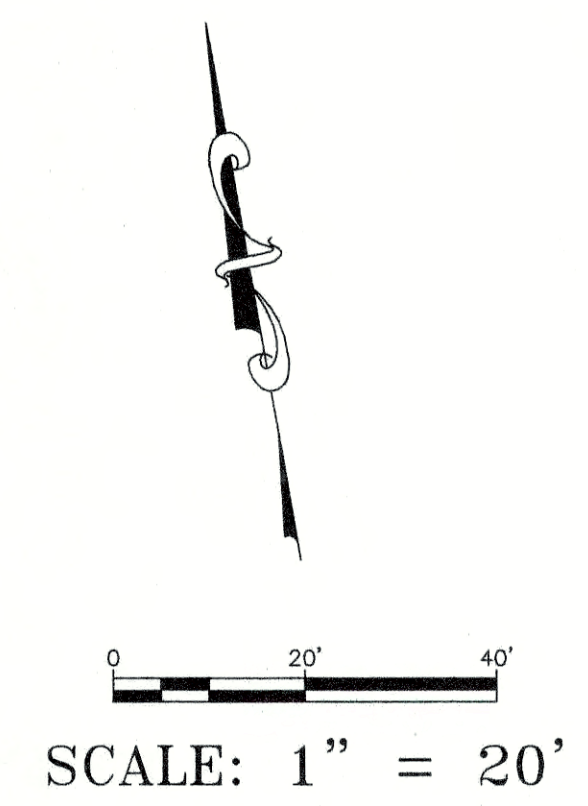




**!!! WARNING !!!:**  
 UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE A BEST ESTIMATE BASED ON RECORDS THAT COULD BE OBTAINED AND PHYSICAL FEATURES VISIBLE AT THE GROUND LEVEL. THE ENGINEER MAKES NO ASSERTIONS BEYOND THAT THEY ARE A BEST ESTIMATE AND AN ATTEMPT TO HELP IDENTIFY POSSIBLE UTILITIES IN THE AREA. THE CONTRACTOR MUST CALL ONE CALL IN ACCORDANCE WITH THE NOTES TO BETTER LOCATE ANY UNDERGROUND UTILITIES.

**WARNING!!!!**  
 REVIEW THE SEQUENCE OF CONSTRUCTION ON THE GENERAL NOTES SHEET PRIOR TO BEGINNING CONSTRUCTION.

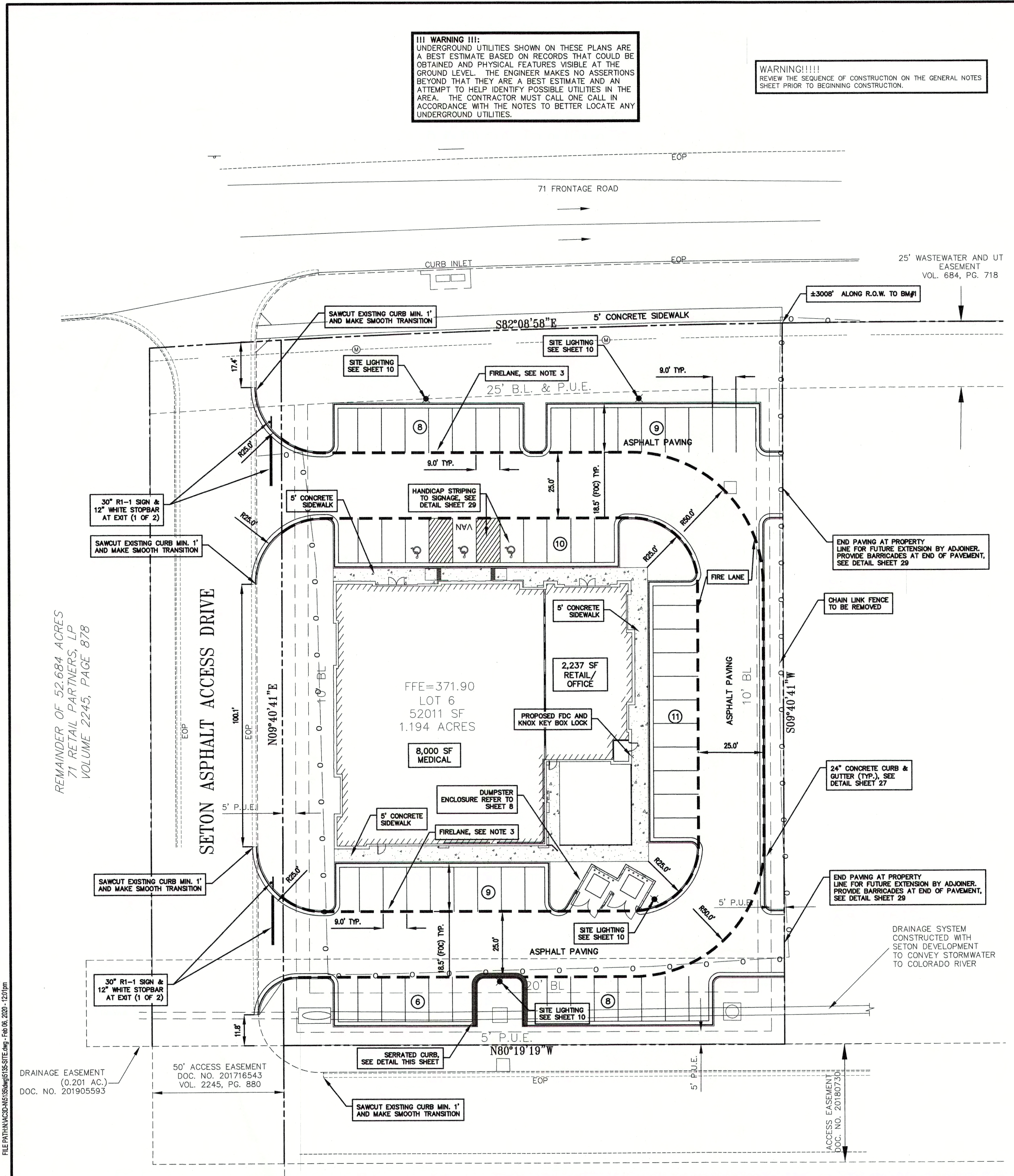
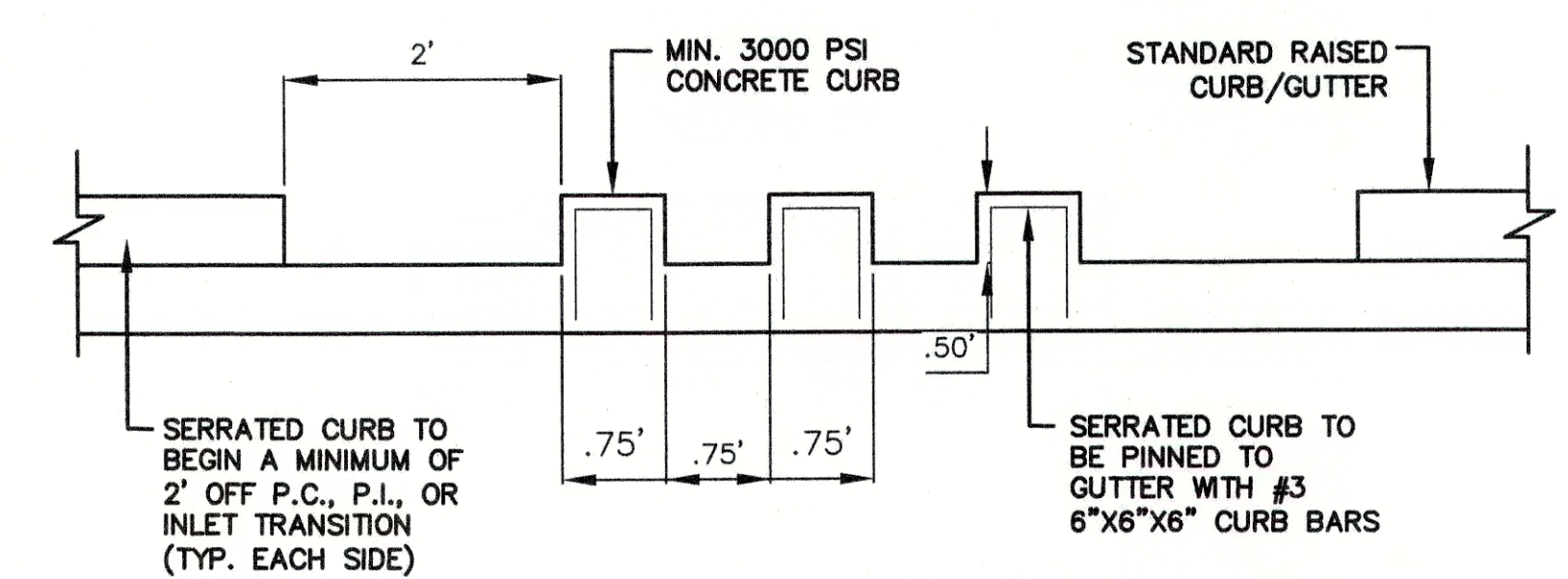
LEGEND	
---	PROPERTY LINE
OU	EXISTING OVERHEAD UTILITY
WLN	EXISTING WASTEWATER LINE
WLN	EXISTING EASEMENT/BUFFER LINE
---	FIRE LANE
⊙	EXISTING GUY WIRE
⊙	EXISTING POWER POLE
+	EXISTING SIGN-ROAD
⊙	EXISTING WASTEWATER MANHOLE
▬	SERRATED CURB
▬	WHITE STOPBAR
⊙	PARKING COUNT
⊙	SITE LIGHTING
▬	TEMPORARY BARRICADE



SITE DATA BLOCK	
LOT 6:	1.194 ACRES
	52,011 SF
ZONING:	P-5 CORE
PROPOSED BUILDING:	
MEDICAL OFFICE USE	8,000 SF
RETAIL/OFFICE	2,237 SF
TOTAL BUILDING	10,237 SF
BUILDING COVERAGE (%)	19.40
OPEN SPACE	0.45 ACRES
OPEN SPACE (%)	37.7
IMPERVIOUS COVER	0.65 ACRES
IMPERVIOUS COVER %	54.4
PARKING ANALYSIS:	
REQUIRED PARKING	
	MEDICAL 1 SPACE/200 40
	RETAIL 1 SPACE/200 11
TOTAL SPACES REQUIRED	51
	ADA ACCESSIBLE REQUIRED 3
PROPOSED PARKING	
	STANDARD PARKING 58
	HANDICAP PARKING 3
TOTAL SPACES PROPOSED	61

**GENERAL NOTES:**

- DIMENSIONS ARE TO FACE OF CURB. ALL DIMENSIONS & RADII ARE TO FACE TO FACE OF CURB IF ONE EXISTS. ALL RADII ARE 3' UNLESS OTHERWISE NOTED.
- SEE GENERAL NOTES SHEET.
- WHERE **---** IS SHOWN, PAINT CURB, OR PAVEMENT WHERE NO CURB EXISTS, 6" WIDE RED PAINT WITH "NO PARKING FIRE LANE" IN 4" TALL WHITE LETTERS. WORDING MAY NOT BE SPACED GREATER THAN 30" APART. STRIPING TO BE PAINTED ON THE FACE OF CURB WHEN PRESENT AND PAINTED FLAT ON THE PARKING SURFACE WHEN IT IS NOT.
- THE OWNER SHALL BE RESPONSIBLE FOR INSTALLATION OF TEMPORARY EROSION CONTROL, VEGETATION AND TREE PROTECTION. IN ADDITION, THE OWNER SHALL BE RESPONSIBLE FOR ANY INITIAL TREE PRUNING AND TREE REMOVAL THAT IS WITHIN TEN FEET OF THE CENTER LINE OF THE PROPOSED OVERHEAD ELECTRICAL FACILITIES DESIGNED TO PROVIDE ELECTRIC SERVICE TO THIS PROJECT. THE OWNER SHALL INCLUDE THIS WORK WITHIN THE LIMITS OF CONSTRUCTION FOR THIS PROJECT.
- THE OWNER OF THE PROPERTY IS RESPONSIBLE FOR MAINTAINING CLEARANCES REQUIRED BY THE NATIONAL ELECTRIC SAFETY CODE, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS, CITY OF BASTROP RULES AND REGULATIONS AND TEXAS STATE LAWS PERTAINING TO CLEARANCES WHEN WORKING IN CLOSE PROXIMITY TO OVERHEAD POWER LINES AND EQUIPMENT.
- ALL IMPROVEMENTS SHALL BE MADE IN ACCORDANCE WITH THE RELEASED SITE PLAN. ANY ADDITIONAL IMPROVEMENTS WILL REQUIRE A SITE PLAN AMENDMENT AND APPROVAL FROM THE PLANNING DEPARTMENT.
- APPROVAL OF THIS SITE PLAN DOES NOT INCLUDE BUILDING CODE APPROVAL; FIRE CODE APPROVAL; OR BUILDING, DEMOLITION, OR RELOCATION PERMITS APPROVAL.
- ALL SIGNS MUST COMPLY WITH THE CITY OF BASTROP SIGN CODE REQUIREMENTS AND WILL REQUIRE SEPARATE SIGN PERMIT APPLICATION AND REVIEW.
- REFER TO BUILDING PLANS FOR EXACT BUILDING DIMENSIONS, LOCATIONS OF DOORS, STOOPS, AND OTHER BUILDING APPURTENANCES. BUILDING SHOWN ON THESE PLANS IS FOR GRAPHICAL REPRESENTATION ONLY, AND SHOULD NOT BE ASSUMED TO BE ACCURATE OR EXACT.
- LEGAL ADDRESS AND BUILDING NUMBERS SHALL BE AT LEAST 8 INCHES HIGH AND VISIBLE FROM THE STREET/FIRE LANE. THE ADDRESS NUMBERS MUST BE OF A COLOR THAT CONTRASTS WITH THE BACKGROUND AND MUST BE INSTALLED ON THE SIDE OF THE BUILDING THAT FACES THE PUBLIC STREET.



REMAINDER OF 52.684 ACRES  
 71 RETAIL PARTNERS, LP  
 VOLUME 2245, PAGE 878

FILE PATH: \\MCD\GIS\505\505-SITE.dwg - Feb 08, 2020 - 12:20pm

DRAINAGE EASEMENT (0.201 AC.)  
 DOC. NO. 201905593

50' ACCESS EASEMENT  
 DOC. NO. 201716543  
 VOL. 2245, PG. 880

DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	
Carlsson, Brigrance & Doering, Inc. Civil Engineering & Surveying FIRM ID #E3791 5501 West William Cannon Dr. Austin, Texas 78749 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
<b>OVERALL SITE PLAN SHEET</b> <b>BASTROP GROVE MEDTAL DEVELOPMENT</b> CIVIL SITE DEVELOPMENT PLANS	
SHEET NAME:	
JOB NAME:	
PROJECT:	
DATE:	11/25/2019
JOB NUMBER:	5135
SHEET:	03 OF 29
SHEET NO.:	03

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**PLANT SCHEDULE**

SHADE TREES	QTY	COMMON / BOTANICAL NAME	CONT	CALIFER	HEIGHT	SPREAD
	10	CEDAR ELM ULMUS CRASSIFOLIA	65 GAL	3" CAL.	10'-12' HT.	5-6' SPFR.
	5	CHINQUAPIN OAK QUERCUS MUILENBERGII	65 GAL	3.25-3.5" CAL.	11-13' HT.	56' SPFR.
	1	SOUTHERN LIVE OAK QUERCUS VIRGINIANA	65 GAL	3" CAL.	10' HT.	6' SPFR.

SHRUBS	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
GM	12	GULF MUHLY MUILENBERGIA CAPILLARIS 'REGAL MIST'	3 GAL	36" o.c.
RY	130	RED YUCCA HESPERALOE PARVIFLORA	5 GAL	36" o.c.
DW	98	DON'S DWARF WAXMYRTLE MYRTICA CERIFERA 'DON'S DWARF'	5 GAL	36" o.c.
DY	133	DWARF YAUFLON ILEX VOMITORIA 'NANA'	5 GAL	36" o.c.

GROUNDCOVER	CODE	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
	NG	66	LANTANA 'NEW GOLD' LANTANA X 'NEW GOLD'	1 GAL	24" o.c.
	ZX	84	ZEXMANIA ZEXMENIA HISPIDA	1 GAL	12" o.c.

TURF	CODE	QTY	COMMON / BOTANICAL NAME	CONT
	SBG	AS SHOWN	SAHARA BERMUDA GRASS CYNODON DACTYLON 'SAHARA'	HYDRO

**STREET YARD**

<b>REQUIRED</b>	<b>PROVIDED</b>
TOTAL SITE AREA	52,011 S.F.
TOTAL STREET YARD AREA	18,731 S.F.
STREET YARD LANDSCAPE (15% OF STREET YARD REQUIRED)	2,811 S.F.      2,811 S.F.

**LANDSCAPE BUFFER**

10' LANDSCAPE BUFFER ADJACENT TO RIGHT-OF-WAY OF ANY MAJOR THOROUGHFARE STREET IS REQUIRED, 1 LARGE TREE PER FORTY LINEAR FEET.

<b>REQUIRED</b>	<b>PROVIDED</b>
190 LF = 5 TREES	6 TREES

**SHRUBS**

SHRUBS MUST BE PLANTED ALONG THE SIDE PROPERTY LINE FROM THE FRONT PROPERTY LINE TO THE REAR. SHRUBS MUST BE PLANTED IN SUCH A MANNER TO CREATE A DENSE HEDGE OF AT LEAST THREE FEET AT MATURITY.

**PARKING LOT LANDSCAPING**

THERE SHALL BE A LANDSCAPED AREA WITH AT LEAST ONE (1) TREE WITHIN SIXTY FEET (60') OF EVERY PARKING SPACE. THERE SHALL BE A MINIMUM OF ONE (1) TREE PLANTED IN THE PARKING AREA FOR EVERY TEN (10) PARKING SPACES WITHIN PARKING LOTS WITH MORE THAN TWENTY (20) SPACES. WITHIN PARKING LOTS, LANDSCAPE AREAS SHOULD BE LOCATED TO DEFINE PARKING AREAS AND ASSIST IN CLARIFYING APPROPRIATE CIRCULATION PATTERNS. A LANDSCAPE ISLAND SHALL BE LOCATED AT THE TERMINUS OF ALL PARKING ROWS, AND SHOULD CONTAIN AT LEAST ONE (1) TREE. ALL LANDSCAPE AREAS SHALL BE PROTECTED BY A MONOLITHIC CURB OR WHEEL STOPS AND REMAIN FREE OF TRASH, LITTER, AND CAR BUMPER OVERHANGS.

**SITE DEVELOPMENT PERMIT**

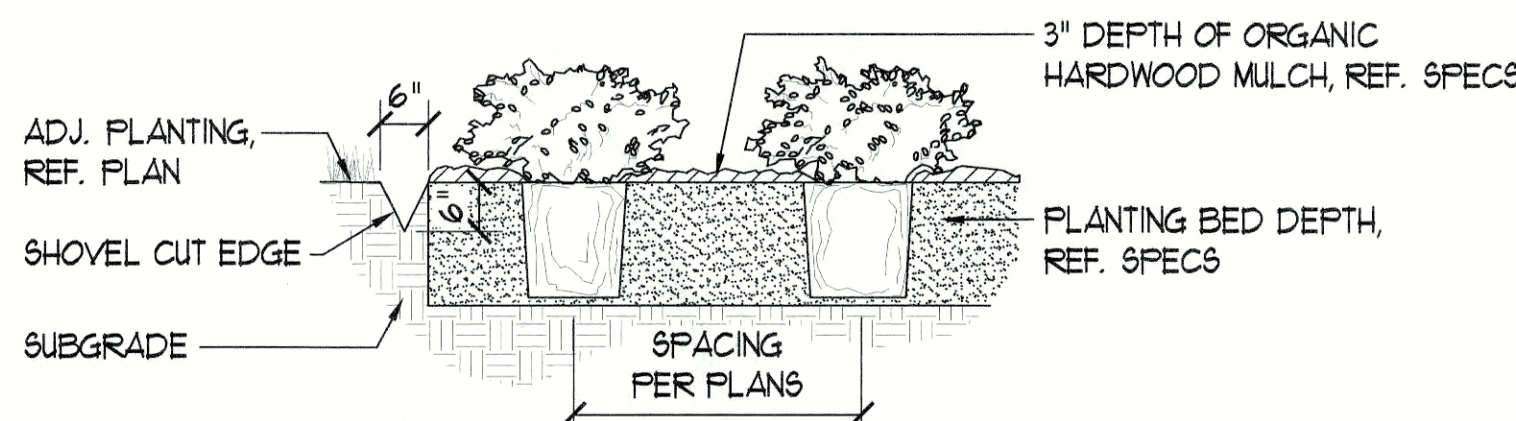
**LANDSCAPE NOTES:**

- ALL LANDSCAPED AREAS TO BE PROTECTED BY 6 INCH CURBS, WHEEL-STOPS OR OTHER APPROVED BARRIERS AS PER ECM 2.4.1(A).
- THE OWNER WILL CONTINUOUSLY MAINTAIN THE REQUIRED LANDSCAPING IN ACCORDANCE WITH DEVELOPMENT STANDARD SECTION-39.
- EXISTING TREES TO BE SAVED SHALL BE PROTECTED BY FENCING BEFORE CONSTRUCTION BEGINS. NO EQUIPMENT OR MATERIALS SHALL BE STORED OR OPERATED WITHIN THE FENCED-IN AREAS. FENCES SHALL BE AT THE DRIP LINE AND COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES. NO BURNING OF DEBRIS, CLEANING FLUIDS, CONCRETE SPILLS, ETC. WILL BE ALLOWED WITHIN THESE AREAS.
- BUFFERING OF THE STREET YARD WILL BE ACCOMPLISHED THROUGH THE COMBINATION OF TREES, SHRUBS, GRADE CHANGES, AND FENCES.
- GRADE CHANGES THAT DO NOT APPEAR ON THE SITE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT BY THE GENERAL CONTRACTOR PRIOR TO CONSTRUCTION.
- TRENCHING SHALL NOT OCCUR WITHIN THE FENCED DRIP LINE AREAS OF EXISTING TREES.
- SHRUB MATERIAL NOT TO EXCEED 36" O.C. UNLESS OTHERWISE SPECIFIED. GROUNDCOVERS NOT TO EXCEED 18" O.C. DURING THE TIME OF MARCH 15-OCTOBER 15 INSTALLATION OF HYDROMULCH SHALL BE COMMON BERMUDA OR SAHARA BERMUDA FOR OCTOBER 16 -MARCH 14 INSTALLATION OF HYDROMULCH SHALL BE ANNUAL OR PERENNIAL RYE WITH A SPRING APPLICATION OF COMMON BERMUDA OR SAHARA BERMUDA.
- ALL LAWN AREAS WITHIN THE LIMITS OF CONSTRUCTION SHALL BE RE-VEGETATED WITH BERMUDA SOD OR RYE UNLESS NATIVE RESTORATION MIX IS SPECIFIED.
- NOT MORE THAN 50% OF THE TREES AND 50% OF SHRUBS PROPOSED WILL BE OF THE SAME SPECIES.
- AN AUTOMATIC IRRIGATION SYSTEM SHALL BE INSTALLED. SEE IRRIGATION NOTES IN THESE DRAWINGS FOR REQUIREMENT.
- IF ESTABLISHING VEGETATION DURING ANY STAGE OF DROUGHT, SECTION 6-4-30 MAY REQUIRE A VARIANCE. CONTACT BASTROP WATER CONSERVATION STAFF.
- IRRIGATION PLANS REQUIRE SEPARATE PERMITS- APPROVAL OF SITE DEVELOPMENT PLAN DOES NOT CONSTITUTE APPROVAL OF ANY IRRIGATION PLANS OR ELEMENTS OF THE LANDSCAPE PLAN.

**1 SHADE TREE**

SECTION / SINGLE TRUNK

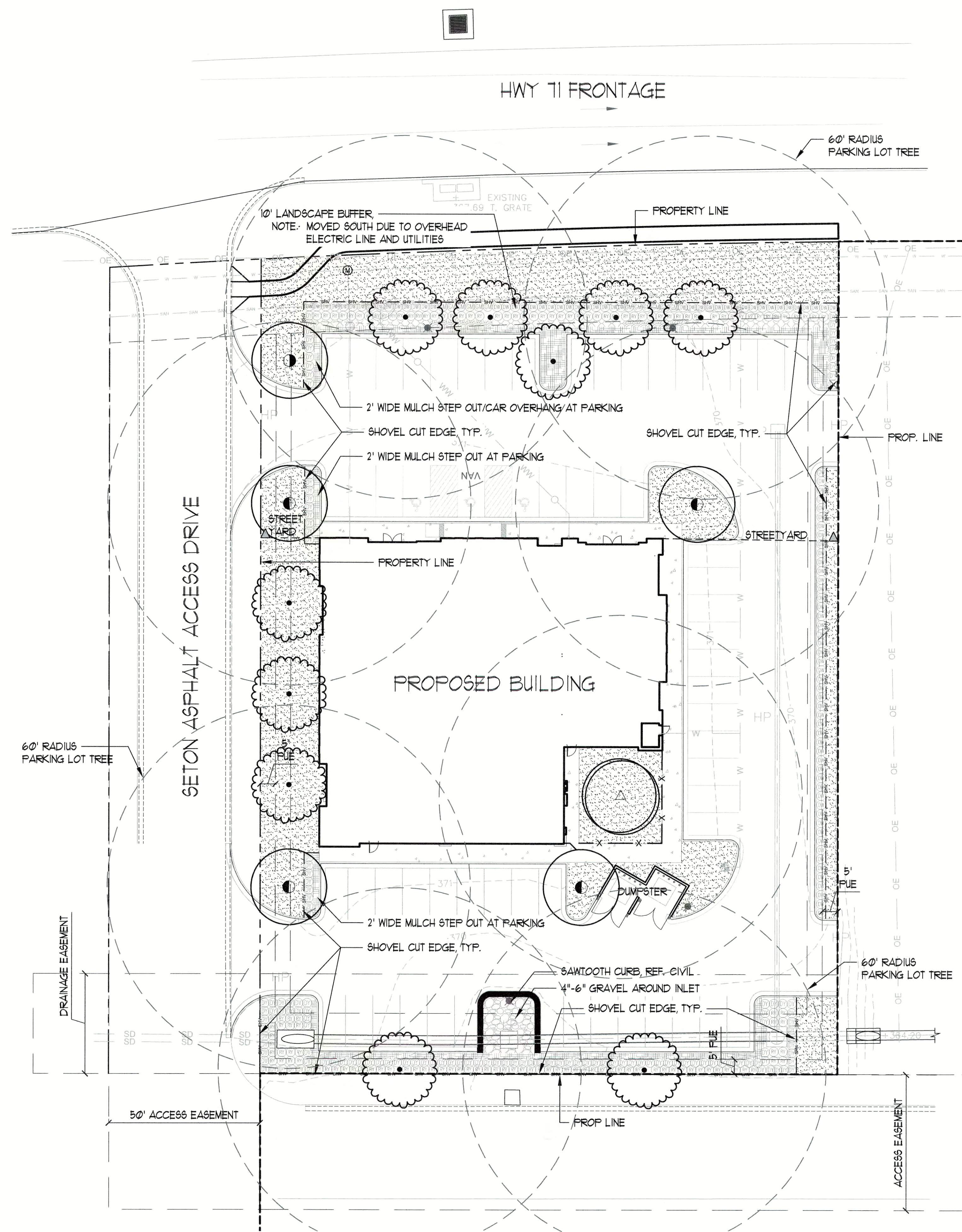
SCALE: 1/2"=1'-0"



**2 SHRUBS / SHOVEL CUT EDGE**

SECTION

SCALE: 1/2"=1'-0"

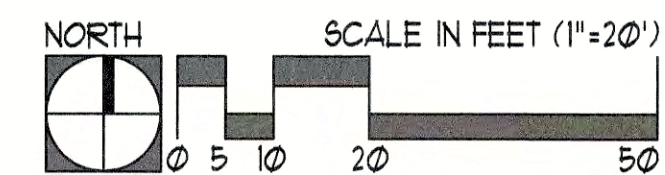


**LANDSCAPE CERTIFICATION**

I, MARISSA A. MCKINNEY, DO HEREBY CERTIFY THAT THE PLANS FOR THE DEVELOPMENT PROJECT LOCATED AT HWY 71 EAST OF 304, SATISFY THE REQUIREMENTS OF THE BASTROP CODE OF ORDINANCES, SECTION 39 AND ALL AMENDMENTS

*MariSSa McKinney*  
MARISSA MCKINNEY  
COLEMAN & ASSOCIATES

1/8/2020  
DATE



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**COLEMAN & ASSOCIATES**  
Landscape Architecture  
Environmental Design

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F: 210-482-9930

9511 Modesto Ave. NE  
Albuquerque, New Mexico 87122  
Ph: 505-433-3426



1/8/2020

LANDSCAPE PLAN AND DETAILS  
CITY SUBMITTAL

BASTROP GROVE MEDTAL DEV.  
CITY OF BASTROP  
BASTROP COUNTY, TEXAS

REVISIONS

SCALE:	AS SHOWN
DRAWN BY:	MAM
CHECKED BY:	MAM
APP. BY:	MAM
PROJECT NO.	
DATE:	1/8/2020



SHEET:

04 OF 29

**LEGEND**

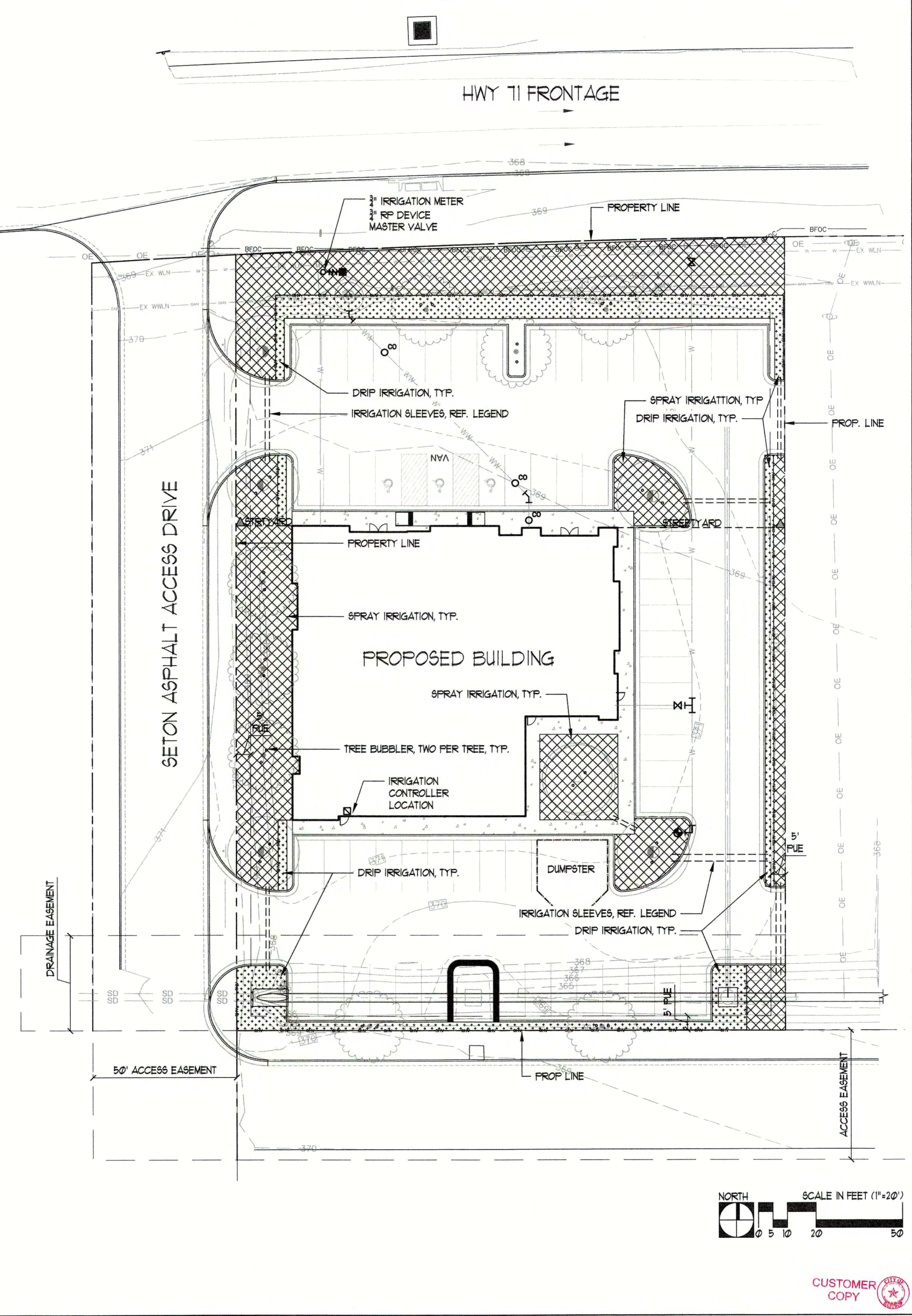
- HUNTER PROS-06-PRS30 SERIES POP UP SPRAY HEADS WITH HUNTER MSBN-50H STREAM BUBBLER NOZZLES. ( TWO PER TREE )  
SEE INSTALLATION NOTE #13 REGARDING TREE BUBBLER LATERAL PIPE
- HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH SS / ES SERIES STRIP NOZZLE UNLESS NOTED OTHERWISE.
- HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH PRO SPRAY SERIES NOZZLE AS NOTED BELOW
- NETAFIM TECHLINE TLHCVR5-12 SERIES DRIP TUBE IN NARROW TURF AREAS INSTALLED AT 4" DEPTH  
SEE INSTALLATION NOTE #17 REGARDING DRIP TUBE LAYOUT IN TURF.
- ⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL VALVE WITH ICD-100 SERIES DECODER
- ⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL, "TREE BUBBLER ZONE" VALVE WITH ICD-100 SERIES DECODER  
SEE INSTALLATION NOTE #12 REGARDING TREE BUBBLER LATERAL PIPE
- ⊕ NETAFIM LVCZ SERIES DRIP VALVE ASSEMBLY WITH PRESSURE REGULATOR AND 140 MESH FILTER  
USE MODEL LVCZS8010075-LF FOR DRIP ZONES WITH .25 TO 4.4 GPM FLOW RATE WITH PRESSURE REGULATOR MODEL #PRV075LF42V2K  
USE MODEL LVCZ10075-HFHP FOR DRIP ZONES WITH 4.5 TO 17.6 GPM FLOW RATE PRESSURE REGULATOR MODEL #PRV075HF45V2K
- ⊕ WILKINS 375 SERIES REDUCED PRESSURE TYPE BACKFLOW PREVENTOR INSTALLED PER CITY CODE  
WITH SAME SIZE BRONZE BALL VALVE AND HEATED / INSULATED ENCLOSURE INSTALLED ON THE UP-STREAM SIDE.
- IRRIGATION WATER METER AND TAP, SIZE AS NOTED ON THE PLAN
- CONTROLLER "A"  
HUNTER ACC2 DECODER SERIES TWO-WIRE CONTROLLER MODEL A2C-75D-M WITH TWO A2C-D75 MODULES AND WIRELESS SOLAR SYNC SENSOR  
LOCATE SENSOR AS FIELD DIRECTED BY THE LANDSCAPE ARCHITECT
- ▭ SURGE PROTECTION DEVICE WITH GROUNDING DEVICE TO BE SPACED NO MORE THAN 500 FEET APART ALONG PATH
- BERMAID 310 RAM SERIES "MASTER" VALVE, ICD-100 DECODER, HFS SERIES FLOW METER WITH FCT AND ICD-SEN SENSOR DECODER

- MAINLINE PIPE  
3" DIAMETER AND SMALLER SHALL BE SCHEDULE 40 PVC SOLVENT-WELD TYPE  
4" DIAMETER AND LARGER SHALL BE CLASS 200 PVC O-RING GASKET TYPE WITH DUCTILE IRON GASKET FITTINGS  
4" EQUALIZER LINE BETWEEN TANKS SHALL BE SCHEDULE 40.
- CLASS 200 ( EXCEPT 1/2 INCH #315 ) PVC LATERAL PIPE
- ONE 4" CLASS 200 SLEEVE PIPES
- TWO 4" CLASS 200 SLEEVE PIPES AT PAVEMENT CROSSINGS WITH 2 1/2" MAINLINE OR SMALLER UNLESS NOTED OTHERWISE
- ONE 8" AND ONE 4" CLASS 200 SLEEVE PIPE AT PAVEMENT CROSSINGS WITH 4" MAINLINE UNLESS NOTED OTHERWISE

L.I.C. SHALL SELECT SPRAY NOZZLES FOR "HEAD-TO-HEAD" COVERAGE, ADJUSTED FOR NO OVERSPRAY ONTO WALLS AND WALKS. NO OVERSPRAY INTO STREETS IS PERMITTED.

ALL PIPES SHALL BE SIZED TO ALLOW A MAXIMUM FLOW VELOCITY OF 5 FEET PER SECOND

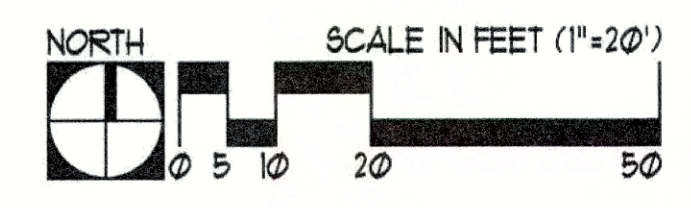
<p><b>POP-UP SPRAY HEAD</b></p>	<p><b>CONTROL ZONE KIT</b></p>	<p><b>REMOTE CONTROL VALVE</b></p>	<p><b>WALL MOUNT CONTROLLER</b></p>
<p><b>PLD-ESD - PLAN</b> PVC SUPPLY HEADER AND PVC DISCHARGE HEADER.</p>	<p><b>SLEEVING</b></p>	<p><b>DRIP TUBE</b></p>	<p><b>TREE BUBBLER</b></p>
<p><b>DRIP CENTER FEED LAYOUT</b></p>	<p><b>DRIP END FEED LAYOUT</b></p>	<p><b>MANUAL LINE FLUSH VALVE</b></p>	<p><b>DRIP ZONE INDICATOR</b></p>
<p><b>THRUST BLOCK</b></p>			<p><b>RP DEVICE</b></p>



**IRRIGATION PLAN AND DETAILS**  
CITY SUBMITTAL

**BASTROP GROVE MEDTAL DEV.**  
CITY OF BASTROP  
BASTROP COUNTY, TEXAS

REVISIONS	
SCALE	AS SHOWN
DRAWN BY	MAM
CHECKED BY	MAM
APP. BY	MAM
PROJECT NO.	
DATE	10/14/2019



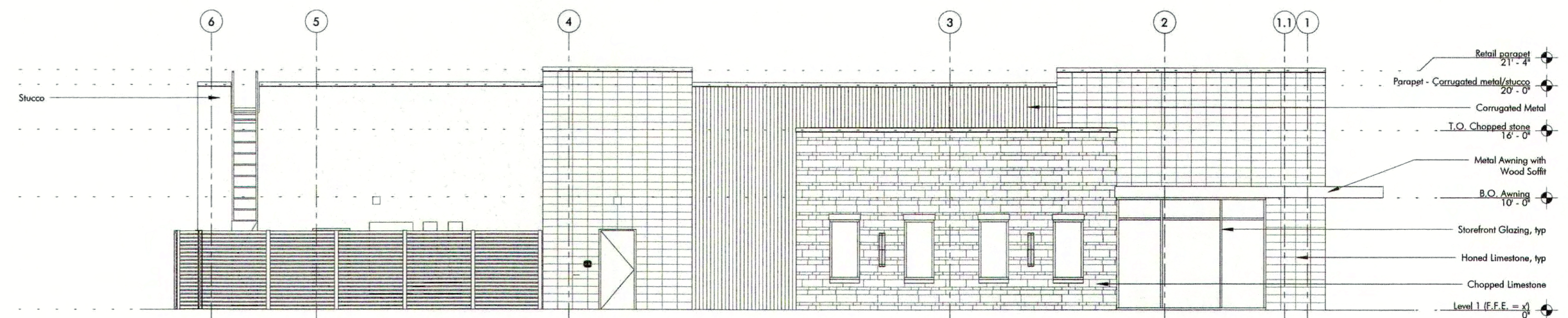
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**PRELIMINARY**

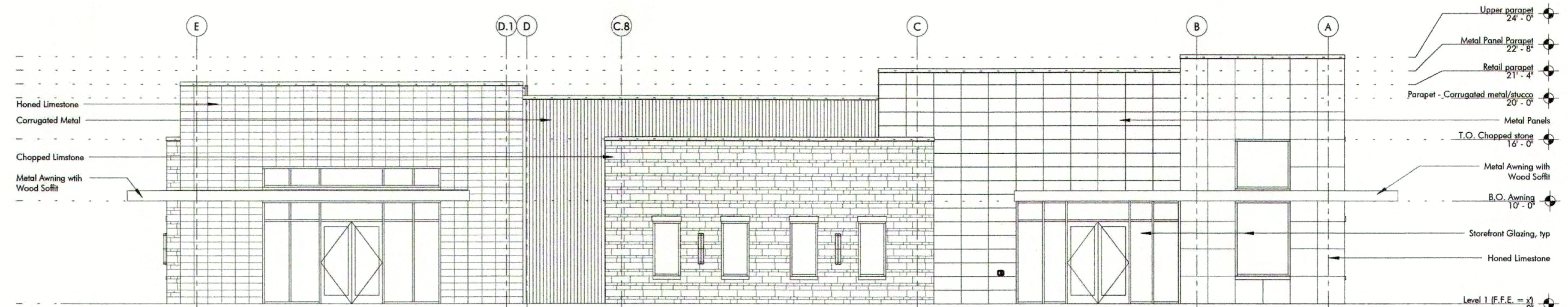
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**FIELD INSPECTION REQUIRED**

Prior to performing any bidding, new construction, and / or repairs, General Contractor shall visit the site, inspect all existing conditions, and report any discrepancies to the Architect.



**2 EAST ELEVATION**  
SCALE: 1/8" = 1'-0"



**1 NORTH ELEVATION**  
SCALE: 1/8" = 1'-0"

The Grove Medtail

Bastrop, TX 78602

#	Date	Issue

Project Number: L9007

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ELEVATIONS FOR CIVIL

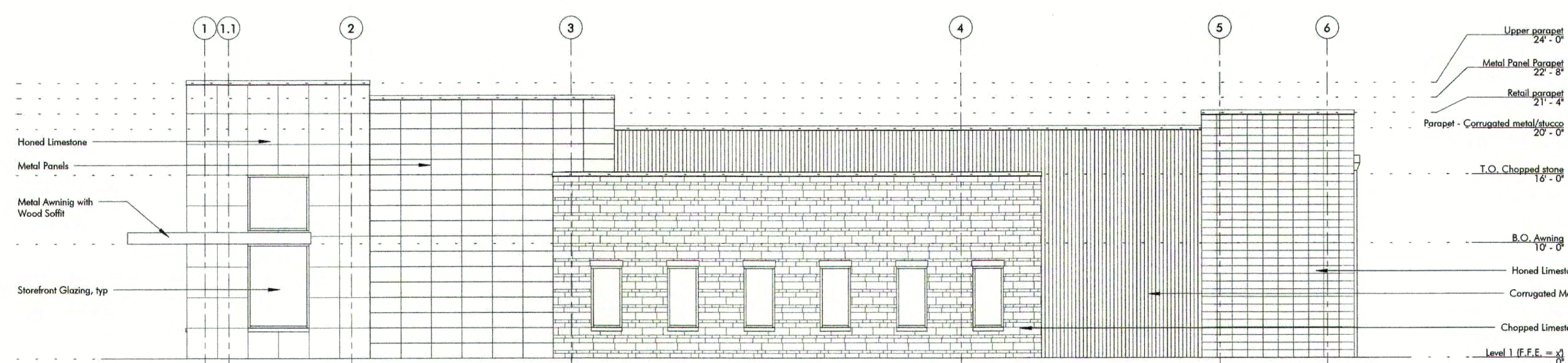


## PRELIMINARY

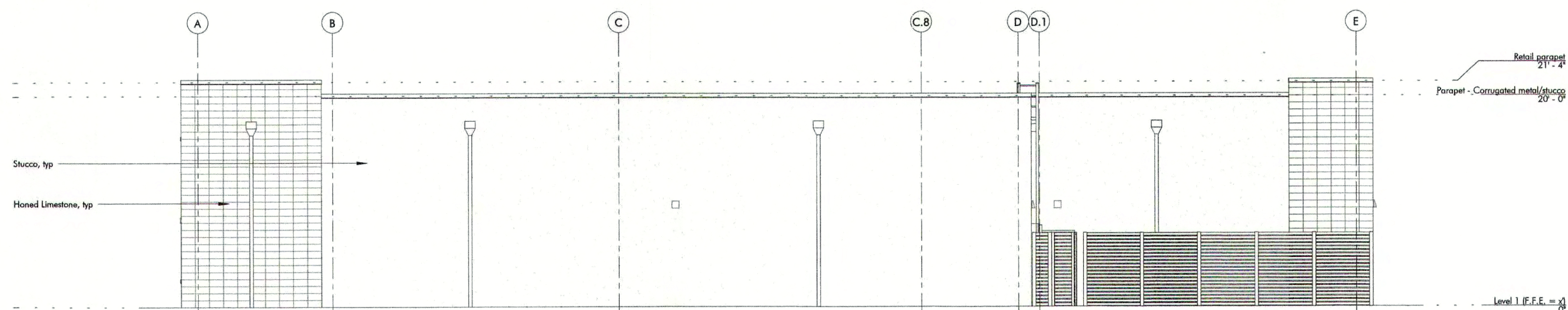
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## FIELD INSPECTION REQUIRED

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new construction, and / or repairs,  
General Contractor shall visit the site,  
inspect all existing conditions, and  
report any discrepancies to the  
Architect.



**2 WEST ELEVATION**  
SCALE: 1/8" = 1'-0"



**1 SOUTH ELEVATION**  
SCALE: 1/8" = 1'-0"

The Grove Medtail

Bastrop, TX 78602

# Date Issue

Project Number: L9007  
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ELEVATIONS FOR CIVIL

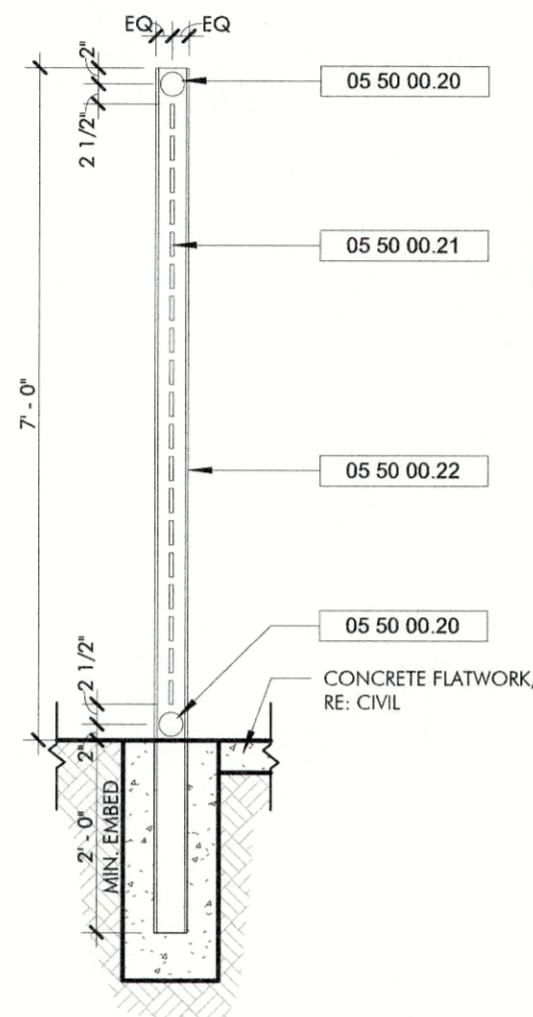
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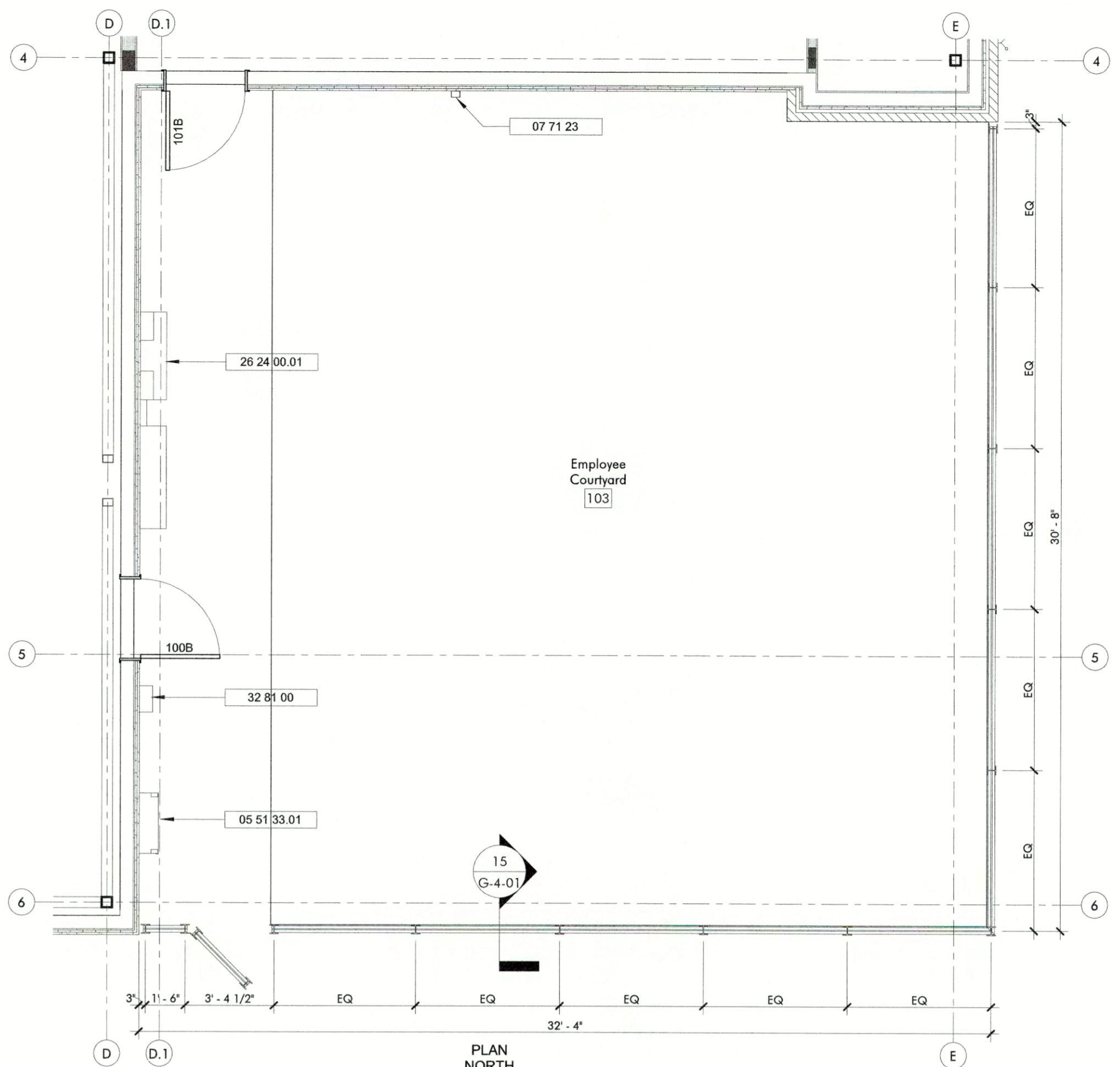
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## FIELD INSPECTION REQUIRED

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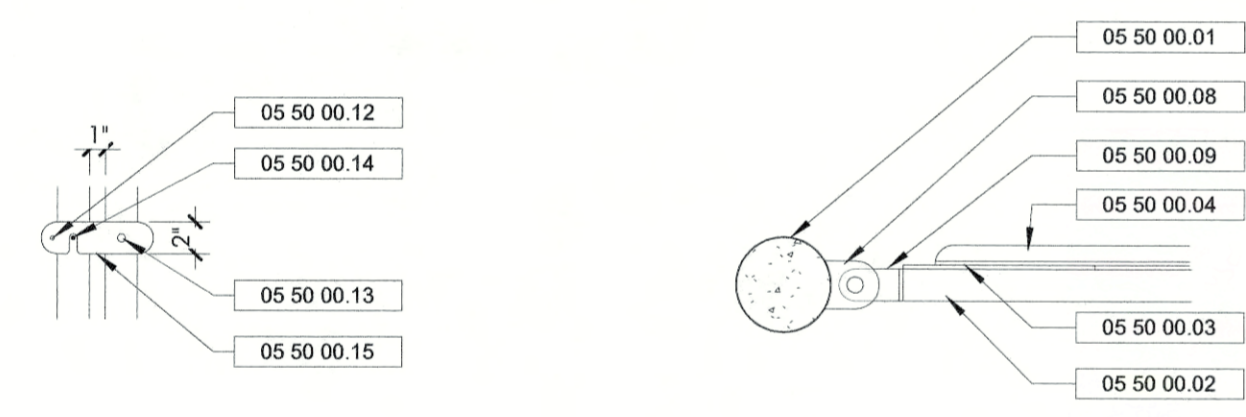
**15 SCREEN DETAIL**  
SCALE: 1/2" = 1'-0"



**7 EMPLOYEE COURTYARD**  
SCALE: 1/4" = 1'-0"

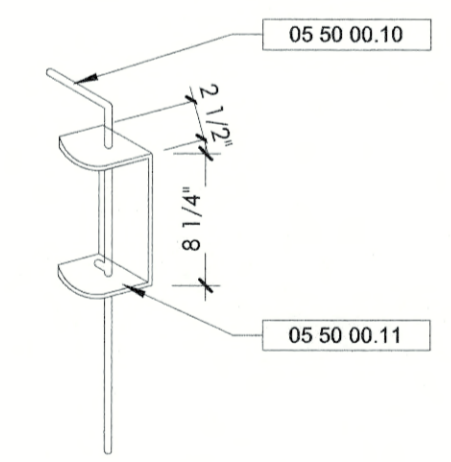
### KEY NOTES

- 04 22 00 01 REINFORCED CMU WALL WITH STUCCO FINISH TO MATCH BUILDING. INSIDE FACE OF CMU TO BE PAINTED TO MATCH THE BUILDING. RE: 17 & 18/A-600
- 05 50 00 01 6" DIA. PAINTED STEEL PIPE FILLED WITH CONCRETE. CAST BOLLARD IN CONCRETE AT A DEPTH OF 5'-0" (MIN.) BELOW DUMPSTER PAD PAVEMENT
- 05 50 00 02 15 2" X 2" X 3/8" STEEL FRAME, WELD FRAME SOLID ALL SIDES
- 05 50 00 03 1/16" STEEL PLATE CORNER BRACE, WELD BOTH SIDES
- 05 50 00 04 1" X 1" X 3/8" STEEL CROSS BRACE, WELD TO FRAME
- 05 50 00 05 L 5/8" X 1" X 1/8" STEEL BRACE, WELD TO FRAME
- 05 50 00 06 1/4" STAINLESS STEEL FASTENER
- 05 50 00 07 CORRUGATED METAL PANEL TO MATCH BUILDING
- 05 50 00 08 L 3" X 3" X 3/8" X 3" RADIUS END AS SHOWN, WELD 1/2" ROUND X 1 1/2" A325 STEEL PIVOT STUD TO BOLLARD
- 05 50 00 09 L 3" X 3" X 3/8" X 2" RADIUS END AS SHOWN, PROVIDE 9/16" HOLE, WELD TO GATE
- 05 50 00 10 1" STAINLESS STEEL ROD WITH SIDE ROD FOR LIFT OUT, PROVIDE 2" DEEP HOLE IN CONCRETE PAVING TO RECEIVE ROD
- 05 50 00 11 3/8" STEEL PLATE FABRICATED AS SHOWN, WELD TO FRAME
- 05 50 00 12 1/2" ROUND STAINLESS STEEL ROD KNOB, WELD TO LATCH
- 05 50 00 13 1/2" BOLT PIVOT, DOUBLE NUT FOR EASY PIVOT
- 05 50 00 14 1/2" STAINLESS STEEL STUD, WELD TO TUBE STEEL
- 05 50 00 15 1/8" STAINLESS STEEL PLATE LATCH ARM, FABRICATE AS SHOWN
- 05 50 00 16 GATE FRAME, RE: 17/G-4-01
- 05 50 00 17 GATE HINGE, RE: 17/G-4-01
- 05 50 00 18 CANE BOLT, RE: 17/G-4-01
- 05 50 00 20 3" DIA. STEEL RAIL, WELDED TO POST, PAINTED EP-01.1
- 05 50 00 21 3" X 1/2" STEEL BATTEN STRIPS SPACED 1" APART, WELDED TO POST, PAINTED EP-01.1
- 05 50 00 22 W4x13 PAINTED EP-01.1
- 05 51 33 01 ROOF ACCESS LADDER WITH MESH SECURITY GATE PRIMED AND FINISHED WITH EP-01.1
- 07 71 23 PRE-FINISHED MANUFACTURED SCURPPER & DOWNSPOUT, RE: PLUMBING
- 26 24 00 01 DISCONNECTS AND TENANT PANELBOARDS, RE: ELECTRICAL
- 32 30 00 01 DUMPSTER PROVIDED BY OWNER
- 32 31 00 01 DUMPSTER GATE, RE: 10/G-4-01
- 32 81 00 IRRIGATION CONTROL BOX, RE: LANDSCAPE

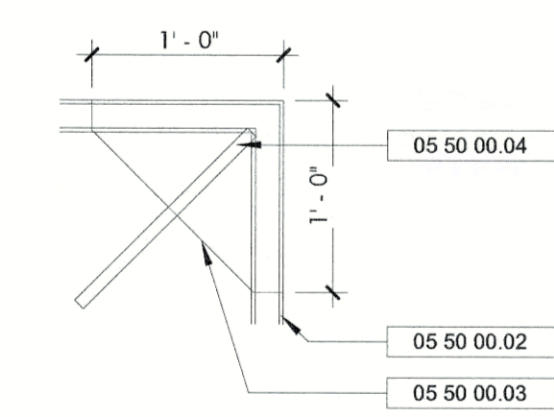


DETAIL E - GATE LATCH

DETAIL C - GATE HINGE

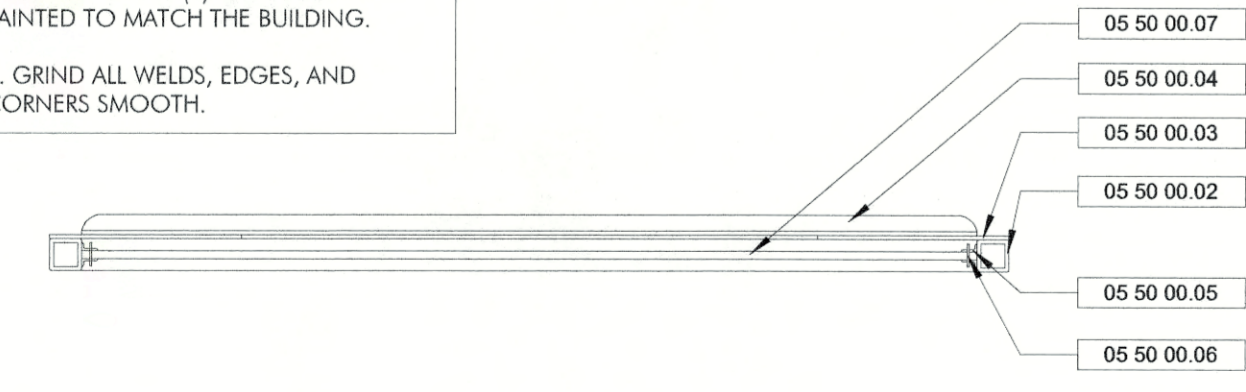


DETAIL D - CANE BOLT



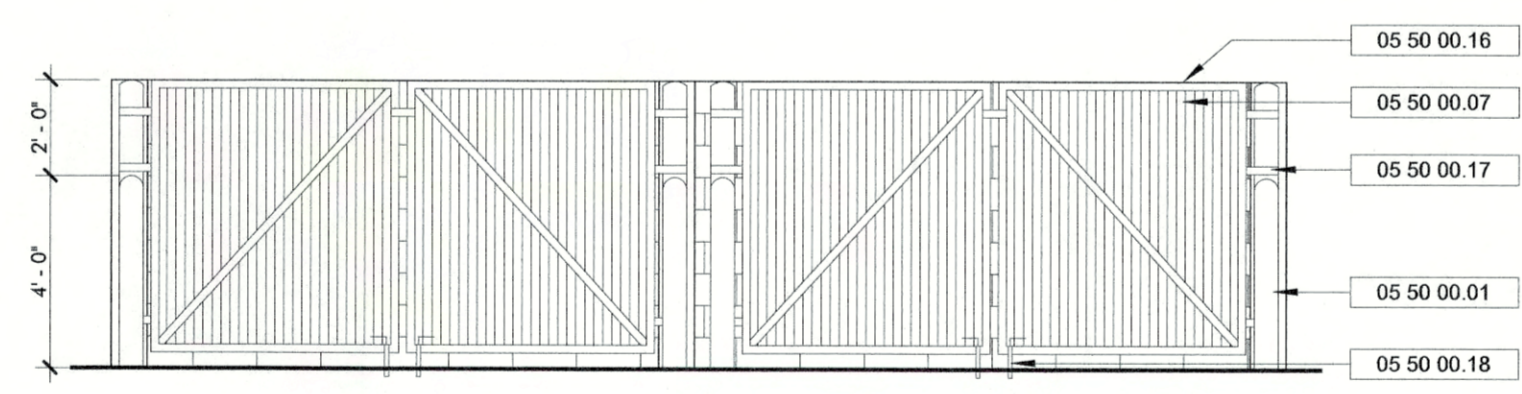
DETAIL B - FRAME ELEVATION

NOTE:  
1. ALL STEEL SHALL BE PAINTED WITH (1) PRIME COAT AND (2) FINISH COATS PAINTED TO MATCH THE BUILDING.  
2. GRIND ALL WELDS, EDGES, AND CORNERS SMOOTH.

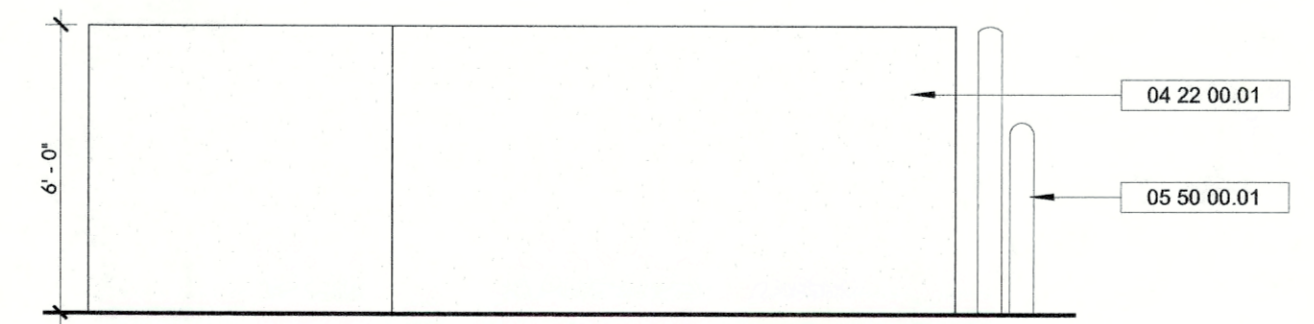


DETAIL A - GATE PLAN

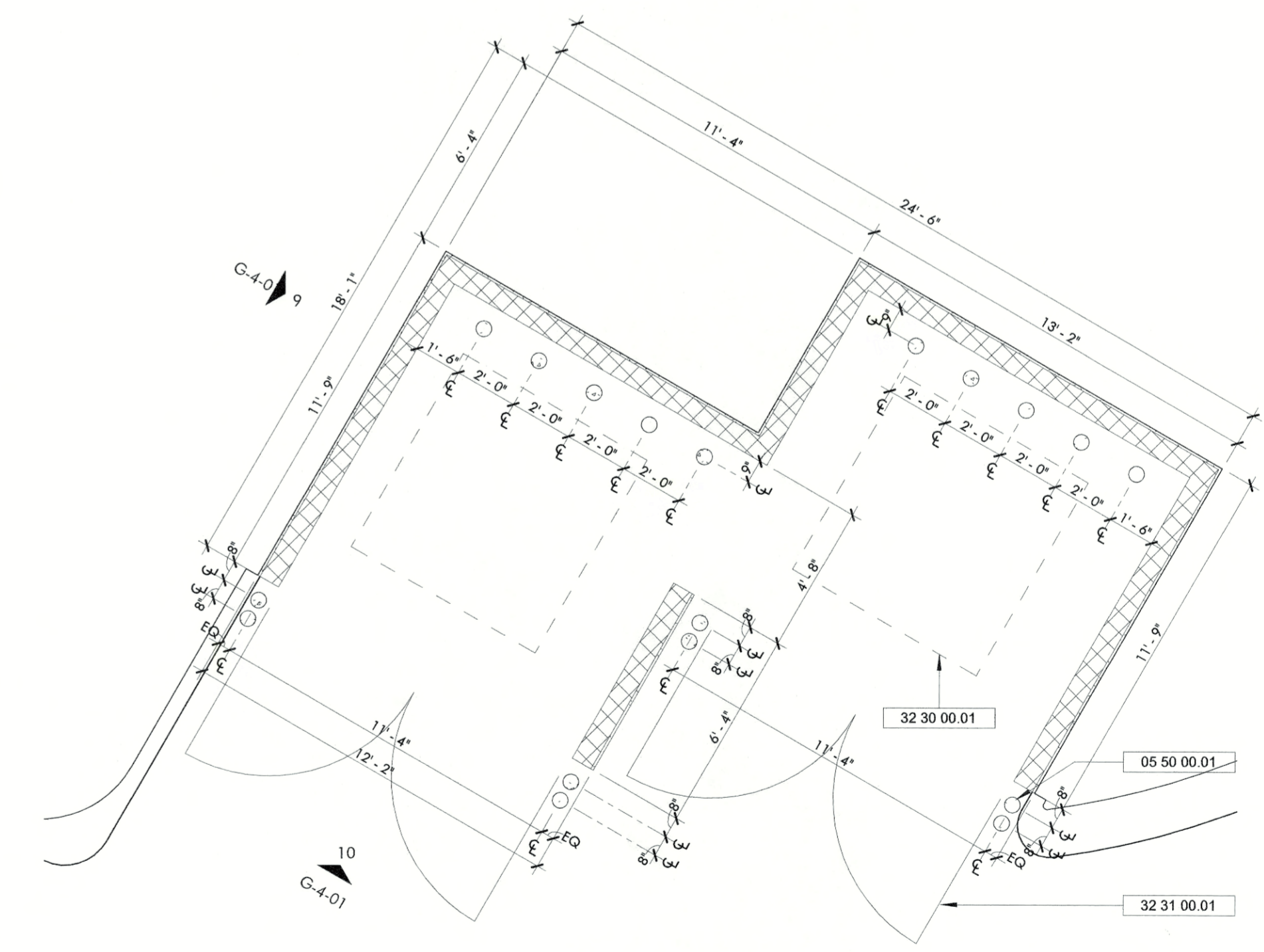
**17 DUMPSTER GATE - DETAILS**  
SCALE: 1" = 1'-0"



**10 DUMPSTER - GATE**  
SCALE: 1/4" = 1'-0"



**9 DUMPSTER - SIDE**  
SCALE: 1/4" = 1'-0"

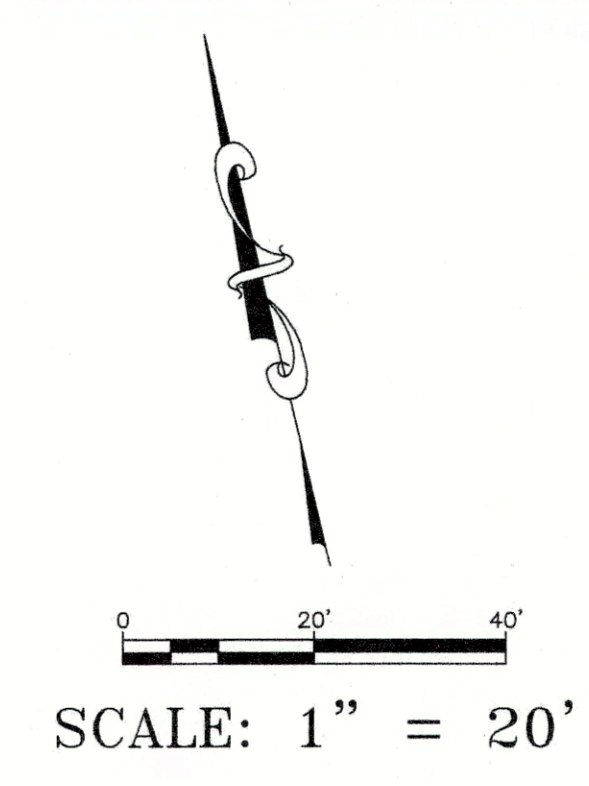
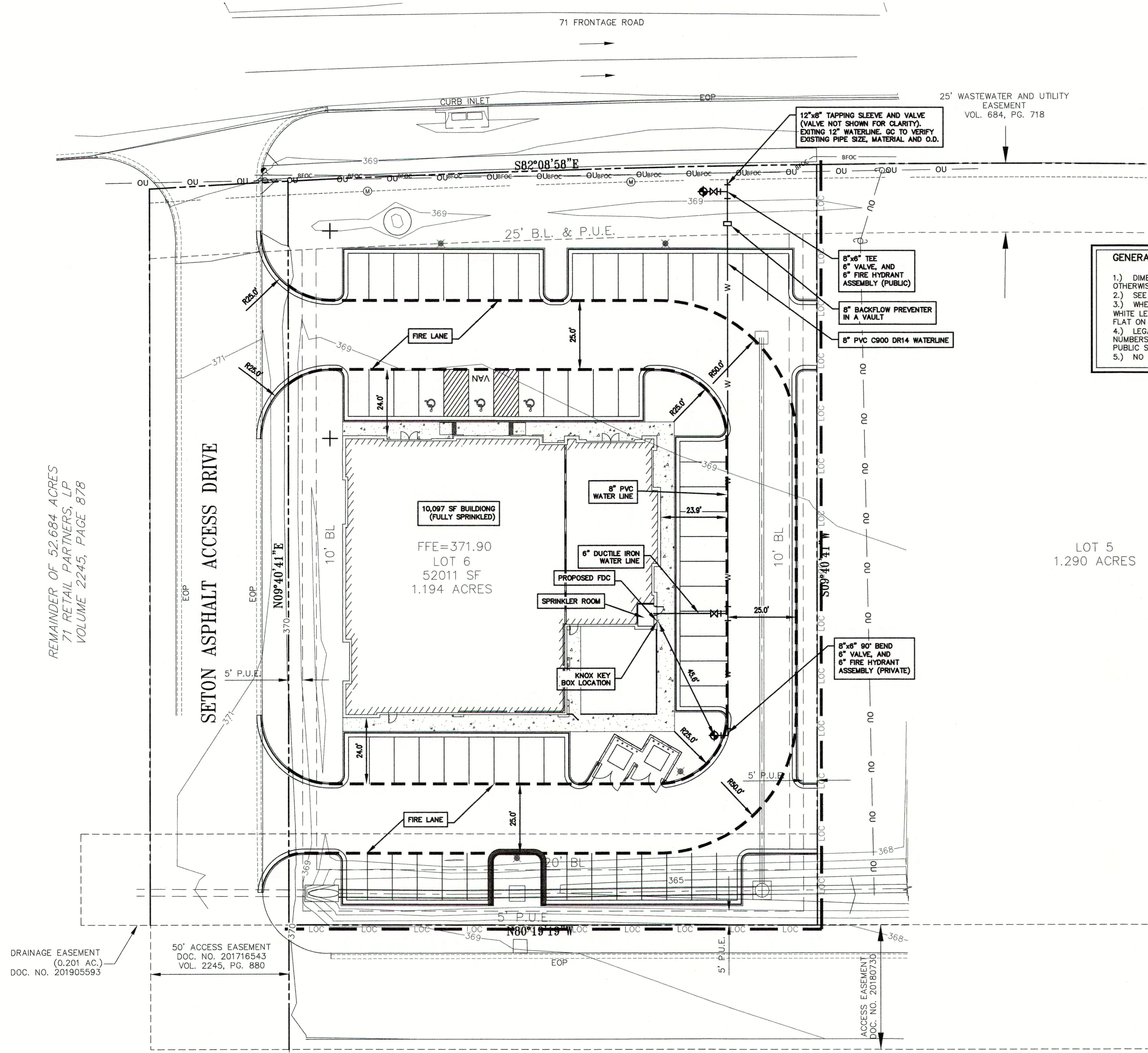


PLAN NORTH

**1 DUMPSTER ENCLOSURE**  
SCALE: 1/4" = 1'-0"

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REMAINDER OF 52.684 ACRES  
71 RETAIL PARTNERS, LP  
VOLUME 2245, PAGE 878



**GENERAL NOTES:**

- 1.) DIMENSIONS ARE TO FACE OF CURB. ALL DIMENSIONS & RADII ARE TO FACE TO FACE OF CURB IF ONE EXISTS. ALL RADII ARE 3' UNLESS OTHERWISE NOTED.
- 2.) SEE GENERAL NOTES SHEET.
- 3.) WHERE IS SHOWN, PAINT CURB, OR PAVEMENT WHERE NO CURB EXISTS, 6" WIDE RED PAINT WITH "NO PARKING FIRE LANE" IN TALL WHITE LETTERS. WORDING MAY NOT BE SPACED GREATER THAN 30" APART. STRIPING TO BE PAINTED ON THE FACE OF CURB WHEN PRESENT AND PAINTED FLAT ON THE PARKING SURFACE WHEN IT IS NOT.
- 4.) LEGAL ADDRESS AND BUILDING NUMBERS SHALL BE AT LEAST 8 INCHES HIGH AND VISIBLE FROM THE STREET/FIRE LANE. THE ADDRESS NUMBERS MUST BE OF A COLOR THAT CONTRASTS WITH THE BACKGROUND AND MUST BE INSTALLED ON THE SIDE OF THE BUILDING THAT FACES THE PUBLIC STREET
- 5.) NO FUEL TANKS OR DIESEL FUEL GENERATORS ARE PROPOSED.

BASTROP FIRE DEPARTMENT	
FIRE DESIGN CODES	2018 INTERNATIONAL FIRE CODE WITH APPENDICES AND LOCAL AMENDMENTS
FIRE FLOW DEMAND @ 20 psi	2,250 gpm - 2 hr DURATION
INTENDED USE	BUSINESS (GROUP B)
CONSTRUCTION CLASSIFICATION	TYPE II-B
BUILDING FIRE AREA (S.F.)	10,237 sf
AUTOMATIC FIRE SPRINKLER SYSTEM TYPE (IF APPLICABLE)	NFPA 13
REDUCED FIRE FLOW DEMAND @ 20 psi FOR HAVING A SPRINKLER SYSTEM (gpm) (IF APPLICABLE)	1,500 gpm - 2 hr DURATION
FIRE HYDRANT FLOW TEST DATE	12/05/2019
FIRE HYDRANT FLOW TEST LOCATION	ONE MAIN FINANCIAL 696 HIGHWAY 71
ALTERNATIVE METHOD OF COMPLIANCE AMOC (IF APPLICABLE)	N/A

DESIGNED BY:	DRAWN BY:
DATE	
REVISION	

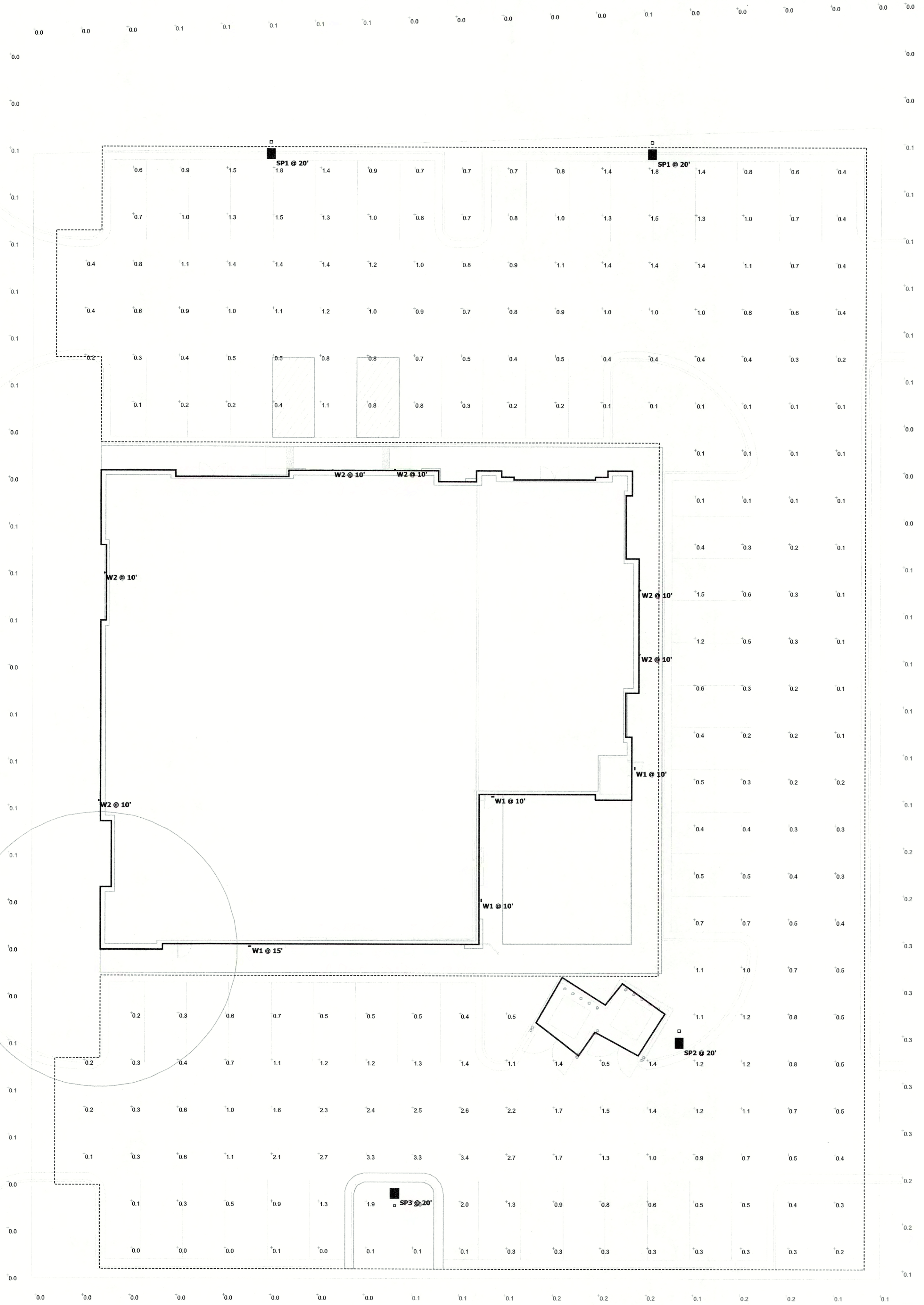
Carlson, Brigrance & Doering, Inc.  
Civil Engineering & Surveying  
FIRM ID #E3791  
Main Office: 5501 West Chatham Street, Suite 200, Austin, Texas 78754  
North Office: 6600 North Loop West, Suite 200, Houston, Texas 77049  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

SHEET NAME: FIRE ACCESS AND CONTROL PLAN SHEET  
JOB NAME: BASTROP GROVE METAL DEVELOPMENT  
PROJECT: CIVIL SITE DEVELOPMENT PLANS

Carlson, Brigrance & Doering, Inc.  
Brendan P. Mentee  
02/06/2020

DATE	11/25/2019
JOB NUMBER	5135
SHEET	09 OF 29
SHEET NO.	09

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Plan View  
Scale - 1" = 14'

EXTERIOR LIGHTING FIXTURE SCHEDULE

TYPE	COUNT	DESCRIPTION	MANUFACTURER	CATALOG NO.	LUMENS	COLOR TEMP.	INPUT WATTS	VOLTS	MOUNTING	REMARKS
SP1	2	LED POLE LIGHT	LITHONIA	DSXD LED P2 40K TFFM MVOLT SPA HS SSS 18 4C DM19AS DDBXD	6007	4000K	49W	MVOLT	POLE	FULLY SHIELDED, NO UP LIGHTING
SP2	1	LED POLE LIGHT	LITHONIA	DSXD LED P2 40K TSM MVOLT SSS 18 4C DM19AS DDBXD	6007	4000K	49W	MVOLT	POLE	FULLY SHIELDED, NO UP LIGHTING
SP3	1	POLE LIGHT	LITHONIA	DSXD LED P3 40K BLC MVOLT SSS 18 4C DM19AS DDBXD	6926	4000K	71W	MVOLT	POLE	FULLY SHIELDED, NO UP LIGHTING
W1	4	WALL PACK	BEGA	33 242 K4	1893	4000K	18W	MVOLT	SURFACE	FULLY SHIELDED, NO UP LIGHTING
W2	6	WALL SCONCE	OBERON	WS-W45726 3000K BK 35	1027	4000K	35W	MVOLT	SURFACE	FIXTURE LUMEN OUTPUT IS BELOW 2050 LUMENS AND DOES NOT REQUIRE FULL CUT OFF PER CODE

- NOTES:
1. WHETHER INDICATED IN CATALOG NUMBER OR NOT, CONTRACTOR TO PROVIDE ALL NECESSARY ACCESSORIES AND MOUNTING HARDWARE REQUIRED FOR A COMPLETE INSTALLATION.
  2. COORDINATE FIXTURE COLOR SELECTION WITH ARCHITECT PRIOR TO PURCHASE.
  3. LEDs SHALL MEET THE FOLLOWING MIN SPECS IN ADDITION TO THE REQUIREMENTS SHOWN ELSEWHERE:
    - a. 50,000 HOUR RATED, MIN CRI = 80 (FOR INTERIOR LIGHTING), 1 TO 10V DIMMABLE.
    - b. LAMP CCT SHALL CONFORM TO ANSI C78.377A COLOR BINNING AND UTILIZE 4 STEP MACADAM ELLIPSE ALGORITHM BINNING PROCESS
  4. LED DRIVERS SHALL MEET THE FOLLOWING MIN SPECS IN ADDITION TO THE REQUIREMENTS SHOWN ELSEWHERE:
    - a. THD LESS THAN 10%, POWER FACTOR GREATER THAN 90%
    - b. TOTAL INSTALLED LUMENS 38691

Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Parking Lot	+	0.5 fc	3.4 fc	0.0 fc	N/A	N/A
Property Line	+	0.1 fc	0.3 fc	0.0 fc	N/A	N/A



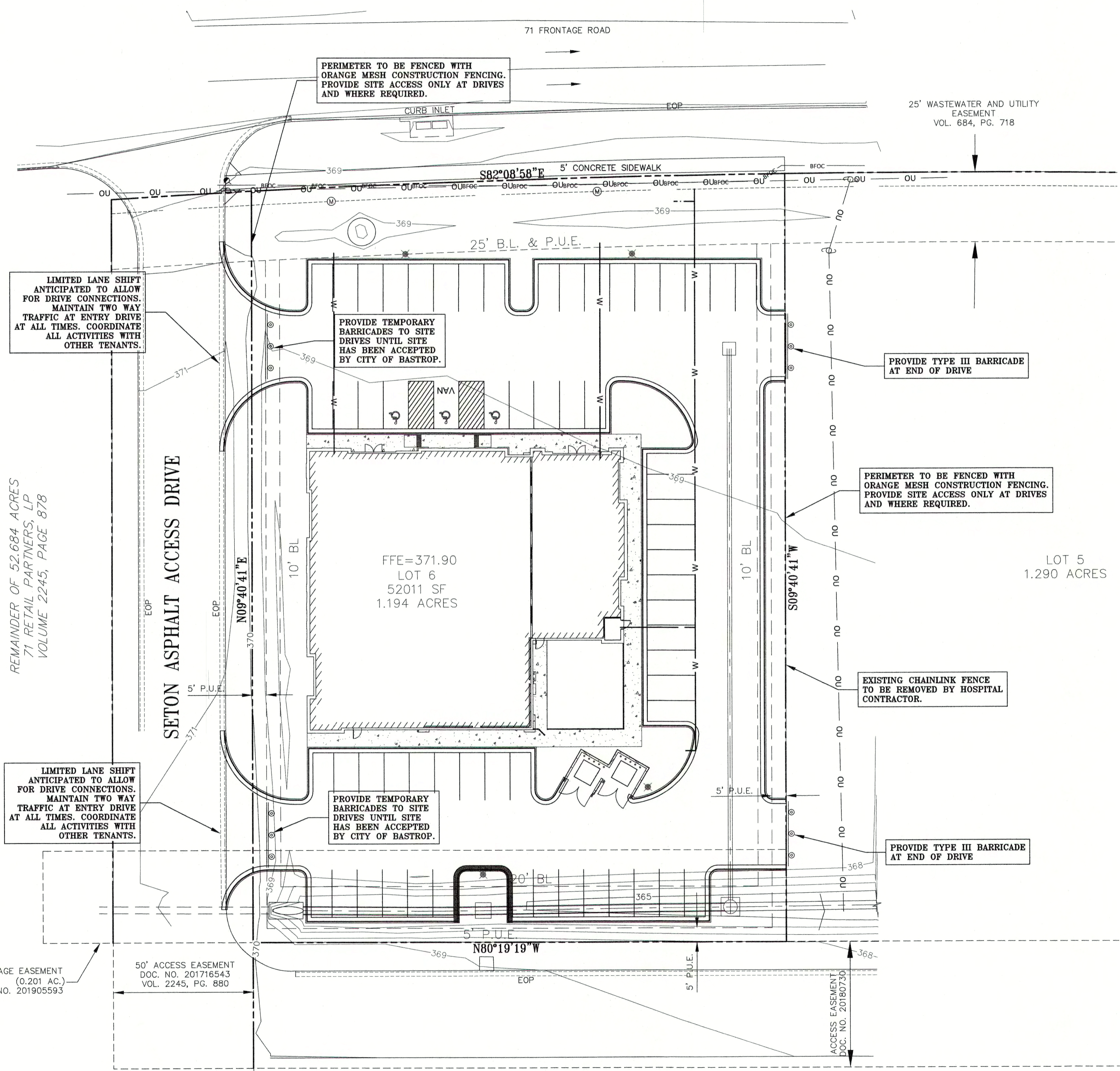
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REMAINDER OF 52.684 ACRES  
71 RETAIL PARTNERS, LP  
VOLUME 2245, PAGE 878

DRAINAGE EASEMENT  
(0.201 AC.)  
DOC. NO. 201905593

50' ACCESS EASEMENT  
DOC. NO. 201716543  
VOL. 2245, PG. 880

ACCESS EASEMENT  
DOC. NO. 20180730



LEGEND	
---	PROPERTY LINE
OU	EXISTING OVERHEAD UTILITY
WLN	EXISTING WASTEWATER LINE
WLN	EXISTING EASEMENT/BUFFER LINE
---	FIRE LANE
⊙	EXISTING GUY WIRE
⊕	EXISTING POWER POLE
⊕	EXISTING SIGN-ROAD
⊕	EXISTING WASTEWATER MANHOLE
▬	SERRATED CURB
▬	WHITE STOPBAR
⊗	PARKING COUNT
⊗	SITE LIGHTING
⊗	TEMPORARY BARRICADE

SCALE: 1" = 20'

PERIMETER TO BE FENCED WITH ORANGE MESH CONSTRUCTION FENCING. PROVIDE SITE ACCESS ONLY AT DRIVES AND WHERE REQUIRED.

25' WASTEWATER AND UTILITY EASEMENT VOL. 684, PG. 718

LIMITED LANE SHIFT ANTICIPATED TO ALLOW FOR DRIVE CONNECTIONS. MAINTAIN TWO WAY TRAFFIC AT ENTRY DRIVE AT ALL TIMES. COORDINATE ALL ACTIVITIES WITH OTHER TENANTS.

PROVIDE TEMPORARY BARRICADES TO SITE DRIVES UNTIL SITE HAS BEEN ACCEPTED BY CITY OF BASTROP.

PROVIDE TYPE III BARRICADE AT END OF DRIVE

PERIMETER TO BE FENCED WITH ORANGE MESH CONSTRUCTION FENCING. PROVIDE SITE ACCESS ONLY AT DRIVES AND WHERE REQUIRED.

EXISTING CHAINLINK FENCE TO BE REMOVED BY HOSPITAL CONTRACTOR.

LIMITED LANE SHIFT ANTICIPATED TO ALLOW FOR DRIVE CONNECTIONS. MAINTAIN TWO WAY TRAFFIC AT ENTRY DRIVE AT ALL TIMES. COORDINATE ALL ACTIVITIES WITH OTHER TENANTS.

PROVIDE TEMPORARY BARRICADES TO SITE DRIVES UNTIL SITE HAS BEEN ACCEPTED BY CITY OF BASTROP.

PROVIDE TYPE III BARRICADE AT END OF DRIVE

- TRAFFIC CONTROL NOTES:**
1. NO PUBLIC LANE CLOSURES ARE ANTICIPATED AS A RESULT OF THIS PROJECT.
  2. NO PEDESTRIAN ROUTE IMPACTS ARE ANTICIPATED AS NO AREA SIDEWALKS EXIST.
  3. ENTIRE PROJECT AREA TO BE FENCED WITH SILT FENCE PER THE EROSION CONTROL PLAN AS WELL AS ORANGE MESH CONSTRUCTION GRADE FENCING.

DESIGNED BY:	DRAPED BY:
DATE:	
REVISION:	
SHEET NAME: TRAFFIC CONTROL & PEDESTRIAN SAFETY SHEET JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT PROJECT: CIVIL SITE DEVELOPMENT PLANS	
DATE: 11/25/2019 JOB NUMBER: 5135 SHEET: 11 OF 29 SHEET NO.: 11	

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# BASTROP GROVE MEDTAIL DEVELOPMENT

LOT 6 - BASTROP GROVE

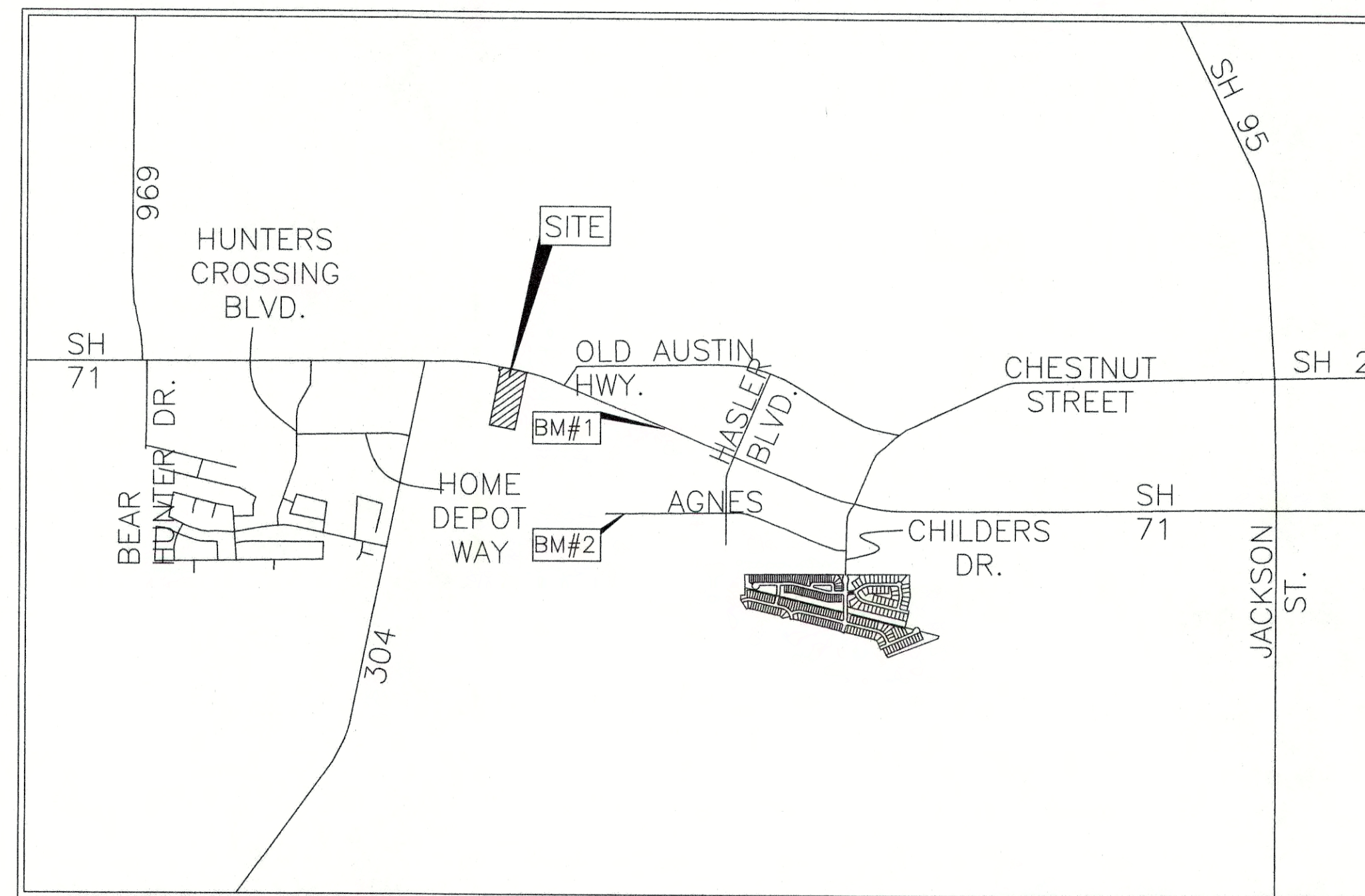
CITY OF BASTROP

FINAL MASTER DRAINAGE PLAN SUBMITTAL

BASTROP COUNTY, TEXAS

## SHEET INDEX

SHEET #	SHEET TITLE
01	COVER SHEET
02	HYDROLOGY SHEET
03	GRADING SHEET
04	STORM PROFILE
05	EROSION CONTROL
06	EROSION CONTROL DETAILS



LOCATION MAP  
(NOT TO SCALE)

**BENCHMARKS:**

- #1 TXDOT MON. BRASS DISC IN CONCRETE, 44' WEST OF THE NORTH-EASTERN PROPERTY CORNER.
- #2 MAG NAIL IN PAVEMENT ON AGNES ST. 500' SOUTH OF THE PROPERTY BOUNDARY

**GENERAL NOTES:**

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED WITH THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

THIS PROJECT IS LOCATED IN THE COLORADO RIVER WATERSHED.

NO PORTION OF THIS TRACT IS WITHIN THE BOUNDARIES OF THE 100-YEAR FLOOD PLAIN OF ANY WATERWAY THAT IS WITHIN THE LIMITS OF STUDY OF THE FEDERAL FLOOD INSURANCE ADMINISTRATION FIRM MAP NO. 48021CO335E, DATED JANUARY 19, 2006, BASTROP COUNTY, TEXAS. BASTROP COUNTY COMMUNITY NO. 481193.



REVIEWED BY:

CITY OF BASTROP ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

APPROVED BY:

CITY OF BASTROP PLANNING \_\_\_\_\_ DATE \_\_\_\_\_

DATE \_\_\_\_\_

OWNER: KPG COMMERCIAL-TYLER DUTTON  
3809 S. 2ND STREET, D-200  
AUSTIN, TEXAS 78704  
512 437-6404

ENGINEER: CARLSON, BRIGANCE & DOERING, INC.  
CIVIL ENGINEERING & SURVEYING  
C/O MR. BRENDAN P. MCENTEE, P.E.  
12129 RANCH ROAD 620 NORTH, SUITE 600  
AUSTIN, TEXAS 78750  
(512) 280-5160

**UTILITY PROVIDERS:**

- ELECTRIC: BLUEBONNET ELECTRIC (979) 542-3151
- GAS: CENTER POINT ENERGY (830) 643-6936
- PHONE: AT&T (512) 870-1450
- WATER: CITY OF BASTROP (512) 332-8830
- WASTEWATER: CITY OF BASTROP (512) 332-8830
- CABLE: SPECTRUM (855) 243-8892



Final Drainage Plan Approved

11/22/19

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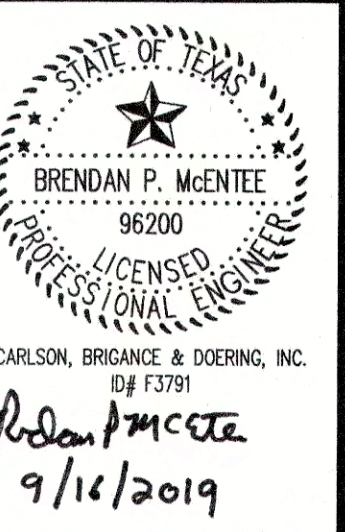
NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V)	CITY OF BASTROP APPROVAL/DATE	APPROVED BY

DESIGNED BY:	DRAWN BY:
DATE	
REVISION	

Carlson, Brigance & Doering, Inc.  
Civil Engineering & Surveying  
FIRM ID #F3791  
Main Office: 5501 West William Cannon Dr., Austin, Texas 78750  
North Office: 12129 RR 620 N., Suite 600, Austin, Texas 78750  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

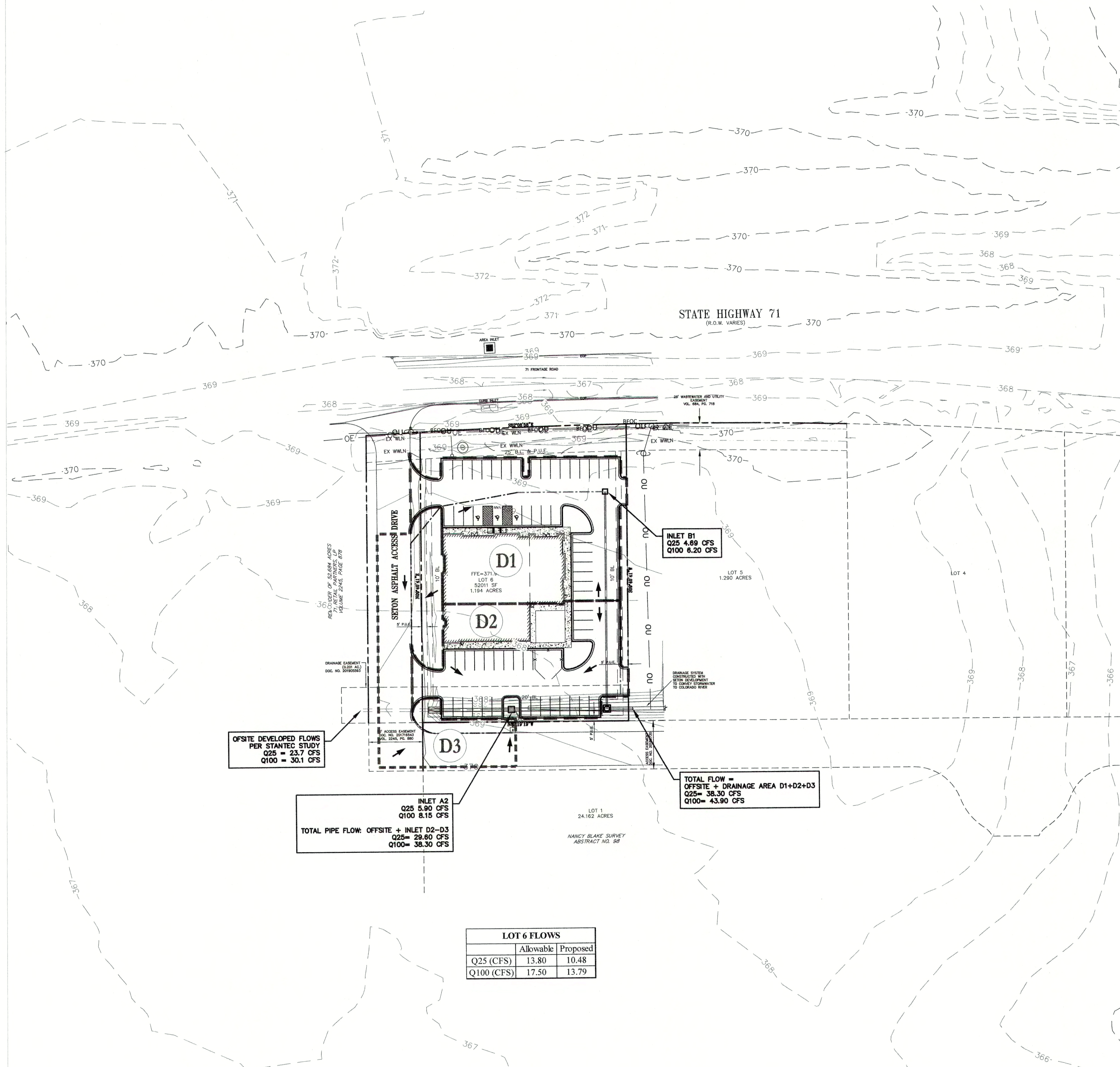


SHEET NAME: COVER  
JOB NAME: BASTROP GROVE MEDTAIL DEVELOPMENT  
PROJECT: FINAL MASTER DRAINAGE PLAN SUBMITTAL



DATE: 9/16/2019  
JOB NUMBER: 5135  
SHEET: 12 OF 29  
SHEET NO.: 12

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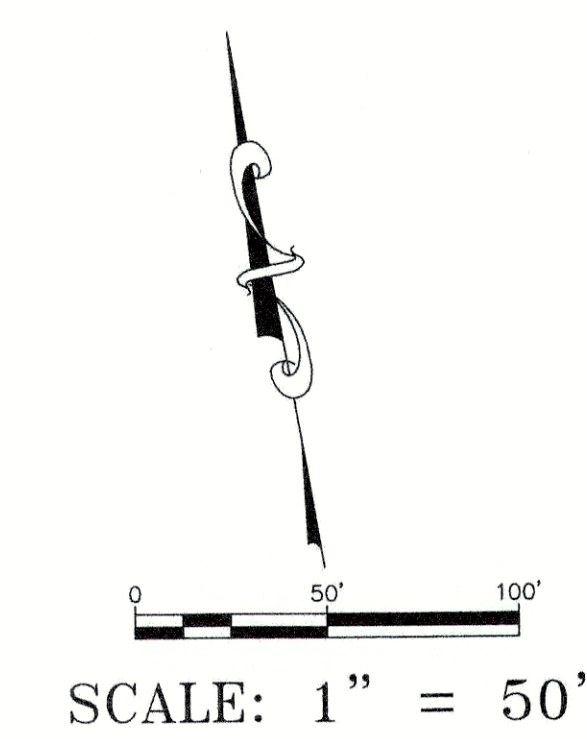
OFFSITE DEVELOPED FLOWS PER STANTEC STUDY  
 Q25 = 23.7 CFS  
 Q100 = 30.1 CFS

INLET A2  
 Q25 5.90 CFS  
 Q100 8.15 CFS

TOTAL PIPE FLOW: OFFSITE + INLET D2-D3  
 Q25 = 29.60 CFS  
 Q100 = 38.30 CFS

TOTAL FLOW = OFFSITE + DRAINAGE AREA D1+D2+D3  
 Q25 = 38.30 CFS  
 Q100 = 43.90 CFS

LOT 6 FLOWS		
	Allowable	Proposed
Q25 (CFS)	13.80	10.48
Q100 (CFS)	17.50	13.79



LEGEND	
<b>D3</b>	DRAINAGE AREA #
-----	DRAINAGE BNDY
-----	TIME OF CONCENTRATION SHALLOW FLOW
-----	TIME OF CONCENTRATION SHEET FLOW
-----	TIME OF CONCENTRATION CHANNEL FLOW
→	FLOW ARROW

Rainfall Intensity, $I = b/(T+d)^a$			
Design Year	b	d	e
2-yr	67	13.3	0.841
10-yr	87	11.1	0.805
25-yr	100	10.8	0.793
100-yr	130	11.3	0.784

Source: Table 2-3, City of Bastrop Drainage Design Manual

Surface Description	Design Year			
	2-year	10-year	25-year	100-year
Asphaltic	0.95	0.95	1	1
Concrete/Roof	0.95	0.95	1	1
Lawns/Sandy Soil				
Flat (0-2%)	0.1	0.11	0.12	0.125
Average (2-7%)	0.15	0.165	0.18	0.1875
Steep, (over 7%)	0.2	0.22	0.24	0.25
Commercial/Industrial				
Light areas	0.7	0.77	0.84	0.875
Heavy areas	0.8	0.88	0.96	1
Parks, cemeteries	0.25	0.275	0.3	0.3125

Source: City of Bastrop Stormwater Drainage Design Manual

Time of Concentration Computations		Existing	Developed		
			D1	D2	D3
Sheet flow [Tc1 = 0.007*(L1 * n1)^0.8 / (P2^0.5 * s1^0.4)]	L1	100	100	43	44
	n1	0.2	0.011	0.011	0.011
	S1	0.010	0.011	0.012	0.012
	Time (min)	15.70	1.46	0.73	0.74
Shallow Flow: Unpaved [Tc3= L3 / (60(16.1345) * s3^0.5)] Paved [Tc3= L3 / (60(20.3282) * s3^0.5)]	L2	87	79	209	0
	n2	0.2	0.011	0.011	0.2
	S2	0.015	0.011	0.013	0.011
	Time (min)	0.74	0.61	1.50	0.00
Channel Flow	L3	151	0	0	284
	Assumed V	6	0	0	6
	S3	0.008	0	0	0.012
	Time (min)	0.42	0.00	0.00	0.73
<b>Total Time of Concentration</b>		<b>16.86</b>	<b>10.00</b>	<b>10.00</b>	<b>10.00</b>

Design Storm	Area Desc.	Existing	Developed				
			D1	D2	D3	D2+D3	D1+D2+D3
2-year	Drainage Area	1.194	0.534	0.422	0.358	0.780	1.315
	Tc (min)	16.86	10.00	10.00	10.00	10.00	10.00
	Intensity (in/hr)	3.82	4.74	4.74	4.74	4.74	4.74
	C	0.10	0.93	0.65	0.89	0.76	0.84
	Q (cfs)	0.5	2.3	1.3	1.5	2.82	5.23
10-year	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
	Intensity (in/hr)	5.96	7.47	7.47	7.47	7.47	7.47
	C	0.10	0.93	0.65	0.89	0.84	0.84
	Q (cfs)	0.7	3.7	2.1	2.4	4.89	8.24
	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
25-year	Intensity (in/hr)	7.19	9.01	9.01	9.01	9.01	9.01
	C	0.11	0.97	0.69	0.93	0.84	0.88
	Q (cfs)	0.9	4.69	2.63	3.02	5.90	10.48
	Tc (min)	16.9	10.0	10.0	10.0	10.00	10.00
	Intensity (in/hr)	9.49	11.82	11.82	11.82	11.82	11.82
100-year	C	0.13	0.98	0.70	0.94	0.88	0.89
	Q (cfs)	1.4	6.2	3.5	4.0	8.15	13.79

**BASTROPTX**  
 Heart of the Lost Pines  
 Est. 1892

Final Drainage  
 Plan Approved

*[Signature]*  
 11/22/19

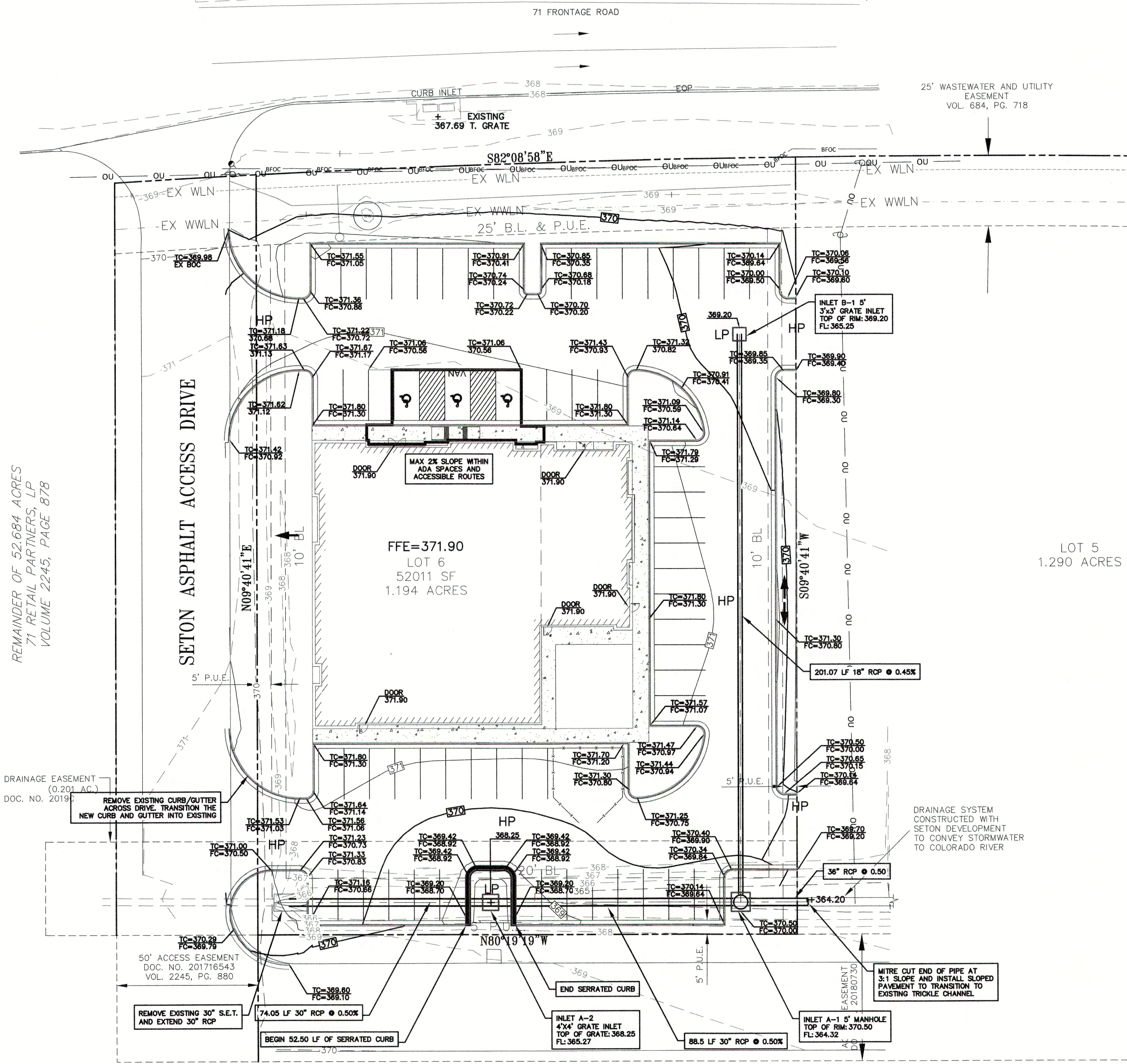
**GRATE INLET CALCULATIONS**

Orifice equation:  $Q_i = Q_o = C_d A \sqrt{2gh}$  (Equation 10-31, TxDOT Hydraulic Design Manual)  
 Opening Area of the Grate,  $A_g = \text{Area} \times \text{Clogging Factor} \times \text{Grate Factor}$   
 Orifice Coefficient,  $C_d = 0.67$   
 $g = 32.17 \text{ ft/s}^2$   
 P-1-7/8-4 Grate Opening Ratio = 0.8 (Fig. 4-13, Austin, TX Drainage Criteria Manual)

Inlet Name	Design Q <sub>25</sub> (CFS)	Design Q <sub>100</sub> (CFS)	Inlet Size	Clogging Factor	Grate Factor	A <sub>g</sub> (sq. ft.)	Grate EL	h <sub>25</sub>	Head <sub>25</sub>	h <sub>100</sub>	Head <sub>100</sub>	Allowable h (ft)	Inlet Capacity, Q <sub>max</sub> (CFS)
B1	4.69	6.16	3' x 3'	0.5	0.8	3.6	369.2	0.059	369.26	0.10	369.30	0.5	13.68
A2	5.90	8.15	4' x 4'	0.5	0.8	6.4	368.25	0.029	368.28	0.06	368.31	0.5	24.32

DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	
Carlson, Brigrance & Doering, Inc. Civil Engineering & Surveying North Office: 12129 RR 620 N., Ste. 600, Austin, Texas 78750 Main Office: 5501 West William Cannon Dr., Austin, Texas 78749 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
HYDROLOGY SHEET BASTROP GROVE MEDICAL DEVELOPMENT FINAL MASTER DRAINAGE PLAN SUBMITTAL	
SHEET NAME:	PROJECT:
JOB NAME:	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	13 OF 29
SHEET NO.:	13

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LEGEND	
---	EXISTING MAJOR CONTOUR
---	EXISTING MINOR CONTOUR
---	PROPOSED MAJOR CONTOUR
---	PROPOSED MINOR CONTOUR
→	FLOW ARROW
TC=XXX.XX FC=XXX.XX	TOP OF CURB ELEVATION FACE OF CURB ELEVATION
□	PROPOSED GRATE INLET
○	PROPOSED STORM MANHOLE
HP	HIGH POINT
LP	LOW POINT
---	PROPOSED STORM SEWER
---	PROPOSED 24" CURB & GUTTER

SCALE: 1" = 20'

**BASTROPTX**  
Heart of the Lost Pines  
Est. 1832  
Final Drainage  
Plan Approved  
11/22/19

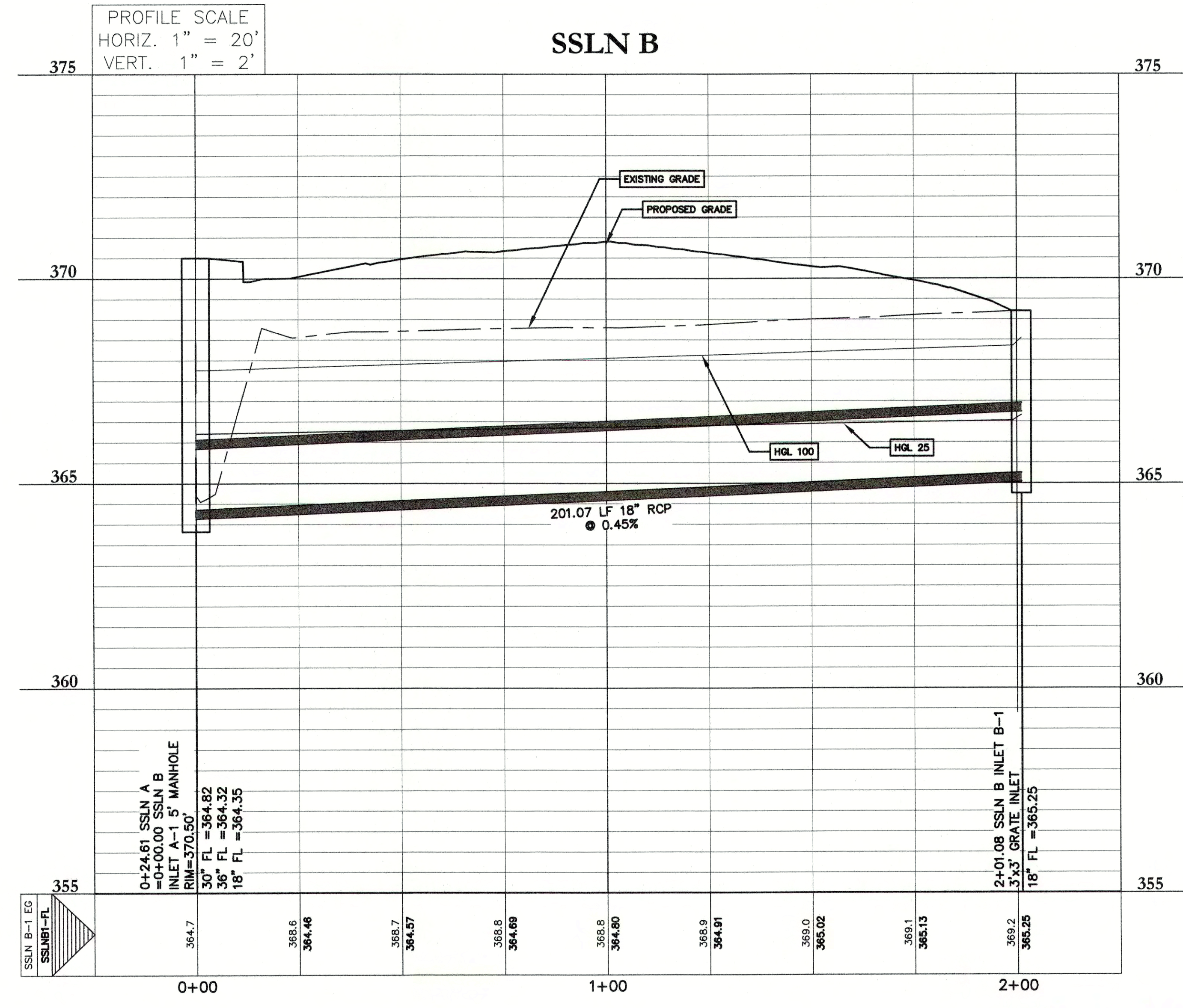
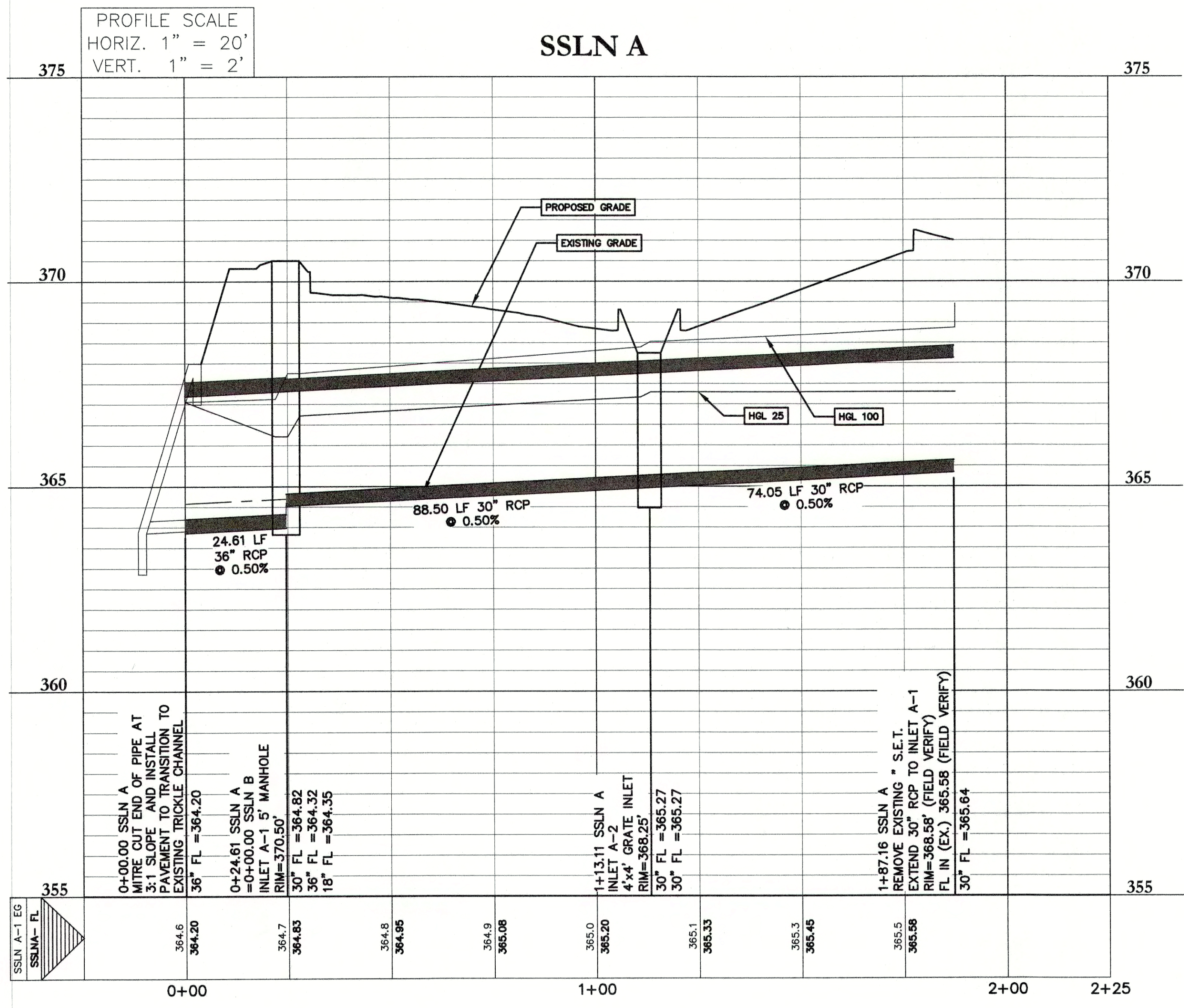
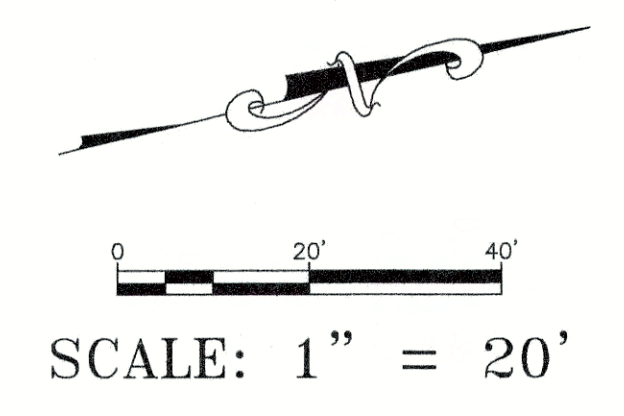
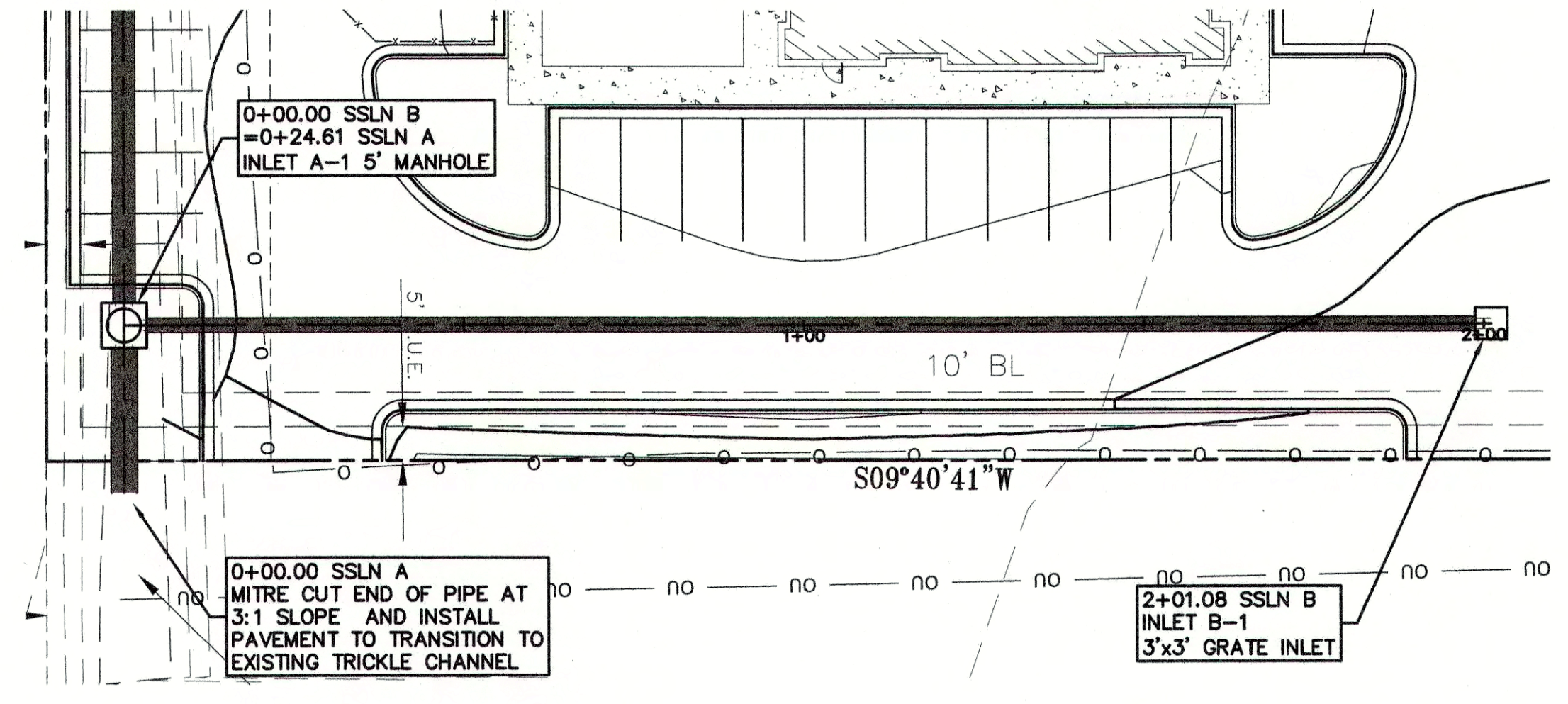
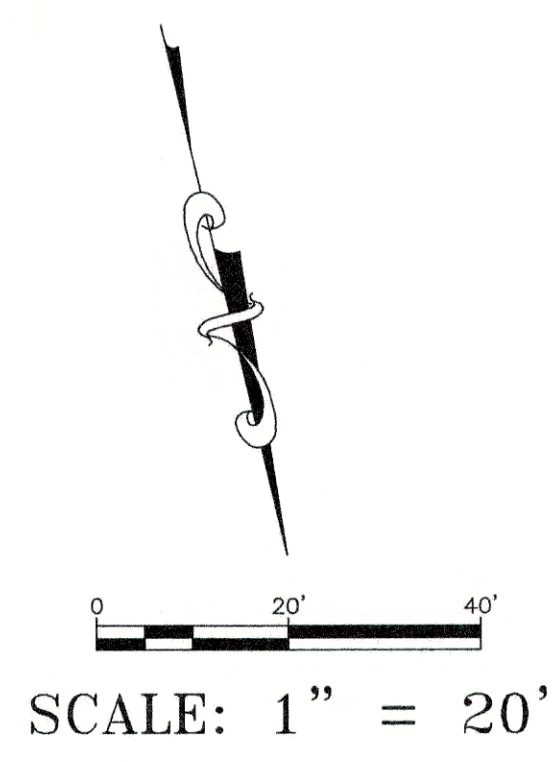
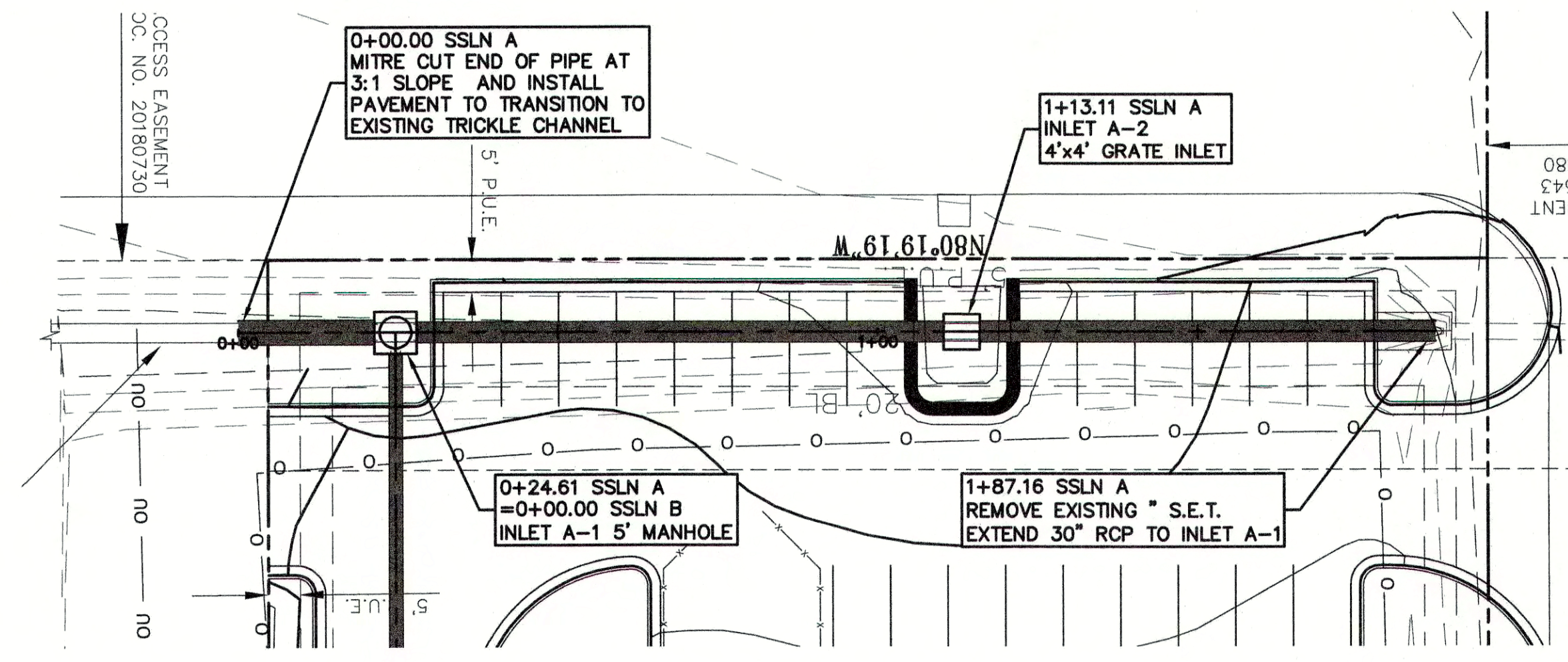
- GRADING NOTES:**
- UNLESS OTHERWISE SPECIFIED, ALL FINISHED EARTHEN SLOPES ARE TO BE FINE GRADED TO PROVIDE A RELATIVELY UNIFORM SURFACE WITH NO ROCKS GREATER THAN 1-INCH IN DIAMETER, NO CLOGS OF SOIL GREATER THAN 1-INCHES IN DIAMETER, AND DEVIATIONS FROM AN OTHERWISE SMOOTH SURFACE GREATER THAN 4 INCHES IN HEIGHT OR DEPTH WITH NO AREAS OF STANDING WATER.
  - ALL FINISHED SLOPES OF A GRADE OF 3:1 OR GREATER ARE TO BE COVERED WITH A JUTE MAT, CURLEX MATTING, OR SIMILAR PRODUCT AFTER SEEDING WITH HYDROMULCH AND THE JUTE ANCHORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
  - ALL DRAINAGE COMPONENTS ARE TO BE PRECAST CONCRETE. STORM DRAIN PIPE TO BE RCP OR RCPA, CLASS III, PER ASTM C76 AND INLETS TO BE ASTM C913 PER TxDOT STANDARDS WITH GALVANIZED GRATES. INLETS IN PAVED AREAS SHALL INCLUDE PEDESTRIAN GRATES.
  - REFER TO LANDSCAPE PLAN FOR PLANTING, IRRIGATION, AND TOPSOIL REQUIREMENTS.

DESIGNED BY:	DRAFTED BY:
DATE:	DATE:
REVISION:	REVISION:
<b>GRADING SHEET</b> <b>BASTROP GROVE METAL DEVELOPMENT</b> FINAL MASTER DRAINAGE PLAN SUBMITTAL	
SHEET NAME: JOB NAME: PROJECT:	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	14 OF 29
SHEET NO.:	14

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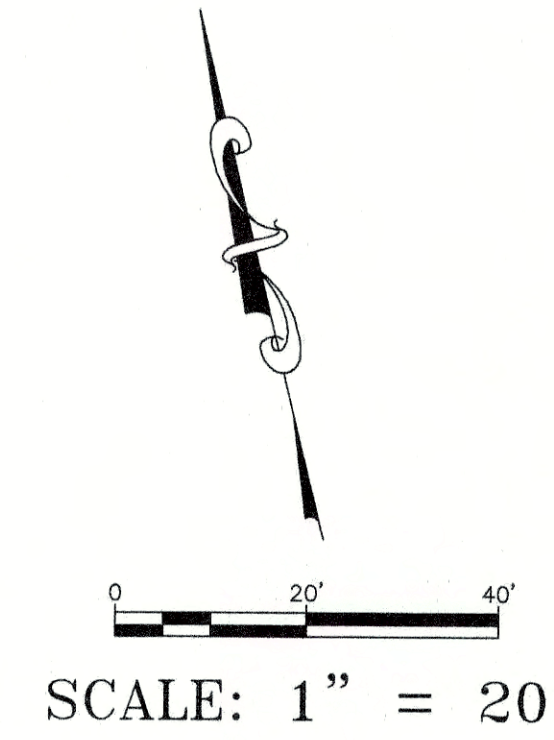
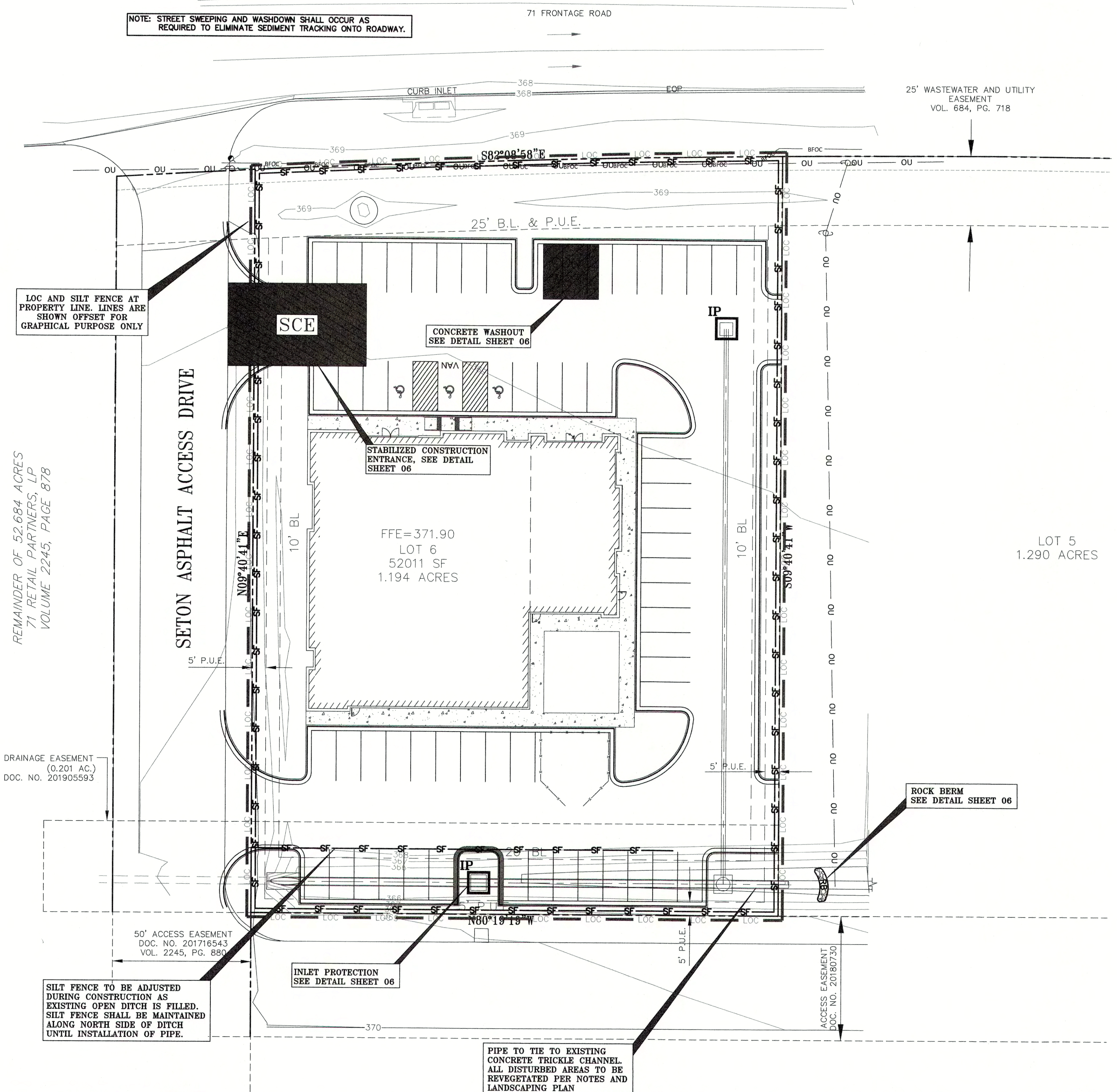
Final Drainage  
Plan Approved

11/22/19

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DESIGNED BY:	DRAFTED BY:
DATE:	DATE:
REVISION:	REVISION:
<b>Carlson, Brigrance &amp; Doering, Inc.</b> Civil Engineering • Surveying FIRM ID #13791 Main Office: 5501 West Williams Cannon Dr., Austin, Texas 78749 North Office: 12129 RR 620 N., Ste. 600 Austin, Texas 78750 Phone No. (512) 290-5160 Fax No. (512) 290-5165	
<b>STORM SEWER PROFILE</b> <b>BASTROP GROVE MEDITAL DEVELOPMENT</b> <b>FINAL MASTER DRAINAGE PLAN SUBMITTAL</b>	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	15 OF 29
SHEET NO.:	15

NOTE: STREET SWEEPING AND WASHDOWN SHALL OCCUR AS REQUIRED TO ELIMINATE SEDIMENT TRACKING ONTO ROADWAY.



LEGEND	
	SILT FENCE
	LIMITS OF CONSTRUCTION
	INLET PROTECTION
	ROCK BERM
	J-HOOK
	STABILIZED CONSTRUCTION ENTRANCE
	CONCRETE WASHOUT

WARNING!!!  
REVIEW THE SEQUENCE OF CONSTRUCTION ON THE GENERAL NOTES SHEET PRIOR TO BEGINNING CONSTRUCTION

!!! WARNING !!!  
UNDERGROUND UTILITIES SHOWN ON THESE PLANS IS A BEST ESTIMATE BASED ON RECORDS THAT COULD BE OBTAINED AND PHYSICAL FEATURES VISIBLE AT THE GROUND LEVEL. THE ENGINEER MAKES NO ASSERTIONS BEYOND THAT THEY ARE A BEST ESTIMATE AND AN ATTEMPT TO HELP IDENTIFY POSSIBLE UTILITIES IN THE AREA. THE CONTRACTOR MUST CALL ONE CALL IN ACCORDANCE WITH THE NOTES TO BETTER LOCATE ANY UNDERGROUND UTILITIES.

- GENERAL EROSION CONTROL NOTES:**
- 1) CONTRACTOR TO FIELD LOCATE DIVERSION, INTERCEPTOR, AND PERIMETER DIKES/DITCHES AS REQUIRED BASED ON THE DRAIN SEQUENCE OF CONSTRUCTION.
  - 2) IF DISTURBED AREA IS NOT WORKED FOR MORE THAN 14 DAYS THEN DISTURBED AREA NEEDS TO BE STABILIZED BY REVEGETATION, MULCH, TARP, OR MATTING.
  - 3) THE ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN-COMPLIANCE WITH THE CITY OF BASTROP RULES AND REGULATIONS.
  - 4) THE CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING SITE CONSTRUCTION SUCH AS WATERING WITH IRRIGATION TRUCKS AND MULCHING AS PER CITY REQUIREMENTS, OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
  - 5) SILT FENCE TYPE AND INSTALLATION SHALL COMPLY WITH CITY OF BASTROP RULES AND REGULATIONS.
  - 6) CONTRACTOR WILL CHECK AND IF NECESSARY CLEAN UP SPOILS THAT MIGRATE ONTO THE ROADS A MINIMUM OF ONCE DAILY.
  - 7) CONTRACTOR IS SOLELY RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING COMPLIANCE WITH SWPPP INSPECTION, REPORTING, NOI, AND NOT FILING. THE PLAN SHOWN IS THE MINIMUM REQUIRED AND THE CONTRACTOR SHALL MODIFY THE PLAN AS REQUIRED TO ELIMINATE SEDIMENT FROM LEAVING THE SITE.
  - 8) ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY ARE TO BE REVEGETATED IN ACCORDANCE WITH THIS SHEET AND THE LANDSCAPING PLAN. REFER TO SHEET 06 FOR EROSION CONTROL DETAILS AND ADDITIONAL NOTES REGARDING REVEGETATION.

**BASTROPTX**  
Heart of the Lost Pines  
Est. 1973

Final Drainage  
Plan Approved

11/22/19  
CUSTOMER COPY

DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	
Carlson, Brigrance & Doering, Inc. Civil Engineering & Surveying FIRM ID #F3791 Main Office: 5501 West William Cannon Dr., Austin, Texas 78750 North Office: 12120 RR 620 N., Sec. 600, Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165	
<b>EROSION CONTROL</b> <b>BASTROP GROVE MEDTAL DEVELOPMENT</b> FINAL MASTER DRAINAGE PLAN SUBMITTAL	
SHEET NAME:	
JOB NAME:	
PROJECT:	
DATE:	9/16/2019
JOB NUMBER:	5135
SHEET:	16 OF 29
SHEET NO.:	16

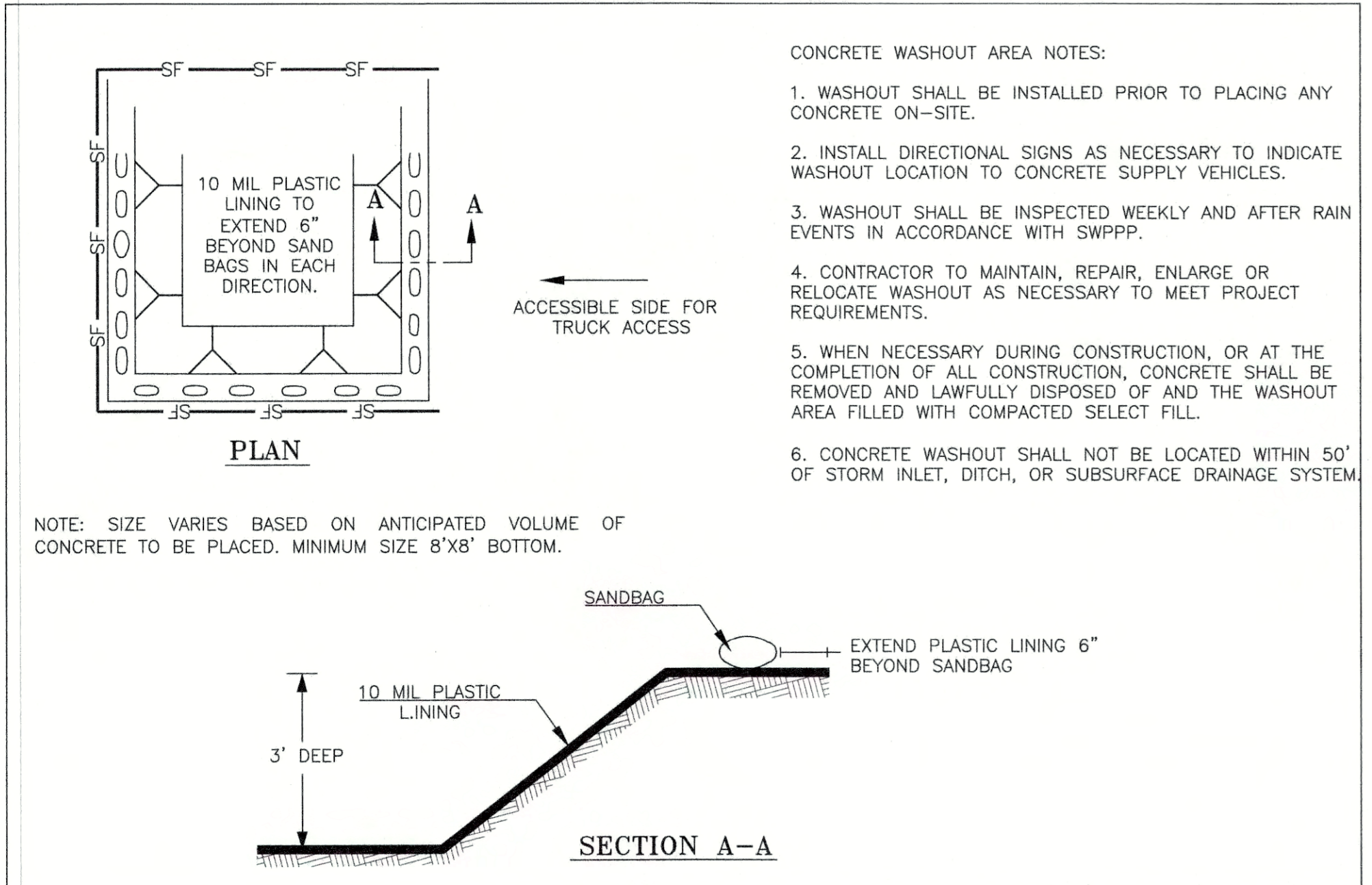
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DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	

Carlson, Briggance & Doering, Inc.  
 Civil Engineering & Surveying  
 Firm ID #13791  
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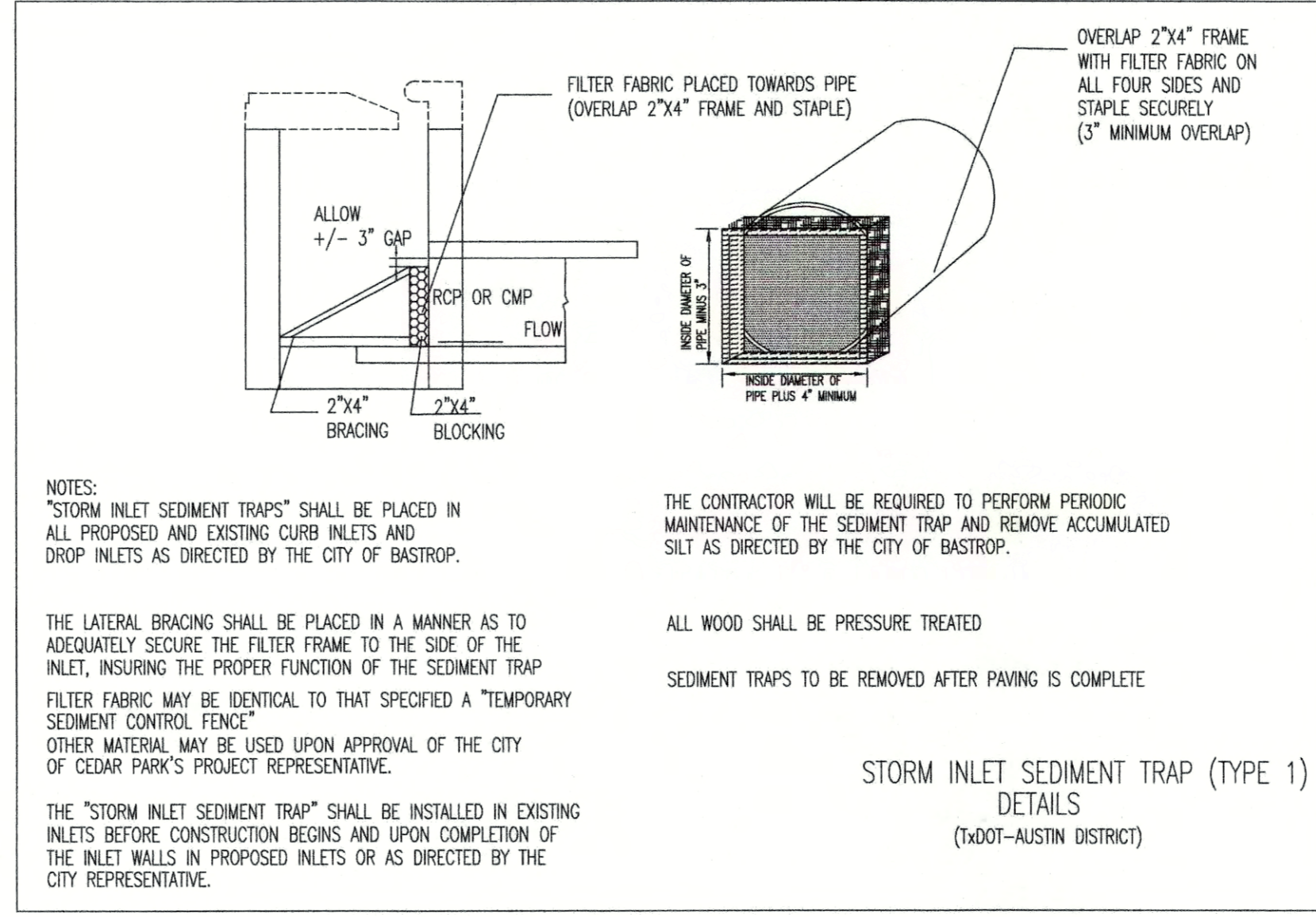
EROSION CONTROL DETAILS  
 BASTROP GROVE MEDITAIL DEVELOPMENT  
 FINAL MASTER DRAINAGE PLAN SUBMITTAL  
 SHEET NAME:  
 JOB NAME:  
 PROJECT:

STATE OF TEXAS  
 BRENDAN P. MCENTEE  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 CARLSON, BRIGGANCE & DOERING, INC.  
 09/16/2019  
 DATE: 9/16/2019  
 JOB NUMBER: 5135  
 SHEET: 17 OF 29  
 SHEET NO.: 17

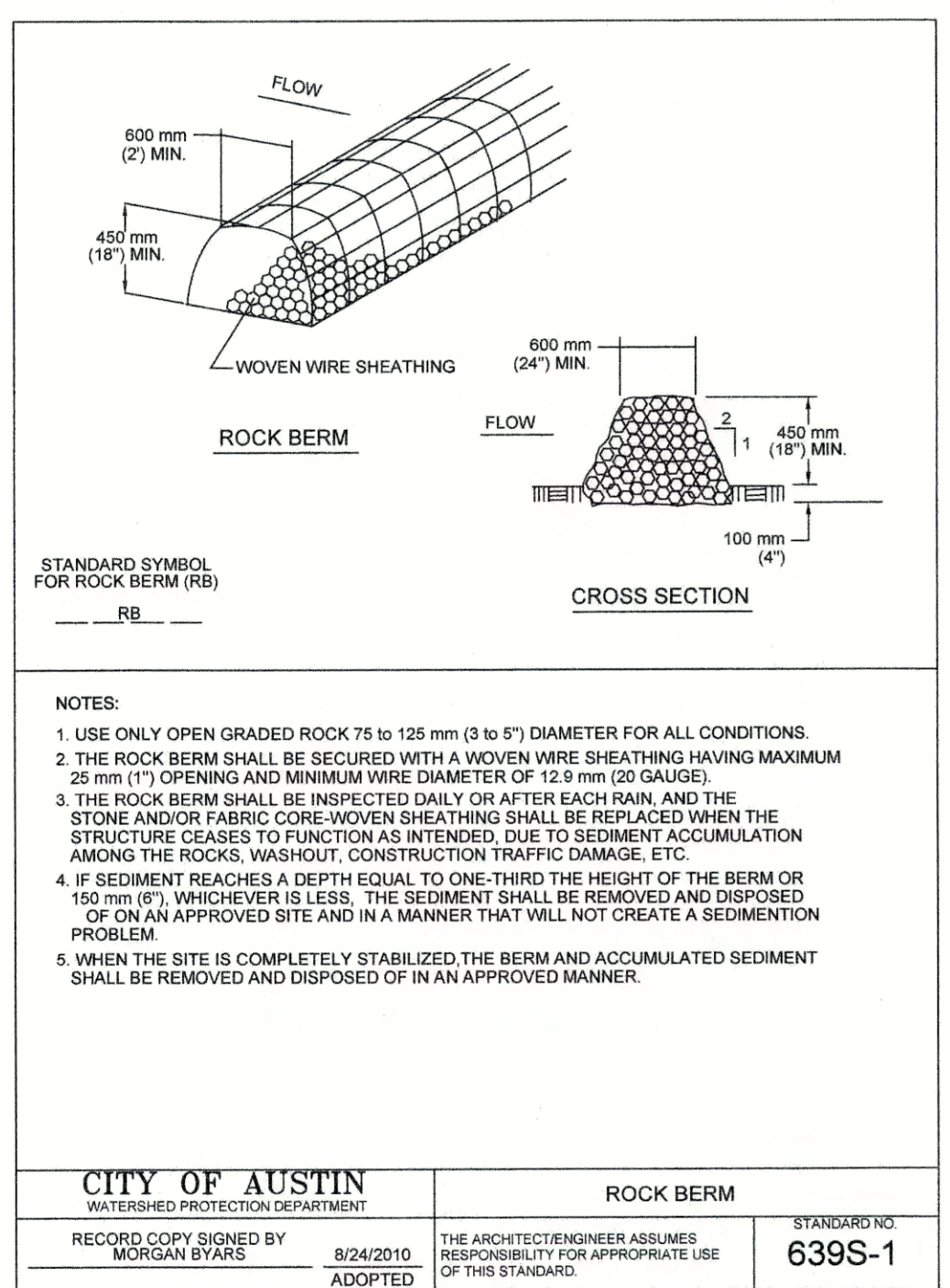


- CONCRETE WASHOUT AREA NOTES:
1. WASHOUT SHALL BE INSTALLED PRIOR TO PLACING ANY CONCRETE ON-SITE.
  2. INSTALL DIRECTIONAL SIGNS AS NECESSARY TO INDICATE WASHOUT LOCATION TO CONCRETE SUPPLY VEHICLES.
  3. WASHOUT SHALL BE INSPECTED WEEKLY AND AFTER RAIN EVENTS IN ACCORDANCE WITH SWPPP.
  4. CONTRACTOR TO MAINTAIN, REPAIR, ENLARGE OR RELOCATE WASHOUT AS NECESSARY TO MEET PROJECT REQUIREMENTS.
  5. WHEN NECESSARY DURING CONSTRUCTION, OR AT THE COMPLETION OF ALL CONSTRUCTION, CONCRETE SHALL BE REMOVED AND LAWFULLY DISPOSED OF AND THE WASHOUT AREA FILLED WITH COMPACTED SELECT FILL.
  6. CONCRETE WASHOUT SHALL NOT BE LOCATED WITHIN 50' OF STORM INLET, DITCH, OR SUBSURFACE DRAINAGE SYSTEM.

CONCRETE WASHOUT DETAIL  
N.T.S



- NOTES:
- "STORM INLET SEDIMENT TRAPS" SHALL BE PLACED IN ALL PROPOSED AND EXISTING CURB INLETS AND DROP INLETS AS DIRECTED BY THE CITY OF BASTROP.
  - THE LATERAL BRACING SHALL BE PLACED IN A MANNER AS TO ADEQUATELY SECURE THE FILTER FRAME TO THE SIDE OF THE INLET, INSURING THE PROPER FUNCTION OF THE SEDIMENT TRAP.
  - FILTER FABRIC MAY BE IDENTICAL TO THAT SPECIFIED A "TEMPORARY SEDIMENT CONTROL FENCE".
  - OTHER MATERIAL MAY BE USED UPON APPROVAL OF THE CITY OF CEDAR PARK'S PROJECT REPRESENTATIVE.
  - THE "STORM INLET SEDIMENT TRAP" SHALL BE INSTALLED IN EXISTING INLETS BEFORE CONSTRUCTION BEGINS AND UPON COMPLETION OF THE INLET WALLS IN PROPOSED INLETS OR AS DIRECTED BY THE CITY REPRESENTATIVE.
- THE CONTRACTOR WILL BE REQUIRED TO PERFORM PERIODIC MAINTENANCE OF THE SEDIMENT TRAP AND REMOVE ACCUMULATED SILT AS DIRECTED BY THE CITY OF BASTROP.
- ALL WOOD SHALL BE PRESSURE TREATED.
- SEDIMENT TRAPS TO BE REMOVED AFTER PAVING IS COMPLETE.
- STORM INLET SEDIMENT TRAP (TYPE 1)  
DETAILS  
(1007-AUSTIN DISTRICT)

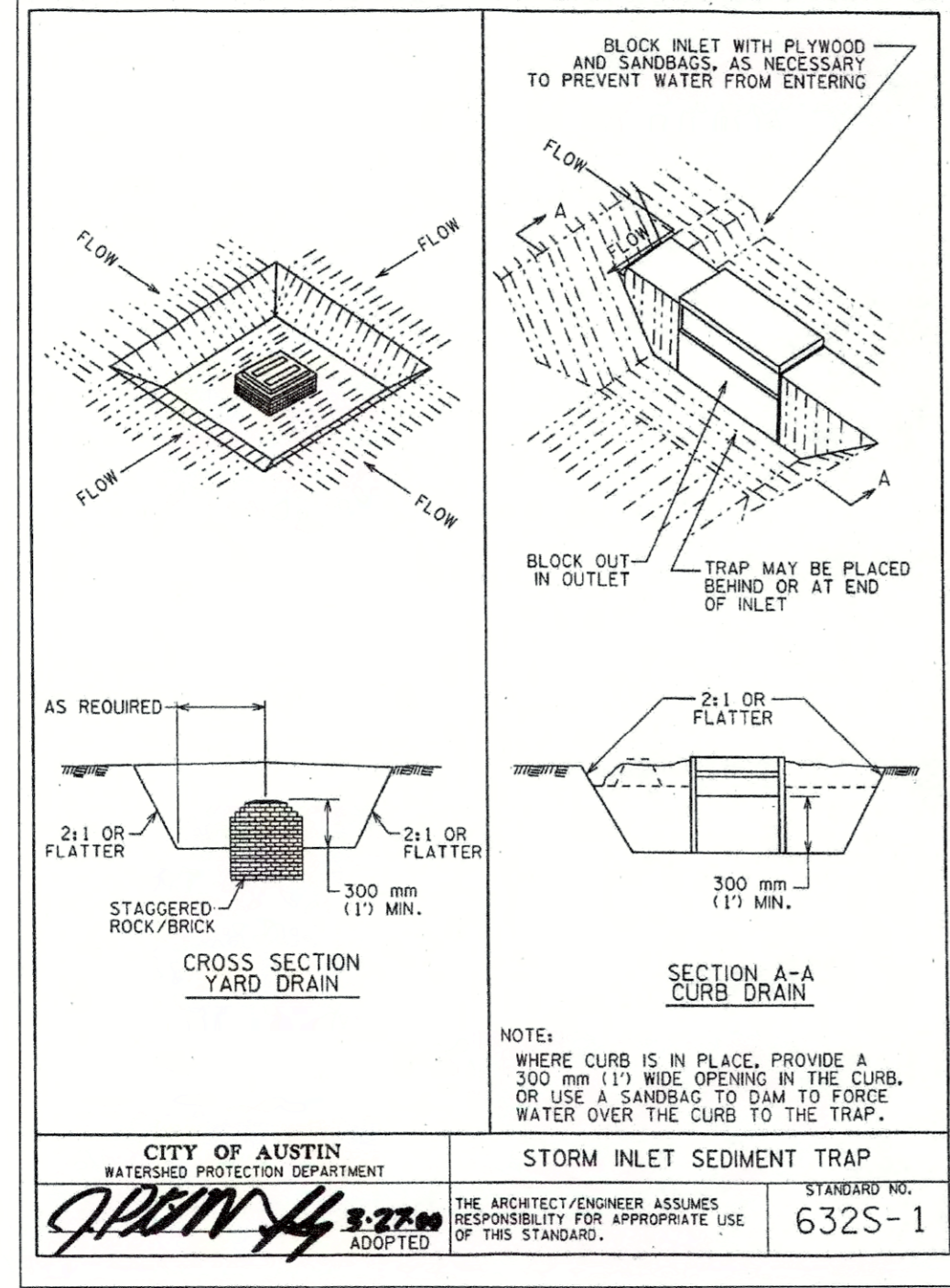


- NOTES:
1. USE ONLY OPEN GRADED ROCK 75 TO 125 mm (3 TO 5") DIAMETER FOR ALL CONDITIONS.
  2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 25 mm (1") OPENING AND MINIMUM WIRE DIAMETER OF 12.9 mm (20 GAUGE).
  3. THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SEDIMENT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
  4. IF SEDIMENT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR 150 mm (6"), WHICHEVER IS LESS, THE SEDIMENT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SEDIMENTATION PROBLEM.
  5. WHEN THE SITE IS COMPLETELY STABILIZED THE BERM AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

CITY OF AUSTIN  
 WATERSHED PROTECTION DEPARTMENT  
 RECORD COPY SIGNED BY MORGAN BYARS  
 8/24/2010  
 ADOPTED

ROCK BERM  
 STANDARD NO.  
 639S-1

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

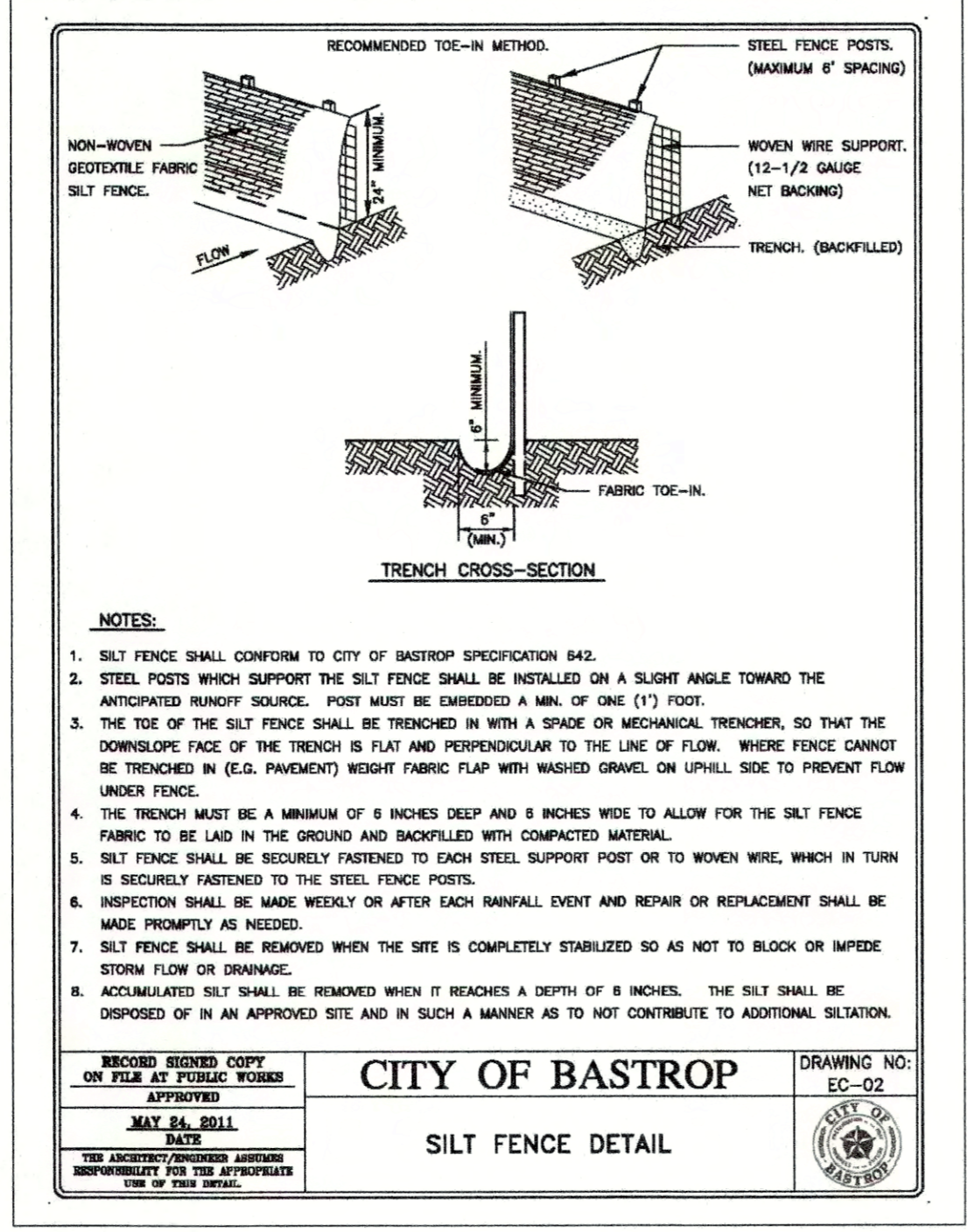


- NOTES:
- WHERE CURB IS IN PLACE, PROVIDE A 300 mm (12") WIDE OPENING IN THE CURB, OR USE A SANDBAG TO DAM TO FORCE WATER OVER THE CURB TO THE TRAP.

CITY OF AUSTIN  
 WATERSHED PROTECTION DEPARTMENT  
 APPROVED  
 8/24/2010  
 ADOPTED

STORM INLET SEDIMENT TRAP  
 STANDARD NO.  
 632S-1

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

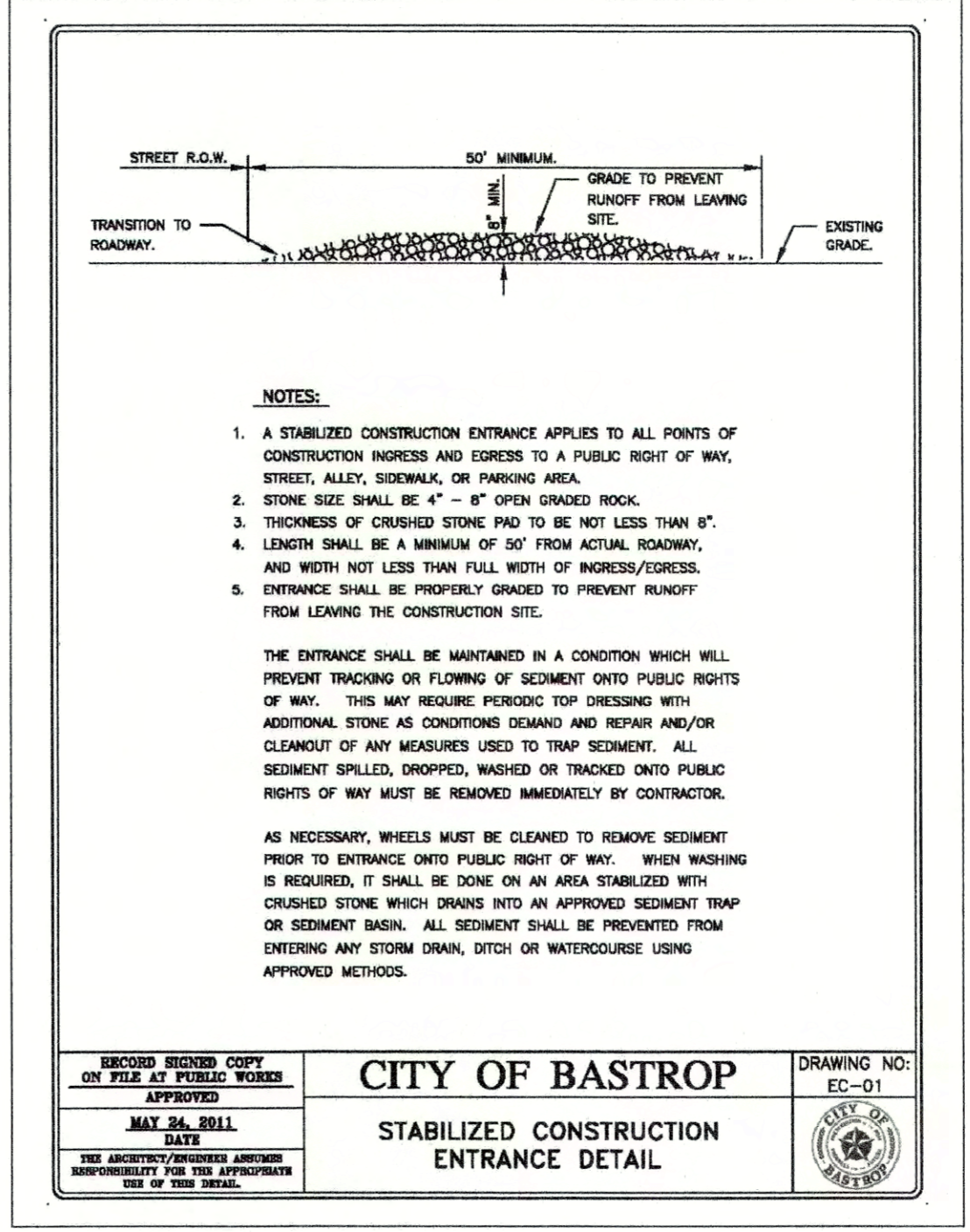


- NOTES:
1. SILT FENCE SHALL CONFORM TO CITY OF BASTROP SPECIFICATION 642.
  2. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MIN. OF ONE (1") FOOT.
  3. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SHARP OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
  4. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 8 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
  5. SILT FENCE SHALL BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS SECURELY FASTENED TO THE STEEL FENCE POSTS.
  6. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
  7. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPIDE STORM FLOW OR DRAINAGE.
  8. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 8 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SEDIMENTATION.

CITY OF BASTROP  
 WATERSHED PROTECTION DEPARTMENT  
 APPROVED  
 MAY 24, 2011  
 DATE

SILT FENCE DETAIL  
 DRAWING NO.  
 EC-02

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS DETAIL.



- NOTES:
1. A STABILIZED CONSTRUCTION ENTRANCE APPLIES TO ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS TO A PUBLIC RIGHT OF WAY, STREET, ALLEY, SIDEWALK, OR PARKING AREA.
  2. STONE SIZE SHALL BE 4" - 8" OPEN GRADED ROCK.
  3. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 6".
  4. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WITH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS.
  5. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.
- AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

CITY OF BASTROP  
 WATERSHED PROTECTION DEPARTMENT  
 APPROVED  
 MAY 24, 2011  
 DATE

STABILIZED CONSTRUCTION ENTRANCE DETAIL  
 DRAWING NO.  
 EC-01

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS DETAIL.

EROSION AND SEDIMENTATION CONTROL:

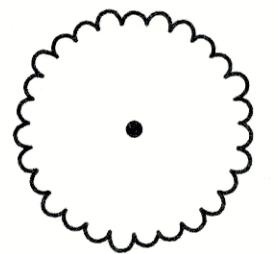
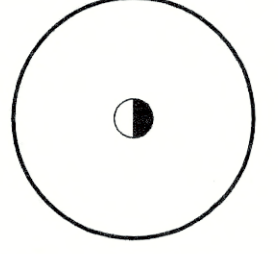
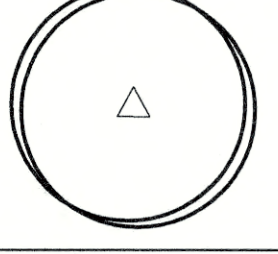
1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND FENCING FOR AREAS OUTSIDE OF THE CONSTRUCTION AREA PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE CONTRACTOR IS REQUIRED TO INSPECT THE CONTROLS AND FENCES AT WEEKLY INTERVALS, AND AFTER SIGNIFICANT RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX (6) INCHES.
3. PRIOR TO FINAL ACCEPTANCE, HAUL ROADS AND WATERWAY CROSSINGS CONSTRUCTED FOR TEMPORARY CONTRACTOR ACCESS MUST BE REMOVED, ACCUMULATED SEDIMENT REMOVED FROM THE WATERWAY AND THE AREA RESTORED TO THE ORIGINAL GRADE AND REVEGETATED. ALL LAND CLEARING DEBRIS SHALL BE DISPOSED OF IN APPROVED SPOIL DISPOSAL SITES.
4. ANY METHODS, STREET MARKINGS AND SIGNAGE NECESSARY FOR WARNING MOTORISTS, WARNING PEDESTRIANS OR DIVERTING TRAFFIC DURING CONSTRUCTION SHALL CONFORM TO THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITION.
5. ALL PAVEMENT MARKINGS, MARKERS, PAINT, TRAFFIC BUTTONS, TRAFFIC CONTROLS AND SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS, BRIDGES, AND THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, LATEST EDITIONS.
6. EROSION CONTROL MEASURES, SITE WORK AND RESTORATION WORK SHALL BE IN ACCORDANCE WITH THE CITY OF BASTROP CODE OF ORDINANCES.
7. ALL SLOPES SHALL BE SODDED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY WERE APPLIED.
8. SILT FENCES, ROCK BERMS, SEDIMENTATION BASINS AND SIMILARLY RECOGNIZED TECHNIQUES AND MATERIALS SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADING OF DOWNSTREAM FACILITIES. SUCH INSTALLATION SHALL BE REGULARLY INSPECTED BY THE CITY OF BASTROP FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF, IN THE OPINION OF THE CITY ENGINEER, THEY ARE WARRANTED.
9. ALL TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL FINAL INSPECTION AND APPROVAL OF THE PROJECT BY THE CITY INSPECTOR. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL TEMPORARY EROSION CONTROL STRUCTURES AND TO REMOVE EACH STRUCTURE AS APPROVED BY THE CITY INSPECTOR.
10. ALL MUD, DIRT, ROCKS, DEBRIS, ETC., SPILLED, TRACKED OR OTHERWISE DEPOSITED ON EXISTING PAVED STREETS, DRIVES AND AREAS USED BY THE PUBLIC SHALL BE CLEANED UP IMMEDIATELY.
11. PERMANENT EROSION CONTROL: ALL DISTURBED AREAS SHALL BE RESTORED AS NOTED BELOW:
  - A. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL SHALL BE PLACED IN ALL DRAINAGE CHANNELS (EXCEPT ROCK), AND BETWEEN THE CURB AND RIGHT-OF-WAY.
  - B. THE SEEDING FOR PERMANENT EROSION CONTROL SHALL BE APPLIED OVER AREAS DISTURBED BY CONSTRUCTION AS FOLLOWS:

- BROADCAST SEEDING:
- (i) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA OR THREE (3) POUNDS PER
  - (ii) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, WITH A PURITY OF 95% WITH 85% GERMINATION.
- FERTILIZER SHALL BE SLOW RELEASE GRANULAR OR PALETTE TYPE, AND SHALL HAVE AN ANALYSIS OF 15-15-15, AND SHALL BE APPLIED AT THE RATE OF ONE (1) POUND PER 1,000 SQUARE FEET, ONCE AT THE TIME OF PLANTING, AND AGAIN ONCE DURING THE TIME OF ESTABLISHMENT.
- MULCH TYPE USED SHALL BE STRAW OR HAY APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET.
- HYDRAULIC SEEDING:
- (i) FROM OCTOBER TO FEBRUARY, SEEDING SHALL BE WITH ONE (1) POUND PER 1,000 SQUARE FEET OF UNHULLED BERMUDA, OR THREE (3) POUNDS PER 1,000 SQUARE FEET OF WINTER RYE, WITH A PURITY OF 95% WITH 90 % GERMINATION.
  - (ii) FROM MARCH TO SEPTEMBER, SEEDING SHALL BE WITH HULLED BERMUDA AT A RATE OF ONE (1) POUND PER 1,000 SQUARE FEET WITH A PURITY OF 95% WITH 95% GERMINATION.
- FERTILIZER SHALL BE A WATER SOLUBLE FERTILIZER WITH AN ANALYSIS OF 15-15-15 AT A RATE OF 1.5 POUNDS PER 1,000 SQUARE FEET.
- MULCH TYPE SHALL BE HAY, STRAW OR MULCH APPLIED AT A RATE OF 45 POUNDS PER 1,000 SQUARE FEET, WITH A SOIL TACKIFIER AT A RATE OF 1.4 POUNDS PER 1,000 SQUARE FEET.
- C. THE PLANTED AREA SHALL BE IRRIGATED OR SPRINKLED IN A MANNER THAT WILL NOT ERODE THE TOPSOIL, BUT WILL SUFFICIENTLY SOAK TO A DEPTH OF SIX (6) INCHES. THE IRRIGATION SHALL OCCUR AT 10-DAY INTERVALS DURING THE FIRST TWO (2) MONTHS. RAINFALL OCCURRENCES OF 1/2 INCH OR MORE SHALL POSTPONE THE WATERING SCHEDULE FOR TEN (10) DAYS.
  - D. RESTORATION SHALL BE ACCEPTABLE WHEN THE GRASS HAS GROWN AT LEAST 1 INCH 1 85% COVERAGE, PROVIDED NO BARE SPOTS LARGER THAN 20 SQUARE FEET EXIST.





BASTROPTX  
 Heart of the Lost Pines  
 Est. 1932  
 Final Drainage  
 Plan Approved  
 11/22/19

# PLANT SCHEDULE

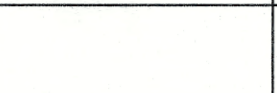
SHADE TREES	QTY	COMMON / BOTANICAL NAME	CONT	CALIFER	HEIGHT	SPREAD
	8	CEDAR ELM ULMUS CRASSIFOLIA	65 GAL	3" CAL.	10'-12' HT.	5-6' SFR.
	5	CHINQUAPIN OAK QUERCUS MUHLBERGII	65 GAL	3.25-3.5" CAL.	11-13' HT.	56' SFR.
	1	SOUTHERN LIVE OAK QUERCUS VIRGINIANA	65 GAL	3" CAL.	10' HT.	6' SFR.

SHRUBS	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
GM	12	GULF MUHLY MUHLBERGIA CAPILLARIS 'REGAL MIST'	3 GAL	36" o.c.
RY	81	RED YUCCA HESPERALOE PARVIFLORA	5 GAL	36" o.c.
DW	98	DON'S DWARF WAXMYRTLE MYRTICA CERIFERA 'DON'S DWARF'	5 GAL	36" o.c.
DY	124	DWARF YALPON ILEX VOMITORIA 'NANA'	5 GAL	36" o.c.

GROUND COVER	CODE	QTY	COMMON / BOTANICAL NAME	CONT	SPACING
	NG	66	LANTANA 'NEW GOLD' LANTANA X 'NEW GOLD'	1 GAL	24" o.c.
	ZX	84	ZEXMENIA ZEXMENIA HISPIDA	1 GAL	12" o.c.

TURF	CODE	QTY	COMMON / BOTANICAL NAME	CONT
	SBG	AS SHOWN	SAHARA BERMUDA GRASS CYNODON DACTYLON 'SAHARA'	HYDRO

## STREET YARD

REQUIRED	PROVIDED
TOTAL SITE AREA	52,011 S.F.
TOTAL STREET YARD AREA	18,131 S.F.
STREET YARD LANDSCAPE (15% OF STREET YARD REQUIRED)	2,811 S.F.

## LANDSCAPE BUFFER

10' LANDSCAPE BUFFER ADJACENT TO RIGHT-OF-WAY OF ANY MAJOR THOROUGHFARE STREET IS REQUIRED, 1 LARGE TREE PER FORTY LINEAR FEET.

REQUIRED	PROVIDED
230' LF = 6 TREES	6 TREES

## SHRUBS

SHRUBS MUST BE PLANTED ALONG THE SIDE PROPERTY LINE FROM THE FRONT PROPERTY LINE TO THE REAR. SHRUBS MUST BE PLANTED IN SUCH A MANNER TO CREATE A DENSE HEDGE OF AT LEAST THREE FEET AT MATURITY.

## PARKING LOT LANDSCAPING

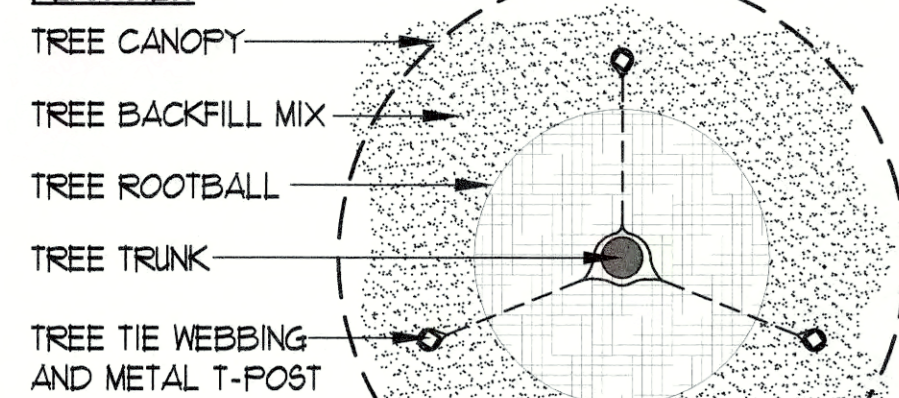
THERE SHALL BE A LANDSCAPED AREA WITH AT LEAST ONE (1) TREE WITHIN SIXTY FEET (60') OF EVERY PARKING SPACE. THERE SHALL BE A MINIMUM OF ONE (1) TREE PLANTED IN THE PARKING AREA FOR EVERY TEN (10) PARKING SPACES WITHIN PARKING LOTS WITH MORE THAN TWENTY (20) SPACES. WITHIN PARKING LOTS, LANDSCAPE AREAS SHOULD BE LOCATED TO DEFINE PARKING AREAS AND ASSIST IN CLARIFYING APPROPRIATE CIRCULATION PATTERNS. A LANDSCAPE ISLAND SHALL BE LOCATED AT THE TERMINUS OF ALL PARKING ROWS, AND SHOULD CONTAIN AT LEAST ONE (1) TREE. ALL LANDSCAPE AREAS SHALL BE PROTECTED BY A MONOLITHIC CURB OR WHEEL STOPS AND REMAIN FREE OF TRASH, LITTER, AND CAR BUMPER OVERHANGS.

## SITE DEVELOPMENT PERMIT LANDSCAPE NOTES:

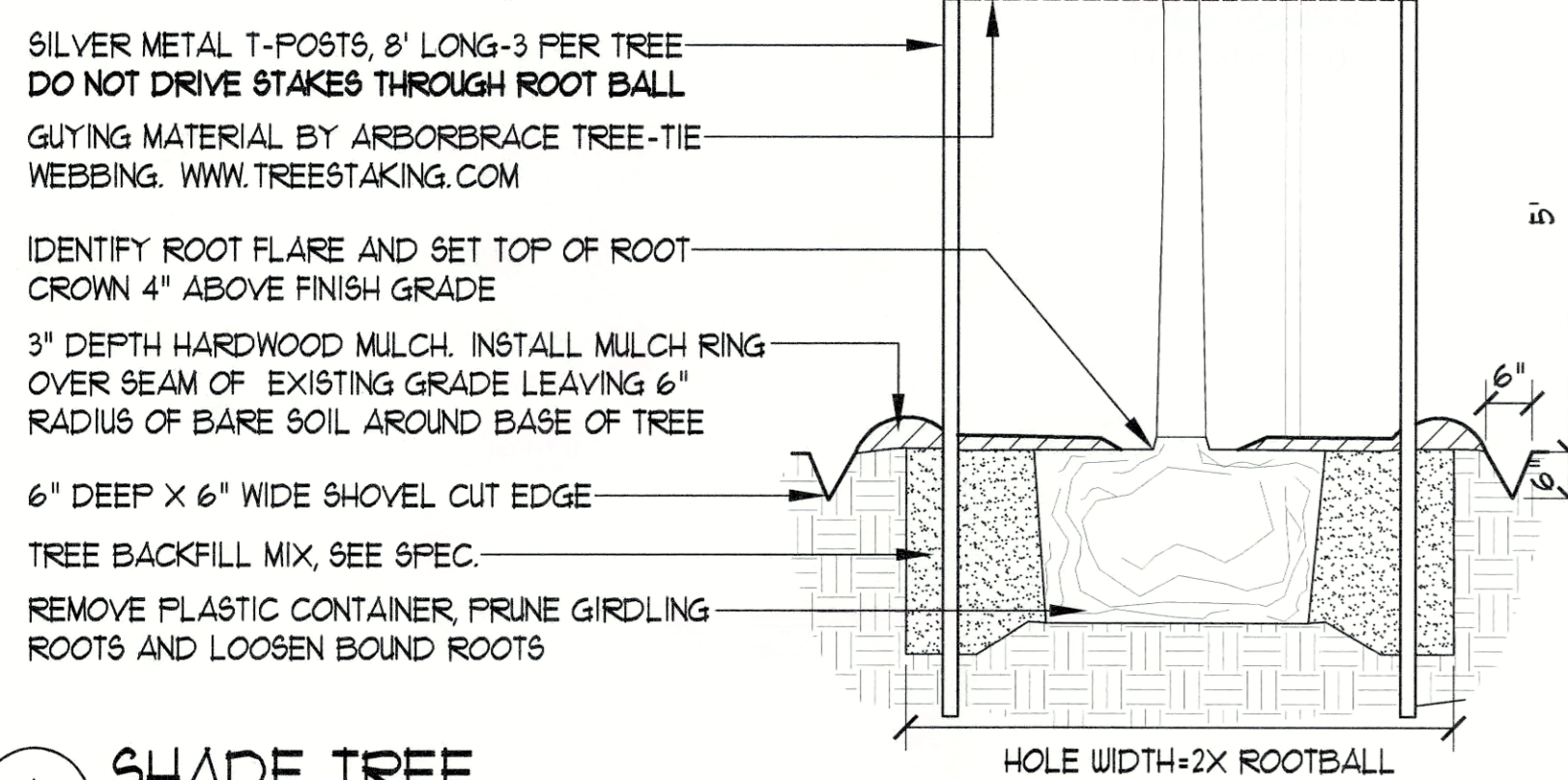
- ALL LANDSCAPED AREAS TO BE PROTECTED BY 6 INCH CURBS, WHEEL-STOPS OR OTHER APPROVED BARRIERS AS PER ECM 2.4.(A).
- THE OWNER WILL CONTINUOUSLY MAINTAIN THE REQUIRED LANDSCAPING IN ACCORDANCE WITH LDC 25-2-384.
- EXISTING TREES TO BE SAVED SHALL BE PROTECTED BY FENCING BEFORE CONSTRUCTION BEGINS. NO EQUIPMENT OR MATERIALS SHALL BE STORED OR OPERATED WITHIN THE FENCED-IN AREAS. FENCES SHALL BE AT THE DRIP LINE AND COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES. NO BURNING OF DEBRIS, CLEANING FLUIDS, CONCRETE SPILLS, ETC. WILL BE ALLOWED WITHIN THESE AREAS.
- BUFFERING OF THE STREET YARD WILL BE ACCOMPLISHED THROUGH THE COMBINATION OF TREES, SHRUBS, GRADE CHANGES, AND FENCES.
- GRADE CHANGES THAT DO NOT APPEAR ON THE SITE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT BY THE GENERAL CONTRACTOR PRIOR TO CONSTRUCTION.
- TRENCHING SHALL NOT OCCUR WITHIN THE FENCED DRIP LINE AREAS OF EXISTING TREES.
- SHRUB MATERIAL NOT TO EXCEED 36" O.C. UNLESS OTHERWISE SPECIFIED. GROUNDCOVERS NOT TO EXCEED 18" O.C. DURING THE TIME OF MARCH 15-OCTOBER 15 INSTALLATION OF HYDROMULCH SHALL BE COMMON BERMUDA OR SAHARA BERMUDA FOR OCTOBER 16 - MARCH 14 INSTALLATION OF HYDROMULCH SHALL BE ANNUAL OR PERENNIAL RYE WITH A SPRING APPLICATION OF COMMON BERMUDA OR SAHARA BERMUDA.
- ALL LAWN AREAS WITHIN THE LIMITS OF CONSTRUCTION SHALL BE RE-VEGETATED WITH BERMUDA 50D OR RYE UNLESS NATIVE RESTORATION MIX IS SPECIFIED.
- NOT MORE THAN 50% OF THE TREES AND 50% OF SHRUBS PROPOSED WILL BE OF THE SAME SPECIES.
- AN AUTOMATIC IRRIGATION SYSTEM SHALL BE INSTALLED. SEE IRRIGATION NOTES IN THESE DRAWINGS FOR REQUIREMENT.
- IF ESTABLISHING VEGETATION DURING ANY STAGE OF DROUGHT, SECTION 6-4-30 MAY REQUIRE A VARIANCE. CONTACT BASTROP WATER CONSERVATION STAFF.

NOTES:  
1. PRUNE DEAD OR BROKEN BRANCHES ONLY  
PRUNES TO BE 80" AFF AT ACCESSIBLE AREAS.  
2. ALIGN STAKING OF TREES IDENTICALLY WHEN IN LINES OR GROUPS.

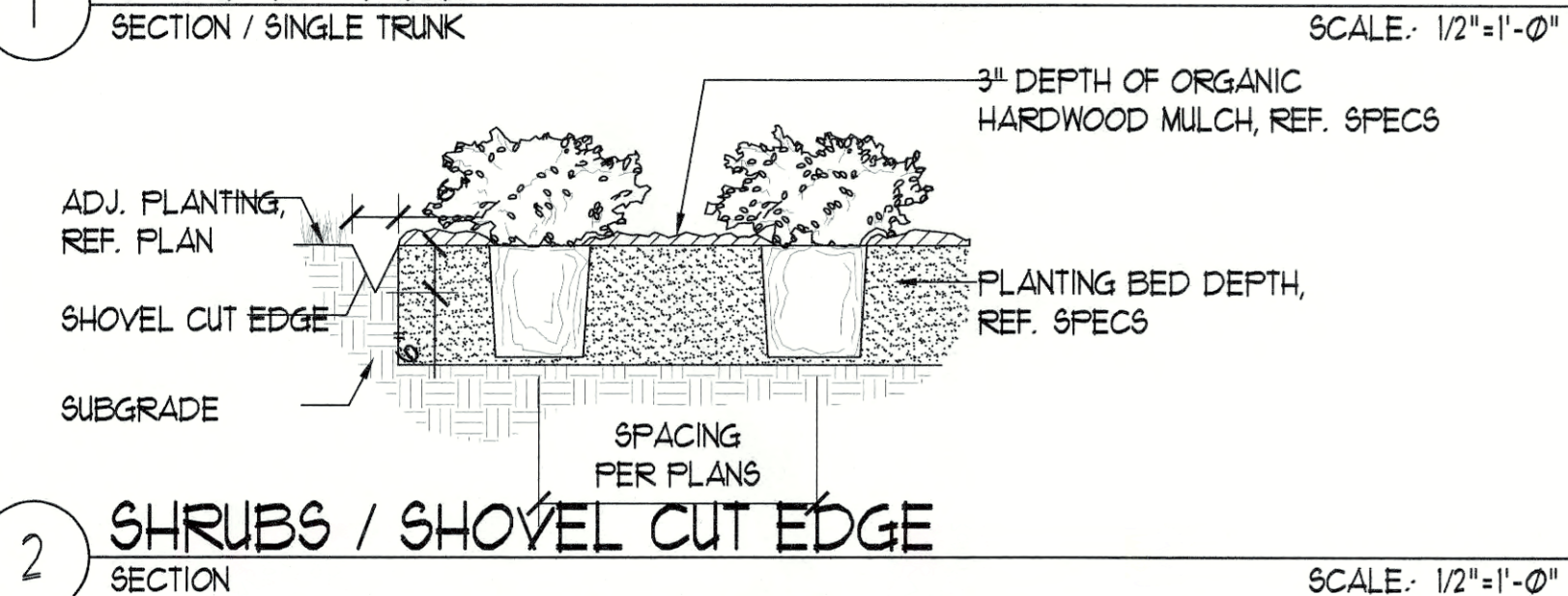
### PLAN VIEW



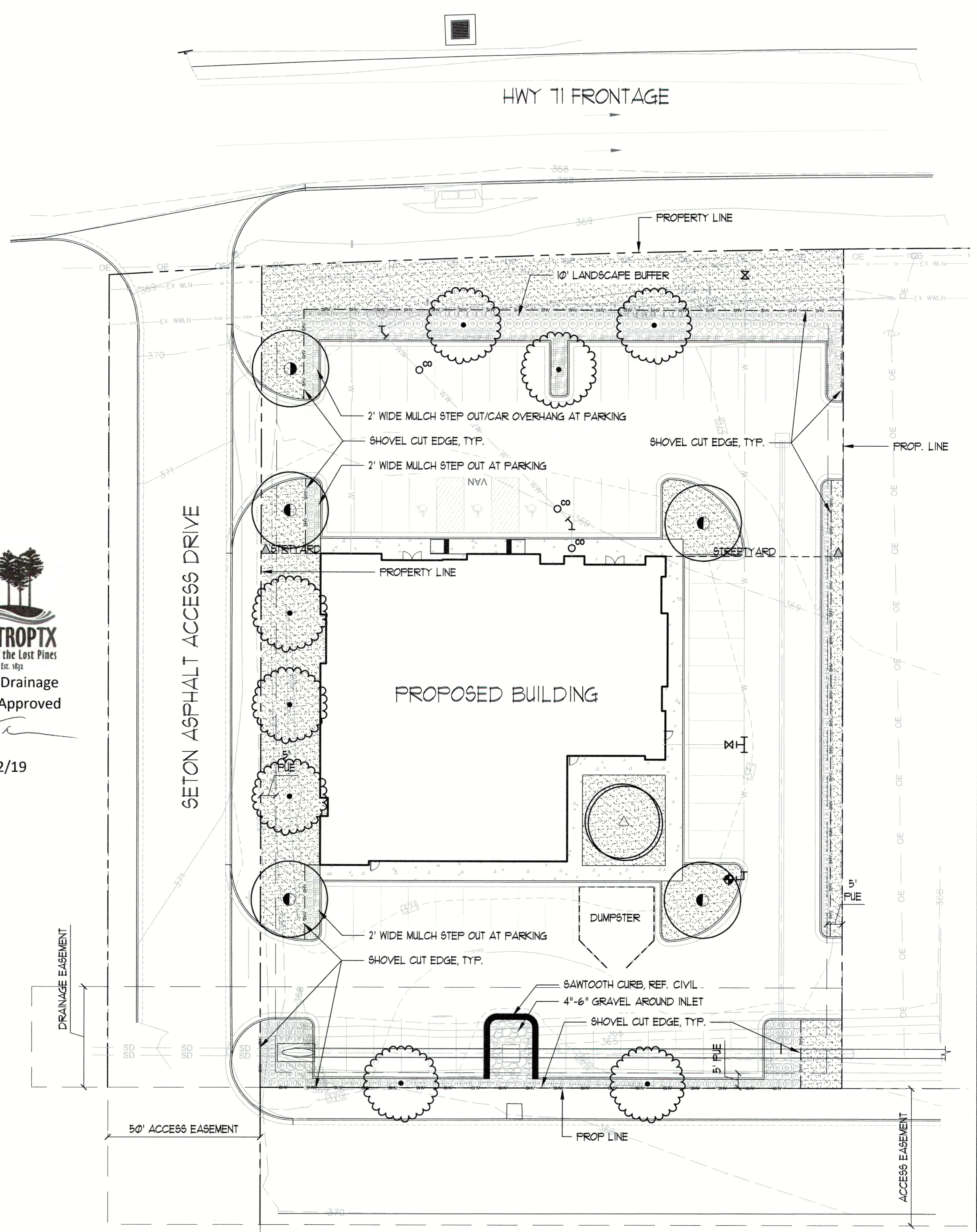
### SECTION / SINGLE TRUNK



### SHRUBS / SHOVEL CUT EDGE



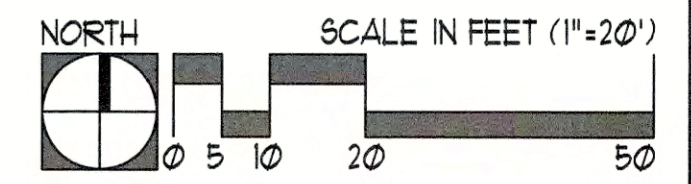
**BASTROPTX**  
Heart of the Lost Pines  
Est. 1932  
Final Drainage  
Plan Approved  
*[Signature]*  
11/22/19



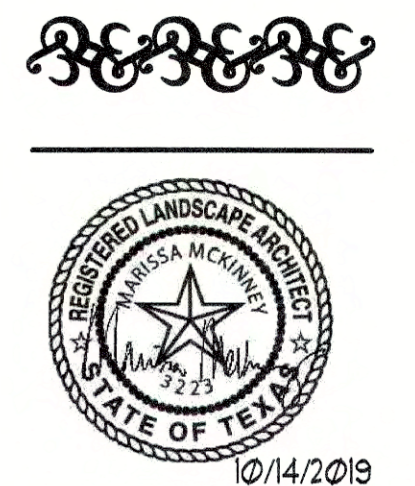
## LANDSCAPE CERTIFICATION

I, AAN G. COLEMAN, DO HEREBY CERTIFY THAT THE PLANS FOR THE DEVELOPMENT PROJECT LOCATED AT HWY 71 EAST OF 304, SATISFY THE REQUIREMENTS OF THE BASTROP CODE OF ORDINANCES, SECTION 38 AND ALL AMENDMENTS

*[Signature]*  
MARISSA MCKINNEY  
COLEMAN & ASSOCIATES  
10/14/19 DATE



**COLEMAN & ASSOCIATES**  
Landscape Architecture  
Environmental Design  
9890 Silver Mountain Drive  
Austin, Texas 78737  
Ph: 512-476-2090  
F: 512-476-2099  
1926 Cambria  
San Antonio, Texas 78258  
Ph: 210-482-4550  
F: 210-482-9930  
9511 Modesto Ave. NE  
Albuquerque, New Mexico 87122  
Ph: 505-433-3426



LANDSCAPE PLAN AND DETAILS  
CITY SUBMITTAL

BASTROP GROVE MEDTAL DEV.  
CITY OF BASTROP  
BASTROP COUNTY, TEXAS

REVISIONS	DATE	DESCRIPTION

SCALE: AS SHOWN  
DRAWN BY: MAM  
CHECKED BY: MAM  
APP. BY: MAM  
PROJECT NO.  
DATE: 10/14/2019

SHEET:  
18 OF 29

CUSTOMER COPY

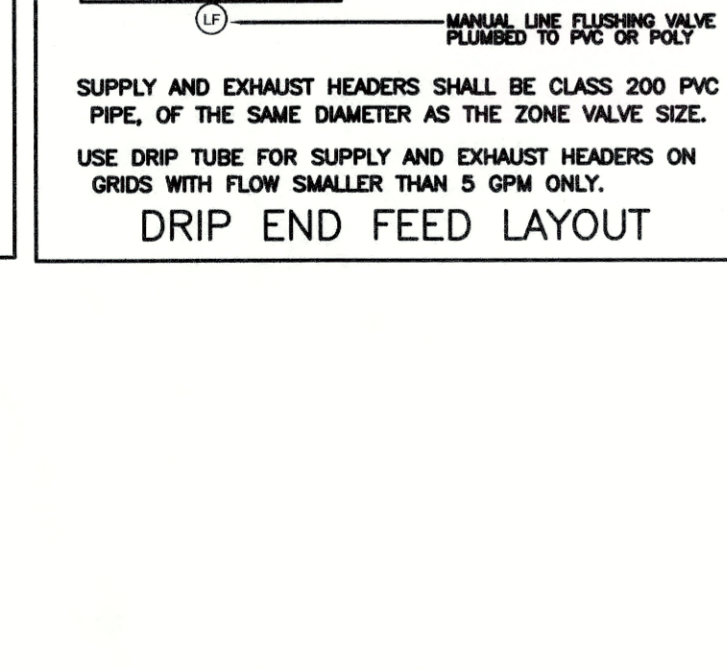
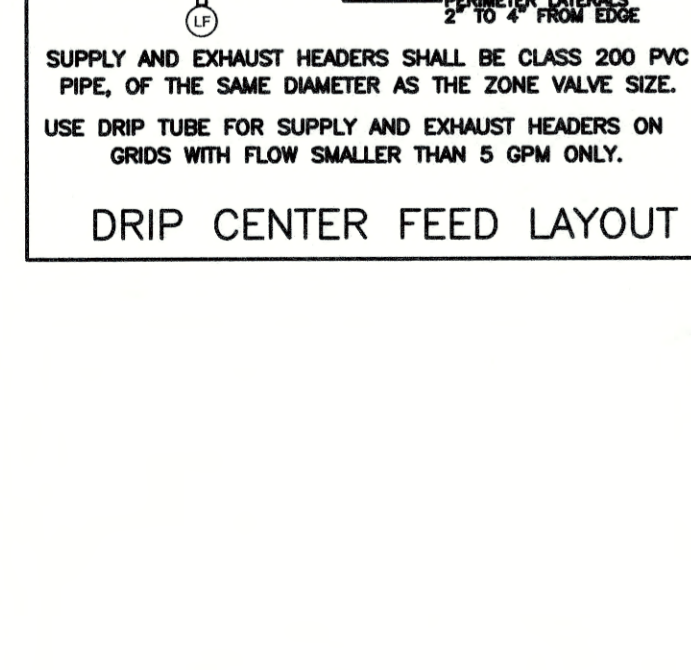
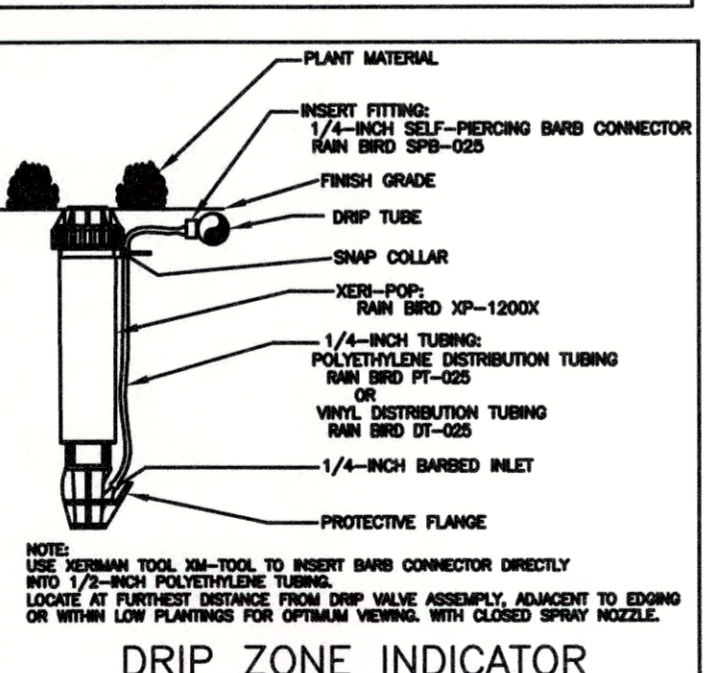
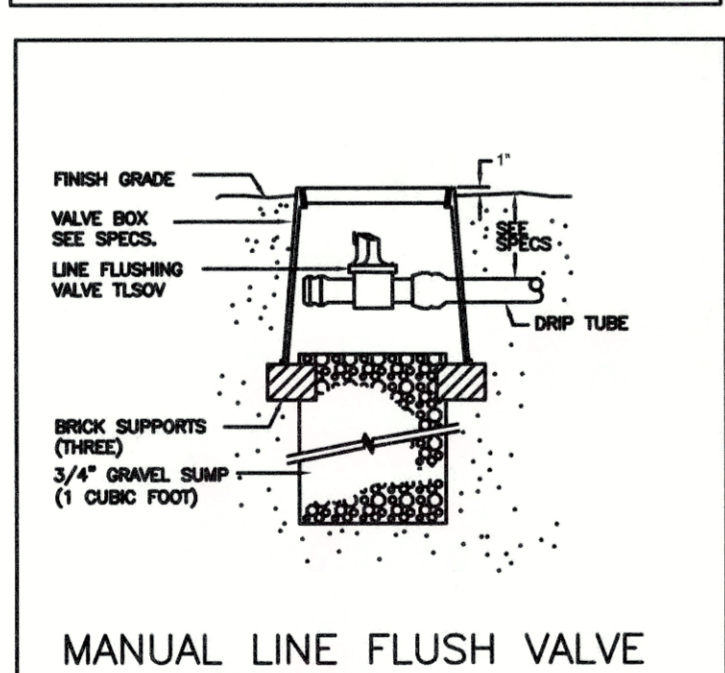
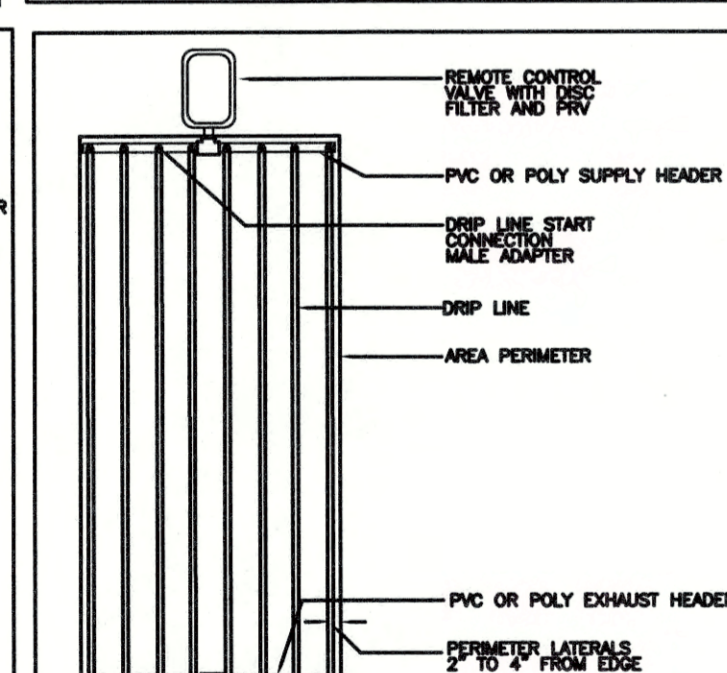
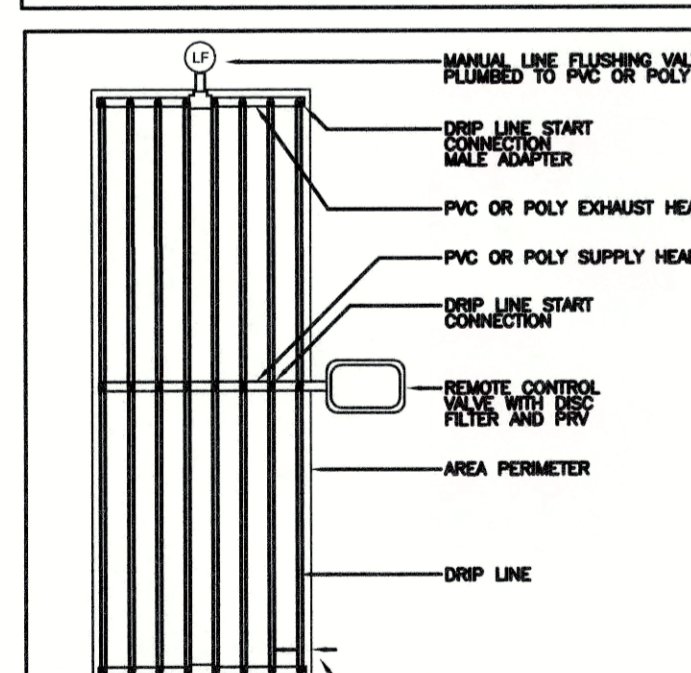
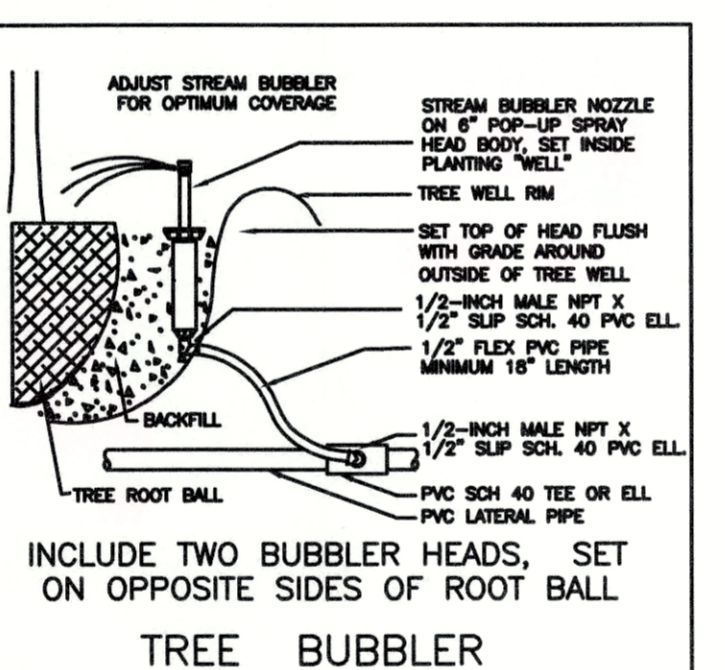
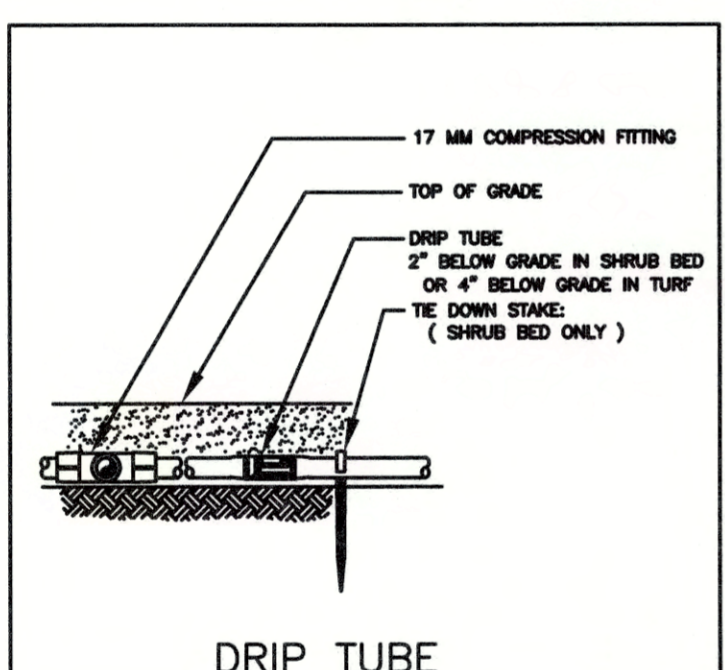
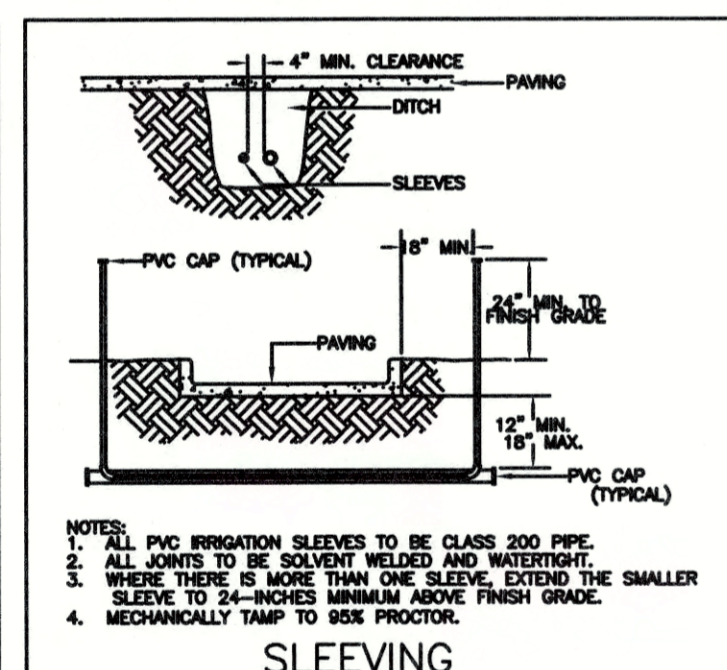
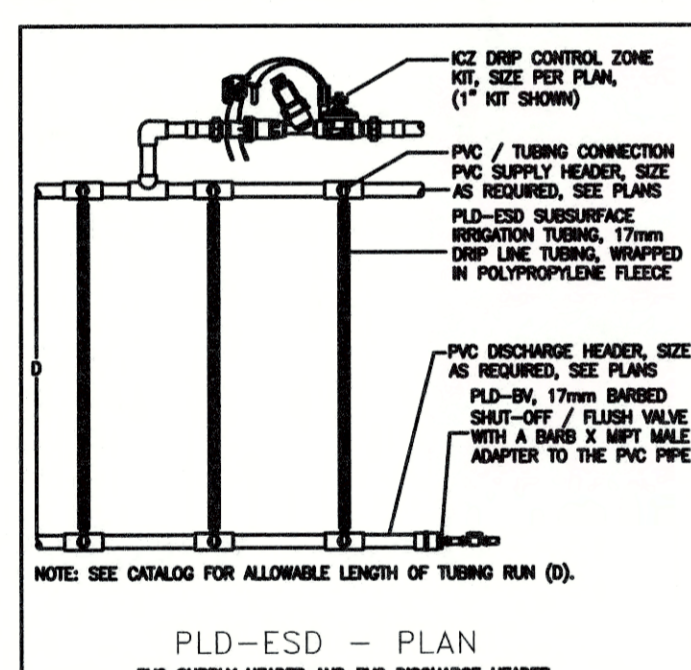
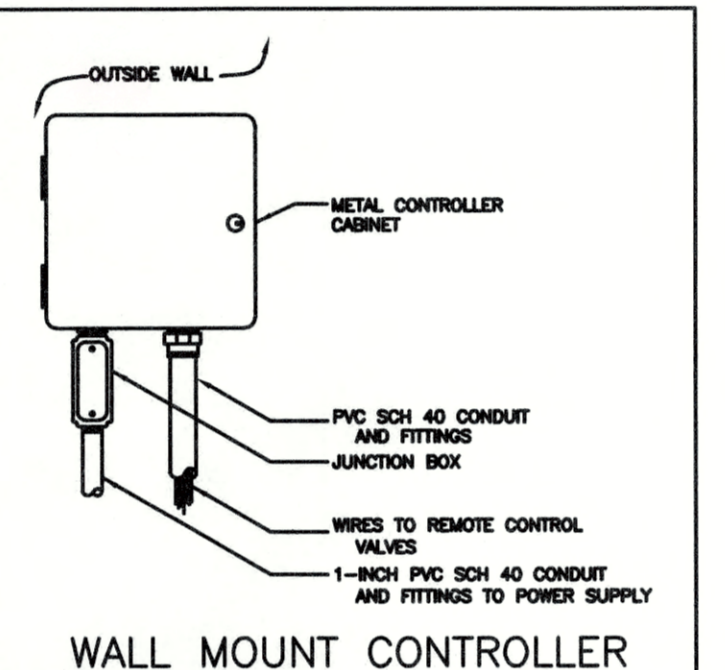
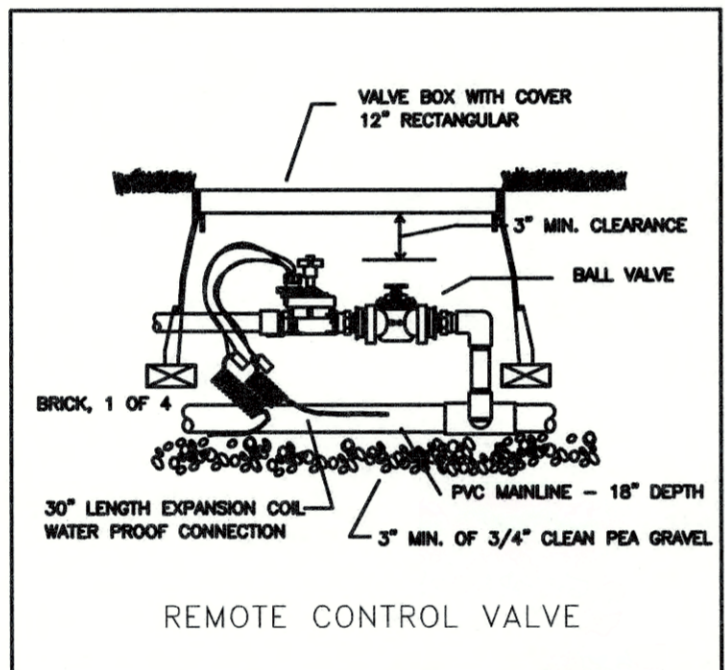
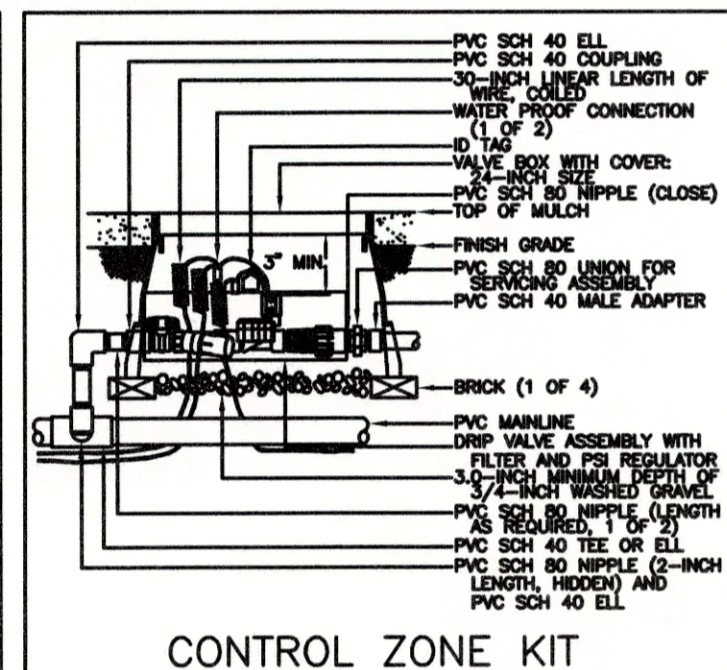
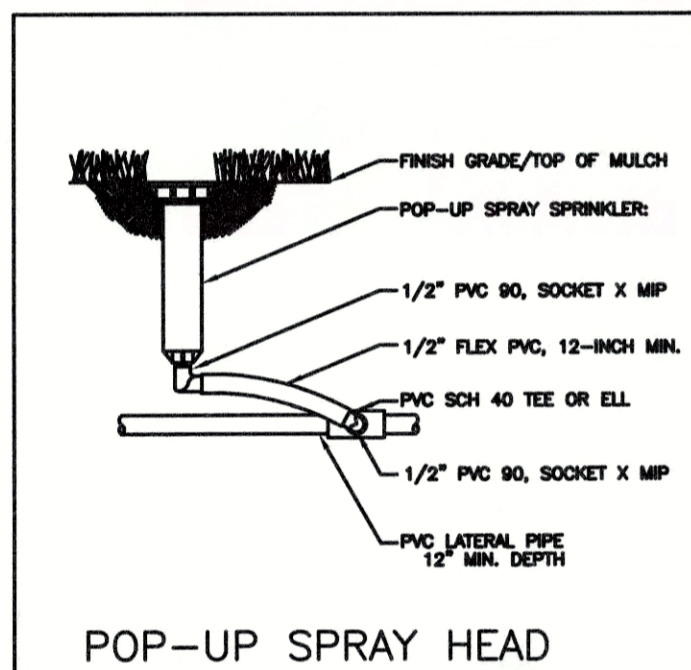


**LEGEND**

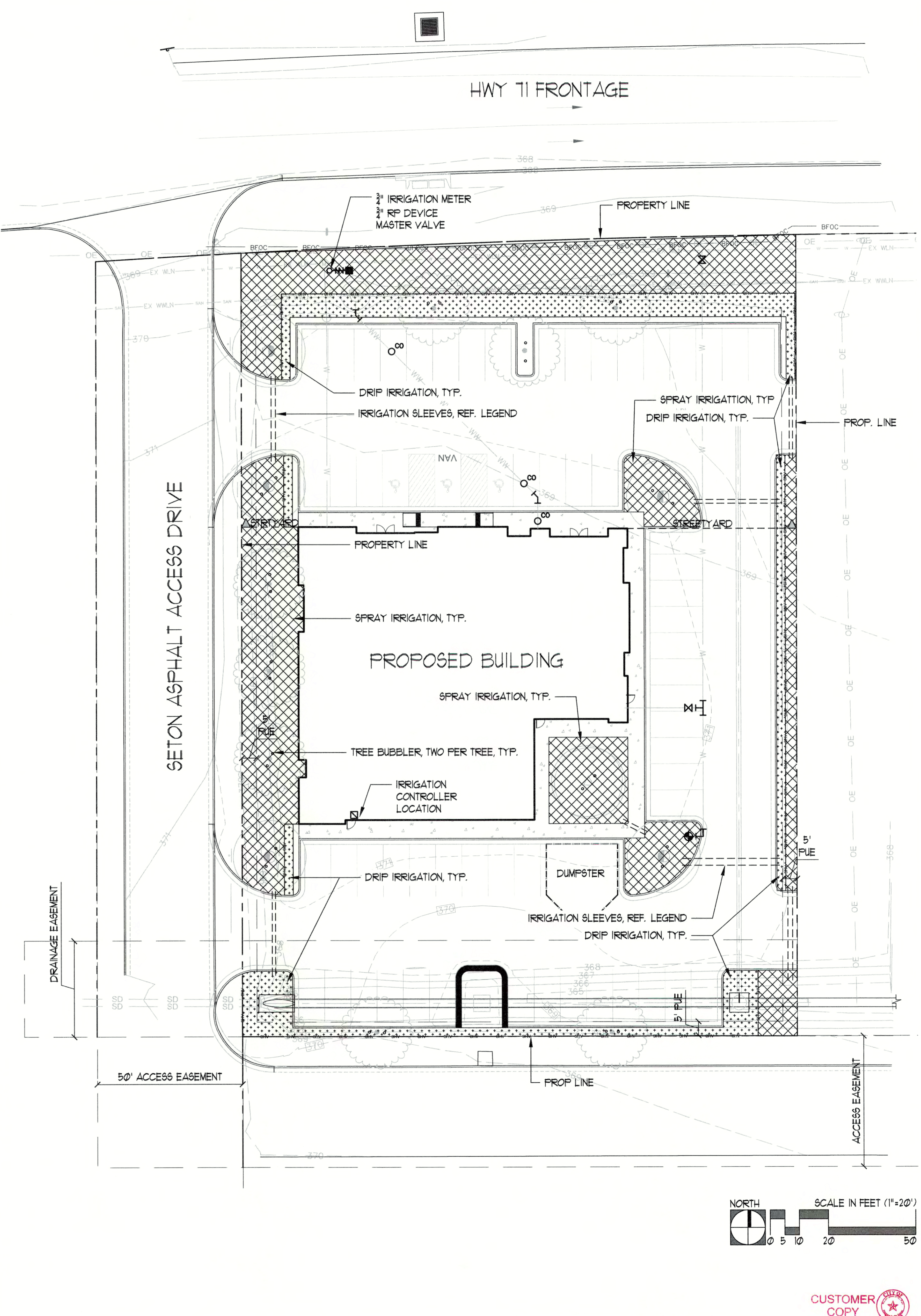
- HUNTER PROS-06-PRS30 SERIES POP UP SPRAY HEADS WITH HUNTER MSBN-50H STREAM BUBBLER NOZZLES. ( TWO PER TREE )  
SEE INSTALLATION NOTE #13 REGARDING TREE BUBBLER LATERAL PIPE
- /□ HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH SS / ES SERIES STRIP NOZZLE UNLESS NOTED OTHERWISE.
- HUNTER PROS-04-PRS30 SERIES POP UP SPRAY HEAD WITH PRO SPRAY SERIES NOZZLE AS NOTED BELOW
- ▬ NETAFIM TECHLINE TLHCVXR5-12 SERIES DRIP TUBE IN NARROW TURF AREAS INSTALLED AT 4" DEPTH  
SEE INSTALLATION NOTE #17 REGARDING DRIP TUBE LAYOUT IN TURF.
- ⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL VALVE WITH ICD-100 SERIES DECODER
- ⊕ HUNTER ICV SERIES ELECTRIC REMOTE CONTROL, "TREE BUBBLER ZONE" VALVE WITH ICD-100 SERIES DECODER  
SEE INSTALLATION NOTE #12 REGARDING TREE BUBBLER LATERAL PIPE
- ⊕ NETAFIM LVCZ SERIES DRIP VALVE ASSEMBLY WITH PRESSURE REGULATOR AND 140 MESH FILTER  
USE MODEL LVCZS8010075-LF FOR DRIP ZONES WITH .25 TO 4.4 GPM FLOW RATE WITH  
PRESSURE REGULATOR MODEL #PRV075LF42V2K  
USE MODEL LVCZ10075-HFHP FOR DRIP ZONES WITH 4.5 TO 17.6 GPM FLOW RATE  
PRESSURE REGULATOR MODEL #PRV075HF45V2K
- ⊕ WILKINS 375 SERIES REDUCED PRESSURE TYPE BACKFLOW PREVENTOR INSTALLED PER CITY CODE  
WITH SAME SIZE BRONZE BALL VALVE AND HEATED / INSULATED ENCLOSURE INSTALLED ON THE UP-STREAM SIDE.
- IRRIGATION WATER METER AND TAP, SIZE AS NOTED ON THE PLAN
- CONTROLLER "A"  
HUNTER ACC2 DECODER SERIES TWO-WIRE CONTROLLER MODEL A2C-75D-M WITH TWO A2C-D75 MODULES AND WIRELESS SOLAR SYNC SENSOR  
LOCATE SENSOR AS FIELD DIRECTED BY THE LANDSCAPE ARCHITECT
- ▬ SURGE PROTECTION DEVICE WITH GROUNDING DEVICE TO BE SPACED NO MORE THAN 500 FEET APART ALONG PATH
- BERMAID 310 RAM SERIES "MASTER" VALVE, ICD-100 DECODER, HFS SERIES FLOW METER WITH FCT AND ICD-SEN SENSOR DECODER
- MAINLINE PIPE  
3" DIAMETER AND SMALLER SHALL BE SCHEDULE 40 PVC SOLVENT-WELD TYPE  
4" DIAMETER AND LARGER SHALL BE CLASS 200 PVC O-RING GASKET TYPE WITH DUCTILE IRON GASKET FITTINGS  
4" EQUALIZER LINE BETWEEN TANKS SHALL BE SCHEDULE 40.
- CLASS 200 ( EXCEPT 1/2 INCH #315 ) PVC LATERAL PIPE
- ONE 4" CLASS 200 SLEEVE PIPES
- TWO 4" CLASS 200 SLEEVE PIPES AT PAVEMENT CROSSINGS WITH 2 1/2" MAINLINE OR SMALLER UNLESS NOTED OTHERWISE
- ONE 8" AND ONE 4" CLASS 200 SLEEVE PIPE AT PAVEMENT CROSSINGS WITH 4" MAINLINE UNLESS NOTED OTHERWISE

L.I.C. SHALL SELECT SPRAY NOZZLES FOR "HEAD-TO-HEAD" COVERAGE, ADJUSTED FOR NO OVERTSPRAY ONTO WALLS AND WALKS. NO OVERTSPRAY INTO STREETS IS PERMITTED.

ALL PIPES SHALL BE SIZED TO ALLOW A MAXIMUM FLOW VELOCITY OF 5 FEET PER SECOND



**BASTROPTX**  
Heart of the Lost Pines  
Est. 1971  
Final Drainage  
Plan Approved  
11/22/19

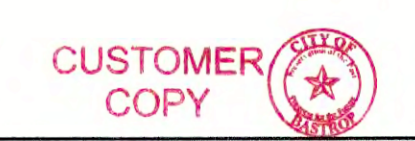


**IRRIGATION PLAN AND DETAILS**  
CITY SUBMITTAL

**BASTROP GROVE METAL DEV.**  
CITY OF BASTROP  
BASTROP COUNTY, TEXAS

REVISIONS

SCALE:	AS SHOWN
DRAWN BY:	MAM
CHECKED BY:	MAM
APP. BY:	MAM
PROJECT NO.	
DATE:	10/14/2019



**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
WATER DISTRIBUTION SYSTEM GENERAL  
CONSTRUCTION NOTES:**

- This water distribution system must be constructed in accordance with the current Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. At a minimum, construction for public water systems must always meet TCEQ's "Rules and Regulations for Public Water Systems.
- All newly installed pipes and related products must conform to American National Standards Institute (ANSI)/NSF International Standard 61 and must be certified by an organization accredited by ANSI [§290.44(a)(1)].
- Plastic pipe for use in public water systems must bear the NSF International Seal of Approval (NSF - pw) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio of 26 or less [§290.44(a)(2)].
- No pipe which has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply [§290.44(a)(3)].
- All water line crossings of wastewater mains shall be perpendicular [§290.44(e)(4)(B)].
- Water transmission and distribution lines shall be installed in accordance with the manufacturer's instructions. However, the top of the water line must be located below the frost line and in no case shall the top of the water line be less than 24 inches below ground surface [§290.44(a)(4)].
- The maximum allowable lead content of pipes, pipe fittings, plumbing fittings, and fixtures is 0.25 percent [§290.44(b)].
- The contractor shall install appropriate air release devices with vent openings to the atmosphere covered with 16 -mesh or finer, corrosion resistant screening material or an acceptable equivalent [§290.44(d)(1)].
- The contractor shall not place the pipe in water or where it can be flooded with water or sewage during its storage or installation [§290.44(f)(1)].
- When waterlines are laid under any flowing or intermittent stream or semi-permanent body of water the waterline shall be installed in a separate watertight pipe encasement. Valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested [§290.44(f)(2)].
- Pursuant to 30 TAC §290.44(a)(5), the hydrostatic leakage rate shall not exceed the amount allowed or recommended by the most current AWWA formulas for PVC pipe, cast iron and ductile iron pipe. Include the formula s in the notes on the plans.

The hydrostatic leakage rate for polyvinyl chloride (PVC) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C -605 as required in 30 TAC §290.44(a)(5) . Please ensure that the formula for this calculation is correct and most current formula is in use;

$$Q = \frac{LP\sqrt{P}}{148,000}$$

Where:

Q = the quantity of makeup water in gallons per hour,  
L = the length of the pipe section being tested, in feet,  
D = the nominal diameter of the pipe in inches, and  
P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

The hydrostatic leakage rate for ductile iron (DI) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C -600 as required in 30 TAC §290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use;

$$L = \frac{SP\sqrt{P}}{148,000}$$

Where:

L = the quantity of makeup water in gallons per hour,  
S = the length of the pipe section being tested, in feet,  
D = the nominal diameter of the pipe in inches, and  
P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
WATER DISTRIBUTION SYSTEM GENERAL  
CONSTRUCTION NOTES:**

- The contractor shall maintain a minimum separation distance in all directions of nine feet between the proposed waterline and wastewater collection facilities including manholes. If this distance cannot be maintained, the contractor must immediately notify the project engineer for further direction. Separation distances, installation methods, and materials utilized must meet §290.44(e)(1) - (4).
- The separation distance from a potable waterline to a wastewater main or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant [§290.44(e)(5)].
- Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater line, wastewater lateral, or wastewater service line regardless of construction [§290.44(e)(6)].
- Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line [§290.44(e)(7)].
- Waterlines shall not be installed closer than ten feet to septic tank drainfields [§290.44(e)(8)].
- The contractor shall disinfect the new waterlines in accordance with AWWA Standard C-651-14 or most recent, then flush and sample the lines before being placed into service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure which shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed waterline will be required or at the next available sampling point beyond 1,000 feet as designated by the design engineer [§290.44(f)(3)].
- Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655 -09 or most recent.

Revised: February 2019

**WATER & WASTEWATER NOTES:**

- Pipe material for water mains shall be pvc (awwa c-900, dr 14), or ductile iron (awwa c-115/151, minimum class 350). Water services (2inches or less) shall be polyethylene tubing (black, 200 psi, dr 9).
- Pipe material for pressure wastewater mains shall be pvc dr 21 or ductile iron (minimum class 350). Pipe material for gravity wastewater mains shall be pvc (astrn d3034, sdr-26).
- Unless otherwise accepted by the engineer, depth of cover for all lines out of the pavement shall be 42 inches minimum, and depth of cover for all lines under pavement shall be a minimum of 30 inches below subgrade.
- All fire hydrant leads shall be ductile iron pipe (awwa c-115/151, minimum class 350).
- All iron pipe and fittings shall be wrapped with minimum 8-mil polyethylene and sealed with duct tape or equal.
- The contractor shall notify city of bastrop, telephone at (512) 332-8920 to coordinate utility tie-ins and notify at least 48 hours prior to connecting to existing lines.
- The contractor must obtain a fire hydrant meter from city of bastrop for all water used during construction or, connect to well at plant, must coordinate with city of bastrop.
- The contractor must obtain a bulk water permit or purchase and install a water meter for all water used during construction. A copy of this permit must be carried at all times by all who use water.
- Line flushing or any activity using a large quantity of water must be scheduled with city of bastrop, telephone at (512) 332-8920.
- The contractor, at his expense, shall perform sterilization of all potable water lines constructed and shall provide all equipment (including test gauges), supplies (including concentrated chlorine disinfecting material), and necessary labor required for the sterilization procedure. The sterilization procedure shall be monitored by city of bastrop personnel. Water samples will be collected by the city of bastrop to verify each treated line has attained an initial chlorine concentration of 50 ppm. Where means of flushing is necessary, the contractor, at his expense, shall provide flushing devices and remove said devices prior to final acceptance.
- Sampling taps shall be brought up to 3 feet above grade and shall be easily accessible for city personnel. At the contractor's request, and in his presence, samples for bacteriological testing will be collected not less than 24 hours after the treated line has been flushed of the concentrated chlorine solution and charged with water approved by the city.
- The contractor, at his expense, shall perform quality testing for all wastewater pipe installed and pressure pipe hydrostatic testing of all water lines constructed and shall provide all equipment (including pumps and gauges), supplies and labor necessary to perform the tests. Quality and pressure testing shall be monitored by city of bastrop personnel and district personnel.
- The contractor shall coordinate testing with the city inspector and city of bastrop and provide no less than 24 hours notice prior to performing sterilization, quality testing or pressure testing.
- The contractor shall not open or close any valves unless authorized by the city of bastrop.
- All valve boxes and covers shall be cast iron.
- Contact city of bastrop utility, telephone at (512) 332-8920 for assistance in obtaining existing water and wastewater locations.
- Embedment materials shall include the material used for bedding, haunching and initial backfill and shall meet the requirements of astrn 2321, class 1 material. Embedment material shall be angular 1/4 to 3/4 inch uniformly graded, hard, durable crushed stone. The embedment material shall have 95 percent passing a 3/4 inch sieve and 95 percent retained on a 1/4 inch sieve (no. 4 sieve). No material which is rounded or has smooth surfaces shall be suitable for embedment material. Sand shall not be used for bedding
- The contractor is hereby notified that connecting to, shutting down, or terminating existing utility lines may have to occur at off-peak hours. Such hours are usually outside normal working hours and possibly between 12 a.M. And 6 a.M.
- All wastewater construction shall be in accordance with the texas commission on environmental quality (tceq) regulations, 30 tac chapter 213 and 317, as applicable. Whenever tceq and city of bastrop specifications conflict, the more stringent shall apply.

**GENERAL NOTES:**

- All construction shall be in accordance with the city of bastrop design and construction standards manual.
- Any existing utilities, pavement, curbs, sidewalks, structures, trees, etc., not planned for demolition that are damaged or removed shall be repaired or replaced at the applicant's expense.
- The contractor shall verify all depths and locations of existing utilities prior to any construction. Any discrepancies with the construction plans found in the field shall be reported immediately to the attention of the engineer who shall be responsible for revising the plans are appropriate.
- Manhole frames, covers, valves, cleanouts, etc. Shall be raised to finished grade after to final paving construction. A concrete square shall be poured around all appurtenances.
- All areas disturbed or exposed during construction shall be re-vegetated in accordance with the plans and specifications. Re-vegetation is to take place within 14 days of construction inactivity. Re-vegetation of all disturbed or exposed areas shall consist of sodding or seeding, at the contractor's option. However, the type of re-vegetation must equal or exceed the type of vegetation present before construction
- Prior to any construction, the applicant's engineer shall convene a preconstruction conference between himself, the city of bastrop, the contractor, utility companies, any affected parties and any other entity the city or the engineer may require. Referenced development packet for guidance on how to schedule a preconstruction conference.
- The contractor and the engineer shall keep accurate records of all construction that deviates from the plans. The engineer shall furnish the city of bastrop accurate "as-built" drawings following completion of all construction.
- When construction is being carried out within easements, the contractor shall confine his work to within the permanent and any temporary easements. Prior to final acceptance, the contractor shall be responsible for removing all trash and debris within the permanent and temporary easements.
- Prior to any construction, the contractor shall apply for and secure all proper permits from the appropriate authorities.
- All storm sewer fittings must be pre-cast.
- Available benchmarks that may be utilized for the construction of this project are described as follows:
- All responsibility for the adequacy of these plans remains with the engineer who prepared them. In reviewing these plans, the city of bastrop must rely upon the adequacy of the design engineer.
- The locations of existing underground utilities are shown in an approximate way only and have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be associated with the contractor's failure to exactly locate and preserve any and all underground utilities.
- This project is located in the colorado river watershed.
- No portion of this tract is within the boundaries of the 100-year flood plain of any waterway that is within the limits of study of the federal flood insurance administration firm map no. 48021co335e, dated january 19, 2006, bastrop county, texas. Bastrop county community no. 481193.
- All mechanical equipment not shown will require screening from public view.

**CONSTRUCTION SEQUENCE:**

- No clearing or rough grading may be done until the approved erosion and sedimentation controls are in place.
- Hold pre-construction conference.
  - Install temporary erosion and sedimentation controls and stabilized construction entrance as shown on the plans.
  - With the approval of all affected parties, the contractor may begin clearing and grubbing.
  - Install storm drainage and utilities.
  - Complete all rough grading and underground installation within the limits of construction. Insure that all underground utility crossings are completed.
  - Construct site paving and improvements.
  - Complete final grading within limits of construction along areas designated, including ditches and parkways restore construction spoils & staging area to natural grade.
  - Complete permanent erosion control and restoration of site vegetation.
  - Project engineer observes construction and writes concurrence letter to the city of bastrop and the district.
  - After final inspection and acceptance of construction, complete any necessary final dress up of disturbed areas and remove/ dispose of temporary erosion controls in an approved manner.

DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	

**Carlson, Brigrance & Doering, Inc.**  
Civil Engineering & Surveying  
FIRM ID #13791  
Main Office: 5501 West William Garrison Dr., Austin, Texas 78750  
North Office: 12129 RANCH ROAD 620 NORTH, SUITE 600, AUSTIN, TEXAS 78750  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

**GENERAL NOTES**  
**BASTROP GROVE MEDTAL DEVELOPMENT**  
**CIVIL SITE DEVELOPMENT PLANS**

SHEET NAME:  
JOB NAME:  
PROJECT:

DEVELOPER INFORMATION: OWNER: GROVE 71 PARTNERS, LP-TYLER DUTTON

ADDRESS: 3809 S. 2ND STREET, D-200  
AUSTIN, TEXAS 78704

PHONE: 512 437-6404

DESIGN ENGINEER/REPRESENTATIVE RESPONSIBLE FOR PLAN CHANGES

NAME: CARLSON BRIGANCE & DOERING, INC. - BRENDAN P. McENTEE, P.E.

ADDRESS: 12129 RANCH ROAD 620 NORTH, SUITE 600  
AUSTIN TX 78750

PHONE: (512) 280-5160

DATE: 11/25/2019  
JOB NUMBER: 5135  
SHEET: 20 OF 29  
SHEET NO.: 20

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CONSTRUCTION PLAN NOTES

GENERAL NOTES

- All construction shall be in accordance with the City of Bastrop Design and Construction Standards Manual.
- Any existing utilities, pavement, curbs, sidewalks, structures, trees, etc., not planned for demolition that are damaged or removed shall be repaired or replaced at the Applicant's expense.
- The Contractor shall verify all depths and locations of existing utilities prior to any construction. Any discrepancies with the construction plans found in the field shall be brought immediately to the attention of the Engineer who shall be responsible for revising the plans are appropriate.
- Manhole frames, covers, valves, cleanouts, etc. shall be raised to finished grade after to final paving construction. A concrete square shall be poured around all appurtenances.
- The Contractor shall give the City of Bastrop 48 hours notice before beginning each phase of construction. Notice shall be given to the Planning and Development Department: telephone 512-332-8841.
- All areas disturbed or exposed during construction shall be re-vegetated in accordance with the plans and specifications. Re-vegetation is to take place within 14 days of construction inactivity. Re-vegetation of all disturbed or exposed areas shall consist of sodding or seeding, at the Contractor's option. However, the type of re-vegetation must equal or exceed the type of vegetation present before construction
- Prior to any construction, the Applicant's Engineer shall convene a preconstruction conference between himself, the City of Bastrop, the Contractor, utility companies, any affected parties and any other entity the City or the Engineer may require. Reference Development Packet for guidance on how to schedule a preconstruction conference.
- The Contractor and the Engineer shall keep accurate records of all construction that deviates from the plans. The Engineer shall furnish the City of Bastrop accurate "As-Built" drawings following completion of all construction. These "As-Built" drawings shall meet with the satisfaction of the Planning and Development Department prior to final acceptance.
- The Bastrop City Council shall not be petitioned for acceptance until all necessary easement documents have been signed and recorded.
- When construction is being carried out within easements, the Contractor shall confine his work to within the permanent and any temporary easements. Prior to final acceptance, the Contractor shall be responsible for removing all trash and debris within the permanent and temporary easements. Clean-up shall be to the satisfaction of the Director.
- Prior to any construction, the Contractor shall apply for and secure all proper permits from the appropriate authorities.
- Available benchmarks that may be utilized for the construction of this project are described as follows:

TRENCH SAFETY NOTES

- In accordance with the Laws of the State of Texas and the U. S. Occupational Safety and Health Administration regulations, all trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, shored, sheeted, braced or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project will be provided by the contractor to the City.
- In accordance with the U. S. Occupational Safety and Health Administration regulations, when persons are in trenches 4-feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.
- If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth and during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the Engineer notified immediately. Construction shall not resume until appropriate trench safety system details, as designed by a professional engineer, are retained and copies submitted to the City of Bastrop.

STREET AND DRAINAGE NOTES

- All testing shall be done by an independent laboratory at the Applicant's expense. A City Inspector shall be present during all tests. Testing shall be coordinated with the City inspector and he shall be given a minimum of 24 hours notice prior to any testing. Contact the Planning and Development Department with notice 512-332-8841.
- Backfill behind the curb shall be compacted to obtain a minimum of 85% maximum density to within 3 inches of top of curb. Material used shall be primarily granular with no rocks larger than 3 inches in the greatest dimension. The remaining 3 inches shall be clean topsoil free from all clods and suitable for sustaining plant life.
- Depth of cover for all crossings under pavement including gas, electric, telephone, cable TV, water services, etc., shall be a minimum of 30 inches below subgrade.
- Street rights-of-way shall be graded at a slope of 1/4 inch per foot toward the curb unless otherwise indicated. However, in no case shall the width of right-of-way at 1/4 inch per foot slope be less than 10 feet unless a specific request for an alternate grading scheme is made to and accepted by the City of Bastrop Planning and Development Department.
- Barricades built to City of Bastrop standards shall be constructed on all dead-end streets and as necessary during construction to maintain job and public safety.

- All RCP shall be minimum Class III.
- The paving sections were designed by the engineer in accordance with the current City of Bastrop design criteria. The paving sections are to be constructed as follows:  
Paving and Drives: 2" HMAAC Type D, 8" Flex Base, 9" Compact Subgrade
- The Geotechnical Engineer shall inspect the subgrade for compliance with the design assumptions made during preparation of the Soils Report. Any adjustments that are required shall be made through revision of the construction plans.
- Where PI's are over 20, subgrades must be stabilized utilizing a method acceptable to the City Engineer. The Geotechnical Engineer shall recommend an appropriate subgrade stabilization if sulfates are determined to be present.

WATER AND WASTEWATER NOTES

- Pipe material for water mains shall be PVC (AWWA C-900, minimum Class 200), or Ductile Iron (AWWA C-100, minimum Class 200). Water services (2 inches or less) shall be polyethylene tubing (black, 200 psi, DR 9).
- Pipe material for pressure wastewater mains shall be PVC, or Ductile Iron (minimum Class 250). Pipe material for gravity wastewater mains shall be PVC (ASTM D2241 or D3034, maximum DR-26), Ductile Iron (AWWA C-100, minimum Class 200200).
- Unless otherwise accepted by the City Engineer, depth of cover for all lines out of the pavement shall be 42 inches minimum, and depth of cover for all lines under pavement shall be a minimum of 30 inches below subgrade.
- All fire hydrant leads shall be PVC (AWWA C-900, minimum Class 200) or ductile iron pipe (AWWA C-100, minimum Class 200), as approved by the Director of Water and Wastewater during plan review.
- All iron pipe and fittings shall be wrapped with minimum 8-mil polyethylene and sealed with duct tape or equal accepted by the City Engineer.
- The Contractor shall contact the City Inspector, telephone at 512-332-8841 to coordinate utility tie-ins and notify him at least 48 hours prior to connecting to existing lines.
- All manholes shall be concrete with cast iron ring and cover. All manholes located outside of the pavement shall have bolted covers. Tapping of fiberglass manholes shall not be allowed.
- The Contractor must obtain a bulk water permit or purchase and install a water meter for all water used during construction. A copy of this permit must be carried at all times by all who use water.
- Line flushing or any activity using a large quantity of water must be scheduled with the City Inspector, telephone at 512-332-8841.
- The Contractor, at his expense, shall perform sterilization of all potable water lines constructed and shall provide all equipment (including test gauges), supplies (including concentrated chlorine disinfecting material), and necessary labor required for the sterilization procedure. The sterilization procedure shall be monitored by City of Bastrop personnel. Water samples will be collected by the City of Bastrop to verify each treated line has attained an initial chlorine concentration of 50 ppm. Where means of flushing is necessary, the Contractor, at his expense, shall provide flushing devices and remove said devices prior to final acceptance by the City of Bastrop.
- Sampling taps shall be brought up to 3 feet above grade and shall be easily accessible for City personnel. At the Contractor's request, and in his presence, samples for bacteriological testing will be collected by the City of Bastrop not less than 24 hours after the treated line has been flushed of the concentrated chlorine solution and charged with water approved by the City. The Contractor shall supply a check or money order, payable to the City of Bastrop, to cover the fee charged for testing each water sample. City of Bastrop fee amounts may be obtained by calling the Water and Wastewater Department, telephone at 512-332-8960
- The Contractor, at his expense, shall perform quality testing for all wastewater pipe installed and pressure pipe hydrostatic testing of all water lines constructed and shall provide all equipment (including pumps and gauges), supplies and labor necessary to perform the tests. Quality and pressure testing shall be monitored by City of Bastrop personnel.
- The Contractor shall coordinate testing with the City of Inspector and provide no less than 24 hours notice prior to performing sterilization, quality testing or pressure testing.
- The Contractor shall not open or close any valves unless authorized by the City of Bastrop.
- All valve boxes and covers shall be plastic.
- Contact the Water and Wastewater Department, telephone at 512-332-8960 for assistance in obtaining existing water and wastewater locations.
- The Planning and Development Department, telephone at 512-332-8841 shall be notified 48 hours prior to testing of any building sprinkler piping in order that the Building Official and/or Fire Department may monitor such testing.
- Sand, as described in Specification item 510 pipe, shall not be used as bedding for wastewater lines. Acceptable bedding materials are pipe bedding stone, pea gravel and in lieu of sand, a naturally occurring or manufactured stone material conforming to ASTM C33 for stone quality and meeting the following gradation specification:

Sieve Size	Percent Retained By Weight
1/2"	0
3/8"	0-2
#4	40-85
#10	95-100

- The Contractor is hereby notified that connecting to, shutting down, or terminating existing utility lines may have to occur at off-peak hours. Such hours are usually outside normal working hours and possibly between 12 a.m. and 6 a.m.
- All wastewater construction shall be in accordance with the Texas Commission on Environmental Quality (TCEQ) Regulations, 30 TAC Chapter 213 and 317, as applicable. Whenever TCEQ and City of Bastrop Specifications conflict, the more stringent shall apply.

TRAFFIC MARKING NOTES

- Any methods, street markings and signage necessary for warning motorists, warning pedestrians or diverting traffic during construction shall conform to the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.
- All pavement markings, markers, paint, traffic buttons, traffic controls and signs shall be installed in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges and, the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest editions.

EROSION AND SEDIMENTATION CONTROL NOTES

- Erosion control measures, site work and restoration work shall be in accordance with the City of Bastrop Code of Ordinances.
- All slopes shall be sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.
- Silt fences, rock berms, sedimentation basins and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Such installation shall be regularly inspected by the City of Bastrop for effectiveness. Additional measures may be required if, in the opinion of the City Engineer, they are warranted.
- All temporary erosion control measures shall not be removed until final inspection and approval of the project by the City Inspector. It shall be the responsibility of the Contractor to maintain all temporary erosion control structures and to remove each structure as approved by the City Inspector.
- All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.

BASTROP FIRE DEPARTMENT GENERAL NOTES

- The bastrop fire department requires final asphalt or concrete pavement on required access roads prior to the start of combustible construction. Any other method of providing "all-weather driving capabilities" shall be required to be documented and approved as an alternate method of construction in accordance with the applicable rules for temporary roads.
- Fire hydrants shall be installed with the center of the large diameter hose connection (steamer) located at least 18 inches above finished grade. The steamer opening of fire hydrants shall face the approved fire access driveway or public-street set back from curb line(s) an approved distance, typically three (3) to six (6) feet. The area within three (3) feet in all directions from any fire hydrant shall be free of obstructions and the area between the steamer opening and the street or driveway giving emergency vehicle access shall be free of obstructions.
- Timing of installations: when fire protection facilities are installed by the contractor, such facilities shall include surface access roads. Emergency access roads or drives shall be installed and made serviceable prior to and during the time of construction. When the fire department approves an alternate method of protection, this requirement may be modified as documented in the approval of the alternate method.
- All emergency access roadways and fire lanes, including pervious/decorative paving, shall be engineered and installed as required to support the axle loads of emergency vehicles. A load capacity sufficient to meet the requirements for hs-20 loading (16 kips/wheel) and a total vehicle live load of 80,000 pounds is considered compliant with this requirement.
- Fire lanes designated on site plans shall be registered with the bastrop fire department and inspected for final approval.
- The minimum vertical clearance required for emergency vehicle access roads or drives is 13 feet - 6 inches for the full width of the roadway or driveway.
- Dumpsters and containers with an individual capacity of 1.5 cubic yards or more shall not be stored in buildings or placed within ten feet of combustible walls, openings, or combustible roof eave lines.

DESIGNED BY:	DRAWN BY:
DATE	REVISION

Carlson, Brigrance & Doering, Inc.  
Civil Engineering & Surveying  
FIRM ID #F7791  
Main Office: 5501 Westwood Dr., Austin, Texas 78749  
North Office: 12129 Rife Rd., Austin, Texas 78750  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

SHEET NAME: CONSTRUCTION NOTES  
JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT  
PROJECT: CIVIL SITE DEVELOPMENT PLANS

DATE: 11/25/2019  
JOB NUMBER: 5135  
SHEET: 21 OF 29  
SHEET NO.: 21

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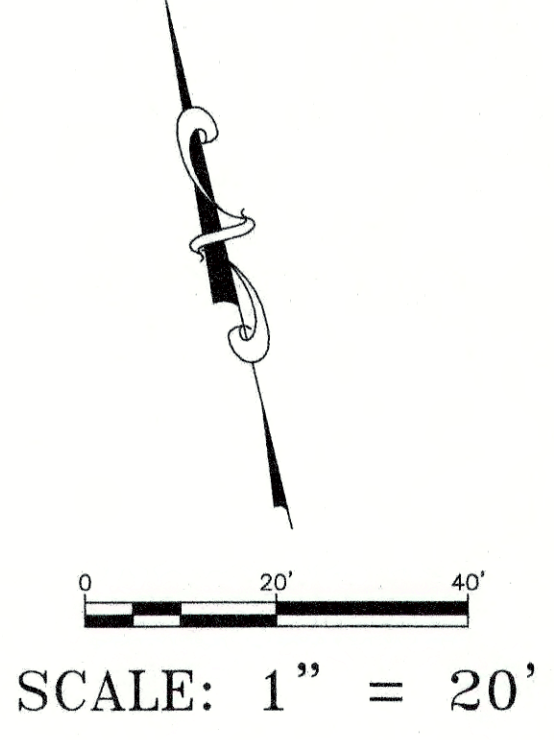
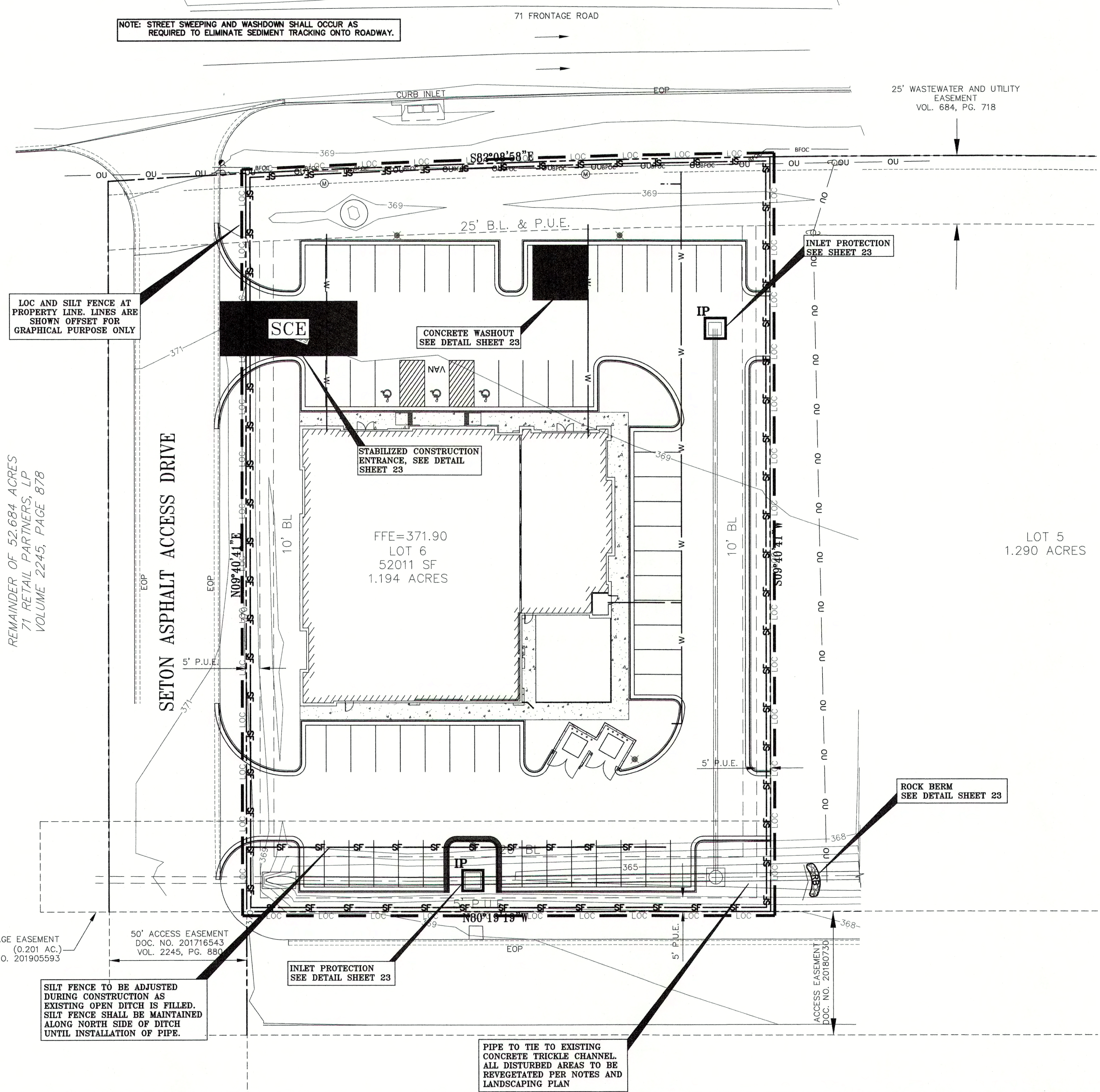
DESIGNED BY:	DATE:
DRAFTED BY:	REVISION:

Carlson, Brigrance & Doering, Inc.  
 Civil Engineering & Surveying  
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 North Office: 12129 North Loop West, Austin, Texas 78758  
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SHEET NAME: EROSION CONTROL PLAN  
 JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT  
 PROJECT: CIVIL SITE DEVELOPMENT PLANS

STATE OF TEXAS  
 BRENDAN P. MCENTEE  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 CARLSON, BRIGRANCE & DOERING, INC.  
 ID# F3791  
 02/06/2020  
 DATE: 11/25/2019  
 JOB NUMBER: 5135  
 SHEET: 22 OF 29  
 SHEET NO.: 22

NOTE: STREET SWEEPING AND WASHDOWN SHALL OCCUR AS REQUIRED TO ELIMINATE SEDIMENT TRACKING ONTO ROADWAY.



**LEGEND**

	SILT FENCE
	LIMITS OF CONSTRUCTION
	INLET PROTECTION
	ROCK BERM
	STABILIZED CONSTRUCTION ENTRANCE
	CONCRETE WASHOUT

WARNING!!!  
 REVIEW THE SEQUENCE OF CONSTRUCTION ON THE GENERAL NOTES SHEET PRIOR TO BEGINNING CONSTRUCTION

!!! WARNING !!!  
 UNDERGROUND UTILITIES SHOWN ON THESE PLANS IS A BEST ESTIMATE BASED ON RECORDS THAT COULD BE OBTAINED AND PHYSICAL FEATURES VISIBLE AT THE GROUND LEVEL. THE ENGINEER MAKES NO ASSERTIONS BEYOND THAT THEY ARE A BEST ESTIMATE AND AN ATTEMPT TO HELP IDENTIFY POSSIBLE UTILITIES IN THE AREA. THE CONTRACTOR MUST CALL ONE CALL IN ACCORDANCE WITH THE NOTES TO BETTER LOCATE ANY UNDERGROUND UTILITIES.

- GENERAL EROSION CONTROL NOTES:**
- 1) CONTRACTOR TO FIELD LOCATE DIVERSION, INTERCEPTOR, AND PERIMETER DIKES/DITCHES AS REQUIRED BASED ON THE DRAIN SEQUENCE OF CONSTRUCTION.
  - 2) IF DISTURBED AREA IS NOT WORKED FOR MORE THAN 14 DAYS THEN DISTURBED AREA NEEDS TO BE STABILIZED BY REVEGETATION, MULCH, TARP, OR MATTING.
  - 3) THE ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN-COMPLIANCE WITH THE CITY OF BASTROP RULES AND REGULATIONS.
  - 4) THE CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING SITE CONSTRUCTION SUCH AS WATERING WITH IRRIGATION TRUCKS AND MULCHING AS PER CITY REQUIREMENTS, OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
  - 5) SILT FENCE TYPE AND INSTALLATION SHALL COMPLY WITH CITY OF BASTROP RULES AND REGULATIONS.
  - 6) CONTRACTOR WILL CHECK AND IF NECESSARY CLEAN UP SPOILS THAT MIGRATE ONTO THE ROADS A MINIMUM OF ONCE DAILY.
  - 7) CONTRACTOR IS SOLELY RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING COMPLIANCE WITH SWPPP INSPECTION, REPORTING, NOI, AND NOT FILING. THE PLAN SHOWN IS THE MINIMUM REQUIRED AND THE CONTRACTOR SHALL MODIFY THE PLAN AS REQUIRED TO ELIMINATE SEDIMENT FROM LEAVING THE SITE.
  - 8) ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY ARE TO BE REVEGETATED IN ACCORDANCE WITH THIS SHEET AND THE LANDSCAPING PLAN. REFER TO SHEET 23 FOR EROSION CONTROL DETAILS AND ADDITIONAL NOTES REGARDING REVEGETATION.

LOC AND SILT FENCE AT PROPERTY LINE. LINES ARE SHOWN OFFSET FOR GRAPHICAL PURPOSE ONLY

REMAINDER OF 52.684 ACRES  
 71 RETAIL PARTNERS, LP  
 VOLUME 2245, PAGE 878

SCE

CONCRETE WASHOUT  
 SEE DETAIL SHEET 23

STABILIZED CONSTRUCTION ENTRANCE  
 SEE DETAIL SHEET 23

INLET PROTECTION  
 SEE SHEET 23

ROCK BERM  
 SEE DETAIL SHEET 23

INLET PROTECTION  
 SEE DETAIL SHEET 23

PIPE TO TIE TO EXISTING CONCRETE TRICKLE CHANNEL  
 ALL DISTURBED AREAS TO BE REVEGETATED PER NOTES AND LANDSCAPING PLAN

SILT FENCE TO BE ADJUSTED DURING CONSTRUCTION AS EXISTING OPEN DITCH IS FILLED. SILT FENCE SHALL BE MAINTAINED ALONG NORTH SIDE OF DITCH UNTIL INSTALLATION OF PIPE.

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 (0.201 AC.)  
 NO. 201905593

50' ACCESS EASEMENT  
 DOC. NO. 201716543  
 VOL. 2245, PG. 880

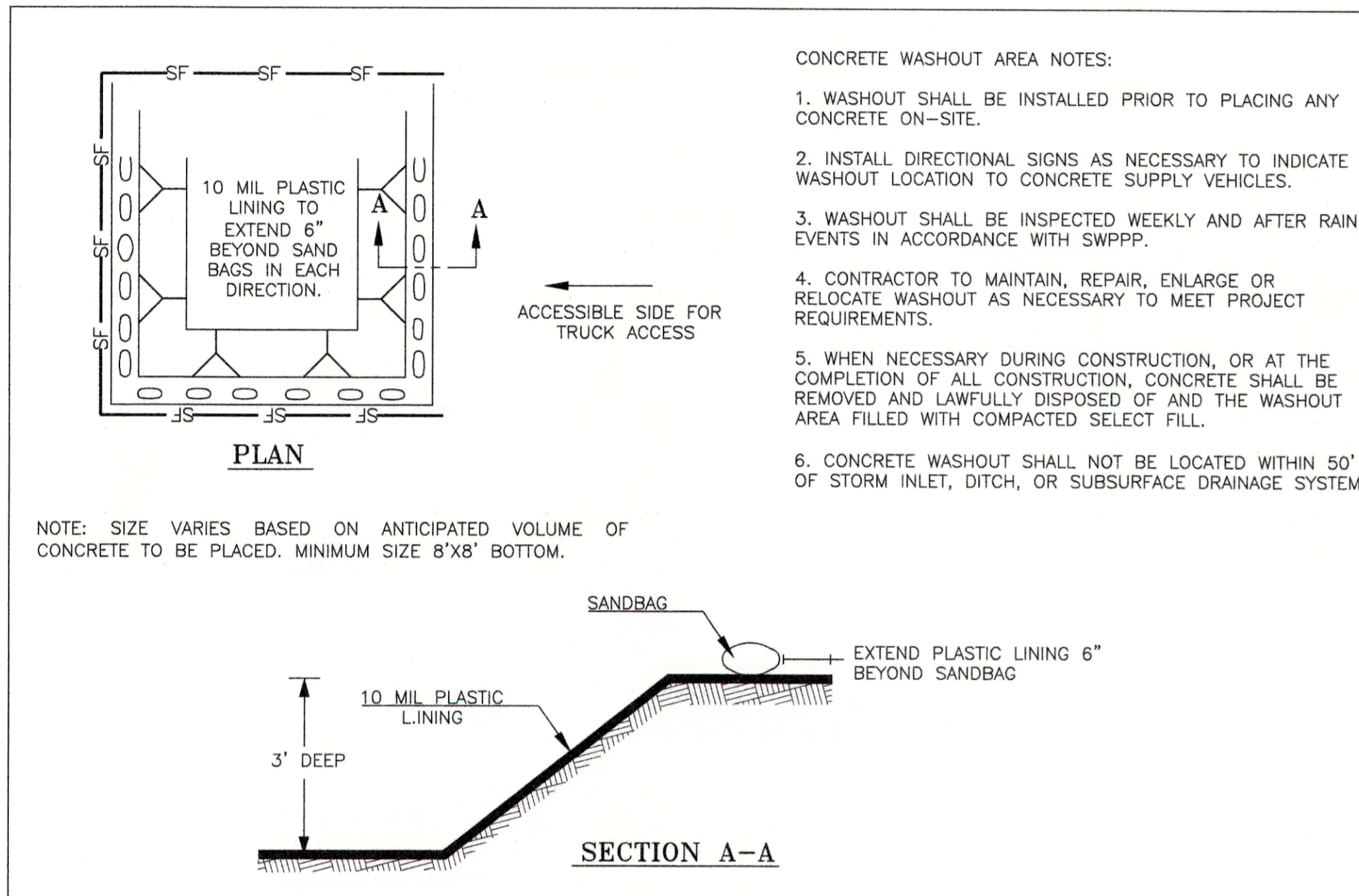
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DATE:	
REVISION:	

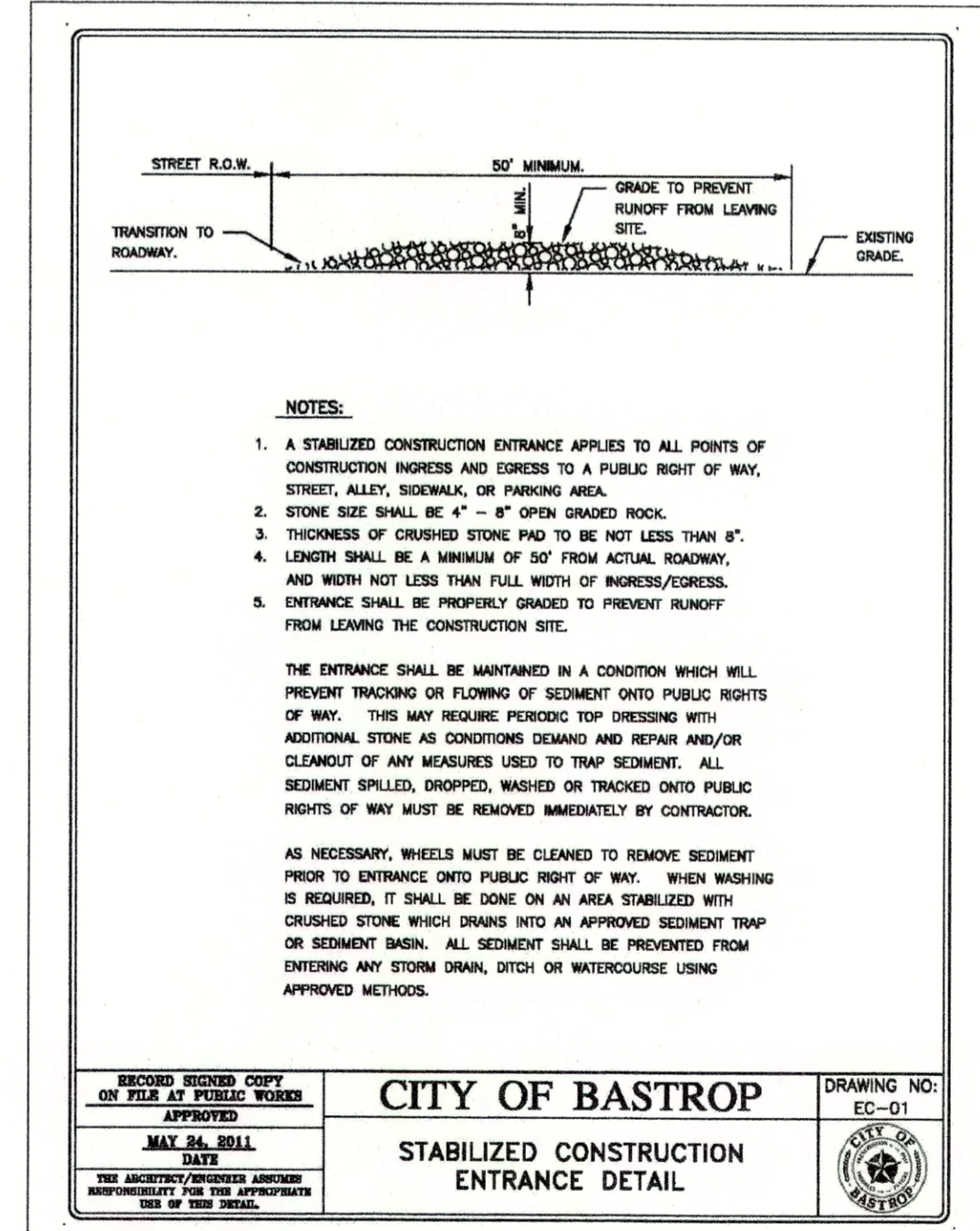
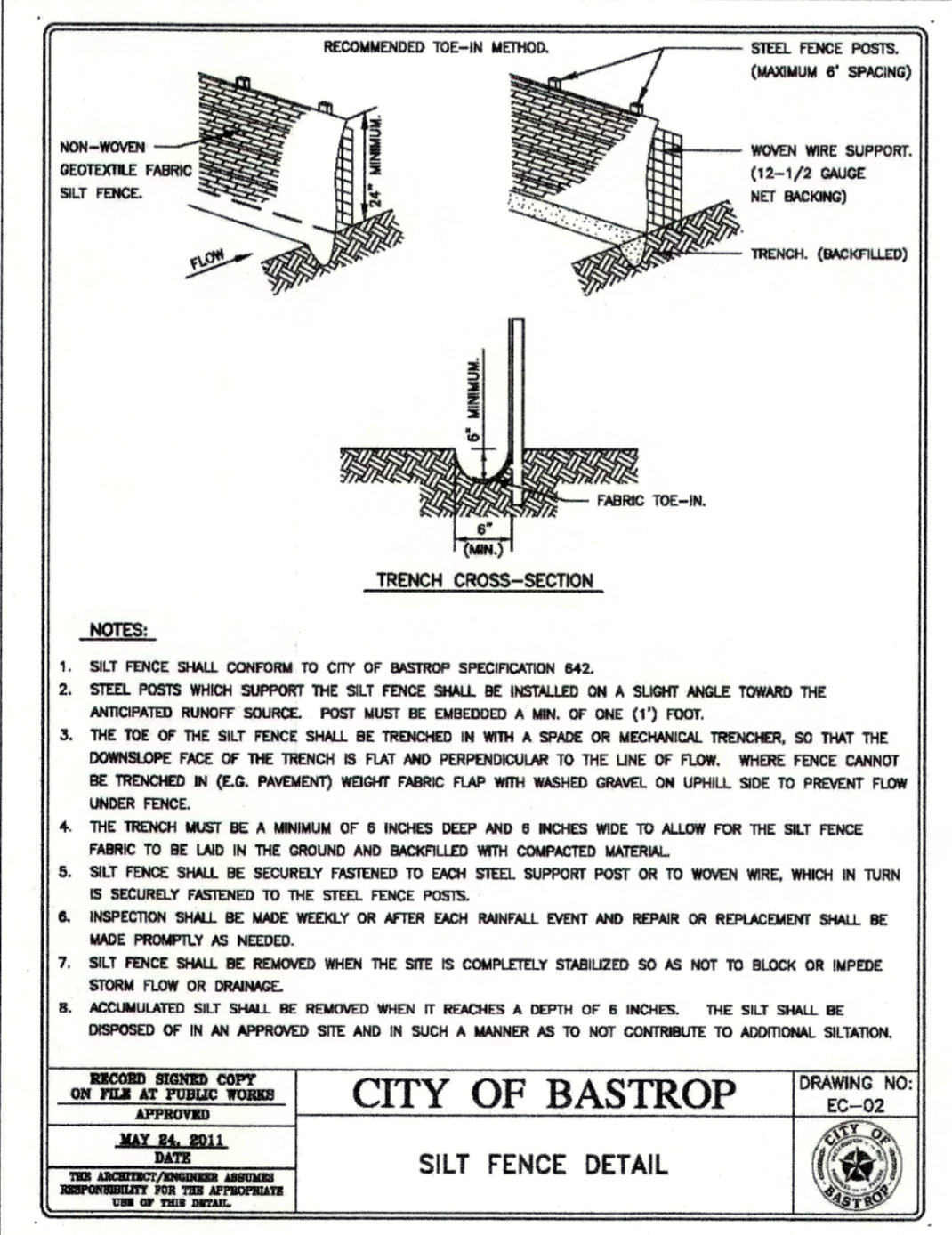
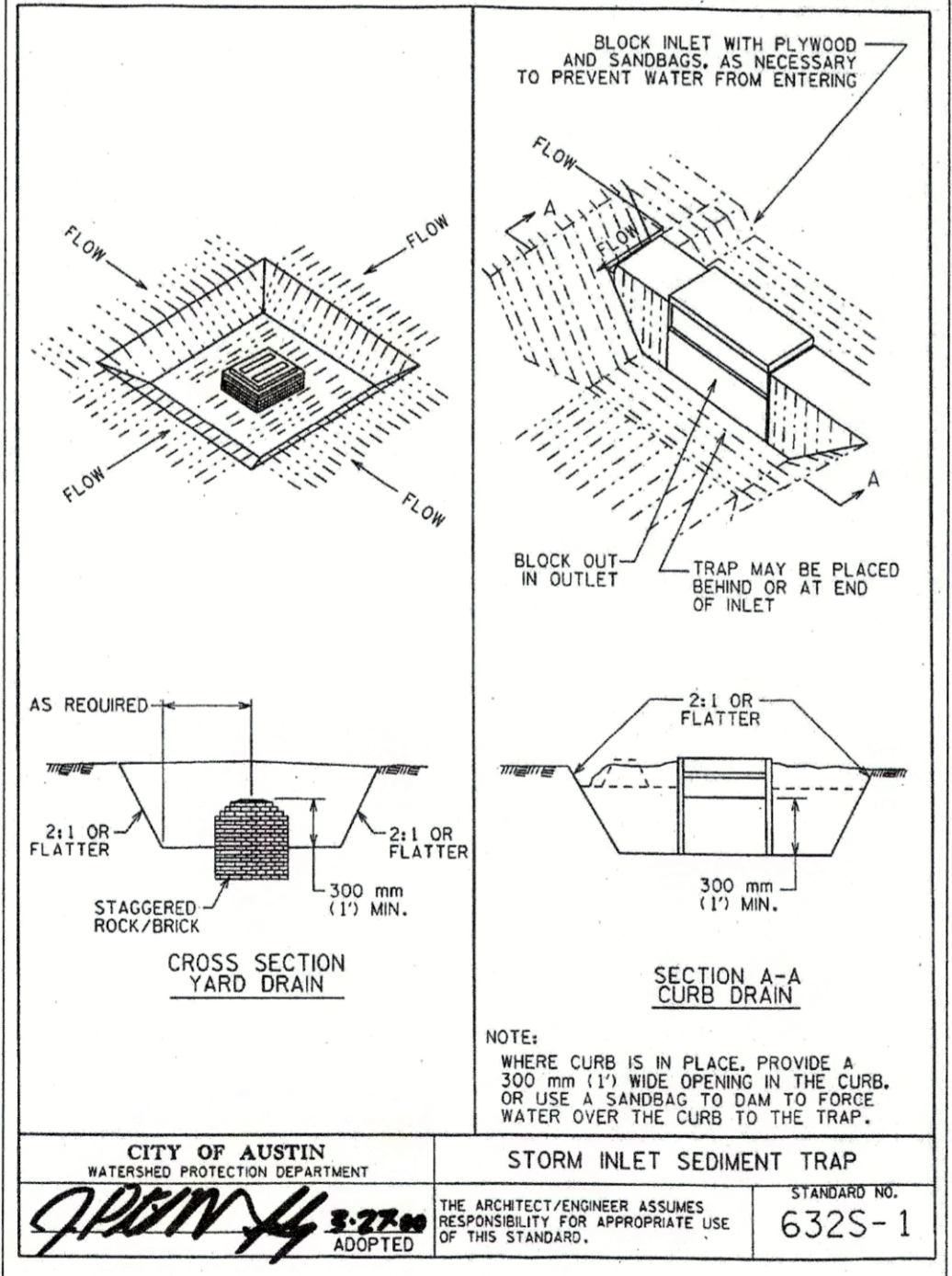
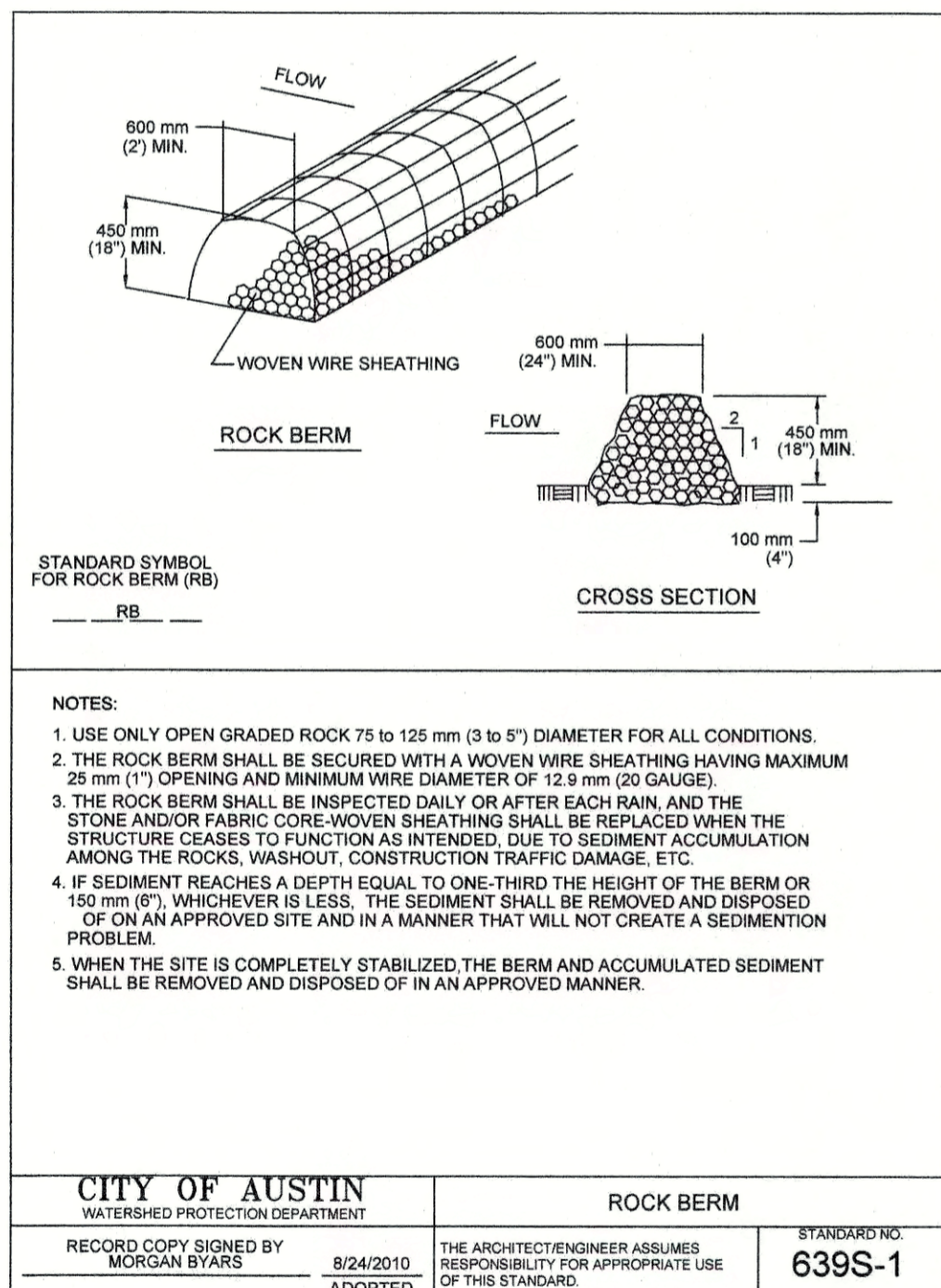
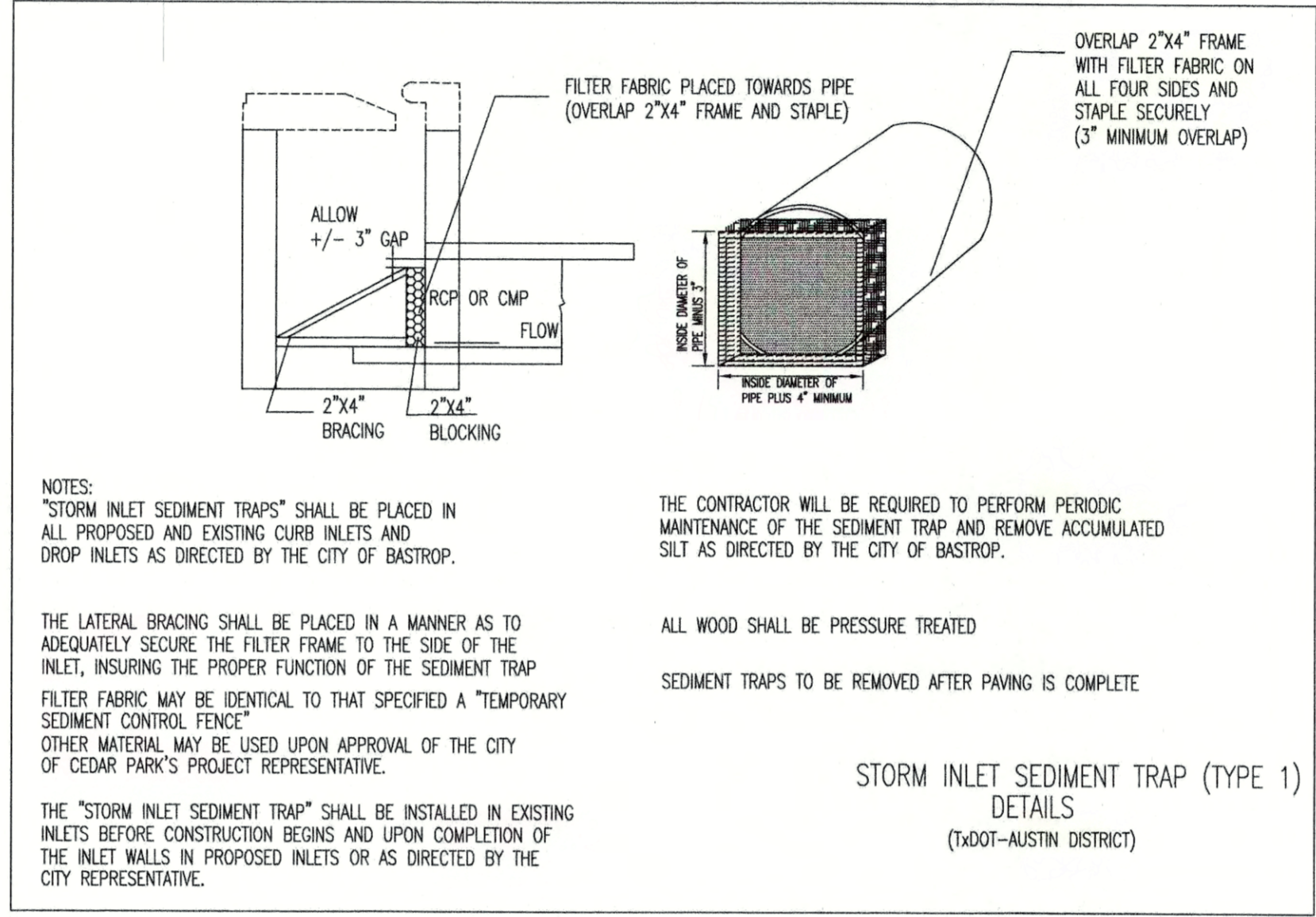
Carlson, Brigrance & Doering, Inc.  
 Civil Engineering & Surveying  
 FIRM ID #49791  
 Main Office: 5501 West William Street, Suite 600, Austin, Texas 78749  
 North Office: 12129 RR 620 N, Suite 600, Abilene, Texas 79602  
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SHEET NAME: EROSION CONTROL NOTES & DETAILS  
 JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT  
 PROJECT: CIVIL SITE DEVELOPMENT PLANS

STATE OF TEXAS  
 BRENDAN P. MCENTEE  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 CARLSON, BRIGRANCE & DOERING, INC.  
 02/06/2020  
 DATE: 11/25/2019  
 JOB NUMBER: 5135  
 SHEET: 23 OF 29  
 SHEET NO. 23



CONCRETE WASHOUT DETAIL  
N.T.S.



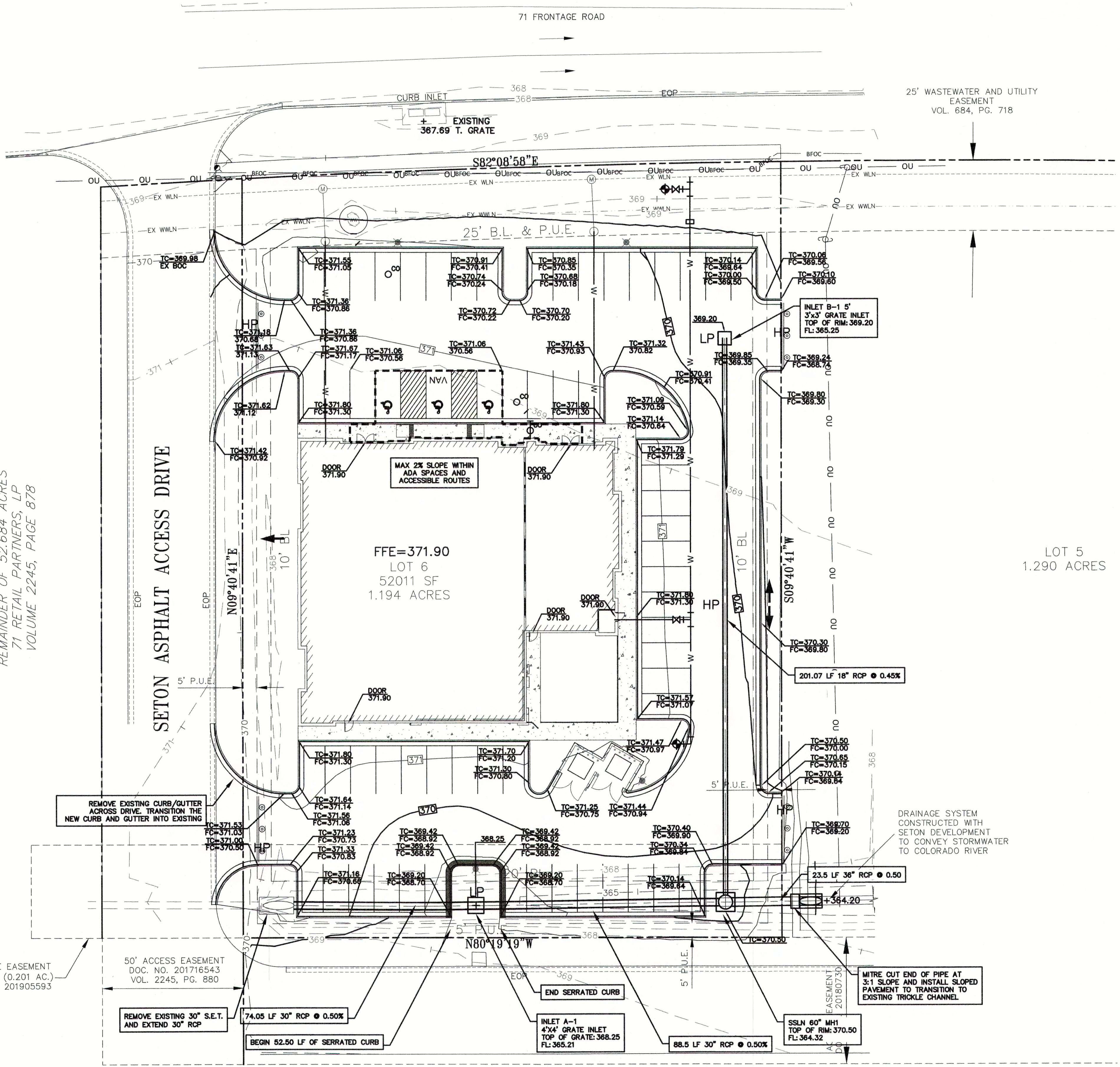
EROSION AND SEDIMENTATION CONTROL:

1. The contractor shall install erosion/sedimentation controls and fencing for areas outside of the construction area prior to any site preparation work (clearing, grubbing or excavation).
2. The contractor is required to inspect the controls and fences at weekly intervals, and after significant rainfall events to insure that they are functioning properly. The person(s) responsible for maintenance of controls and fences shall immediately make any necessary repairs to damaged areas. Silt accumulation at controls must be removed when the depth reaches six (6) inches.
3. Prior to final acceptance, haul roads and waterway crossings constructed for temporary contractor access must be removed, accumulated sediment removed from the waterway and the area restored to the original grade and revegetated. All land clearing debris shall be disposed of in approved spoil disposal sites.
4. Any methods, street markings and signage necessary for warning motorists, warning pedestrians or diverting traffic during construction shall conform to the Texas manual of uniform traffic control devices for streets and highways, latest edition.
5. All pavement markings, markers, paint, traffic buttons, traffic controls and signs shall be installed in accordance with the Texas department of transportation standard specifications for construction of highways. Streets, bridges, and the Texas manual of uniform traffic control devices for streets and highways, latest editions.
6. Erosion control measures, site work and restoration work shall be in accordance with the city of bastrop code of ordinances.
7. All slopes shall be sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they were applied.
8. Silt fences, rock berms, sedimentation basins and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Such installation shall be regularly inspected by the city of bastrop for effectiveness. Additional measures may be required if, in the opinion of the city engineer, they are warranted.
9. All temporary erosion control measures shall not be removed until final inspection and approval of the project by the city inspector. It shall be the responsibility of the contractor to maintain all temporary erosion control structures and to remove each structure as approved by the city inspector.
10. All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, Drives and areas used by the public shall be cleaned up immediately.
11. Permanent erosion control: all disturbed areas shall be restored as noted below.
  - a. Minimum of four (4) inches of topsoil shall be placed in all drainage channels (except rock), and between the curb and right-of-way.
  - b. The seeding for permanent erosion control shall be applied over areas disturbed by construction as follows:  
 broadcast seeding:  
 (i) from october to february, seeding shall be with one (1) pound per 1,000 square feet of unuhulled bermuda or three (3) pounds per 1,000 square feet.  
 (ii) from march to september, seeding shall be with hulled bermuda at a rate of one (1) pound per 1,000 square feet, with a purity of 95% with 85% germination.  
 Fertilizer shall be slow release granular or palette type, and shall have an analysis of 15-15-15, and shall be applied at the rate of one (1) pound per 1,000 square feet, once at the time of planting, and again once during the time of establishment.  
 Mulch type used shall be straw or hay applied at a rate of 45 pounds per 1,000 square feet.  
 Hydraulic seeding:  
 (i) from october to february, seeding shall be with one (1) pound per 1,000 square feet of unuhulled bermuda, or three (3) pounds per 1,000 square feet of winter rye, with a purity of 95% with 90% germination.  
 (ii) from march to september, seeding shall be with hulled bermuda at a rate of one (1) pound per 1,000 square feet with a purity of 95% with 85% germination.  
 Fertilizer shall be a water soluble fertilizer with an analysis of 15-15-15 at a rate of 1.5 pounds per 1,000 square feet.
12. Mulch type shall be hay, straw or mulch applied at a rate of 45 pounds per 1,000 square feet, with a soil tackifier at a rate of 1.4 pounds per 1,000 square feet.
13. C. The planted area shall be irrigated or sprinkled in a manner that will not erode the topsoil, but will sufficiently soak to a depth of six (6) inches. The irrigation shall occur at 10-day intervals during the first two (2) months. Rainfall occurrences of 1/2 inch or more shall postpone the watering schedule for ten (10) days.
14. D. Restoration shall be acceptable when the grass has grown at least 1 inch high with 85% coverage, provided no bare spots larger than 20 square feet exist.

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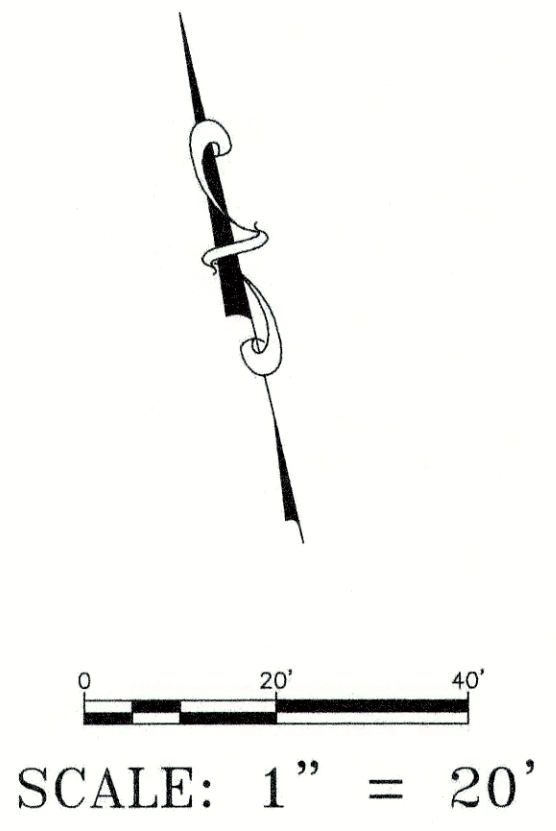
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REMAINDER OF 52.684 ACRES  
71 RETAIL PARTNERS, LP  
VOLUME 2245, PAGE 878



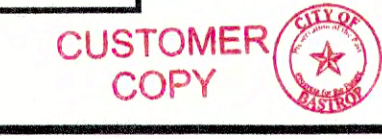
### LEGEND

- 936 --- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- FLOW ARROW
- TC=XXX.XX  
FC=XXX.XX TOP OF CURB ELEVATION  
FACE OF CURB ELEVATION
- PROPOSED GRATE INLET
- PROPOSED STORM MANHOLE
- HP HIGH POINT
- LP LOW POINT
- PROPOSED STORM SEWER
- PROPOSED 24" CURB & GUTTER

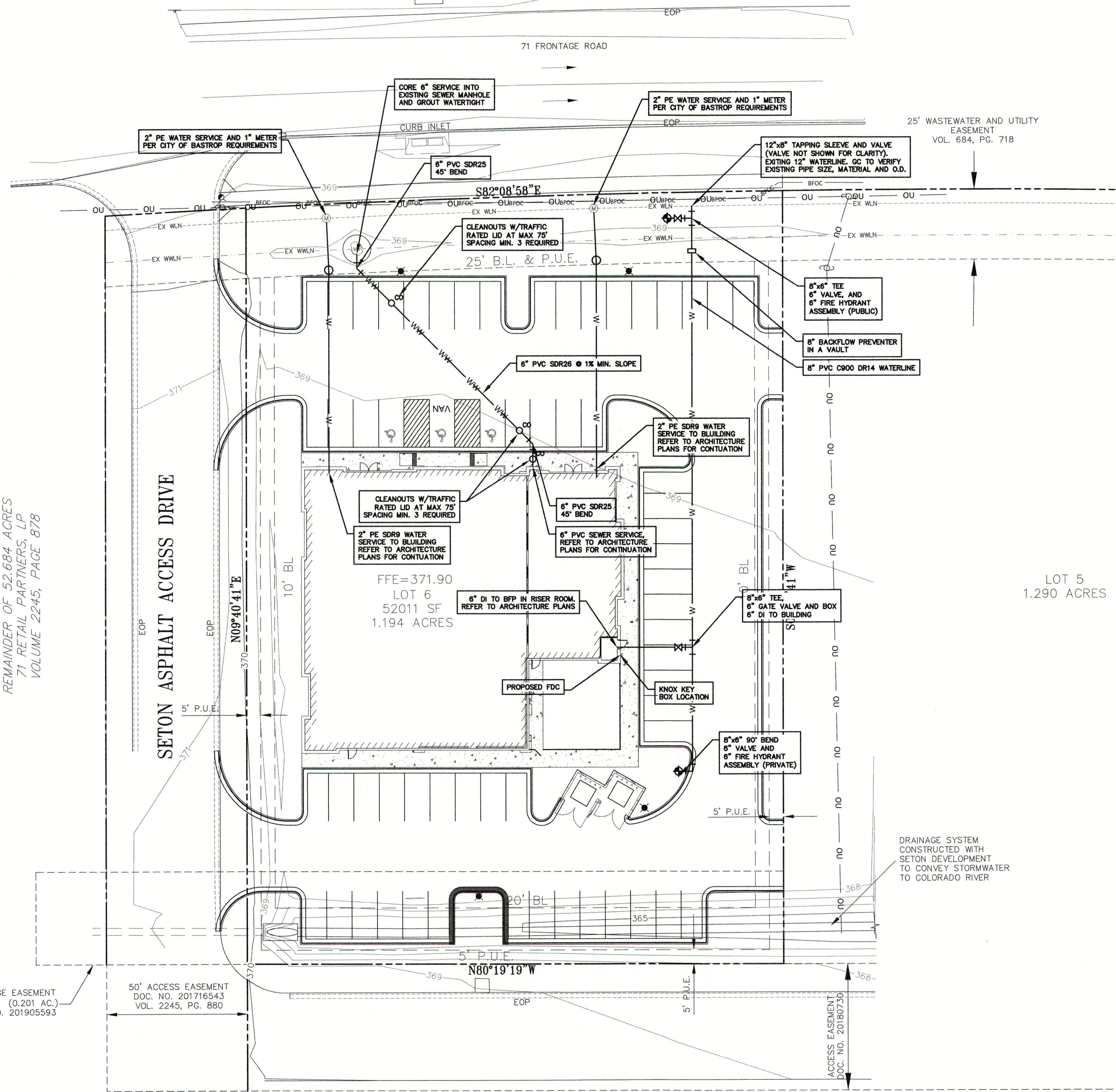
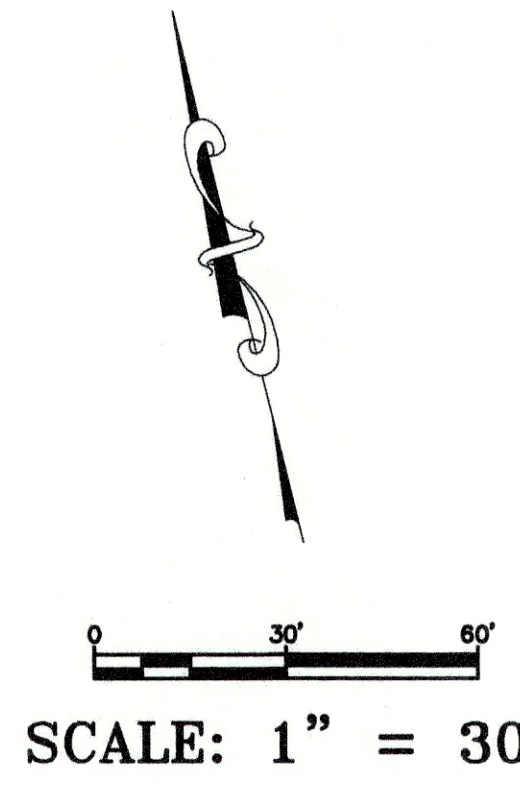


- #### GRADING NOTES:
- UNLESS OTHERWISE SPECIFIED, ALL FINISHED EARTHEN SLOPES ARE TO BE FINE GRADED TO PROVIDE A RELATIVELY UNIFORM SURFACE WITH NO ROCKS GREATER THAN 1-INCH IN DIAMETER, NO MATERIAL GREATER THAN 1-INCHES IN DIAMETER, AND NO DEVIATIONS FROM AN OTHERWISE SMOOTH SURFACE GREATER THAN 4 INCHES IN HEIGHT OR DEPTH WITH NO AREAS OF STANDING WATER.
  - ALL FINISHED SLOPES GREATER THAN 3:1 ARE TO BE COVERED WITH A JUTE MAT, CURLEX MATTING, OR SIMILAR PRODUCT AFTER SEEDING WITH HYDROMULCH AND THE JUTE ANCHORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
  - ALL DRAINAGE COMPONENTS ARE TO BE PRECAST CONCRETE. STORM DRAIN PIPE TO BE RCP OR RCPA, CLASS III, PER ASTM C76 AND INLETS TO BE ASTM C913 PER TxDOT STANDARDS WITH GALVANIZED GRATES. INLETS IN PAVED AREAS SHALL INCLUDE PEDESTRIAN GRATES.
  - REFER TO LANDSCAPE PLAN FOR PLANTING, IRRIGATION, AND TOPSOIL REQUIREMENTS.
  - REFER TO EROSION CONTROL PLAN FOR TEMPORARY AND PERMANENT REVEGETATION REQUIREMENTS.

DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	
<p>Carlison, Brigrance &amp; Doering, Inc. Civil Engineering &amp; Surveying FIRM ID #57971 Main Office: 12129 RR 620 N., Ste. 600 Austin, Texas 78750 Phone No. (512) 280-5160 Fax No. (512) 280-5165</p>	
<p><b>GRADING AND DRAINAGE PLAN</b></p> <p><b>BASTROP GROVE MEDTAL DEVELOPMENT</b></p> <p>CIVIL SITE DEVELOPMENT PLANS</p>	
<p>SHEET NAME:</p> <p>JOB NAME:</p> <p>PROJECT:</p>	
<p>DATE: 11/25/2019</p> <p>JOB NUMBER: 5135</p> <p>SHEET: 24 OF 29</p> <p>SHEET NO. 24</p>	



DESIGNED BY:	DRAFTED BY:
DATE:	DATE:
REVISION:	REVISION:



LEGEND	
---	PROPERTY LINE
- - - -	EXISTING MINOR CONTOURS
- - - -	EXISTING MAJOR CONTOURS
OU	EXISTING OH ELEC/TELE
WLN	EXISTING WATER LINE
WLN	EXISTING WASTEWATER LINE
---	EXISTING EASEMENT/BUFFER LINE
○	EXISTING GUY WIRE
○	EXISTING POWER POLE
○	EXISTING SIGN-ROAD
○	EXISTING WASTEWATER MANHOLE
○	PROPOSED WATER LINE
○	PROPOSED WASTEWATER LINE
○	PROPOSED WATERMETER LINE
○	PROPOSED CLEANOUT
○	PROPOSED 45° BEND
○	PROPOSED FIRE HYDRANT
○	PROPOSED WATER VALVE
○	PROPOSED TEE
○	PROPOSED 90° BEND
○	SITE LIGHTING
○	BACKFLOW PREVENTER IN A VAULT

**NOTE:**  
THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR WILL AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE INCURRED BY THEIR FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES, STRUCTURES OR FACILITIES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES 24 - HOURS PRIOR TO COMMENCING CONSTRUCTION.

- UTILITY NOTES:**
1. ALL WATER LINES MUST BE CONSTRUCTED IN COMPLIANCE WITH TCEQ RULE 30 TAC SEC. 290.44 RELATED TO WATER DISTRIBUTION LINES. WATER LINES SHALL HAVE A MINIMUM 4" SEPARATION FROM PRESSURE SEWER MAINS
  2. ALL HORIZONTAL AND VERTICAL WATER LINE BENDS, TEE'S AND DEAD END'S SHALL BE RESTRAINED TO THE WATER MAIN USING FACTORY RESTRAINED JOINT PIPE OR MECHANICAL JOINT RESTRAINT DEVICES.
  3. ALL FILL AREAS ARE TO BE COMPACTED TO 95% PROCTOR DENSITY, PRIOR TO UTILITY INSTALLATION.
  4. ALL FITTINGS, VALVES, PLUGS AND OTHER PIPE APPURTENANCES TO BE RESTRAINED.
  5. ALL MAINS MUST HAVE A MAXIMUM 48 INCHES OF COVER FROM FINISHED GRADE TO TOP OF PIPE AND A MINIMUM COVER OF 30 INCHES.
  6. WATER LINE PIPE SHALL BE C-900 DR-14 BLUE IN COLOR OR DUCTILE IRON PIPE CLASS 350.
  7. REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING PENETRATION, LOCATIONS, SIZE, AND ELEVATIONS.
  8. BUILDING IS TO BE SPRINKLED. BACKFLOW PREVENTER IS LOCATED IN SPRINKLER ROOM ALONG REAR WALL. CONTRACTOR TO REFER TO ARCHITECTURAL PLANS FOR BFP, FDC LOCATIONS, AND BUILDING SPRINKLER REQUIREMENTS.
  9. REFER TO MEP PLANS FOR REQUIRED ELECTRICAL TRANSFORMER SIZE AS WELL AS PRIMARY AND SECONDARY CONDUIT REQUIREMENTS, ALL CONDUITS ARE TO BE INSTALLED PRIOR TO SUBGRADE COMPACTION AND TESTING.
  10. CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO CITY DESIGN STANDARDS FOR ALL WORK IN PUBLIC R/W AND EASEMENTS AND TO 2009 INTERNATIONAL PLUMBING CODE, WITH LOCAL AMENDMENTS, FOR WORK ON PRIVATE PROPERTY.
  11. IRRIGATION SYSTEM WILL REQUIRE A SEPARATE IRRIGATION PERMIT.
  12. UNDERGROUND MAINS SERVING NFPA 13 FIRE SPRINKLER SYSTEMS AND PRIVATE HYDRANTS SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH NFPA 13, NFPA 24, AND FIRE CODE BY A LICENSED CONTRACTOR WITH A PLUMBING PERMIT. THE ENTIRE MAIN MUST BE HYDROSTATICALLY TESTED AT ONE TIME, UNLESS ISOLATION VALVES ARE PROVIDED BETWEEN TESTED SECTIONS.

REMAINDER OF 52.684 ACRES  
71 RETAIL PARTNERS, LP  
VOLUME 2245, PAGE 878

RAINAGE EASEMENT  
(0.201 AC.)  
OC. NO. 201905593

50' ACCESS EASEMENT  
DOC. NO. 201716543  
VOL. 2245, PG. 880

ACCESS EASEMENT  
DOC. NO. 20180730

DRAINAGE SYSTEM  
CONSTRUCTED WITH  
SETON DEVELOPMENT  
TO CONVEY STORMWATER  
TO COLORADO RIVER

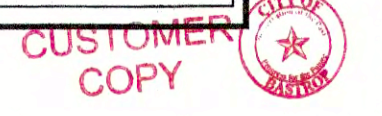
Carlson, Brigrance & Doering, Inc.  
Civil Engineering & Surveying  
FIRM ID #13791  
Main Office 12129 RR 620 N., Ste. 600  
Austin, Texas 78750  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

UTILITY PLAN  
BASTROP GROVE MEDTAL DEVELOPMENT  
CIVIL SITE DEVELOPMENT PLANS

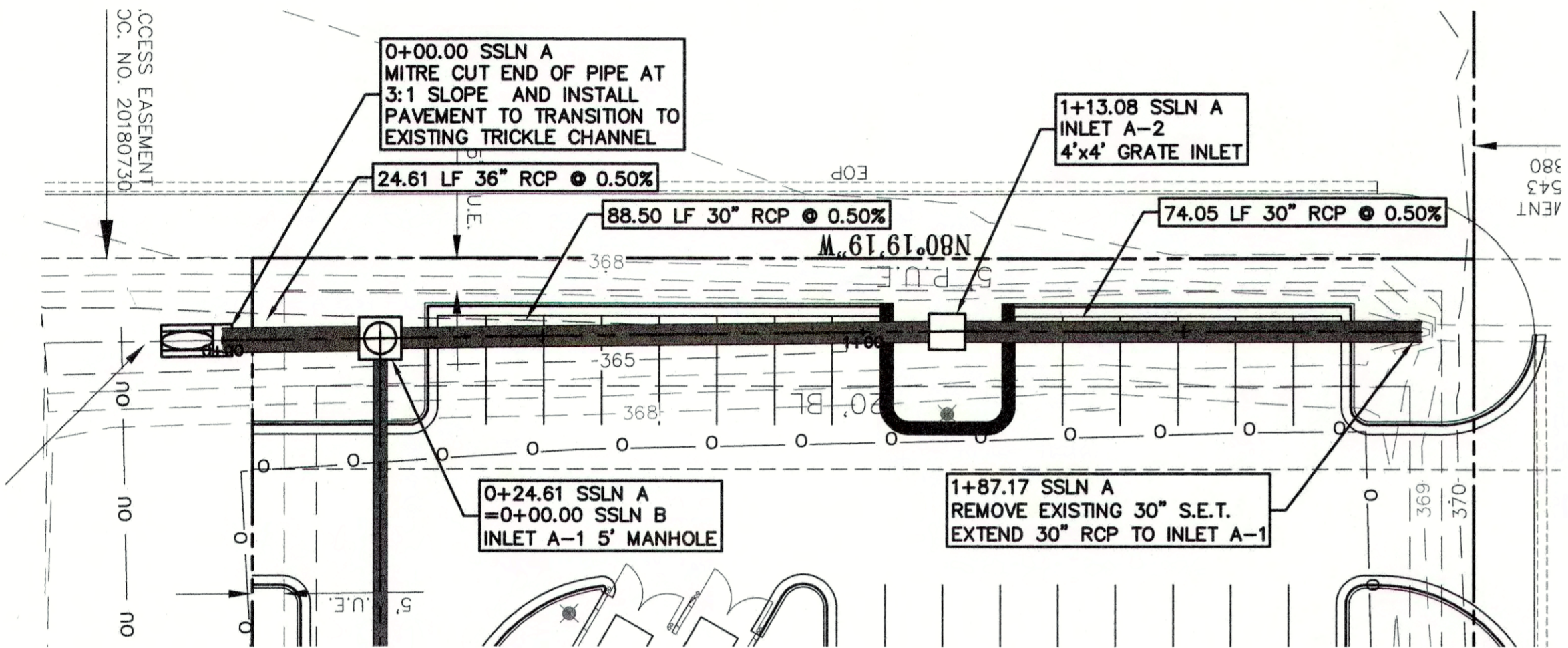
SHEET NAME:  
JOB NAME:  
PROJECT:

BRENDAN P. McENTEE  
LICENSED PROFESSIONAL ENGINEER  
96200  
CARLSON, BRIGRANCE & DOERING, INC.  
D#173791

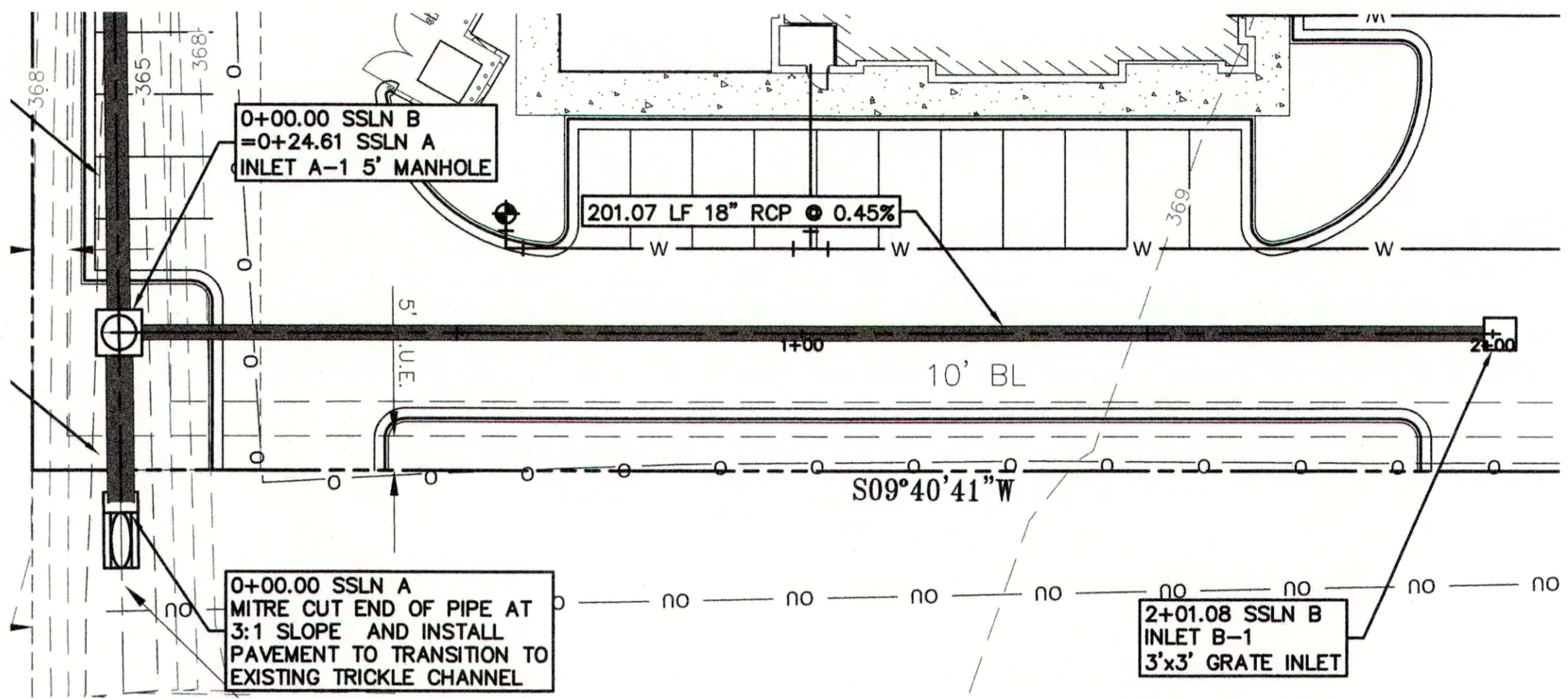
DATE: 11/25/2019  
JOB NUMBER: 5135  
SHEET: 25 OF 29  
SHEET NO. 25



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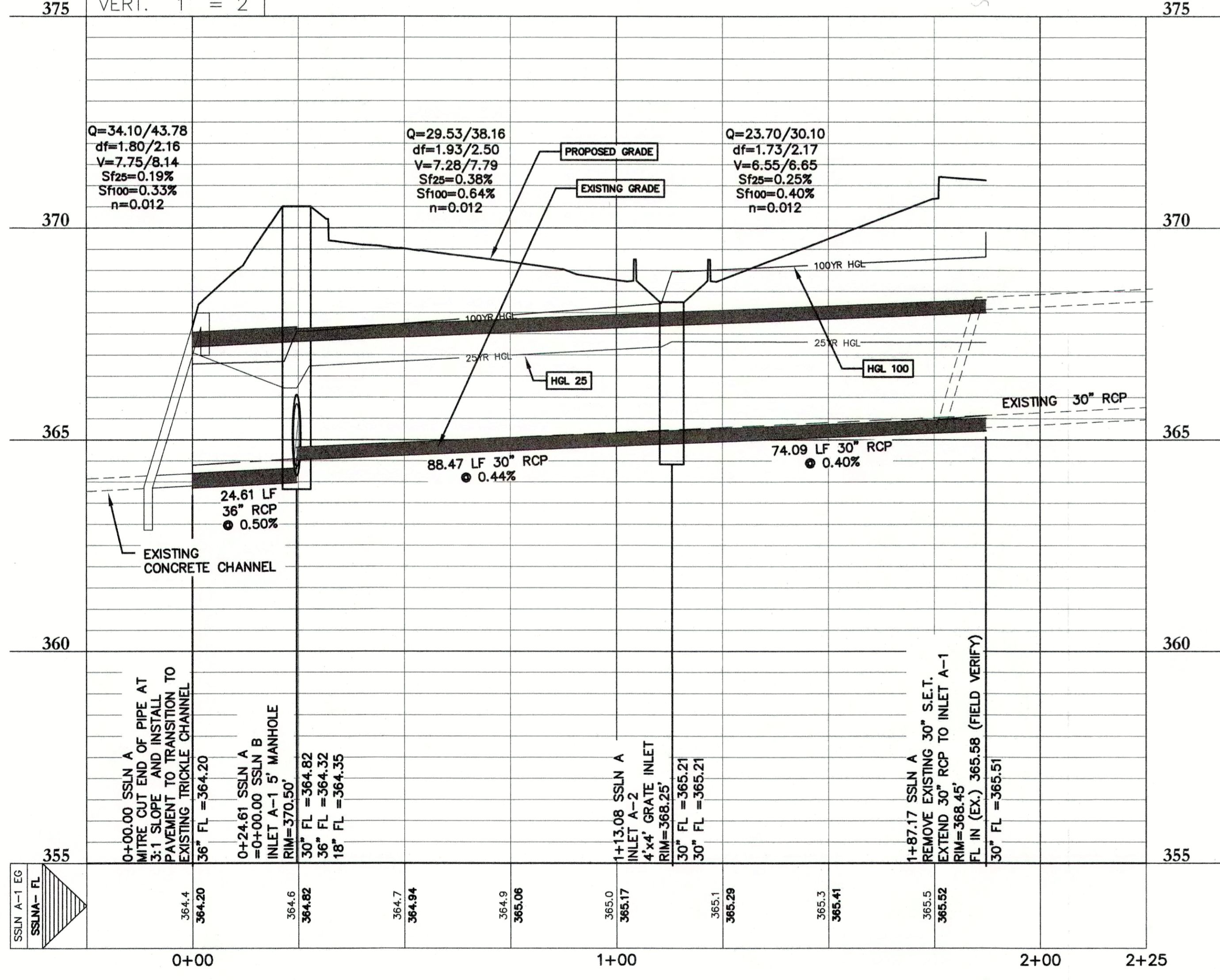


SCALE: 1" = 20'



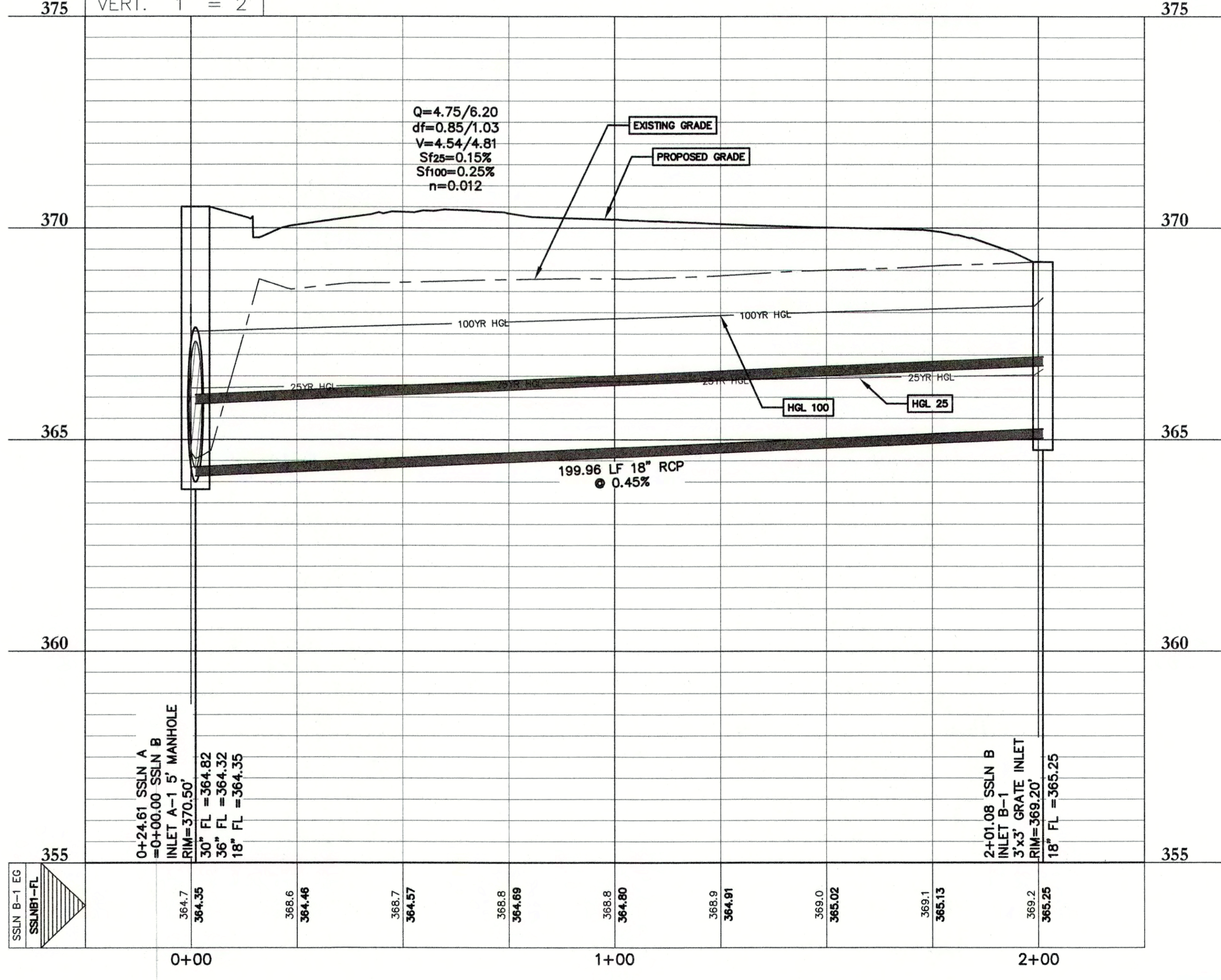
PROFILE SCALE  
HORIZ. 1" = 20'  
VERT. 1" = 2'

SSLN A



PROFILE SCALE  
HORIZ. 1" = 20'  
VERT. 1" = 2'

SSLN B



FILE PATH: N:\CADD\GIS\STORM.dwg - Feb 06, 2020 - 11:00am

DESIGNED BY:	DRAFTED BY:
DATE:	
REVISION:	

Carlson, Brigrance & Doering, Inc.  
Civil Engineering • Surveying  
FIRM ID #13791  
North Office: 12129 RR 620 N., Ste. 600  
Austin, Texas 78750  
Main Office: 5501 West William Cannon Dr.,  
Austin, Texas 78749  
Phone No. (512) 280-5160  
Fax No. (512) 280-5165

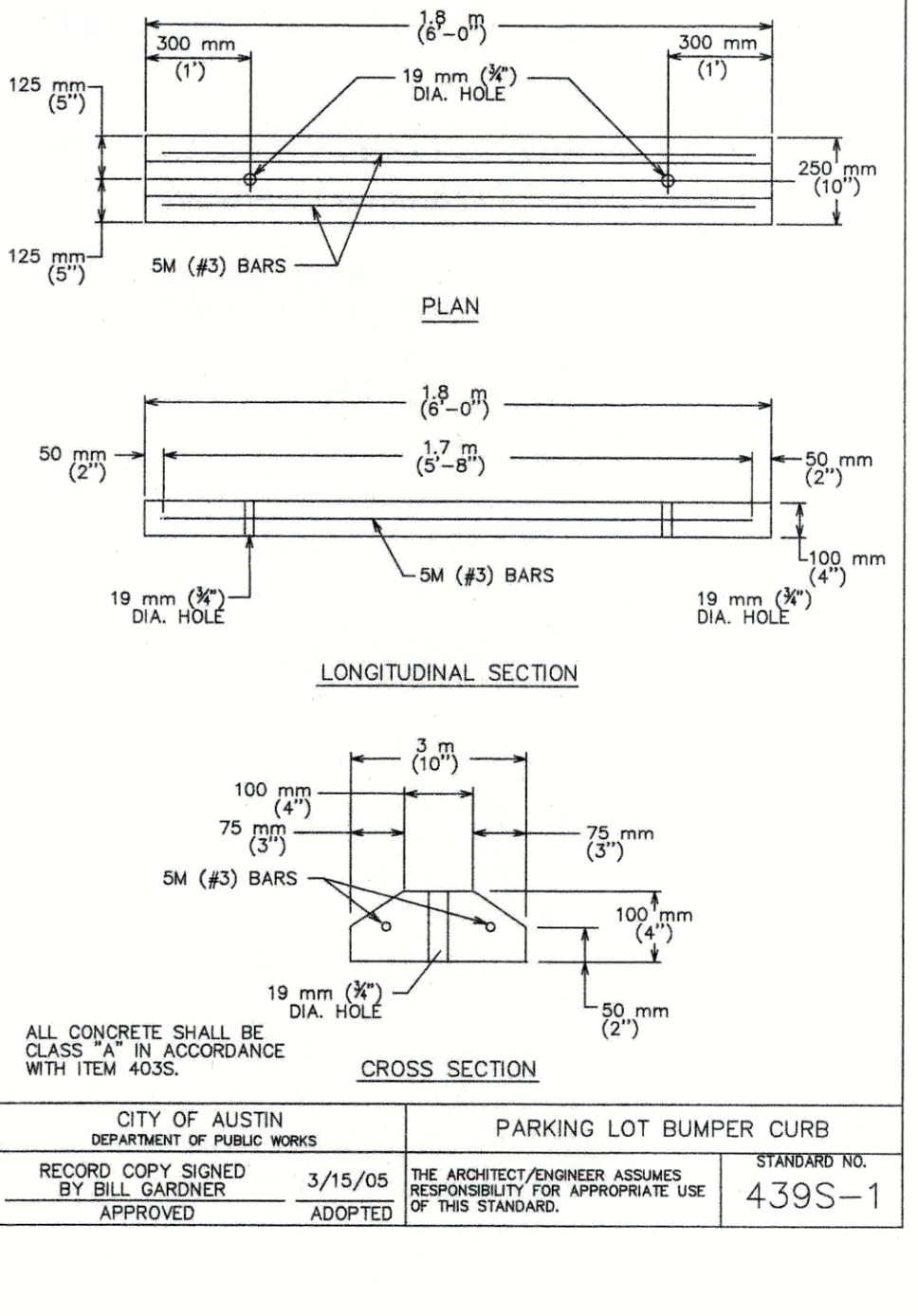
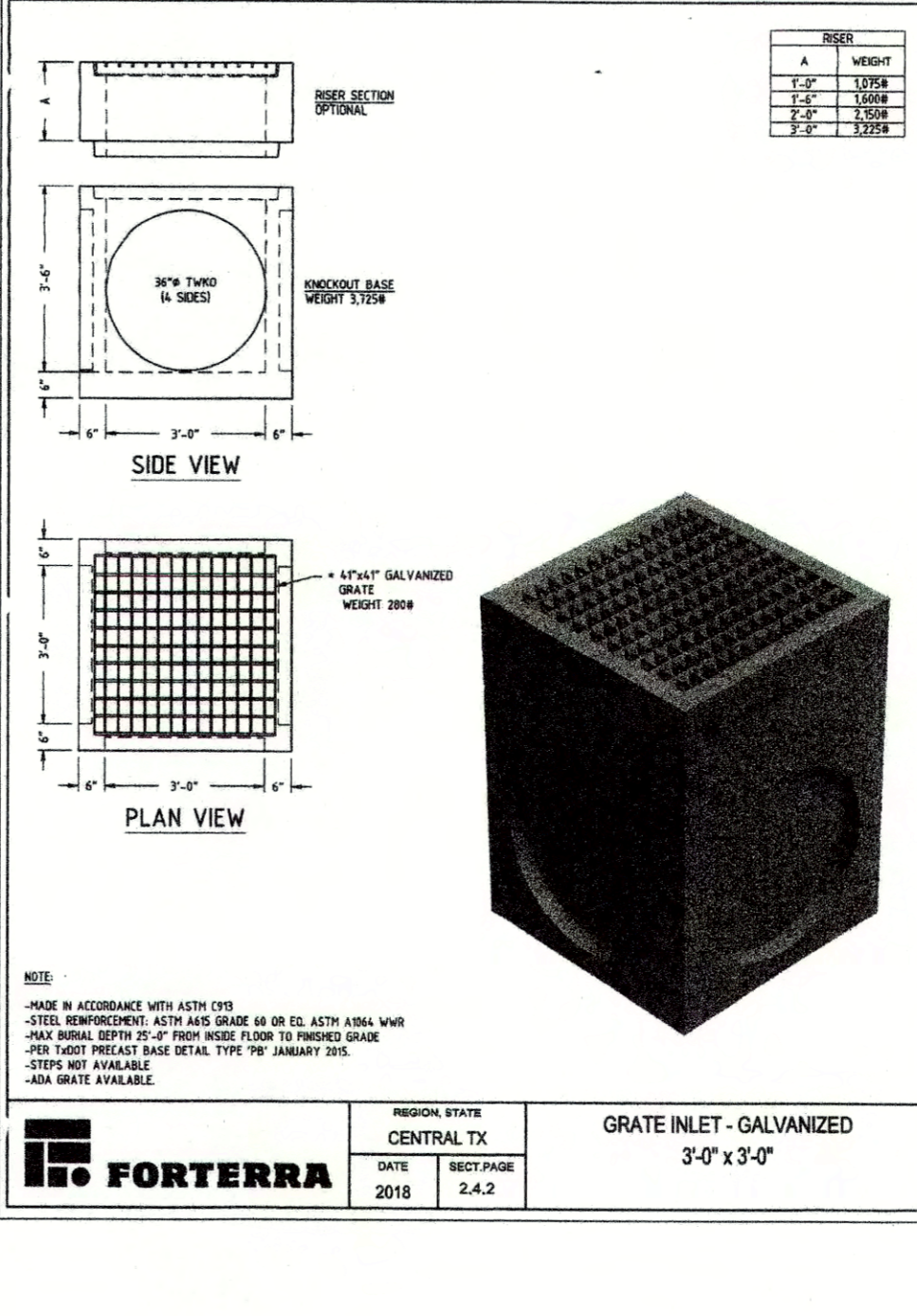
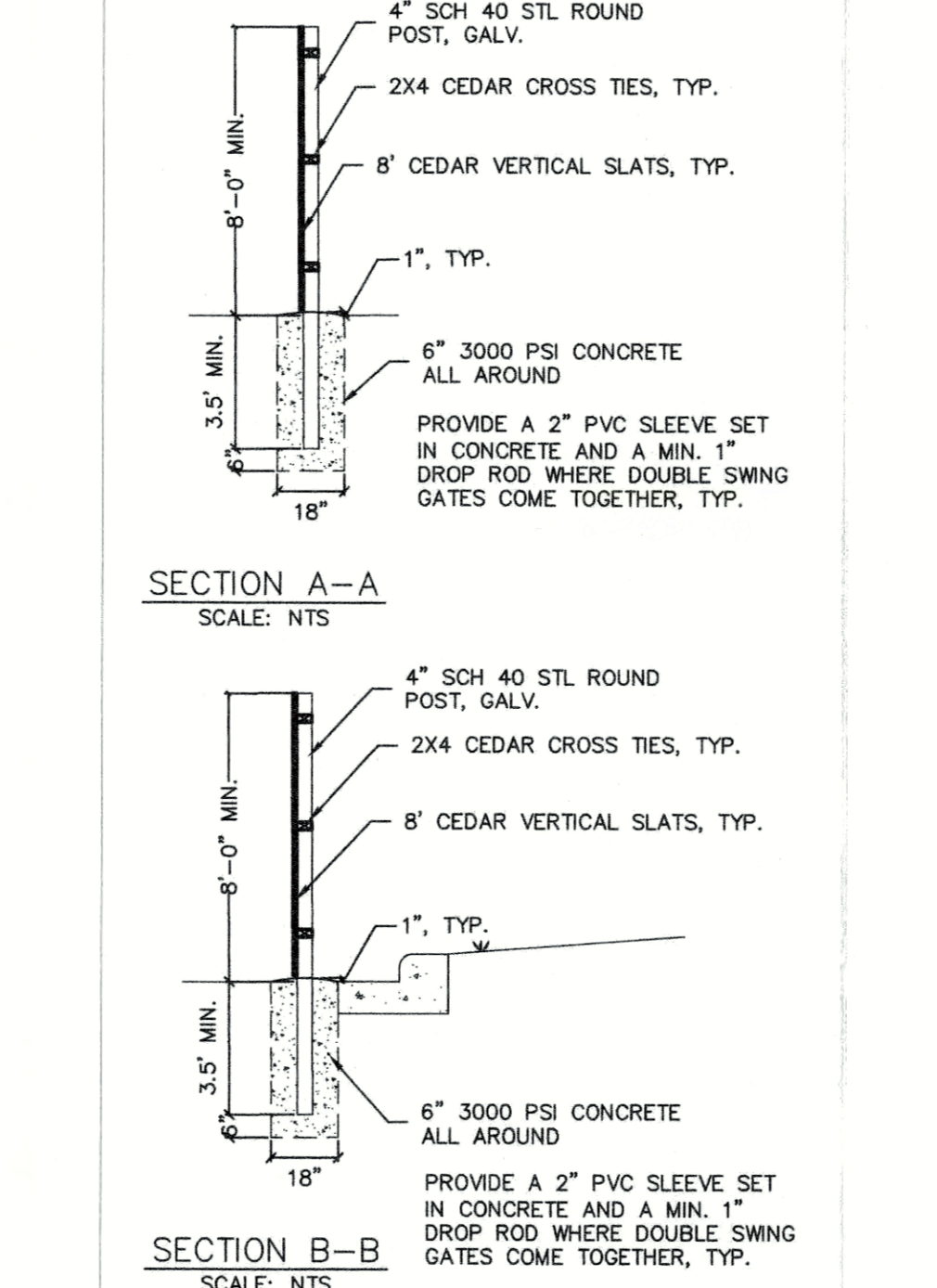
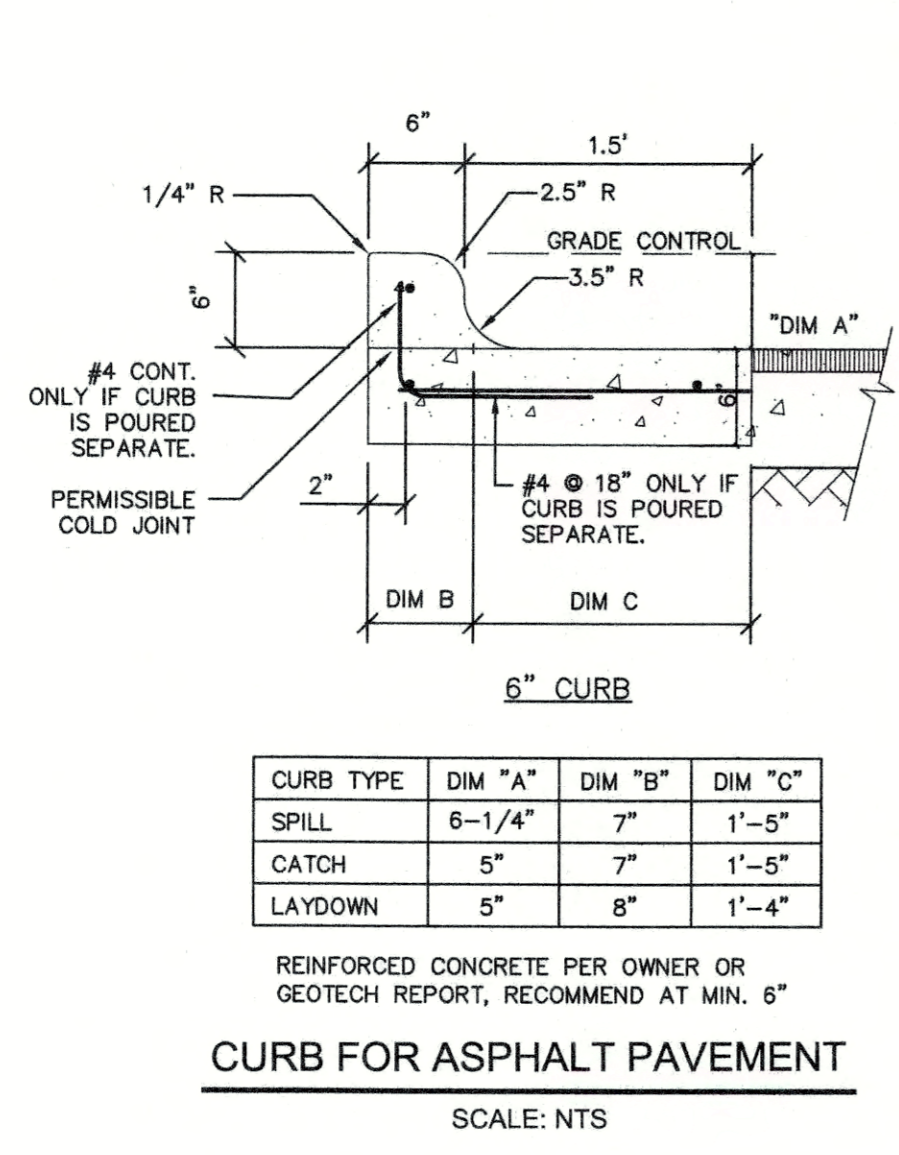
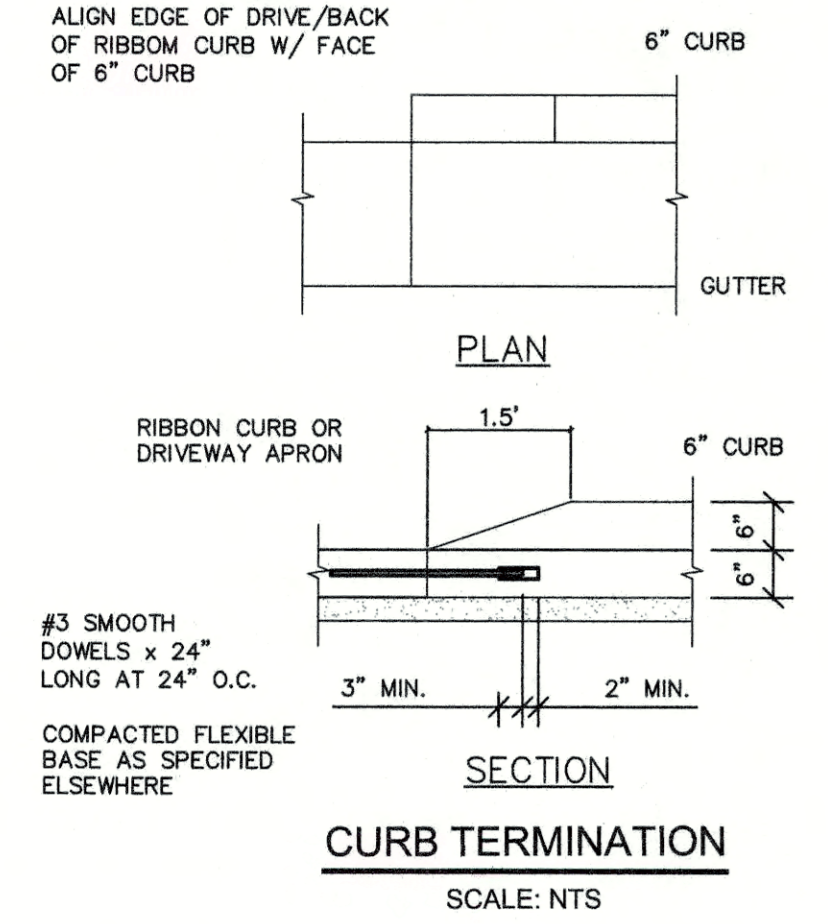
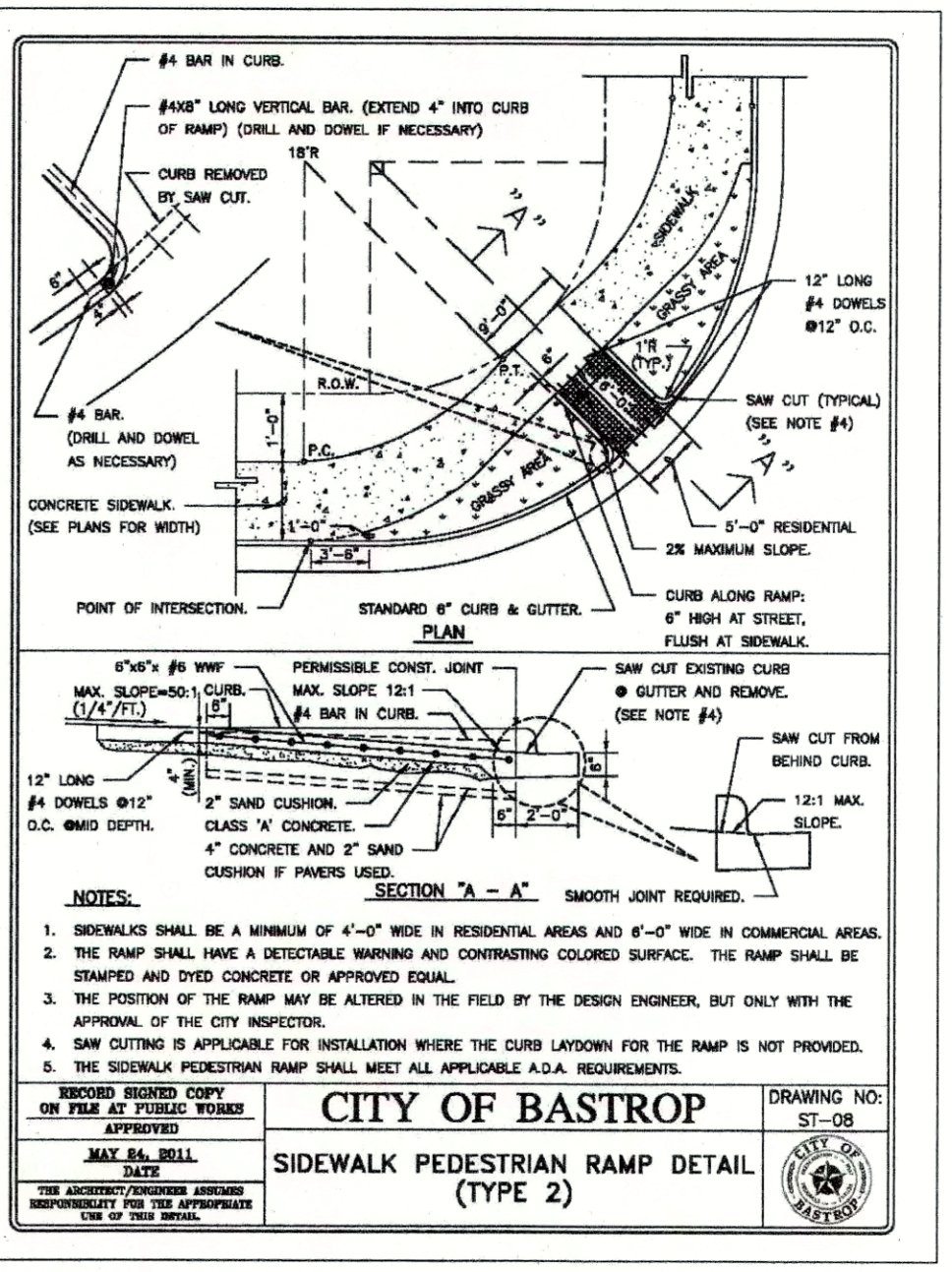
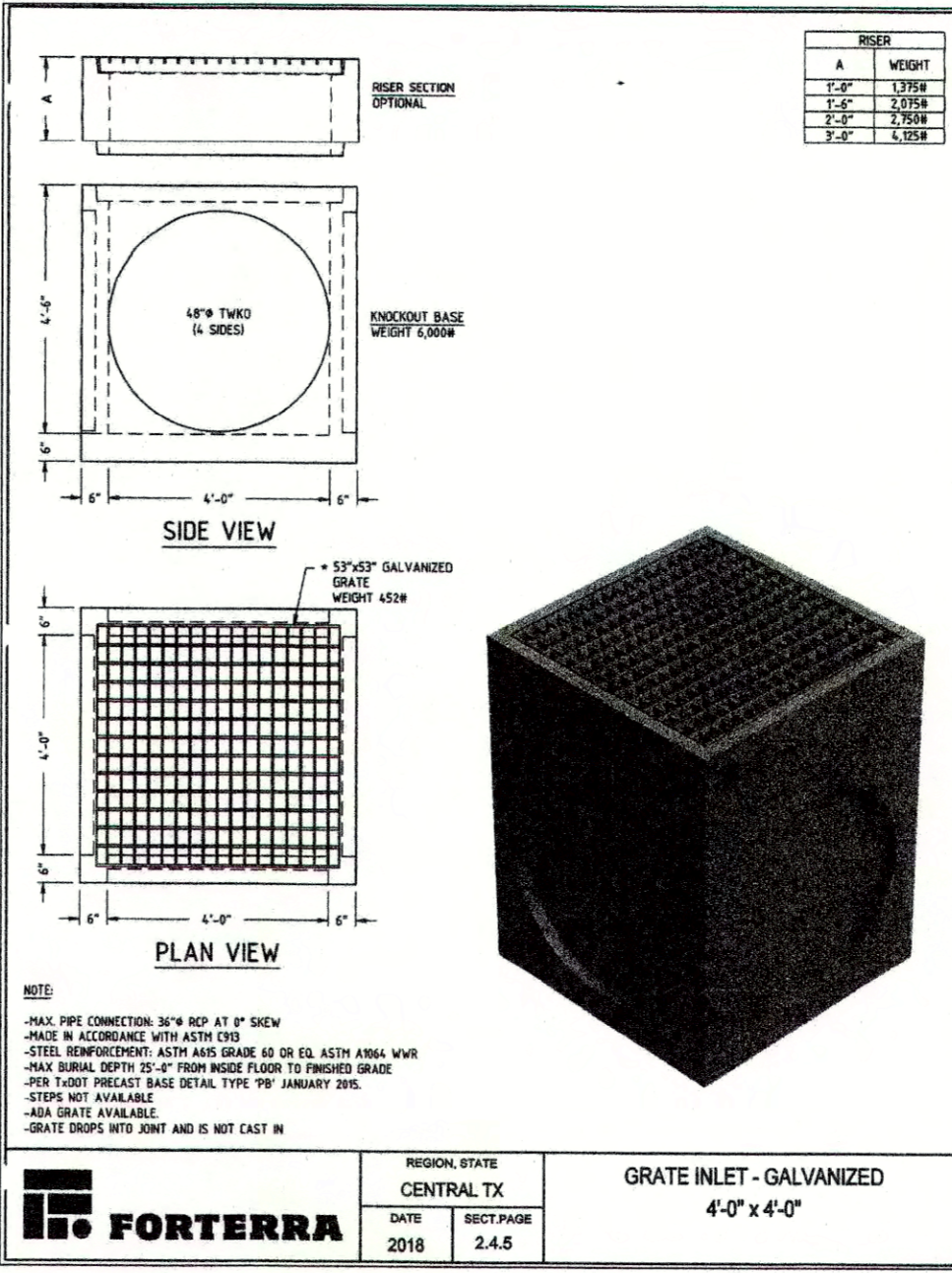
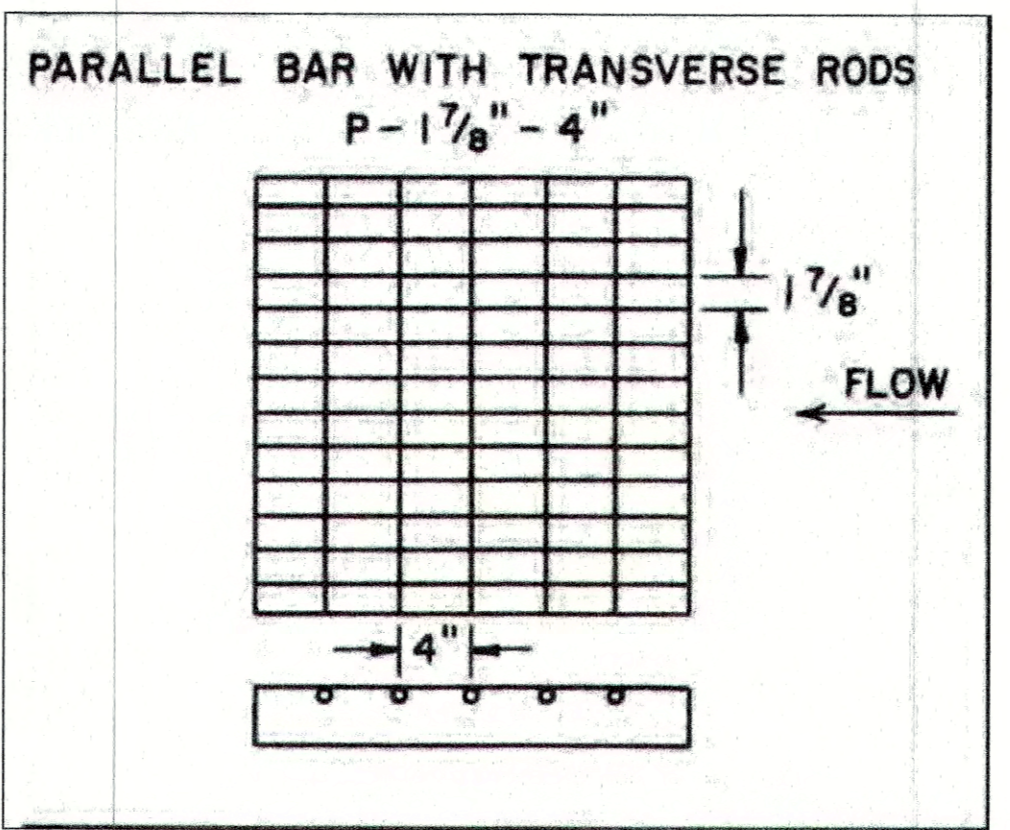
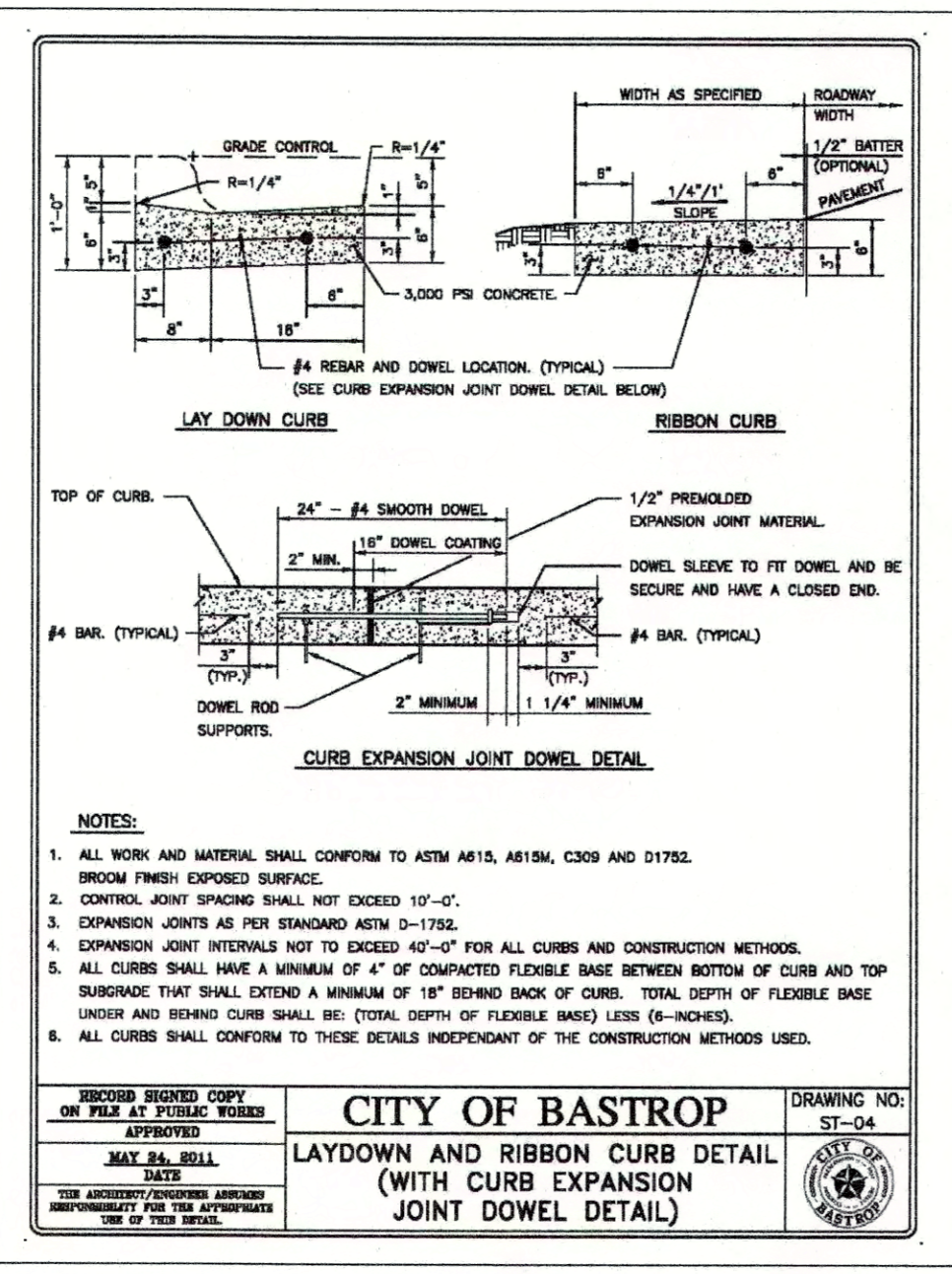
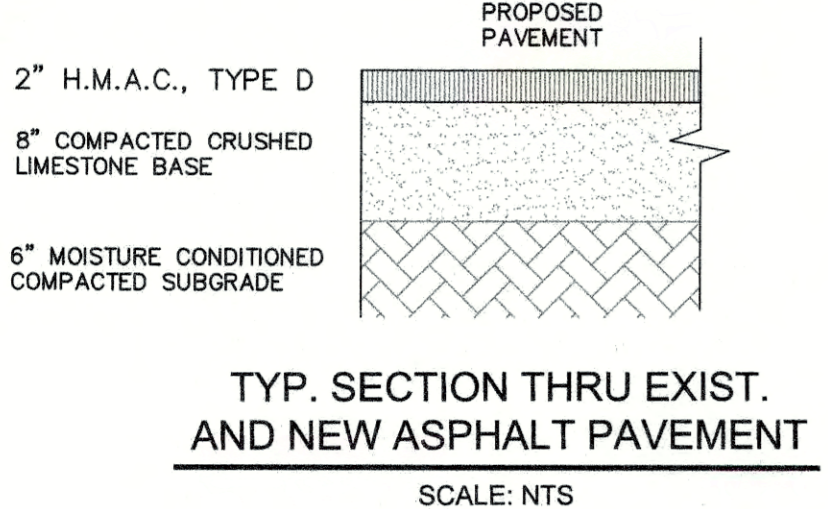
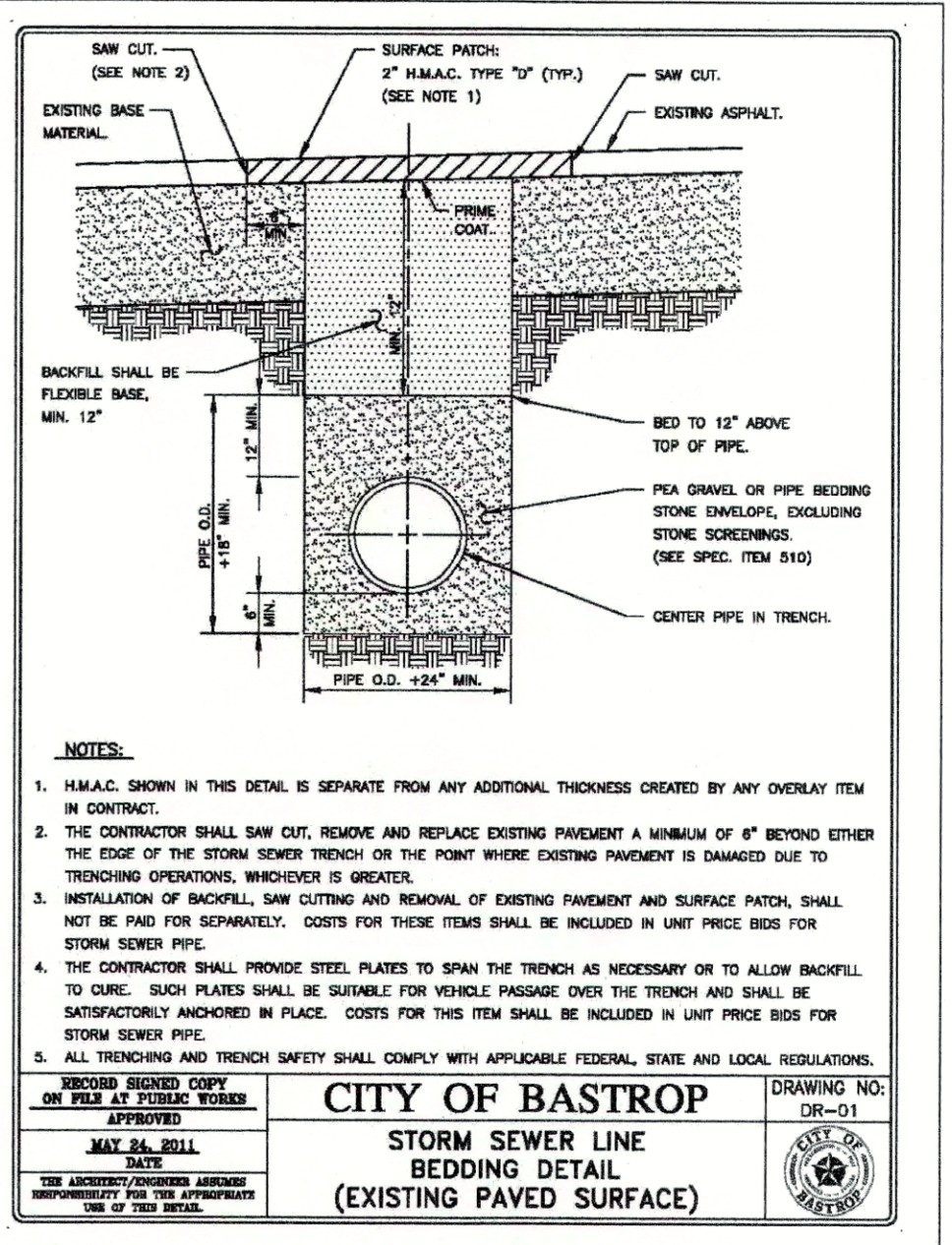
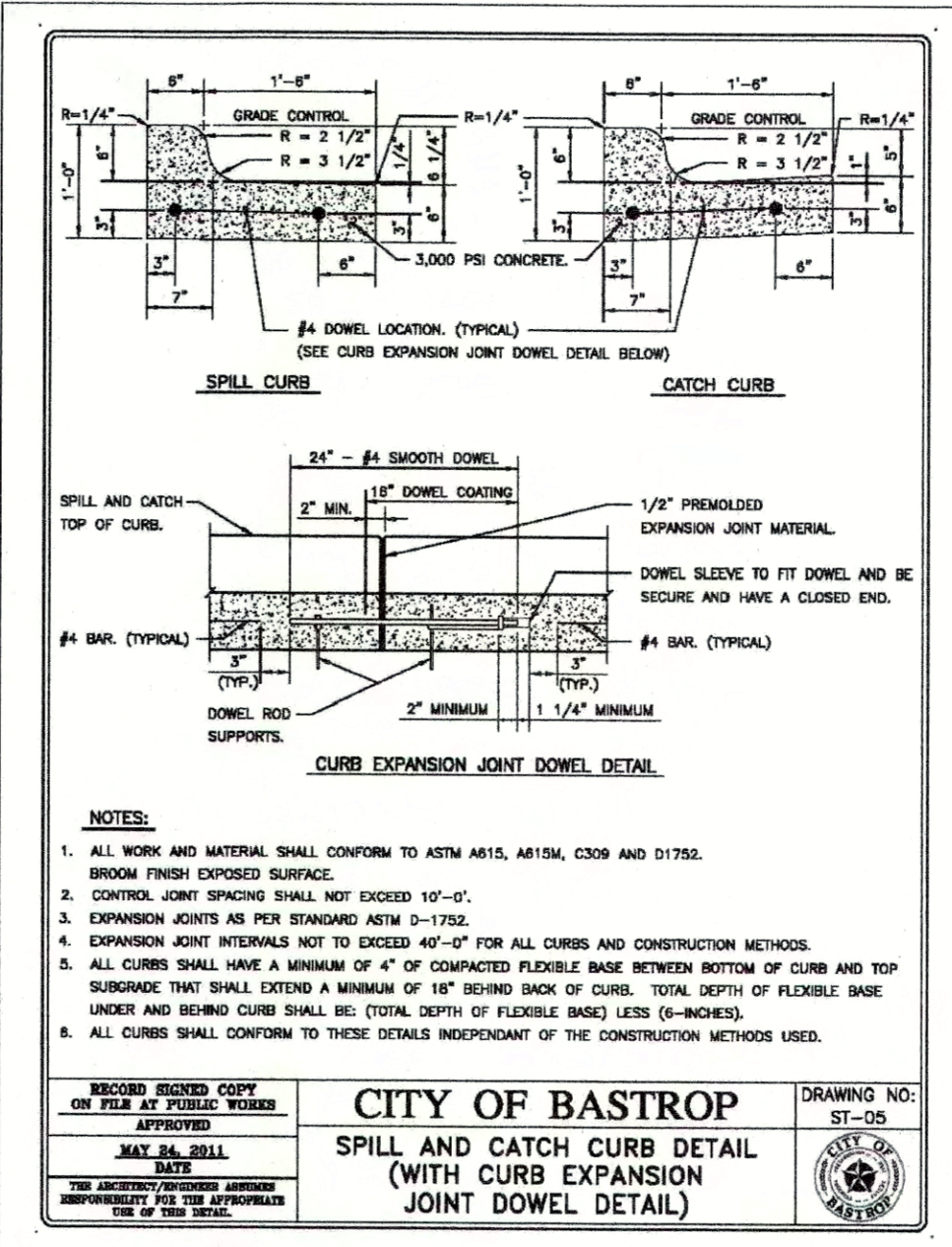
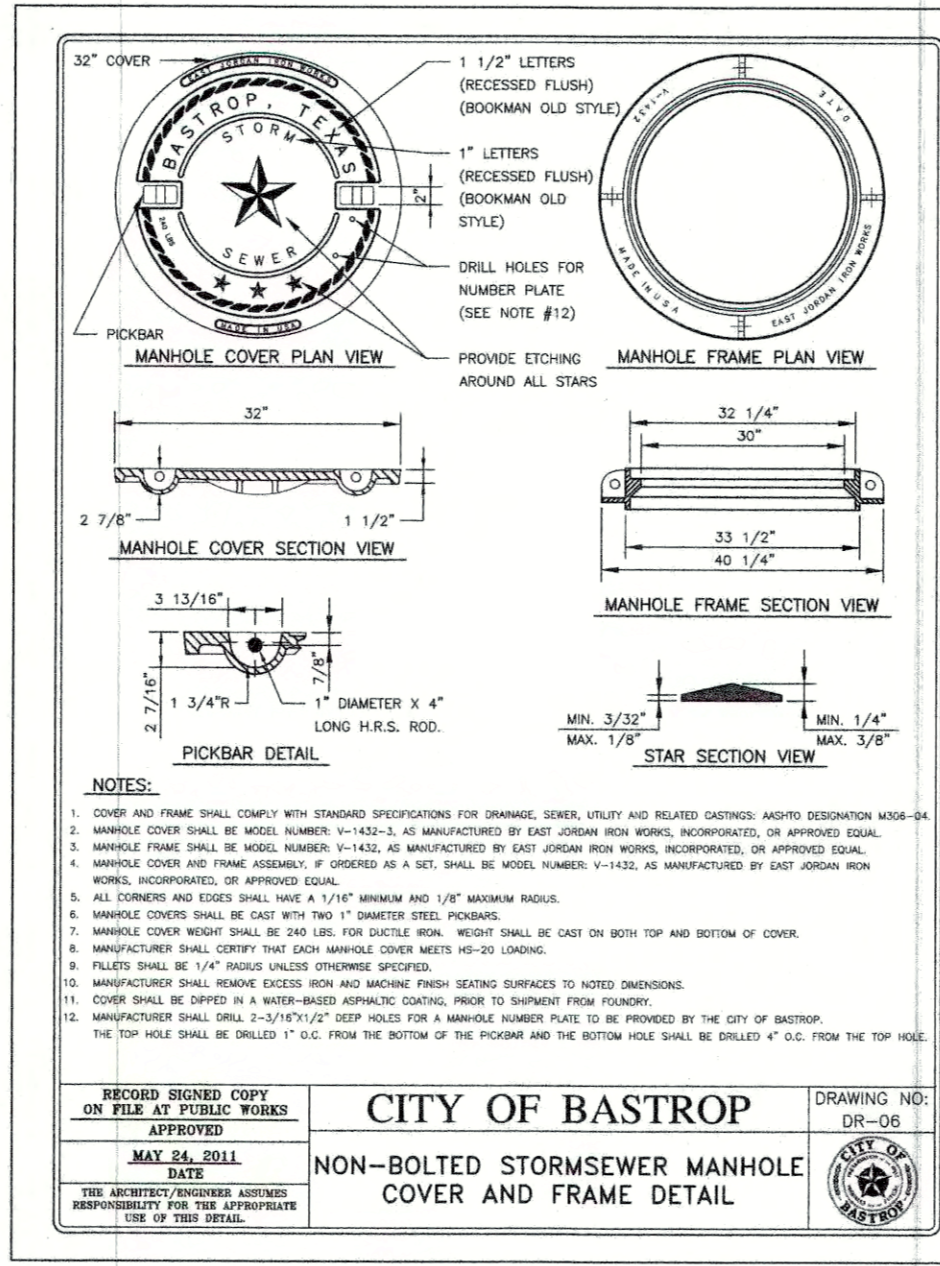
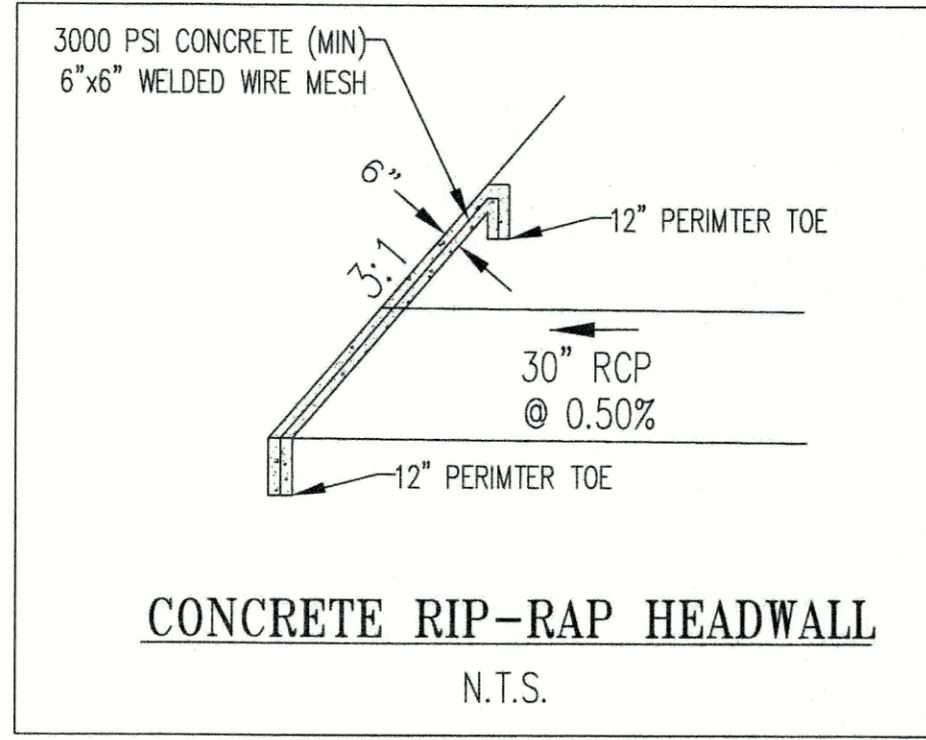
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JOB NAME: BASTROP GROVE MEDTAL DEVELOPMENT  
PROJECT: CIVIL SITE DEVELOPMENT PLANS

STATE OF TEXAS  
BRENDAN P. MENTEL  
LICENSED PROFESSIONAL ENGINEER  
96200  
CARLSON, BRIGRANCE & DOERING, INC.  
02/06/2020

DATE:	11/25/2019
JOB NUMBER:	5135
SHEET:	26 OF 29
SHEET NO.:	26

CUSTOMER COPY





DESIGNED BY:	DRAFTED BY:

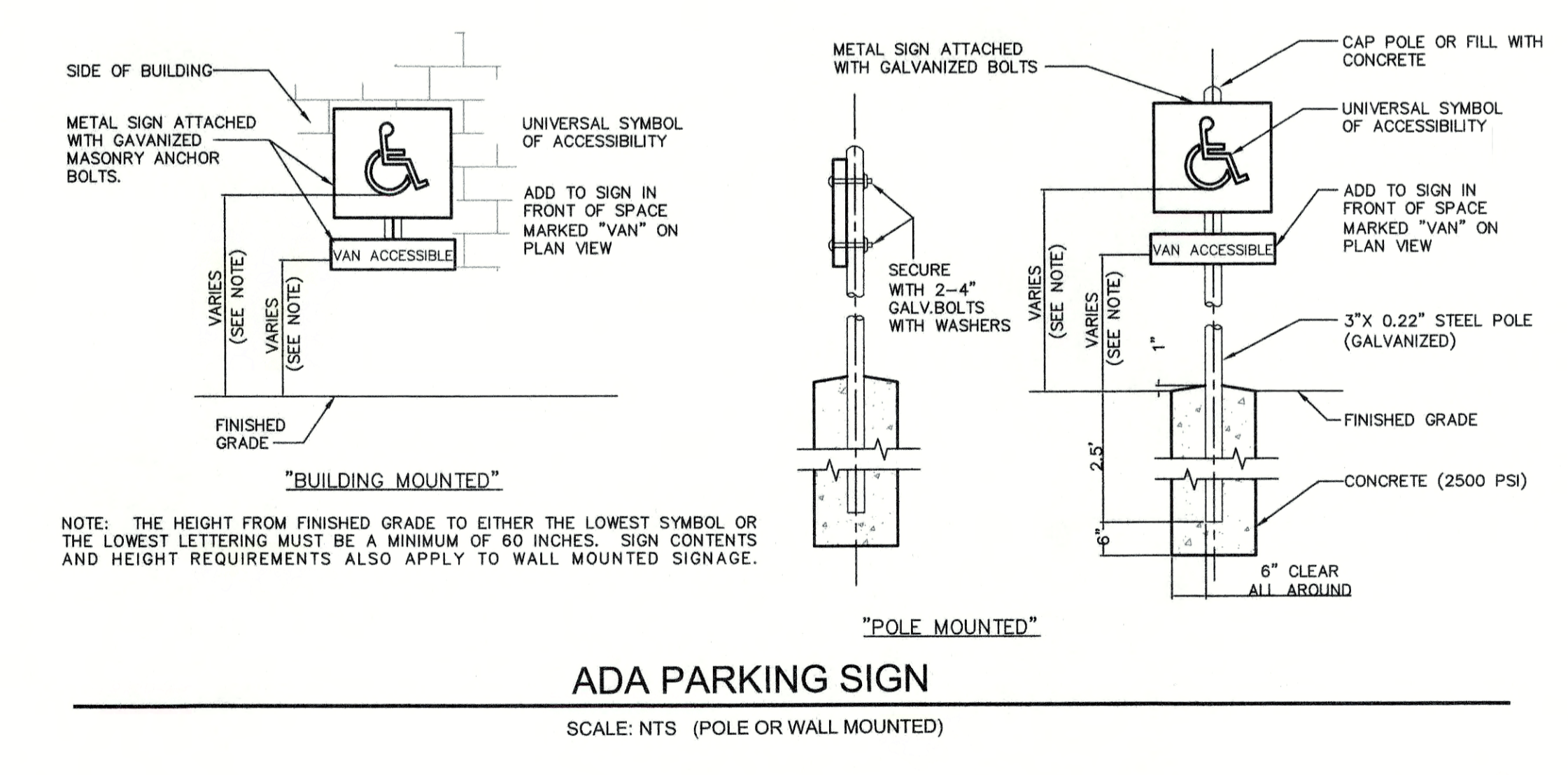
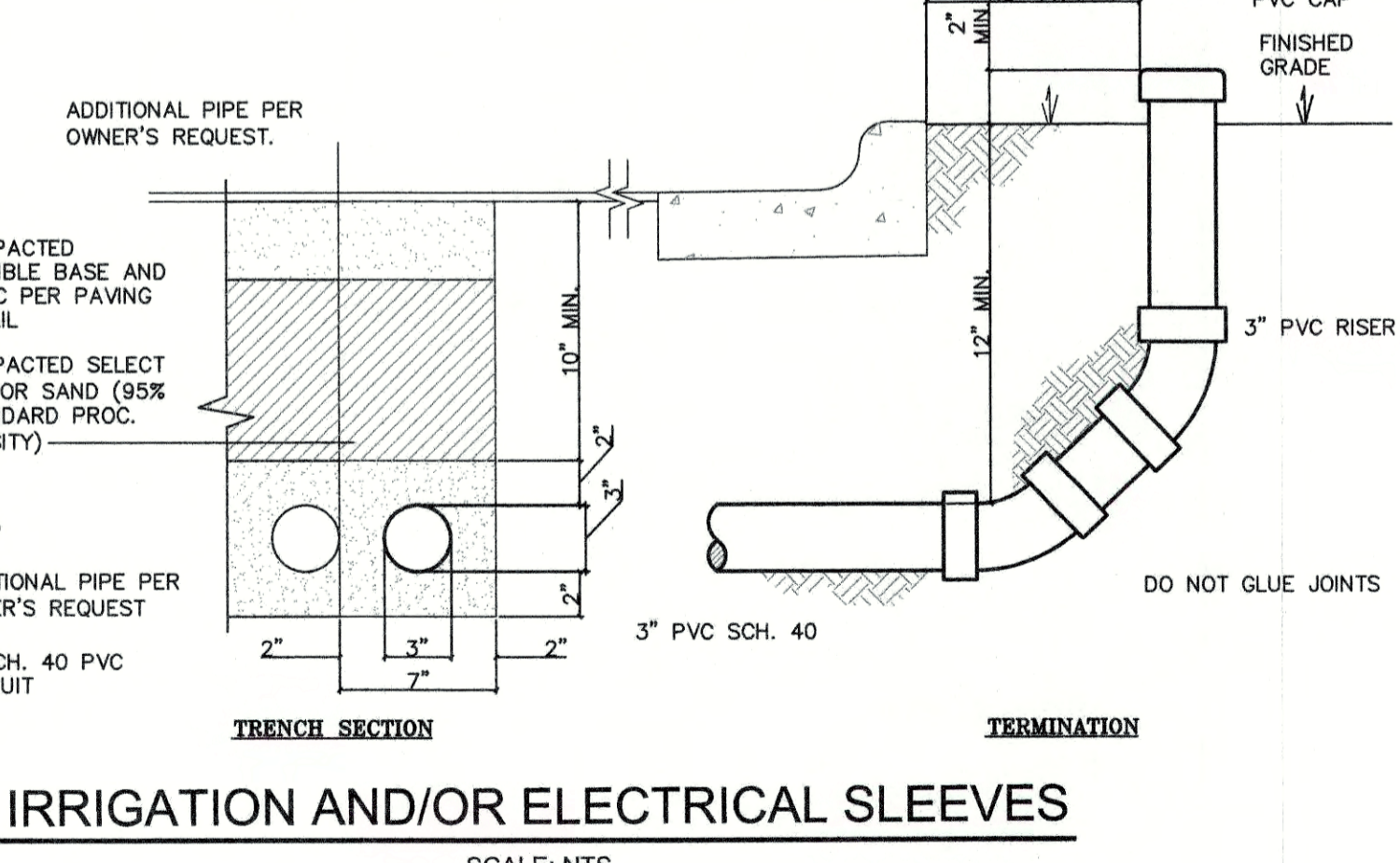
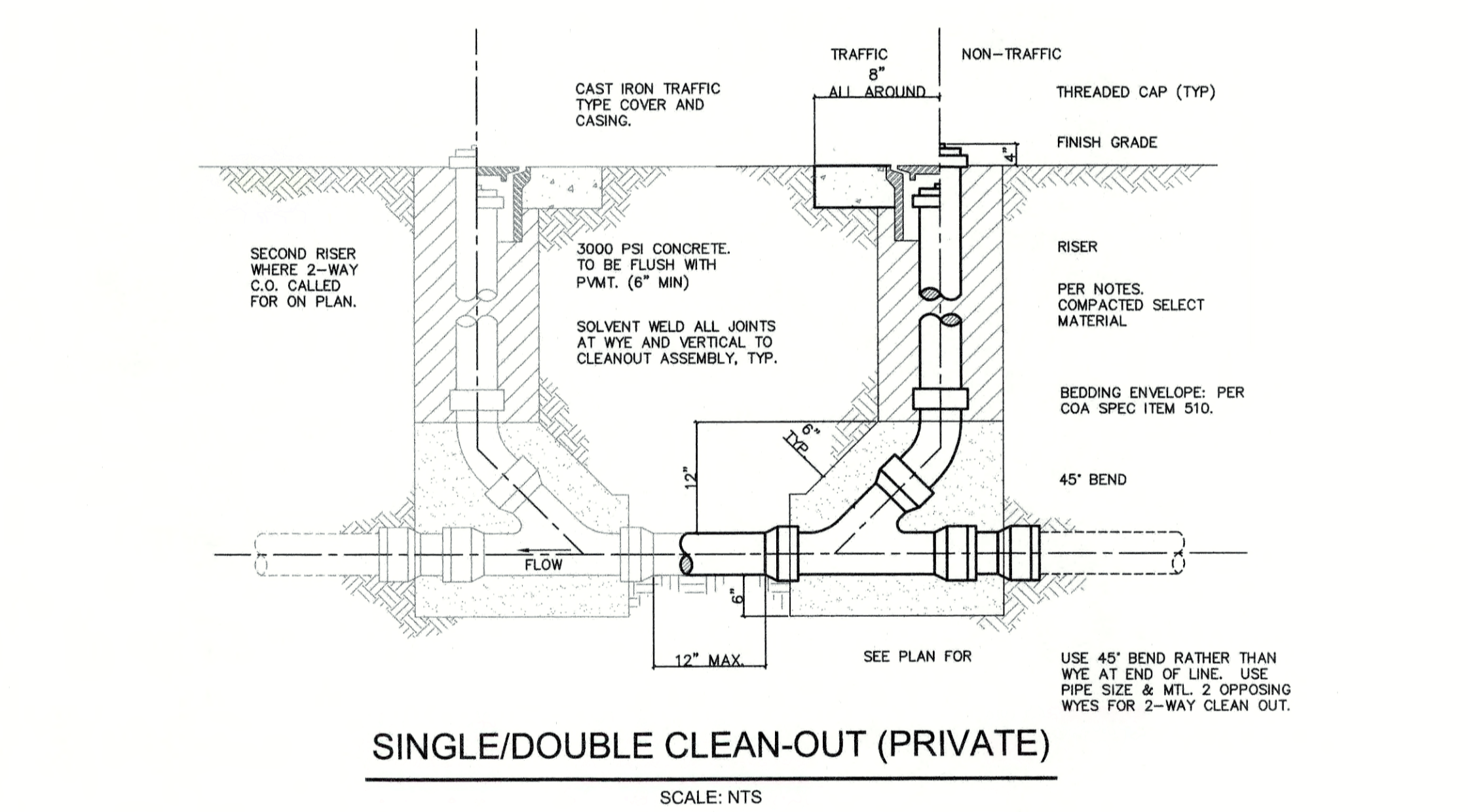
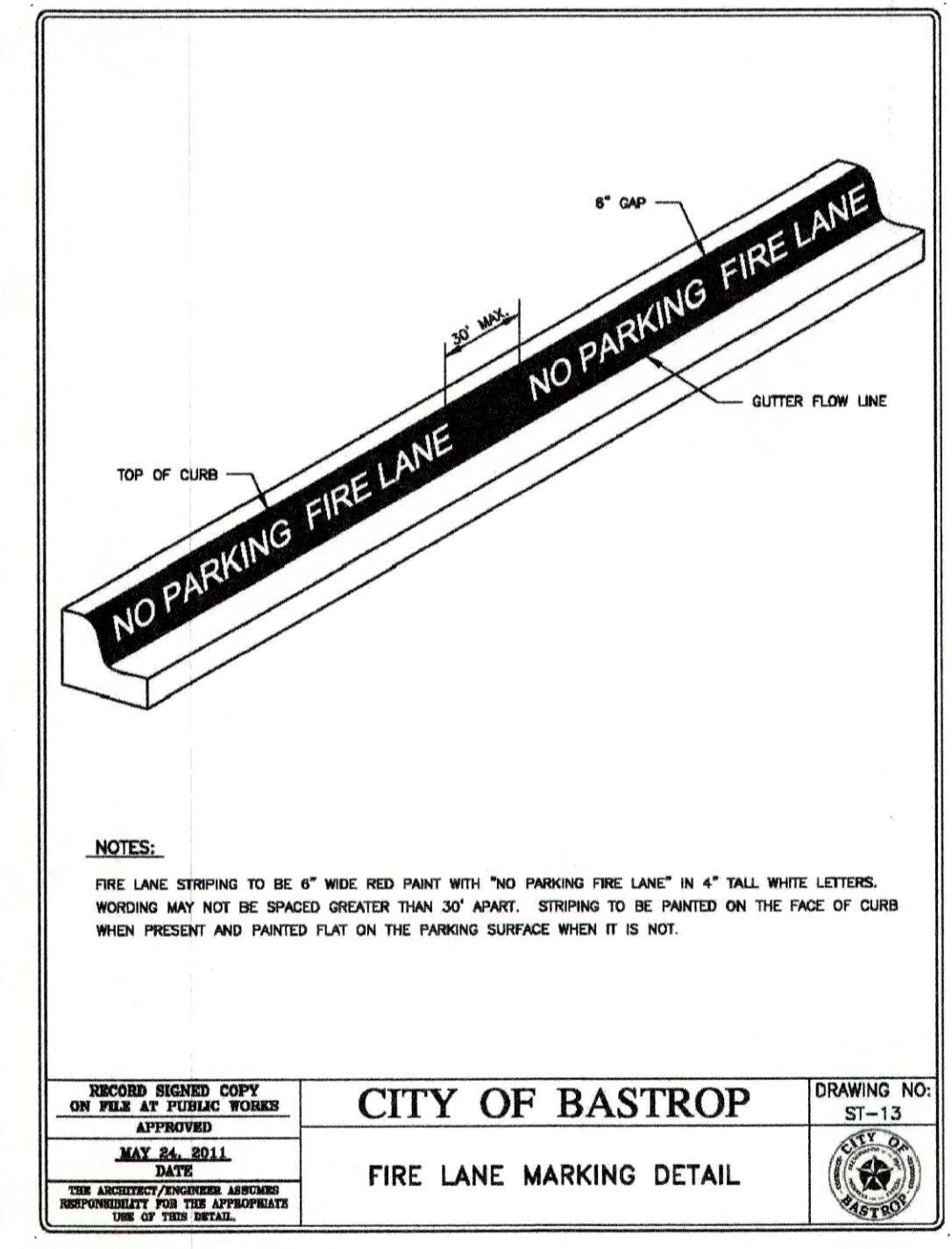
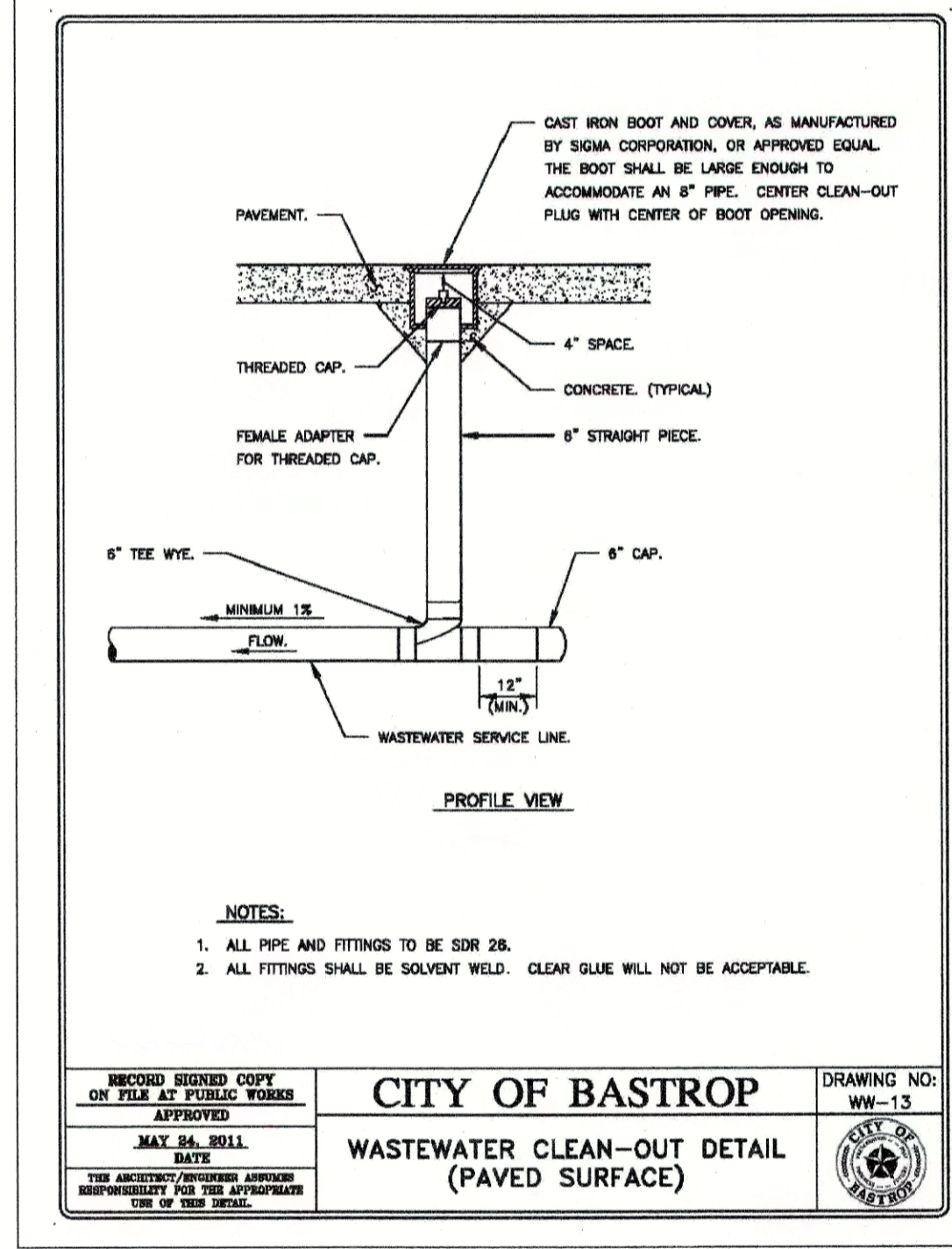
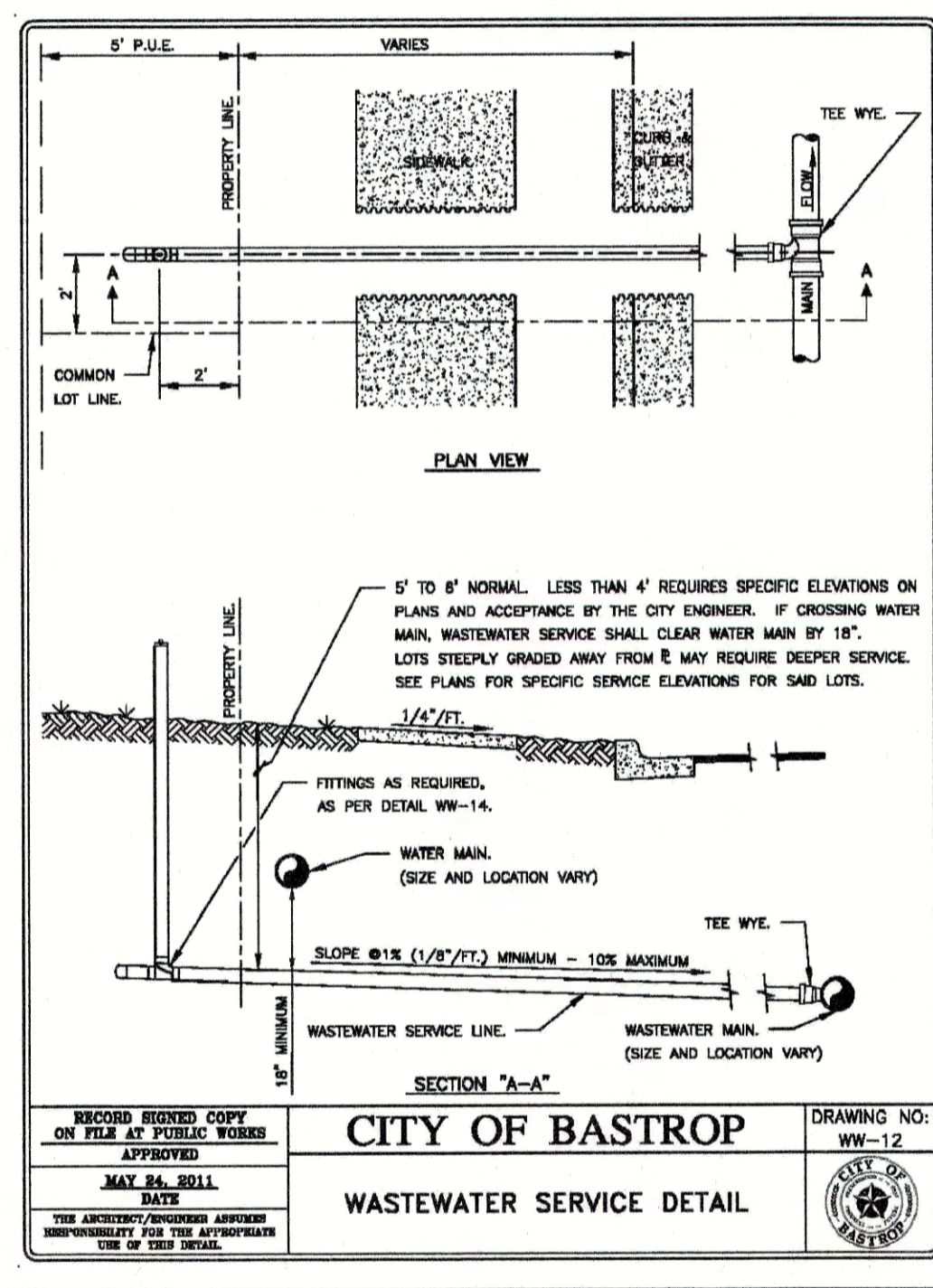
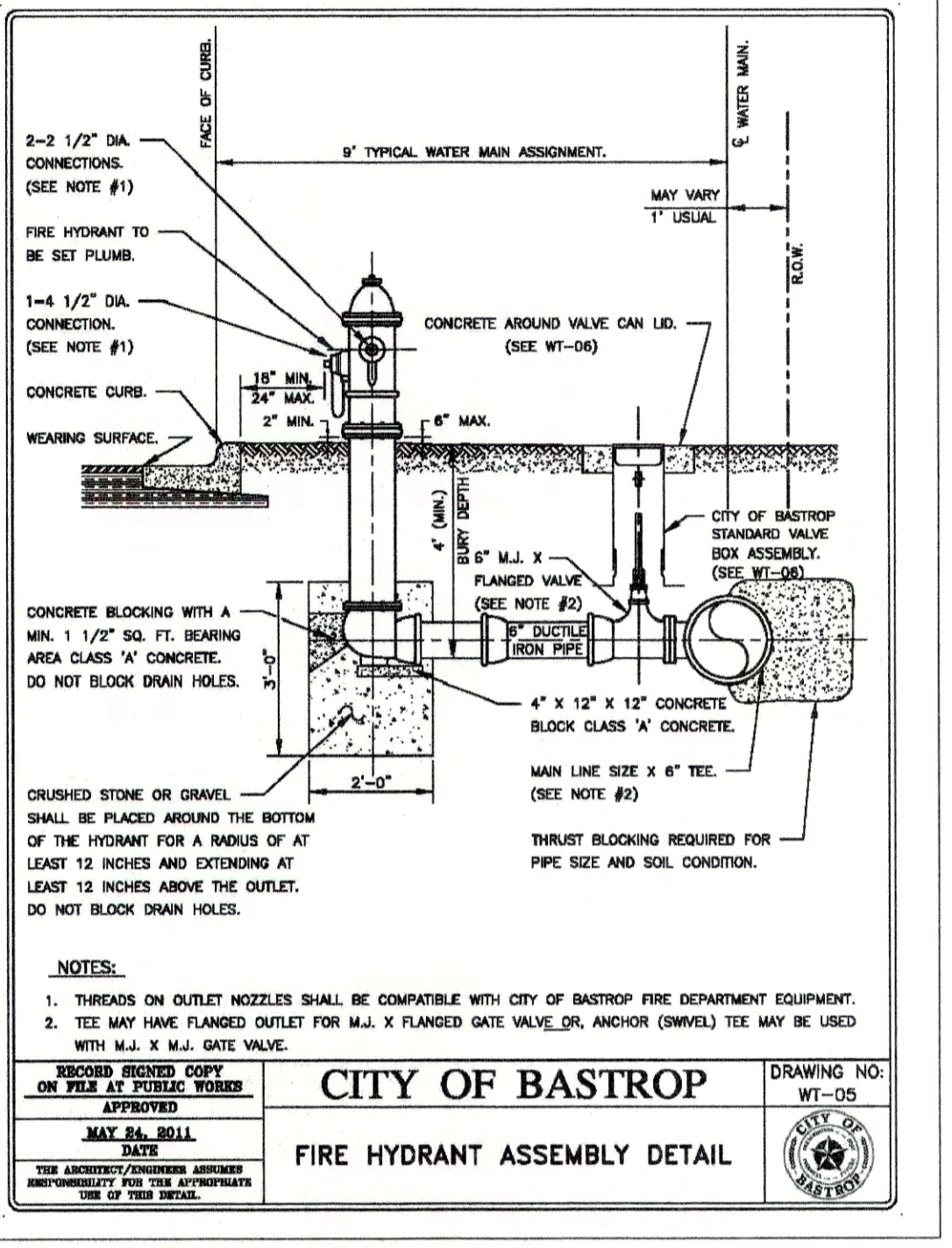
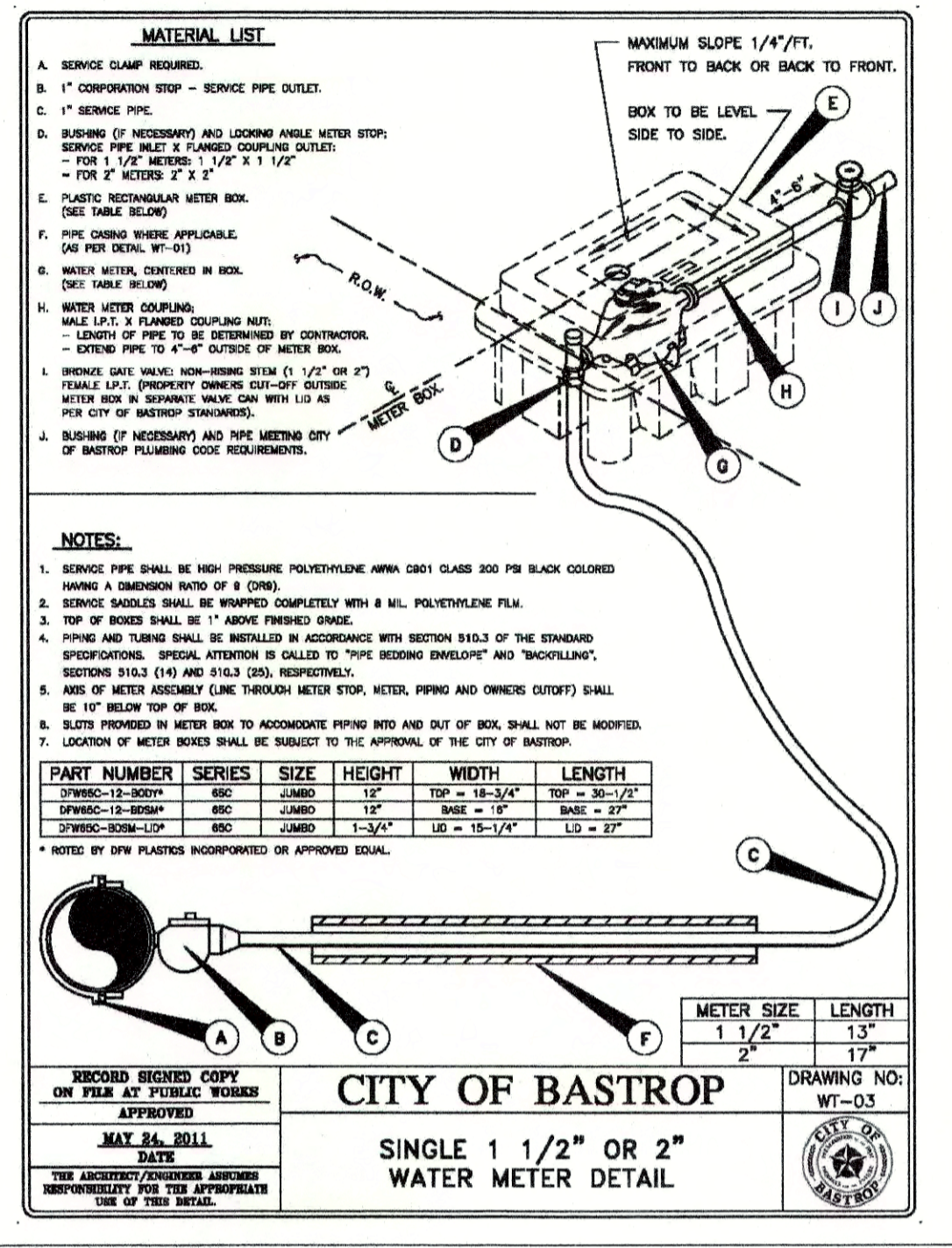
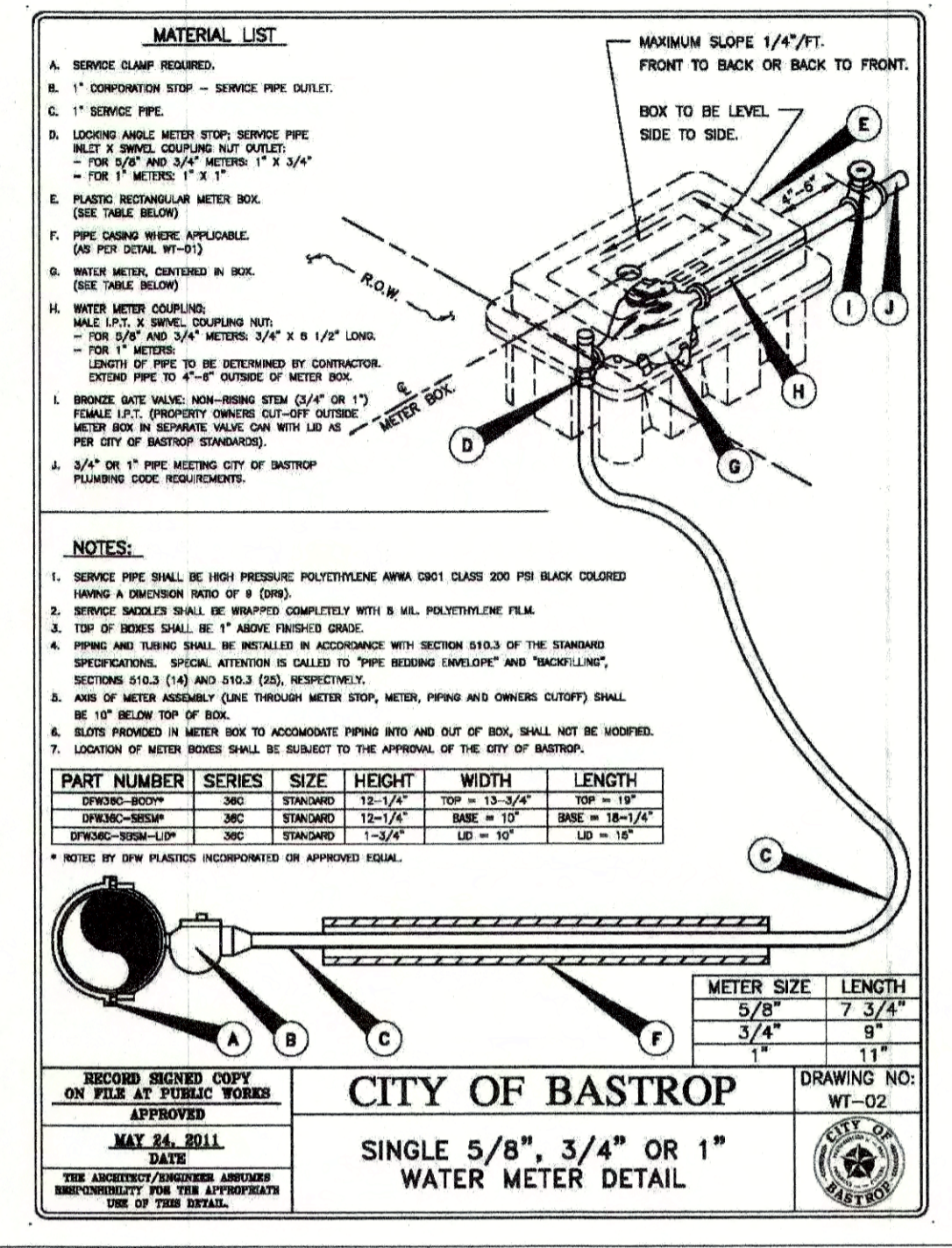
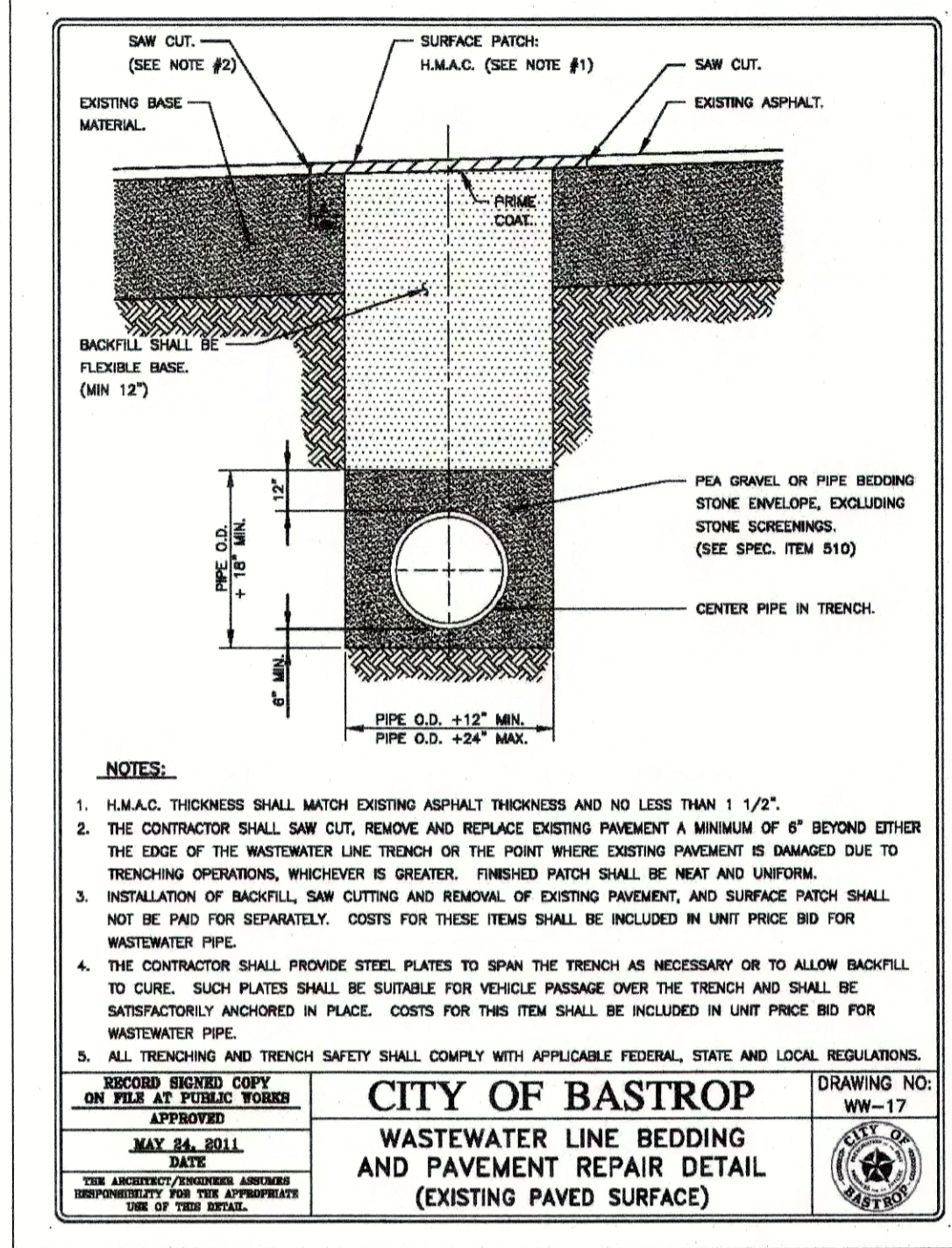
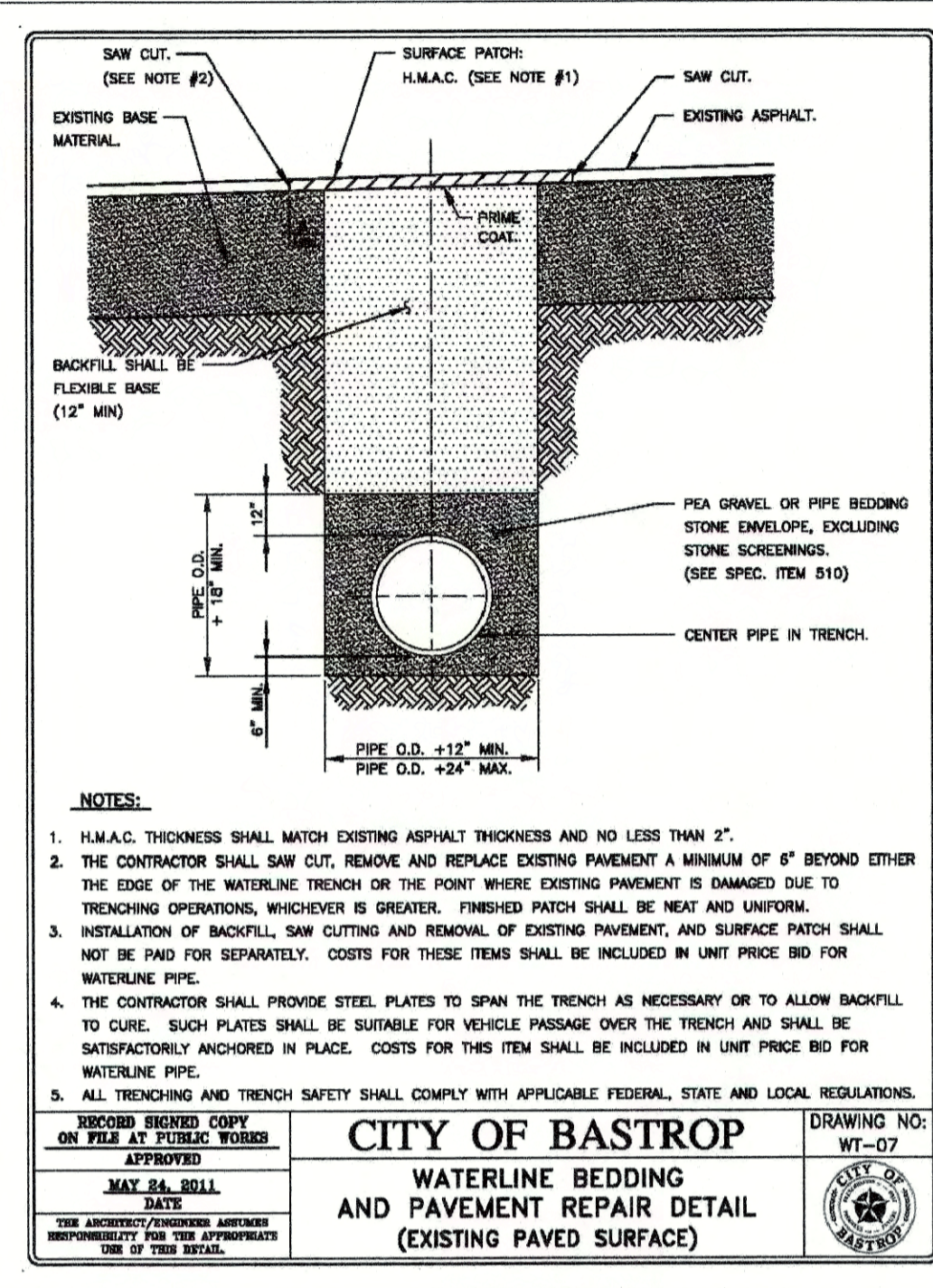
REVISION	DATE	BY

**Carlson, Brigrance & Doering, Inc.**  
Civil Engineering & Surveying  
FIRM ID #F3791  
Main Office: 3500 West Loop West, Suite 1200, Austin, Texas 78750  
North Office: 12120 North Loop West, Suite 100, Houston, Texas 77050  
Phone No. (512) 290-5160

**CONSTRUCTION DETAILS (1 OF 3)**  
**BASTROP GROVE MEDIAL DEVELOPMENT**  
SHEET NAME:  
JOB NAME:  
PROJECT:

**STATE OF TEXAS**  
BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
CARLSON, BRIGRANCE & DOERING, INC.  
ID# F3791  
02/06/2020  
DATE: 11/25/2019  
JOB NUMBER: 5135  
SHEET: 27 OF 29  
SHEET NO.: 27





DESIGNED BY: DATE: REVISION: DRAFTED BY:

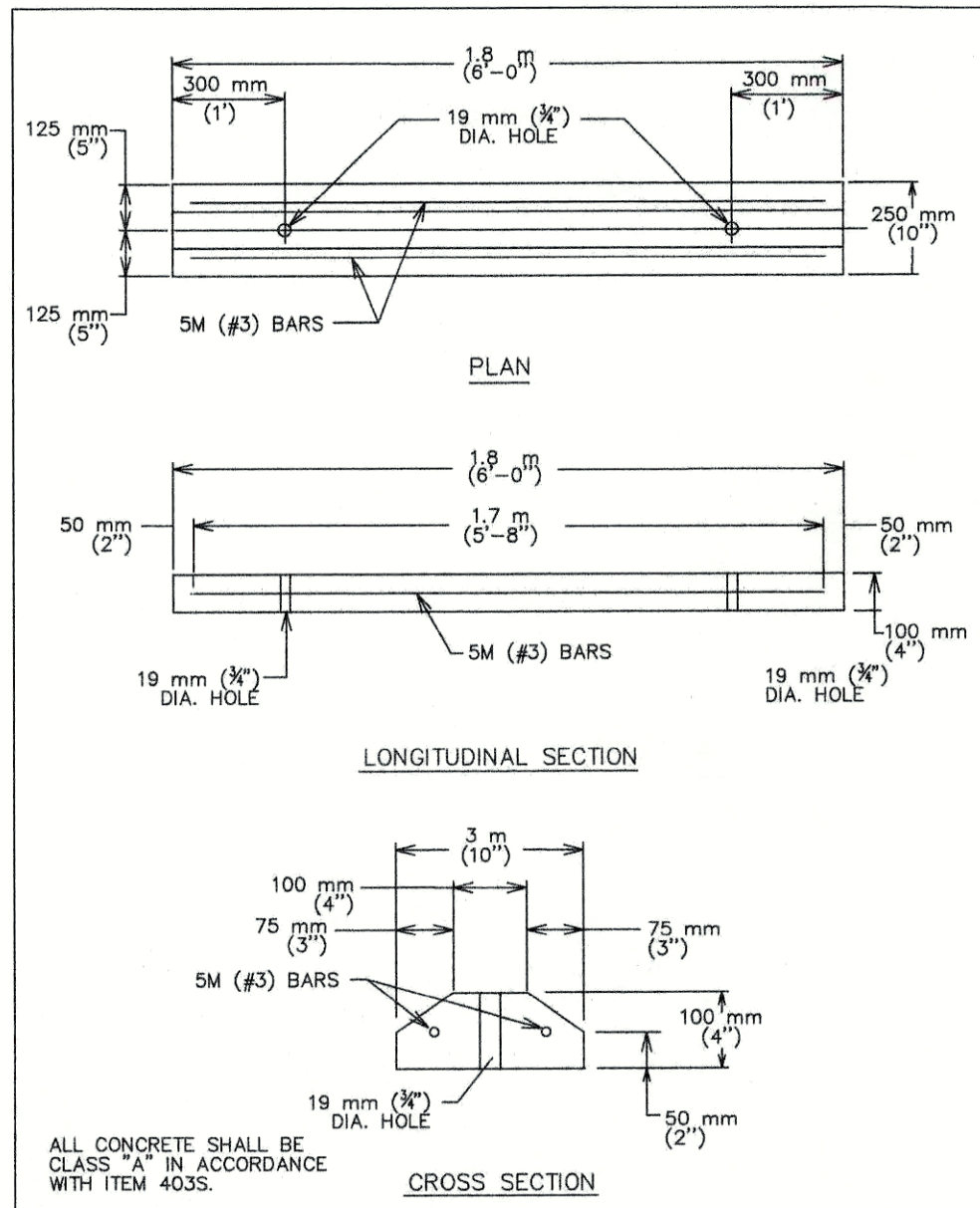
**Carlson, Brigrance & Doering, Inc.**  
Civil Engineering & Surveying  
FIRM ID #F3791  
12129 RR 630 N. Sec. 600  
Austria, Texas 75750  
Phone No. (817) 280-5160 Fax No. (817) 280-5165

**CONSTRUCTION DETAILS (2 OF 3)**  
JOB NAME: **BASTROP GROVE MEDTAL DEVELOPMENT**  
PROJECT: **CIVIL SITE DEVELOPMENT PLANS**

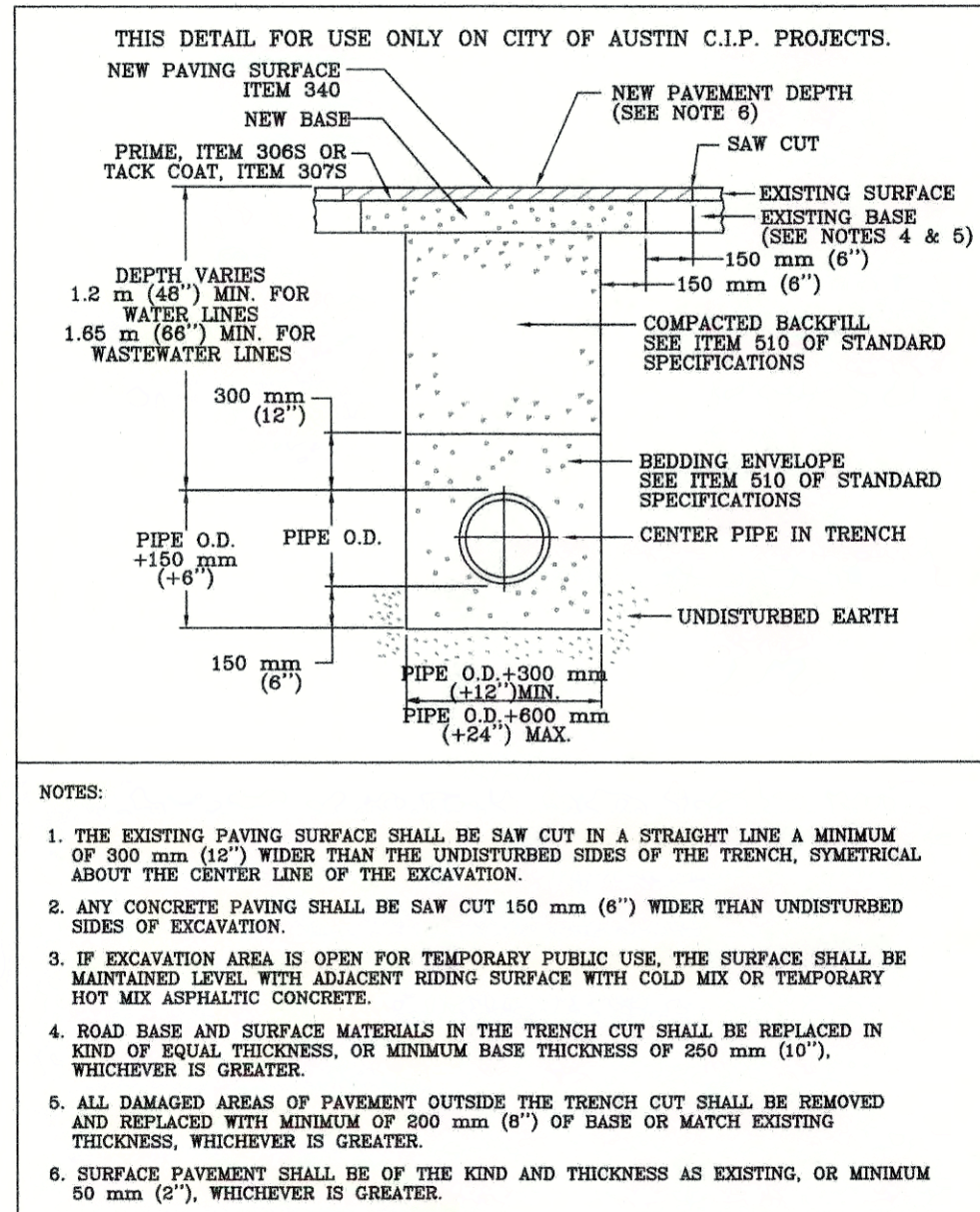
**STATE OF TEXAS**  
BRENDAN P. MCENTEE  
96200  
LICENSED PROFESSIONAL ENGINEER  
CARLSON, BRIGRANCE & DOERING, INC.  
D# F3791  
Redundant  
02/06/2020

DATE: 11/25/2019  
JOB NUMBER: 5135  
SHEET: 28 OF 29  
SHEET NO.: 28

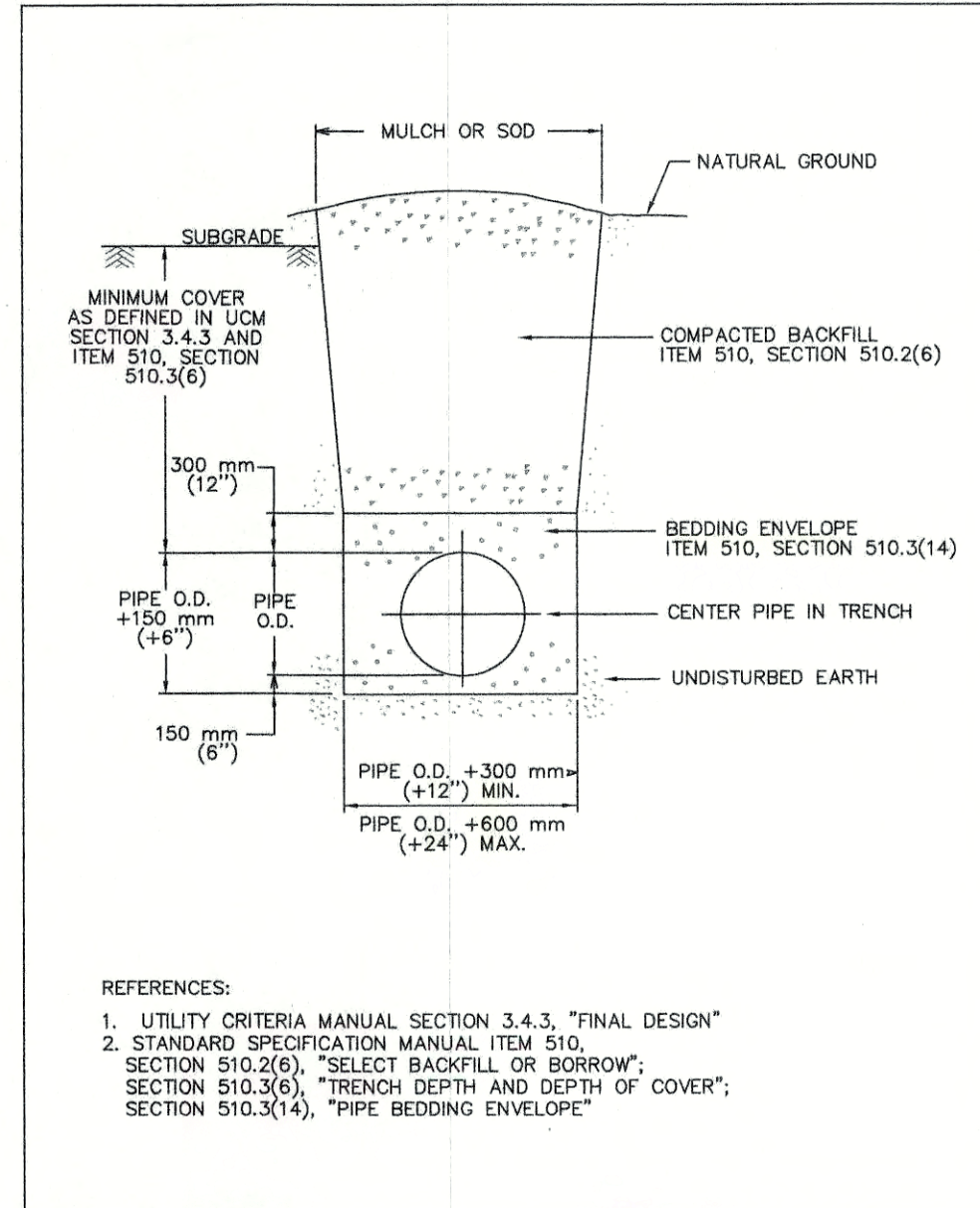
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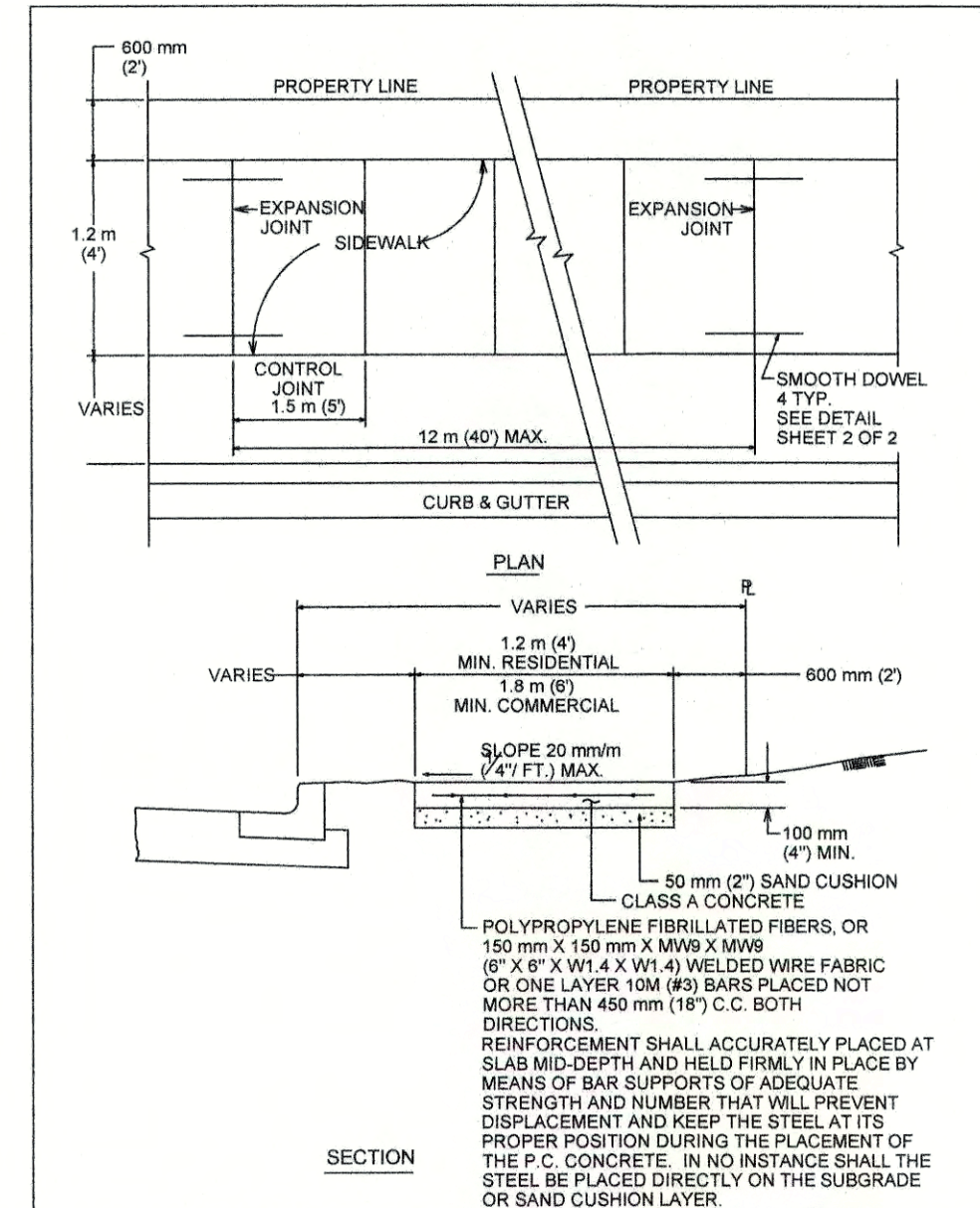
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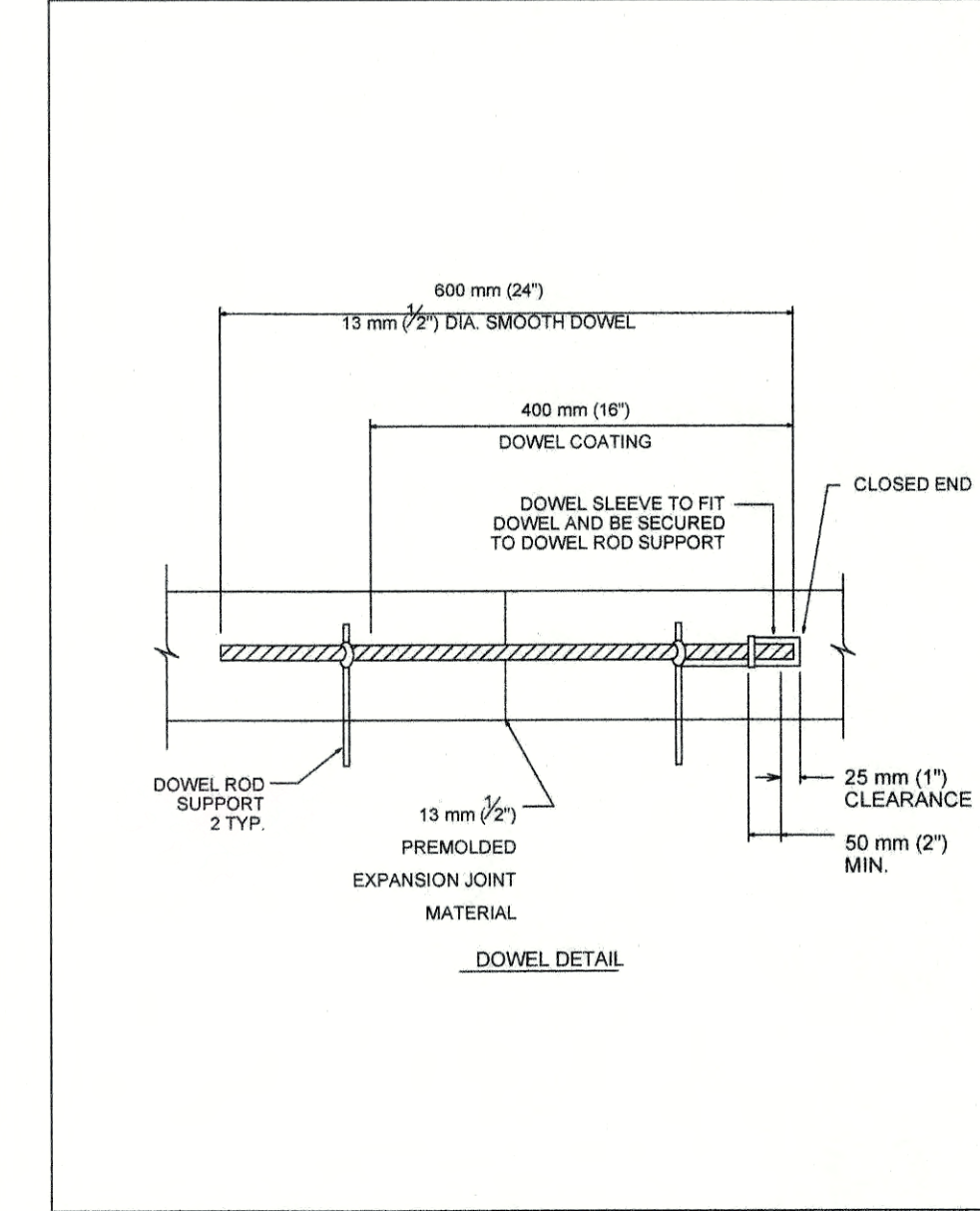
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL TRENCH WITH PAVED SURFACE	STANDARD NO. 510S-3
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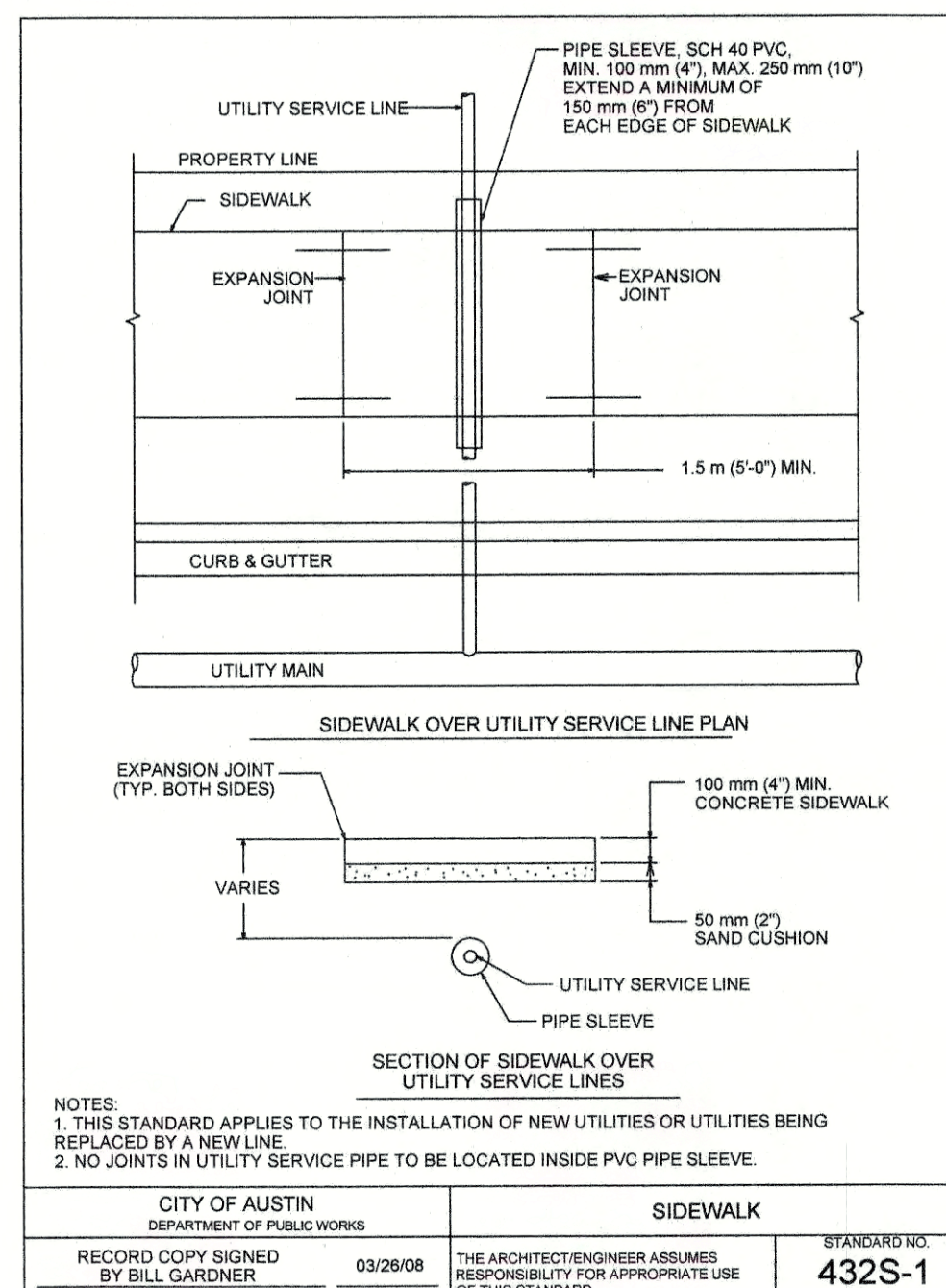
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TRENCH DETAIL WITH UNFINISHED SURFACE	STANDARD NO. 510S-5
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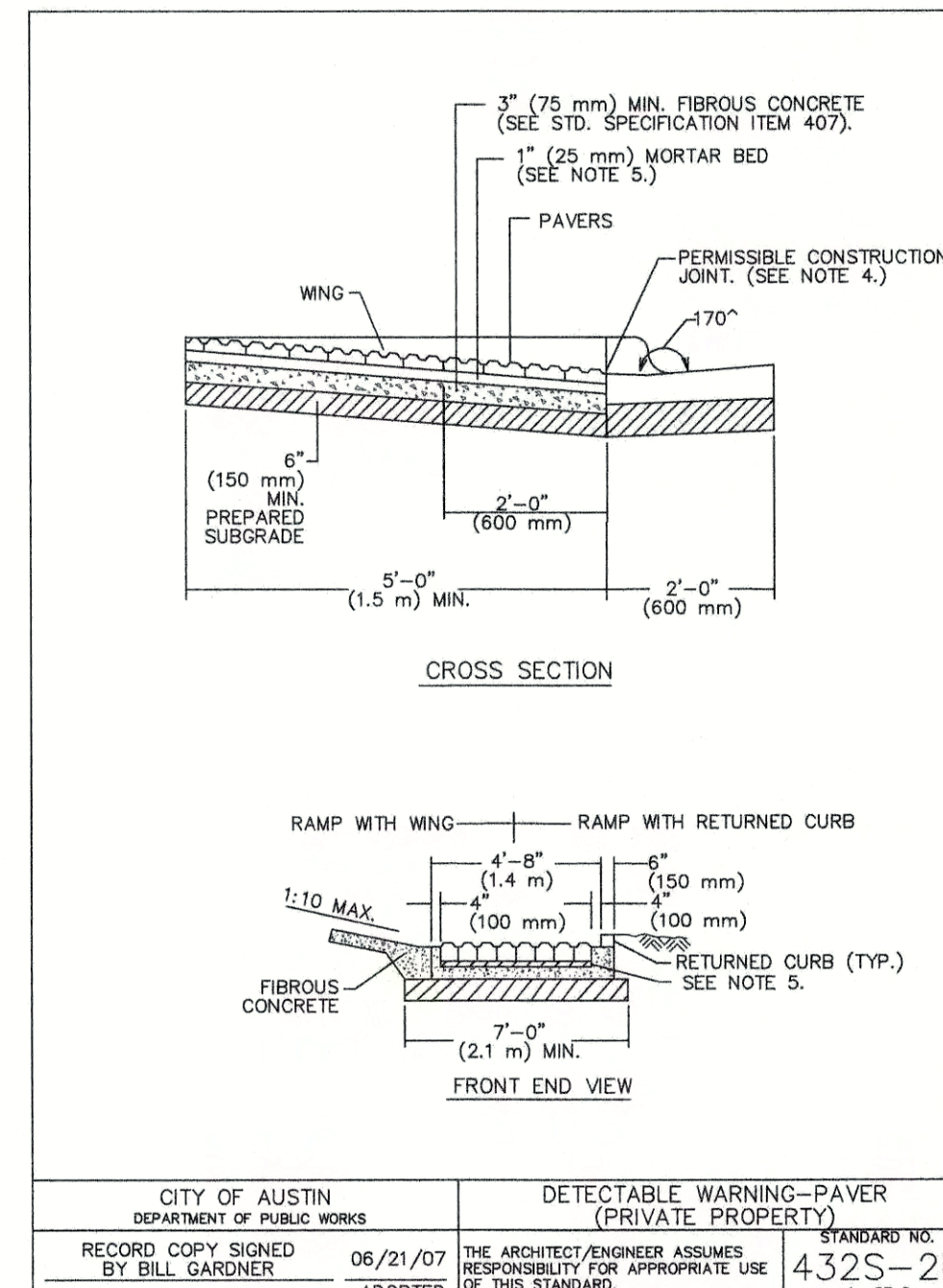
CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SIDEWALK	STANDARD NO. 432S-1
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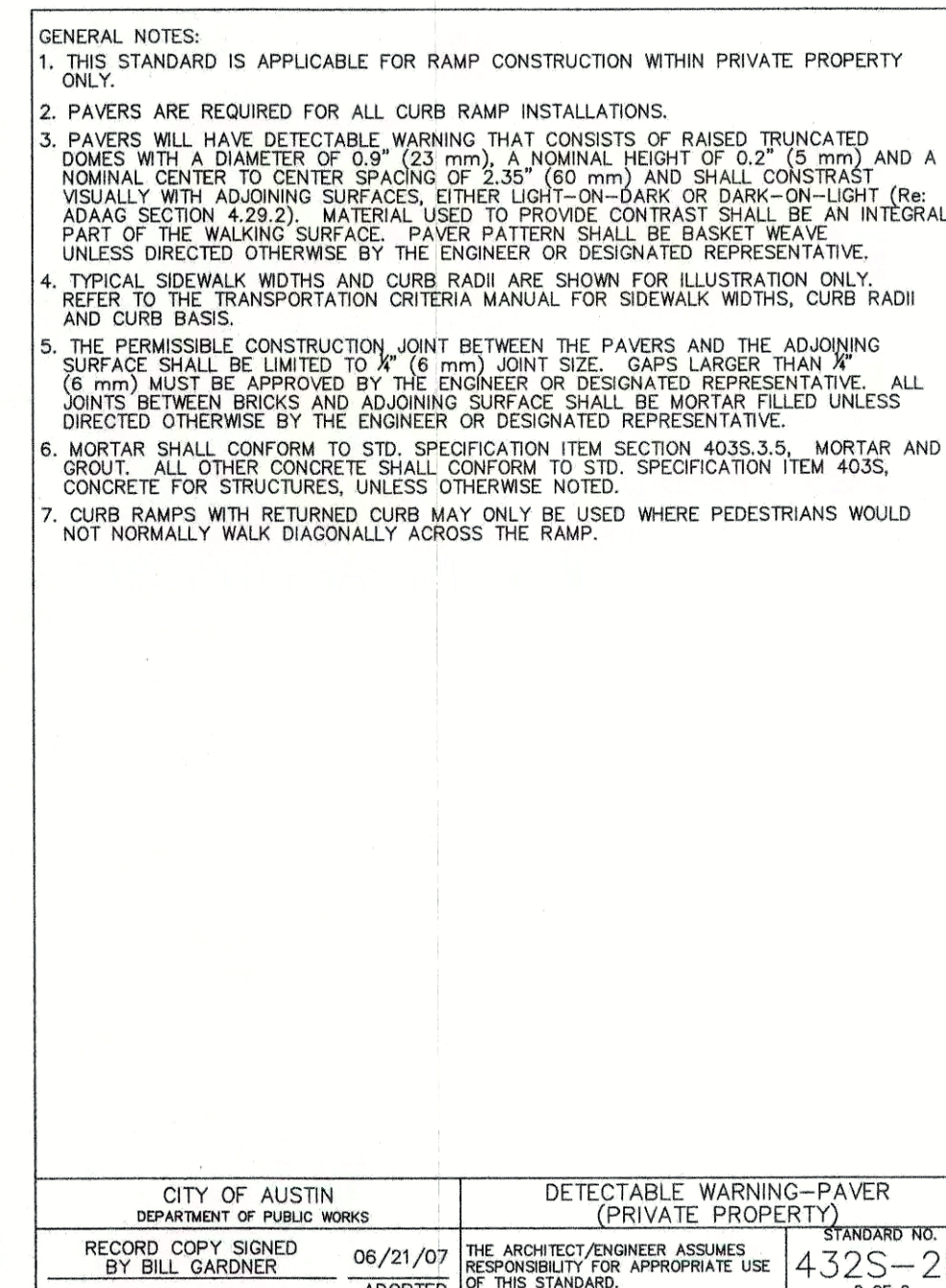
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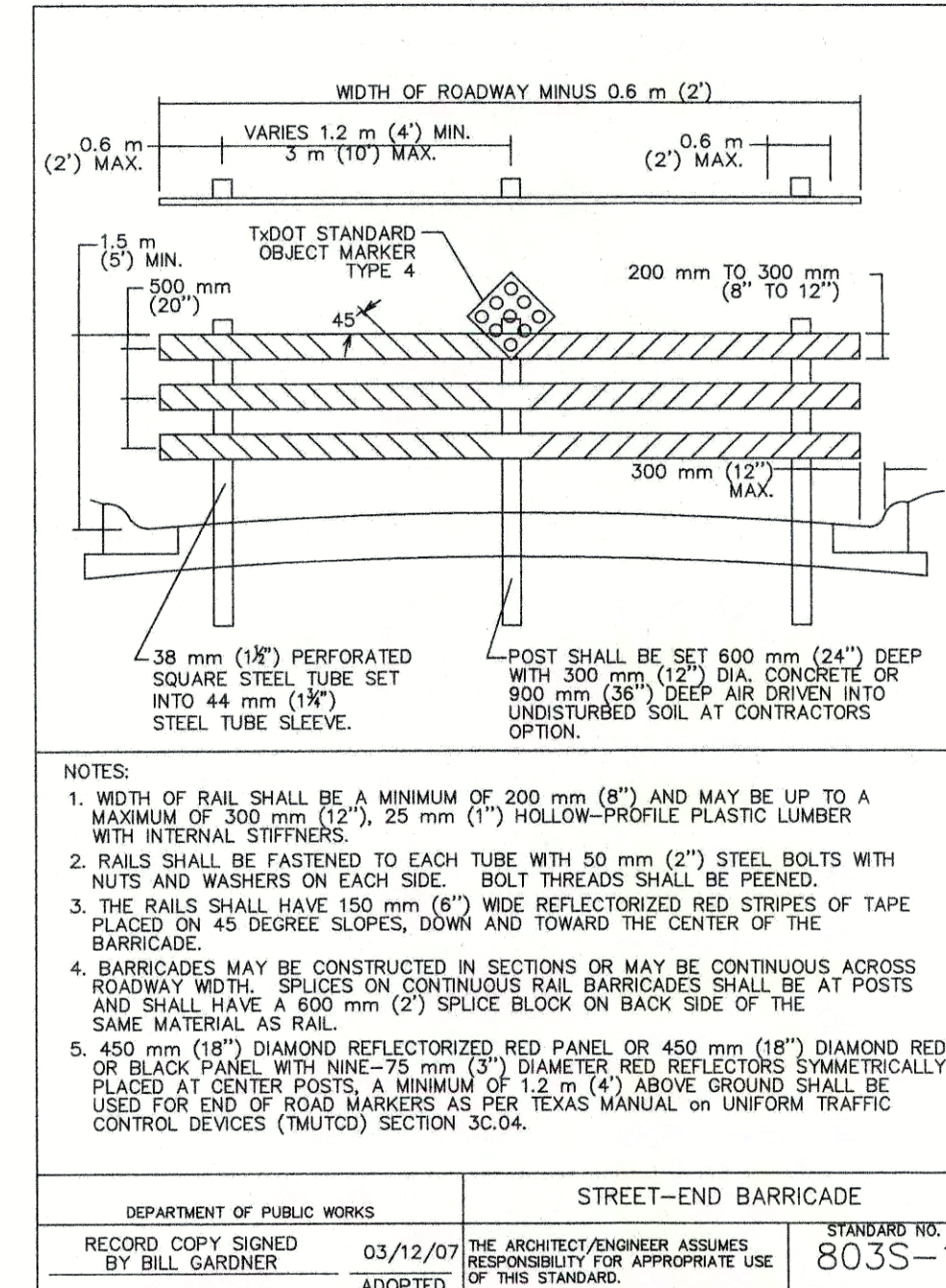
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RECORD COPY SIGNED BY BILL GARDNER	03/26/08 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.



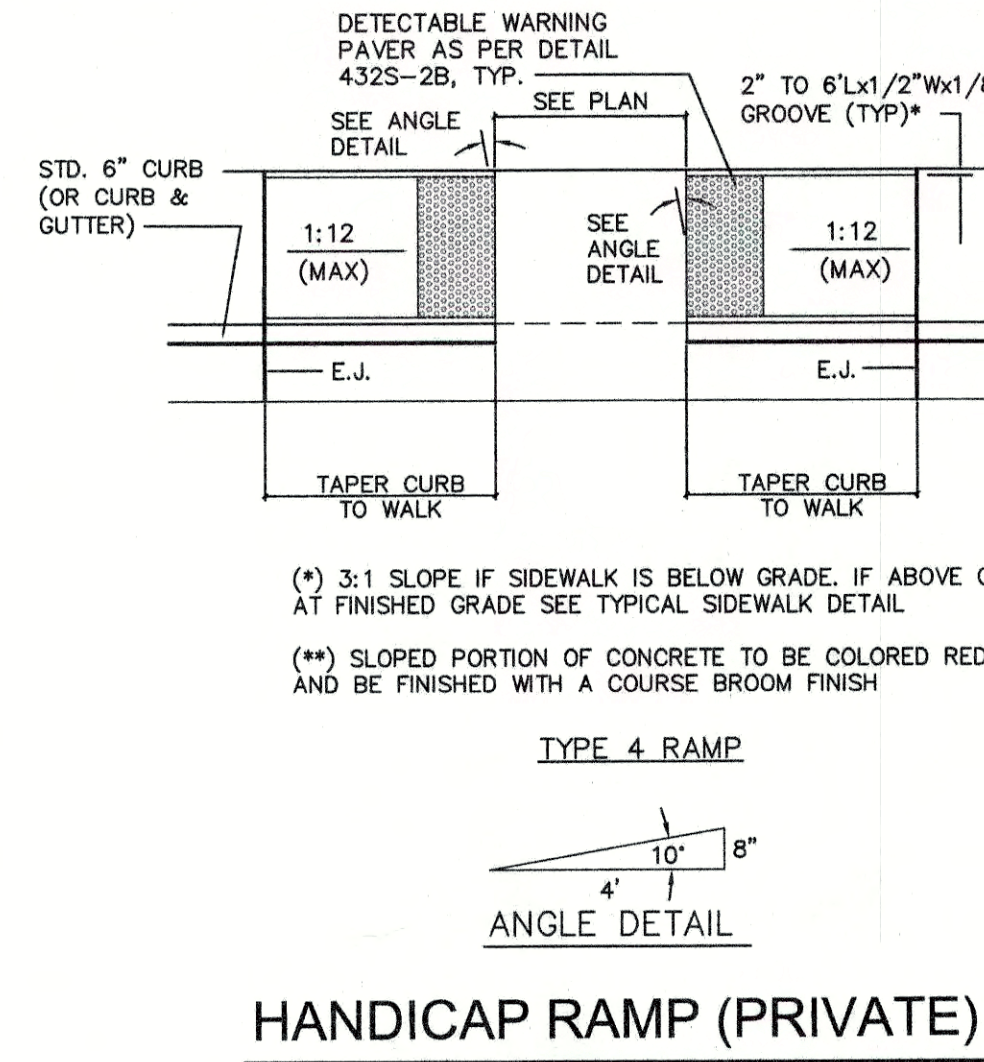
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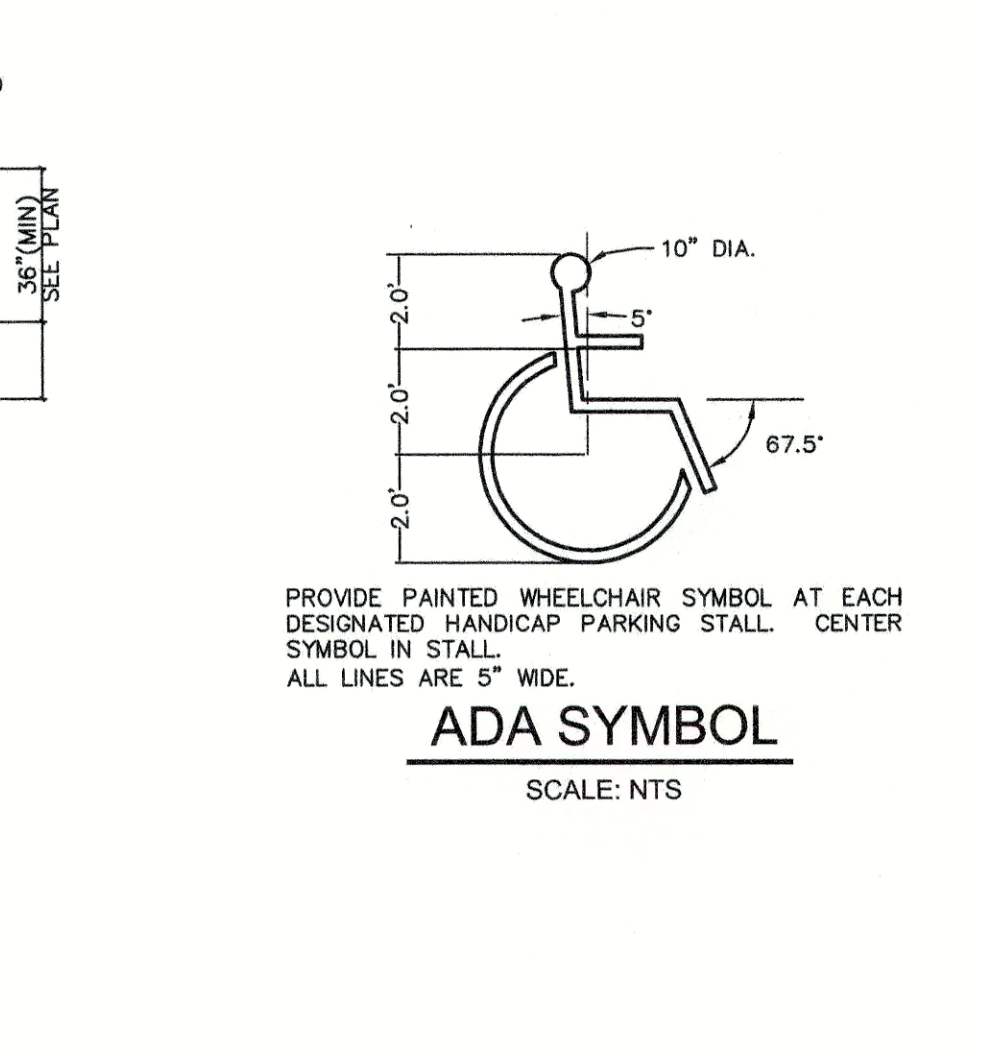
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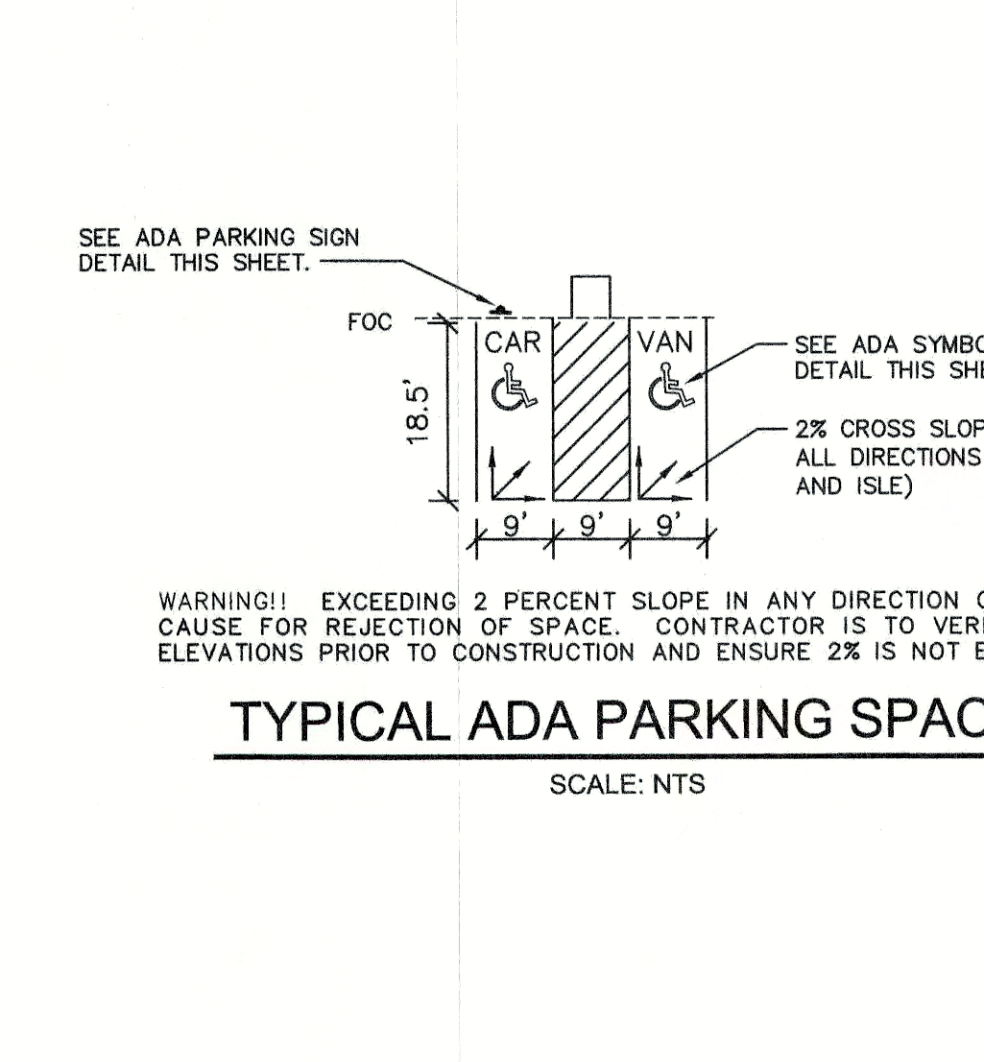
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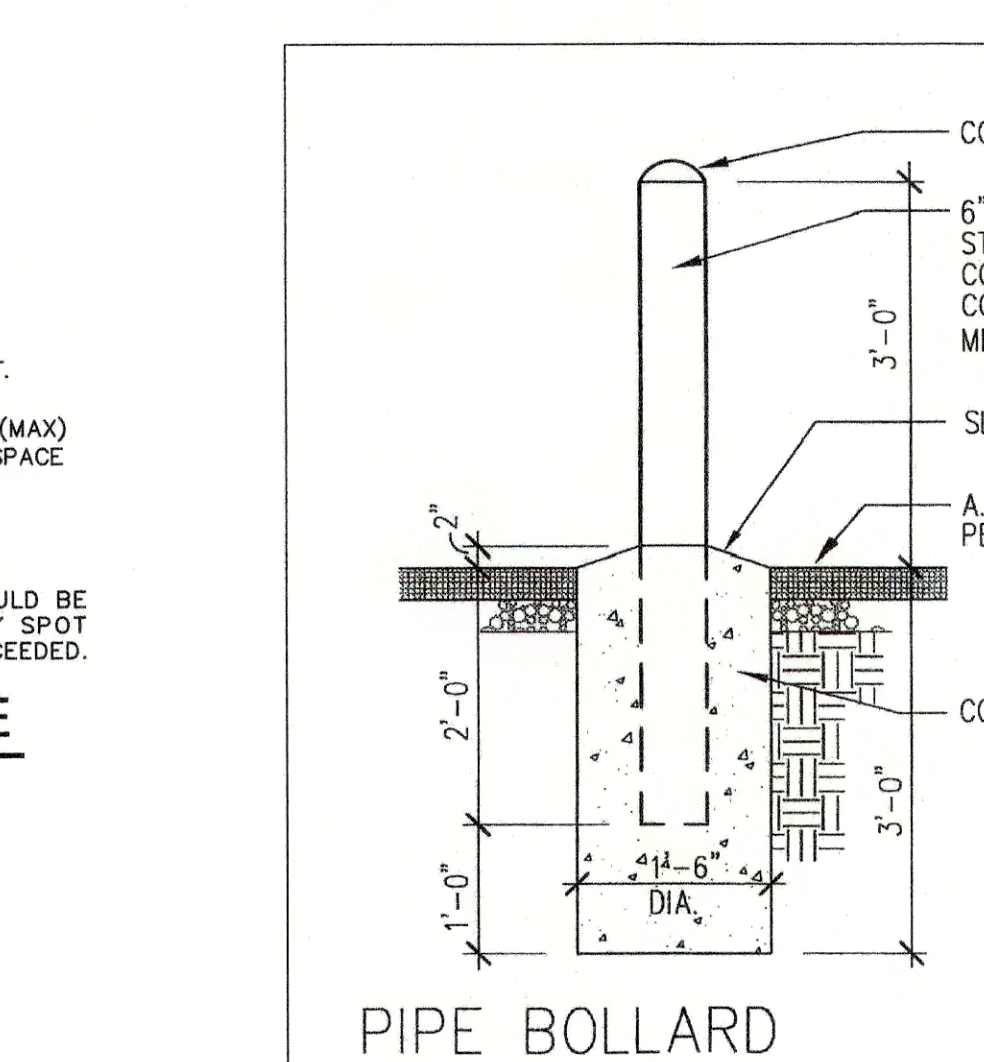
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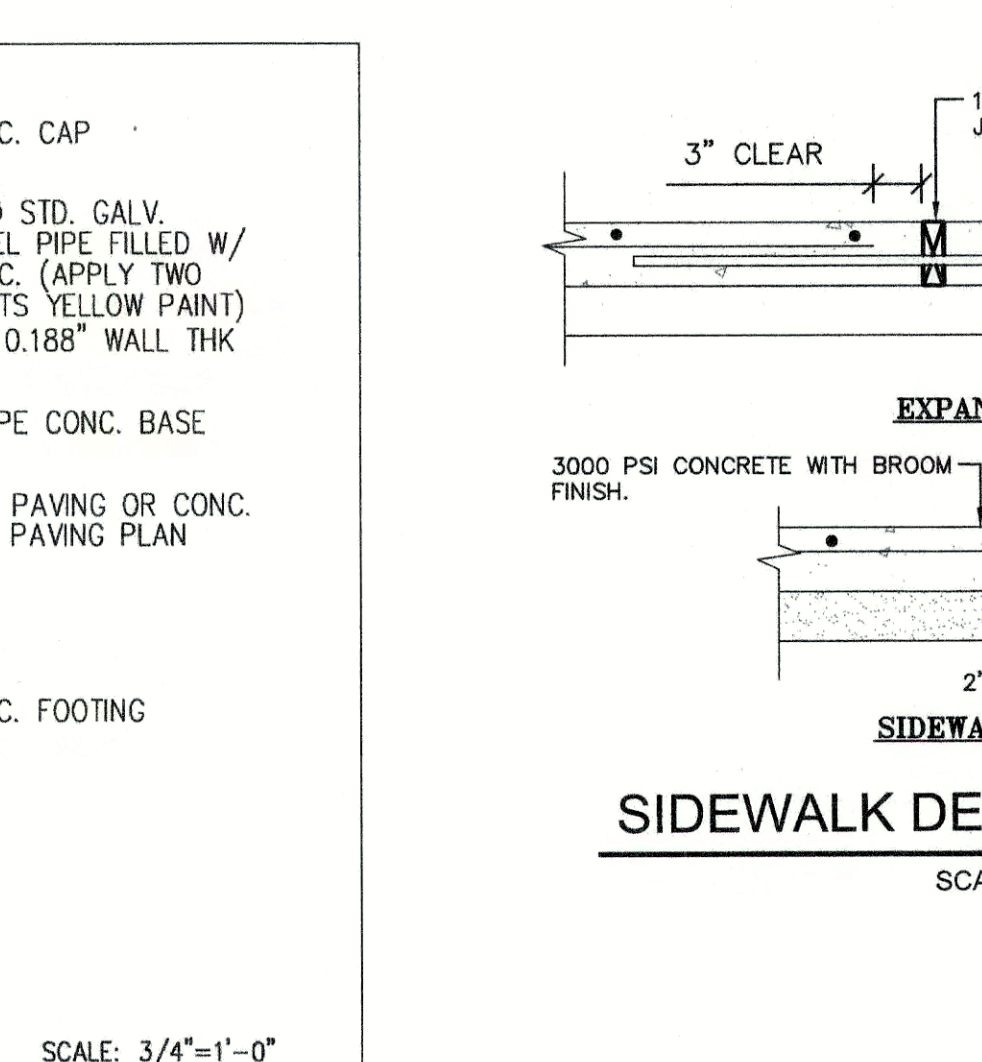
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CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	TYPICAL ADA PARKING SPACE	SCALE: NTS
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CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	PIPE BOLLARD	SCALE: 3/4"=1'-0"
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CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	SIDEWALK DETAILS (PRIVATE)	SCALE: NTS
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DESIGNED BY:	DRAWN BY:
DATE:	
REVISION:	
PROJECT: <b>BASTROP GROVE MEDTAL DEVELOPMENT</b>	
SHEET NAME: <b>CONSTRUCTION DETAILS (3 OF 3)</b>	
JOB NAME: <b>BASTROP GROVE MEDTAL DEVELOPMENT</b>	
PROJECT: <b>CIVIL SITE DEVELOPMENT PLANS</b>	
DATE: <b>11/25/2019</b>	
JOB NUMBER: <b>5135</b>	
SHEET: <b>29 OF 29</b>	
SHEET NO.: <b>29</b>	







# Grandfathering Review Committee

**Date of Decision – March 30, 2021**

**Applicant:** Carlson, Brigance, and Doering, Inc.  
71 Retail Partners LP

**Project:** #21-000055 – Bastrop Grove Section 3 Lot 7 Grandfathering Request

**Members:** Director of Planning & Development  
City Engineer  
Director of Public Works

## DETERMINATION

The Grandfathering Review Committee has evaluated the above referenced project and recognizes certain items of the project as grandfathered as described below.

## BASIS OF DETERMINATION AND CLAIMS RECOGNIZED / REJECTED

The original lot layout and dimensions for lot 7 that can be seen on the preliminary plat dated May 22, 2017; thus, the City of Bastrop can justify making a determination that the project is grandfathered to that date. Any plans or permits prior to that date appear to have been for what could only be characterized as a different project, and thus do not support an earlier grandfathering determination. The record for this property and the material you submitted do not provide a basis for a finding that the project is grandfathered to July 24, 2013. In addition to the lot lay out your request states you believe you are grandfathered to property classification. The City agrees that your property classification was commercial, and it remains commercial. This does not apply to (permitted uses) such as C-1 or C-2 which is a zoning district. However, the new zoning (P5) Placetype 5 allows for more diverse building types such as apartments etc., if it is built in the correct form as seen in the Bastrop Building Block Code (B3 Code).

The duration of the 2017 project for purposes of grandfathering for lot 7 was in our opinion was extended upon recording of the final plat for lot 6 which shows progression of the above-mentioned preliminary plat. This continues the grandfathering status.

Certain items properly characterized as zoning are not recognized as grandfathered in accordance with statutory exemptions listed in LGC 245.004.

Contrary to the Project Description Letter (dated March 16, 2021), the City of Bastrop's Building Bastrop Block Code (B3) was enacted (in substantive part) in accordance with the City's statutory zoning authority, and elements of the B3 Code do constitute municipal zoning regulations under LGC 245. Related regulations such as the B3 Technical Manual and Development Manual may be applicable to your project (depending on your specific plans). The City of Bastrop's process for determining grandfathering is governed by LGC 245 as implemented through Article 1.20 of Bastrop's Code of Ordinances [Uniformity of Regulations].

**SIGNED:**

Trey Job, Assistant City Manager for Community Development













# Grandfathering Review Committee

Date of Decision – May 4, 2021

**Applicant:** Carlson, Brigance, and Doering, Inc.  
71 Retail Partners LP

**Project:** #21-000089 – Bastrop Grove Section 3 Lot 8 & 9 Grandfathering Request

**Members:** Director of Planning & Development  
City Engineer  
Director of Public Works

## DETERMINATION

The Grandfathering Review Committee has evaluated the above referenced project and recognizes certain items of the project as grandfathered as described below.

## BASIS OF DETERMINATION AND CLAIMS RECOGNIZED / REJECTED

The original lot layout and dimensions for lots 8 & 9 that can be seen on the preliminary plat dated May 22, 2017. In addition to the lot lay out your request states you believe you are grandfathered to property classification. That is correct your property classification is commercial, and it remains commercial. This does not apply to (permitted uses) such as C-1 or C-2 which is a zoning district. However, the is the new zoning (P5) Placetype 5 allows for more diverse building types such as apartments etc., if it is built in the correct form as seen in the Bastrop Building Block Code (B3 Code).

The expiration of the grandfathering for lots 8 & 9 in our opinion was extended upon recording of the final plat for lot 6 which shows progression of the above-mentioned preliminary plat. This continues the grandfathering status two years from January 3, 2020.

The following items are not recognized as grandfathered in accordance with LGC 245 or because the items have not been submitted to date:

- Drainage standards: all drainage standards must comply with currently adopted stormwater drainage codes
- Uniform building, fire, electrical, plumbing, or mechanical codes and their locally adopted amendments as they apply to this project
- Landscaping or tree preservation
- Permitted uses
- Building size
- Zoning district C- 1

**SIGNED:**

Trey Job, Assistant City Manager for Community Development

71 RETAIL PARTNERS, L.P.  
8214 Westchester Drive, Ste 550  
Dallas, TX 75225

May 25, 2021

Trey Jobs, Assistant City Manager  
City of Bastrop, TX  
Planning and Development Department  
1311 Chestnut Street  
Bastrop, TX 78602

**Request for Reconsideration**

Dear Trey,

71 Retail Partners, L.P. ("71 RP") filed a Grandfathering Development Status Application under City Code Art. 1.20 (the "Ordinance") on April 19, 2021. The Grandfathering Review Committee (the "GRC") issued a determination (the "GRC Determination") on May 4, 2021. 71 RP hereby requests reconsideration of the GRC Determination pursuant to the Ordinance.

The GRC Determination is required by the City for the City to make its own determination of its position on the application of Texas Local Government Code ("LGC") Chapter 245 ("LGC 245"), which provides protections from changes in local regulation as to an ongoing development project (such protections being commonly known as "vested rights"). Only Chapter 245 determines the applicable vested rights, and to the extent the Ordinance seeks to limit vested rights or give the City control over the interpretation process (such as, but not limited to, establishing standards and burdens), we protest, and submit this application under protest. The GRC Determination is for the benefit of the City only, and is not binding on 71 RP as to the nature or extent of vested rights. 71 RP reserves all its rights under LGC 245.

Vested Rights defined (emphasis added):

- "If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements *in effect at the time the original application for the first permit in that series is filed shall be the sole basis for consideration of all subsequent permits required for the completion of the project*. All permits required for the project are considered to be a single series of permits. Preliminary plans and related subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats

are considered collectively to be one series of permits for a project.” LGC 245.002(b)

- “Rights to which a permit applicant is entitled under this chapter *accrue on the filing of an original application or plan for development or plat application* that gives the regulatory agency fair notice of the project and the nature of the permit sought.” LGC 245.002(a-1)

The GRC Determination granted grandfathered status, but not the date (appearing to approve May 22, 2017). It seems to limit the scope of grandfathered status to (i) “lot lay out” as shown on the 2017 Preliminary Plat application, and (ii) “property classification”, which the city determined to be “commercial”, but not all the permitted uses permitted under then zoning district C-1. The City goes on to say that other uses are permitted today, but only if development is compliant with the B3 Code. Lastly, the City lists landscaping or tree preservation and building size as not grandfathered “because the items have not been submitted to date.”

The Ordinance requires the following:

1. Filing with the Director of Planning and Development in writing within fifteen (15) business days of the date of the Grandfathering Review Committee's previous determination or the date of automatic denial;
2. State the reasons why the previous determination should be reversed or modified;
3. Present information that has not previously been presented for consideration by the Grandfathering Review Committee;
4. Provide an explanation of the legal and factual grounds of the request; and
5. Be accompanied by payment of the reconsideration fee established by the City Council, as codified in the city's fee schedule.

For purposes of this appeal request, the word “Project” refers to 52.68 acres that was owned on the date of the original application by 71 RP, inclusive of the creation of the lots and related infrastructure and the construction of buildings thereon. Both the land development and the building development are entitled to vested rights. 71 RP has continuously pursued this Project since the original application. The scope and nature of the Project is well known to the City, as suburban retail/commercial pad site development for buildings consistent with the Medtail facility. The elements of the contemplated retail/commercial pad sites are relatively small buildings (usually 1 story), typically centered in each lot, with ample, surface parking surrounding the building, and cross access easements shared among the other pad sites. These lots are typically called “commercial reserves”. Lot 8 is a typical pad site and Lot 9 is a larger tract for larger development. Lots 8 & 9 were planned for and contemplated building for the uses permitted under Zoning District C-1 at the time of the 2017 Preliminary Plat application.

## **Reconsideration Request # 1: Which application is the original application for the Project?**

71 RP believes the GRC Determination made an erroneous determination that the original application for the Project is the application dated 5-22-2017 for the Preliminary Plat for the Bastrop Grove (the "2017 Application"). 71 RP agrees that the 2017 Application was a vesting event, but asserts that the first vesting event was the application dated 7-24-2013 for Preliminary Plat for the Grove (the "2013 Application").

71 RP asserts that the original application for the Project that gave the regulatory agency fair notice of the Project and the nature of the permit sought pursuant to LGC 245.002(a-1) was the 2013 Application.

71 RP asserts the following in support of its request and offers the following explanation of the legal and factual grounds of this appeal:

- The 2013 Application and 2017 Application are both for the exact same tract of land.
- The 2013 Application and 2017 Application generally provide both the same access points onto State Highway 71 and the same internal vehicular circulation.
- A side-by-side comparison of the 2013 Application and 2017 Application shows that they are substantially similar and generally depict the same project, which is a development of smaller lots and buildings fronting on State Highway 71 with the remainder of land available for further subdivision and future development of larger buildings as the Project progresses.
- LGC 245.002(a-1) states:
  - “Rights to which a permit applicant is entitled under this chapter accrue on the *filing of an original application or plan for development or plat application* that gives the regulatory agency *fair notice of the project and the nature of the permit sought.*” *emphasis added.*
  - 71 RP did file the 2013 Application on 7-22-2013 properly and as required.
  - The 2013 Application was of sufficient detail to give fair notice of the Project and the nature of the permit sought.
  - The City has accepted the 2017 Application and a side by side comparison shows that the 2013 Application and 2017 Application are substantially similar.
- LGC 245.002(b) states:

“If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements *in effect at the time the original application for the first permit in that series is filed* shall be the sole basis for consideration of all subsequent permits required for the completion of the project. All permits required for the project are considered to be a single series of permits. Preliminary plans and related subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats are considered collectively to be one series of permits for a project.” *emphasis added.*

- Both the 2013 Application and 2017 Application are Preliminary Plat applications for the same exact tract of land and therefore are deemed to be one series of permits for the Project under Texas LGC 245.002(b).
- The 2017 Application was merely a refinement of the Project.

In summary, 71 RP is vested with the both the 2013 Application and the 2017 Application.

**Reconsideration Request # 2: Is the Project subject to the Bastrop Building Block (B3) Code, the B3 Technical Manual, and the Development Manual (collectively the “B3 Code”)?**

While 71 RP asserts the 2013 Application is the proper application for determining vested rights under Texas LGC 245, both the 2013 Application and 2017 Application pre-date the B3 Code. Therefore, 71 RP asserts the GRC Determination made an erroneous determination in the following statement, “However the is the [sic] new zoning (P5) Placetype 5 allows for more diverse building types such as apartments, etc., if it is built in the correct form as seen in the Bastrop Building Block (B3 Code).” The B3 Code does not apply to the Project, as it does not qualify for exemption under Texas LGC 245.004.

71 RP asserts the following in support of its request and offers the following explanation of the legal and factual grounds of this appeal:

- LGC 245.004(2) provides an exemption to LGC 245 for “*municipal zoning regulations* that do not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size or that do not change development permitted by a restrictive covenant required by a municipality”. *emphasis added.*
- In order for a zoning regulation to be exempt under LGC 245.004 (2), such regulation must be a municipal zoning regulation **and** must not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size (collectively the “LGC 245.004 Vested Rights”). The word “affect” means “having an effect on”, which is a broad

interpretation. The B3 Code impacts every aspect of the LGC 245.004 Vested Rights. 71 RP asserts that the B3 Code fails this test as follows:

- B3 is not a municipal zoning regulation, but a “form based code” whose regulations are based on public infrastructure. Public infrastructure is regulated by the subdivision and platting process, not the zoning process. Zoning focuses on separation of use by geographic district. Use is not directly regulated by the B3 Code. There are no permitted/prohibited uses, no use table or matrix, and no use definitions. A fair reading of the B3 Code shows it is not zoning regulations, but subdivision and platting regulations.
- Page 22 of the B3 Code states “Blocks are the foundation for development in Bastrop.” If Blocks (and therefore street grids/specifications and lot sizes/dimensions) are the foundation of development in Bastrop under the B3 Code, then the B3 Code, without question, fails the test and does not qualify as exempt under LGC 245.004 exemption for “municipal zoning regulations.”
- B3 is a “unified development code” which mixed various types of land use regulations that otherwise would be separate ordinances. It is not “municipal zoning regulations” of the type contemplated when LGC 245 was adopted. This is particularly true for a form-based code. The “Explanation of the Code” on Page 15 of the B3 Code states “Each section of the Code provides Standards that guide development to be holistic to each Building, Street, Block, and neighborhood.” Merriam-Webster defines “holistic” as “relating to or concerned with wholes or with complete systems rather than with the analysis of, treatment of, or dissection into parts”. As a result, the B3 Code in its entirety fails the test to be “municipal zoning regulations” and does not qualify as exempt under LGC 245.004.
- The broad exceptions to the general “municipal zoning regulations” exception in LGC 245.004 swallow the general exception when applied to the B3 Code. The “B3 Development Tables” in the Code, which “contain the details necessary to develop using the Code” contain specific requirements for lot sizes, lot dimensions, lot coverage, building sizes, open space and park dedication requirements. Any regulations which have any effect on these areas are subject to vesting as “exceptions to the exceptions”. As a form-based code, the core focus is on infrastructure, particularly the street grid and “blocks”. This approach, by its nature, affects the LGC 245.004 Vested Rights. Given that the details necessary to develop using the B3 Code directly affect the LGC 245.004 Vested Rights, the B3 Code fails the test and does not qualify as exempt under LGC 245.004.

### Reconsideration Request # 3:

71 RP believes the GRC Determination made an erroneous determination in this statement, "The following items are not recognized as grandfathered in accordance with LGC 245 or because the items have not been submitted to date:

- Landscaping and tree preservation
- Permitted Uses
- Building Size
- Zoning District C-1"

71 RP asserts the following in support of its request and offers the following explanation of the legal and factual grounds of this appeal:

1. LGC 245(2)(b) states:

"If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements *in effect at the time the original application for the first permit in that series is filed* shall be the sole basis for consideration of all subsequent permits required for the completion of the project. All permits required for the project are considered to be a single series of permits. Preliminary plans and related subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats are considered collectively to be one series of permits for a project."

LGC 245 does not require each and every permit in a series of permits to be filed in order for the Project to have vested rights under LGC 245 and whether those specific items have been submitted to date does not preclude the Project's vested rights under LGC 245. The Project includes the entire life cycle of development, from lots to completed buildings, such that the Project is fully vested under LGC 245. The City determination should be clarified, or rescinded.

2. LGC 245.004 (2) provides an exemption to LGC 245 for "municipal zoning regulations that do not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size or that do not change development permitted by a restrictive covenant required by a municipality". 71 RP asserts that there has been no new zoning regulation passed by the City that meets this test and therefore Zoning District C-1 and the Permitted Uses under C-1 as of the date of the original application for the Project are vested rights. The "property classification" vested rights covers all uses permitted as of the date of vesting, in this case the date of the original



application, at which time the C-1 Zoning District applies. All uses then permitted are permissible for the Project. Any provisions of the B3 Code that would have an effect on those permitted uses are not applicable to the Project. A number of those permitted uses are not practically possible under the B3 Code, therefore those B3 Code provisions may not be applied to such uses, as they indirectly do what LGC 245 prohibits.

3. LGC 245.002(d) permits a permit holder to take advantage of “a change in the laws, rules, regulations, or ordinances of a regulatory agency that enhance or protect the project...” This means that the Project may be developed with any uses, since the City does not currently regulate uses. The owner of any portion of the Project may develop under the regulatory scheme as of the vesting date, but without any of the limits of the B3 Code. This section permits a developer to “cherry pick” new regulations to develop a vested project, without forfeiting any vested rights.

**Reconsideration Request #4: To the extent the Project is subject to any elements of the B3 Code, what are they?**

As stated in #2, 71 RP asserts that the entirety of the Bastrop Building Block (B3) Code, the B3 Technical Manual, and the Development Manual are not applicable to the Project. To the extent the City determines that the B3 Code is a “municipal zoning regulation”, subject to the LGC 245.004 Vested Rights in LGC 245.004(2), 71 RP asserts that the Project is specifically exempt from the following elements (listed by Chapter) and asks the City to confirm the same:

- Executive Summary- This section is not regulatory in nature and should not be applicable to the Project.
- Chap. 1- Chapter 1: *Subdivisions* is not applicable to the Project. Pursuant to LGC 245, the Project is grandfathered to the subdivision ordinance in effect at the time of the original application and therefore any future subdivision or platting application for the Project would not be subject to the requirements of Chapter 1.
- Chap. 2- Chapter 2: *Zoning Procedures* deals with procedural aspects only. It is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety).
- Chap. 3- Chapter 3: *Place Type Zoning Districts* cannot be fairly read as “municipal zoning regulations”. There is no focus on use, whether with a hierarchy of uses or separate of uses. But for a gratuitous scattering of the word “zoning” in Chap. 3, it reads like a subdivision or platting regulation, focused on street and block patterns and size. The geographic division is not based on use, but on street block

based subdivision/platting standards. The requirement to prepare a Neighborhood Regulating Plan (a "NRP") is a critical component of the B3 Code and its focus is purely streets and blocks. Chapter 2 of the B3 Technical Manual, which includes the NRP process, is entitled "Site Planning and Private Realm." A fair reading of that Chapter shows that it is not part of "municipal zoning regulations", but rather subdivision and platting regulations. Article 2.3 of the B3 Technical Manual states "Neighborhood Regulating Plans are used as the process to create new complete neighborhoods. Each neighborhood will be made of a series of blocks created for a variety of Street Types, Building Types, and Place Types." The NRP's process to create "new complete neighborhoods" requires dedication of land for streets of designated sizes to creates certain block sizes to build specifically designated building types. The NRP is platting and subdivision regulation, not zoning, which is why the NRP is the first step for any owner of greater than 3.4 acres under the B3 Code seeking to subdivide its land. The NRP is a part of the the platting process, not the zoning process. The NRP process is subject to vested rights and is not applicable to the Project (and no portion of Chapter 3 of the B3 Code or Chapter 2 of B3 Technical Manual is applicable). As such, the NRP process directly affects the LGC 245.004 Vested Rights and is not exempt under LGC 245.004.

- Chap. 4- Chapter 4: *Character Districts* of the B3 Code can't be fairly read as "municipal zoning regulations". There is no focus on use, whether with a hierarchy of uses or separate of uses. Chapter Four of the B3 Code states that "Character Districts are the largest regulating geographic boundary in the Code" and "...each character district allows for different Development Patterns." If this Chapter is "municipal zoning regulations", it is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety).
- Chap. 5- Chapter 5: *Development Patterns* of the B3 Code states "The Development Pattern type will be used to guide the creation of...the Neighborhood Regulating Plan." Chapter 5 cannot be fairly read as "municipal zoning regulations". There is no focus on use, whether with a hierarchy of uses or separate of uses. As stated above, the Project is exempt from submitting a NRP and therefore is exempt from Chapter 5 of the B3 Code. In addition, Chapter 5 states the Project is located in the "Meadows" Character District, which solely permits either a Development Pattern of Traditional Neighborhood Development or Village Center Development. Each of these Development Patterns imposes development requirements on the Project that affect LGC 245.004 Vested Rights. If this Chapter is "municipal zoning regulations", it is only applicable to the extent there is no effect on the LGC 245.004 Vested Rights (which we believe eliminates the B3 Code in its entirety).

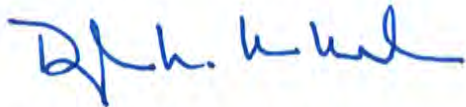
- Chap. 6- Chapter 6: *Private Realm* is not applicable to the Project. Chapter 6 states the permitting requirements under the B3 Code for building and site plan approvals, which are pre-requisites under the B3 Code for issuance of a building or construction permit. Chapter 6 clearly affects the LGC 245.004 Vested Rights, including without limitation, lot coverage and building size (as dictated by the Façade Buildout at Build-to-Line minimum percentage requirement), which is shown most clearly in the chart under Sec. 6.5.003 on Page 109. While lot coverage is explicitly dictated by Chapter 6, the use of the minimum “Build-to-Line” percentage requirement effectively dictates building size, which is included in the LGC 245.004 Vested Rights by requiring that a building be a minimum length based on the lot dimensions. By imposing a strict requirement on building dimensions, certain building sizes are impossible or impractical to build. Chapter 6 also affects landscaping and tree preservation (Section 6.3.004), which is a LGC 245.004 Vested Right.
- Chap. 7- Chapter 7: *Public Realm* is not applicable to the Project. Chapter 7 states the requirements for public dedication of streets and other ROW’s of certain size and design, which impact LGC 245.004 Vested Rights, including without limitation landscaping and tree preservation, open space and park dedication, property classification, lot size, lot dimensions, lot coverage, and building size. Each aspect of Chap. 7 affects the LGC 245.004 Vested Rights and are therefore not exempt under LGC 254.004(2). Instead, Chapter 7 is a subdivision or platting regulation. In addition, Section 7.4.001 *Intent* states “The Bastrop Building Block is the foundation of Bastrop and of the Code.”. If the foundation of the Code is not exempt under LGC 254.004, then the Code itself cannot be exempt. Furthermore, Article 7.5 requires a specific percentage of any Project to be dedicated to Civic Space, which clearly affects LGC 245.004 Vested Rights and is not exempt under LGC 254.004.
- Chap. 8- Chapter 8: Signage is not applicable to the Project. Chapter 8 states the requirements for securing sign permits, which is not a municipal zoning regulation and therefore is not exempt under LGC 254.004. In addition, the Project benefits from an agreement between the City of Bastrop and Hal and Lisa Berdoll dated July 17, 1993, in which the City of Bastrop agrees to issue all permits, variances, and approvals as may be required to construct, own, and operate a sign with a height not to exceed twenty (20) feet higher than any sign, flag pole, or similar structure which may exist within 2500 feet (all as more particularly in described in such agreement). 71 RP reserves any and all rights under such agreement.
- Chap. 9- Chapter 9: *Historic Landmark Preservation & The Iredell District* are not applicable to the Project due to the nature of such chapter.

- Chap. 10- Chapter 10: *Definitions* is not applicable to the Project to the extent such definitions define terms that affect vested rights under LGC 245, including without limitation the LGC 245.004 Vested Rights or are otherwise used in the sections of the B3 Code that are not applicable to the Project.
- The B3 Technical Manual, and the Development Manual (collectively the "Manuals") simply implement the B3 Code, and to the extent the B3 Code (or any portion thereof) is not applicable, then the Manuals are also not applicable. The Manuals do not stand on their own.

The Ordinance requests legal grounds, and seems to want a legal brief on this matter, when 71 RP is simply trying to comply with a City requirement to help it determine its own conclusion on vested rights, and the City has no authority to adjudicate vested rights binding on 71 RP. Nonetheless, we attach an addendum with reference to LGC 245 and relevant case law. Our primary reliance is on the text of LGC 245, as cited herein and available online to the City.

71 Retail Partners, L.P. and its representatives look forward to your reconsideration. Should any further information or clarification be required, please do not hesitate to contact us.

Sincerely,



Douglas M. MacMahon  
Manager of the General Partner of 71 Retail Partners, L.P.

## Addendum

### Relevant Vested Rights Caselaw Supporting this Application

*River City Partners, Ltd v. City of Austin*, NO. 03-19-00253-CV, 2020 WL 3164404 (Tex. App.—Austin, 2020, no pet. h.)- Interpretes the LGC 245.004 Vested Rights and that the term “affecting” means broadly interpreted “to produce an effect on” and is applied to the subject ordinance “as applied” to the project, in this case focused on “building size.”

*Hatchett v. West Travis County Public Utility Agency*, 598 S.W.3d 744, (Tex. App—Austin, 2020, pet denied)- Summary of the current state of vested rights under LGC 245.

*FLCT, Ltd. v. City of Frisco*, 49 S.W.3d 238 (Tex. App.—Fort Worth 2016, pet. den.)- The exceptions to the “municipal zoning regulations” except to vested rights under LGC 245.004 as determined on an “as applied” basis to any regulations which “have an effect” on the listed exception issues. The exception for “property classification” means the permissible uses under the regulator scheme when vesting occurs. A project is entitled to all uses permitted when vesting occurs. “Fair notice” of a project incorporates all the city actual knows about the project, not just what the applicate documents. The definition of a “project” is broad.

*City of San Antonio v. Greater San Antonio Builders Ass'n*, 419 S.W.3d 597 (Tex. App.—San Antonio 2013, pet. den.)- A city may not add local limits to vested rights, only LGC 245 determines vested rights.

*Harper Park Two, LP v. City of Austin*, 359 S.W.3d 247 (Tex. App.—Austin 2011, pet. den.)- The entirety of a development project is considered in a “project”, not components or phases. The definition of “permit” is very broad. The vesting is considered in the context of the regulatory scheme at the time to determine the scope of the project. The objective intent shown in the permit application is the focus for vested rights, not the subjective intent of the developer at the time of the vesting event.

*Hartsell v. Town of Talty*, 130 S.W.3d 325, 326 (Tex. App.—Dallas 2004, pet. denied)- Vested rights extend to the entire development project, land and buildings. The city tried to separate land development from building development, but that distinction was not permitted.

*City of Austin v. Garza*, 124 S.W.3d 867, 868 (Tex. App.—Austin 2003, no pet.)- LGC 254.002(d) is valid and permits the developer to “cherrypick” between vested regulations and later adopted regulations.



June 15, 2021

71 Retail Partners LP  
C/O Douglas MacMahon  
8214 Westchester Drive, Suite 550  
Dallas, TX 75225

Dear Mr. MacMahon,

I have reviewed the documents that have been submitted and the previous determination the Grandfathering Committee issued.

This request is to determine which of the previously adopted city codes can be utilized by the current project, not which sections of the current code are applicable. We have determined that the property described as Bastrop Grove, Section 3, Lot 8 & 9 is grandfathered to specific regulations in effect as of May 22, 2017, the date of the submittal of the Bastrop Grove Preliminary Plat, which was approved by City Council on August 8, 2017. This is the controlling document for the approval, disapproval, or conditional approval of future application for subdivision, pursuant to LGC § 245.002(a) and (b), as may be amended.

To this end, the project is grandfathered to the Subdivision Ordinance (Chapter 10 of the Code of Ordinances 2017), and specific municipal regulations that informed the subdivision standards, including regulations in effect related to landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size (Chapter 14 of the Code of Ordinance 2017). As noted in the previous determination, the property classification as of May 22, 2017 was commercial (C-1, Local Commercial), and the property remains classified as commercial with the Place Type 5 district as rezoned during in the B<sup>3</sup> Code.

The project is not grandfathered to any regulations exempted by LGC § 245.004, which includes drainage and zoning regulations, which were updated with the Stormwater Drainage Ordinance and the Bastrop Building Block (B<sup>3</sup>) Code in 2019. The B<sup>3</sup> Code is a unified development code, which includes subdivision, zoning, and sign regulations.

Sincerely,

Trey Job  
Acting Director of Planning  
Assistant City Manager of Community Development

CC: Jennifer Bills, Assistant Planning Director



# STAFF REPORT

**MEETING DATE:** September 7, 2021

**AGENDA ITEM:** 3D

**TITLE:**

Public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 5 (previously called Section 2) Proposed Preliminary Plat, being 25.9 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.

**AGENDA ITEM SUBMITTED BY:**

Jennifer C. Bills, Assistant Planning Director  
Trey Job, Assistant City Manager of Community Development

**ITEM DETAILS:**

Site Address: East of SH 304 in the 600 Block west of SH 71 (Attachment 1)  
Total Acreage: 25.9 acres  
Legal Description: 25.9 acres of land out of the Nancy Blakey Survey, Abstract 98  
Property Owner: MC Bastrop 71 LP/Douglas MacMahon  
Agent Contact: Carlson, Brigrance, and Doering/Brendan McEntee  
Existing Use: Vacant/Undeveloped  
Existing Zoning: P-5, Place Type 5 – Core  
Future Land Use: General Commercial

**BACKGROUND/HISTORY:**

The Texas Local Government Code Chapter 245 contains specific language about projects and permits that have been filed with a municipality and establishes the intent of the development projects. Below is the information provided by the applicant.

With the project information provided to this date, the City determined that the project is not considered Grandfathered to the previous codes in effect on January 22, 2019 as claimed by the applicant, as the project has not continued to move forward by submitting permits that can be approved by the city. Additionally, the applicant has provided and has filed a competing application following the adopted Bastrop Building Block (B<sup>3</sup>) Code process.

**Documents Provided by the Applicant:**

- October 1, 2018 - Bastrop Grove Drainage Improvements Application Submitted
  - A construction plans and drainage plan for a regional drainage channel to provide direct discharge from the area owned by Retail 71 Partners and MC Bastrop 71. Plans specifically show Bastrop Grove Section 1-3 Preliminary Plat. Does not provide any information for the layout of lots south of Agnes.

- January 22, 2019 – Preliminary Plat for Bastrop Grove Section 2 (now Section 5) Application Submitted
  - Not accepted for review due to the drainage moratorium adopted under Emergency Ordinance No. 2018-1-A
- April 4, 2019 – Drainage Moratorium Exemption Application Submitted
  - Drainage Moratorium was lifted May 14, 2019

### **Grandfathering Appeal**

The applicant is appealing three aspects of this determination (Attachment 7).

1. The Original Application gave fair notice to the City of the Project;
2. MC 71 made progress towards completion of the Project as required by LGC 245.005 (c); and
3. The Project is vested as of the Original Application on January 22, 2019.

The applicant is requesting that the ZBA remand the determination back to the City Manager for review.

Planning Staff recommends upholding the City Manager's Determination. While fair notice may have been provided, staff disputes that any progress has been made to further the completion of any permits within the two years after submittal, because permits submitted have not met the code requirements, first of the drainage moratorium, and then of the Stormwater Drainage Manual and the B<sup>3</sup> Codes.

### **Request for Variance**

If the appeal is denied, the applicant is requesting a variance for the Project to be exempt from the B<sup>3</sup> Code, and more specifically the requirements of the Code to complete a Neighborhood Regulating Plan, the requirements of the Development Patterns in Chapter 5, and compliance with the Building Placement requirements of Chapter 6, any building size regulation (or regulations that affect building size, including without limitation the Built-to-line and building to land ratio), and minimum or maximum setbacks and any other B<sup>3</sup> Code requirements which affects the Project's Vested Rights.

Planning Staff does not recommend a blanket variance to the B<sup>3</sup> Codes without review of a specific project outlining how the variances would affect each site.

### **POLICY EXPLANATION:**

V.T.C.A. Local Government Code Chapter 245 ("LGC 245"), provides an opportunity for landowners or developers to lock-in certain government regulations that apply to a particular development by filing a specific permit application. are regulated under Section 212.172 of the Texas Local Government Code.

Bastrop adopted Article 1.20 – Uniformity of Requirements, commonly referred to as the “Grandfathering Development Status Ordinance”. This provides standards and procedures to determine possible grandfathered development status of development projects.



Procedure:

1. Applicant submission of Grandfathering Request with documentation
  - a. April 19, 2021 (Attachment 4)
2. Grandfathering Review Committee (Director of Planning, City Engineer, and Public Works Director) makes determination within 15 business days.
  - a. The Committee determination was made and sent on May 4, 2021. (Attachment 5)
3. Applicant can request reconsideration of the determination by the Grandfathering Review Committee within 15 business days of determination.
  - a. Submitted May 25, 2021 (Attachment 6)
4. Grandfathering Review Committee can either affirm or reverse the determination within 15 business days of request.
  - a. Decision upheld – June 15, 2021 (Attachment 7)
5. If the determination reconsideration is denied, the request is automatically forwarded to the City Manager for determination, which must be completed within 15 business days of reconsideration determination.
  - a. Forwarded on June 16, 2021
  - b. Determination on July 7, 2021 (Attachment 2)
6. Applicant can appeal the City Manager's determination to the Zoning Board of Adjustment within 15 business days of determination.
  - a. Appeal submitted on July 28, 2021 (Attachment 3)
7. The ZBA must be convened within 30 days after the appeal has been received (or the City Manager, at the request of the appellant can postpone to a date certain), or the appeal is deemed to have automatically been denied.
  - a. Meeting called for September 7, 2021.
8. Should the appellant be dissatisfied with the actions of the ZBA, the appellant may pursue all legal remedies to review the ZBA's decision as set forth in LGC Section 211.011.

**RECOMMENDATION:**

Hold public hearing and consider action on an appeal of a Grandfathered Development Status Determination and request for a variance to be exempt from the Bastrop Building Block (B3) Code for Bastrop Grove Section 5 (previously called Section 2) Proposed Preliminary Plat, being 25.9 acres out of the Nancy Blakey Survey, Abstract 98, located east of SH 304 in the 600 Block west of SH 71, within the city limits of the City of Bastrop, Texas.

**ATTACHMENTS:**

- Attachment 1 – Location Map
- Attachment 2 – City Manager Reconsideration Determination July 7, 2021
- Attachment 3 – Applicant Appeal to Zoning Board of Adjustment July 28, 2021
- Attachment 4 – Applicant Grandfathering Request for Bastrop Grove, Section 5 April 19, 2021
- Attachment 5 – Grandfathering Review Committee Determination May 4, 2021

- Attachment 6 – Applicant GRC Reconsideration Request April 14, 2021
- Attachment 7 – GRC Reconsideration Determination April 22, 2021



# Attachment 1 Location Map

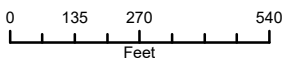


## Bastrop Grove Section 5

1 inch = 400 feet

Date: 8/13/2021

The accuracy and precision of this cartographic data is limited and should be used for information /planning purposes only. This data does not replace surveys conducted by registered Texas land surveyors nor does it constitute an "official" verification of zoning, land use classification, or other classification set forth in local, state, or federal regulatory processes. The City of Bastrop, nor any of its employees, do not make any warranty of merchantability and fitness for particular purpose, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any such information, nor does it represent that its use would not infringe upon privately owned rights.





July 7, 2021

71 Retail Partners LP  
C/O Douglas MacMahon  
8214 Westchester Drive, Suite 550  
Dallas, TX 75225

Dear Mr. MacMahon,

I have reviewed the documents that have been submitted and the previous determinations of the Grandfathering Committee issued by Trey Job, Assistant City Manager (Acting Director of Planning & Development).

This request is to determine if the city has had fair notice of a project and that a series of permits have been submitted that have moved the project forward towards completion. The determination under review is for Bastrop Grove Section 5 (previously submitted as Section 2). The first application for this specific project was submitted on April 4, 2019, more than two years before the request for Grandfathering on April 19, 2021. This submittal and other subsequent submittals were not complete and are considered expired. Additionally, a Neighborhood Regulating Plan for this section was submitted on November 6, 2020, was reviewed by staff, and sent to the Planning & Zoning Commission for the February 25, 2021, meeting. The item was not heard due to a request by the applicant to withdraw the application on February 24, 2021. Due to this submittal, the City has received notice of multiple projects on this property none of which have moved forward.

In consideration of these facts, it is my determination that this project does not qualify as grandfathered.

Sincerely,

Paul A. Hofmann  
City Manager

CC: Trey Job, Assistant City Manager  
Jennifer Bills, Assistant Planning Director

MC BASTROP 71, L.P.  
8214 Westchester Drive, Ste 550  
Dallas, TX 75225

July 28<sup>th</sup>, 2021

City of Bastrop  
Zoning Board of Adjustment  
1311 Chestnut Street  
Bastrop, TX 78602

**Request for Appeal**

Dear Sir or Madam,

The determination by the City Manager dated July 7, 2021 that the Project is not grandfathered is incorrect, since the City mistakenly states that our plat *application* expired and that a later withdrawn application is relevant. The Project is vested by the original 2019 *application*, which application gave the City *fair notice* of the Project and the requested plan approval. The Project has progressed with numerous later filings, none of which have yet to be approved by the City, so this appeal has nothing to do with any issued permit. We have the right to withdraw any application and thereafter that withdrawn application is irrelevant. The City is twisting the facts because it doesn't want the Project to be vested from the application of its new B3 Unified Development Code.

MC BASTROP 71, L.P. (“**MC 71**”) filed a Grandfathering Development Status Application on April 19<sup>th</sup>, 2021 under City Code Art. 1.20 (the “**Ordinance**”). The Grandfathering Review Committee (the “**GRC**”) issued a determination (the “**GRC Determination**”) on May 4<sup>th</sup>, 2021. MC 71 requested reconsideration of the GRC Determination pursuant to the Ordinance on May 25<sup>th</sup>, 2021. The GRC declined to reconsider on June 15<sup>th</sup>, 2021. The GRC Determination was automatically appealed to the City Manager, who issued his determination (the “**CM Determination**”) on July 7<sup>th</sup>, 2021. This is an appeal of the prior determinations, and, in the alternative a request for variance.

The GRC Determination is required by the City for the City to make its own determination of its position on the application of Texas Local Government Code Chapter 245 (“**LGC 245**”), which provides protections from changes in local regulation as to an ongoing development project (such protections being commonly known as “**Vested Rights**”). Only LGC 245 determines the applicable Vested Rights, and to the extent the Ordinance seeks to limit Vested Rights or to give the City control over the interpretation process (such as, but not limited to, establishing standards and burdens), we protest, and submit this appeal under protest. The GRC Determination, the CM Determination, and interim administrative appeals are for the benefit of the City and are not binding on MC 71 as to the nature or extent of vested rights. MC 71 reserves all its rights under LGC 245.

For this appeal, the relevant LGC 245 provisions are **highlighted** below:

Sec. 245.002. UNIFORMITY OF REQUIREMENTS. (a) Each regulatory agency shall consider the approval, disapproval, or conditional approval of an application for a permit solely on the basis of any orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements in effect at the time:

(1) **the original application for the permit is filed for review for any purpose, including review for administrative completeness; or**

(2) **a plan for development of real property or plat application is filed with a regulatory agency.**

(a-1) **Rights to which a permit applicant is entitled under this chapter accrue on the filing of an original application or plan for development or plat application that gives the regulatory agency fair notice of the project and the nature of the permit sought.** An application or plan is considered filed on the date the applicant delivers the application or plan to the regulatory agency or deposits the application or plan with the United States Postal Service by certified mail addressed to the regulatory agency. A certified mail receipt obtained by the applicant at the time of deposit is prima facie evidence of the date the application or plan was deposited with the United States Postal Service.

(b) If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements in effect **at the time the original application for the first permit in that series is filed** shall be the sole basis for consideration of all subsequent permits required for the completion of the project. All permits required for the project are considered to be a single series of permits. **Preliminary plans and related**

subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats are considered collectively to be one series of permits for a project.

...(e) **A regulatory agency may provide that a permit application expires** on or after the 45th day after the date the application is filed if:

(1) the applicant fails to provide documents or other information necessary to comply with the agency's technical requirements relating to the form and content of the permit application;

(2) **the agency provides to the applicant not later than the 10th business day after the date the application is filed written notice of the failure that specifies the necessary documents or other information and the date the application will expire if the documents or other information is not provided;** and

(3) the applicant fails to provide the specified documents or other information within the time provided in the notice.

Sec. 245.005. DORMANT PROJECTS. (a) After the first anniversary of the effective date of this chapter, a regulatory agency may enact an ordinance, rule, or regulation that places an **expiration date on a permit** if as of the first anniversary of the effective date of this chapter: (i) the **permit** does not have an expiration date; and (ii) no progress has been made towards completion of the project. Any ordinance, rule, or regulation enacted pursuant to this subsection shall place an expiration date of no earlier than the fifth anniversary of the effective date of this chapter.

(b) A regulatory agency may enact an ordinance, rule, or regulation that places an expiration date of not less than two years on an individual **permit** if no progress has been made towards

completion of the project. **Notwithstanding any other provision of this chapter, any ordinance, rule, or regulation enacted pursuant to this section shall place an expiration date on a project of no earlier than the fifth anniversary of the date the first permit application was filed for the project if no progress has been made towards completion of the project.** Nothing in this subsection shall be deemed to affect the timing of a **permit** issued solely under the authority of Chapter 366, Health and Safety Code, by the Texas Commission on Environmental Quality or its authorized agent.

(c) Progress towards completion of the project shall include any one of the following:

(1) an application for a final plat or plan is submitted to a regulatory agency;

(2) **a good-faith attempt is made to file with a regulatory agency an application for a permit necessary to begin or continue towards completion of the project;**

(3) costs have been incurred for developing the project including, without limitation, costs associated with roadway, utility, and other infrastructure facilities designed to serve, in whole or in part, the project (but exclusive of land acquisition) in the aggregate amount of five percent of the most recent appraised market value of the real property on which the project is located;

(4) fiscal security is posted with a regulatory agency to ensure performance of an obligation required by the regulatory agency; or

(5) utility connection fees or impact fees for the project have been paid to a regulatory agency.

## **APPEAL OF GRANDFATHERING DETERMINATIONS**

MC 71 hereby appeals to Zoning Board of Adjustment (the “ZBA”) pursuant to the Ordinance, which requires the following:



1. A statement that the appellant sought an appeal from the City Manager, and that the appeal:
  - a. Was denied;
  - b. Yielded an erroneous determination regarding the project's eligibility for grandfathered development status.
2. A statement of the reasons why the determination should be reversed or modified;
3. An explanation of the legal and factual grounds of the appeal; and
4. Payment of the appeal fee established by the City Council, as codified in the city's fee schedule.

For purposes of this appeal request, the word "Project" refers to the development of the 25.902 acres owned by MC 71 as shown in the Preliminary Plat Application dated 1-22-2019 (the "**Original Application**") discussed below, inclusive of the creation of the lots and related infrastructure and the construction of buildings thereon. Both the land development and the building development are entitled to vested rights.

The CM Determination relied on an interpretation of LGC 245 that contradicts the plain language of the statute as well as the applicable case law and therefore yielded an erroneous determination regarding the Project's eligibility for grandfathered development status. An analysis of the CM Determination's shortcomings is included as Exhibit "A" to this appeal.

In order to determine whether the Project is entitled to Vested Rights under LGC 245 as of the date of the Original Application, we are asking that the ZBA review this appeal and make the following determinations:

1. The Original Application gave fair notice to the City of the Project;
2. MC 71 made progress towards completion of the Project as required by LGC 245.005(c); and, therefore
3. The Project is vested as of the Original Application on January 22, 2019.

**It Is Undisputed the MC 71 Properly Filed the Original Application on January 22<sup>nd</sup>, 2019**

MC 71 properly filed the Original Application on January 22<sup>nd</sup>, 2019. Following the submittal, MC 71 representatives met with the City staff to discuss the Original Application on February 5<sup>th</sup>, 2019. The City issued a memo (the "**Meeting Memo**") to MC 71 dated February 13<sup>th</sup>, 2019 attached as Exhibit "B" in which the City states "Previously have submitted – Plat, grading, utility, engineering report discussing access, etc." Therefore, there is no dispute as to whether MC 71 filed the Original Application.

LGC 245.002 only requires filing (not acceptance, approval nor completeness):

"...the original application for the permit is filed for review for any purpose, including review for administrative completeness"

“...the original application for the first permit in that series is filed....”

These statements in the CM Determination are incorrect:

- “This submittal and other subsequent submittals were not complete and are considered expired.”
- “Due to this [NRP] submittal, the City has received notice of multiple projects on this property none of which have been moved forward.”

**The Original Application Was Sufficient to Give the City “fair notice” of the Project**

Further, it is clear from an objective review of the Original Application that it is sufficient to give the City fair notice of the Project and the nature of the permit sought as required by Texas LGC 245.022 (a-1). In addition, the Project was discussed in detail between MC 71 and the City staff at February 5<sup>th</sup>, 2019 Meeting and the Meeting Memo shows the City had a clear understanding of the Project:

- The Meeting Memo refers to the Project as “Grove Commercial”
- The Meeting Memo describes the Meeting Goal as “Discuss commercial development”
- The Meeting Memo states that MC 71 “Wants to do preliminary plat for all commercial parcels”

Lastly, as detailed in the Meeting Memo, MC 71 was instructed to file an Exemption Application, which MC 71 did on April 14<sup>th</sup>, 2019. Included in the Exemption Application is a “Project Description Letter”, which was a requirement of the submittal. This letter is attached as Exhibit “C”. The Project Description Letter thoroughly details the Project and further demonstrates that the City had fair notice of the Project.

The Neighborhood Regulating Plan (“NRP”) application referenced in the CM Determination was for the same Project. Further, it is irrelevant as it was *affirmatively withdrawn* by MC 71. Only MC 71 has the right to define its Project. The NRP application was filed by MC 71 as a result of statements by City Staff which were inconsistent with the City Staff Report for the that application, therefore it was withdrawn, as is MC 71’s right to do.

The CM Determination statement: “Due to this [NRP] submittal, the City has received notice of multiple projects on this property none of which have been moved forward.” is incorrect.

The term “fair notice” is not defined in the statute, but should be interpreted to simply require the applicant to reasonably identify the project and the requested permit so the City understands what is asked. This occurred. The City and its staff understand that the project is commercial reserves and the permit is a plat. This is very simple and clear. For the City to say that it does not have fair notice is disingenuous.

In fact, the CM Determination is *silent* on the issue of fair notice, therefore we request the ZBA hold that there is NO fair notice issue.

**MC 71 Received No LGC 245.005(e) Notice, Thus its Application Never Expired**

The only way an application (contrasted to a permit) may expire is if the City provides the detailed notice required by LGC 245.005(e). The City never provided that notice to MC 71. The Meeting Memo does not satisfy the requirements for LGC 245.005(e).

The CM Determination statement “This submittal and other subsequent submittals were not complete and are considered expired.” is incorrect.

**Only Permits sre Subject to Required “Progress”, but no Permit was Issued**

LGC 245.005 only applies to issued permits and limits the City’s ability to limit the term of an issued permit to no less than a period equal to the later of (i) 2 years from permit issuance, or (ii) 5 years from project vesting. “Progress” as defined in LGC 245.005 does not apply to applications for a permit, nor the issue of whether a project is vested.

The CM Determination does not use the work “progress”, but “continuation”. It does not state that there is a lack of progress. Therefore, the ZBA should hold that there is no impact of LGC 245.005 to this matter.

Even if LGC 245.005 applies, MC 71 made progress, as follows:

- Attached as Exhibit “D” is a list of the applications submitted by MC 71 for the Project. Since filing the Original Application, MC 71 has continued to submit applications required by City staff.
- In fact, MC 71 made seventeen separate submittals to the City for the Project, including four preliminary plat applications on the following dates:
  - January 22, 2019
  - January 13, 2020
  - June 1, 2020
  - June 15, 2020
- Each submittal was made for the same Project.
- Each preliminary plat application is virtually identical:
  - Each application is for the exact same land
  - Each application shows the exact same number of lots
  - Each application shows the exact same size of the individual lots
  - Each application shows the exact same access road configuration
- An objective review of Exhibit “D” and the various submittals made by MC 71 leaves no doubt that MC 71 has made a good faith attempt to file with the City for a permit to begin the Project.

**The Project has Vested Rights Under LGC 245 as of the Date of the Original Application**

As detailed above, MC 71 has met the requirements of LGC 245 for Vested Rights. MC 71 properly submitted the Original Application. MC 71 has continued to make progress towards completion of the Project. Therefore, the Project has Vested Rights under LGC 245.

**The ZBA Should Remand This Appeal Back to the City Manager Following its Determination that the Project has Vested Rights Under LGC 245.**

The CM Determination did not reach all of the issues related to Vested Rights for the Project. If the ZBA reverses the CM Determination and finds that a vesting event occurred, then MC 71 requests this appeal be remanded back to the City Manager to make a determination as to the extent of the Project's Vested Rights, following which MC 71 will have the opportunity to review that determination and have a separate opportunity to appeal such determination to the ZBA.

**Alternative Remedy - REQUEST FOR VARIANCE**

The Ordinance permits the ZBA to grant a variance from the regulations at issue under the same standards governing variances for other matters.

If the appeal is denied, in the alternative, MC 71 requests a variance for the Project to be exempt from the B3 Code, particularly the requirements for a NRP, the requirements to develop in accordance with the TND or VCD Development Patterns in Chapter 5, compliance with the Building Placement requirements in Chapter 6, any building size regulation (or regulations that affect building size, including without limitation the Build-To-Line and building to land ratio), any minimum or maximum building setback (or "Build-to" requirement), and any other B3 Code requirement which affects the Project's Vested Rights. All of the information, documentation and discussion in the City file and in this letter are incorporated as part of the record for this variance.

This variance is based upon hardship, and is not adverse to the public interest (or the interest of any neighboring property), promotes economic development, will promote the availability of market driven providers of goods and services to Bastrop, is due to the unique circumstances of the Project, is consistent with intent of City Code to encourage reasonable development, and meets the requirements for a variance under state law and city ordinance.

The Project is an inverted "L" configuration located in a suburban area of Bastrop impacted by the existence of FM 304, a major, heavily trafficked highway along its western frontage. The Project has been shown on plats, plans and schemes to be "commercial reserves" or "pad sites" as far back as 2019. These reserves/sites are locations for single owners or tenants with commercial uses who wish to be located on high traffic roadways in front of other developments, sometimes commercial and sometimes residential. Users are typically single story and require ample parking, and often a drive-through window (1 or more). An example is the Medtail project along SH 71 to the north. In almost all instances, the user requires that vehicles can circle the building, and that there are parking spaces immediately at the entrance of the building, for customer convenience.

There are 12 lots planned in the Project. These lots are shown on the Original Application as well as each subsequent plat submittal. Directly to the east and south is a residential development, which has been developed pursuant to a "PD". The residential development does not face the Project, but rather the Project fronts the rear fence of the residential homes with no direct access to the Project.

The following factors are a hardship for Lot 7:

- The size and lot dimensions in the Project vary significantly from the 330' x 330' preferred block size for a TND making development under the B3 Code impractical.
- FM 304 is not conducive to a pedestrian oriented development and there is no access to the residential development along the shared border between the residential development and the Project. It is doubtful that pedestrians would walk down FM 304 or the rear fence of the residential "PD" to access the Project.
- There are no sidewalks as part of the existing development immediately to the north or south along FM 304, which could lead to a potentially dangerous situation if the Project were forced to develop along the highway frontage. There are also no sidewalks on the rear of the residential "PD".
- The development conditions of the "PD" approved for the Lennar project around which the Project wraps makes it impossible to achieve the goals of B3.

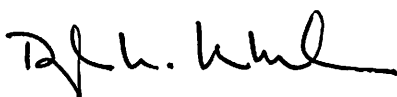
71 RP requests a variance in accordance with the foregoing.

### **Legal Ground for this Appeal**

The Ordinance requests legal grounds and seems to want a legal brief on this matter, when MC 71 is simply trying to comply with a City requirement to help it determine its own conclusion on the Project's Vested Rights, and the City has no authority to adjudicate Vested Rights that are binding on MC 71. Nonetheless, we attach an addendum as Exhibit "E" with reference to LGC 245 and relevant case law. Our primary reliance is on the text of LGC 245, as cited herein and available online to the City.

I look forward to presenting this appeal at the upcoming hearing. I would like to request the ZBA hearing for this appeal take place on 8/23, 8/25, 8/26 or 8/27 so that I can personally appear. I will need to make travel plans to attend so any advance notice would be much appreciated. If it is not possible to meet on any of those dates, MC 71 would be willing to extend the timeline prescribed for the hearing by the Ordinance to facilitate my attendance.

Sincerely,



Douglas M. MacMahon  
Manager of the General Partner of MC Bastrop 71, L.P.

## Exhibit “A”

### An Analysis of the CM Determination’s Interpretation of LGC 245

The CM Determination relied on an interpretation of LGC 245 that contradicts the plain language of the statute as well as the applicable case law and therefore yielded an erroneous determination regarding the Project’s eligibility for grandfathered development status. Below are **bolded** excerpts from the CM Determination along with an analysis of the CM’s interpretation of LGC 245:

**“This request is to determine if the city has had fair notice of a project and that a series of permits have been submitted that have moved the project towards completion.”**

- After stating that “fair notice” is part of the appeal, the CM Determination does not further address fair notice.
- LGC 245.005 applies only to permits, not applications.
- LGC 245.005 (C)(2) provides that “a good faith attempt is made to file with a regulatory agency an *application for a permit* necessary to begin or continue towards completion of the project” (*emphasis added*), so even if LGC 245.005 applies, it was satisfied by numerous later applications.
- LGC 245 is clear that “an application for a permit” demonstrates progress towards completion of a project

**“The first application for this specific project was submitted on April 4, 2019, more than two years before the request for Grandfathering on April 19, 2021. This submittal and other subsequent submittals were not complete and are considered expired.”**

- The statement is factually inaccurate as the Original Application was submitted on January 22<sup>nd</sup>, 2019
- First, LGC 245 does not require the City to “accept” a filing. See, LGC 245.002(a), (a-1) and (b), none of which require an “accepted” or “complete” application, and mention only an “original application.” The Ordinance, particularly Sec. 1.20.010(g) is not consistent with LGC 245.
- Second, LGC 245.002 (e) is the only section of LGC 245 that provides for the expiration of a permit application and it details specific requirements, none of which occurred for the submittals.
  - MC 71 did not receive written notice within 10 business days after the filing of the Original Application that it failed to provide documents or other information necessary to comply the City’s technical requirements relating to the form and content of the permit application.

- Rather MC 71 received the Meeting Memo on February 13<sup>th</sup>, 2019 instructing MC 71 to submit the Exemption Application as the next step in the Project, which MC 71 did on April 14<sup>th</sup>, 2019.
- After filing the Exemption Application, MC 71 did not receive written notice within 10 business days that it failed to provide documents or other information necessary to comply the City’s technical requirements relating to the form and content of the Exemption Application.
- The Meeting Memo states that “After the submittal is deemed complete, Staff will take to the next available City Council meeting for approval to move forward with the Checklist option chosen and the development process”. As such, the Exemption Application is pending action by the City.
- Given the above, the City does not have the ability under LGC 245 to deem the applications filed by MC 71 as incomplete or expired.
- Third, LGC 245.005 only applies to *permits* and provides limited situations for permits to expire.
  - LGC 245.005 (b) does provide the City the ability to set expiration dates for *permits* if no progress has been made towards completion of the project as follows, “A regulatory agency may enact an ordinance, rule, or regulation that places an expiration date of not less than two years on an individual *permit* if no progress has been made towards completion of the project.” (*emphasis added*).
  - LGC 245.001 (1) provides a very specific definition of the word “Permit” as follows, ““Permit” means a license, certificate, approval, registration, consent, permit, contract or other agreement for construction related to, or provision of, service from a water or wastewater utility owned, operated, or controlled by a regulatory agency, or other form of authorization required by law, rule, regulation, order, or ordinance that a person must obtain to perform an action or initiate, continue, or complete a project for which the permit is sought.”
    - The word “application” is nowhere in this definition.
    - An “application” and a “permit” are different.
    - The difference between a “permit” and an “application” has been further validated by the court in *City of San Antonio v. Rogers Shavano Ranch, Ltd.*, which provided that a “request” for a Permit is an application.
- Fourth, LGC 245.005 (b) provides specific limitations on the City’s ability to place expiration dates on the Project as follows, “Notwithstanding any other provision of this chapter, any ordinance, rule, or regulation enacted pursuant to this section shall place an expiration date on a project of no earlier than the fifth anniversary of the date the first permit application was filed for the project if no progress has been made towards completion of the project.”
  - The Original Application was submitted on January 22, 2019. Therefore, even if you were to accept the City’s position that no progress had been made towards completion of the Project (which MC 71 denies as detailed in this appeal), the earliest possible expiration date for the Project would be January 22, 2024.

- Fifth, if the City’s position is that the application lapsed under its internal requirements, then that is an inequitable result since it was the City which was refusing to process the filed applications, thus impeding the progress of the Project.

**“Additionally a Neighborhood Regulating Plan for this section was submitted on November 6, 2020, was reviewed by staff, and sent to the Planning & Zoning Commission for the February 25, 2021 meeting. This item was not heard due to a request by the applicant to withdraw the application on February 24, 2021. Due to this submittal, the City has received notice of multiple projects on this property none of which have moved forward.”**

- This statement is factually inaccurate.
  - The City has not received notice of multiple projects.
  - LGC 245.001 defines Project as “an endeavor over which a regulatory agency exerts its jurisdiction and for which one or more permits are required to initiate, continue, or complete the endeavor.”
  - Each and every submittal MC 71 made was for the same project as such word is defined by LGC 245 and has been further defined by the courts in the cases cited in Exhibit “E”, including without limitation *Anderson v. City of Cedar Hill*.
- Further, the submittal of the Neighborhood Regulating Plan was made for the same Project as was every prior submittal and was an attempt to follow the process dictated by the City staff to move the Project forward.
  - MC 71 *withdrew* the submittal because the City staff requirements for approval of the Neighborhood Regulating Plan were in violation of the Project’s Vested Rights.
- MC 71 has not withdrawn any other submittal for the Project, including without limitation the Original Application or the Exemption Application. In fact, MC 71’s engineer routinely followed up with the City about the status of these items. In essence, the City seems to have stonewalled the Original Application and Exemption Application.



**Exhibit "B"**  
**The Meeting Memo**



## MEMO

**To:** Brendan McEntee  
**From:** Allison Land  
**cc:** Staff  
**Date:** February 13, 2019  
**Re:** Pre-Application Meeting – Grove Commercial

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City staff has generated notes from the meeting on February 5, 2019. The information discussed and comments made by staff during this meeting are not intended to constitute a formal review of your project. This meeting *does not substitute* for the formal review that will take place in the event you file a development application with the City. Information provided and comments made by staff during the meeting are based solely on the information provided by you prior to or during the meeting.

Upon submittal of the appropriate application(s), additional comments are to be expected that may or may not be discussed in this meeting. More detailed information provided by you concerning your project during staff's review of a formal application may alter comments made during the meeting depending on the situation.

### Property Information

Address:	TBD	In floodplain:	partial
R Number:		Water, Wastewater available:	Nearby
Jurisdiction:	City Limits	Electricity available:	Nearby
Platted:	No	Toad Habitat Area:	No
Current Zoning:	General Retail with restrictions		

### Meeting Goal

Discuss commercial development

## Items Discussed:

### Drainage channel

- Needs to establish good vegetation
- Anticipated 9 to 10 feet/second eventually

### Exemption:

- Requires pre-submission meeting (this one)
- Requires submittal of the Exemption Application and an associated Checklist: Planned Development District, Alternative Site Design, ETJ Agreement, or Waiver. A checklist and all items listed on the checklist must accompany the Application
- After the submittal is deemed complete, Staff will take to the next available City Council meeting for approval to move forward with the Checklist option chosen and the development process
- **Engineer Certification required. See Emergency Ordinance 2018-2-A Section 5b - [link](#)**
- Note: Documentation provided with the Exemption Application does NOT constitute a submittal for any required permits after the Exemption is granted
- This project could use either Planned Development or Alternative Design Standards
- Alternative Design Standards
  - Use new rainfall totals and Atlas 14 data
  - Add some water quality infrastructure
- Need to run the channel and anticipated development against Atlas 14 data to show that it works and that the new development tying in is accounted for
- If you can live with the setbacks, use Alternative Design Standards
- If not, use the Planned Development
  - Can keep high level, call out uses, driveway spacing
  - Need to show a concept plan
  - If you choose to address water quality, address the first 1.5 inches
  - Pervious pavers are allowed under this
  - Leave GR as the base zoning
  - Change setbacks (could be flexible, min/max), drainage standards, landscaping, etc. Get creative

### Zoning

- Two story development will have a 60-foot building setback from the residential lots
  - To change: need either a zoning variance (no financial hardship) or a planned development
  - Variances are hard to justify and hard to support

### Platting

- Lot of Record Verification or Platting is required before permits may be issued
- All lots must have public road frontage and utility access. Access easements and/or driveways across other lots does not provide public road frontage.
- Wants to do preliminary plat for all commercial parcels
- Channel sized for 50% cover of Nixon and 80% cover on the other side
- Preliminary plat:
  - Previously have submitted - Plat, grading, utility, engineering report discussing access, etc.
  - Checklist is the same now. Additional details are needed for the Exemption before the prelim can be submitted
- Note: still need to record Agnes St ROW by separate instrument

## Utilities

- Lift station: does it have capacity for the south side of Agnes?
  - Stantec for capacity

## Moving Forward

### Action Items

- City
  - Send copy of PD to Brendan
- Applicant

## Process Overview

What steps the project attendees need to follow to move forward in the project, in order of recommended completion.

- Exemption and Exception applications and checklists are available on the [Building Bastrop website](#).
  - Building/Permitting and Planning applications and checklists are available on the Planning & Development Department's website via the menu on the left.
1. Exemption Application with Planned Development Checklist
    - a. This will go to P&Z and Council like a normal PD
  2. Planning Application with Preliminary Plat Checklist
  - 3.

## City of Bastrop

*"Where Preservation of the Past Combined with Progress  
for the Future Encourages Opportunities to Grow"*

### Pre-Application Meeting Sign-in Sheet (Staff):

Project & Location: Grove Commercial

Date: February 5, 2019

	Name	Title/Organization	Phone	Email
<input type="checkbox"/>	Lynda Humble	City Manager	(512)-332-8800	<a href="mailto:lhumble@cityofbastrop.org">lhumble@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Jerry Palady, PE	Director of Engineering	(512) 332-8846	<a href="mailto:jpaldy@cityofbastrop.org">jpaldy@cityofbastrop.org</a>
<input type="checkbox"/>	James McCann, PE	Engineering Consultant		
<input type="checkbox"/>	Matt Jones, AICP	Director of Planning	(512) 332-8840	<a href="mailto:mjones@cityofbastrop.org">mjones@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Jennifer C. Bills, AICP, LEED AP	Assistant Planning Director	(512) 332-8845	<a href="mailto:jbills@cityofbastrop.org">jbills@cityofbastrop.org</a>
<input type="checkbox"/>	Matt Lewis, CNU	Planning Consultant		
<input checked="" type="checkbox"/>	Trey Job	Director of Water/Wastewater and Public Works	(512) 332-8932	<a href="mailto:tjob@cityofbastrop.org">tjob@cityofbastrop.org</a>
<input type="checkbox"/>	Curtis Hancock	Assistant Director of Water/Wastewater and Public Works	(512) 332-8964	<a href="mailto:chancock@cityofbastrop.org">chancock@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Allison Land	Planner/GIS Coordinator	(512) 332-8843	<a href="mailto:aland@cityofbastrop.org">aland@cityofbastrop.org</a>
<input type="checkbox"/>	Kimberly Hanly (Tap & Impact Fees)	Coordinator, Water & Wastewater Department	(512) 332-8960	<a href="mailto:khanly@cityofbastrop.org">khanly@cityofbastrop.org</a>
<input type="checkbox"/>	Tim Goetz	Electric Superintendent, Bastrop Power & Light	(512) 332-8900	<a href="mailto:tgoetz@cityofbastrop.org">tgoetz@cityofbastrop.org</a>
<input type="checkbox"/>	Cheryl Renfro	Project Coordinator Bastrop Power & Light	(512) 332-8901	<a href="mailto:crenfro@cityofbastrop.org">crenfro@cityofbastrop.org</a>
<input type="checkbox"/>	Andres Rosales	Fire Chief	(512) 332-8670	<a href="mailto:arosales@cityofbastrop.org">arosales@cityofbastrop.org</a>
<input type="checkbox"/>	Rod Stradling	Assistant Fire Chief	(512) 332-8670	<a href="mailto:rstradling@cityofbastrop.org">rstradling@cityofbastrop.org</a>
<input type="checkbox"/>	David Brasich	Building Official	(512) 332-8847	<a href="mailto:Dbrasich@cityofbastrop.org">Dbrasich@cityofbastrop.org</a>
<input type="checkbox"/>	Jean Riemenschneider	Bastrop Economic Development Corp.	(512) 332-8873	<a href="mailto:jean@bastropedc.org">jean@bastropedc.org</a>
<input type="checkbox"/>	Carolyn Dill, PE	County Engineer, Bastrop County	(512) 581-7180	<a href="mailto:carolyn.dill@co.bastrop.tx.us">carolyn.dill@co.bastrop.tx.us</a>
<input type="checkbox"/>	Cari Croft (contact for Houston toad)	Lost Pines HCP Administrator, Bastrop County	(512) 332-7284	<a href="mailto:Cari.croft@co.bastrop.tx.us">Cari.croft@co.bastrop.tx.us</a>

**City of Bastrop**

*"Where Preservation of the Past Combined with Progress  
for the Future Encourages Opportunities to Grow"*

**Pre-Application Meeting Sign-in Sheet (Project Attendees):**

Project & Location: Grove Commercial

Date: February 5, 2019

Name	Title/Organization	Phone	Email*
Brendan McEntee			

\*Email address will be used to send a copy of notes taken at this meeting, and as a further correspondence option as needed

**Exhibit "C"**

**The Project Description Letter**



Carlson, Brigance & Doering, Inc.  
Civil Engineering ❖ Surveying

---

CBD Project Number: 4879

Date: April 4, 2019

City of Bastrop, TX  
Planning and Development Department  
1311 Chestnut Street  
Bastrop, TX 78602

RE: Exemption Application Submittal for Bastrop Grove Section 2  
Project Description Letter

The proposed project consists of developing 12 lots, encompassing an overall acreage of 25.882 acres, located along the south side of Agnes Road and the east side of SH 304. This development is anticipated to consist of individual developments consisting of office, retail, commercial, medical and/or other uses allowed within the current GR zoning. This project is being submitted for approval of an Exemption Application based on an Alternative Drainage Plan to allow for the development to proceed with submittal of Preliminary Plans, Final Plats, and construction drawings for the various developments.

The stormwater drainage system for this area was recently enhanced with the construction of the Bastrop Grove Channel Improvement project. That project, jointly funded by the Bastrop Economic Development Corporation, Ascension (Seton) Hospital, and the Bastrop Grove developer, provided for the conveyance of stormwater from the fully developed areas that contribute to the channel. The Bastrop Grove Channel Improvement project was designed and permitted prior to the Drainage Moratorium and was based on the codes and ordinances of the City of Bastrop. Since that time, Atlas 14 has been issued by the NWS and updated precipitation values were issued for Central Texas areas. Attached to this Exemption Application is an updated Drainage Report for the Bastrop Grove Channel Improvement project with all precipitation values updated to reflect the higher current values of Atlas 14. A review of the report demonstrates that the constructed channel adequately conveys the fully developed conditions (including development of the Bastrop Grove Section 2 area at 75% impervious cover) up to and including a 100-year event. These improvements, coupled with updated calculations for Atlas 14 precipitation, result in a stormwater system that exceeds the current standards in the Code of Ordinances.

Please contact me should you have any questions or require any additional information.

Sincerely,

Carlson, Brigance and Doering, Inc.  
(TX Firm #F3791)

Brendan P. McEntee, P.E.  
Branch Manager



## Exhibit "D"

MC 71 has made the following applications in good faith to secure a permit necessary to begin or continue towards completion of the Project. All applications for permits have been for the same Project since filing the Original Application:

- Application dated 10-01-2018 for Bastrop Grove Drainage Improvements
- Application dated 01-22-2019 for Preliminary Plat Bastrop Grove, Section 2
- Application dated 01-22-2019 for Plat Details and Drainage Improvements Report
- Application dated 04-14-2019 for Bastrop Grove Section 2 Exemption Application
- Application dated 01-13-2020 for Preliminary Plat, Bastrop Grove, Section 5
- Application dated 01-13-2020 for Preliminary Drainage, Bastrop Grove, Section 5
- Application dated 01-13-2020 for Preliminary Infrastructure, Bastrop Grove, Section 5
- Application Resubmittal dated 06-01-2020 for Preliminary Plat, Bastrop Grove, Section 5
- Application Resubmittal dated 06-01-2020 for Preliminary Drainage, Bastrop Grove, Section 5
- Application Resubmittal dated 06-01-2020 for Preliminary Infrastructure Submittal, Bastrop Grove, Section 5
- Application dated 06-08-2020 for Preliminary Plat Application Bastrop Grove, Section 5
- Application Resubmittal dated 06-15-2020 for Preliminary Plat, Bastrop Grove, Section 5
- Application Resubmittal dated 06-15-2020 for Preliminary Drainage, Bastrop Grove, Section 5
- Application Resubmittal dated 06-15-2020 for Preliminary Infrastructure Submittal, Bastrop Grove, Section 5
- Application dated 11-06-2020 for Bastrop Grove Neighborhood Regulating Plan, North and South of Agnes
- Application dated 11-09-2020 for Bastrop Grove B3 Warrant Request
- Application dated 03-16-2021 for Bastrop Grove Neighborhood Regulating Plan, South of Agnes

## Exhibit “E”

### Relevant Vested Rights Caselaw Supporting this Appeal

*Hatchett v. West Travis County Public Utility Agency*, 598 S.W.3d 744, (Tex. App.—Austin, 2020, pet denied)- Summary of the current state of vested rights under LGC 245.

*FLCT, Ltd. v. City of Frisco*, 49 S.W.3d 238 (Tex. App.—Fort Worth 2016, pet. den.)- The exceptions to the “municipal zoning regulations” except to vested rights under LGC 245.004 is determined on an “as applied” basis to any regulations which “have an effect” on the listed exception issues. The exception for “property classification” means the permissible uses under the regulator scheme when vesting occurs. A project is entitled to all uses permitted when vesting occurs. “Fair notice” of a project incorporates all the city actual knows about the project, not just what the applicate documents. The definition of a “project” is broad.

*City of San Antonio v. Greater San Antonio Builders Ass’n*, 419 S.W.3d 597 (Tex. App.—San Antonio 2013, pet. den.)- A city may not add local limits to vested rights, only LGC 245 determines vested rights.

*Harper Park Two, LP v. City of Austin*, 359 S.W.3d 247 (Tex. App.—Austin 2011, pet. den.)- The entirety of a development project is considered in a “project”, not components or phases. The definition of “permit” is very broad. The vesting is considered in the context of the regulatory scheme at the time to determine the scope of the project.

*Hartsell v. Town of Talty*, 130 S.W.3d 325, 326 (Tex. App.—Dallas 2004, pet. denied)- Vested rights extend to the entire development project, land and buildings.

*Anderson v. City of Cedar Hill*, 447 S.W.3d 84 (Tex. App.—Dallas 2014, pet. den.)- • Broad definition of “Endeavor” = “the action of endeavoring; effort, or pains, directed to attain an object” (citing AG OP. No. JC-0425 (2001)), “a systematic or continuous effort to attain some goal”, “to exert physical or intellectual strength toward the attainment of an object of goal”



# Carlson, Brigance & Doering, Inc.

Civil Engineering ❖ Surveying

Date: April 19<sup>th</sup>, 2021

Trey Job, Assistant City Manager  
City of Bastrop, TX  
Planning and Development Department  
1311 Chestnut Street  
Bastrop, TX 78602

RE: Grandfather Development Status - Bastrop Grove Section 2 (South of Agnes)  
Project Description Letter

Bastrop Grove Section 2 is a multi-lot commercial land development with frontage along SH 304 and Agnes Road in the City of Bastrop. It includes 12 outparcels with frontage on SH 304 or Agnes as well as provides for the dedication of the southern portion of Agnes Road. As discussed in earlier meetings with staff regarding this project, it is my belief that the project has vested rights, based on the earlier applications and the continued nature of this commercial land development project, and therefore we are submitting this letter and the accompanying documentation for a Grandfathering Determination Status.

The “Project” is described in the following Project related applications for permits required for the Project, and has been the same Project since inception in 2018:

- Application dated 10-01-2018 for Bastrop Grove Drainage Improvements
- Application dated 01-22-2019 for Preliminary Plat Bastrop Grove, Section 2
- Application dated 04-14-2019 for Bastrop Grove Section 2 Exemption Application

It is my understanding that the Project is not subjected to any City of Bastrop regulations except those described in Tx. Loc. Gov’t Code Section 245.004, being those in effect 01-22-2019 (date of first accepted development application) and any which are exempt from vesting.

Furthermore, I understand that the zoning provisions of the City’s Bastrop Building Block Code (B3) relating to the following are not applicable to the project (as being within the exemptions for the general exception from vested rights as to municipal zoning ordinances), which are all zoning provisions which affect (have an effect on):

- Landscaping or tree preservation
- Open space or park dedication
- Property classification (permitted uses)
- Lot size, dimensions or coverage
- Building size.

Our view is that the B3 isn't zoning so no portion of B3 is exempt from vesting, but to the extent the City says that portions are zoning, then the foregoing are vested.

It is my belief that all provisions in the Bastrop Building Block Technical Manual and the City of Bastrop Development Manual are subject to vesting, and not applicable to the Project. Only the City regulation in effect as of initial January 22, 2019 plat application apply to the Project, including the City Subdivision Ordinance

Based on the above vesting, the following provisions of the City Zoning Ordinance as of April 13<sup>th</sup>, 1991 (1991 Zoning Ord.) apply to the Project, as vested rights:

The permitted uses allowed for GR (General Retail) listed in the following exhibits.

Exhibit A - Use Regulations Chart, City of Bastrop, 1991,

The permitted lot size, dimensions or coverage for the Project under Section 25.4 - Area Regulations.

Size of Lot:

- Minimum Lot Area - Twelve thousand (12,000) square feet.
- Minimum Lot Width - One hundred feet (100').
- Minimum Lot Depth - One hundred ten feet (110').
- Maximum Lot Coverage: Fifty percent (50%).

The permitted building size under Section 25 (including the related regulations which affect Building Size, such as:

- Setback- Section 25.4
- Height- Section 25.3
- Required Parking- Section 38

Other Regulations: As established in the Development Standards, Sections 37 through 45

Required landscaping or tree preservation in Section 39.5, 39.6 & 39.7

The Project is also vested from changes in flood regulations effective outside the FEMA flood plain.

The Project is not dormant, as progress has been made towards completion of the original contemplated project as follows:

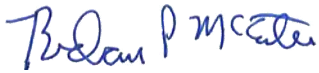
- Construction of the offsite Drainage Channel to the Colorado River- Project Name: Bastrop Grove Drainage Improvements (*Approval Date: 10-01-2018*)
- Cost have been incurred for development the project with CBD Engineering, and other professional and legal firms

This application is not intended to waive any vested rights, under Tex. Loc. Gov't Code Ch. 245 or otherwise. My client protests any idea that the City can legally determine or limit the vested rights for the Project, and submits this application only to aid the City is coming to its own internal decision as to the appropriate vested rights for the Project. All rights are reserved.

Should you have any questions or require any additional information, please feel free to call/email.

Sincerely,

Carlson, Brigance & Doering, Inc.  
F-3791

A handwritten signature in blue ink that reads "Brendan P. McEntee". The signature is written in a cursive style with a horizontal line underneath it.

Brendan P. McEntee, P.E.  
Branch Manager



# Grandfathered Development Status Application

## Project Information

Legal Description: ABS A98 BLAKEY, NANCY, ACRES 145.697

Project Address(es): Not Addressed

Total Acreage: 25.882 BCAD Property ID: 78736, 8712472, and 8712473

Was the Project in progress on or after September 1, 1997? After

## Property Owner

Name/Entity/Trustee: MC BASTROP 71, LP

Mailing Address: 8214 WESTCHESTER DR, STE 550, DALLAS, TX 75225

Phone & Fax Numbers: 214-622-6525 E-mail Address dm@morancap.com

## Applicant

Name/Entity/Trustee: Brendan P. McEntee, P.E. - Carlson, Brigance & Doering, Inc.

Mailing Address: 12129 Ranch Road 620 North, Suite 600, Austin, Texas 78750

Phone & Fax Numbers: (512) 280-5160 E-mail Address bmcentee@cbdeng.com

## Permit Identification

First Permit		
Name: <u>Preliminary Plat Bastrop Grove, Section 2</u>	Application Date: <u>01/22/2019</u>	
Approval Date:	Expiration Date:	Volume and Page No.:
Additional Permit		
Name: <b>Please see the attached supplement document</b>	Application Date:	
Approval Date:	Expiration Date:	Volume and Page No.:
Additional Permit		
Name:	Approval Date:	
Expiration Date:	Volume No.:	Page No.:
Additional Permit		
Name:	Approval Date:	
Expiration Date:	Volume No.:	Page No.:



# Grandfathered Development Status Application

## Additional Permit

Name:	Approval Date:
Expiration Date:	Volume No.:
	Page No.:

## Additional Permit

Name:	Approval Date:
Expiration Date:	Volume No.:
	Page No.:

APPLICANT:		OFFICIAL USE ONLY		
Included in Submittal	Per Ordinance 2019-10, Additional Submittal Items are:		Meets Standard	Does Not Meet Standard
✓	1	Identification of the "Project," as that term is defined in LGC 245.001(3), as may be amended. Example: Residential Subdivision		
✓	2	Narrative description of the development/construction Project or proposed land use for which the Permit is being sought. Describe which Permits have been completed and which are remaining.		
✓	3	Layout of the site, including locations of buildings, streets, utilities, fences, drives, sidewalks, drainage facilities, and any other permanent or temporary structures which may be present at the time of application		
✓	4	Identification of each City regulation in effect at the time of the original application for the Permit filed that applies to the Project and that the Applicant contends: <ul style="list-style-type: none"> <li>A. Is grandfathered</li> <li>B. Controls the approval, disapproval, or conditional approval of an application for a Permit, pursuant to LGC 245.002(a), as may be amended</li> </ul>		
✓	5	Identification of each current City regulation for which the Applicant seeks an exemption due to the grandfathered development status provided the property owner by LGC 245 or other applicable vesting laws		
✓	6	Explanation of the applicability of any approval expirations and related requests for extension of approvals		
✓	7	Photographs, drawings, maps, and previous approvals that would assist the Grandfathering Review Committee in making its determination		
✓	8	Certified land survey of topography showing existing drainage patterns and structures		
✓	9	Any other information or supportive materials deemed necessary and requested in writing by the Director of Planning and Development		

## Signature and Certification

The applicant certifies that the facts stated herein and exhibits attached hereto are true, correct, and complete.

*Brian P. McCreary*

Project Engineer and Agent

04-18-2021

Signature and Title

Date



# Grandfathered Development Status Application

## Process Overview

1. Complete Application, which includes: Application, Permit Identification, and Additional Submittal Items
  - a. Incomplete submittals will not be accepted.
2. Director of Planning & Development will promptly forward to the Grandfathering Review Committee.
3. Determination made by Grandfathering Review Committee.
  - a. Within 15 days of Application filing, the Committee will issue a written administrative determination approving the application, disapproving the application, or requesting more information.
  - b. Determination shall identify the date the original Permit was filed, which claims have been recognized, and which claims have been rejected.
4. Reconsideration: must be requested in writing within 15 days of the Determination
5. Appeal to City Manager: must be requested in writing within 15 days of the date that the Committee declined to reconsider the Application.
6. Appeal to Zoning Board of Adjustment: must be requested in writing within 15 days of the City Manager's Determination.

## Determination Standards

1. Date of first application
2. Fair notice
3. Consistency
4. Subsequent development
5. Prior vested rights determinations
6. Regulations
7. Expiration of prior applications
8. Exemptions in LGC 245.004
9. Expiration of Project
10. City Code
11. State Law

## Staff Use Only

Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Fees Paid \$ \_\_\_\_\_

Comments: \_\_\_\_\_





Carlson, Brigance & Doering, Inc.

Civil Engineering ❖ Surveying

**Bastrop Grove Section 2 (South of Agnes)  
Grandfathered Development Status Application  
*Supplement Document-Permit Identification***

**First Project Related Development Permit**

Name: Bastrop Grove Drainage Improvements

Approval Date: 10-01-2018

Volume No:

Page No:

**First Development Application**

Name: Preliminary Plat Bastrop Grove, Section 2

Application Date: 1-22-2019

Volume No:

Page No:

**Additional Development Application**

Name: Bastrop Grove Section 2 Exemption Application

Approval Date: 04-04-2019

Volume No:

Page No:



**Bastrop Grove Section 2 (South of Agnes)  
Grandfathered Development Status Application  
Checklist Supplement**

1. Identification of the “Project,” as that term is defined in LGC 245.001(3), as may be amended.  
Example: Residential Subdivision

[Please see the attached project narrative](#)

2. Narrative description of the development/construction Project or proposed land use for which the Permit is being sought. Describe which Permits have been completed and which are remaining.

[Please see the attached project narrative](#)

3. Layout of the site, including locations of buildings, streets, utilities, fences, drives, sidewalks, drainage facilities, and any other permanent or temporary structures which may be present at the time of application

[Please see the attached Preliminary Plat Bastrop Grove, Section 2 submittal. No structures or improvements exist on the lots.](#)

4. Identification of each City regulation in effect at the time of the original application for the Permit filed that applies to the Project and that the Applicant contends:
  - a. Is grandfathered
  - b. Controls the approval, disapproval, or conditional approval of an application for a Permit, pursuant to LGC 245.002(a), as may be amended

[Provided in the attached project narrative](#)

5. Identification of each current City regulation for which the Applicant seeks an exemption due to the grandfathered development status provided the property owner by LGC 245 or other applicable vesting laws

[Provided in the attached project narrative](#)

6. Explanation of the applicability of any approval expirations and related requests for extension of approvals

[Explained in the attached project narrative](#)

7. Photographs, drawings, maps, and previous approvals that would assist the Grandfathering Review Committee in making its determination

[Previously submitted plans that are listed in the ‘Permit Identification’ section have been attached.](#)

8. Certified land survey of topography showing existing drainage patterns and structures

Please see the Preliminary Plat Bastrop Grove, Section 2 submittal attached.

9. Any other information or supportive materials deemed necessary and requested in writing by the Director of Planning and Develop  
N/A.

SECTION 36 - USE REGULATIONS (CHARTS)

36.1 - USE CHART ORGANIZATION/UNLISTED USES

A. The use of land and/or buildings shall be in accordance with those listed in the following Use Charts. No land or building shall hereafter be used and no building or structure shall be erected, altered, or converted other than for those uses specified in the zoning district in which it is located. The legend for interpreting the permitted uses in the Schedule of Uses is:

X  Designates use is permitted in the zoning district indicated

   Designates use is prohibited in district indicated

C  Designates use may be approved by a Conditional Use Permit (also see Section 33)

See Definitions in the Appendix (A-3) for further description of uses identified with an asterisk (\*).

B. If a use is not listed, it is not allowed in any zoning district.

C. Use Chart Organization:

- 1. Primary Residential Uses (Use Chart 36.2)
- 2. Accessory and Incidental Uses (Use Chart 36.3)
- 3. Utility and Service Uses (Use Chart 36.4)
- 4. Recreational and Entertainment Uses (Use Chart 36.5)
- 5. Education, Institutional, Public, and Special Uses (Use Chart 36.6)
- 6. Transportation Related Uses (Use Chart 36.7)
- 7. Automobile and Related Uses (Use Chart 36.8)
- 8. Office and Professional Uses (Use Chart 36.9)
- 9. Retail and Related Service Uses (Use Chart 36.10)
- 10. Commercial Uses (Use Chart 36.11)
- 11. Light Industrial and Related Uses (Use Chart 36.12)

D. Classification of New/Unlisted Uses: It is recognized that new types of land use will develop and forms of land use not presently anticipated may seek to locate in the City of Bastrop. In order to provide for such changes and contingencies, a determination as to the appropriate classification of any new or unlisted form of land use in the Use Charts (Sections 36.2 through 36.12) shall be made as follows:

1. Initiation

- a. A person, City department, the Planning and Zoning Commission, or City Council may propose zoning amendments to regulate new and previously unlisted uses.
- b. A person requesting the addition of a new or unlisted use shall submit to the Director of Planning all information necessary for the classification of the use, including but not limited to:
  - (1) The nature of the use and whether the use involves dwelling activity, sales, services, or processing;
  - (2) The type of product sold or produced under the use;
  - (3) Whether the use has enclosed or open storage and the amount and nature of the storage;
  - (4) Anticipated employment typically anticipated with the use;
  - (5) Transportation requirements;
  - (6) The nature and time of occupancy and operation of the premises;
  - (7) The off-street parking and loading requirements;
  - (8) The amount of noise, odor, fumes, dust, toxic materials and vibration likely to be generated; and
  - (9) The requirements for public utilities such as sanitary sewer and water and any special public services that may be required.

2. The Director of Planning shall refer the question concerning any new or unlisted use to the Planning and Zoning Commission with a recommendation as to the zoning classification into which such use should be placed. The referral of the use interpretation question shall be accompanied by the statement of facts in "b" above. An amendment to this ordinance shall be required as prescribed by Section 10.

3. The Planning and Zoning Commission shall consider the nature and described performance of the proposed use and its compatibility with the uses permitted in the various districts and determine the zoning district or districts within which such use is most similar and should be permitted.

4. The Planning and Zoning Commission shall transmit its findings and recommendations to the City Council as to the classification proposed for any new or unlisted use. The City Council shall approve or disapprove the recommendation of the Planning and Zoning Commission or make such determination concerning the classification of such use as is determined appropriate based upon its findings. If approved, the new or unlisted use shall be amended in the Use Charts of the Zoning Ordinance according to Section 10.

5. Standards for new and unlisted uses may be interpreted by the Director of Planning as those of a similar use. When a determination of the appropriate zoning district cannot be readily ascertained, the same criteria outlined above ("b") shall be followed for determination of the appropriate district. The decision of the Director of Planning may be appealed according to the process outlined in "2" through "4" above.

(Ord. No. 2002-8, § 2, 3-26-02)

USE CHART  
ZONING ORDINANCE  
CITY OF BASTROP, TX

SECTION 36.2

Legend for interpreting the Schedule of Uses

X  Designated use permitted in District

   Designated use prohibited in District

C  Use may be allowed with a Conditional Use Permit

Primary Residential Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Bed and Breakfast Inn or Facility	X	C	C	C	C	C	C	X	X		X	X	X	X		X	X	X			X	
Boarding or Rooming House								X	X		X	X	X	X							X	
Community Home (per State Statute)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fraternity or Sorority House								X	X		X	X	X	X								
Housing for the Elderly/Senior								X	X		X	X	X	X							X	
Manufactured/HUD-Code Mobile Home	C	C	C	C	C					X											X	X
Manufactured Home Park										X											X	X
Mobile Home Subdivision										X											X	X
Multiple-Family Dwelling (Apartment)									X		X	X	X	X							X	
Multiple-Family Dwelling (Quadraplex)								X	X		X	X	X	X								
Patio Home (Zero Lot Line Dwelling)																					X	
Single-Family Dwelling Attached						C	X	X	X					X							X	
Single-Family Dwelling Detached		X	X	X	X	X	X	X	X	X				X		X					X	X
Two-Family Dwelling (Duplex)						X	X	X	X												X	

(Ord. No. 2010-1, 1-12-10)

USE CHART  
 ZONING ORDINANCE  
 CITY OF BASTROP, TX

SECTION 36.3:

Legend for interpreting the Schedule of Uses

  X   Designated use permitted in District

       Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

Accessory and Incidental Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO	
Accessory Building (Residential) +240 s	X	C	C	C	C	C	C	C	X		X	X	X	X	X	X	X	X		X	X		
Accessory Building (Residential) -240 s.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
Accessory Building Non Residential (Bus/Ind)											X	X	X	X	X	X	X	X	X	X	X		
Caretaker's or Guard's Residence	X	C						X	X		X	X	X	X	X	X	X	X	X	X	X	X	
Garage/Accessory Dwelling (See <u>Sec 40.4</u> )	X	X	C	C	C	C	C	X	X		X	X	X	X	X	X	X	X		X	X		
Home Occupation	See Definitions A-3, Home Occupation (123)																			See Def.			
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Off-street Parking Incidental to Main Use	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Swimming Instruction as Home Occupation	C	C	C	C	C	C	C	C	C	C	X	X	X	X		X	X	X		X	X	C	
Swimming Pool (Private)	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		
Temp Field Office/Const. Yard or Office Subject to Permit issued by Building Official																							
Tennis Court (Lighted)	C	C							C		X	X	X	X	X	X	X	X		X	X	C	
Tennis Court (Private) (No Lights)	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	

(Ord. No. 2010-1, 1-12-10; Ord. No. 2013-24, 11-12-13)

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SECTION 36.4:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

\_\_\_\_ Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

Utility, Service and Other Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Antenna (Commercial) See Section 43	C																			C		
Antenna (Non Commercial)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Electrical Energy Generating Plant	C																		C	C	X	
Electrical Substation (High Volt. Bulk Power)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Electrical Transmission Line (High Voltage)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Farm, Ranch, Crops or Orchard (Commercial)	X																					
Fire, Police, Public Health, Municipal Bldgs/Fac	X	C	C	C	C	C	C	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Franchised Private Utility (not listed)	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Garden or Orchard (Non Commercial)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Gas Line and Regulating Station	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Local Utility Line	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Public Building with Shop/Yard of Local, State or Federal Agency (Outside Storage)	C													C	C	C	C	X	C	X	X	
Radio or Television Transmitting Station	C											C	C	C	C	C	C	X	C	X	X	
Sewage Pumping Station (Public)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Telephone Business Office											X	X	X	X		X	X	X	X	X	X		
Telephone Exchange/ Switching/Relay or Transmitting Station	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Utility Shop/ Storage Yards/Buildings	C																	X	C	X	X		
Water Reservoir Well/Pumping Station	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water stand Pipe/Elevated Water Stora [Storage]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water Treatment Plant	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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SECTION 36.5:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

     Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

Recreational and Entertainment Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO	
Amusement Arcade														C	C	C		X	X		X	X	
Amusement Arcade (Indoor)														C	C	C		X	X		X	X	
Amusement Arcade (Outdoor)																		C	C		X	X	
Ballroom Dancing															X	X		X	X			X	
Carnival, Circus or Tent Services (Temp) See City of Bastrop Code of Ordinances																							



Country Club (Private)	X	C	C	C	C	C	C	C	C	C	C	X	X	X	X		C	X	X		X	X	X
Day Camp for Children	C								C	C	C	C	C	X	X	X	C	X	X			X	C
Golf Course (Commercial)	C	C	C	C	C	C	C	C	C	C	C		C	C		C	X	X		X	X	C	
Park/Playground (Private) Non Commercial	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Playfield/Stadium (Public)	C											C	C	X	X	X		X	X	X	X	X	C
Private Club (See Article 4.100 [Art. 4.02])																							
R.V Park																		X		X	X		
Rodeo Grounds	C																			X	X		
Roller/Ice Rink																	X	X		X	X		
Stable (Commercial)	C																			X	X		
Stable (Private)	X	C	C	C	C															X	X		
Swim/Tennis or Handball Club	C	C	C	C	C	C	C	C	C	C	C	C	X	X		X	X	X		X	X	C	
Swimming Pool (Commercial)											C	C	C	C	X		X	X		X	X		
Theater (Open Drive-In)																				X	X		
Theater/Playhouse (Indoor)											X	X	X	X	X		X	X		X	X		
Zoo (Private)	C																			C	X		
Zoo (Public)	C																			X	X		

USE CHART  
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 CITY OF BASTROP, TX

SECTION 36.6:

Legend for interpreting the Schedule of Uses

  X   Designated use permitted in District

       Designated use prohibited in District

  C   Use may be allowed with a Conditional Use Permit

Educational, Institutional and Special Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Art Gallery/ Museum											X	X	X	X	X	X	X	X			X	
Assisted Living Facility								C	X		X	X	X	X							X	
Cemetery/ Mausoleum	C										C	C	C	C			C	C		C	X	
Cemetery, Animal	C																				X	
Child Care Center w/Church	C	C	C	C	C	C	C	C	C		X	X	X	X	X		X	X			X	
Child Care Center/Day Care Center									C		X	X	X	X	X		X	X	C	C	X	
Church, Rectory or Temple	C	C	C	C	C	C	C	C	X	X	X	X	X	X	X	X	X	X		X	X	X
College/ University	C	C	C	C	C	C	C	C	C	C	X	X	X	X		X	X	X	X	X	X	C
Community Center (Public)	X										X	X	X	X	X	X	X	X			X	X
Continuing Care Retirement Community									C		X	X	X	X			X	X			X	
Convent/Monastery	C	C	C	C	C	C	C	C	C	C	X	X	X	X			X	X			X	C
Fairgrounds/Exhibition Area	C																			C	X	
Family Home (Child Care)	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X			X	X
Fraternal/Lodge/Union/Hall/Civic Cente [Center]	C										C	C	X	X			X	X		X	X	
Group Daycare Center	C							C	C	C	X	X	X	X			X	X			X	C
Hospital, Acute Care	C										X	X	X	X			X	X			X	C
Hospital, Chronic Care	C										C	C	X	X			X	X			X	
Institution for Alcoholic, Narcotic, Psychiatric	C										C	C	C	C			C	C			X	
Institution for Religious, Charitable or Philanthropic Nature	C								C	C	X	X	X	X			X	X			X	
Kindergarten/ Nursery School (Private)	C							C	C	C	C	X	X	X			X	X			X	C
Non Profit Activities by a Church	C							X	X	X	X	X	X	X	X	X	X	X			X	X
Rehab Care Facility (Halfway House)								C	C		C	C	C	C			C	C			X	
Retirement Housing for the Elderly							X	X	X		X	X	X	X							X	
School Driving/Defensive Driving													X	X			X	X		X	X	

School Private (Primary/Secondary)	C								C	C	C	C	X	X	X			X	X			X		
School, Business														C	C			X	X	C	C	X		
School, Commercial Trade														C	C			X	X	C	C	X		
School, Federally Funded Preschool Pgrm.	C	C	C	C	C	C	C	C	C	X			X	X	X	X			X	X		X		
School, Public/Parochial	X	C	C	C	C	C	C	C	C	X	X	X	X	X	X	X		X	X	X		X	X	X
Seasonal Uses (Temporary)	C												C	C	C	C	C	C	C	C		C	C	
Skilled Nursing Facility										C			X	X	X	X		C	X	X			X	

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SECTION 36.7:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

     Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Transportation Related Uses																						
Airport/Landing Field	C																			C	X	
Bus Station/Other Terminal of Similar Nature														C		C	X	X		X	X	
Hauling/Storage Co w/outside Storage																		X		X	X	
Heliport	C																	C		C	X	
Helistop	C														C		C	C	C	C	C	
Motor Freight Company																		X	C	X	X	
Parking Lot/Structure Commercial-Auto													C	C	X	C	X	X		X	X	
Parking Lot, Truck/Trailers															X			X		X	X	
Tractor Sales																		X		X	X	

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SECTION 36.8:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

\_\_\_ Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

Automobile and Related Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Auto Accessory Installation, Minor														C			C	X		X	X	
Auto Financing/Leasing (No outdoor lot/display)											C	C	X	X			X	X		X	X	
Auto Glass/Seat Cover/Upholstery/Muffler Shop																	C	X		X	X	
Auto Laundry/Car Wash																	C	X		X	X	
Auto Painting/Body Rebuilding Shop																		X		X	X	
Auto Parts/Accessory Sales (Indoor)													C	X			X	X		X	X	
Auto Rental														C			C	X		X	X	
Auto Repair, Major																		X		X	X	
Auto Repair, Minor														C			C	X		X	X	
Auto Storage/Auto Auction																					X	
Automotive Gasoline/Motor Fuel Service Station														C			C	X		X	X	
Boat Sales																	C	X		X	X	
Motorcycle Sales/Repair																	C	X		X	X	
New/Used Auto Sales																	C	X		X	X	
RV/Camper Sales																	C	X		X	X	
Tire Dealership														C			C	X		X	X	

Trailer/Heavy Load Vehicle Repair																		X		X	X		
Trailer/Truck Rental																			C		X	X	
Used Auto Sales																			X		X	X	
Window Tinting, Auto																		C	X		X	X	

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SECTION 36.9:

Legend for interpreting the Schedule of Uses

  X   Designated use permitted in District

       Designated use prohibited in District

  C   Use may be allowed with a Conditional Use Permit

Office and Professional Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO	
Accountant/Bookkeeping Office											X	X	X	X	X	X	X	X				X	
Architect's Office											X	X	X	X	X	X	X	X				X	
Armed Services Recruiting Center											X	X	X	X		X	X	X				X	
Bank/Savings & Loan/Credit Union/Brokerage											C	C	X	X		X	X	X				X	
Check Cashing Service/Loan Agency												C	C	C		C	X	X				X	
Dental Clinic/Laboratory/Office											X	X	X	X		X	X	X				X	
Medical Clinic or Office											X	X	X	X		X	X	X				X	
Medical Laboratory												C	C	C		C	X	X				X	
Minor Medical Emergency Clinic											C	C	X	X		X	X	X				X	
Mortgage/Loan Agency											C	X	X	X		X	X	X				X	
Offices, General Business/ Professional											X	X	X	X		X	X	X				X	
Optician/Optomestrist											X	X	X	X		X	X	X				X	
Radio/TV Broadcasting w/o Tower											C	X	X	X		X	X	X				X	

Real Estate Office												X	X	X	X			X	X	X			X	
Telemarketing Agency												C	C	C	C			C	C	C			X	

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SECTION 36.10:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

     Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit

Retail and Service Type Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHC	
Animal Humane Society	C																	C		X	X		
Antique Shop/Sales Indoor												C	X	X		X	X	X				X	
Appliance Rental													X	X			X	X				X	
Art Supply Store												X	X	X		X	X	X				X	
Bakery/Confectionery Shop (Retail)											X	X	X	X		X	X	X				X	
Banking, Automatic Teller Only											X	X	X	X	X	X	X	X				X	
Barber Shop/Hair Salon											X	X	X	X		X	X	X					
Book/Stationery/Newsstand Shop												X	X	X	X	X	X	X				X	
Building Material/Hardware/Home Improvement (Indoor)																	X	X		X	X		
Building Material/Hardware/Home Improvement (Outdoor)																	C	X		X	X		
Cellular Phone/Pager Sales (Indoor)												C	X	X		X	X	X		X	X		
Cleaning Plant (Commercial/Wholesale)																		X		X	X		
Cleaning Shop/Laundry Pick-up Self-Service (Small Shop)												X	X	X		X	X	X				X	
Computer Sales												C	X	X		X	X	X				X	
Consignment Store												C	X	X		X	X	X				X	
Copy Shop												C	C	X	X		X	X	X			X	
Custom Personal Service Shop												C	C	X	X		X	X	X			X	
Discount/Department Store													X	X		X	X	X				X	
Donut Shop												X	X	X		X	X	X				X	

Drapery/Needlework/Weaving Shop												X	X		X	X	X			X			
Drug Store/Pharmacy											C	X	X	X		X	X	X			X		
Florist Shop											C	X	X	X	X	X	X	X			X		
Food/Beverage Sales Store w/Gasoline											C		C			X	X		X	X			
Food/Beverage Sales Store w/o Gasoline											X	X	X		C	X	X		X	X			
Food Store											C	X	X	X	X	X	X		X	X			
Funeral Home/Mortuary											C	C	X			X	X				X		
Furniture, Home Furnishings/ Appliance													X		X	X	X				X		
Garden Shop											C	C	X		X	X	X				X		
Greenhouse/Plant Nursery w/Outside Display of Plants (Retail)													X		X	X	X				X		
Handicraft/Art Object Sales Shop											C	X	X	X	X	X	X				X		
Hardware Shop/Store												C	X		X	X	X				X		
Hobby Shop											C	X	X		X	X	X				X		
Household Appliance Service/Repair													X		X	X	X				X		
Ice Cream/Yogurt Sales											X	X	X	X	X	X	X				X		
Incidental/Accessory Retail/Service Uses											X	X	X	X	X	X	X				X		
Key Shop											X	X	X		X	X	X				X		
Kiosk											C	C	C	C	X	C	C	C				X	
Laundromat/Self Service Washateria											C	X	X		C	X	X				X		
Medical Appliances, Fitting, Sales/Rental											X	X	X	X	C	X	X				X		
Metal Recycling Center																	C		C		X		
Mini-Warehouse																	C		X	X			
Off-Premises Sales Office												X	X		X	X	X						
Pawn Shop																	X		X				
Pet Shop/ Grooming											C	X	X		C	X	X				X		
Restaurant/Drive Thru												C			C	X	X				X		
Restaurant/Cafeteria (Not a Drive Thru)											C	X	X	X	X	X	X				X		

Restaurant/Eating Place (Drive In Service)												X	X		X	X	X			X	
Retail Shop/Apparel/Gift/Accessory Similar												X	X	X	X	X	X	X			X
Security Systems Installation Company												X	X		X	X	X			X	
Silk Screening Studio/Tee-Shirt Shop												X	X		X	X	X			X	
Studio/Decorator/Artist/Photographer											C	X	X	X	X	X	X	X			X
Studio/Health/Reducing Service (or Similar)											C	X	X	X	X	X	X	X			X
Studio/Music/ Dance/Drama											C	X	X	X	X	X	X	X			X
Temp Outdoor Retail Sales Commercial												C	X	X	X	X	X			X	
Tool/Light Equipment Rental (Indoor)												C	X		C	X	X			X	
Travel Bureau/Travel Consultant											X	C	X	X	X	X	X	X			X
Trophy Sales/Engraving													X	X		C	X	X			X
Used Merchandise/Second Hand Thrift														C		C	X	X			X
Used Merchandise/Second Hand (non profit)														C		C	X	X			X
Vacuum Cleaner Sales and Repair												C	X		C	X	X			X	
Variety Store/Similar Retail Outlet													X	X		X	X	X			X
Vet Hospital (Inside Animal Pens Only)	C												X	X		C	X	X			X
Vet Hospital (Outside Animal Pens Only)	C																C	X		X	X
Veterinarian Office (No Animal Hospital)	C											C	X	X	X		C	X	X		X
Wallpaper/Flooring/Carpet Store													C	X		C	X	X			X

(Ordinance 2010-1 adopted 1/12/10)

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SECTION 36.11:

Legend for interpreting the Schedule of Uses

X Designated use permitted in District

     Designated use prohibited in District

C Use may be allowed with a Conditional Use Permit



Commercial Type Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO
Alcoholic Beverage Establishments (Beer Wine) See Bastrop Code 4.100 [Art. 4.02]																						
Alcoholic Beverage Establishments (Liquor) See Bastrop Code 4.100 [Art. 4.02]																						
Ambulance Service																	X	X			X	
Bakery/Confectionery Shop (Commercial)														C			X	X		X	X	
Bakery/Confectionery Shop (Wholesale)														C			X	X	X	X	X	
Book Binding																		X	X	X	X	
Bottling Works																		X	X	X	X	
Breweries														C				C		C		
Cabinet Shop														C				X	X	X	X	
Clothing/Similar Light Manufacturing																		X	X	X	X	
Contractor Shop w/Outside Storage Yard																		C		C	X	
Distilleries														C				C		C		
Distribution Center																			X	X	X	
Drapery/ Furniture Upholstery Shop														C			X	X	X	X	X	
Dyeing/Laundry Plant (Commercial)																		X	X	X	X	
Equipment Rental (Heavy)																		C		X	X	
Equipment Sales (New/Used)																		C		X	X	
Feed/Grain Store																	X	X		X	X	
Flea Market (Indoor)																	C	X		X	X	
Food Processing Plant																		C		X	C	

Furniture Manufacture/ Refinishing Shop													C				X		X	X			
Heating/AC Sales																	X	X		X	X		
Heavy Machinery Sales Storage																	X		X	X			
Kennel (Indoor Pens)	C																X	X		X	X		
Kennel (Outdoor Pens)	C																C		X	X			
Laboratory Equipment Manufacturing																	X	X	X	X			
Laboratory Scientific/Research																	X	X	X	X			
Landscaping Service/ Construction																	X		X	X			
Light Manufacturing/ Assembly Processes																	X	X	X	X			
Lithographic/ Print Shop													C			X	X	X	X	X			
Maintenance/ Repair Service for Buildings																	X		X	X			
Manufactured or Lt. Industrialized Home New																	C		X	X			
Manufactured or Lt. Industrialized Home Used																	C		X	X			
Milk Depot, Dairy/Ice Cream Plant																	X	X	X	X			
Motel/Hotel (Less than 75 Rooms)										C	C		X	X	X					X			
Motel/Hotel (More than 75 Rooms)										C		C	X	X						X			
Newspaper Printing																	C	X	X	X			
Office Showroom										C		C	C	X	C	X	X		X	X			
Office Warehouse																	X	X	X	X			

Open Storage/Display/ Work Area for Merchandise or Machinery																			X		X	X			
Paint Shop																			C		C	C	C	X	X
Palm Reader/Card Reader																					X		X	X	
Plumbing Shop																					X		X	X	
Portable Building Sales (Outdoor Display)																					C		X	X	
Printing Company																					C		X	X	
Propane Sales (Retail)																					C		X	X	
Taxidermist																					X		X	X	
Tinsmith/Sheet Metal Shop																						X		X	
Welding/Machine Shop																						X		X	
Wineries																						C		C	

(Ord. No. 2010-1, 1-12-10; Ord. No. 2014-17, pt. 2, 9-23-14)

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SECTION 36.12:

Legend for interpreting the Schedule of Uses

  X   Designated use permitted in District

       Designated use prohibited in District

  C   Use may be allowed with a Conditional Use Permit

Industrial and Related Uses	AOS	SF20	SF9	SF8	SF7	2F	SFA	MF1	MF2	MH	O	NS	GR	CBD	CF	CT	C-1	C-2	IP	LI	PD	MHO	
Animal Rendering Plant																						C	
Any Use Which Could Potentially Create A Problem To The Environment Due To Emissions, Odor, Noise, Etc																						C	

Cement/Hydrated Lime Plant																				C			
Concrete/Asphalt Batching Plant (Perm)																					C		
Concrete/Asphalt Batching Plant (Temp) With 6 Month, With One Extension																				C	C		
Grain Elevator	C																				C		
Hatcheries	C																				C		
High Risk/Hazardous Industrial Mnfctrng. Wholly Enclosed Within a Bldg See <u>31.2</u>																					C		
High Risk/Hazardous Industrial Mnfctrng. Not Wholly Enclosed Within Building																							
Light Manufacturing/ Industrial Use as Defined in Appendix A-3																					X	X	X
Livestock Auction Facilities	C																					C	
Low Risk Industrial Manufacturing Not Wholly Enclosed Within a Building																						C	X
Low Risk Industrial Manufacturing Wholly Enclosed Within A Building																					C	C	X
Petroleum Storage/ Collection Facilities																						C	

Sand/Topsoil/ Gravel/Stone/ Petroleum Extraction or Storage	C																		C	X	
Sexually Oriented Business (See [Sec.] <u>43.9</u> )																			C		
Slaughtering Facilities																			C		
Smelter/Refinery/ Chemical Plant																			C		
Storage/ Wholesale Warehouse																			X	X	
Wrecking Yard																			C		

(Ord. No. 2010-1, 1-12-10)

# BASTROP GROVE

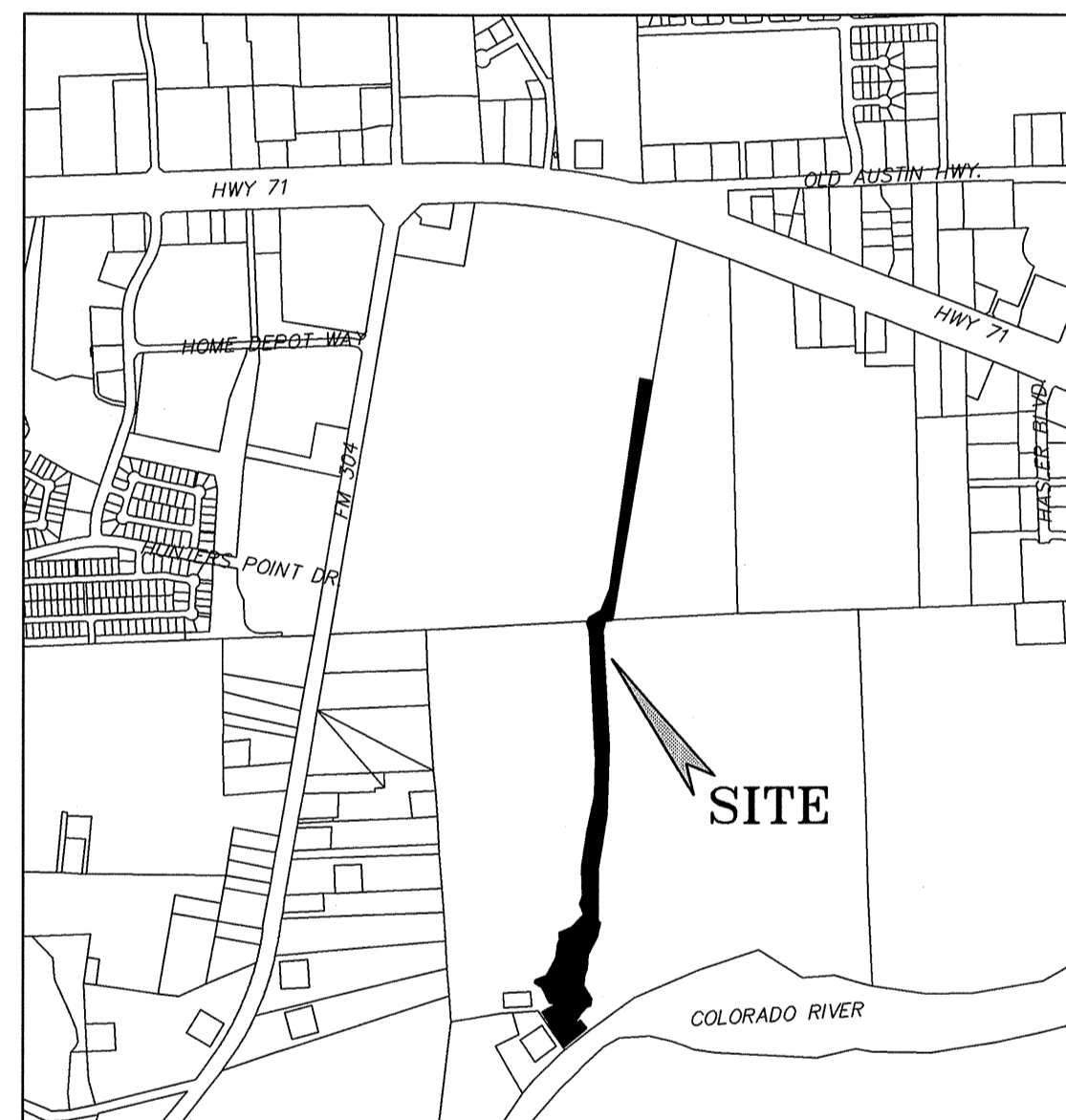
## DRAINAGE IMPROVEMENTS

### AGNES ROAD TO COLORADO RIVER

### BASTROP COUNTY, TEXAS

#### SHEET INDEX

Sheet Number	Sheet Title
1	COVER
2	GENERAL NOTES & DETAILS
3	DETAILS - EROSION CONTROL MATTING
4	DETAILS - BOX CULVERTS
5	EROSION CONTROL PLAN
6	EXISTING DRAINAGE AREA MAP
7	PROPOSED DRAINAGE AREA MAP
8	CHANNEL - STA. 0+00 TO 6+00
9	CHANNEL - STA. 6+00 TO 10+50
10	CHANNEL - STA. 10+50 TO 20+50
11	CHANNEL - STA. 20+50 TO 30+50
12	CHANNEL - STA. 30+50 TO 41+50
13	CHANNEL - STA. 41+50 TO END
14	CHANNEL X-SECTIONS



**LOCATION MAP**

MAPSCO PAGE #:	N.T.S.	MAPSCO GRID #:
468S		Q34
468N		Q35
468P		Q35

**NOTES:**

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE ASSOCIATED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF BASTROP MUST RELY UPON THE ADEQUACY OF THE DESIGN ENGINEER.

THIS PROJECT IS LOCATED IN THE COLORADO RIVER WATERSHED AND WITHIN THE BOUNDARIES OF THE 100-YEAR FLOOD PLAIN AS PER FEDERAL FLOOD INSURANCE ADMINISTRATION FIRM MAP NO. 48021C0335E, DATED JANUARY 19, 2006, BASTROP COUNTY, TEXAS. BASTROP COUNTY COMMUNITY NO. 481193.



SUBMITTED BY:

*Madeline Bulant* 09/28/2018  
CARLSON, BRIGANCE & DOERING, INC.

REVIEWED BY:

*Jerry P. Lady* 10/1/2018  
CITY OF BASTROP ENGINEER

OWNER: 71 RETAIL PARTNERS, L.P.  
DOUGLAS MACMAHON  
8214 WESTCHESTER DRIVE  
DALLAS, TEXAS 75225  
(214) 622-6565

ENGINEER: CARLSON, BRIGANCE & DOERING, INC.  
CIVIL ENGINEERING & SURVEYING  
MR. BRENDAN P. MCENTEE, P.E.  
5501 WEST WILLIAM CANNON  
AUSTIN, TEXAS 78749  
(512) 280-5160

UTILITY PROVIDERS:

ELECTRIC:	BLUEBONNET ELECTRIC (979) 542-3151
GAS:	CENTER POINT ENERGY (830) 643-6936
PHONE:	AT&T (512) 870-1450
WATER:	CITY OF BASTROP (512) 332-8960
WASTEWATER:	CITY OF BASTROP (512) 332-8960
CABLE:	SPECTRUM (800) 418-8848

NO.	DESCRIPTION	REVISE (R) ADD (A) VOID (V)	CITY OF BASTROP APPROVAL/DATE	APPROVED BY



CARLSON, BRIGANCE & DOERING, INC.  
DESIGNED BY: BM  
DRAFTED BY: JW  
DATE: 09/28/2018

REVISION	DATE

Carlson, Brigance & Doering, Inc.  
FIRM ID #E3791  
Civil Engineering & Surveying  
5501 West William Cannon Dr. Austin, Texas 78749  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

**COVER**

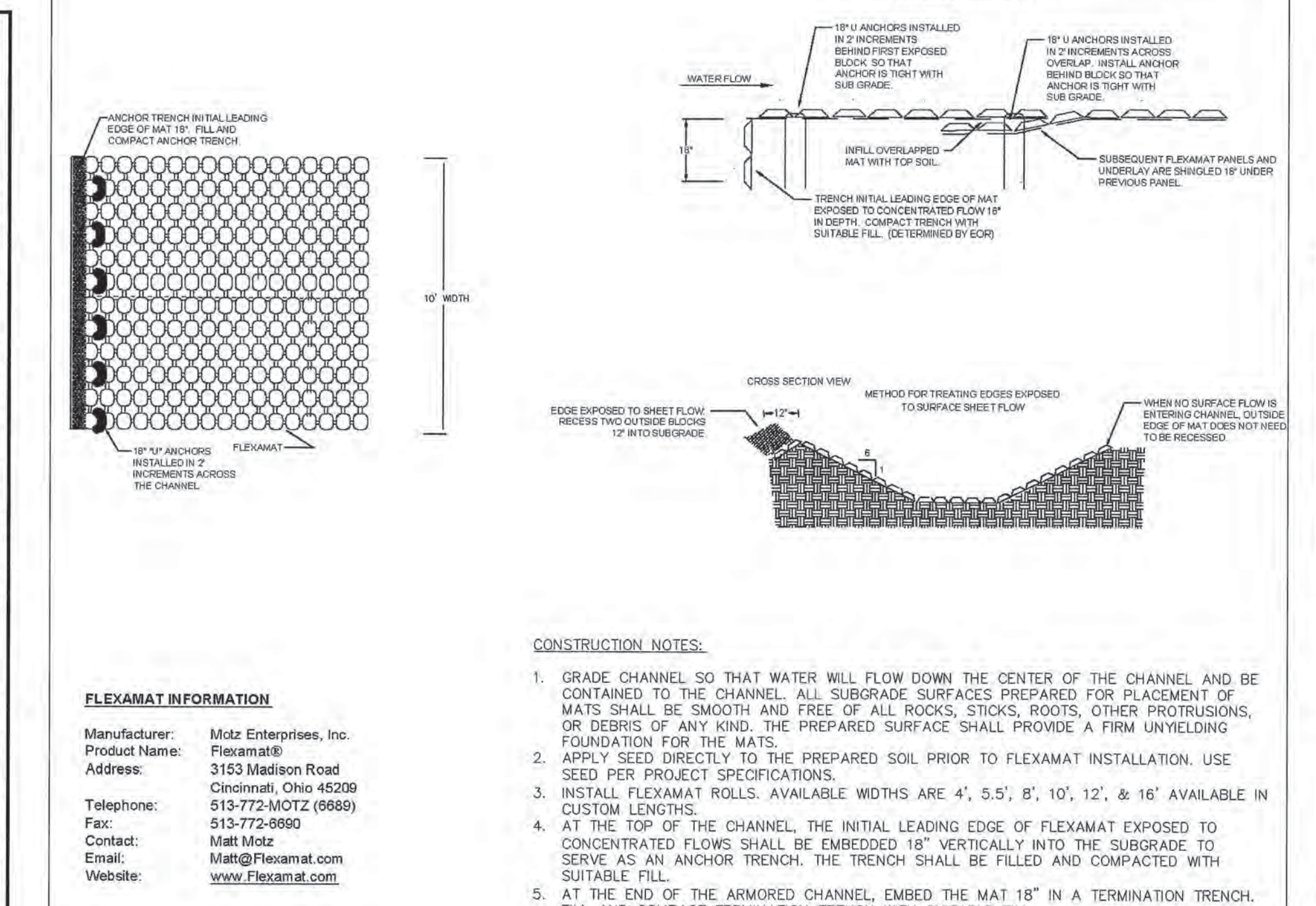
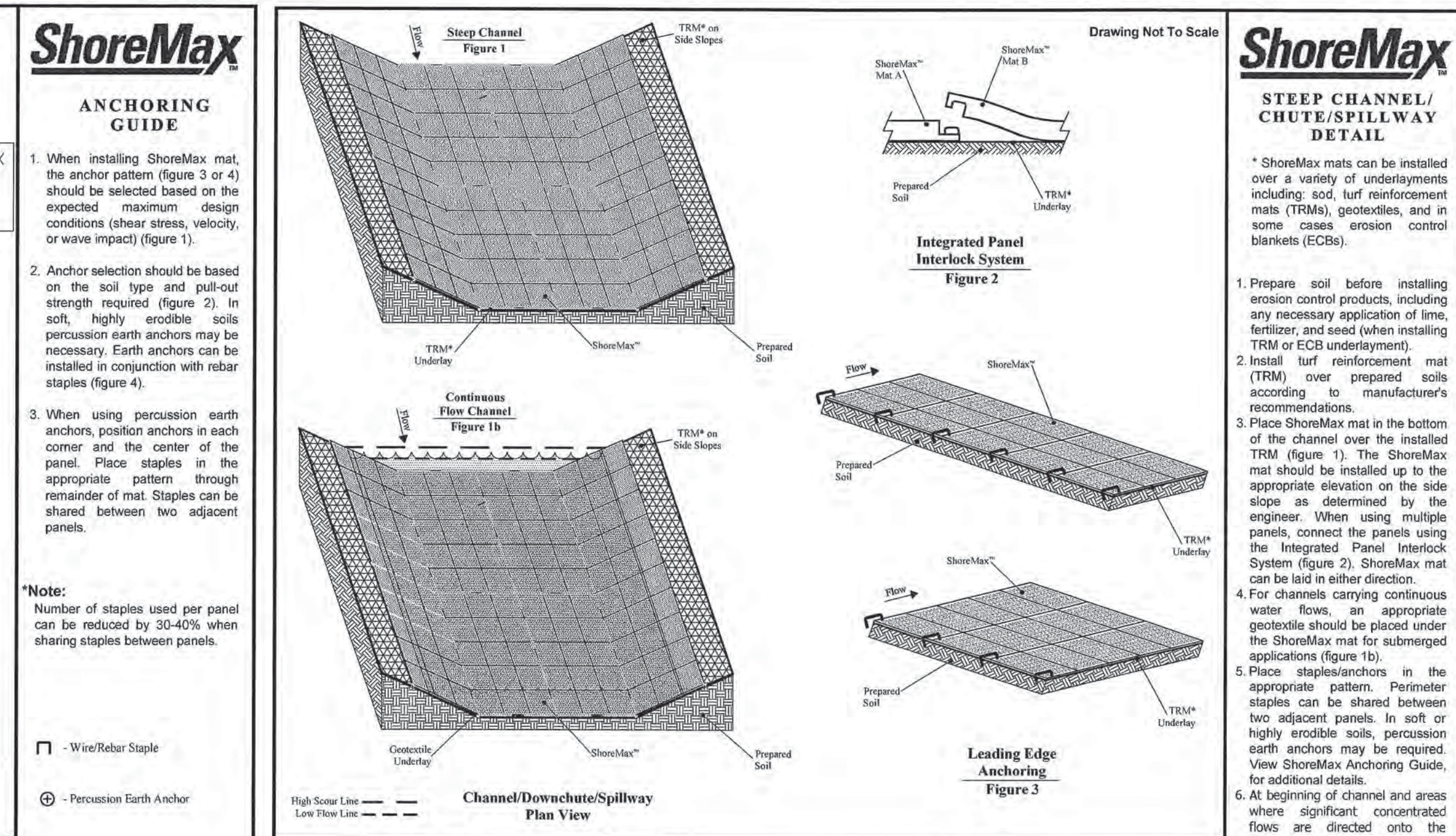
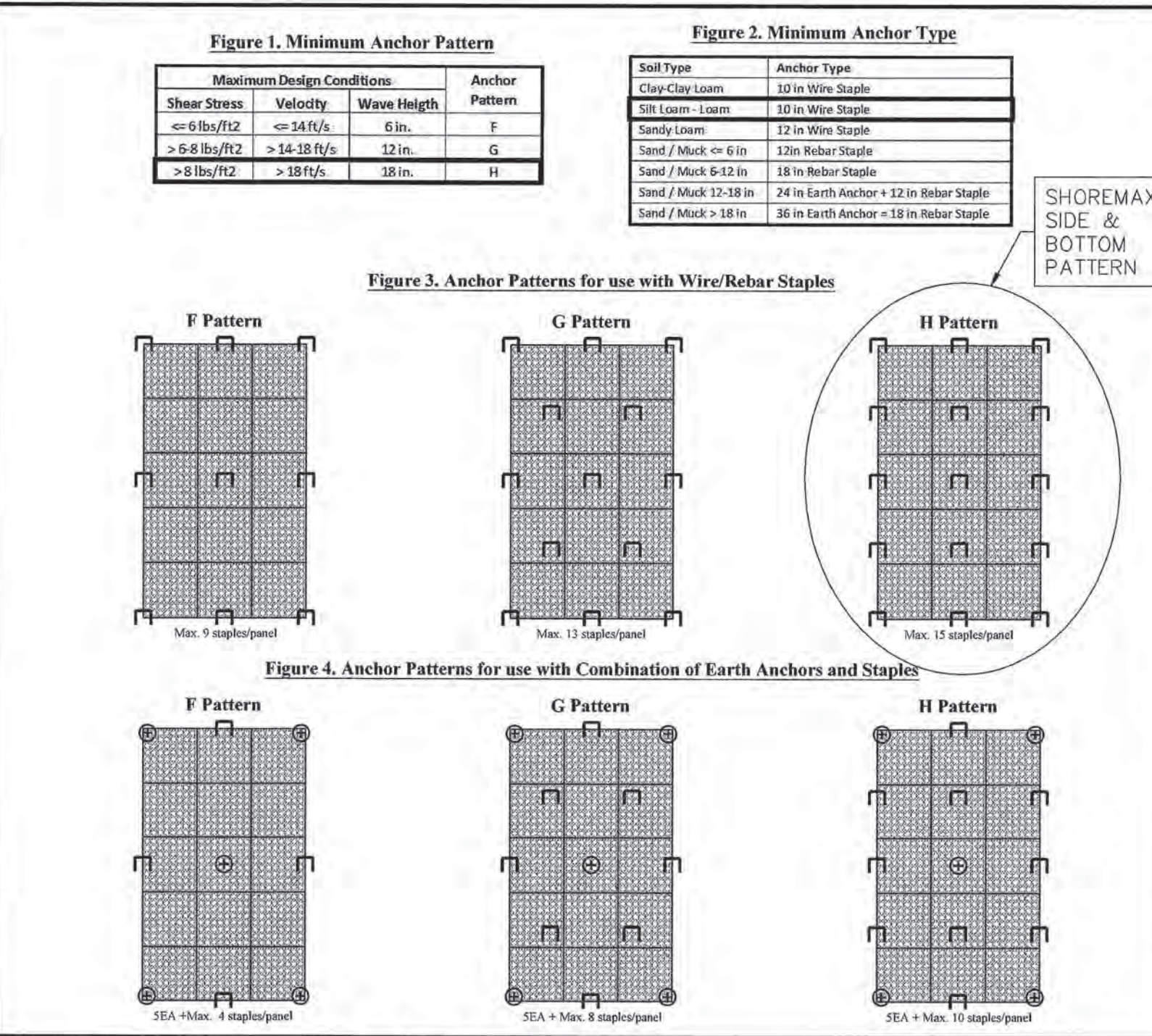
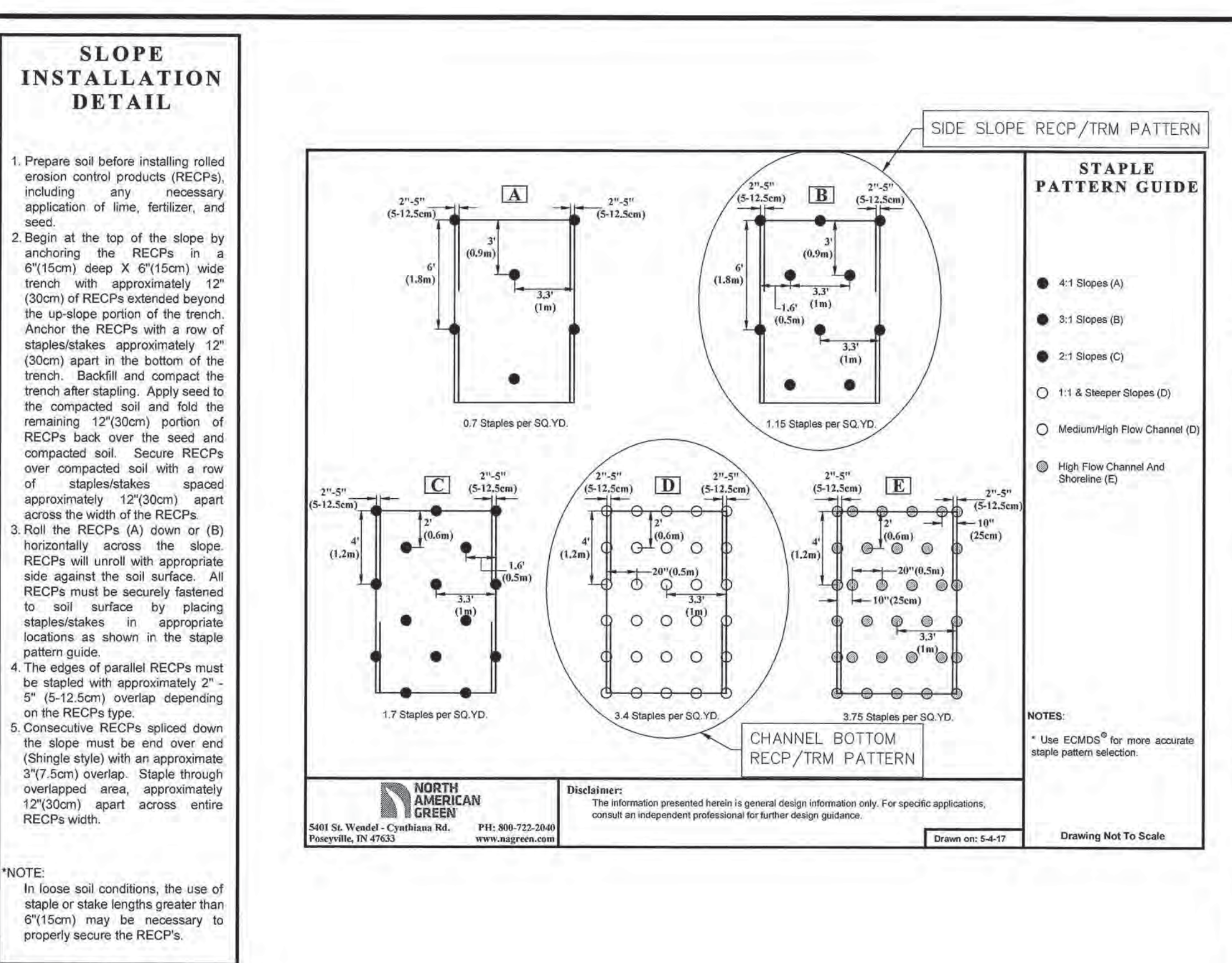
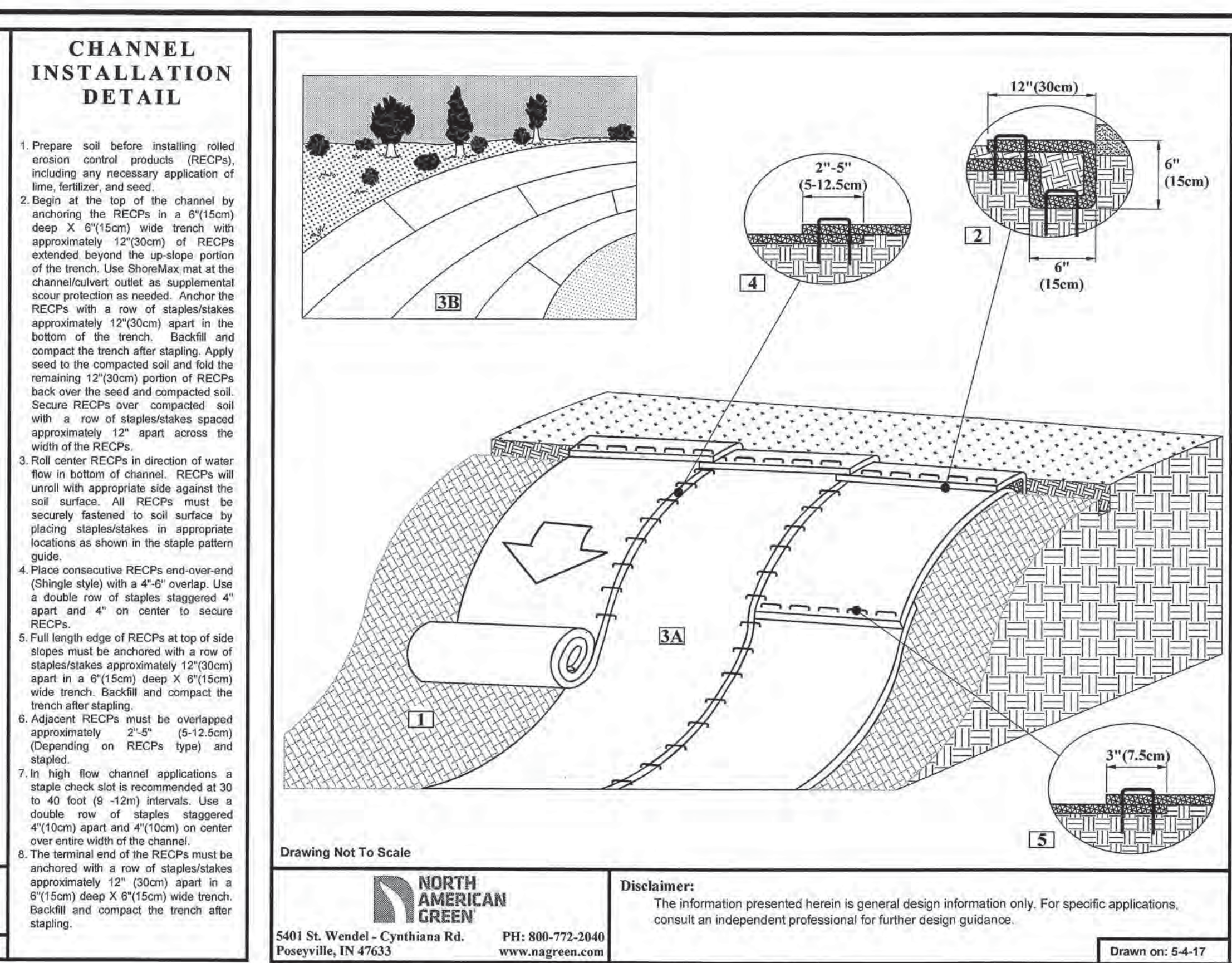
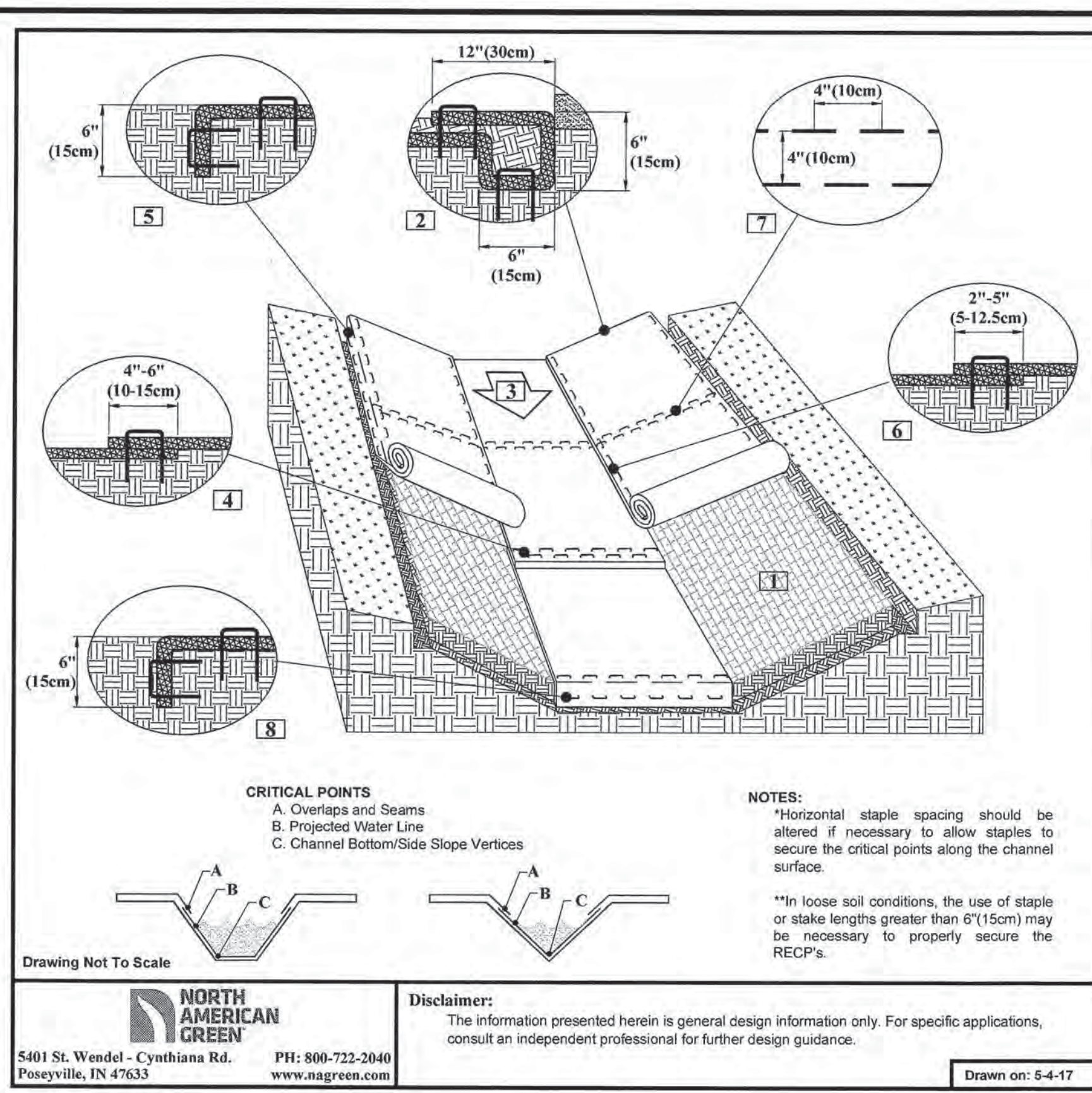
**BASTROP GROVE**

**DRAINAGE IMPROVEMENTS**

SHEET NAME: COVER  
JOB NAME: BASTROP GROVE  
PROJECT: DRAINAGE IMPROVEMENTS

DATE: APRIL 2018  
JOB NUMBER: 4697  
SHEET: 1 OF 14  
SHEET NO.: 1





**NORTH AMERICAN GREEN**  
 5401 St. Wendel - Cynthiana Rd. Poseyville, IN 47633 PH: 800-772-2040 www.nagreen.com

Disclaimers: The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 5-4-17

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Drawn on: 5-4-17

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Drawn on: 5-4-17

STATE OF TEXAS  
 BRIGANCE & DOERING, INC.  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 #13791  
 Carlson, Brigance & Doering, Inc.  
 5501 West William Cannon Dr. Austin, Texas 78749  
 Phone No. (512) 280-5160 Fax No. (512) 280-5165

DESIGNED BY: BM  
 DRAFTER BY: TW  
 DATE: \_\_\_\_\_  
 REVISION: \_\_\_\_\_

SHEET NAME: DETAILS - EROSION CONTROL MATTING  
 JOB NAME: BASTROP GROVE  
 PROJECT: DRAINAGE IMPROVEMENTS

DATE: APRIL 2018  
 JOB NUMBER: 4697  
 SHEET: 3 OF 14  
 SHEET NO.: 3





DESIGNED BY:	BM	DRAWN BY:	IV
DATE:	10/18/18		
REVISION:			
	RELOCATED SPOIL PILES		

Carlson, Brigance & Doering, Inc.  
 FIRM ID #E791  
 Civil Engineering  
 5801 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5168 • Fax No. (512) 280-5165

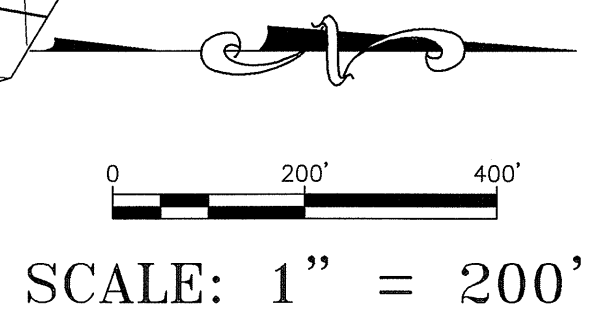
**EROSION CONTROL PLAN**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:  
 JOB NAME:  
 PROJECT:

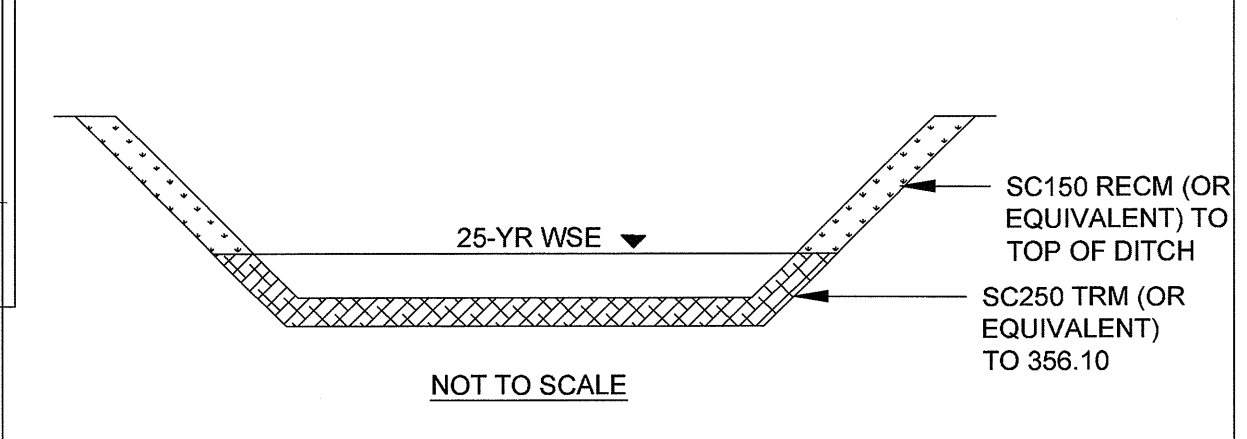
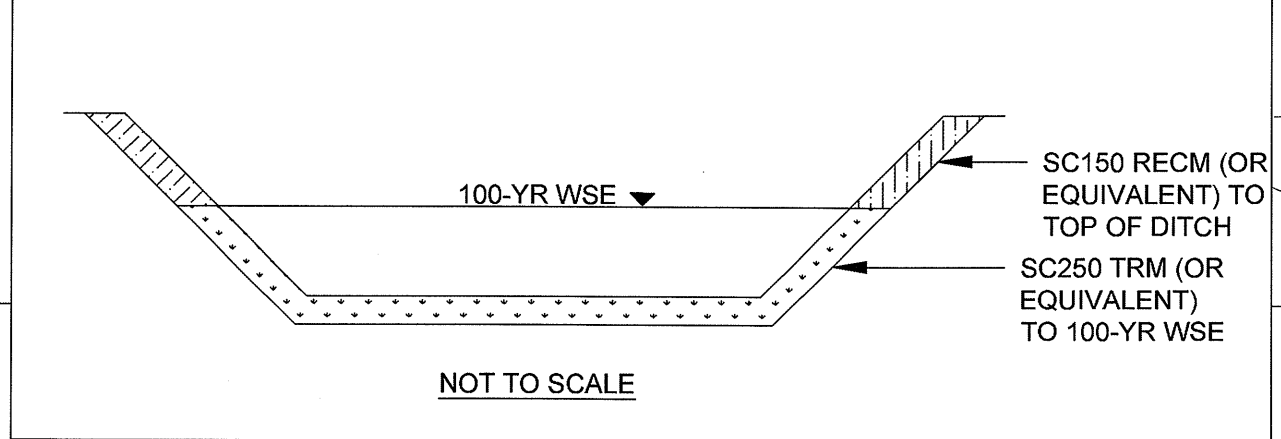
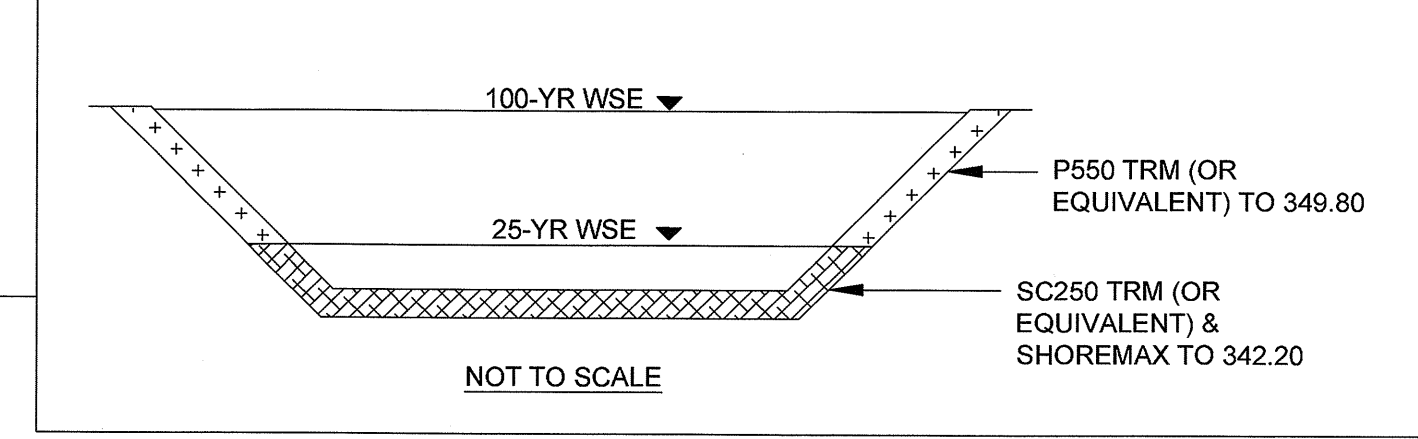
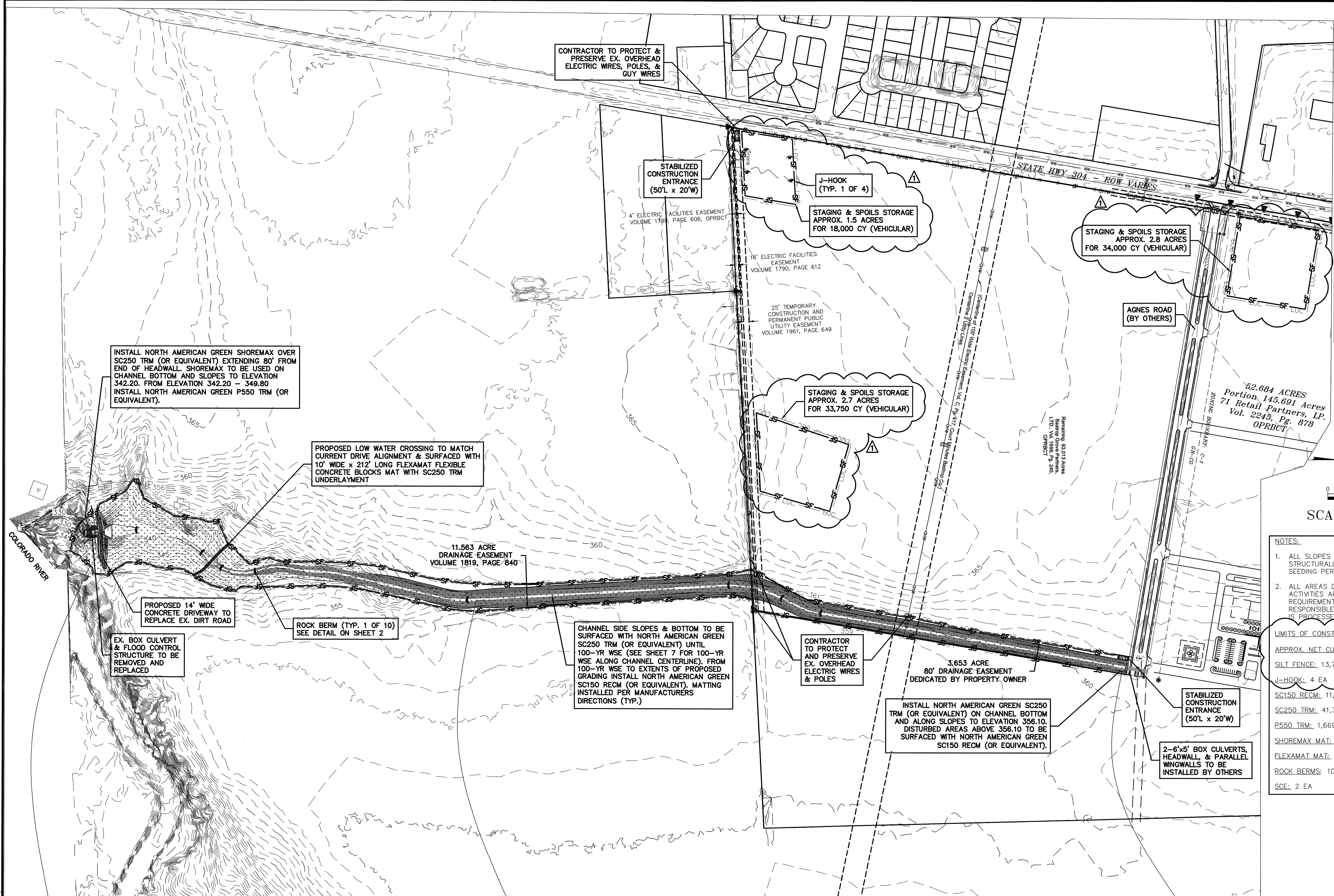
DATE: **APRIL 2018**  
 JOB NUMBER: **4697**  
 SHEET: **5 OF 14**  
 SHEET NO. **5**

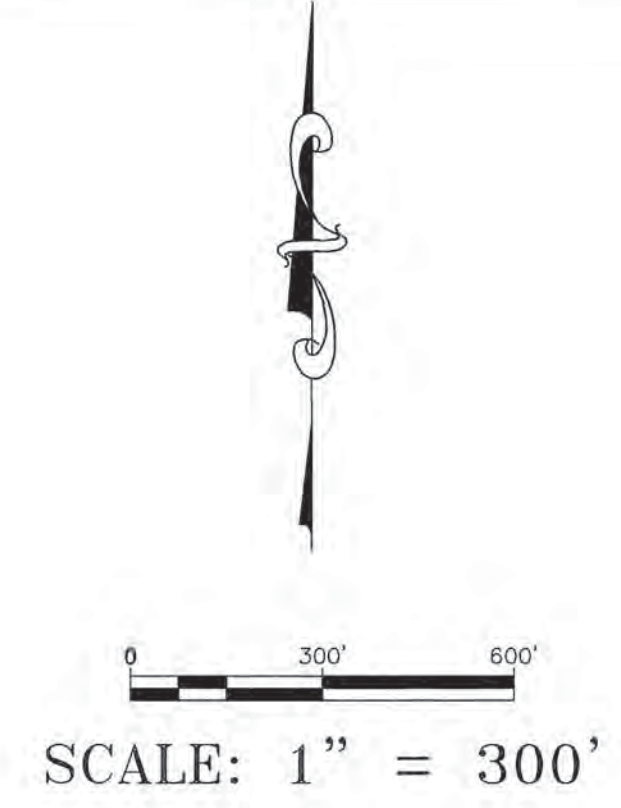
**LEGEND**

SF	SILT FENCE
LOC	LIMITS OF CONSTRUCTION
IP	INLET PROTECTION
RB	ROCK BERM
JH	J-HOOK
SCE	STABILIZED CONSTRUCTION ENTRANCE
[Pattern]	NORTH AMERICAN GREEN SHOREMAX OVER SC250 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN P550 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN SC250 TRM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)
[Pattern]	NORTH AMERICAN GREEN SC150 RECM (OR EQUIVALENT) (SEE DETAIL ON SHEET 3)



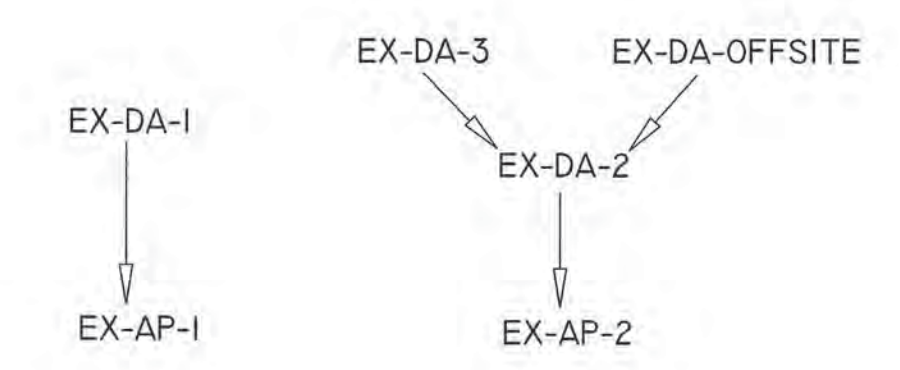
- NOTES:**
- ALL SLOPES 3:1 OR GREATER SHALL BE STRUCTURALLY STABILIZED WITH TRM, SOIL, AND SEEDING PER GENERAL NOTES.
  - ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES ARE TO BE REVEGETATED PER TPDES REQUIREMENTS. CONTRACTOR WILL BE RESPONSIBLE TO MAINTAIN BMPs UNTIL A N.O.T. IS PROCESSED FOR THE SITE.
- LIMITS OF CONSTRUCTION: 958,599 SF / 22.01 AC  
 APPROX. NET CUT: 63,500 CY (NET SECTION)
- SILT FENCE: 13,740 LF  
 J-HOOK: 4 EA  
 SC150 RECM: 11,221 SY  
 SC250 TRM: 41,367 SY  
 P550 TRM: 1,669 SY  
 SHOREMAX MAT: 738 SY  
 FLEXAMAT MAT: 236 SY  
 ROCK BERMS: 10 EA  
 SCE: 2 EA





LEGEND	
---	DRAINAGE EASEMENT BOUNDARY
---	DRAINAGE BOUNDARY LINE
AI	DRAINAGE AREA LABEL
●	ANALYSIS POINT (AP)
---	EXISTING CONTOUR MAJOR
---	EXISTING CONTOUR MINOR
→	FLOW ARROW
TcFP	TIME OF CONCENTRATION FLOW PATH

**HYDROLOGY FLOW CHART**



**TIME OF CONCENTRATION CALCULATIONS EXISTING CONDITIONS**

Drainage Area #	Sheet Flow				Shallow Conc. Flow				Channel Flow				Tc (Min.)		
	n	Slope	L	Tc	Paved/Unpaved	Slope	L	Tc	n	Slope	L	A <sub>sect</sub>		WP	Tc
EX-DA-1	0.15	0.30%	100	19.73	U	0.19%	3154.97	74.77							94.5
DA-OFFSITE	0.011	0.50%	100	1.99	U	0.50%	2336	34.13	0.013	0.50%	1793	18	18	3.69	39.8
EX-DA-2	0.15	0.56%	100	15.37	U	0.34%	3712.93	65.78	0.026	1.58%	2631.64	200	60	2.72	83.9
EX-DA-3	0.15	0.36%	100	18.34	U	0.76%	1684.2	19.96							38.3

**RESULTS TABLE - EXISTING CONDITIONS**

SUB-BASIN	AREA (AC.)	% IC	CN	Q <sub>10</sub> (CFS)	Q <sub>25</sub> (CFS)	Q <sub>100</sub> (CFS)
EX-DA-1 / EX-AP-1	101.79	0	57	59.56	97.12	167.35
DA-OFFSITE	69.84	28	71	127.94	181.31	273.3
EX-DA-2	193.08	0	60	140.32	219.91	366.23
EX-DA-3	50.91	0	52	36.56	64.3	117.99
EX-AP-2				257.24	395.87	648.66

**NOTES:**

- SCS WAS USED AS DRAINAGE CALCULATION METHOD
- RAINFALL INTENSITIES DATA FOR DESIGN STORMS WERE PROVIDED BY BASTROP COUNTY'S CODE OF ORDINANCES (10.1.40 & 10.5.90)
- CN'S ARE BASED ON EXISTING TYPE A & B SOILS AND REFLECT VALUES PER THE USDA WEB SOIL SURVEY
- TOC CALCULATIONS ARE BASED ON ASSUMED EXISTING CONDITIONS & TR-55
- MANNING'S N VALUES FROM TR-55:
  - PIPE/CHANNEL FLOW
    - PIPES - REINFORCED CONCRETE = 0.013
    - NATURAL CHANNELS - EARTH, STRAIGHT, SOME GRASS = 0.026
  - OVERLAND FLOW
    - SMOOTH SURFACE (CONCRETE, ASPHALT, BARE SOIL) = 0.011
    - SHORT GRASS = 0.015
- OFFSITE IMPERVIOUS COVERS ARE APPROXIMATE BASED ON AERIAL IMAGERY

**BRENDAN P. MCENTEE**  
LICENSED PROFESSIONAL ENGINEER  
STATE OF TEXAS  
95200

DESIGNED BY: *Brendan P. McEntee* DATE: 05/15/2018  
DRAFTER: *BM*

---

DATE: \_\_\_\_\_ REVISION: \_\_\_\_\_

---

Carlson, Brigrance & Doering, Inc.  
FIRM ID #F3791  
5501 West William Cannon Dr. • Suite 100 • Bastrop, Texas 78749  
Phone No. (512) 280-5160 • Fax No. (512) 280-5165

---

**EXISTING DRAINAGE AREA MAP**

**BASTROP GROVE**

**DRAINAGE IMPROVEMENTS**

---

SHEET NAME: \_\_\_\_\_  
JOB NAME: \_\_\_\_\_  
PROJECT: \_\_\_\_\_

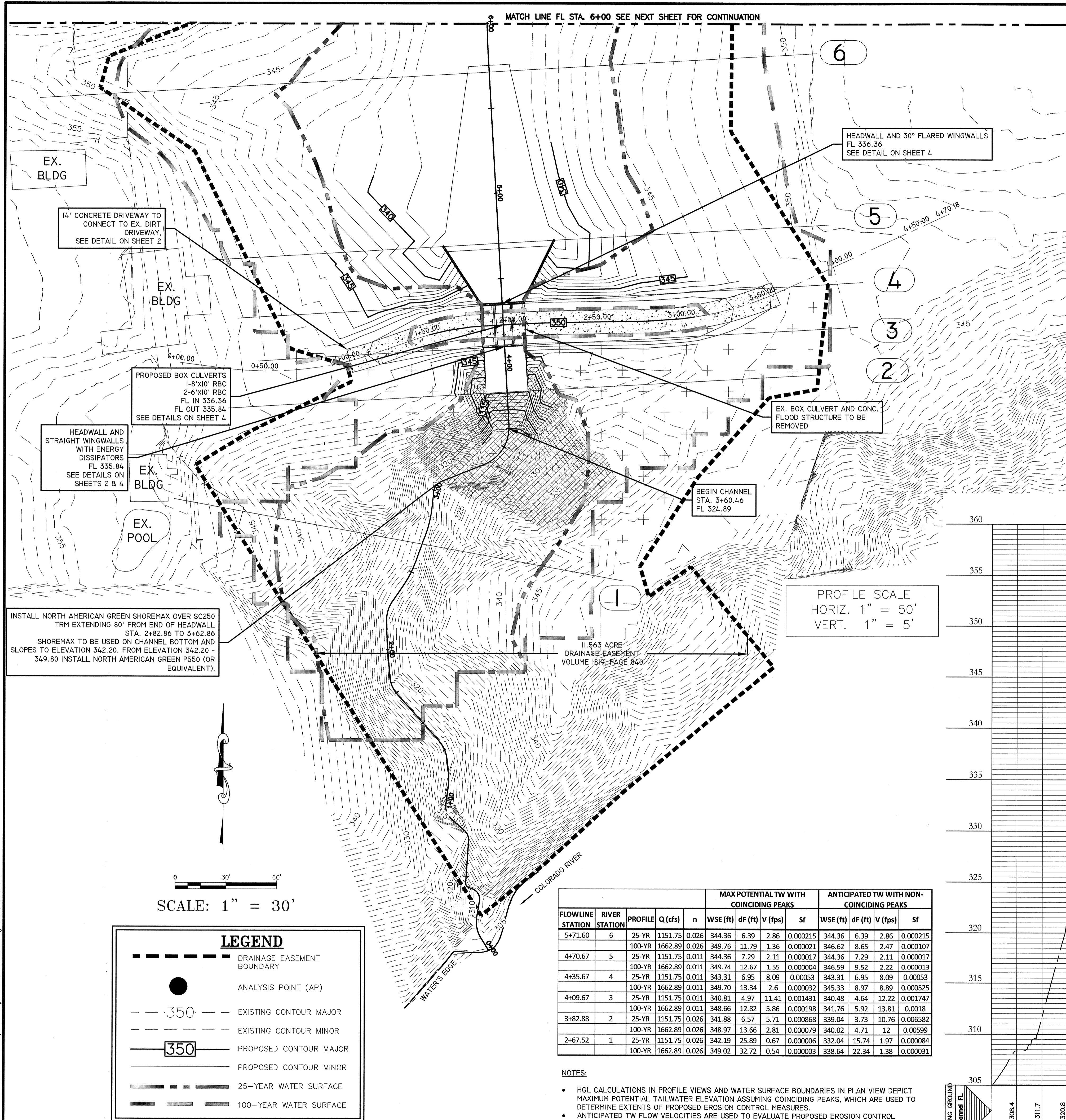
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DATE: **APRIL 2018**  
JOB NUMBER: 4697  
SHEET: 6 OF 14  
SHEET NO. **6**

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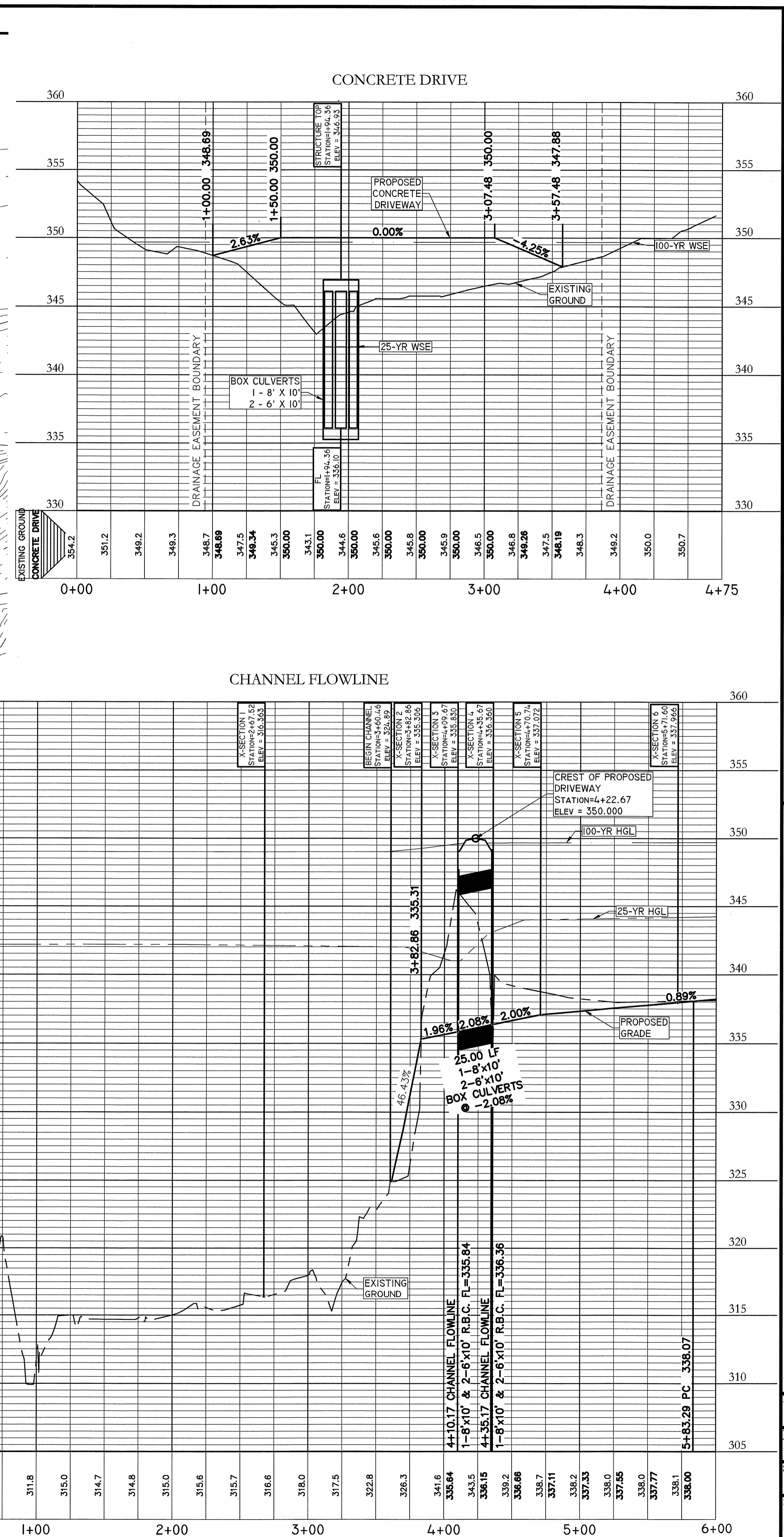


SCALE: 1" = 30'

LEGEND	
	DRAINAGE EASEMENT BOUNDARY
	ANALYSIS POINT (AP)
	EXISTING CONTOUR MAJOR
	EXISTING CONTOUR MINOR
	PROPOSED CONTOUR MAJOR
	PROPOSED CONTOUR MINOR
	25-YEAR WATER SURFACE
	100-YEAR WATER SURFACE

FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
5+71.60	6	25-YR	1151.75	0.026	344.36	6.39	2.86	0.000215	344.36	6.39	2.86	0.000215
		100-YR	1662.89	0.026	349.76	11.79	1.36	0.000021	346.62	8.65	2.47	0.000107
4+70.67	5	25-YR	1151.75	0.011	344.36	7.29	2.11	0.000017	344.36	7.29	2.11	0.000017
		100-YR	1662.89	0.011	349.74	12.67	1.55	0.000004	346.59	9.52	2.22	0.000013
4+35.67	4	25-YR	1151.75	0.011	343.31	6.95	8.09	0.00053	343.31	6.95	8.09	0.00053
		100-YR	1662.89	0.011	349.70	13.34	2.6	0.000032	345.33	8.97	8.89	0.000525
4+09.67	3	25-YR	1151.75	0.011	340.81	4.97	11.41	0.001431	340.48	4.64	12.22	0.001747
		100-YR	1662.89	0.011	348.66	12.82	5.86	0.000198	341.76	5.92	13.81	0.0018
3+82.88	2	25-YR	1151.75	0.026	341.88	6.57	5.71	0.000868	339.04	3.73	10.76	0.006582
		100-YR	1662.89	0.026	348.97	13.66	2.81	0.000079	340.02	4.71	12	0.00599
2+67.52	1	25-YR	1151.75	0.026	342.19	25.89	0.67	0.000006	332.04	15.74	1.97	0.000084
		100-YR	1662.89	0.026	349.02	32.72	0.54	0.000003	338.64	22.34	1.38	0.000031

NOTES:  
 • HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.  
 • ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.



PROFILE SCALE  
 HORIZ. 1" = 50'  
 VERT. 1" = 5'

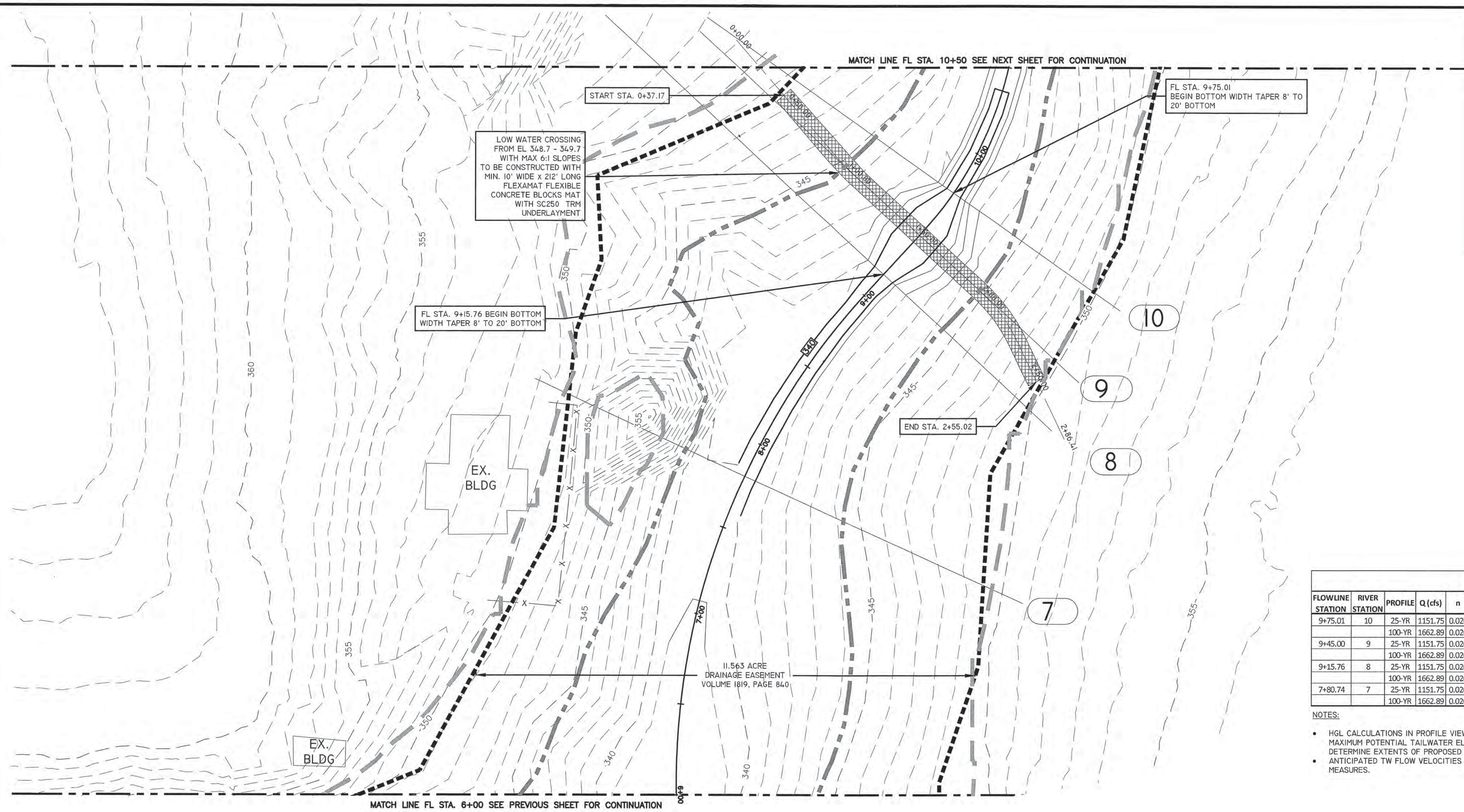
DESIGNED BY: BM  
 DRAFTED BY: IW

**Carlson, Briggance & Doering, Inc.**  
 FIRM ID: #F9791  
 Civil Engineering  
 5801 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

**CHANNEL - STA. 0+00 TO 6+00**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:  
 DATE: **APRIL 2018**  
 JOB NUMBER: **4697**  
 SHEET: **8 OF 14**  
 SHEET NO.: **8**

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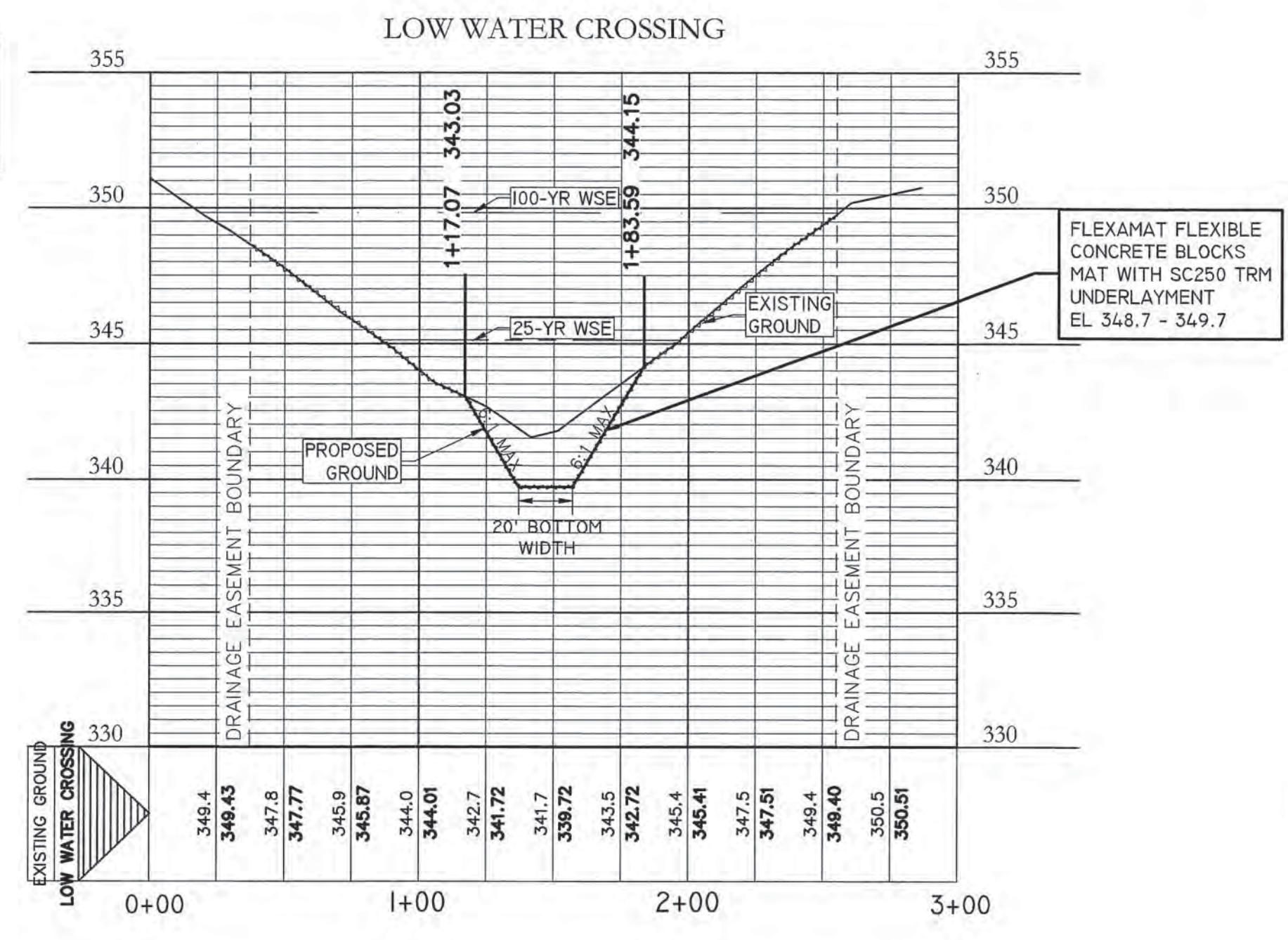
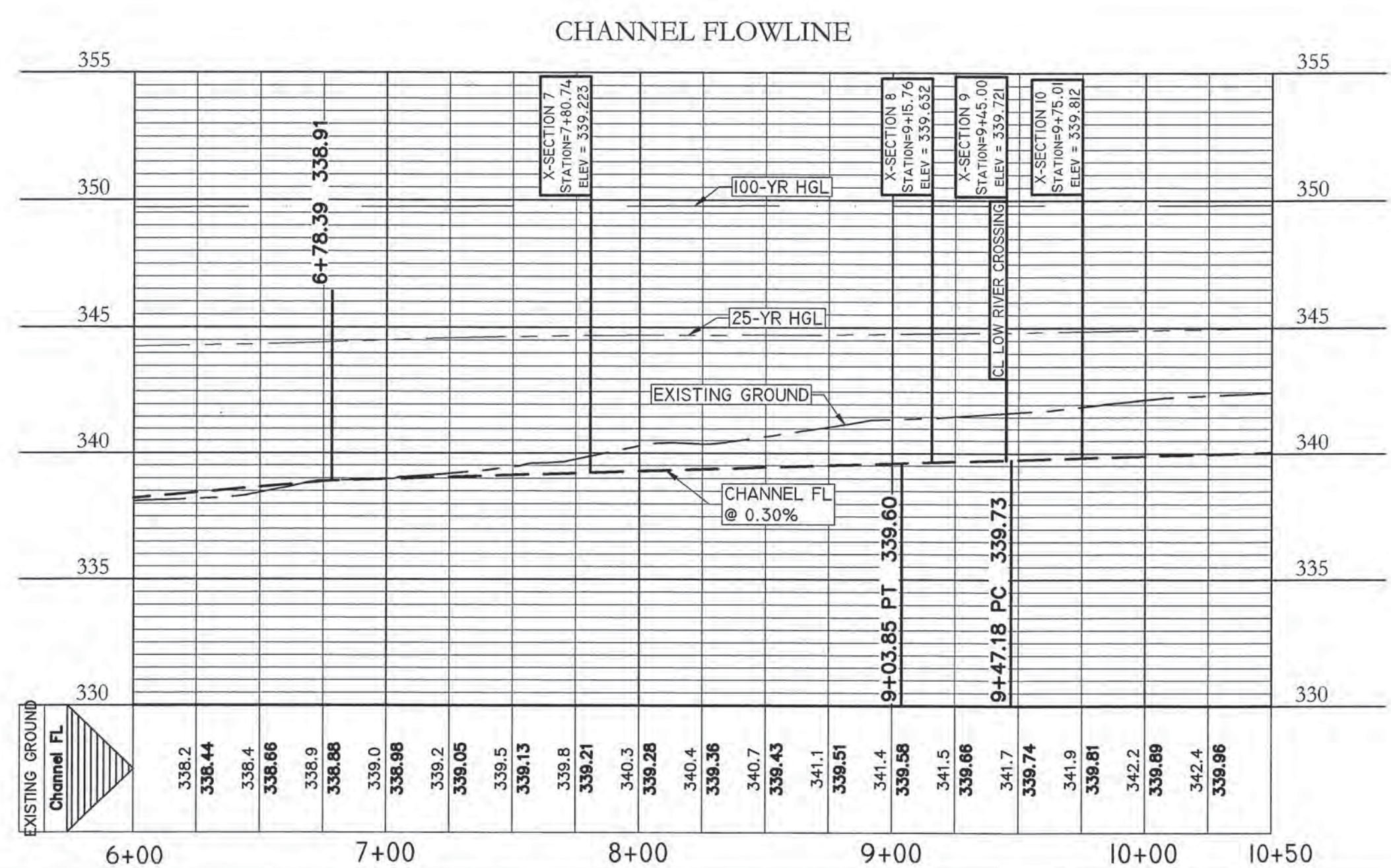
### LEGEND

- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE

FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
9+75.01	10	25-YR	1151.75	0.026	344.75	4.94	9.18	0.004232	344.75	4.94	9.18	0.004232
		100-YR	1662.89	0.026	349.75	9.94	3.11	0.000166	346.54	6.73	6.94	0.001482
9+45.00	9	25-YR	1151.75	0.026	344.84	5.12	4.55	0.001111	344.84	5.12	4.55	0.001111
		100-YR	1662.89	0.026	349.76	10.04	2.16	0.000081	346.70	6.98	3.99	0.000497
9+15.76	8	25-YR	1151.75	0.026	344.35	4.72	7.99	0.002899	344.35	4.72	7.99	0.002899
		100-YR	1662.89	0.026	349.77	10.14	2.63	0.000106	346.63	7.00	5.43	0.000759
7+80.74	7	25-YR	1151.75	0.026	344.22	5.00	7.39	0.002116	344.22	5.00	7.39	0.002116
		100-YR	1662.89	0.026	349.74	10.52	2.89	0.000117	346.55	7.33	5.45	0.00068

NOTES:

- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
- ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.



**BRENDAN P. MCENTEE**  
LICENSED PROFESSIONAL ENGINEER  
96200

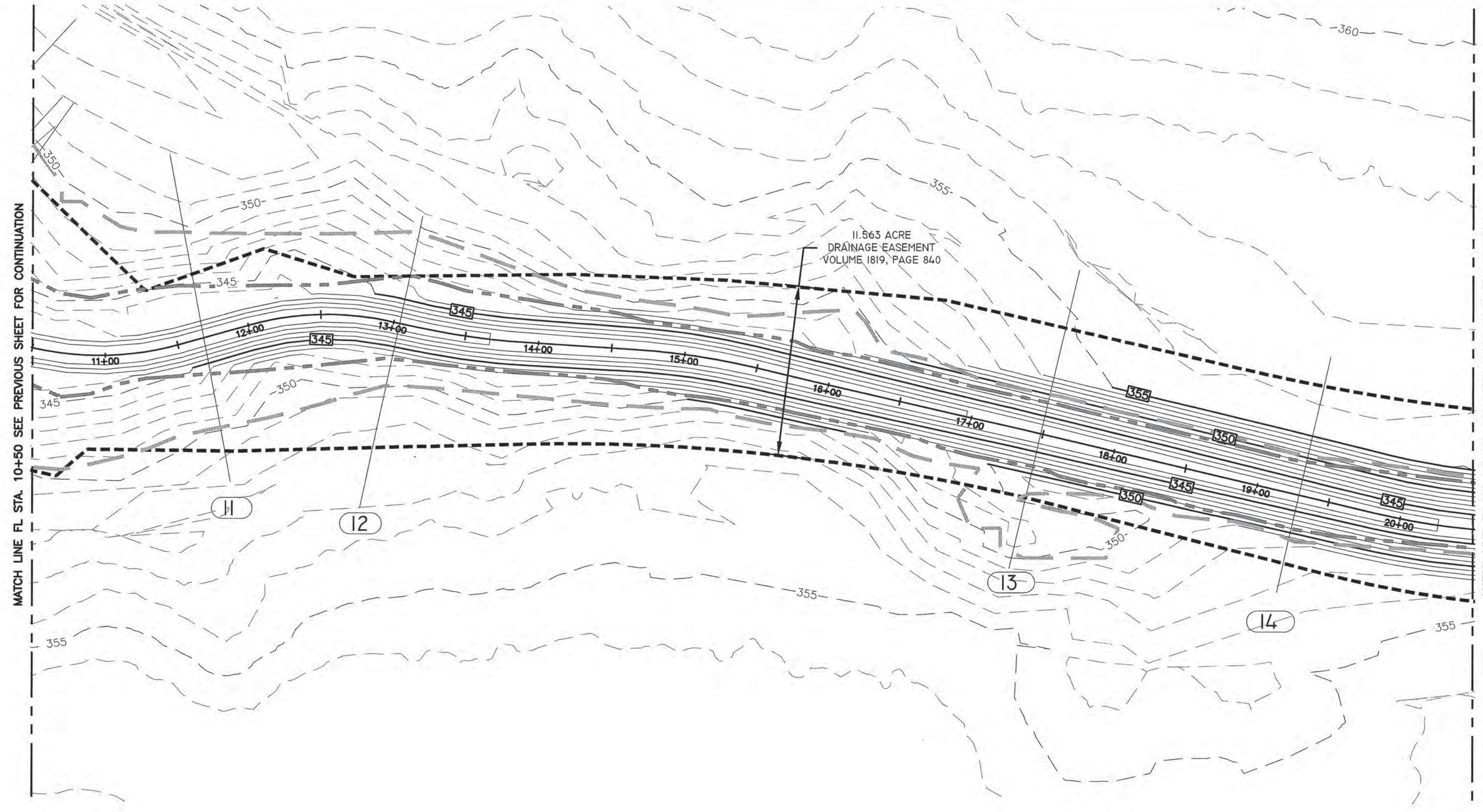
CARLSON, BRIGANCE & DOERING, INC.  
107 F 3791  
*Brendan P. McEntee*  
05/15/2018

DESIGNED BY: BM	DRAFTED BY: JW
DATE:	
REVISION:	

**Carlson, Brigrance & Doering, Inc.**  
FIRM ID #F3791  
Civil Engineering  
6501 West Loop, Suite 200  
Houston, Texas 77049  
Phone No. (813) 286-5160 Fax No. (813) 286-5165

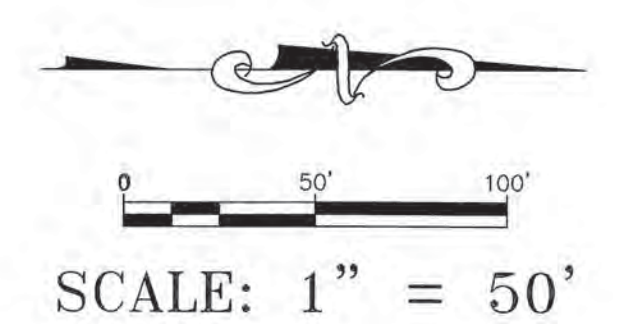
**CHANNEL - STA. 6+00 TO 10+50**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:	DATE:
JOB NAME:	APRIL 2018
PROJECT:	JOB NUMBER:
	4697
	SHEET:
	9 OF 14
	SHEET NO.:
	9



**LEGEND**

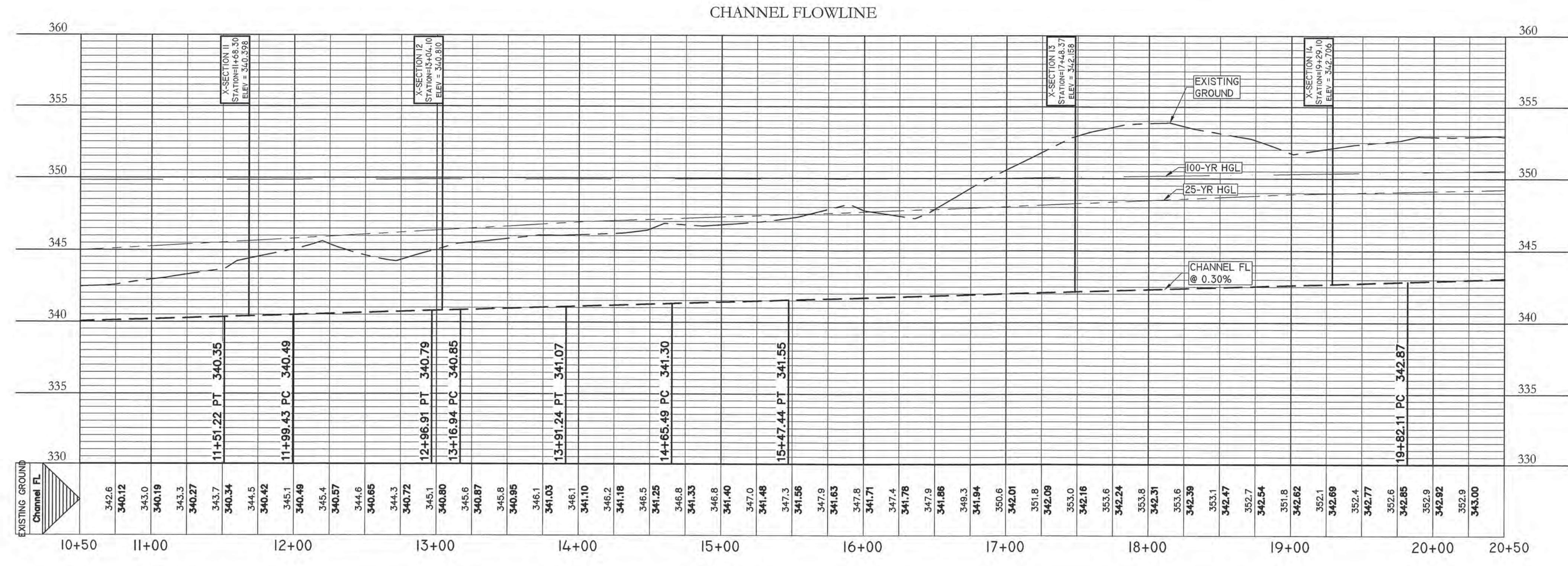
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- ANALYSIS POINT (AP)
- - - 350 - - - EXISTING CONTOUR MAJOR
- - - EXISTING CONTOUR MINOR
- 350 PROPOSED CONTOUR MAJOR
- - - PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE



FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
19+29.1	14	25-YR	868.31	0.026	349.06	6.35	5.05	0.001429	349.06	6.35	5.05	0.001429
		100-YR	1234.19	0.026	350.55	7.84	4.99	0.001095	350.18	7.47	5.43	0.001371
17+48.37	13	25-YR	1151.75	0.026	348.21	6.05	7.26	0.003155	348.21	6.05	7.26	0.003155
		100-YR	1662.89	0.026	350.09	7.93	6.28	0.001586	349.23	7.07	7.96	0.003064
13+04.1	12	25-YR	1151.75	0.026	346.61	5.80	7.44	0.004251	346.61	5.80	7.44	0.004251
		100-YR	1662.89	0.026	349.70	8.89	4.78	0.000681	347.22	6.41	8.83	0.004786
11+68.3	11	25-YR	1151.75	0.026	345.46	5.06	9.46	0.005489	345.46	5.06	9.46	0.005489
		100-YR	1662.89	0.026	349.71	9.31	4.44	0.000416	346.47	6.07	9.83	0.004214

- NOTES:
- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
  - ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

PROFILE SCALE  
 HORIZ. 1" = 50'  
 VERT. 1" = 5'



BRENDAN P. McENTEE  
 96200  
 LICENSED PROFESSIONAL ENGINEER  
 CARLSON, BRIGANCE & DOERING, INC.  
 ID# 13791  
*Brendan P. McEntee*  
 05/15/2018

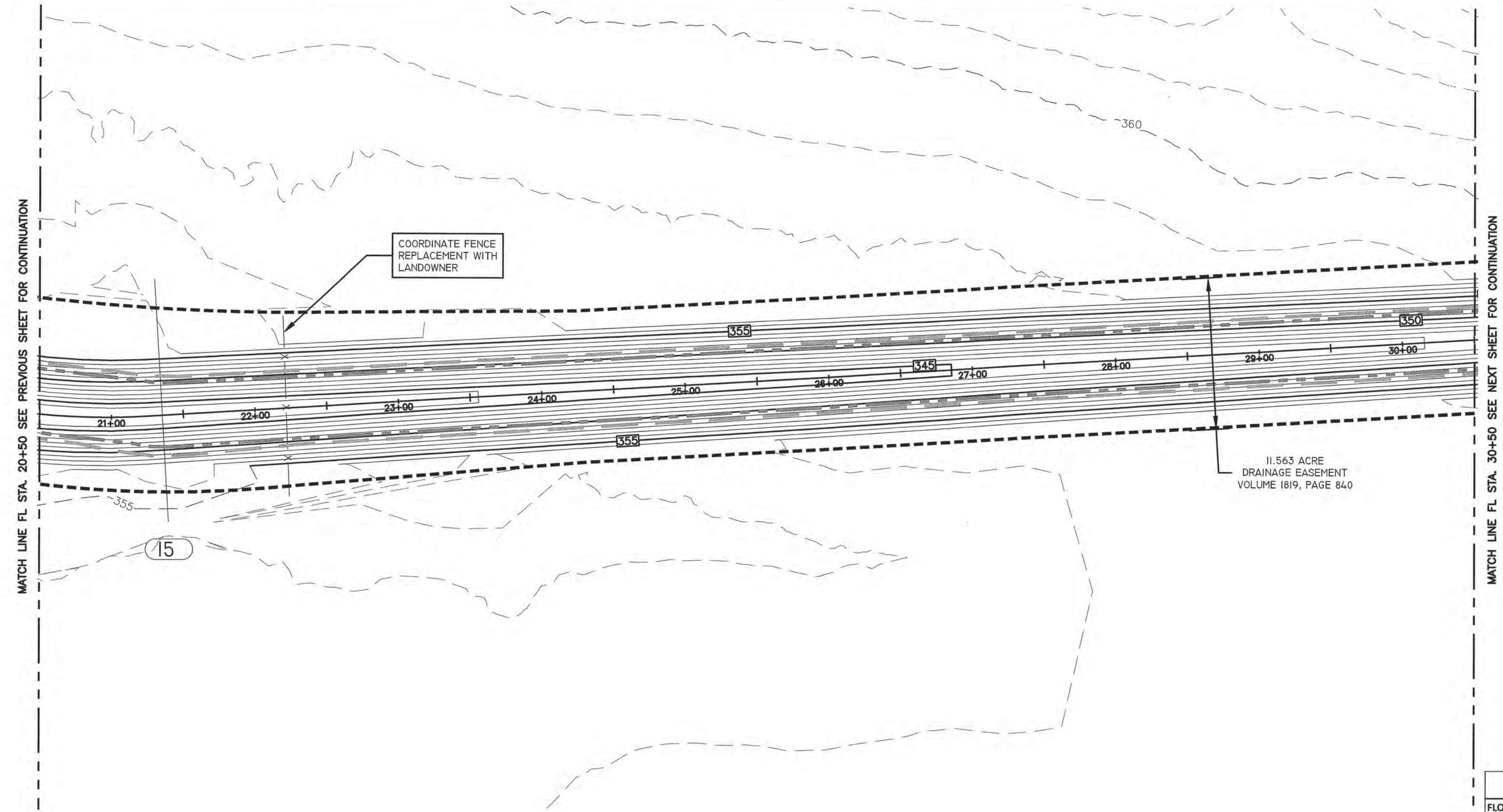
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DATE:	DATE:
REVISION:	REVISION:

**Carlson, Brigrance & Doering, Inc.**  
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 5501 Westpark Center Dr.  
 Houston, Texas 78249  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

**CHANNEL - STA. 10+50 TO 20+50**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

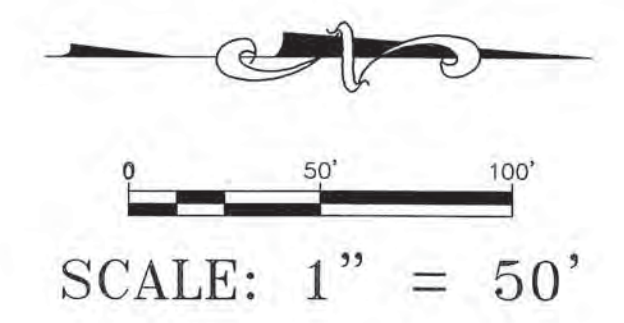
SHEET NAME:	DATE:
JOB NAME:	APRIL 2018
PROJECT:	JOB NUMBER:
	4697
	SHEET
	10 OF 14
	SHEET NO.
	10

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### LEGEND

- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE

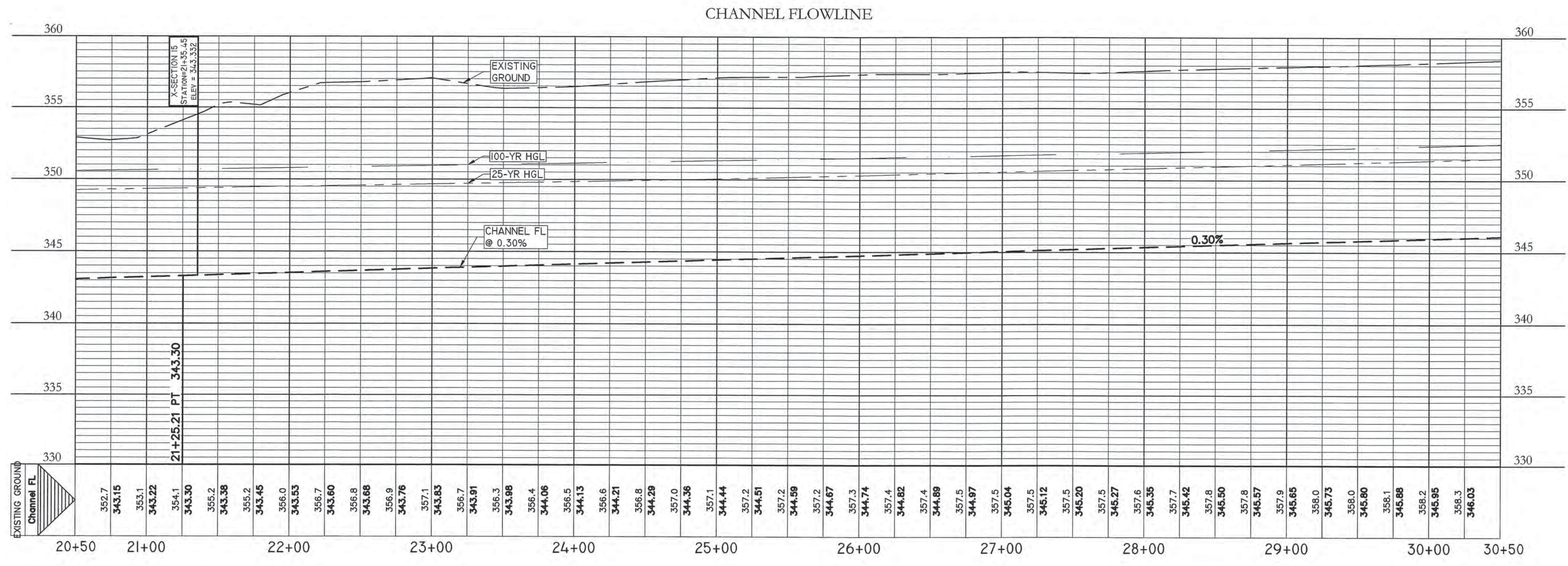


PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'

FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
21+35.45	15	25-YR	868.31	0.026	349.34	6.01	5.56	0.001849	349.34	6.01	5.56	0.001849
		100-YR	1234.19	0.026	350.75	7.42	5.5	0.001418	350.43	7.10	5.93	0.001734

NOTES:

- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
- ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.



BRENDAN P. MCENTEE  
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STATE OF TEXAS

CARLSON, BRIGANCE & DOERING, INC.  
D# 13791

*Brendan P. McEntee*  
05/15/2018

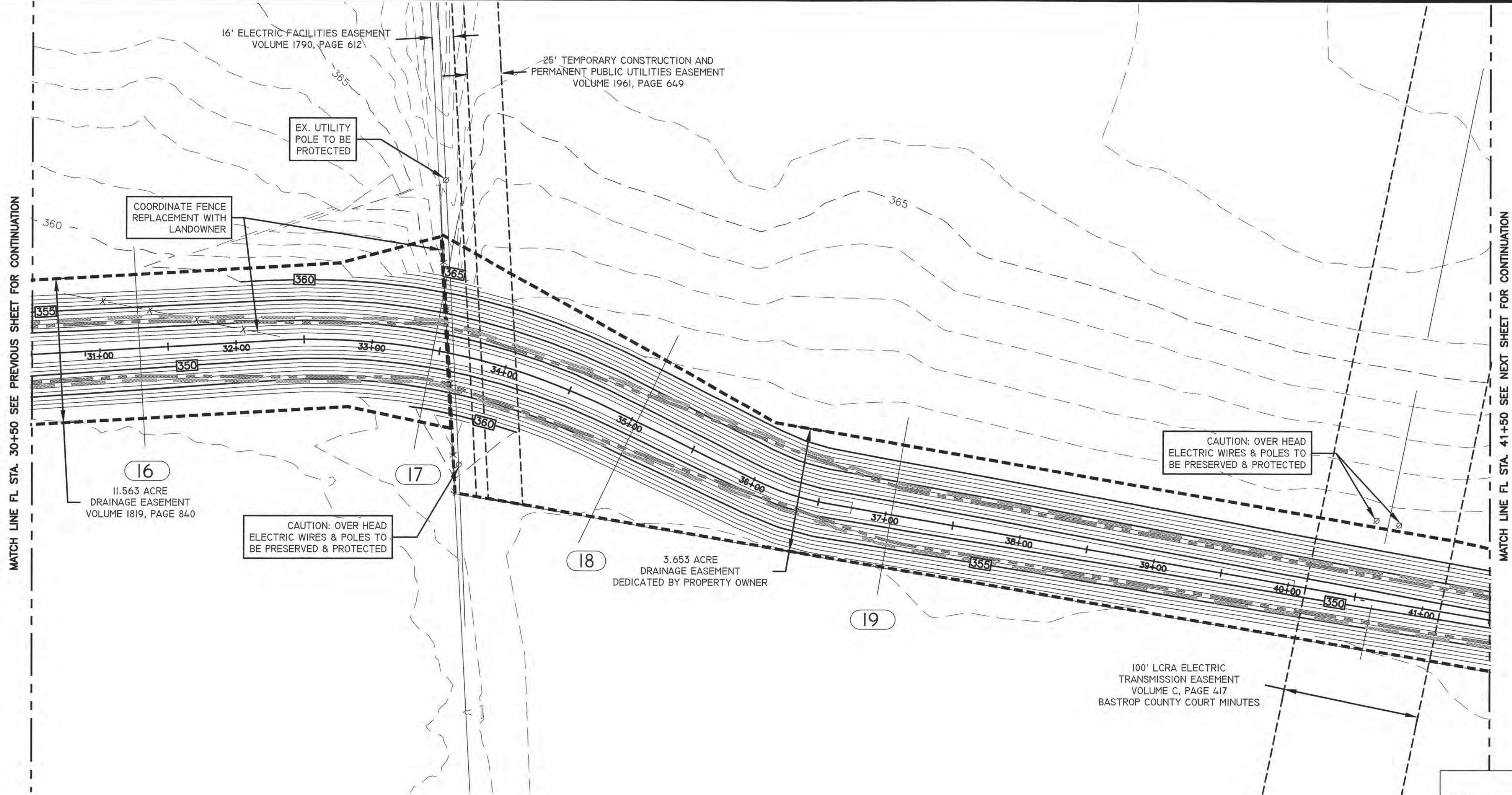
DESIGNED BY: BM	DRAWN BY: TW
DATE	
REVISION	

Carlson, Brigrance & Doering, Inc.  
FIRM ID #F7791  
Civil Engineering & Surveying  
5501 West Loop South, Suite 1000, Houston, Texas 77049  
Phone Nos. (813) 280-5160 • Fax No. (813) 280-5165

SHEET NAME: <b>CHANNEL - STA. 20+50 TO 30+50</b>
JOB NAME: <b>BASTROP GROVE</b>
PROJECT: <b>DRAINAGE IMPROVEMENTS</b>
DATE <b>APRIL 2018</b>
JOB NUMBER <b>4697</b>
SHEET <b>11 OF 14</b>
SHEET NO. <b>11</b>

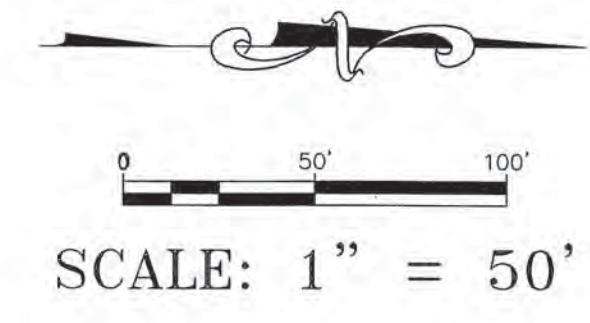


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### LEGEND

- DRAINAGE EASEMENT BOUNDARY
- ANALYSIS POINT (AP)
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE

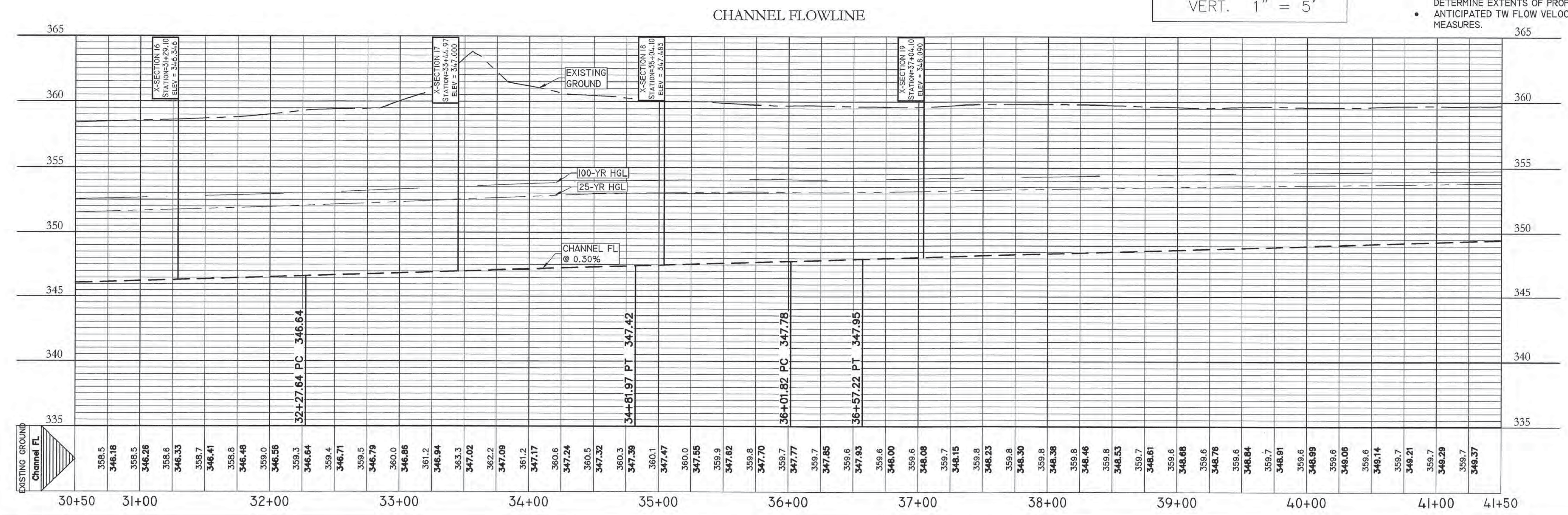


FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
37+04.1	19	25-YR	414.96	0.026	353.33	5.24	3.34	0.000782	353.33	5.24	3.34	0.000782
		100-YR	587.02	0.026	354.36	6.27	3.49	0.000694	354.35	6.26	3.5	0.000698
35+04.1	18	25-YR	414.96	0.026	353.24	5.76	2.85	0.000513	353.24	5.76	2.85	0.000513
		100-YR	587.02	0.026	354.28	6.80	3.04	0.00048	354.27	6.79	3.05	0.000483
33+44.97	17	25-YR	868.31	0.026	352.39	5.39	6.66	0.003008	352.39	5.39	6.66	0.003008
		100-YR	1234.19	0.026	353.34	6.34	7.2	0.002937	353.32	6.32	7.24	0.002981
31+29.1	16	25-YR	868.31	0.026	351.75	5.40	6.65	0.002991	351.75	5.40	6.65	0.002991
		100-YR	1234.19	0.026	352.72	6.37	7.14	0.00285	352.68	6.33	7.22	0.002935

NOTES:

- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
- ANTICIPATED TW FLOW VELOCITIES ARE USED TO EVALUATE PROPOSED EROSION CONTROL MEASURES.

PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'



Carlson, Brigrance & Doering, Inc.  
FIRM ID #P791  
Civil Engineering  
5501 Westport Dr.  
Houston, Texas 78249  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

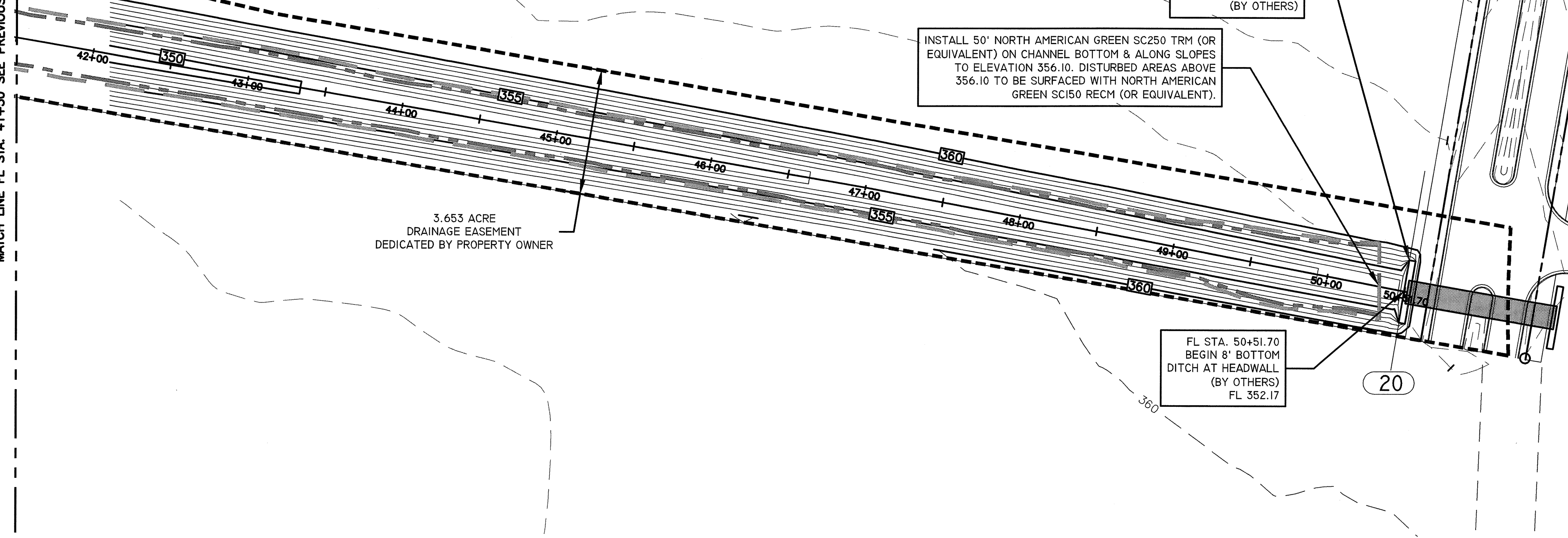
**CHANNEL - STA. 30+50 TO 41+50**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME:  
JOB NAME:  
PROJECT:

DATE: APRIL 2018  
JOB NUMBER: 4697  
SHEET: 12 OF 14  
SHEET NO.: 12

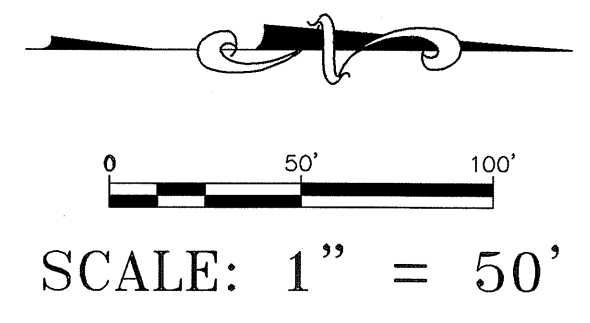
100' LCRA ELECTRIC TRANSMISSION EASEMENT VOLUME C, PAGE 417 BASTROP COUNTY COURT MINUTES

MATCH LINE FL STA. 41+50 SEE PREVIOUS SHEET FOR CONTINUATION



### LEGEND

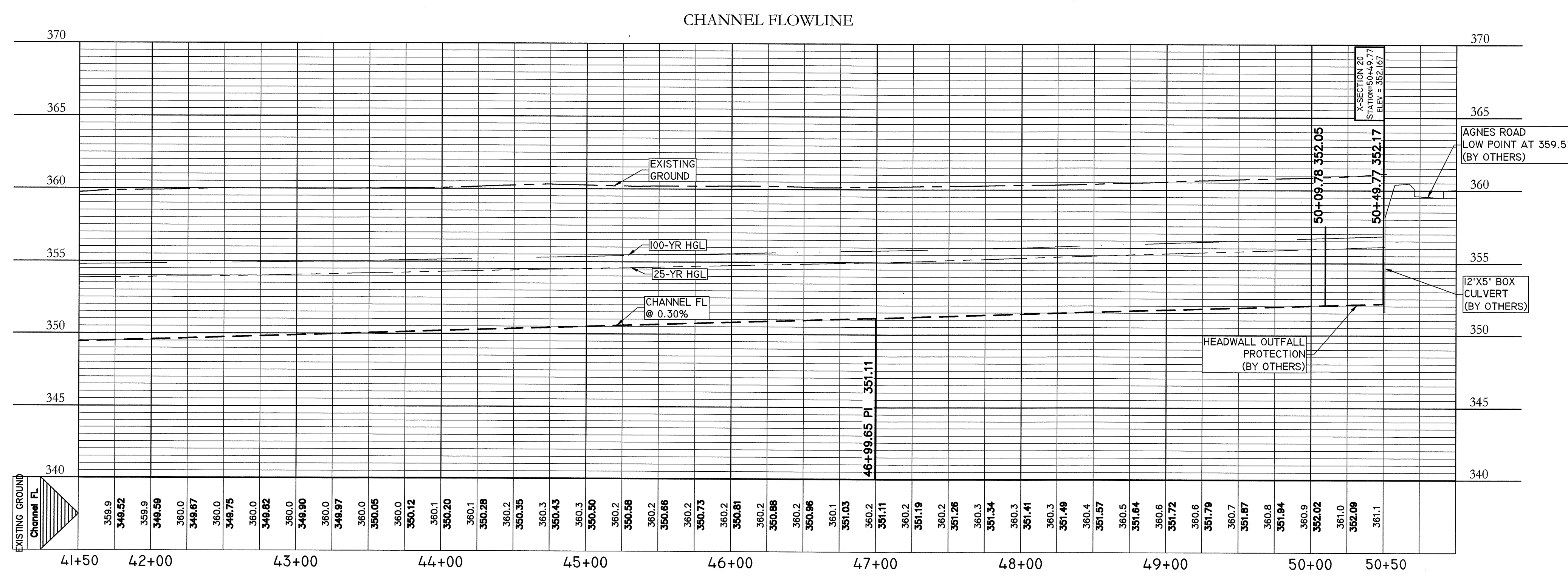
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- ANALYSIS POINT (AP)
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- 25-YEAR WATER SURFACE
- 100-YEAR WATER SURFACE



FLOWLINE STATION	RIVER STATION	PROFILE	Q (cfs)	n	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS			
					WSE (ft)	dF (ft)	V (fps)	Sf	WSE (ft)	dF (ft)	V (fps)	Sf
50+49.7	20	25-YR	414.96	0.026	356.13	3.13	3.31	0.000888	356.13	3.13	3.31	0.000888
		100-YR	587.02	0.026	356.87	3.87	3.79	0.000918	356.87	3.87	3.79	0.000918

- NOTES:
- HGL CALCULATIONS IN PROFILE VIEWS AND WATER SURFACE BOUNDARIES IN PLAN VIEW DEPICT MAXIMUM POTENTIAL TAILWATER ELEVATION ASSUMING COINCIDING PEAKS, WHICH ARE USED TO DETERMINE EXTENTS OF PROPOSED EROSION CONTROL MEASURES.
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PROFILE SCALE  
HORIZ. 1" = 50'  
VERT. 1" = 5'



**BRENDAN P. MENTEE**  
LICENSED PROFESSIONAL ENGINEER  
96200

DESIGNED BY: BM  
DRAWN BY: JW

DATE: \_\_\_\_\_  
REVISION: \_\_\_\_\_

**Carlson, Brigrance & Doering, Inc.**  
FIRM ID: #B7991  
Civil Engineering  
5901 West William Cannon Dr., Austin, Texas 78749  
Phone No. (512) 280-5160 Fax No. (512) 280-5165

SHEET NAME: **CHANNEL - STA. 41+50 TO END**

JOB NAME: **BASTROP GROVE**

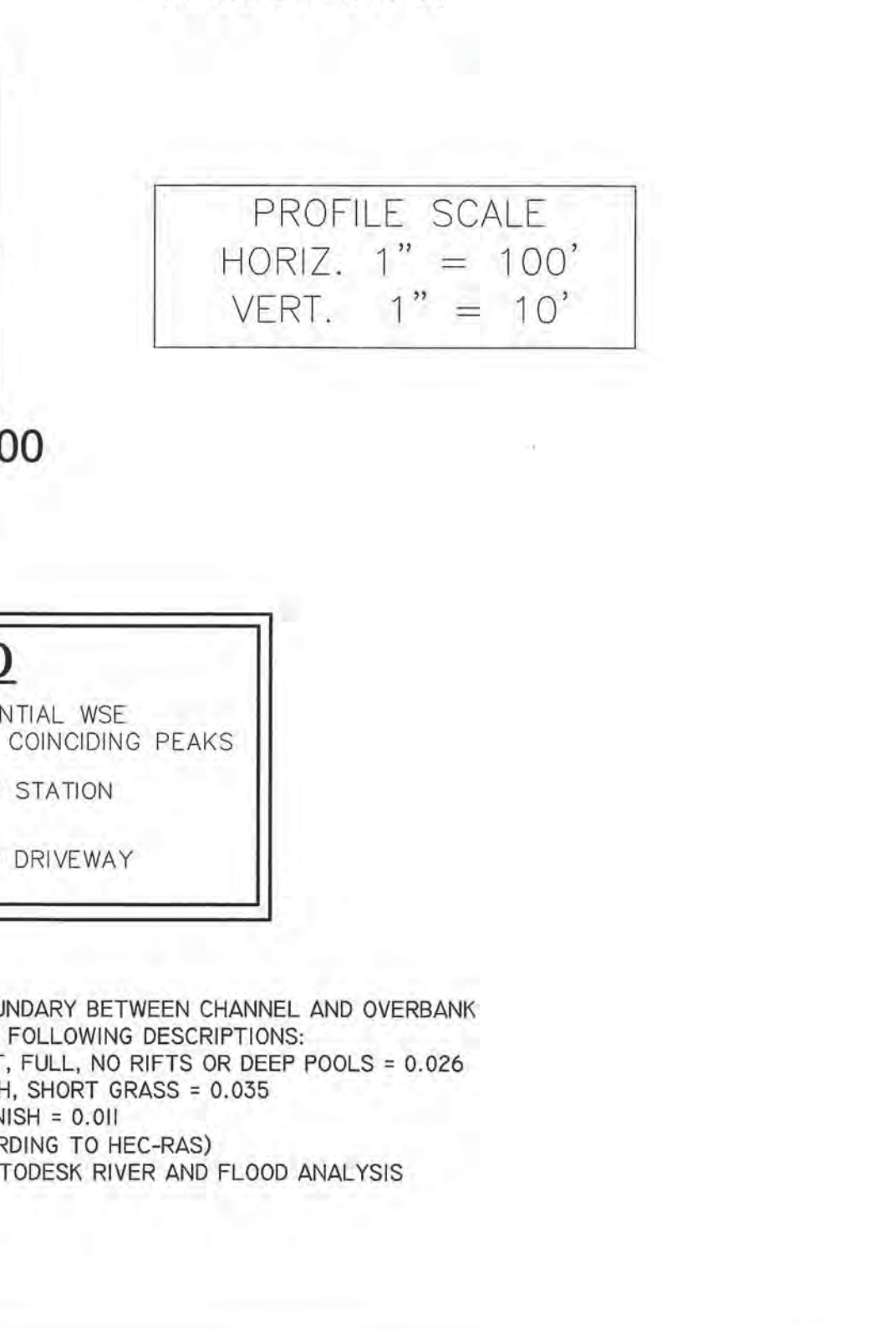
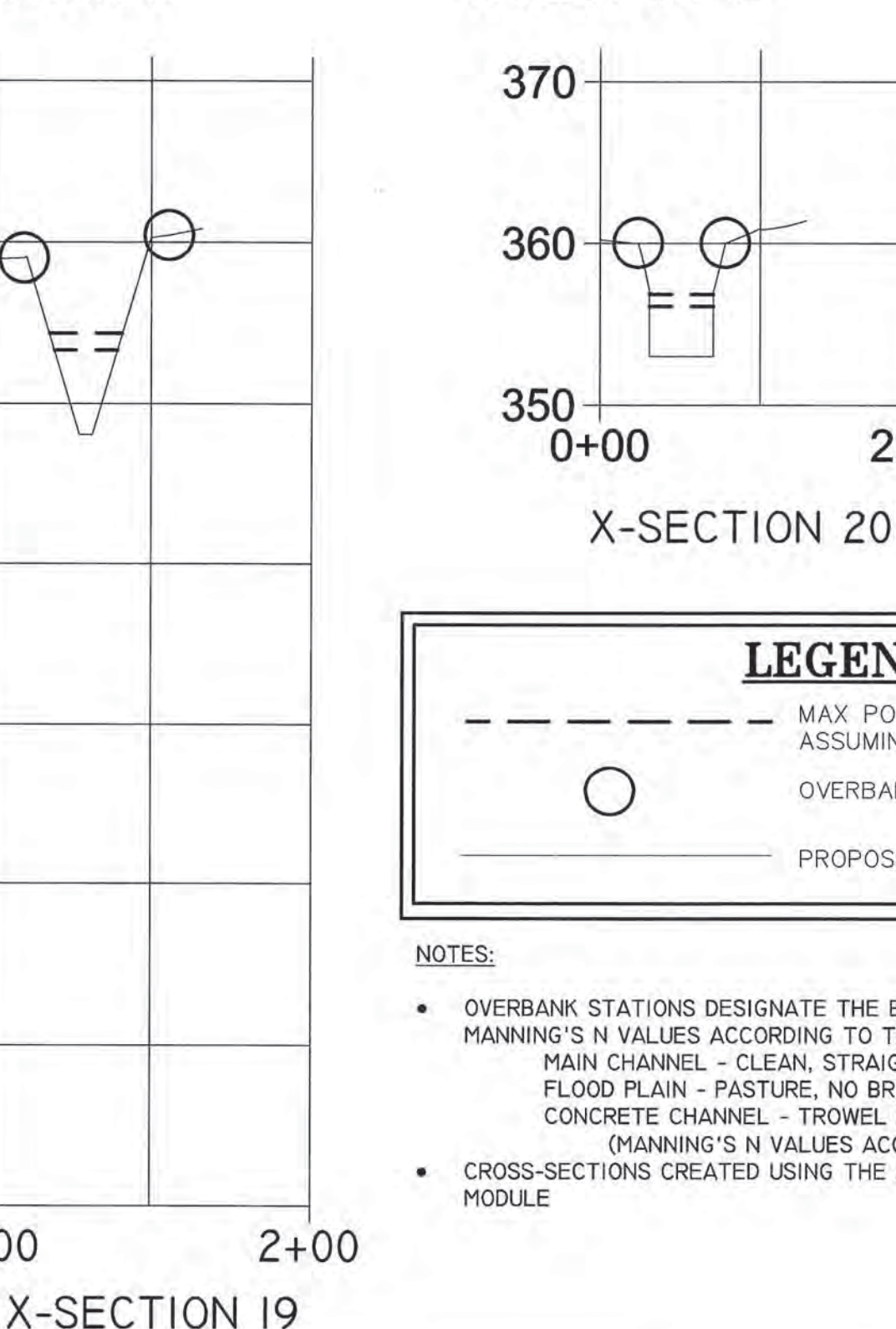
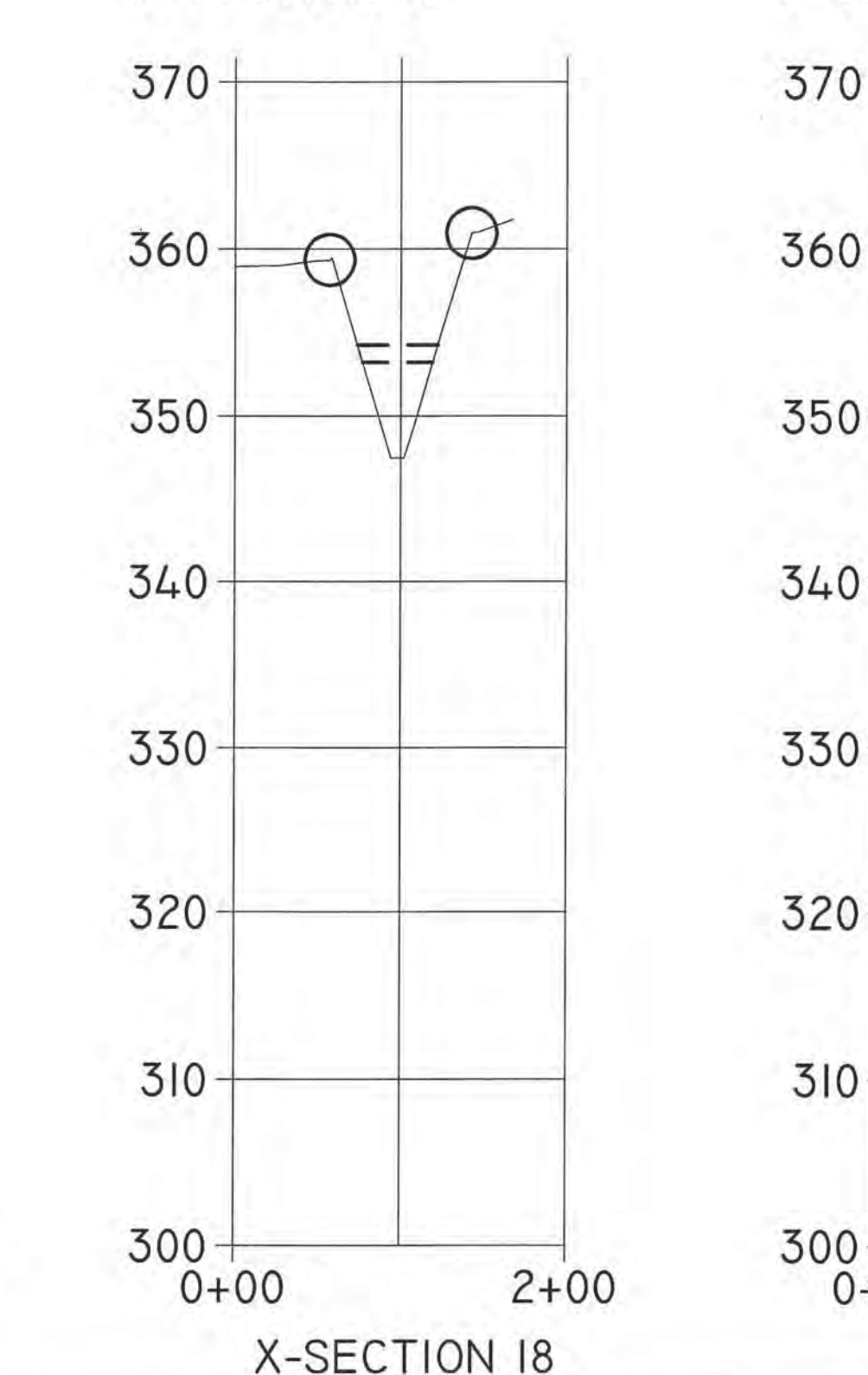
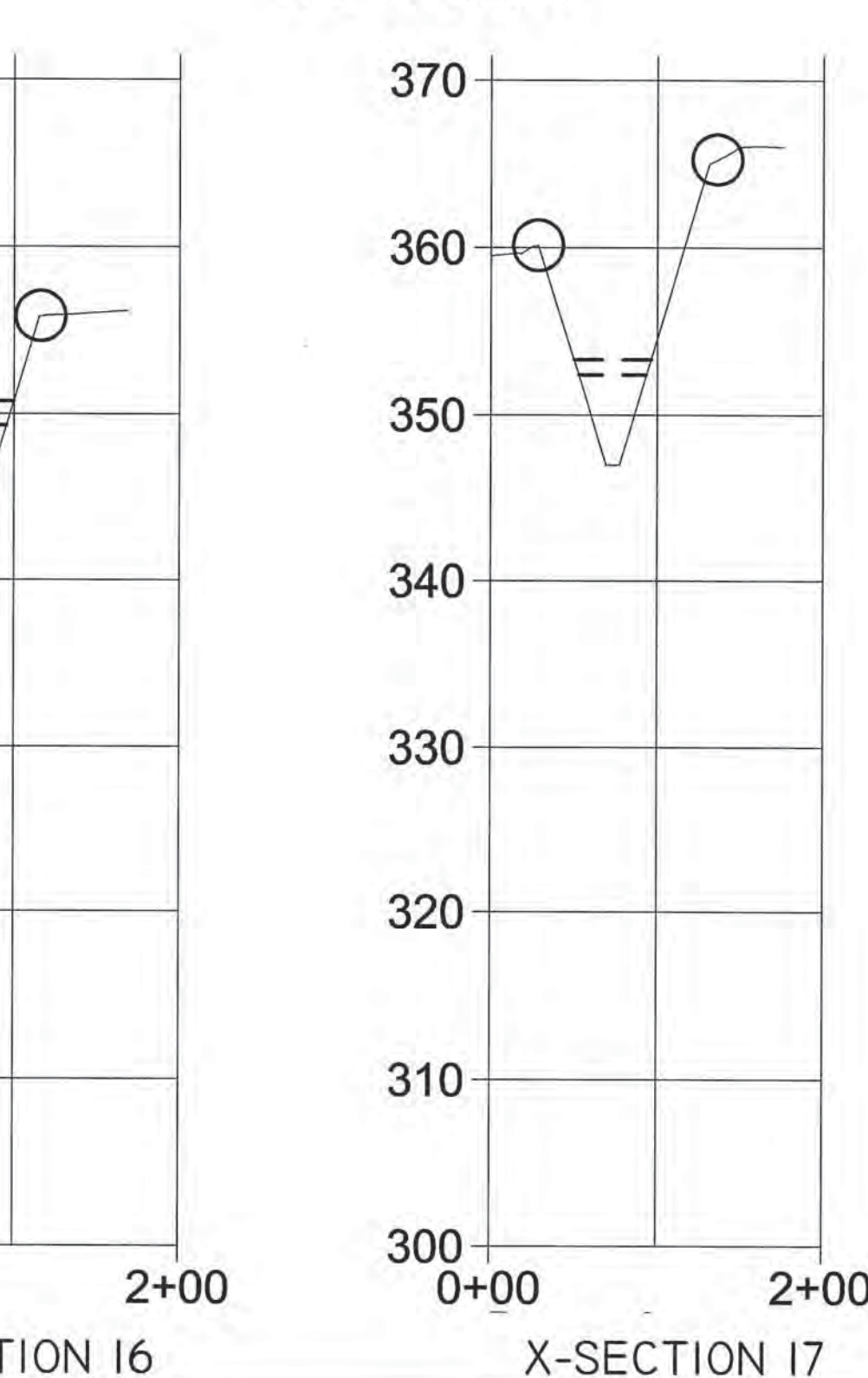
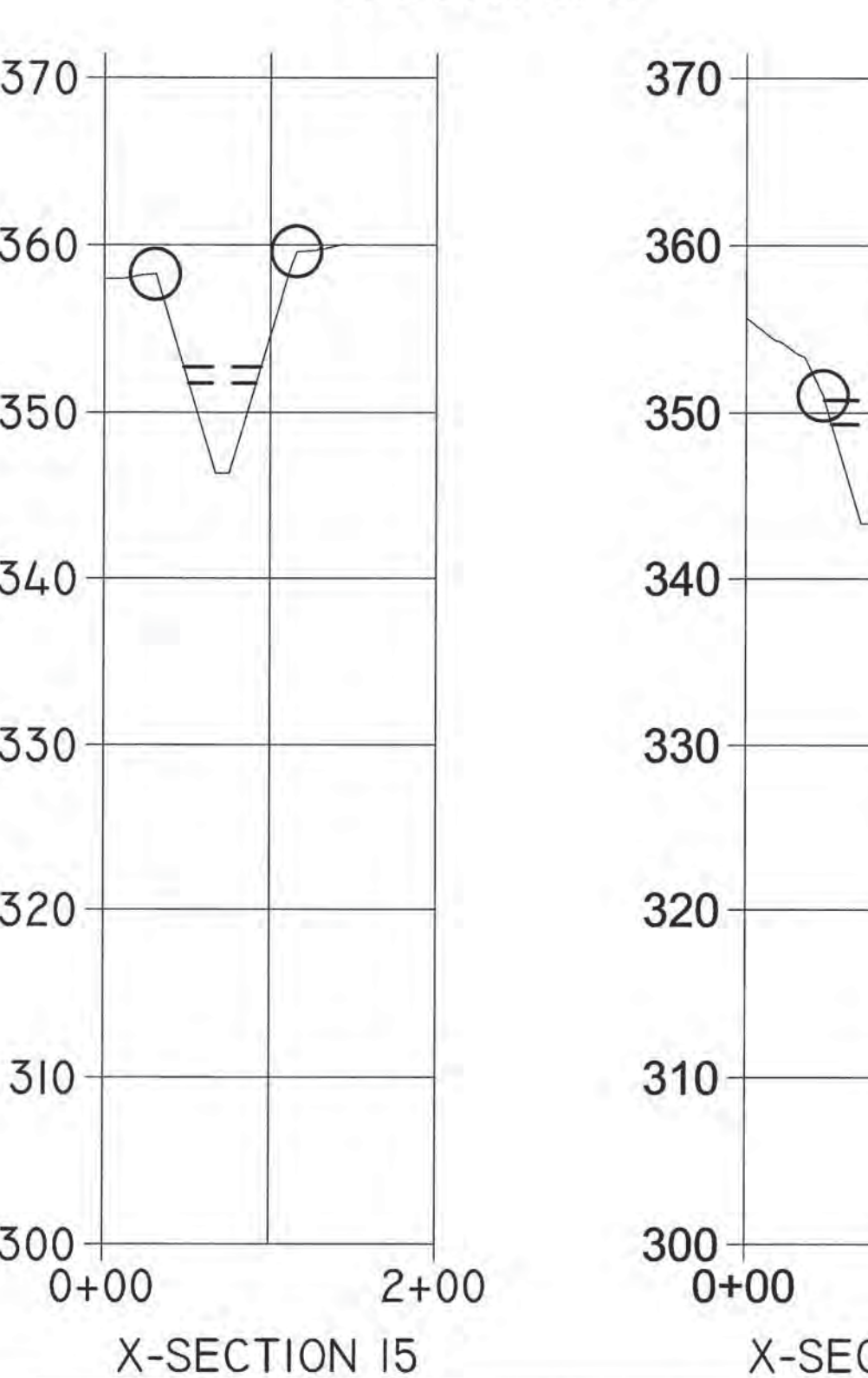
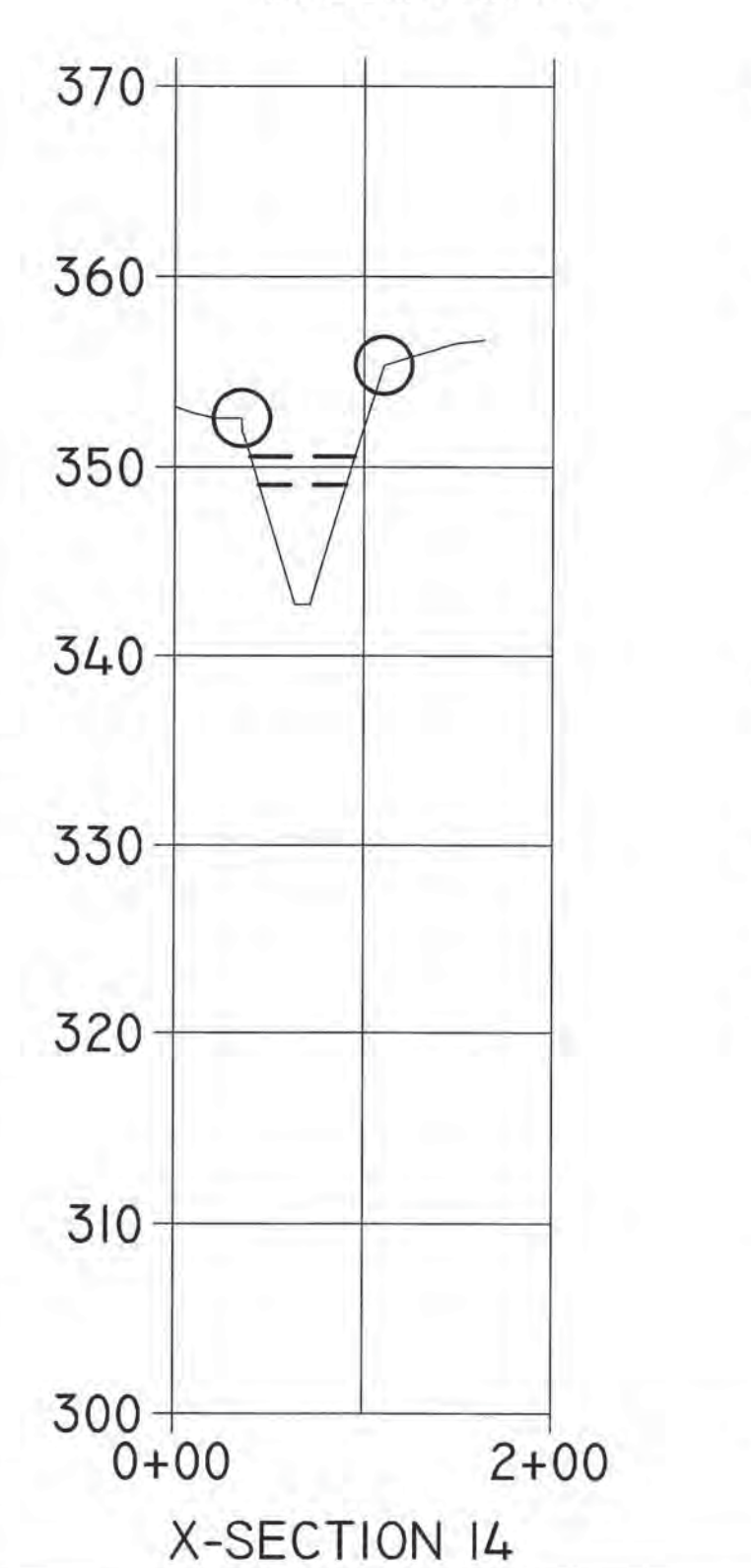
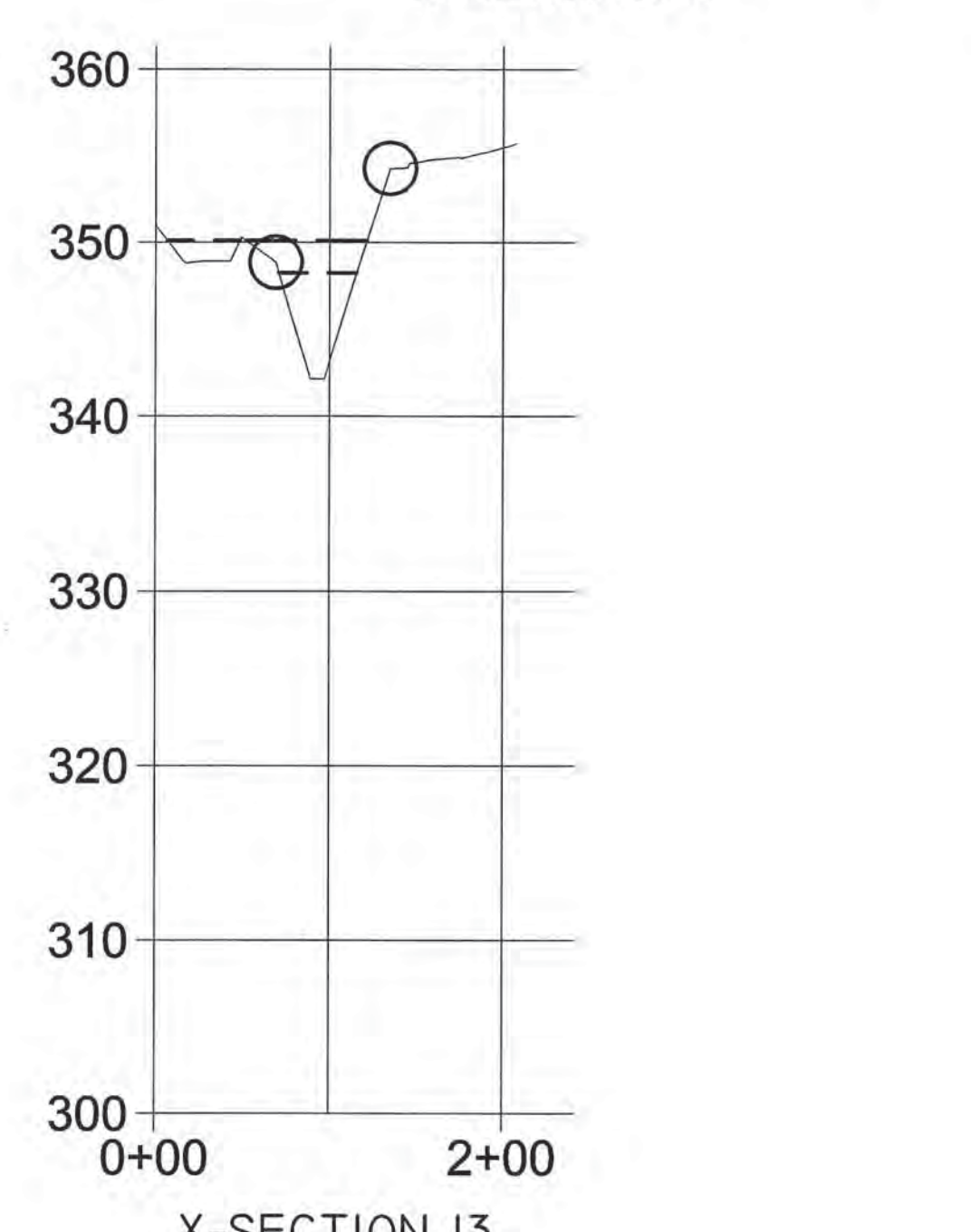
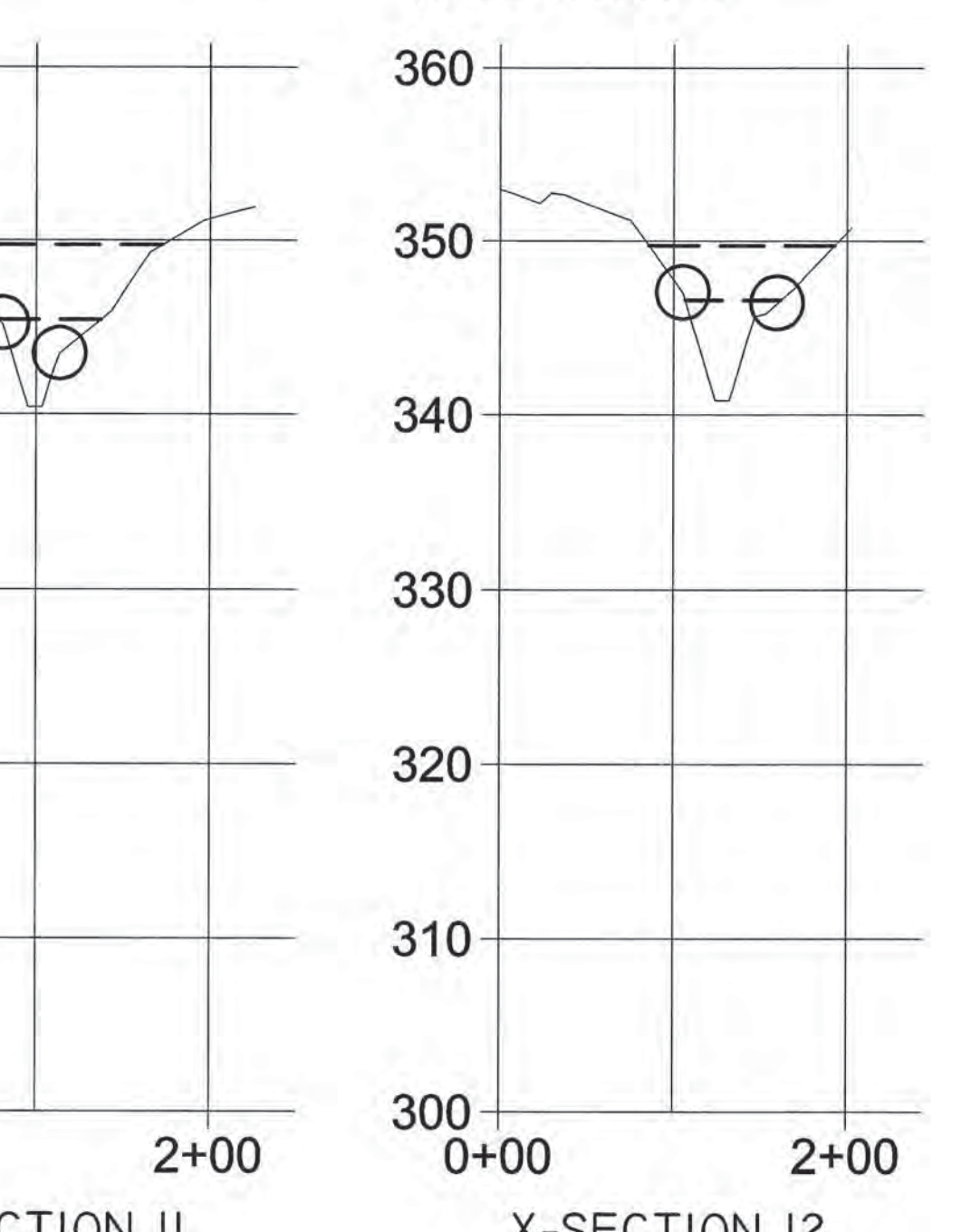
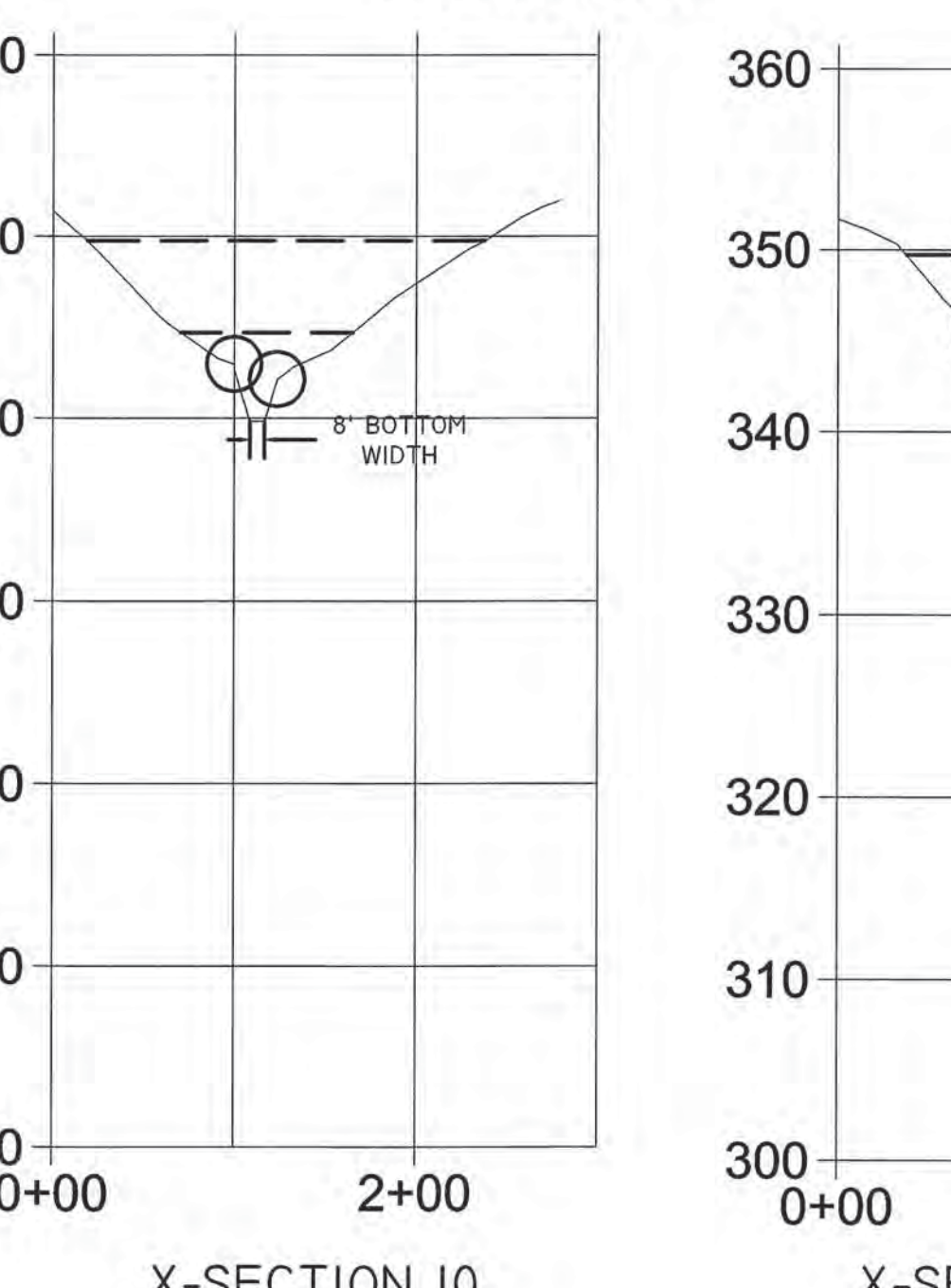
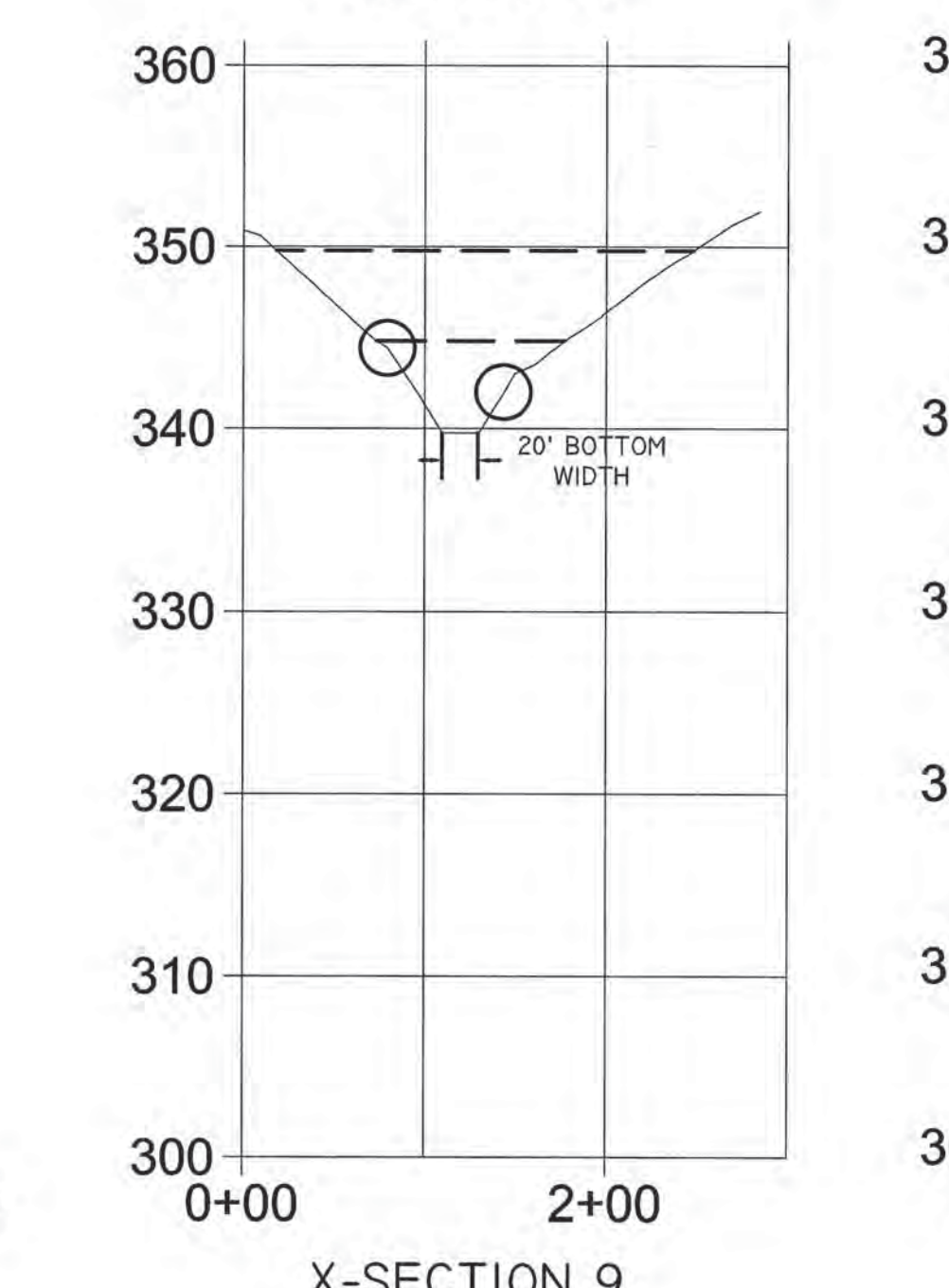
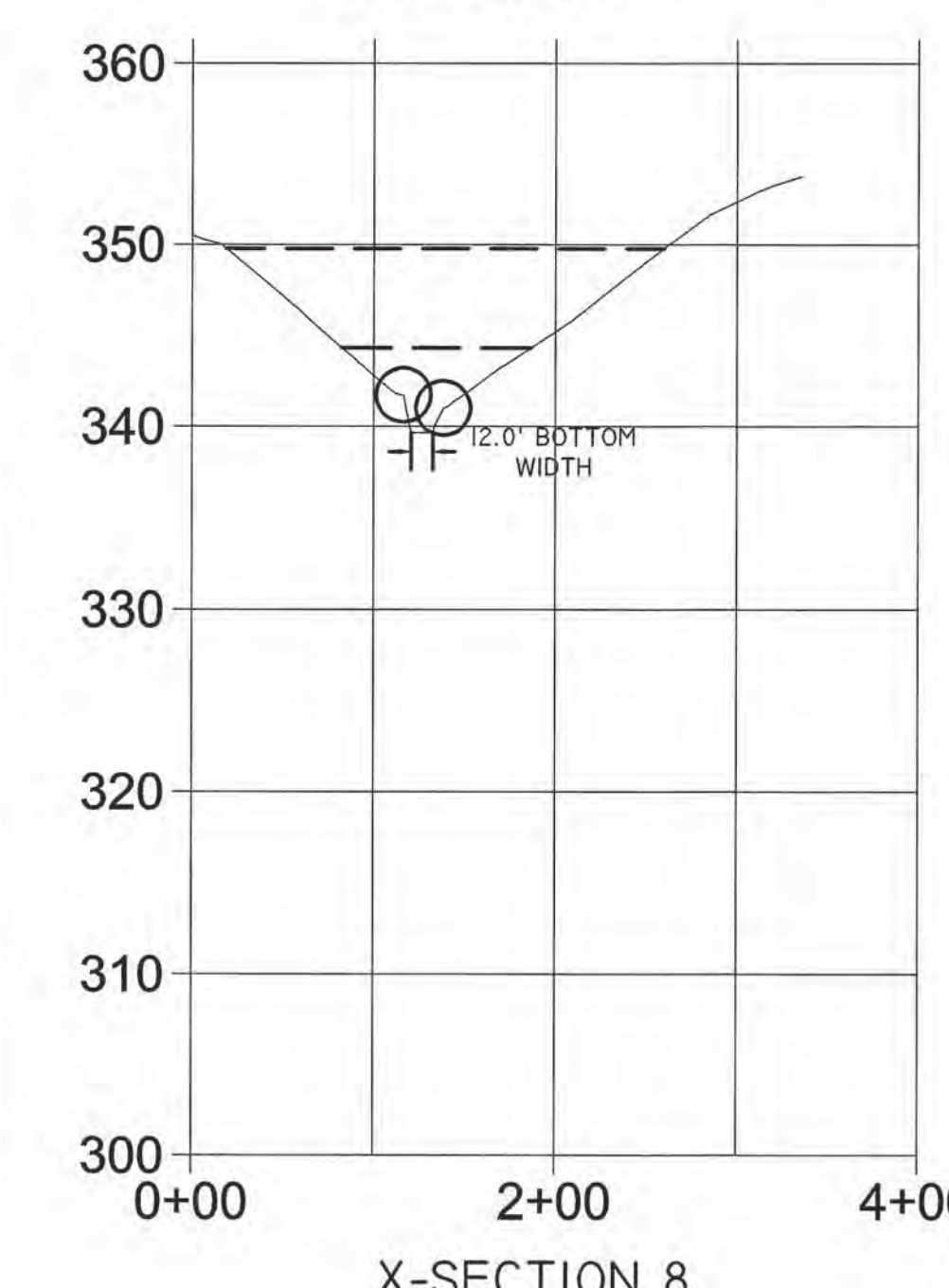
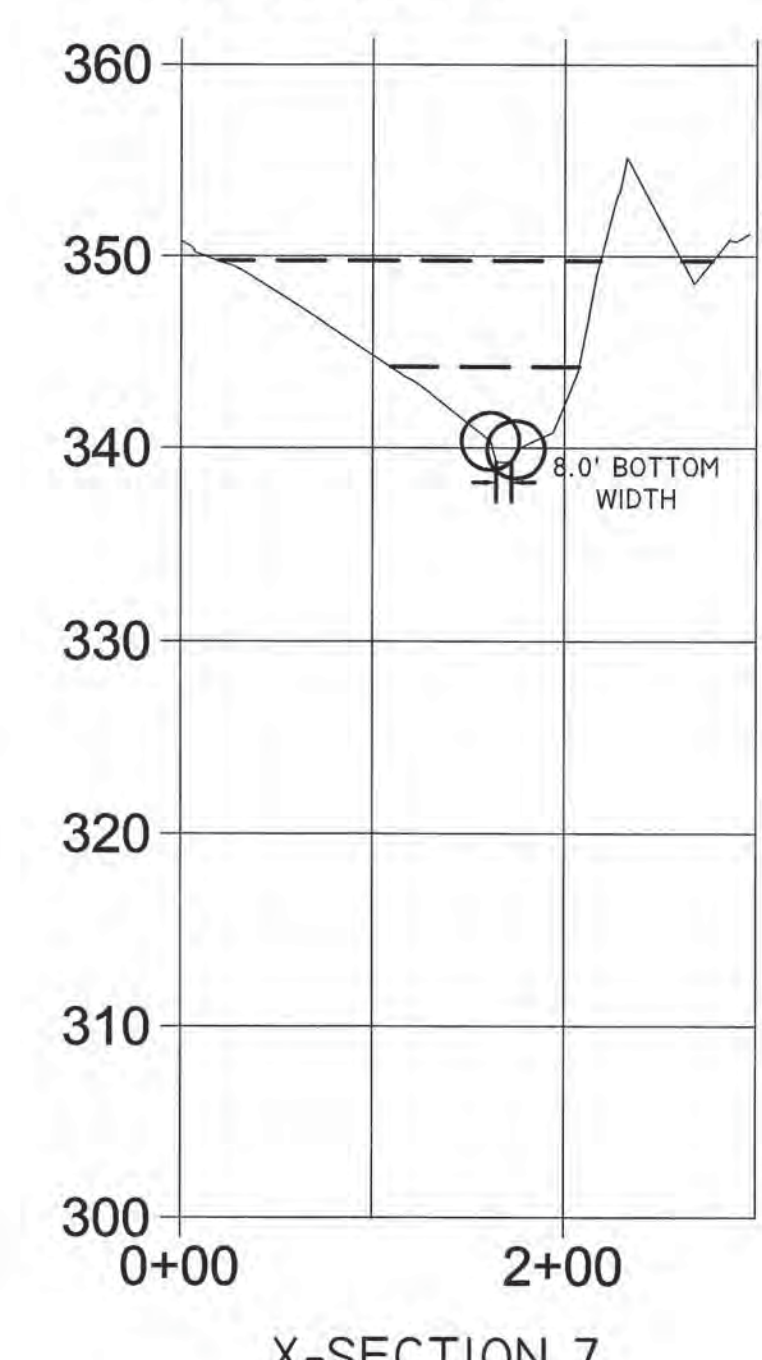
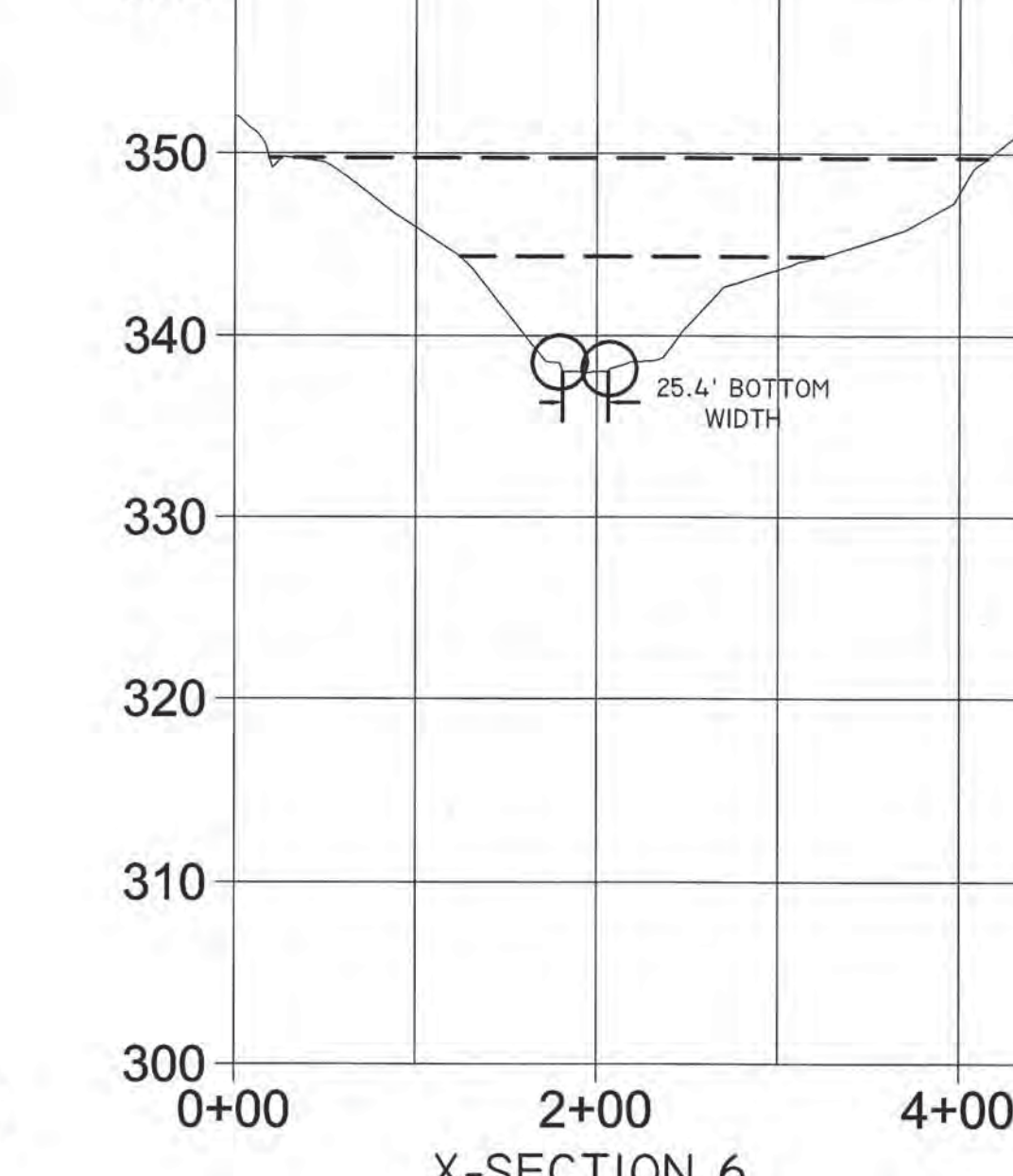
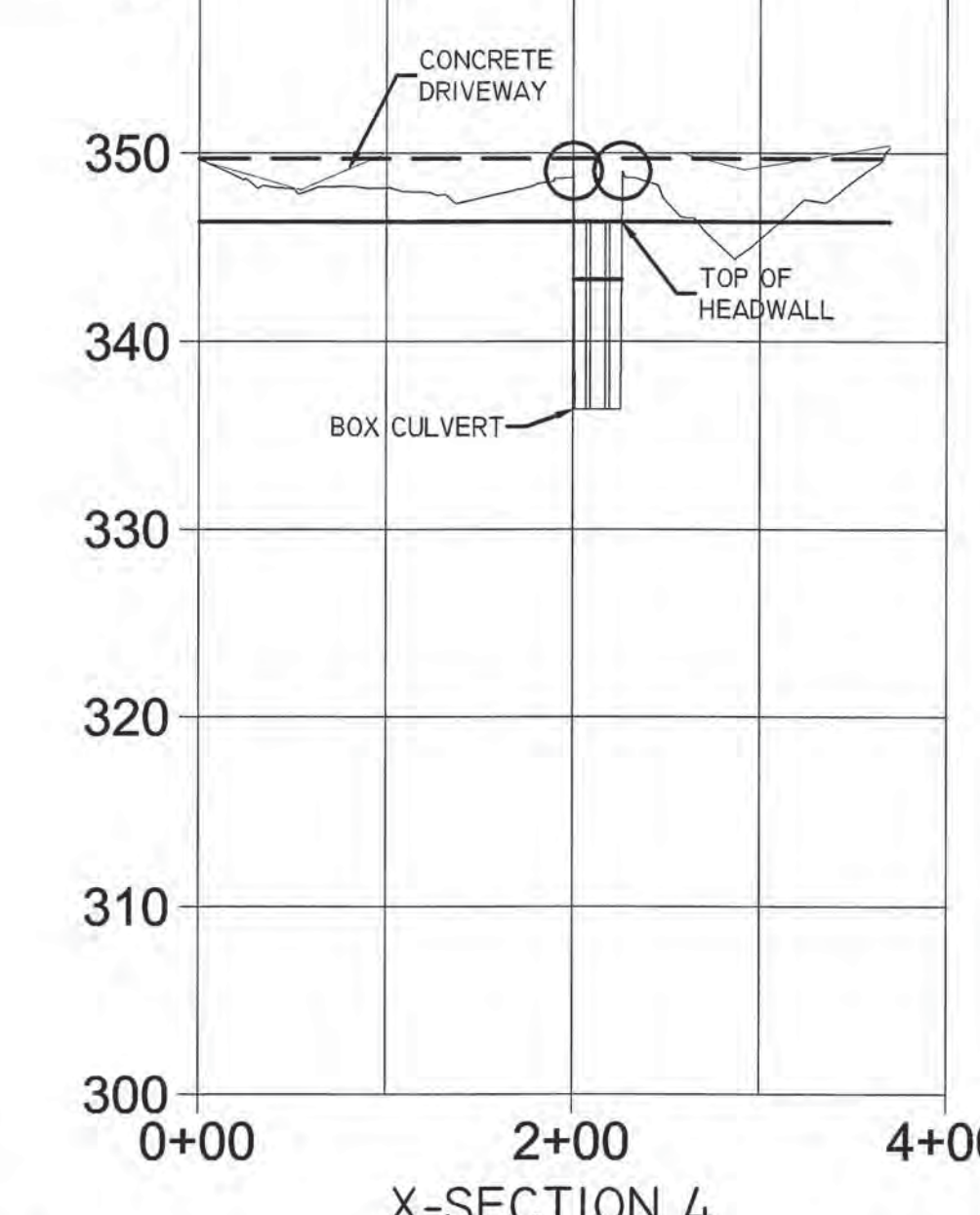
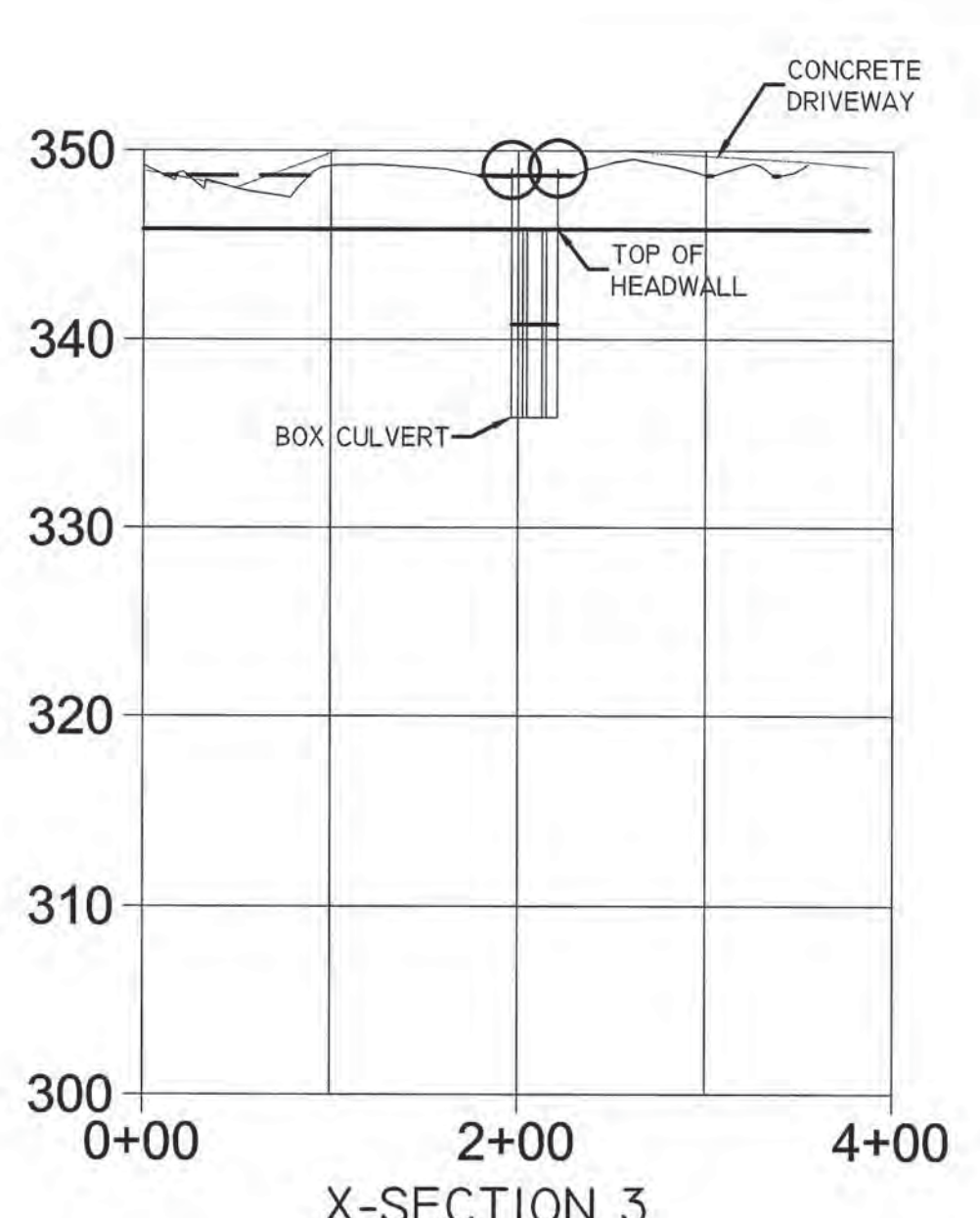
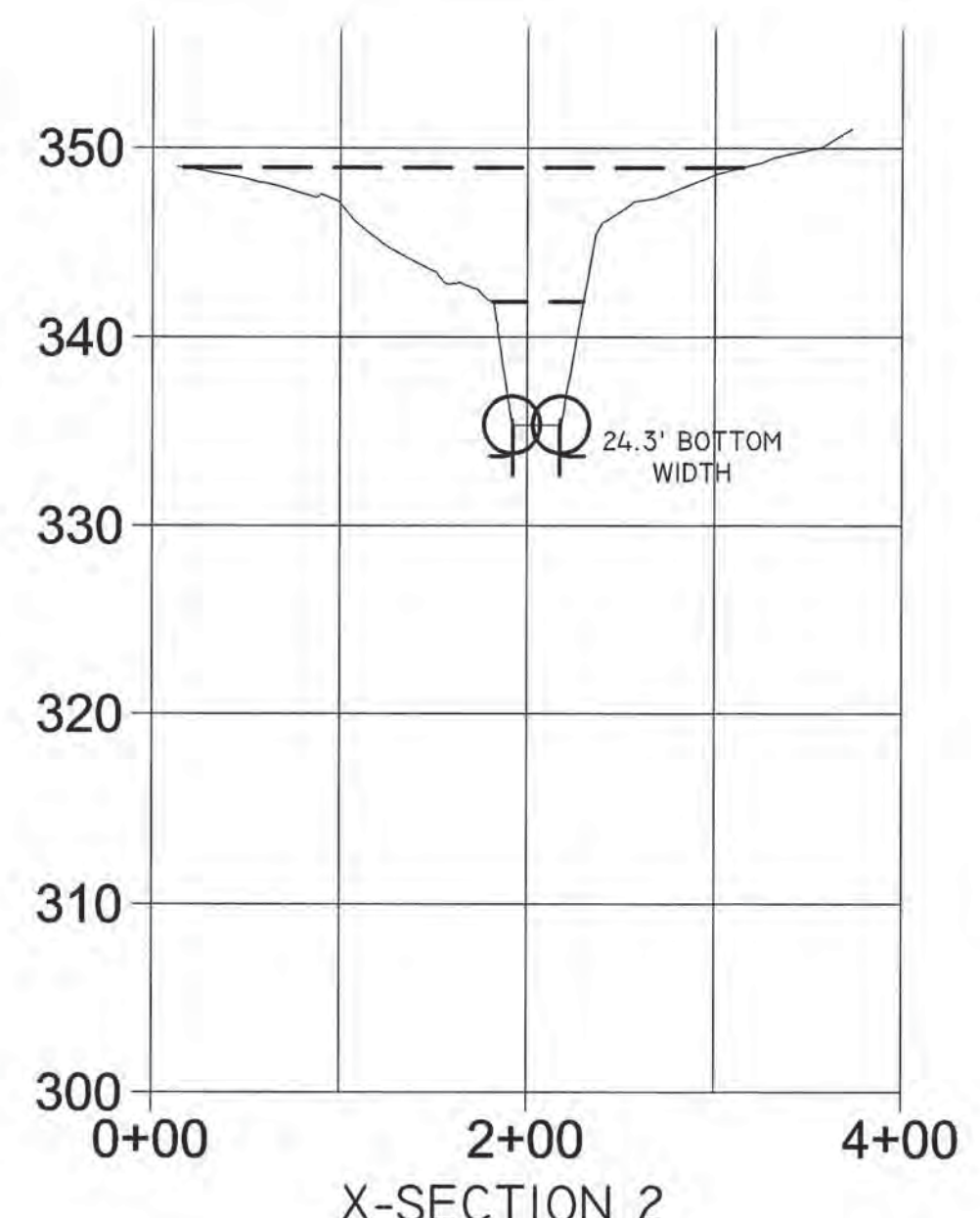
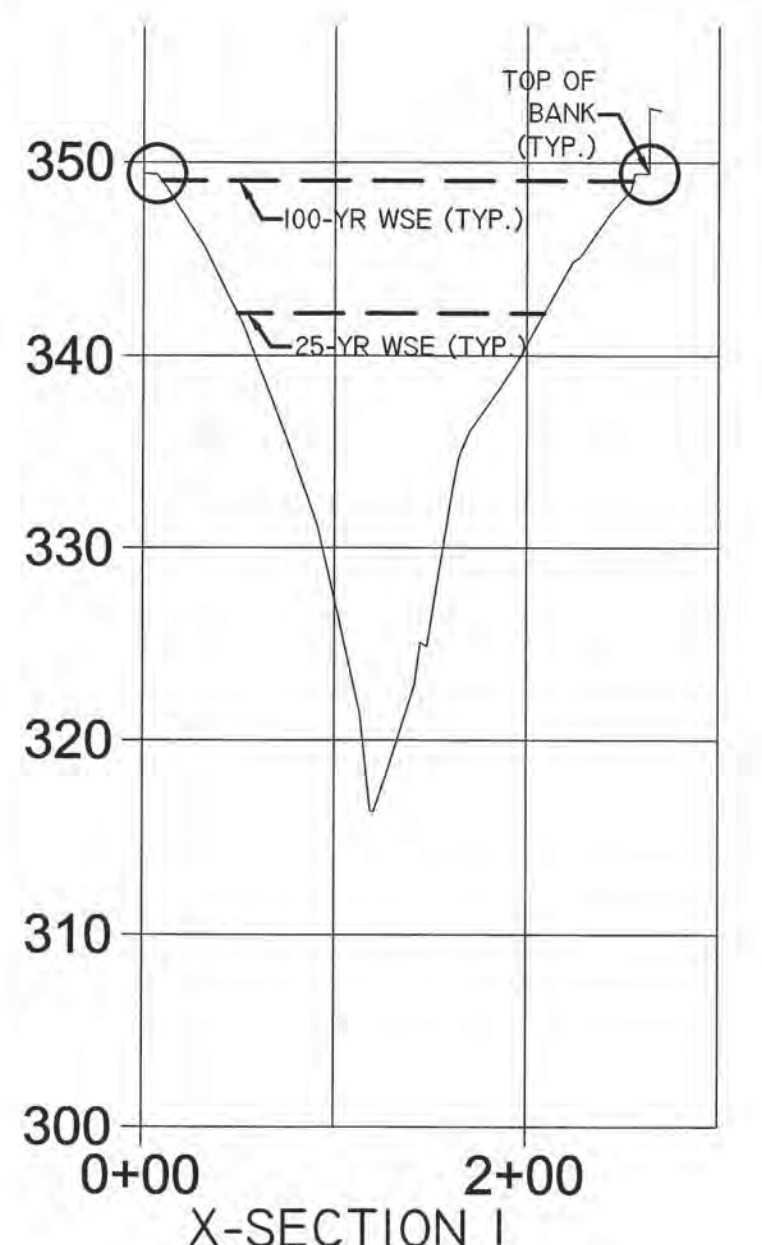
PROJECT: **DRAINAGE IMPROVEMENTS**

DATE: **APRIL 2018**

JOB NUMBER: **4697**

SHEET: **13 OF 14**

SHEET NO.: **13**



PROFILE SCALE  
 HORIZ. 1" = 100'  
 VERT. 1" = 10'

**LEGEND**

- MAX POTENTIAL WSE ASSUMING COINCIDING PEAKS
- OVERBANK STATION
- PROPOSED DRIVEWAY

- NOTES:**
- OVERBANK STATIONS DESIGNATE THE BOUNDARY BETWEEN CHANNEL AND OVERBANK MANNING'S N VALUES ACCORDING TO THE FOLLOWING DESCRIPTIONS:  
 MAIN CHANNEL - CLEAN, STRAIGHT, FULL, NO RIFTS OR DEEP POOLS = 0.026  
 FLOOD PLAIN - PASTURE, NO BRUSH, SHORT GRASS = 0.035  
 CONCRETE CHANNEL - TROWEL FINISH = 0.011  
 (MANNING'S N VALUES ACCORDING TO HEC-RAS)
  - CROSS-SECTIONS CREATED USING THE AUTODESK RIVER AND FLOOD ANALYSIS MODULE

FILE PATH: J:\AutoCad 2004\Land\Projects\4697.dwg\CrossSection.dwg - May 14, 2018 - 5:55pm

**BRENDAN P. MCENTEE**  
 LICENSED PROFESSIONAL ENGINEER  
 STATE OF TEXAS  
 LICENSE NO. 96200

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 108 F3791  
 5501 West William Cannon Dr. • Austin, Texas 78749  
 Phone No. (512) 280-5160 • Fax No. (512) 280-5165

DESIGNED BY: *Adam McEntee* / *as/15/2018*  
 DRAFTED BY: *IV*

DATE: \_\_\_\_\_  
 REVISION: \_\_\_\_\_

**CHANNEL X-SECTIONS**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

SHEET NAME: \_\_\_\_\_  
 JOB NAME: \_\_\_\_\_  
 PROJECT: \_\_\_\_\_

DATE: **APRIL 2018**  
 JOB NUMBER: **4697**  
 SHEET: **14 OF 14**  
 SHEET NO.: **14**

**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**  
**ENGINEERING REPORT**

**PREPARED FOR:**

71 Retail Partners LP  
8214 Westchester Drive, Suite 550  
Dallas, TX 75225

**PREPARED BY:**

CARLSON, BRIGANCE & DOERING, INC.  
(TX Firm F-3791)  
Mr. Brendan P. McEntee, P.E.  
5501 West William Cannon  
Austin, Texas 78749



CBD NO. 4697  
May 2018

**BASTROP GROVE**  
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- ▶ Existing Drainage Conditions
- ▶ Proposed Drainage Conditions

B. Hydrologic Soil Group Summary

C. Existing Conditions Drainage Area Map

D. Proposed Conditions Drainage Area Map

E. Hydraflow Report

F. Channel & Structures Design

- ▶ Channel Geometry
- ▶ Channel Surfacing
- ▶ Low Water Crossing
- ▶ Culvert
- ▶ Driveway

G. Hydraulic Analysis

- ▶ Methodology & Input Variables
- ▶ Cross-Sections Map & Geometries
- ▶ Profile Tables
- ▶ Output Report

**III. APPENDIX A – FEMA Flood Insurance Study Map & Study**

**IV. APPENDIX B – Drainage Technical Memorandum for Pecan Park Development**

**V. APPENDIX C – Engineering Report for Pecan Crossing Offsite Drainage Improvements**

# I. PROJECT SUMMARY

## 1.0 GENERAL

Bastrop Grove is a 145.70 Acre site, located within City of Bastrop at the intersection of Texas Highway 304 and Texas 71 Service Road. This engineering report details the proposed drainage improvements intended to convey storm runoff from upstream Seton Hospital and 71 Retail Partners LP developments to the Colorado River without ponding. Drainage improvements include construction of a 4,691-foot long earthen drainage ditch beginning south of Agnes Road and discharging into an existing channel that outfalls at the Colorado River, stabilization of an existing low water crossing, and replacement of a washed-out driveway, culvert, and flood control structure. The proposed culvert contains one 8'x10' and two 6'x10' box culverts and was designed to mimic the site's existing hydrology by matching the conveyance provided by the existing flood control structure that currently regulates flow to the Colorado River. The proposed channel was designed to contain upstream storm runoff and the Colorado River's 100-year flood without inundating Agnes Road.

## 2.0 ORDINANCE STATUS

This project is subject to the City of Bastrop Code of Ordinances.

## 3.0 DRAINAGE

Storm water runoff from the developed sites north of Agnes Road flow to the southeast corner of the 52.68-acre site, where it flows through a 12'x5' box culvert (designed by others) underneath Agnes Road. An existing 6'x3' box culvert conveys storm water runoff from approximately 69.84 acres north of Texas 71 Service Road. The ultimate drainage plan for the 145.70-acre development includes construction of a drainage channel to the Colorado River within an existing Drainage Easement recorded in Volume 1819, Page 840 in the Official Public Records of Bastrop County. The following engineering report presents design assumptions and justifications for the proposed channel, low water crossing, box culvert, and driveway. The report also evaluates the proposed channel's capacity to contain and convey the 25-year and 100-year storm events under different tailwater conditions. The model demonstrates that the channel will have sufficient capacity to convey runoff from these storm events given maximum possible tailwater at the Colorado River without flooding Agnes Road. Final channel design and details are found in the Bastrop Grove Drainage Improvement plans.

#### 4.0 CERTIFICATION

I hereby certify that this report complies with the Bastrop Code of Ordinances where applicable and the information contained hereon is true and correct to the best of my knowledge.

Brendan P. McEntee  
Brendan P. McEntee, P.E.

05-17-2018  
Date

## II. DESIGN NARRATIVE & ANALYSIS

### A. Hydrological Analysis

#### METHODOLOGY & INPUT VARIABLES

Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2018 version 12 was used to model the hydrologic characteristics of existing and proposed conditions.

The proposed channel’s drainage area is greater than 200 acres and thus the Soil Conservation Service unit hydrograph method was used to determine storm runoff. The modeled rainfall event was a 24-hour SCS Type III storm with a 3-minute time interval and the following rainfall depths:

**Table A.1 – Bastrop County 24-hr SCS Rainfall Depths**

	<b>2-YR</b>	<b>5-YR</b>	<b>10-YR</b>	<b>25-YR</b>	<b>100-YR</b>
<b>24-HOUR DEPTH (IN)</b>	3.6	5.1	6.2	7.7	10.2

Source: Chapter 10, Section 1.40.3(2) of Bastrop County Code of Ordinances

The site contains hydrologic soil groups A and B, as per the USDA Web Soil Survey. The site’s soils map and data have been included in Section B. The curve numbers and Manning’s n values found in Tables A.2 & A.3 below were taken from “Technical Release 55 – Urban Hydrology for Small Urban Watersheds”.

**Table A.2 – Curve Numbers**

<b>Cover Type</b>	<b>Hydrologic Condition</b>	<b>Hydrologic Soil Group</b>	<b>Curve Number</b>
<b>Agricultural lands</b>			
Pasture, grassland, or range – continuous forage for grazing	Good Grass cover > 75% & lightly grazed	A	39
		B	61
<b>Fully developed urban areas</b>			
Open space	Good Grass cover > 75%	A	39
		B	61
Impervious areas		ALL	98

Source: Soil Conservation Service TR-55



**Table A.3 - Manning’s N-Values**

<b>Surface Description</b>	<b>N</b>
<b>Sheet Flow &amp; Shallow Overland Flow</b>	
Smooth surfaces - concrete, asphalt, gravel, or bare soil	0.011
Grass – short grass prairie	0.15
<b>Channel Flow</b>	
Natural channels – earth, straight, some grass	0.026

Source: Soil Conservation Service TR-55

All time of concentration calculations were generated using the formulas given in “Technical Release 55 – Urban Hydrology for Small Urban Watersheds” for sheet, shallow concentrated, and channel flow. A maximum of 100 feet was used for sheet flow calculations.

EXISTING DRAINAGE CONDITIONS

Four drainage basins and two confluence points were used to model and evaluate existing site drainage conditions. An impervious cover of 28% was determined using aerial imagery for the 69.84 acres of drainage basin EX-OFFSITE. There was an assumed 0% impervious cover on the remaining existing drainage basins. EX-DA-1 drains to the roadside ditch along State Highway 304 marked EX-AP-1. EX-OFFSITE contributes to EX-DA-2 as sheet flow after discharging from existing 6’x3’ box culvert running underneath Texas 71 Service Road. EX-DA-3 is the southwestern basin contributing to the existing channel flowing into the Colorado River. EX-DA-2 includes overland flow contributing to the existing channel flowing into the Colorado River and drains to the southern analysis point EX-AP-2. See the Existing Drainage Area Map in Section C.

PROPOSED DRAINAGE CONDITIONS

Nine drainage basins and three confluence points were used to model and evaluate proposed site drainage conditions. Proposed drainage basin impervious covers were assumed based on future development as shown in the table below:

<b>Land Use</b>	<b>Impervious Cover %</b>
Single-Use Residential	50
Commercial	70
Roadway	100

PR-DA-1 and PR-DA-2 will be commercially developed. PR-DA-3 will be the proposed Agnes Drive, which is currently a 30’ R.O.W. PR-DA-4 through PR-DA-7 will potentially be developed as single-use residential. PR-DA-8 models the northern part of the proposed drainage channel within the boundaries of the 3.653-acre drainage easement dedicated by MC Bastrop 71, LP. PR-DA-9 models the southern part of the proposed drainage channel within the boundaries of the 11.563-acre drainage easement (Volume 1819, Page 840, O.P.R.B.C.TX.). Three analysis points were selected along the length of the proposed channel. AP-1 represents the initial channel flow from EX-DA-OFFSITE,

PR-DA-1, PR-DA-2, and PR-DA-3. AP-2 marks the border of the two dedicated drainage easements and the junction of the upstream drainage areas and PR-DA-4, PR-DA-5, and PR-DA-8. AP-3 is the final confluence point of all upstream drainage basins before flow is released into the Colorado River. See the Proposed Drainage Area Map in Section D.

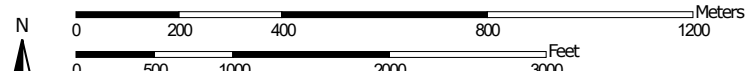
Flows at proposed analysis points were used to model the capacity of the proposed channel in the Autodesk River and Flood Analysis Module. See Hydraulic Analysis in Section G.

## **B. Hydrologic Soil Group Summary**

Soil Map—Bastrop County, Texas



Map Scale: 1:14,700 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



Natural Resources Conservation Service

Web Soil Survey National Cooperative Soil Survey

5/16/2018 Page 1 of 3

## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bastrop County, Texas

Survey Area Data: Version 15, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 8, 2015—Mar 14, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bo	Bosque loam, 0 to 1 percent slopes, occasionally flooded	300.1	56.0%
DeC	Robco-Tanglewood complex, 1 to 5 percent slopes	46.8	8.7%
SeD2	Shep clay loam, 3 to 8 percent slopes, eroded	21.8	4.1%
Sm	Smithville fine sandy loam, 0 to 1 percent slopes	167.4	31.2%
<b>Totals for Area of Interest</b>		<b>536.1</b>	<b>100.0%</b>

## Bastrop County, Texas

### Bo—Bosque loam, 0 to 1 percent slopes, occasionally flooded

#### Map Unit Setting

*National map unit symbol:* f67c  
*Elevation:* 200 to 1,400 feet  
*Mean annual precipitation:* 28 to 40 inches  
*Mean annual air temperature:* 64 to 70 degrees F  
*Frost-free period:* 220 to 275 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Bosque and similar soils:* 95 percent  
*Minor components:* 5 percent  
*Estimates are based on observations, descriptions, and transects of  
the mapunit.*

#### Description of Bosque

##### Setting

*Landform:* Flood plains  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Loamy alluvium of holocene age derived from  
mixed sources

##### Typical profile

*H1 - 0 to 24 inches:* loam  
*H2 - 24 to 58 inches:* clay loam  
*H3 - 58 to 75 inches:* clay loam

##### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Negligible  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.57 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Occasional  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 20 percent  
*Available water storage in profile:* High (about 10.7 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 5w  
*Hydrologic Soil Group:* B  
*Ecological site:* Loamy Bottomland (R086AY012TX)  
*Hydric soil rating:* No

### **Minor Components**

#### **Unnamed**

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

### **Data Source Information**

Soil Survey Area: Bastrop County, Texas

Survey Area Data: Version 15, Nov 7, 2017



## Bastrop County, Texas

### DeC—Robco-Tanglewood complex, 1 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2wg9h

*Elevation:* 220 to 610 feet

*Mean annual precipitation:* 35 to 45 inches

*Mean annual air temperature:* 67 to 69 degrees F

*Frost-free period:* 252 to 275 days

*Farmland classification:* Farmland of statewide importance, if drained

#### Map Unit Composition

*Robco and similar soils:* 46 percent

*Tanglewood and similar soils:* 25 percent

*Minor components:* 29 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Robco

##### Setting

*Landform:* Ridges

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Linear

*Across-slope shape:* Concave

*Parent material:* Sandy, clayey, and loamy residuum weathered from sandstone, claystone, and shale of eocene age

##### Typical profile

*A - 0 to 11 inches:* loamy fine sand

*E - 11 to 26 inches:* loamy fine sand

*Btg1 - 26 to 31 inches:* sandy clay loam

*Btg2 - 31 to 39 inches:* sandy clay loam

*Bt/C - 39 to 80 inches:* sandy clay loam

##### Properties and qualities

*Slope:* 1 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Moderately well drained

*Runoff class:* Very low

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* About 18 to 42 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Gypsum, maximum in profile:* 1 percent

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Moderate (about 8.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* A  
*Ecological site:* Sandy (R087AY234TX)  
*Hydric soil rating:* No

### Description of Tanglewood

#### Setting

*Landform:* Ridges  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Parent material:* Sandy, clayey, and loamy residuum weathered  
from sandstone, claystone, and shale of eocene age

#### Typical profile

*A - 0 to 5 inches:* loamy fine sand  
*E - 5 to 23 inches:* loamy fine sand  
*Btg1 - 23 to 33 inches:* sandy clay loam  
*Btg2 - 33 to 68 inches:* clay  
*Btg3 - 68 to 80 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 1 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Moderately well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* About 20 to 46 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Gypsum, maximum in profile:* 1 percent  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0  
to 2.0 mmhos/cm)  
*Available water storage in profile:* Moderate (about 8.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* 3s  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* C/D  
*Ecological site:* Sandy (R087AY234TX)  
*Hydric soil rating:* No

### Minor Components

#### Edge

*Percent of map unit:* 5 percent  
*Landform:* Ridges, ridges  
*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Interfluve, side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Ecological site:* Claypan Savannah (R087AY221TX)  
*Hydric soil rating:* No

**Rader**

*Percent of map unit:* 5 percent  
*Landform:* Stream terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Ecological site:* Sandy Loam (R087AY237TX)  
*Hydric soil rating:* No

**Straber**

*Percent of map unit:* 5 percent  
*Landform:* Ridges  
*Landform position (two-dimensional):* Summit, footslope  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Ecological site:* Sandy (R087AY234TX)  
*Hydric soil rating:* No

**Silstid**

*Percent of map unit:* 5 percent  
*Landform:* Ridges  
*Landform position (two-dimensional):* Shoulder  
*Landform position (three-dimensional):* Interfluve  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Ecological site:* Sandy (R087AY234TX)  
*Hydric soil rating:* No

**Tabor**

*Percent of map unit:* 5 percent  
*Landform:* Ridges  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Ecological site:* Sandy Loam (R087AY237TX)  
*Hydric soil rating:* No

**Padina**

*Percent of map unit:* 2 percent  
*Landform:* Ridges  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Ecological site:* Deep Sand (R087AY225TX)  
*Hydric soil rating:* No

**Gasil**

*Percent of map unit:* 2 percent

*Landform:* Ridges

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Interfluve

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Ecological site:* Sandy Loam (R087AY237TX)

*Hydric soil rating:* No

**Data Source Information**

Soil Survey Area: Bastrop County, Texas

Survey Area Data: Version 15, Nov 7, 2017

## Bastrop County, Texas

### SeD2—Shep clay loam, 3 to 8 percent slopes, eroded

#### Map Unit Setting

*National map unit symbol:* f68m  
*Elevation:* 1,200 to 2,300 feet  
*Mean annual precipitation:* 21 to 34 inches  
*Mean annual air temperature:* 64 to 70 degrees F  
*Frost-free period:* 210 to 230 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Shep and similar soils:* 95 percent  
*Minor components:* 5 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Shep

##### Setting

*Landform:* Stream terraces  
*Landform position (three-dimensional):* Riser  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Loamy alluvium of pleistocene age

##### Typical profile

*H1 - 0 to 20 inches:* clay loam  
*H2 - 20 to 60 inches:* clay loam

##### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.57 to 1.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 40 percent  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* High (about 9.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6e  
*Hydrologic Soil Group:* B  
*Ecological site:* Southern Clay Loam (R086AY007TX)  
*Hydric soil rating:* No

### **Minor Components**

#### **Unnamed, hydric**

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

### **Data Source Information**

Soil Survey Area: Bastrop County, Texas

Survey Area Data: Version 15, Nov 7, 2017

## Bastrop County, Texas

### Sm—Smithville fine sandy loam, 0 to 1 percent slopes

#### Map Unit Setting

*National map unit symbol:* f68q

*Elevation:* 150 to 500 feet

*Mean annual precipitation:* 35 to 42 inches

*Mean annual air temperature:* 66 to 70 degrees F

*Frost-free period:* 260 to 290 days

*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Smithville and similar soils:* 95 percent

*Minor components:* 5 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Smithville

##### Setting

*Landform:* Flood-plain steps

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Loamy alluvium of quaternary age derived from mixed sources

##### Typical profile

*H1 - 0 to 6 inches:* fine sandy loam

*H2 - 6 to 16 inches:* loam

*H3 - 16 to 50 inches:* sandy clay loam

*H4 - 50 to 62 inches:* fine sandy loam

##### Properties and qualities

*Slope:* 0 to 1 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Negligible

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum in profile:* 20 percent

*Available water storage in profile:* High (about 9.9 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 1

*Hydrologic Soil Group:* B

*Ecological site:* Loamy Upland (F133BY005TX)

*Hydric soil rating:* No

**Minor Components**

**Unnamed, hydric**

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

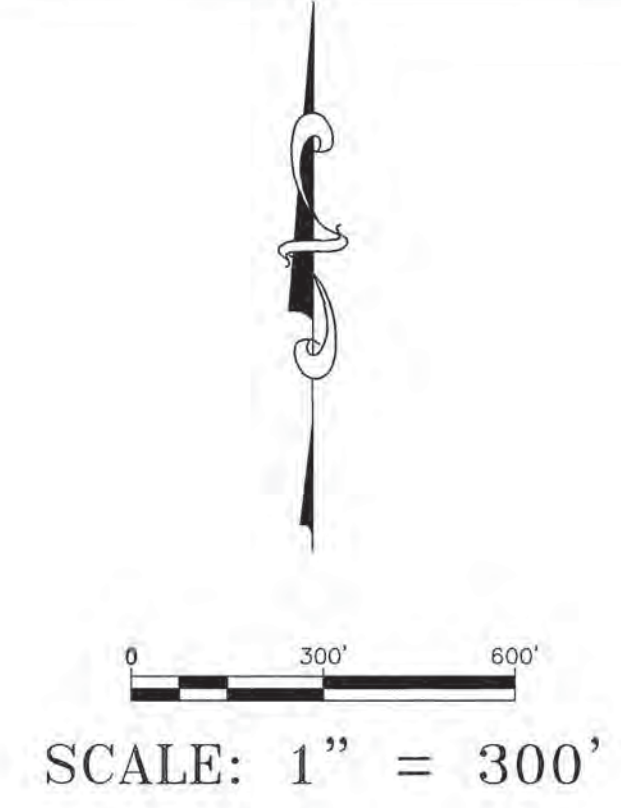
**Data Source Information**

Soil Survey Area: Bastrop County, Texas

Survey Area Data: Version 15, Nov 7, 2017



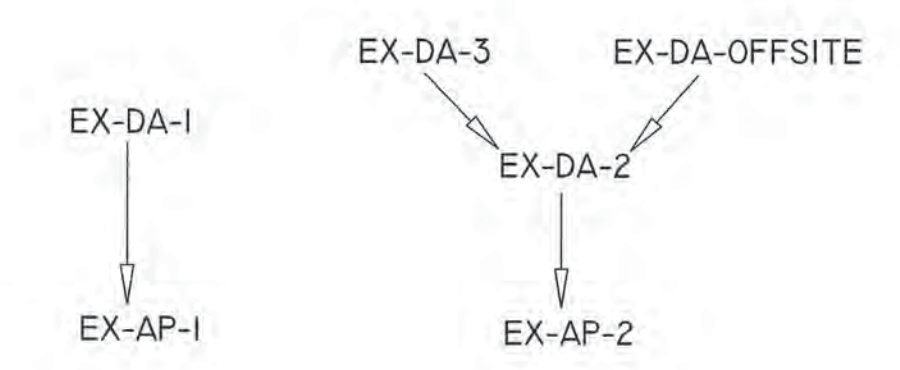
## **C. Existing Conditions Drainage Area Map**



**LEGEND**

- - - - - DRAINAGE EASEMENT BOUNDARY
- - - - - DRAINAGE BOUNDARY LINE
- AI DRAINAGE AREA LABEL
- ANALYSIS POINT (AP)
- - 940 - - - EXISTING CONTOUR MAJOR
- - - - - EXISTING CONTOUR MINOR
- FLOW ARROW
- - - - - TcFP TIME OF CONCENTRATION FLOW PATH

**HYDROLOGY FLOW CHART**



**TIME OF CONCENTRATION CALCULATIONS EXISTING CONDITIONS**

Drainage Area #	Sheet Flow				Shallow Conc. Flow				Channel Flow				Tc (Min.)		
	n	Slope	L	Tc	Paved/Unpaved	Slope	L	Tc	n	Slope	L	A <sub>cross</sub>		WP	Tc
EX-DA-1	0.15	0.30%	100	19.73	U	0.19%	3154.97	74.77							94.5
DA-OFFSITE	0.011	0.50%	100	1.99	U	0.50%	2336	34.13	0.013	0.50%	1793	18	18	3.69	39.8
EX-DA-2	0.15	0.56%	100	15.37	U	0.34%	3712.93	65.78	0.026	1.58%	2631.64	200	60	2.72	83.9
EX-DA-3	0.15	0.36%	100	18.34	U	0.76%	1684.2	19.96							38.3

**RESULTS TABLE - EXISTING CONDITIONS**

SUB-BASIN	AREA (AC.)	% IC	CN	Q <sub>10</sub> (CFS)	Q <sub>25</sub> (CFS)	Q <sub>100</sub> (CFS)
EX-DA-1 / EX-AP-1	101.79	0	57	59.56	97.12	167.35
DA-OFFSITE	69.84	28	71	127.94	181.31	273.3
EX-DA-2	193.08	0	60	140.32	219.91	366.23
EX-DA-3	50.91	0	52	36.56	64.3	117.99
EX-AP-2				257.24	395.87	648.66

**NOTES:**

- SCS WAS USED AS DRAINAGE CALCULATION METHOD
- RAINFALL INTENSITIES FOR DESIGN STORMS WERE PROVIDED BY BASTROP COUNTY'S CODE OF ORDINANCES (10.1, 40 & 10.5, 90)
- CN'S ARE BASED ON EXISTING TYPE A & B SOILS AND REFLECT VALUES PER THE USDA WEB SOIL SURVEY
- TOC CALCULATIONS ARE BASED ON ASSUMED EXISTING CONDITIONS & TR-55
- MANNING'S N VALUES FROM TR-55:
  - PIPE/CHANNEL FLOW
    - PIPES - REINFORCED CONCRETE = 0.013
    - NATURAL CHANNELS - EARTH, STRAIGHT, SOME GRASS = 0.026
  - OVERLAND FLOW
    - SMOOTH SURFACE (CONCRETE, ASPHALT, BARE SOIL) = 0.011
    - SHORT GRASS = 0.015
- OFFSITE IMPERVIOUS COVERS ARE APPROXIMATE BASED ON AERIAL IMAGERY

DESIGNED BY: *Brendan P. McEntee* DATE: 05/15/2018  
 CHECKED BY: *Brendan P. McEntee* DATE: 05/15/2018

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DATE: \_\_\_\_\_ REVISION: \_\_\_\_\_

---

**Carlson, Brigrance & Doering, Inc.**  
 FIRM ID #F3791  
 5501 West Willow Creek, Bastrop, TX 78649  
 Phone Nos. (512) 280-5160 • Fax No. (512) 280-5165

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**EXISTING DRAINAGE AREA MAP**  
**BASTROP GROVE**  
**DRAINAGE IMPROVEMENTS**

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SHEET NAME: \_\_\_\_\_ JOB NAME: \_\_\_\_\_ PROJECT: \_\_\_\_\_

---

DATE: **APRIL 2018**  
 JOB NUMBER: **4697**  
 SHEET: **6 OF 14**  
 SHEET NO. **6**

FILE PATH: \\uacbz2004\Land Projects\4697\King\Channel\4697 - DRAINAGE - river.dwg - May 15, 2018 - 1:34pm

**D. Proposed Conditions Drainage Area Map**



## **E. Hydraflow Report**

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**100 - Year**

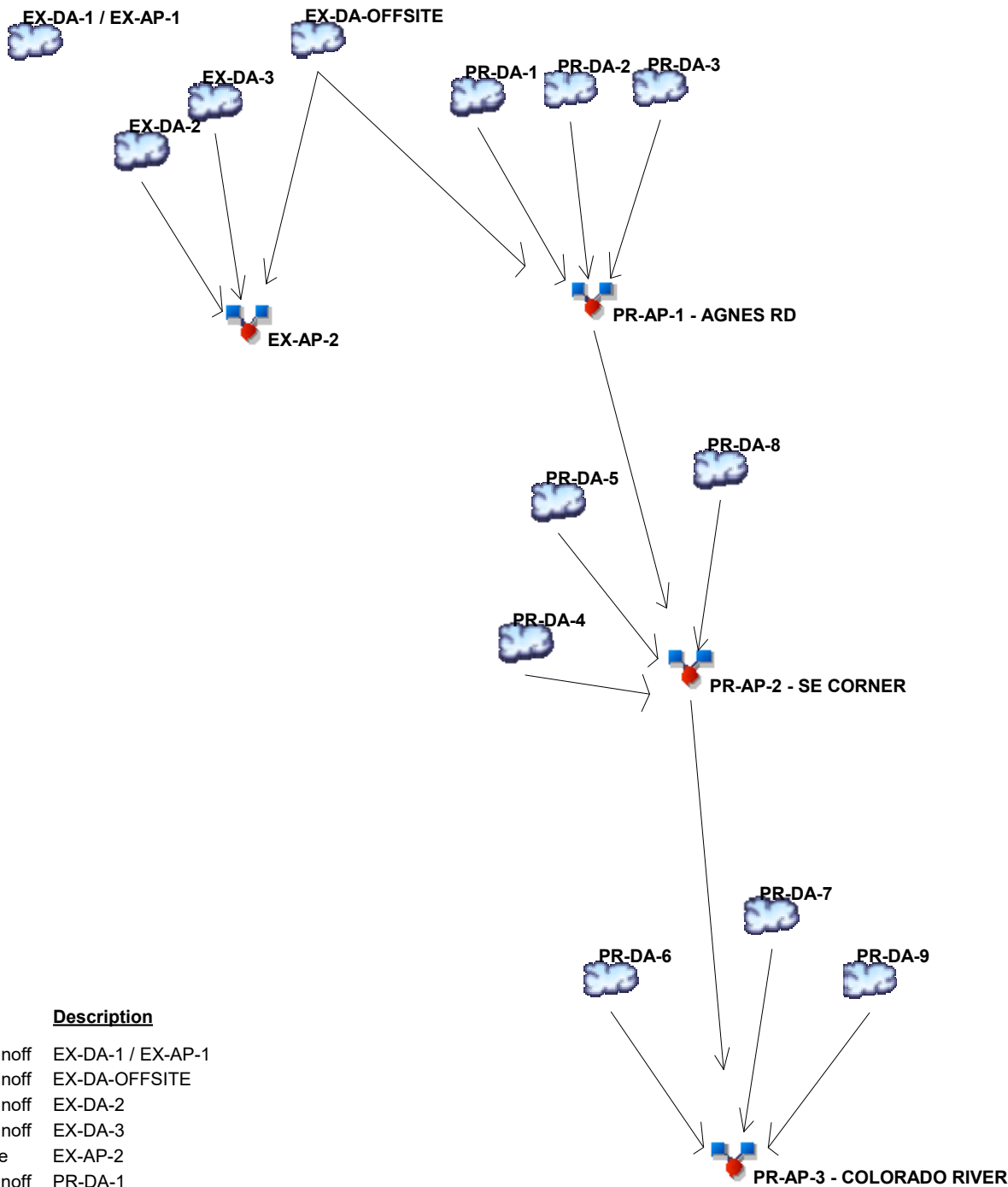
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# Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12



## Legend

Hyd. Origin	Origin	Description
1	SCS Runoff	EX-DA-1 / EX-AP-1
2	SCS Runoff	EX-DA-OFFSITE
3	SCS Runoff	EX-DA-2
4	SCS Runoff	EX-DA-3
5	Combine	EX-AP-2
6	SCS Runoff	PR-DA-1
7	SCS Runoff	PR-DA-2
8	SCS Runoff	PR-DA-3
9	SCS Runoff	PR-DA-4
10	SCS Runoff	PR-DA-5
11	SCS Runoff	PR-DA-6
12	SCS Runoff	PR-DA-7
13	SCS Runoff	PR-DA-8
14	SCS Runoff	PR-DA-9
15	Combine	PR-AP-1 - AGNES RD
16	Combine	PR-AP-2 - SE CORNER
17	Combine	PR-AP-3 - COLORADO RIVER

# Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	10.98	-----	35.60	59.56	97.12	-----	167.35	EX-DA-1 / EX-AP-1
2	SCS Runoff	-----	-----	44.36	-----	90.58	127.94	181.31	-----	273.30	EX-DA-OFFSITE
3	SCS Runoff	-----	-----	30.77	-----	87.97	140.32	219.91	-----	366.23	EX-DA-2
4	SCS Runoff	-----	-----	3.938	-----	19.58	36.56	64.30	-----	117.99	EX-DA-3
5	Combine	2, 3, 4	-----	63.75	-----	165.26	257.24	395.87	-----	648.66	EX-AP-2
6	SCS Runoff	-----	-----	74.29	-----	117.66	149.45	192.56	-----	263.76	PR-DA-1
7	SCS Runoff	-----	-----	45.20	-----	71.58	90.92	117.15	-----	160.47	PR-DA-2
8	SCS Runoff	-----	-----	5.631	-----	8.018	9.764	12.14	-----	16.10	PR-DA-3
9	SCS Runoff	-----	-----	119.75	-----	208.26	275.24	367.46	-----	521.27	PR-DA-4
10	SCS Runoff	-----	-----	28.56	-----	50.07	66.42	88.96	-----	126.64	PR-DA-5
11	SCS Runoff	-----	-----	56.40	-----	104.79	142.77	195.94	-----	285.88	PR-DA-6
12	SCS Runoff	-----	-----	89.62	-----	159.57	213.43	288.18	-----	413.80	PR-DA-7
13	SCS Runoff	-----	-----	1.724	-----	5.024	7.881	12.16	-----	19.88	PR-DA-8
14	SCS Runoff	-----	-----	5.329	-----	15.53	24.36	37.58	-----	61.45	PR-DA-9
15	Combine	2, 6, 7, 8,	-----	142.63	-----	239.42	312.95	414.96	-----	587.02	PR-AP-1 - AGNES RD
16	Combine	9, 10, 13, 15	-----	286.68	-----	493.34	650.57	868.31	-----	1234.19	PR-AP-2 - SE CORNER
17	Combine	11, 12, 14, 16	-----	354.73	-----	634.13	850.01	1151.75	-----	1662.89	PR-AP-3 - COLORADO RIVER

# Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	10.98	3	804	168,807	----	----	----	EX-DA-1 / EX-AP-1	
2	SCS Runoff	44.36	3	750	281,463	----	----	----	EX-DA-OFFSITE	
3	SCS Runoff	30.77	3	792	392,306	----	----	----	EX-DA-2	
4	SCS Runoff	3.938	3	765	50,899	----	----	----	EX-DA-3	
5	Combine	63.75	3	759	724,668	2, 3, 4	----	----	EX-AP-2	
6	SCS Runoff	74.29	3	726	248,636	----	----	----	PR-DA-1	
7	SCS Runoff	45.20	3	726	151,270	----	----	----	PR-DA-2	
8	SCS Runoff	5.631	3	726	21,261	----	----	----	PR-DA-3	
9	SCS Runoff	119.75	3	726	399,398	----	----	----	PR-DA-4	
10	SCS Runoff	28.56	3	732	128,801	----	----	----	PR-DA-5	
11	SCS Runoff	56.40	3	738	275,703	----	----	----	PR-DA-6	
12	SCS Runoff	89.62	3	771	788,659	----	----	----	PR-DA-7	
13	SCS Runoff	1.724	3	729	7,870	----	----	----	PR-DA-8	
14	SCS Runoff	5.329	3	729	24,325	----	----	----	PR-DA-9	
15	Combine	142.63	3	726	702,631	2, 6, 7, 8,	----	----	PR-AP-1 - AGNES RD	
16	Combine	286.68	3	726	1,238,700	9, 10, 13, 15	----	----	PR-AP-2 - SE CORNER	
17	Combine	354.73	3	726	2,327,386	11, 12, 14, 16	----	----	PR-AP-3 - COLORADO RIVER	
CHANNEL (05-16-18).gpw					Return Period: 2 Year			Wednesday, 05 / 16 / 2018		

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

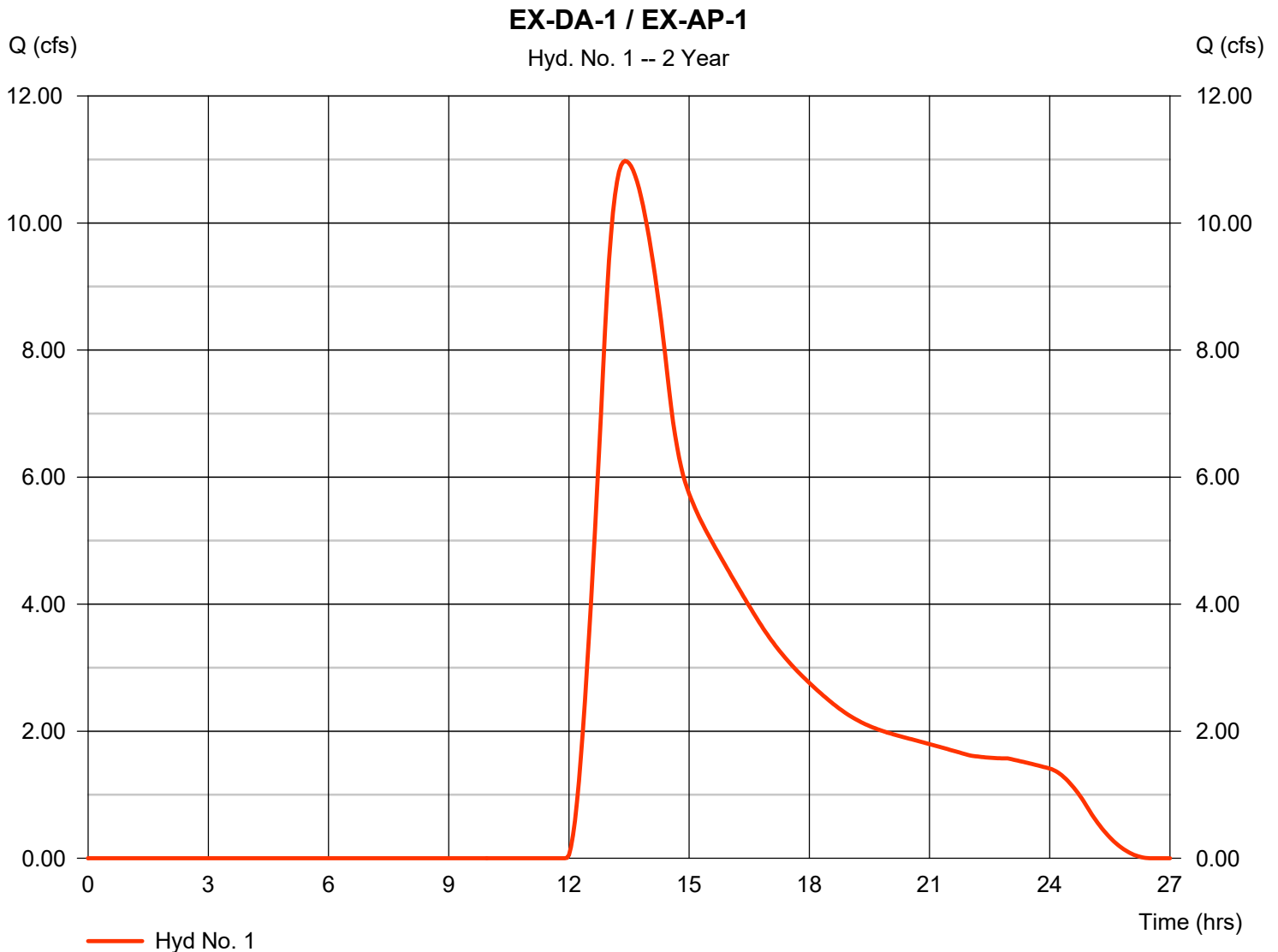
Wednesday, 05 / 16 / 2018

## Hyd. No. 1

EX-DA-1 / EX-AP-1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.98 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.40 hrs
Time interval	= 3 min	Hyd. volume	= 168,807 cuft
Drainage area	= 101.790 ac	Curve number	= 57*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 94.50 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(84.000 x 61) + (17.790 x 39)] / 101.790



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 1

EX-DA-1 / EX-AP-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.30	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 19.73</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 19.73</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 3154.97	0.00	0.00	
Watercourse slope (%)	= 0.19	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=0.70	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 74.77</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 74.77</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	{{0}}0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc .....</b>				<b>94.50 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

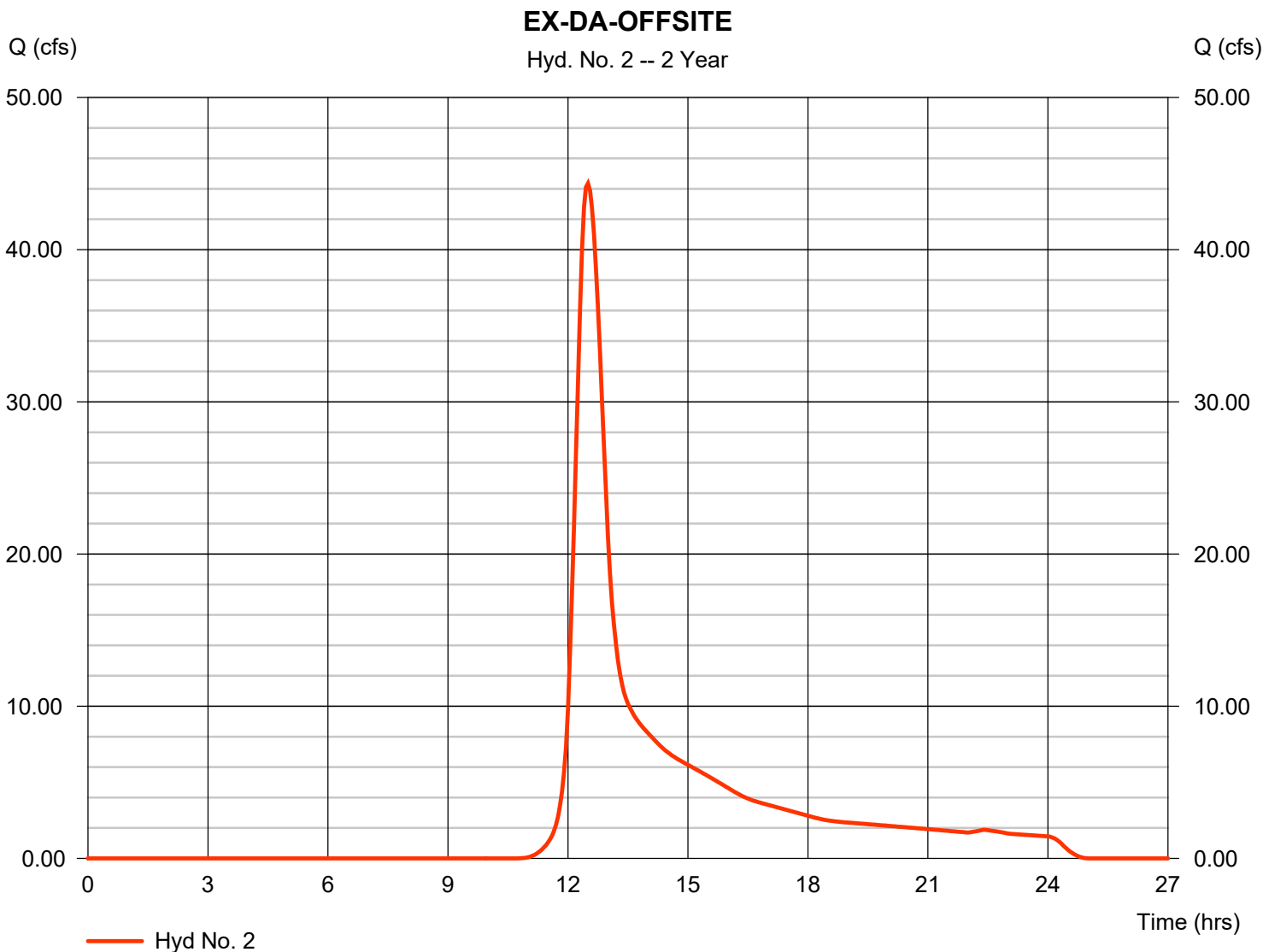
Wednesday, 05 / 16 / 2018

## Hyd. No. 2

EX-DA-OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 44.36 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.50 hrs
Time interval	= 3 min	Hyd. volume	= 281,463 cuft
Drainage area	= 69.840 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 39.80 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.230 x 98) + (50.610 x 61)] / 69.840



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 2

EX-DA-OFFSITE

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 2336.00	0.00	0.00	
Watercourse slope (%)	= 0.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.14	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 34.13</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 34.13</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 18.00	0.00	0.00	
Wetted perimeter (ft)	= 18.00	0.00	0.00	
Channel slope (%)	= 0.50	0.00	0.00	
Manning's n-value	= 0.013	0.015	0.015	
Velocity (ft/s)	=8.10	0.00	0.00	
Flow length (ft)	{{0}}1793.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 3.69</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 3.69</b>
<b>Total Travel Time, Tc .....</b>				<b>39.80 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

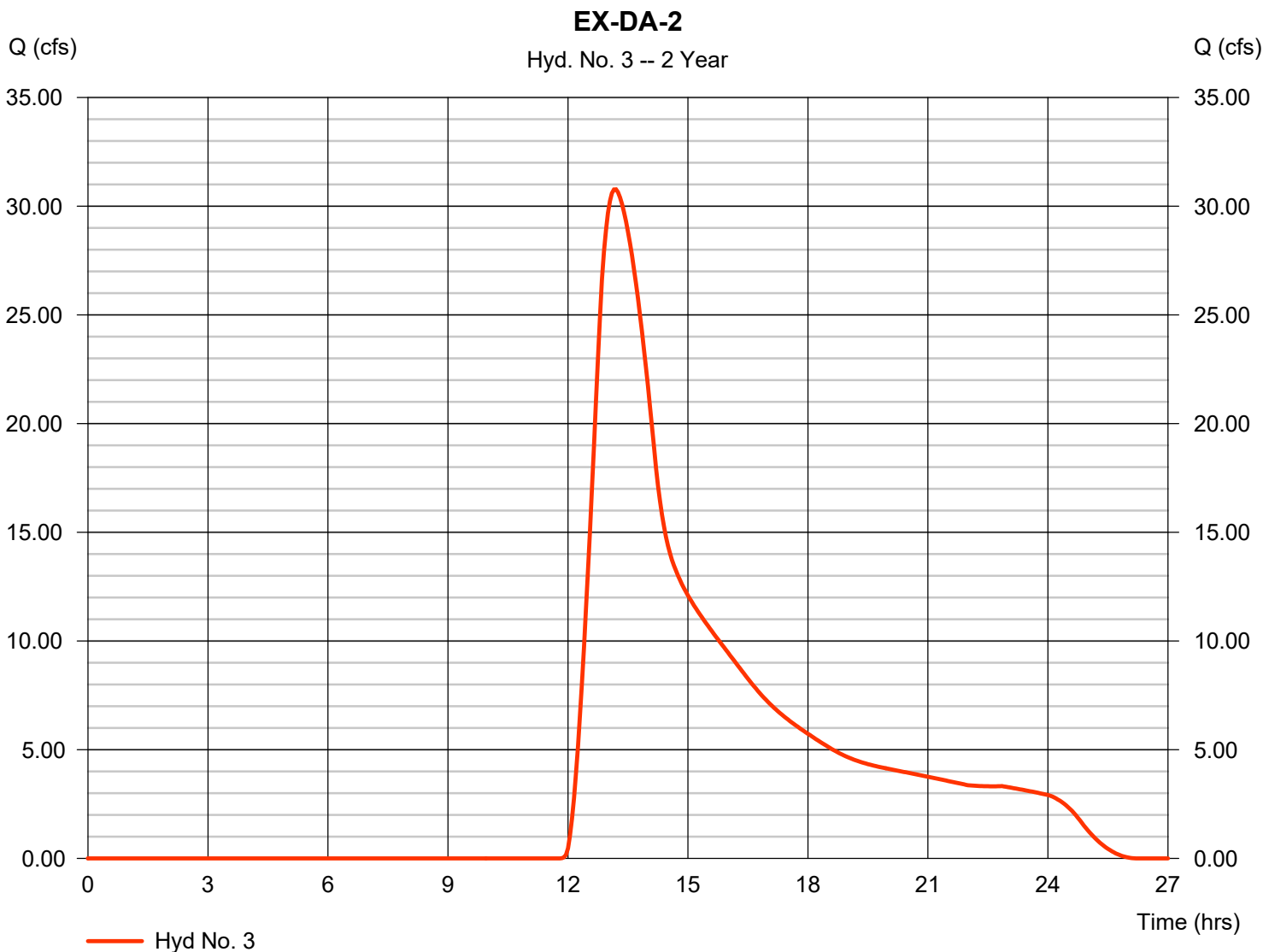
Wednesday, 05 / 16 / 2018

## Hyd. No. 3

EX-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 30.77 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.20 hrs
Time interval	= 3 min	Hyd. volume	= 392,306 cuft
Drainage area	= 189.310 ac	Curve number	= 60*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 83.86 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(183.470 x 61) + (5.840 x 39)] / 189.310





# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 3

EX-DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.56	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 15.37</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 15.37</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 3712.93	0.00	0.00	
Watercourse slope (%)	= 0.34	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=0.94	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 65.78</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 65.78</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 200.00	0.00	0.00	
Wetted perimeter (ft)	= 60.00	0.00	0.00	
Channel slope (%)	= 1.58	0.00	0.00	
Manning's n-value	= 0.026	0.015	0.015	
Velocity (ft/s)	=16.14	0.00	0.00	
Flow length (ft)	2631.6	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 2.72</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 2.72</b>
<b>Total Travel Time, Tc .....</b>				<b>83.86 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

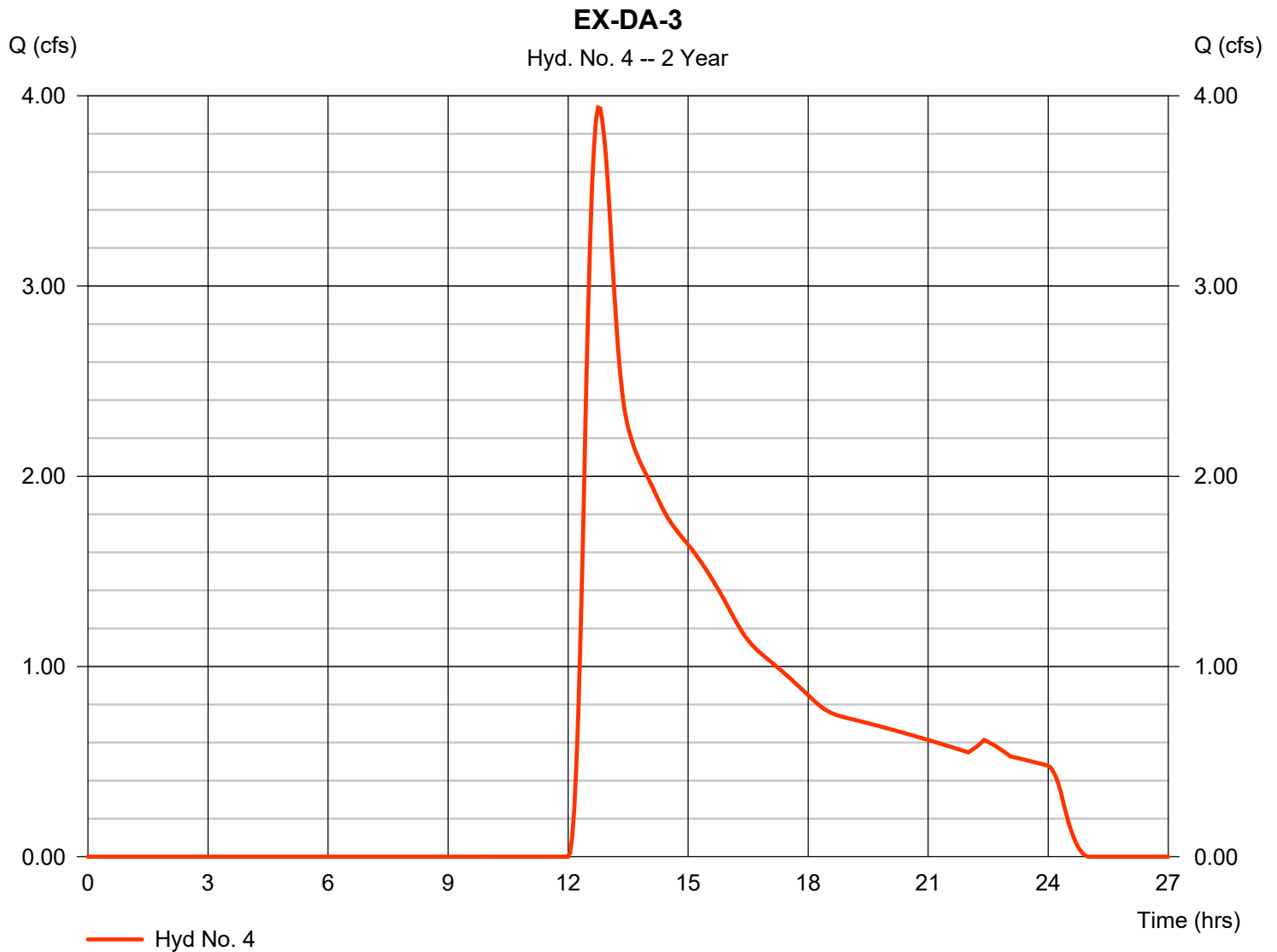
Wednesday, 05 / 16 / 2018

## Hyd. No. 4

EX-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.938 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.75 hrs
Time interval	= 3 min	Hyd. volume	= 50,899 cuft
Drainage area	= 50.910 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 38.30 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(30.546 x 61) + (20.364 x 39)] / 50.910



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 4

EX-DA-3

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.36	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 18.34</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 18.34</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 1684.20	0.00	0.00	
Watercourse slope (%)	= 0.76	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.41	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 19.96</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 19.96</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc .....</b>				<b>38.30 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

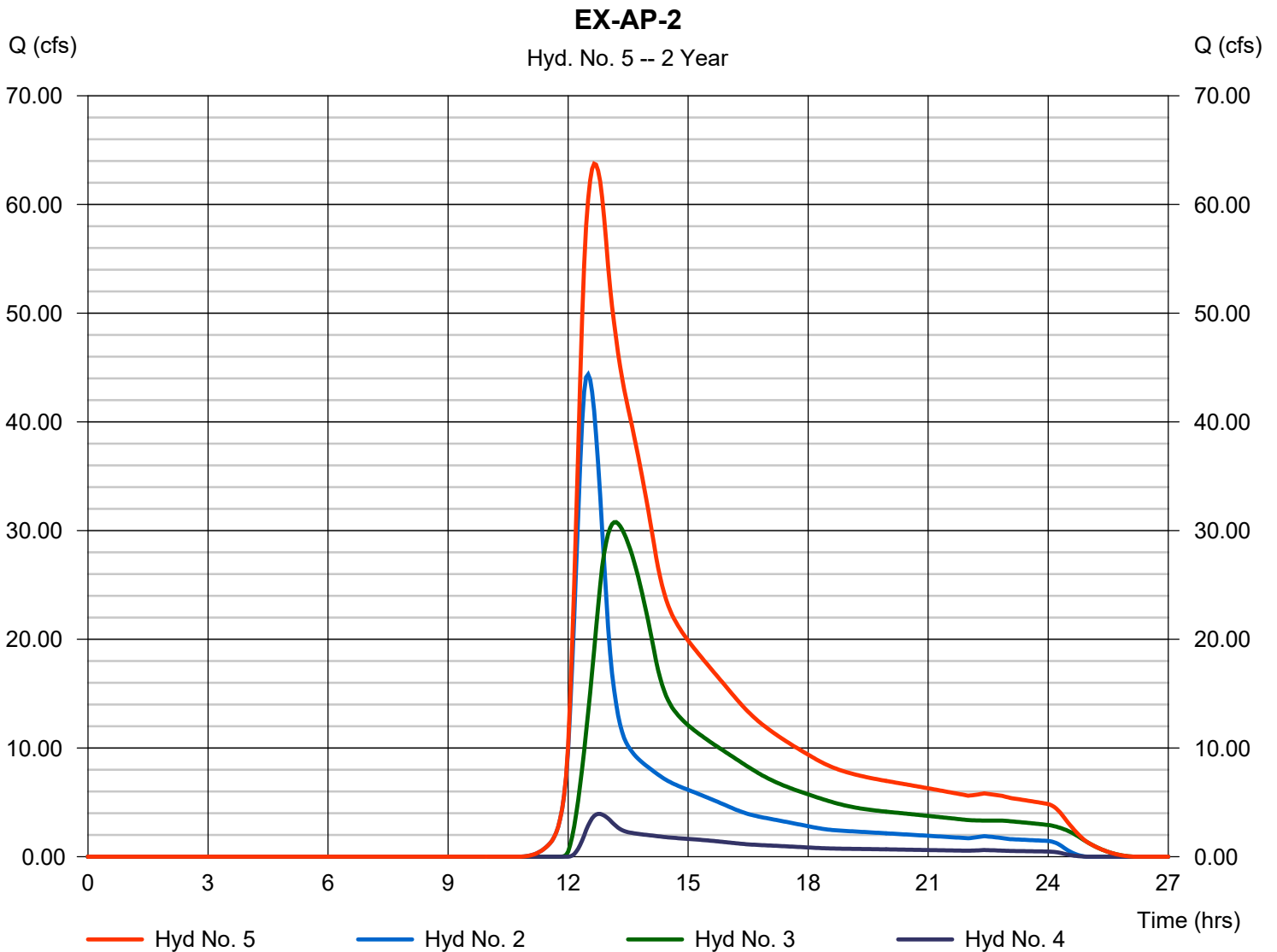
Wednesday, 05 / 16 / 2018

## Hyd. No. 5

EX-AP-2

Hydrograph type = Combine  
 Storm frequency = 2 yrs  
 Time interval = 3 min  
 Inflow hyds. = 2, 3, 4

Peak discharge = 63.75 cfs  
 Time to peak = 12.65 hrs  
 Hyd. volume = 724,668 cuft  
 Contrib. drain. area = 310.060 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

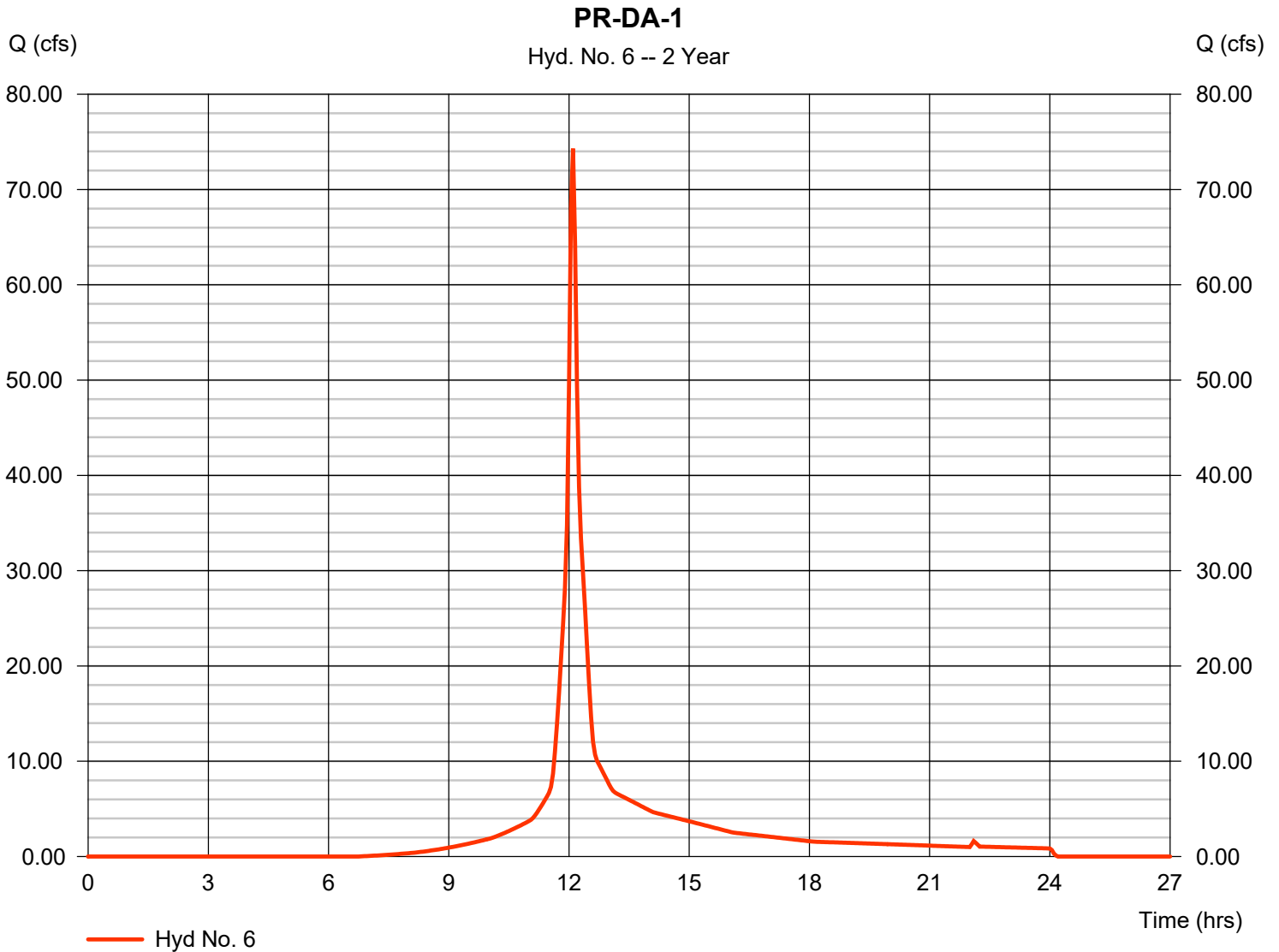
## Hyd. No. 6

PR-DA-1

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 3 min  
 Drainage area = 32.150 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 3.60 in  
 Storm duration = 24 hrs

Peak discharge = 74.29 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 248,636 cuft  
 Curve number = 87\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 7.60 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(22.300 x 98) + (9.560 x 61)] / 32.150



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 6

PR-DA-1

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>
<b>Sheet Flow</b>							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.60		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+</b>	<b>0.00</b>	<b>+</b>	<b>0.00</b>	<b>=</b>	<b>1.99</b>
<b>Shallow Concentrated Flow</b>							
Flow length (ft)	= 152.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=1.14		0.00		0.00		
<b>Travel Time (min)</b>	<b>= 2.22</b>	<b>+</b>	<b>0.00</b>	<b>+</b>	<b>0.00</b>	<b>=</b>	<b>2.22</b>
<b>Channel Flow</b>							
X sectional flow area (sqft)	= 27.58		0.00		0.00		
Wetted perimeter (ft)	= 15.88		0.00		0.00		
Channel slope (%)	= 0.50		0.00		0.00		
Manning's n-value	= 0.013		0.015		0.015		
Velocity (ft/s)	=11.73		0.00		0.00		
Flow length (ft)	({0})2403.0		0.0		0.0		
<b>Travel Time (min)</b>	<b>= 3.41</b>	<b>+</b>	<b>0.00</b>	<b>+</b>	<b>0.00</b>	<b>=</b>	<b>3.41</b>
<b>Total Travel Time, Tc .....</b>							<b>7.60 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

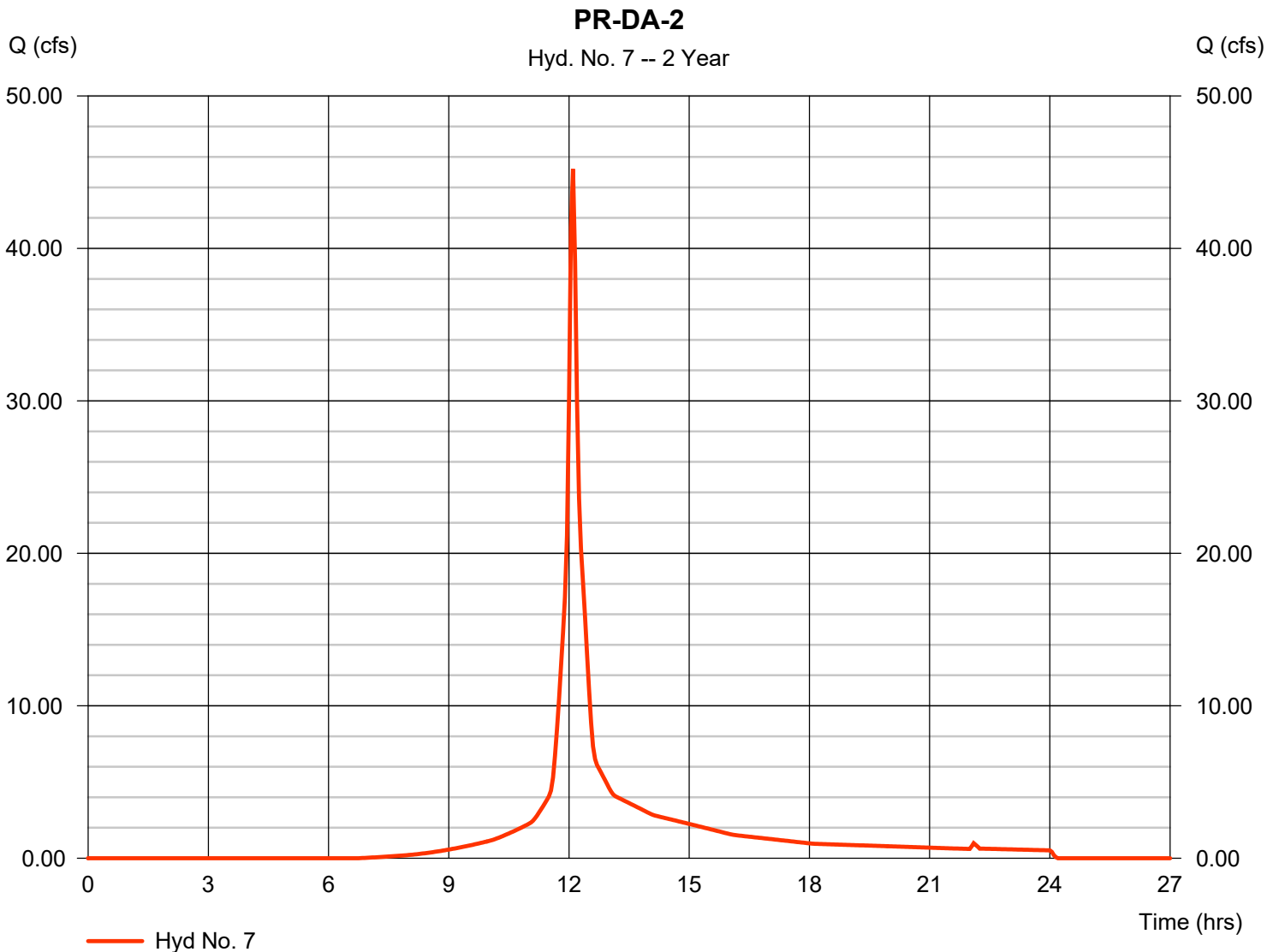
Wednesday, 05 / 16 / 2018

## Hyd. No. 7

PR-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 45.20 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 151,270 cuft
Drainage area	= 19.560 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(13.580 x 98) + (5.820 x 61)] / 19.560



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 7

PR-DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 217.47	0.00	0.00	
Watercourse slope (%)	= 0.50	0.00	0.00	
Surface description	= Unpaved	Unpaved	Paved	
Average velocity (ft/s)	=1.14	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 3.18</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 3.18</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 19.15	0.00	0.00	
Wetted perimeter (ft)	= 13.23	0.00	0.00	
Channel slope (%)	= 0.50	0.00	0.00	
Manning's n-value	= 0.013	0.015	0.015	
Velocity (ft/s)	=10.38	0.00	0.00	
Flow length (ft)	1518.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 2.44</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 2.44</b>
<b>Total Travel Time, Tc .....</b>				<b>7.60 min</b>



# Hydrograph Report

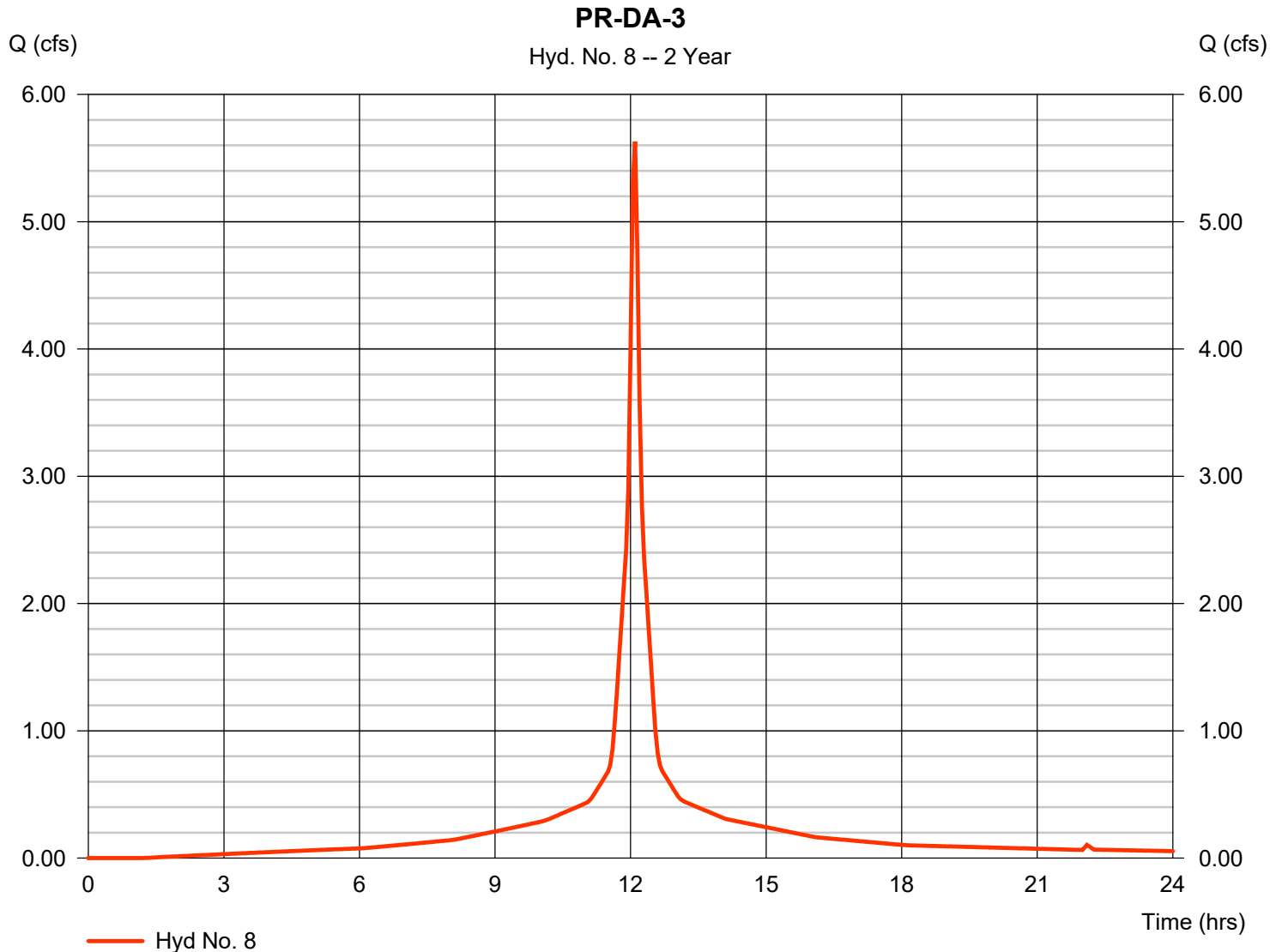
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 8

PR-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 5.631 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 21,261 cuft
Drainage area	= 1.856 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.80 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 8

PR-DA-3

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 2.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.66</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.66</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 198.00	0.00	0.00	
Watercourse slope (%)	= 1.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=2.03	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.62</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.62</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 27.58	0.00	0.00	
Wetted perimeter (ft)	= 15.88	0.00	0.00	
Channel slope (%)	= 0.50	0.00	0.00	
Manning's n-value	= 0.013	0.015	0.015	
Velocity (ft/s)	=11.73	0.00	0.00	
Flow length (ft)	({0})1748.1	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 2.48</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 2.48</b>
<b>Total Travel Time, Tc .....</b>				<b>4.80 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

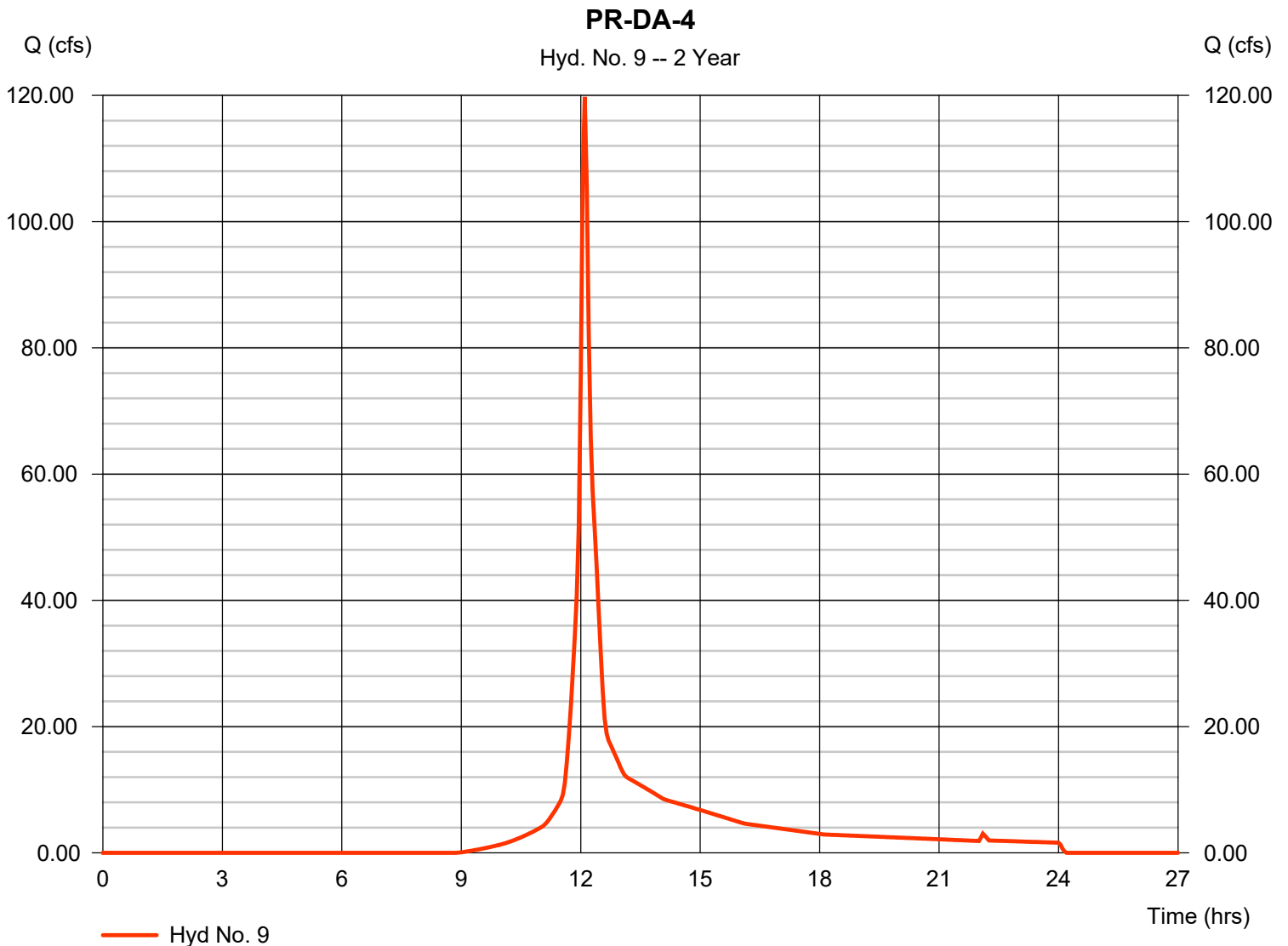
Wednesday, 05 / 16 / 2018

## Hyd. No. 9

PR-DA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 119.75 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 399,398 cuft
Drainage area	= 68.390 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.10 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(34.190 x 98) + (34.200 x 61)] / 68.390



# TR55 Tc Worksheet

**Hyd. No. 9**

PR-DA-4

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 110.95	0.00	0.00	
Watercourse slope (%)	= 0.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.14	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.62</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.62</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 37.54	0.00	0.00	
Wetted perimeter (ft)	= 18.53	0.00	0.00	
Channel slope (%)	= 0.50	0.00	0.00	
Manning's n-value	= 0.013	0.015	0.015	
Velocity (ft/s)	=13.01	0.00	0.00	
Flow length (ft)	3491.2	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 4.47</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 4.47</b>
<b>Total Travel Time, Tc</b> .....				<b>8.10 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

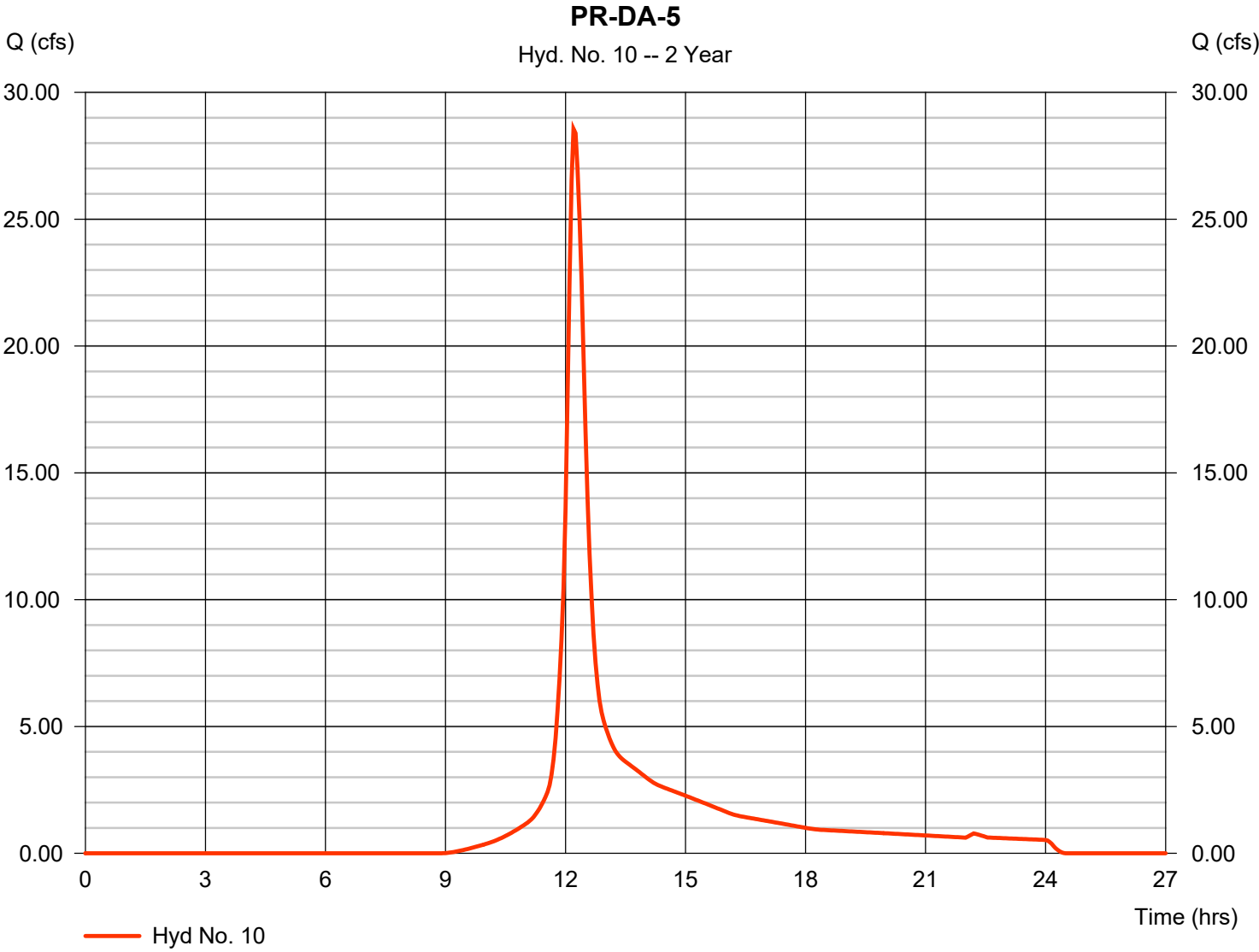
## Hyd. No. 10

PR-DA-5

Hydrograph type = SCS Runoff  
Storm frequency = 2 yrs  
Time interval = 3 min  
Drainage area = 20.050 ac  
Basin Slope = 0.0 %  
Tc method = TR55  
Total precip. = 3.60 in  
Storm duration = 24 hrs

Peak discharge = 28.56 cfs  
Time to peak = 12.20 hrs  
Hyd. volume = 128,801 cuft  
Curve number = 80\*  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 18.40 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(10.167 x 98) + (10.167 x 61)] / 20.050



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 10

PR-DA-5

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 918.22	0.00	0.00	
Watercourse slope (%)	= 0.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.14	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 13.41</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 13.41</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 86.78	0.00	0.00	
Wetted perimeter (ft)	= 34.61	0.00	0.00	
Channel slope (%)	= 0.30	0.00	0.00	
Manning's n-value	= 0.026	0.015	0.015	
Velocity (ft/s)	=5.81	0.00	0.00	
Flow length (ft)	1031.6	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 2.96</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 2.96</b>
<b>Total Travel Time, Tc .....</b>				<b>18.40 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

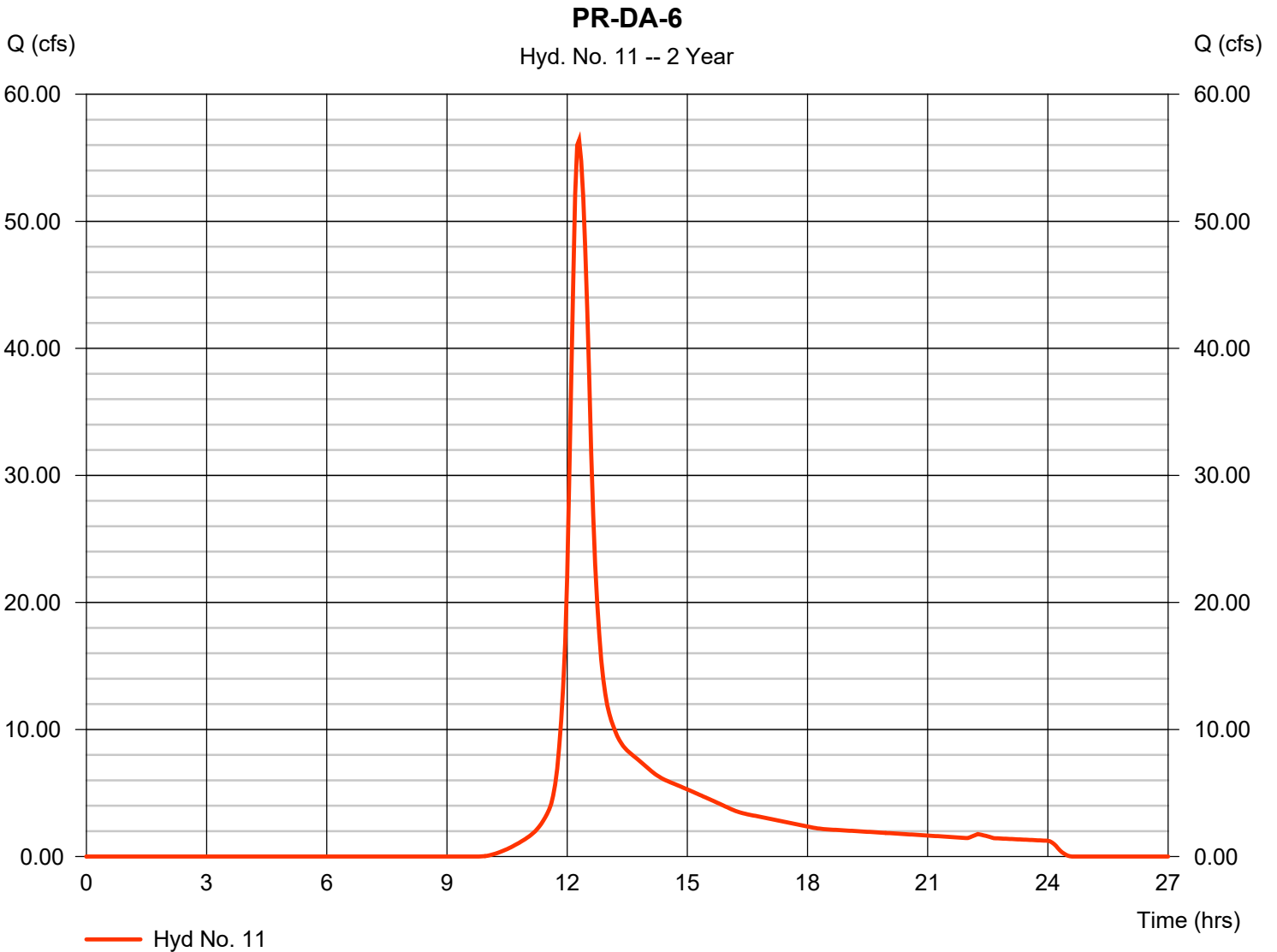
Wednesday, 05 / 16 / 2018

## Hyd. No. 11

PR-DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 56.40 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.30 hrs
Time interval	= 3 min	Hyd. volume	= 275,703 cuft
Drainage area	= 54.160 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.60 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.630 x 61) + (7.450 x 39) + (27.080 x 98)] / 54.160



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 11

PR-DA-6

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 1884.20	0.00	0.00	
Watercourse slope (%)	= 0.74	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=1.39	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 22.63</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 22.63</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc .....</b>				<b>24.60 min</b>



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

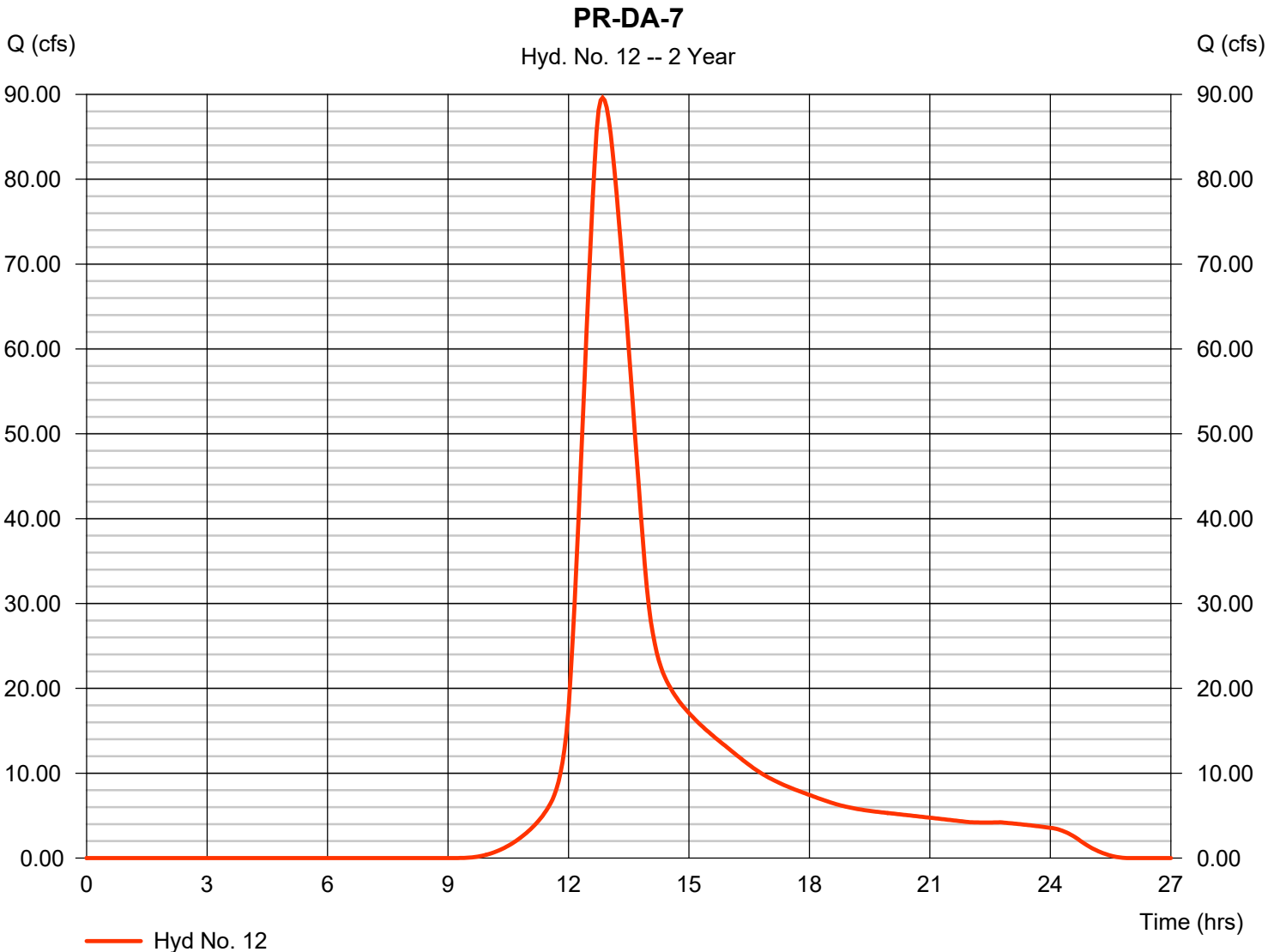
## Hyd. No. 12

PR-DA-7

Hydrograph type = SCS Runoff  
 Storm frequency = 2 yrs  
 Time interval = 3 min  
 Drainage area = 132.150 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 3.60 in  
 Storm duration = 24 hrs

Peak discharge = 89.62 cfs  
 Time to peak = 12.85 hrs  
 Hyd. volume = 788,659 cuft  
 Curve number = 79\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 71.80 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(66.080 x 98) + (66.070 x 61)] / 132.150



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 12

PR-DA-7

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.60	0.00	0.00	
Land slope (%)	= 0.50	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 1.99</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 1.99</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 3242.18	0.00	0.00	
Watercourse slope (%)	= 0.23	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=0.77	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 69.83</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 69.83</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Total Travel Time, Tc .....</b>				<b>71.80 min</b>

# Hydrograph Report

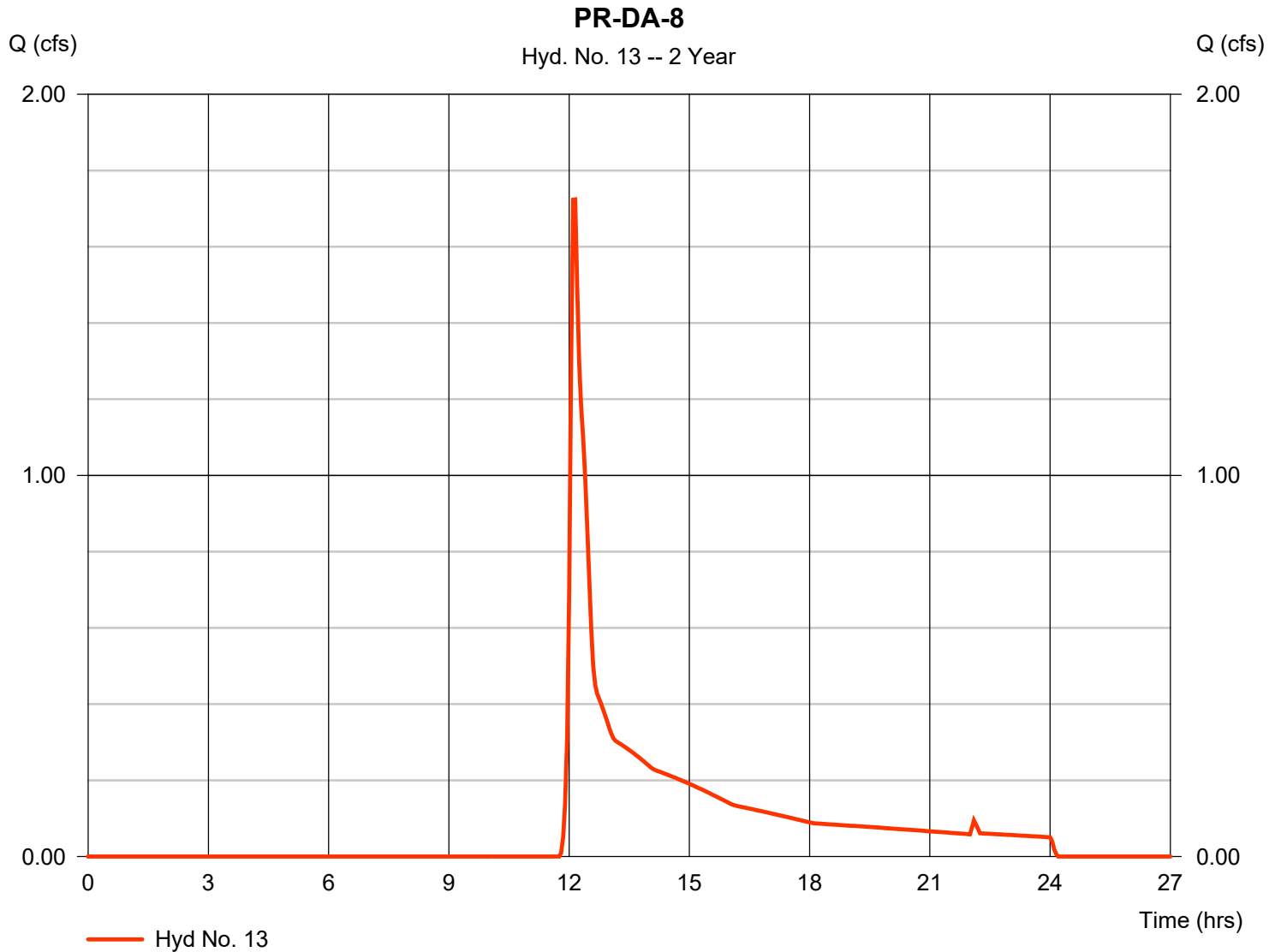
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 13

PR-DA-8

Hydrograph type	= SCS Runoff	Peak discharge	= 1.724 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 7,870 cuft
Drainage area	= 3.740 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.90 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 13

PR-DA-8

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 0.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00	
Land slope (%)	= 0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 86.78	0.00	0.00	
Wetted perimeter (ft)	= 34.61	0.00	0.00	
Channel slope (%)	= 0.30	0.00	0.00	
Manning's n-value	= 0.026	0.015	0.015	
Velocity (ft/s)	=5.81	0.00	0.00	
Flow length (ft)	{{0}}1715.4	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 4.92</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 4.92</b>
<b>Total Travel Time, Tc .....</b>				<b>4.90 min</b>

# Hydrograph Report

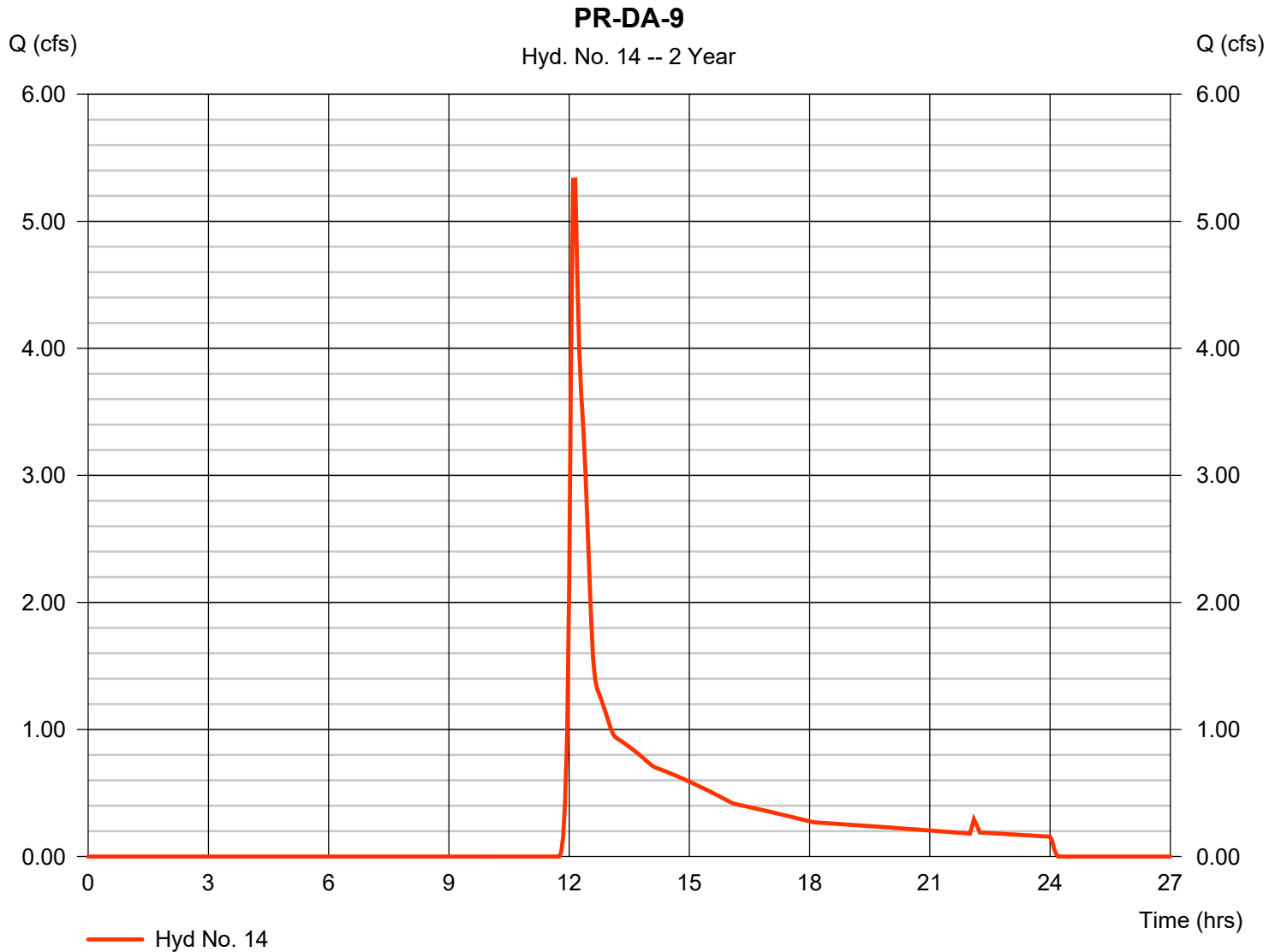
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 14

PR-DA-9

Hydrograph type	= SCS Runoff	Peak discharge	= 5.329 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 24,325 cuft
Drainage area	= 11.560 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.70 min
Total precip.	= 3.60 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

## Hyd. No. 14

PR-DA-9

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
<b>Sheet Flow</b>				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 0.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 0.00	0.00	0.00	
Land slope (%)	= 0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Shallow Concentrated Flow</b>				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	=0.00	0.00	0.00	
<b>Travel Time (min)</b>	<b>= 0.00</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 0.00</b>
<b>Channel Flow</b>				
X sectional flow area (sqft)	= 320.00	0.00	0.00	
Wetted perimeter (ft)	= 65.25	0.00	0.00	
Channel slope (%)	= 0.30	0.00	0.00	
Manning's n-value	= 0.026	0.015	0.015	
Velocity (ft/s)	=9.11	0.00	0.00	
Flow length (ft)	3133.0	0.0	0.0	
<b>Travel Time (min)</b>	<b>= 5.73</b>	<b>+ 0.00</b>	<b>+ 0.00</b>	<b>= 5.73</b>
<b>Total Travel Time, Tc .....</b>				<b>5.70 min</b>

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 15

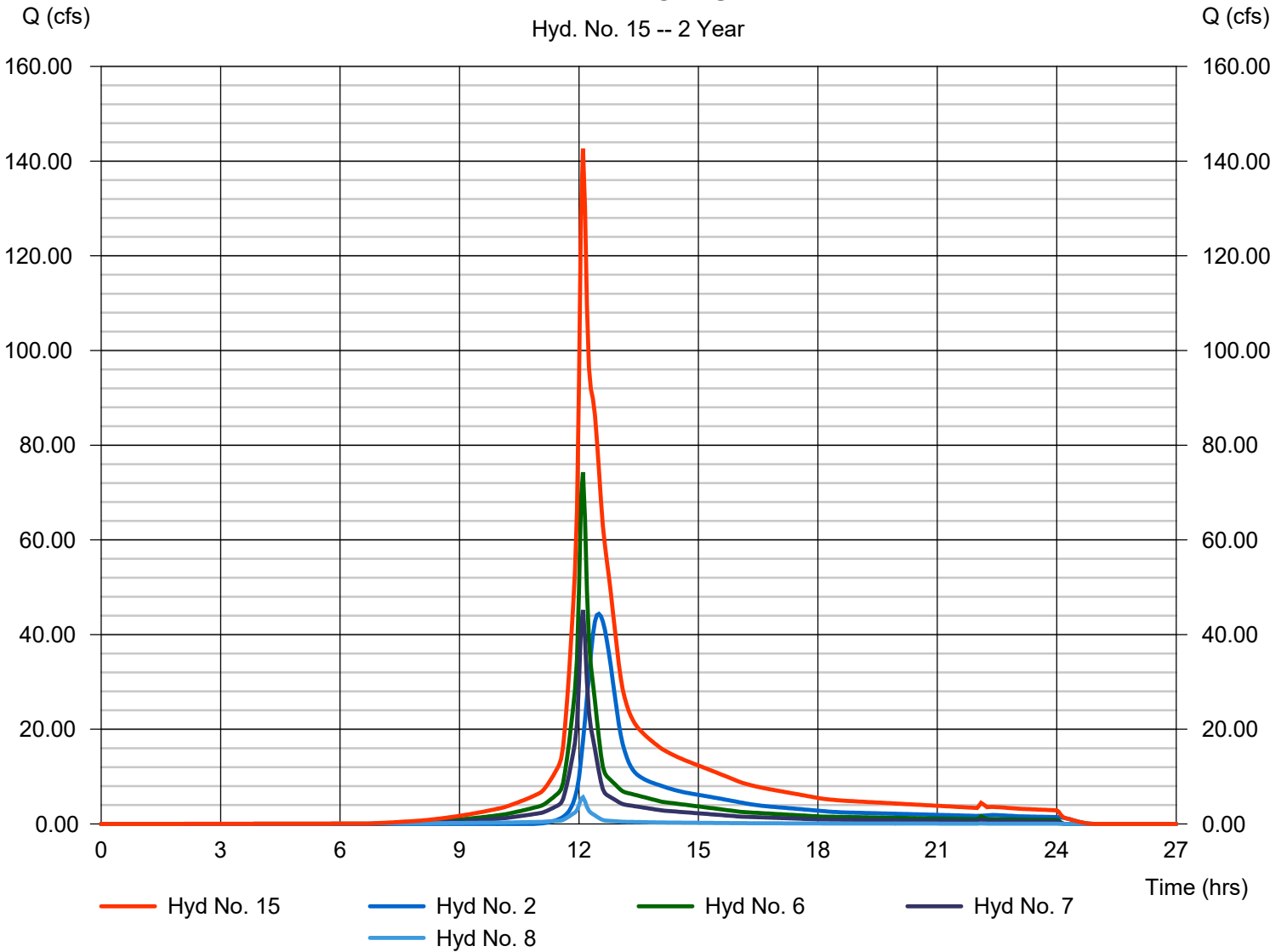
PR-AP-1 - AGNES RD

Hydrograph type = Combine  
Storm frequency = 2 yrs  
Time interval = 3 min  
Inflow hyds. = 2, 6, 7, 8

Peak discharge = 142.63 cfs  
Time to peak = 12.10 hrs  
Hyd. volume = 702,631 cuft  
Contrib. drain. area = 123.406 ac

### PR-AP-1 - AGNES RD

Hyd. No. 15 -- 2 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

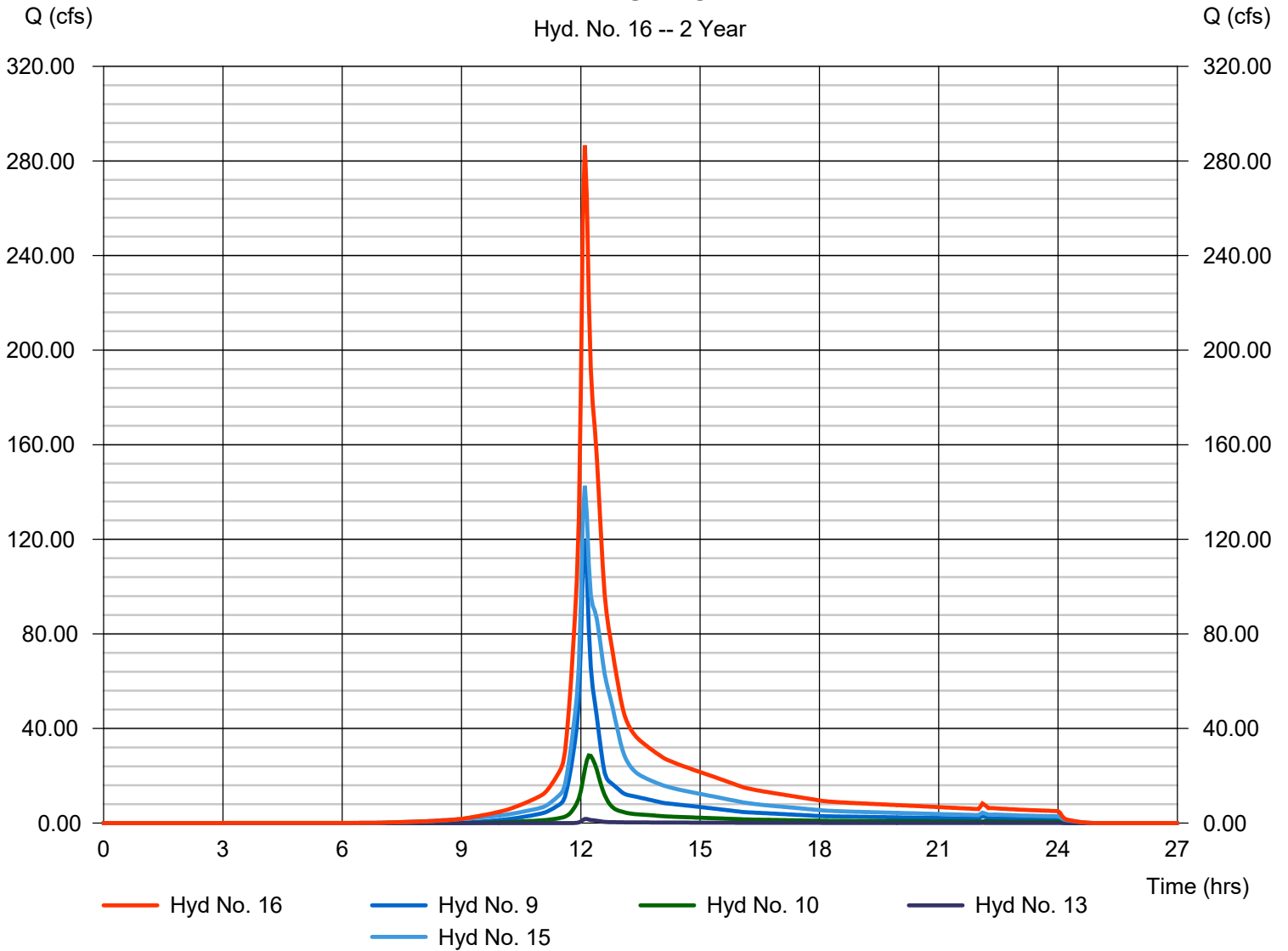
## Hyd. No. 16

PR-AP-2 - SE CORNER

Hydrograph type	= Combine	Peak discharge	= 286.68 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 1,238,700 cuft
Inflow hyds.	= 9, 10, 13, 15	Contrib. drain. area	= 92.180 ac

### PR-AP-2 - SE CORNER

Hyd. No. 16 -- 2 Year





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

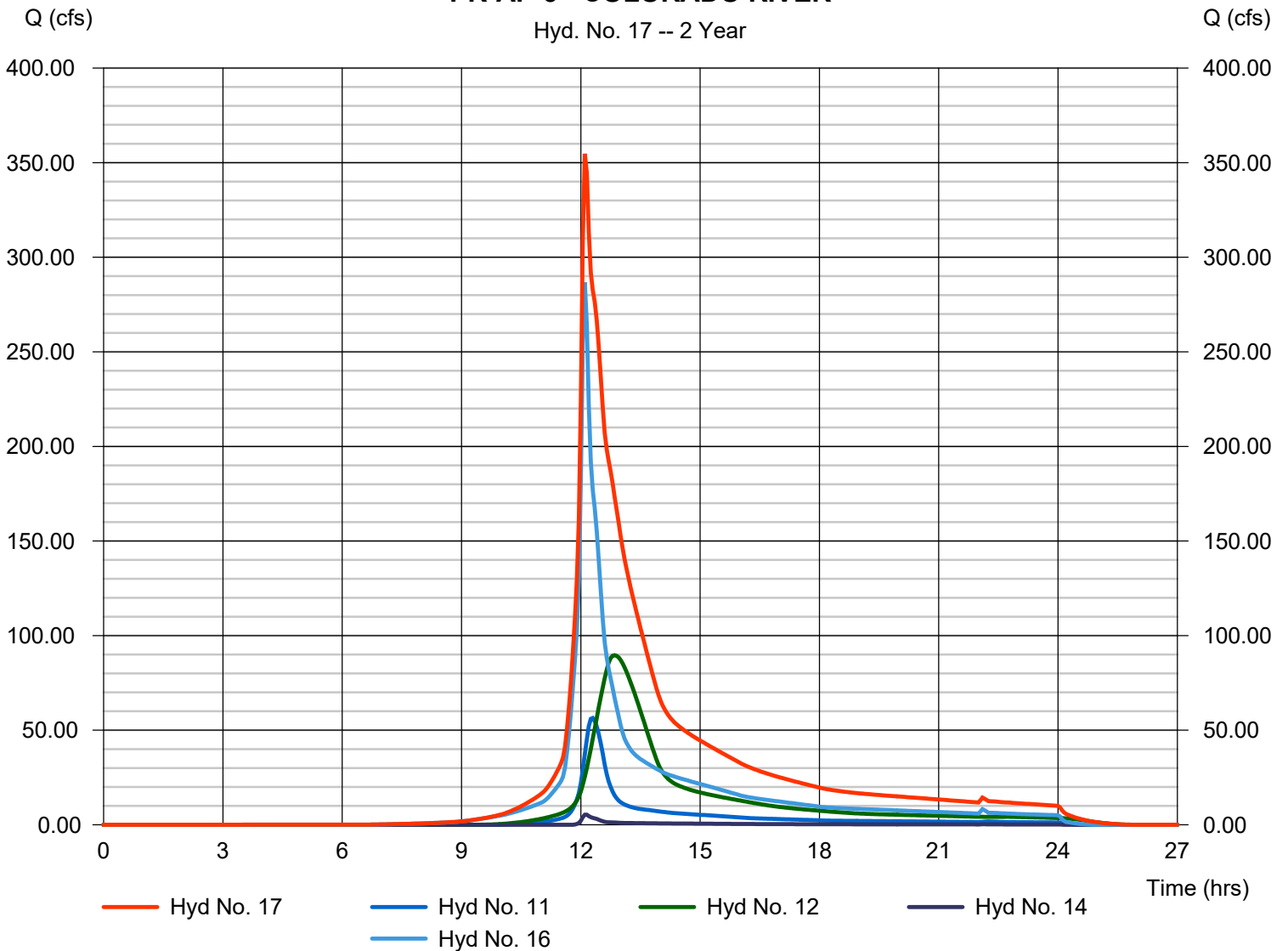
## Hyd. No. 17

PR-AP-3 - COLORADO RIVER

Hydrograph type	= Combine	Peak discharge	= 354.73 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 2,327,386 cuft
Inflow hyds.	= 11, 12, 14, 16	Contrib. drain. area	= 197.870 ac

### PR-AP-3 - COLORADO RIVER

Hyd. No. 17 -- 2 Year



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	35.60	3	792	430,770	----	----	----	EX-DA-1 / EX-AP-1	
2	SCS Runoff	90.58	3	747	547,124	----	----	----	EX-DA-OFFSITE	
3	SCS Runoff	87.97	3	783	927,611	----	----	----	EX-DA-2	
4	SCS Runoff	19.58	3	756	154,249	----	----	----	EX-DA-3	
5	Combine	165.26	3	759	1,628,986	2, 3, 4	----	----	EX-AP-2	
6	SCS Runoff	117.66	3	726	400,613	----	----	----	PR-DA-1	
7	SCS Runoff	71.58	3	726	243,732	----	----	----	PR-DA-2	
8	SCS Runoff	8.018	3	726	30,716	----	----	----	PR-DA-3	
9	SCS Runoff	208.26	3	726	693,630	----	----	----	PR-DA-4	
10	SCS Runoff	50.07	3	732	223,688	----	----	----	PR-DA-5	
11	SCS Runoff	104.79	3	735	501,861	----	----	----	PR-DA-6	
12	SCS Runoff	159.57	3	768	1,385,353	----	----	----	PR-DA-7	
13	SCS Runoff	5.024	3	726	18,195	----	----	----	PR-DA-8	
14	SCS Runoff	15.53	3	726	56,238	----	----	----	PR-DA-9	
15	Combine	239.42	3	726	1,222,186	2, 6, 7, 8,	----	----	PR-AP-1 - AGNES RD	
16	Combine	493.34	3	726	2,157,699	9, 10, 13, 15	----	----	PR-AP-2 - SE CORNER	
17	Combine	634.13	3	726	4,101,151	11, 12, 14, 16	----	----	PR-AP-3 - COLORADO RIVER	
CHANNEL (05-16-18).gpw					Return Period: 5 Year			Wednesday, 05 / 16 / 2018		

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

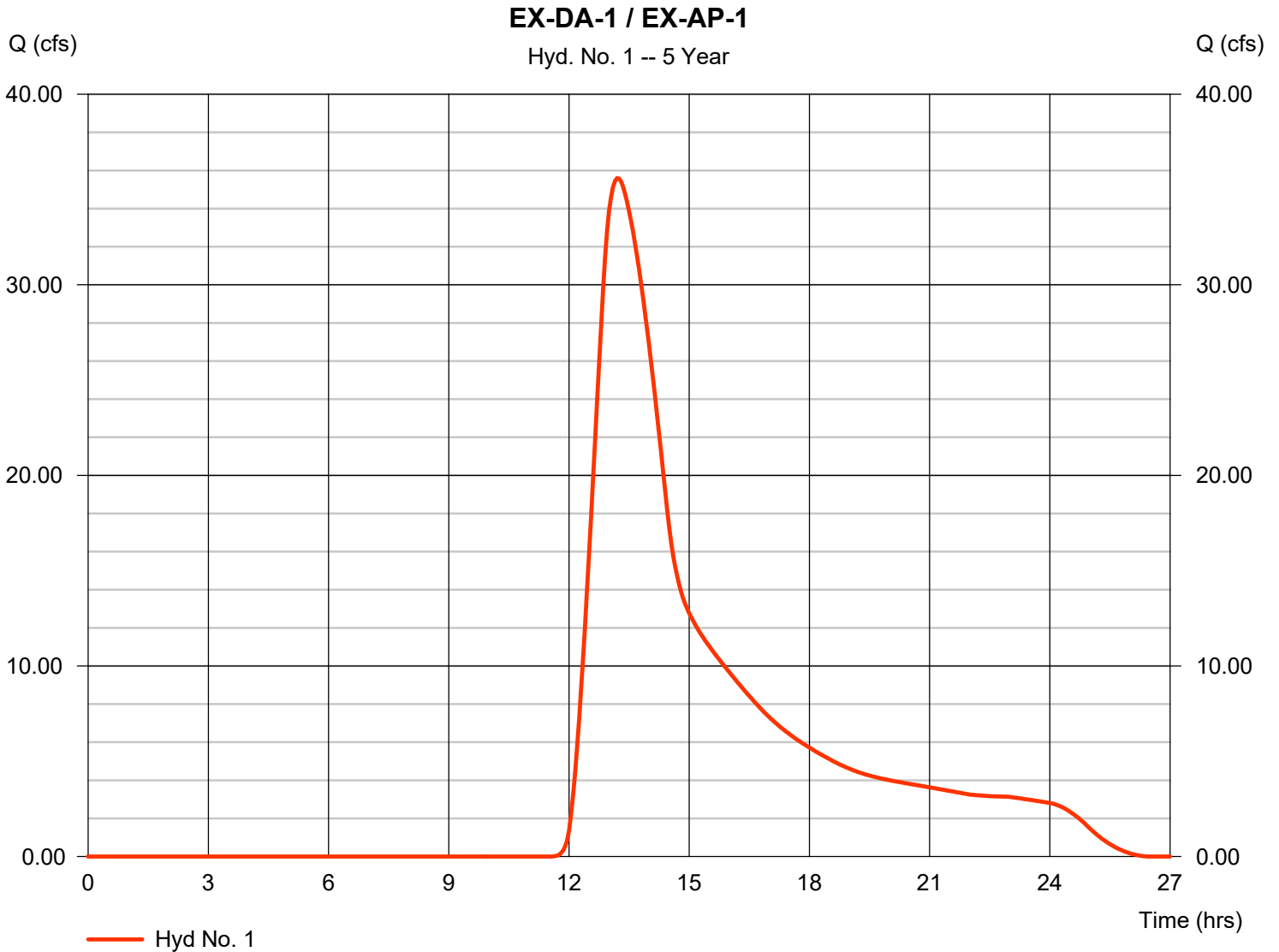
## Hyd. No. 1

EX-DA-1 / EX-AP-1

Hydrograph type = SCS Runoff  
 Storm frequency = 5 yrs  
 Time interval = 3 min  
 Drainage area = 101.790 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 5.10 in  
 Storm duration = 24 hrs

Peak discharge = 35.60 cfs  
 Time to peak = 13.20 hrs  
 Hyd. volume = 430,770 cuft  
 Curve number = 57\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 94.50 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(84.000 x 61) + (17.790 x 39)] / 101.790



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

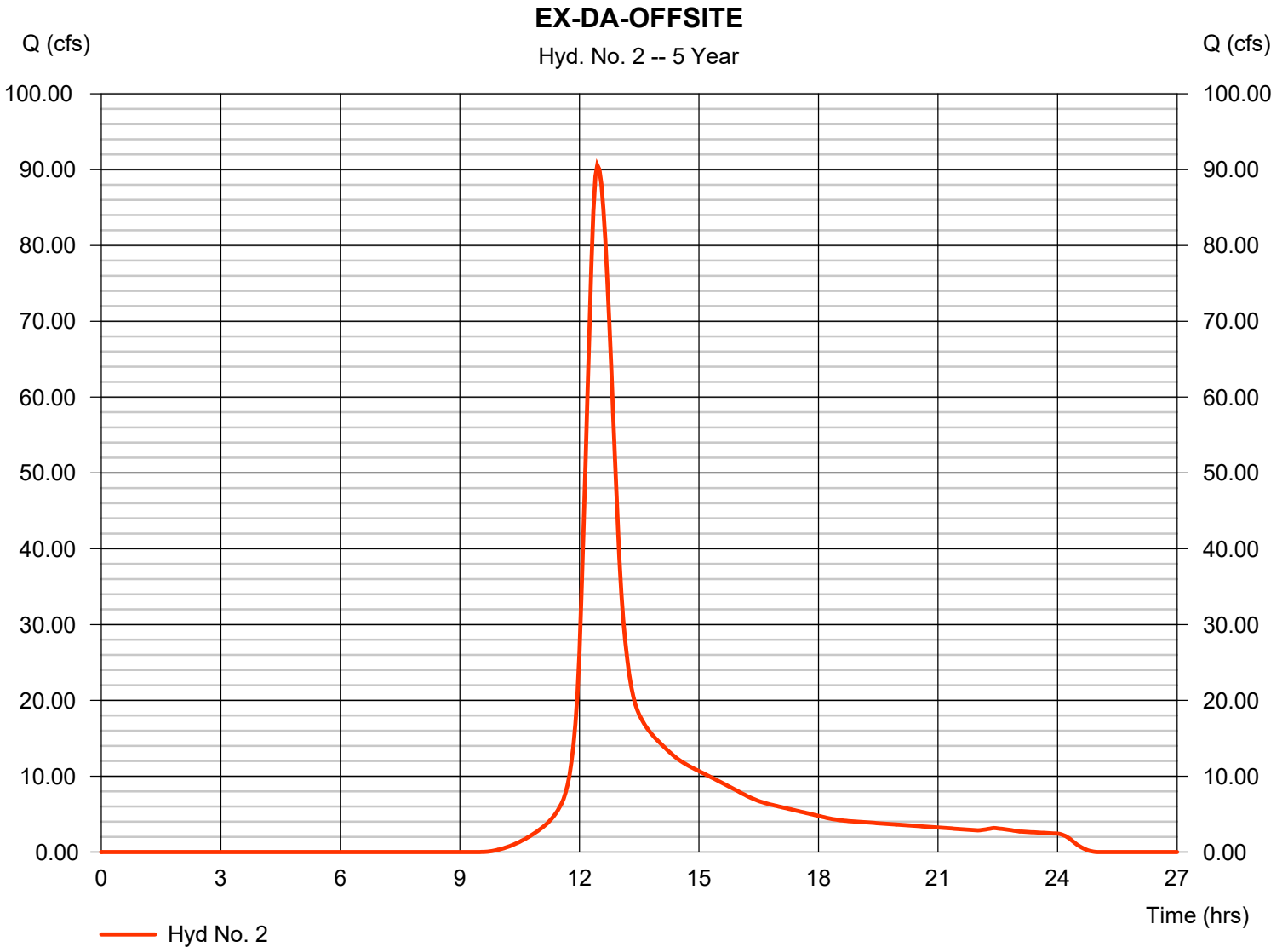
## Hyd. No. 2

EX-DA-OFFSITE

Hydrograph type = SCS Runoff  
 Storm frequency = 5 yrs  
 Time interval = 3 min  
 Drainage area = 69.840 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 5.10 in  
 Storm duration = 24 hrs

Peak discharge = 90.58 cfs  
 Time to peak = 12.45 hrs  
 Hyd. volume = 547,124 cuft  
 Curve number = 71\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 39.80 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(19.230 x 98) + (50.610 x 61)] / 69.840



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

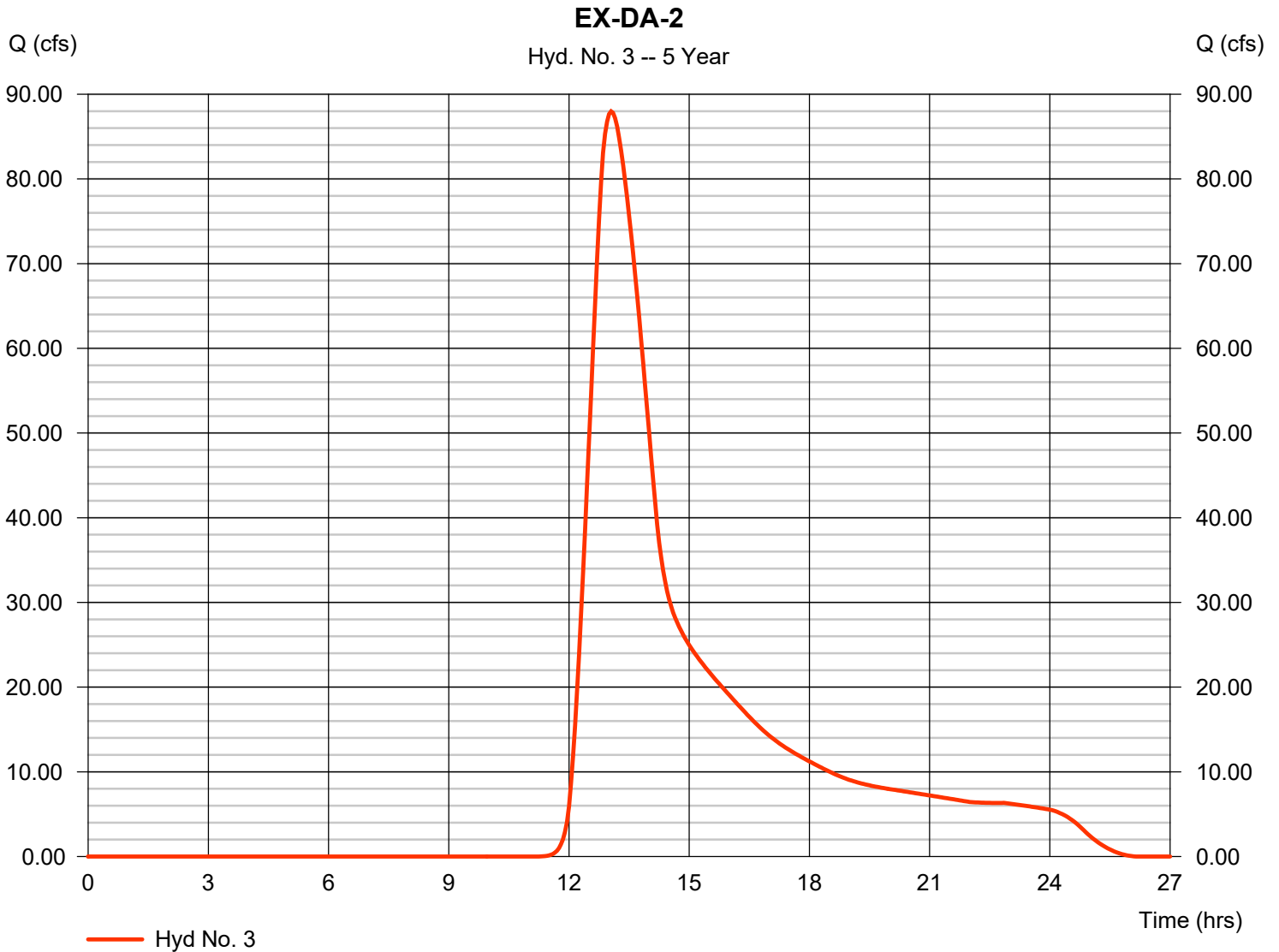
Wednesday, 05 / 16 / 2018

## Hyd. No. 3

EX-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 87.97 cfs
Storm frequency	= 5 yrs	Time to peak	= 13.05 hrs
Time interval	= 3 min	Hyd. volume	= 927,611 cuft
Drainage area	= 189.310 ac	Curve number	= 60*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 83.86 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(183.470 x 61) + (5.840 x 39)] / 189.310



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

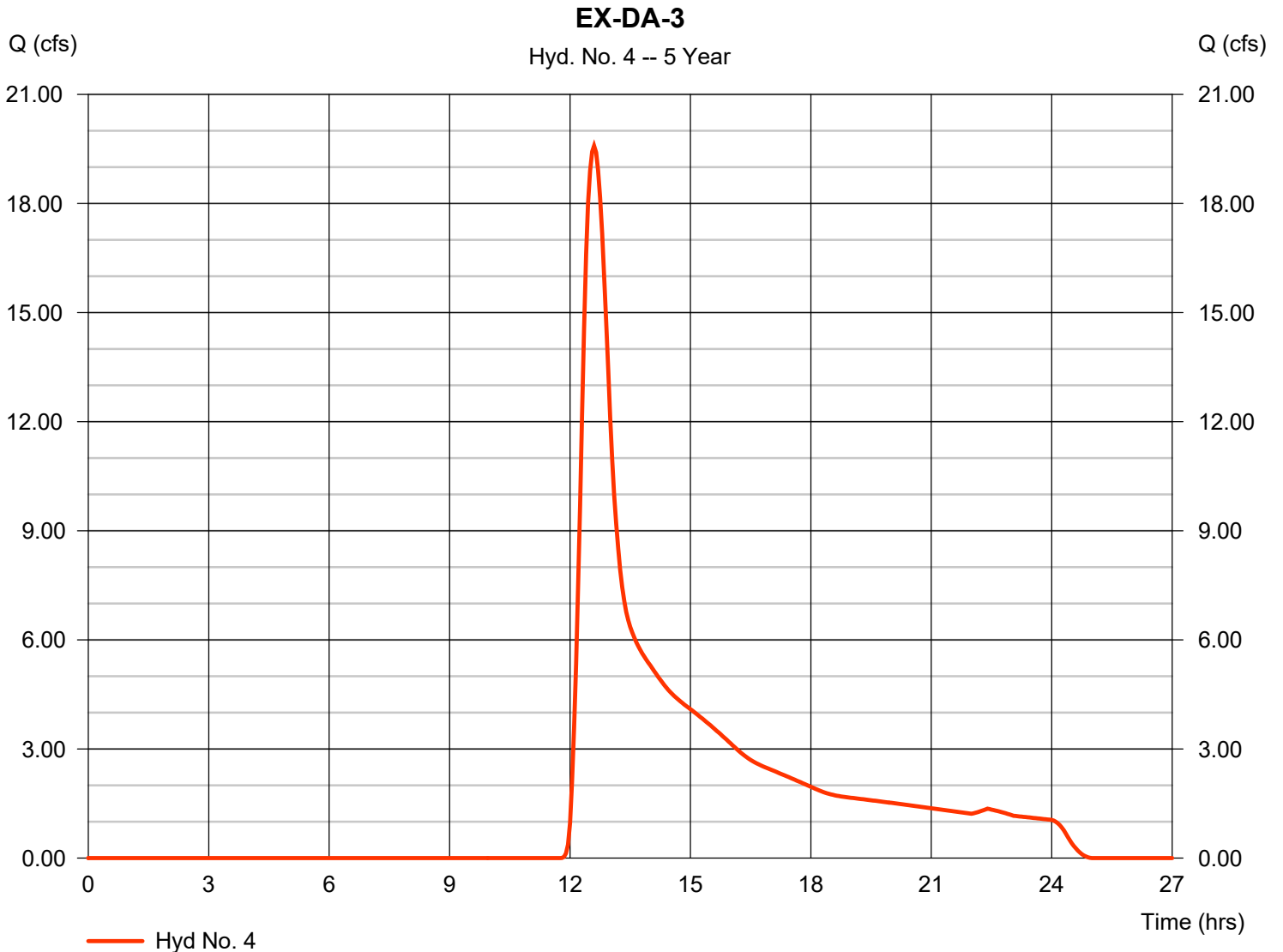
Wednesday, 05 / 16 / 2018

## Hyd. No. 4

EX-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 19.58 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.60 hrs
Time interval	= 3 min	Hyd. volume	= 154,249 cuft
Drainage area	= 50.910 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 38.30 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(30.546 x 61) + (20.364 x 39)] / 50.910



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

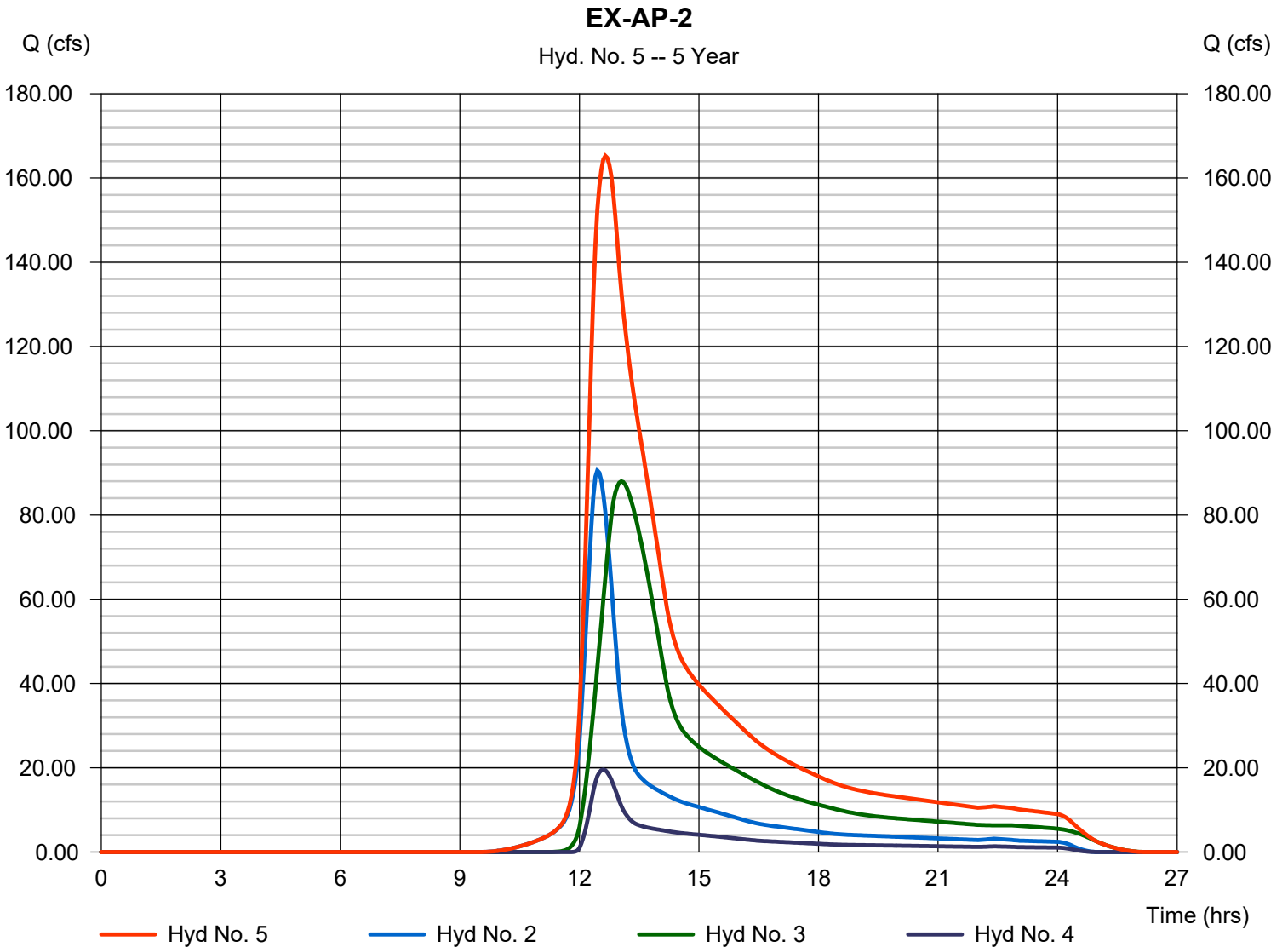
Wednesday, 05 / 16 / 2018

## Hyd. No. 5

EX-AP-2

Hydrograph type = Combine  
Storm frequency = 5 yrs  
Time interval = 3 min  
Inflow hyds. = 2, 3, 4

Peak discharge = 165.26 cfs  
Time to peak = 12.65 hrs  
Hyd. volume = 1,628,986 cuft  
Contrib. drain. area = 310.060 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

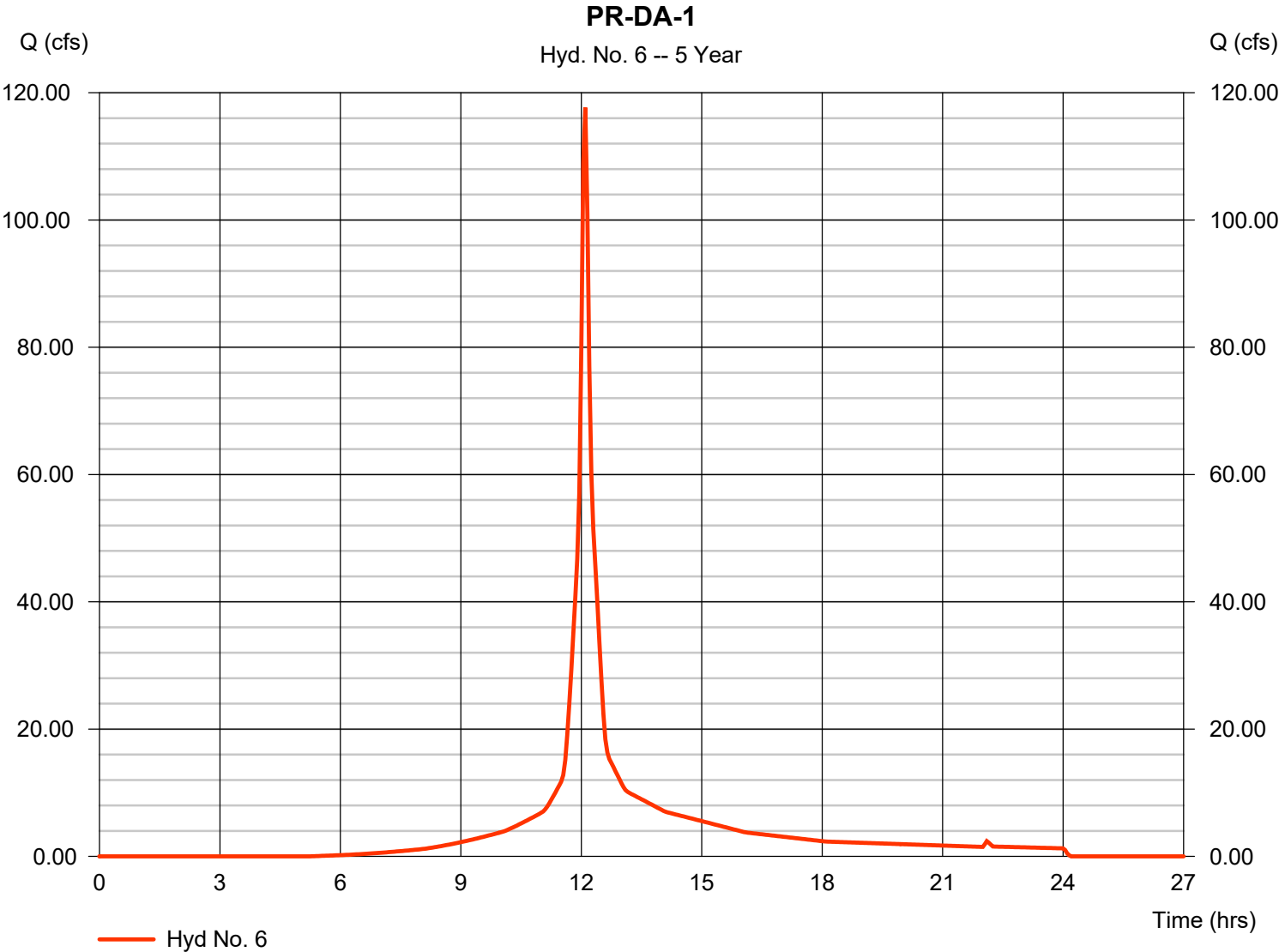
Wednesday, 05 / 16 / 2018

## Hyd. No. 6

PR-DA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 117.66 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 400,613 cuft
Drainage area	= 32.150 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(22.300 x 98) + (9.560 x 61)] / 32.150





# Hydrograph Report

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Wednesday, 05 / 16 / 2018

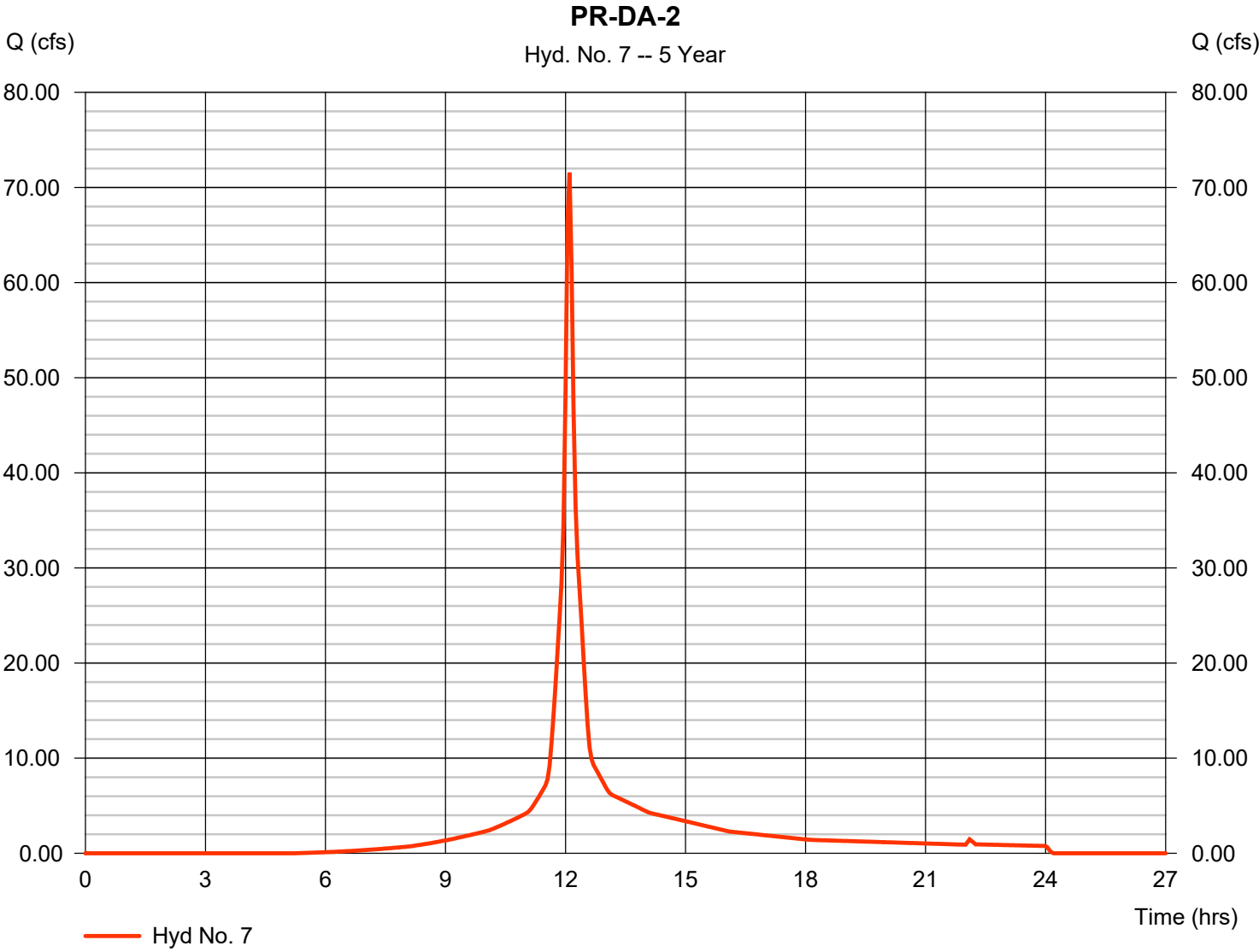
## Hyd. No. 7

PR-DA-2

Hydrograph type = SCS Runoff  
Storm frequency = 5 yrs  
Time interval = 3 min  
Drainage area = 19.560 ac  
Basin Slope = 0.0 %  
Tc method = TR55  
Total precip. = 5.10 in  
Storm duration = 24 hrs

Peak discharge = 71.58 cfs  
Time to peak = 12.10 hrs  
Hyd. volume = 243,732 cuft  
Curve number = 87\*  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 7.60 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(13.580 x 98) + (5.820 x 61)] / 19.560



# Hydrograph Report

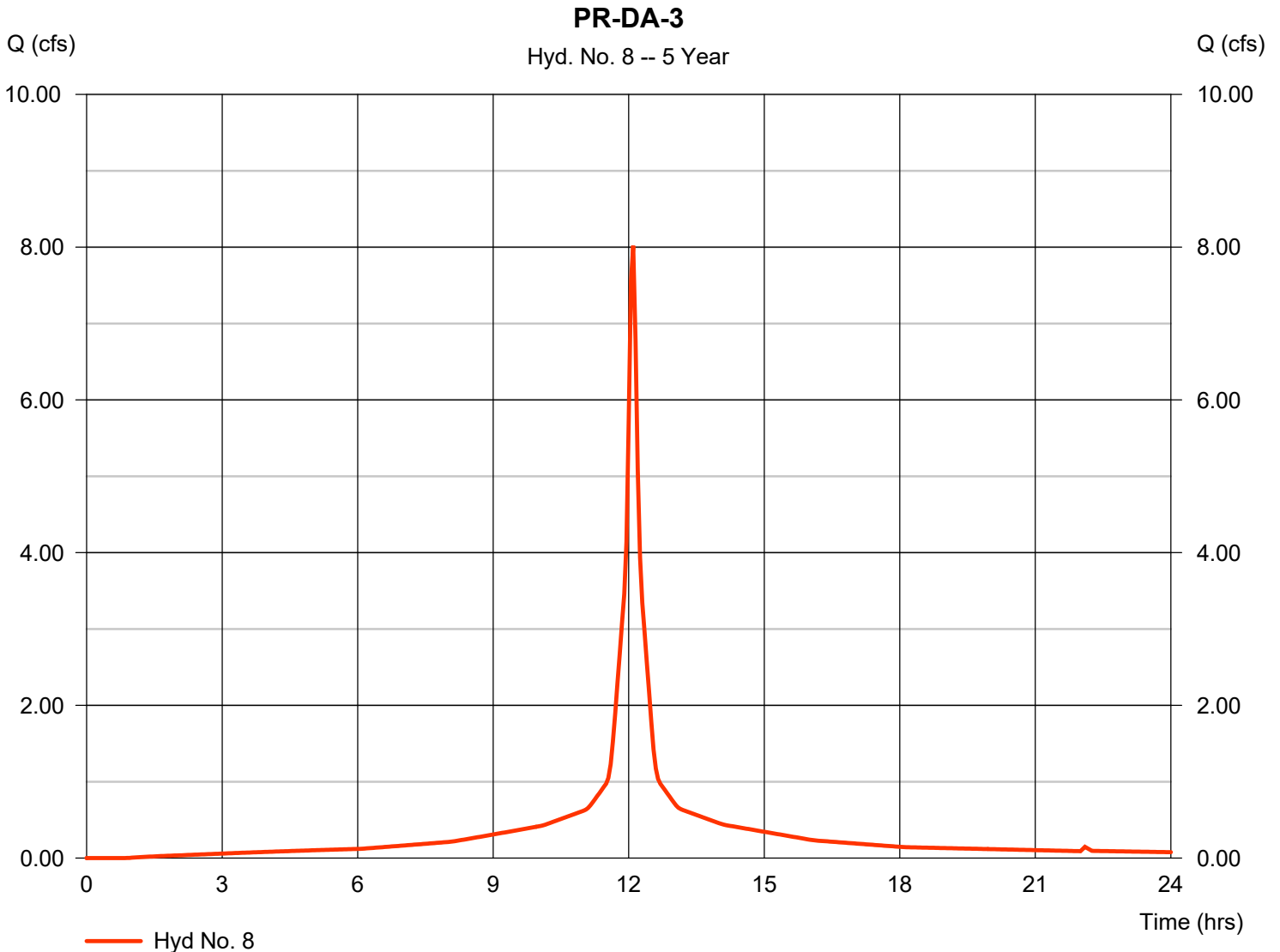
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Wednesday, 05 / 16 / 2018

## Hyd. No. 8

PR-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 8.018 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 30,716 cuft
Drainage area	= 1.856 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.80 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

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Wednesday, 05 / 16 / 2018

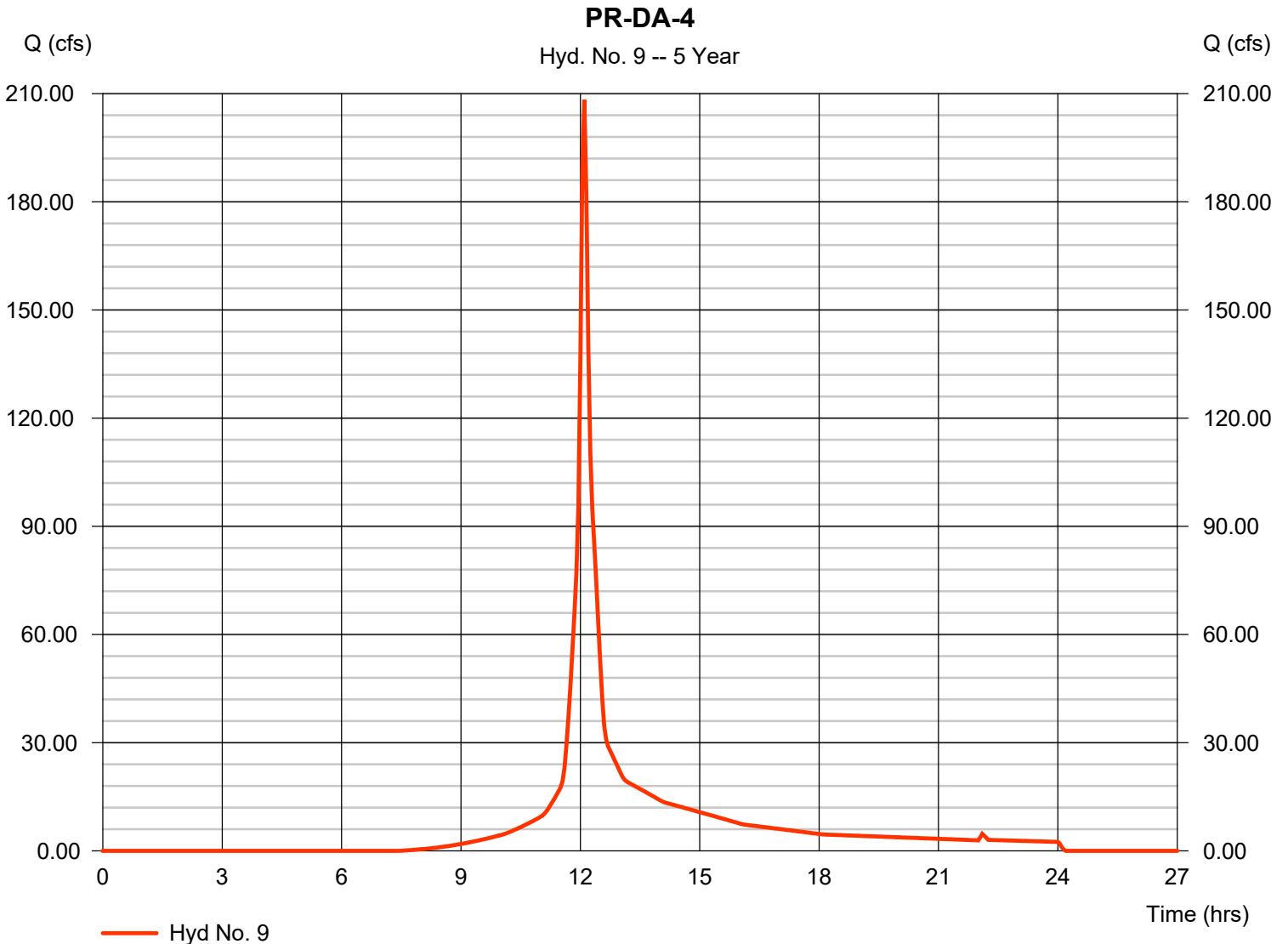
## Hyd. No. 9

PR-DA-4

Hydrograph type = SCS Runoff  
 Storm frequency = 5 yrs  
 Time interval = 3 min  
 Drainage area = 68.390 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 5.10 in  
 Storm duration = 24 hrs

Peak discharge = 208.26 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 693,630 cuft  
 Curve number = 80\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 8.10 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(34.190 x 98) + (34.200 x 61)] / 68.390



# Hydrograph Report

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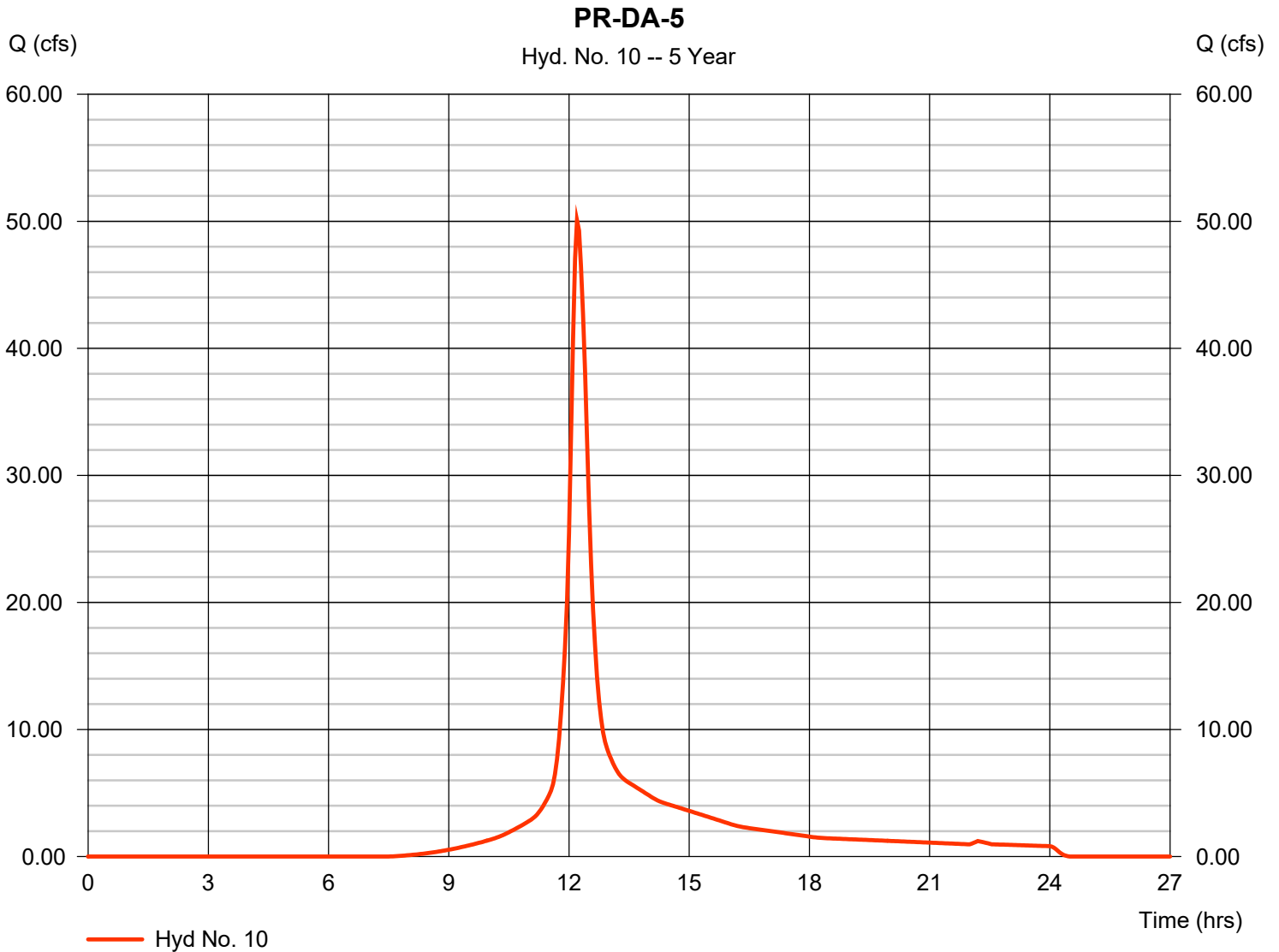
Wednesday, 05 / 16 / 2018

## Hyd. No. 10

PR-DA-5

Hydrograph type	= SCS Runoff	Peak discharge	= 50.07 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.20 hrs
Time interval	= 3 min	Hyd. volume	= 223,688 cuft
Drainage area	= 20.050 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.40 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(10.167 x 98) + (10.167 x 61)] / 20.050



# Hydrograph Report

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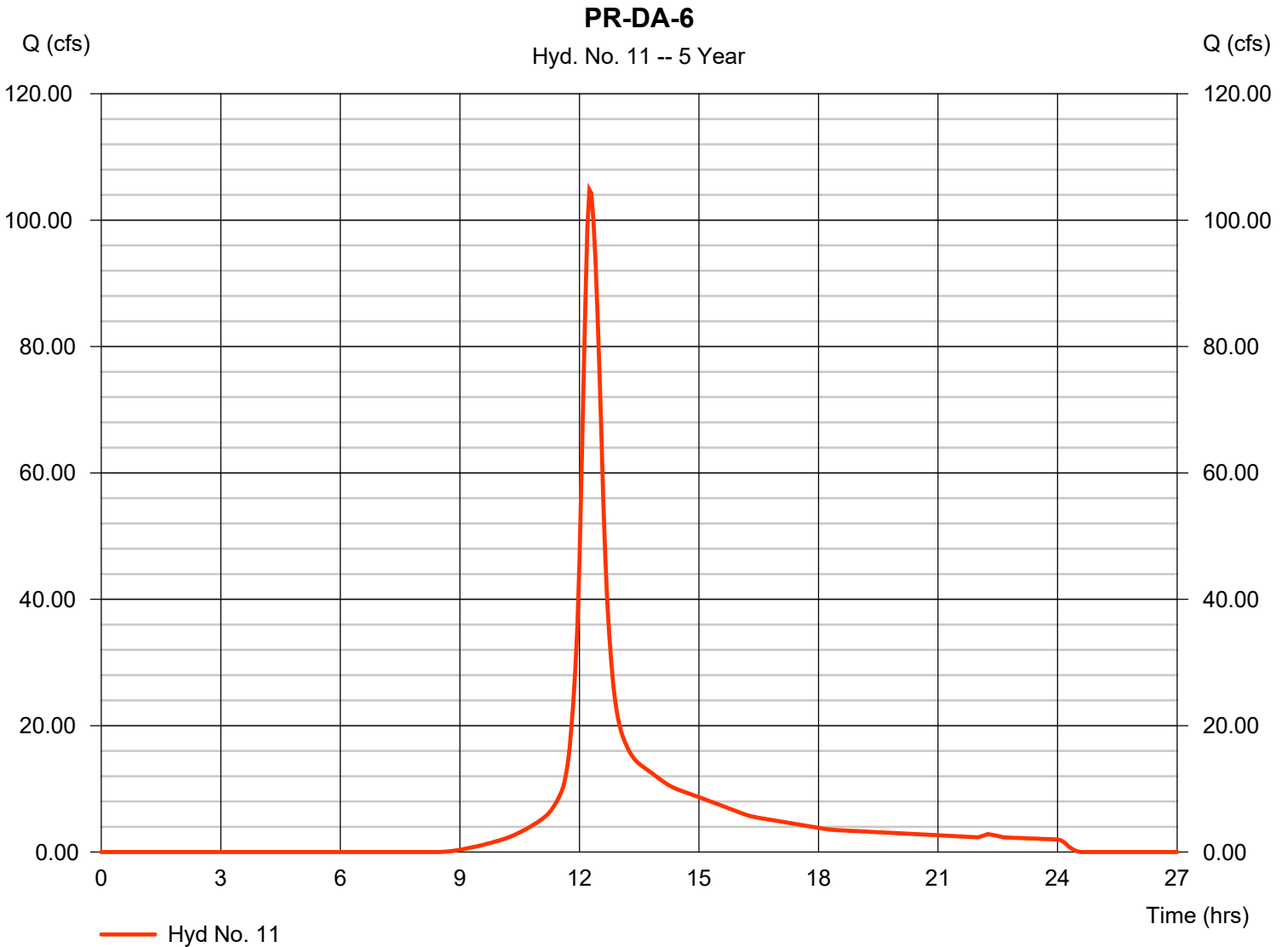
Wednesday, 05 / 16 / 2018

## Hyd. No. 11

PR-DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 104.79 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 501,861 cuft
Drainage area	= 54.160 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.60 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.630 x 61) + (7.450 x 39) + (27.080 x 98)] / 54.160



# Hydrograph Report

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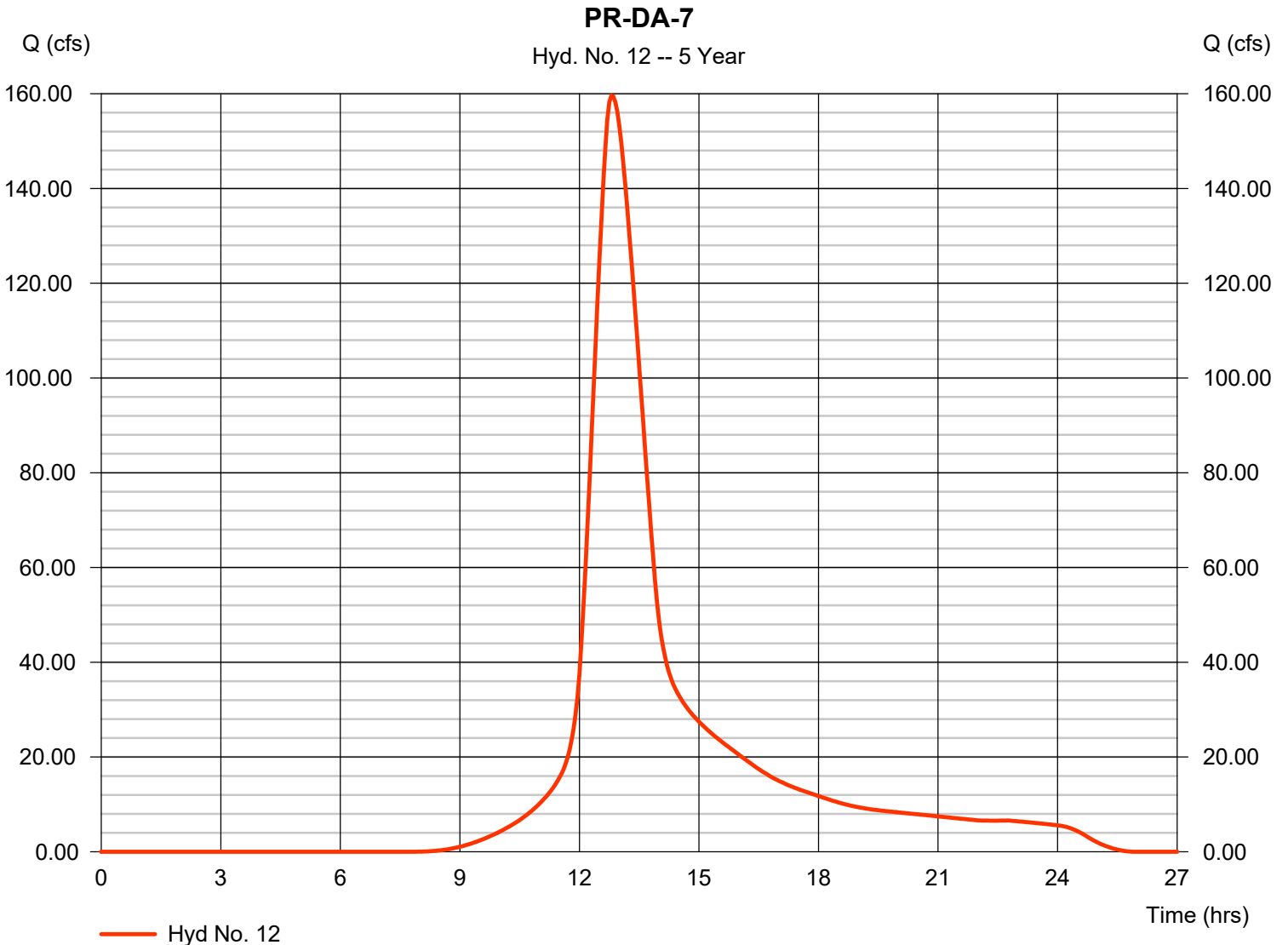
Wednesday, 05 / 16 / 2018

## Hyd. No. 12

PR-DA-7

Hydrograph type	= SCS Runoff	Peak discharge	= 159.57 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.80 hrs
Time interval	= 3 min	Hyd. volume	= 1,385,353 cuft
Drainage area	= 132.150 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 71.80 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(66.080 x 98) + (66.070 x 61)] / 132.150



# Hydrograph Report

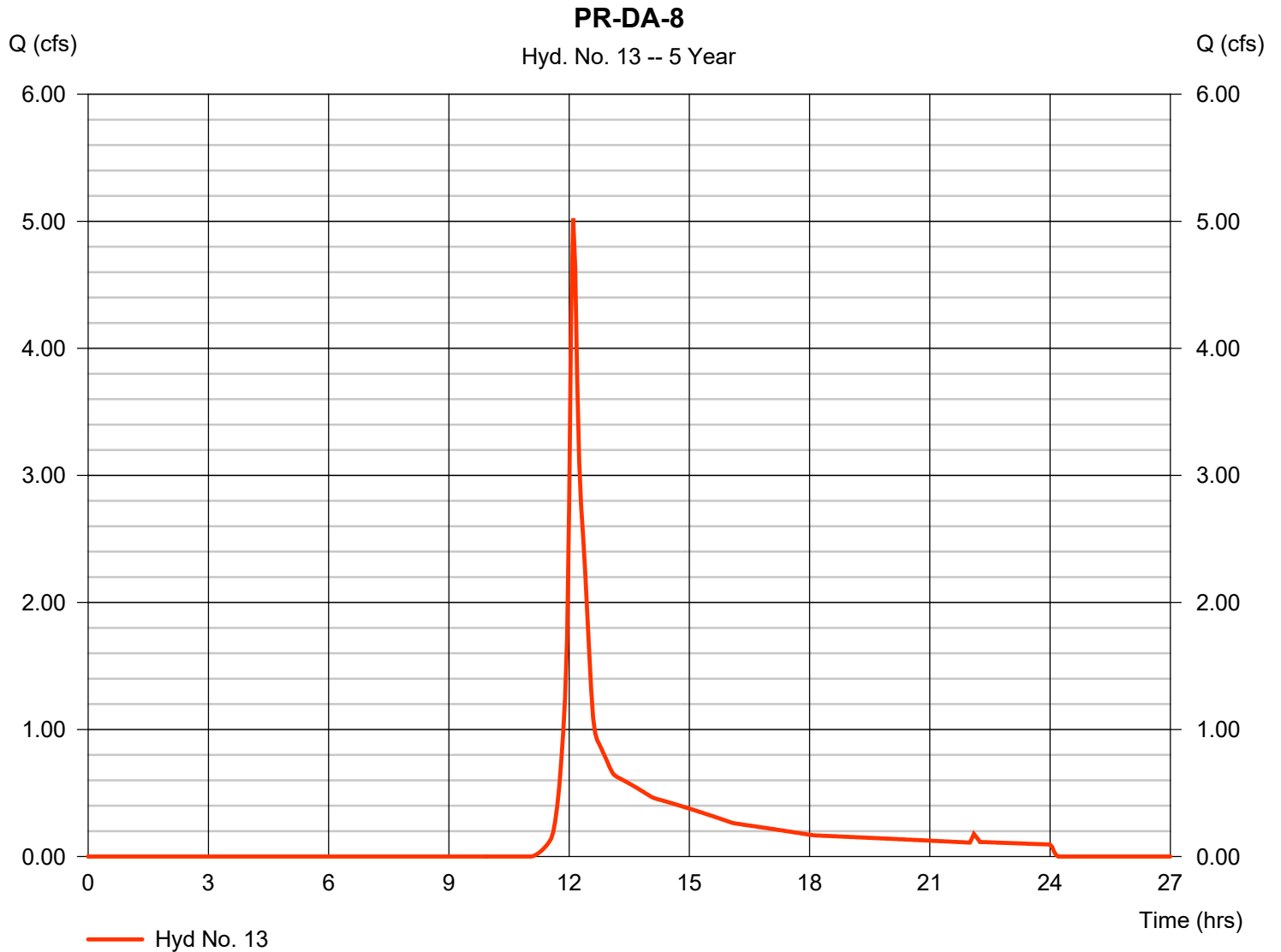
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Wednesday, 05 / 16 / 2018

## Hyd. No. 13

PR-DA-8

Hydrograph type	= SCS Runoff	Peak discharge	= 5.024 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 18,195 cuft
Drainage area	= 3.740 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.90 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

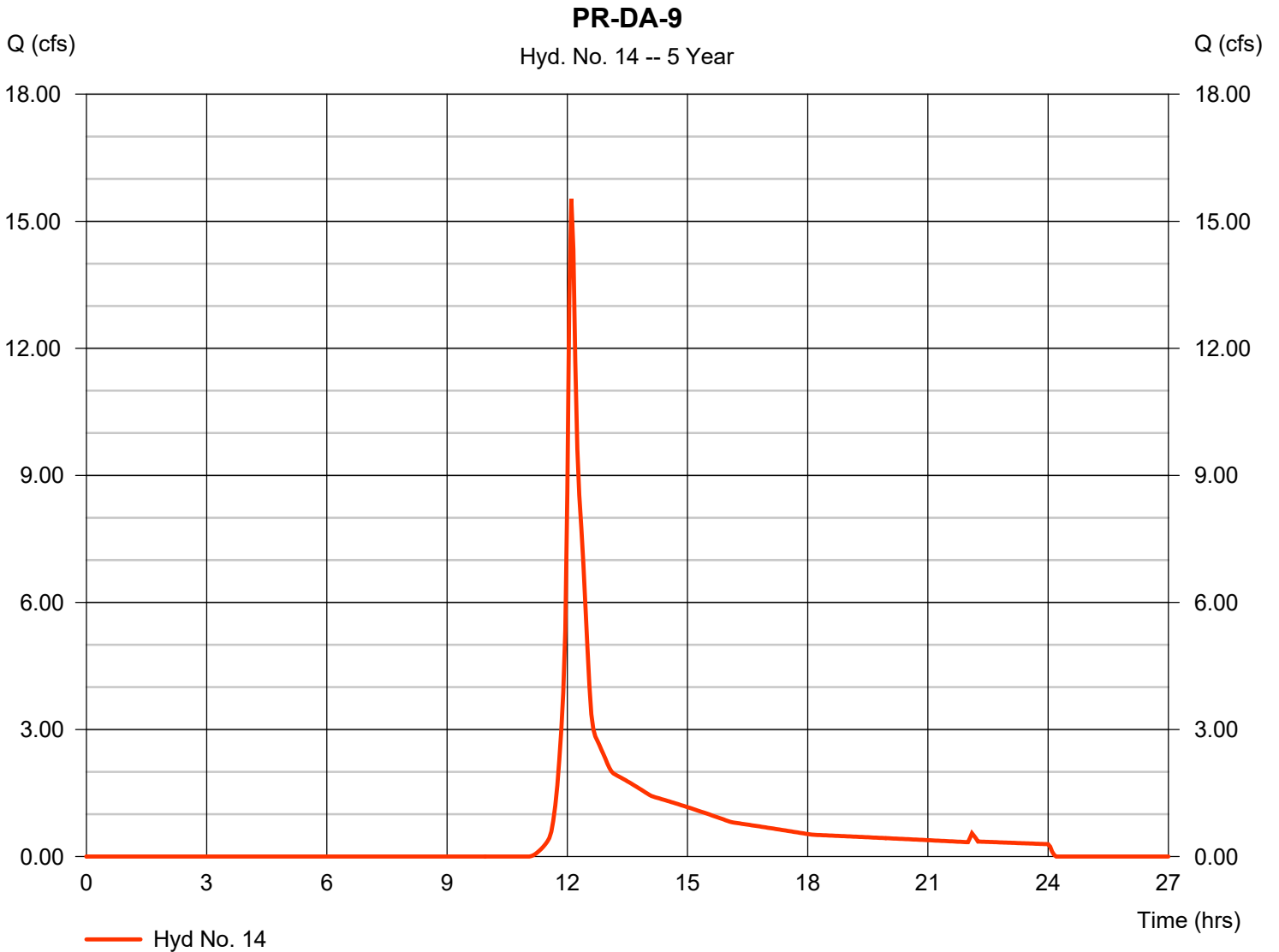
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

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## Hyd. No. 14

PR-DA-9

Hydrograph type	= SCS Runoff	Peak discharge	= 15.53 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 56,238 cuft
Drainage area	= 11.560 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.70 min
Total precip.	= 5.10 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

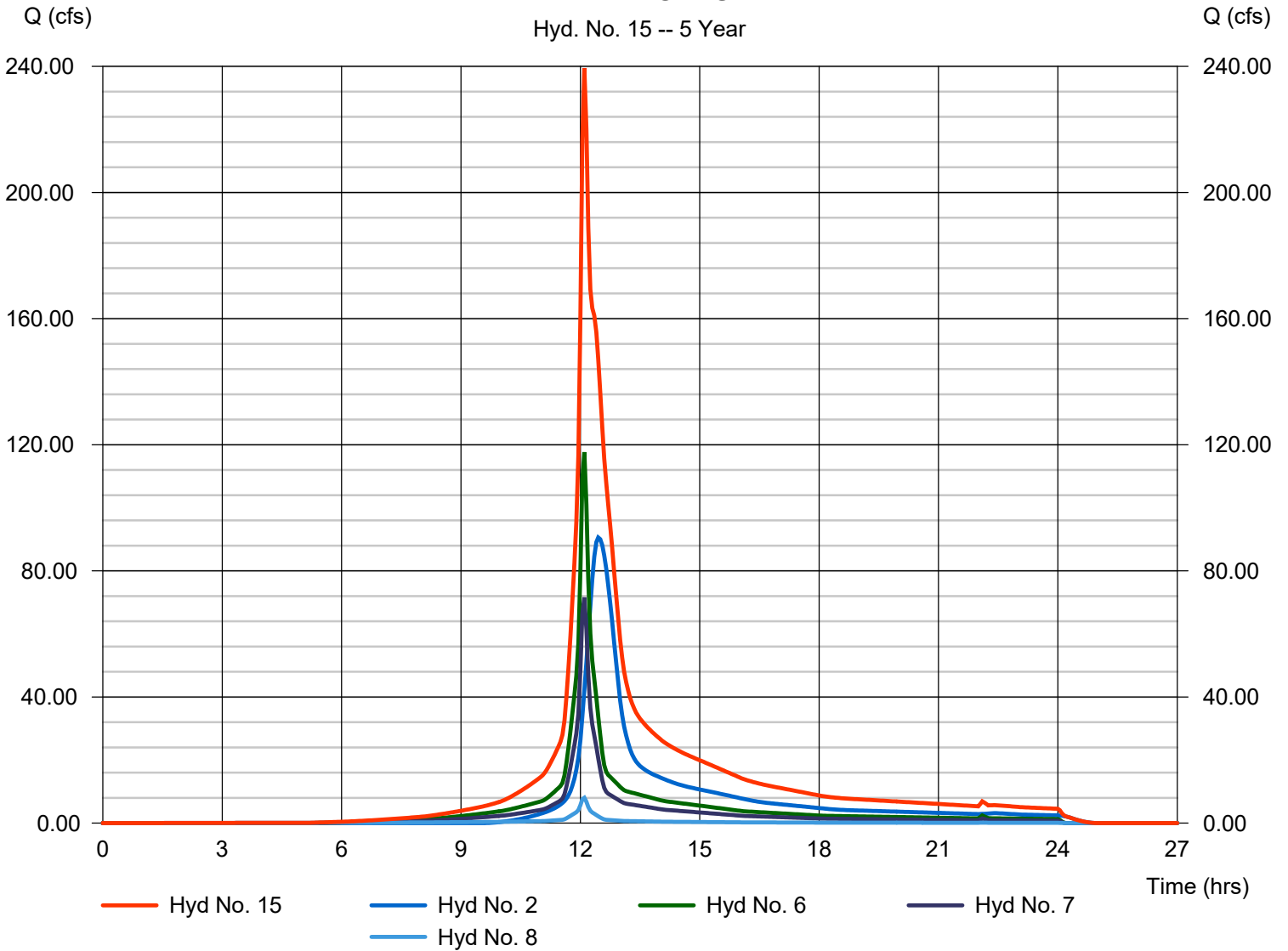
## Hyd. No. 15

PR-AP-1 - AGNES RD

Hydrograph type	= Combine	Peak discharge	= 239.42 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 1,222,186 cuft
Inflow hyds.	= 2, 6, 7, 8	Contrib. drain. area	= 123.406 ac

### PR-AP-1 - AGNES RD

Hyd. No. 15 -- 5 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

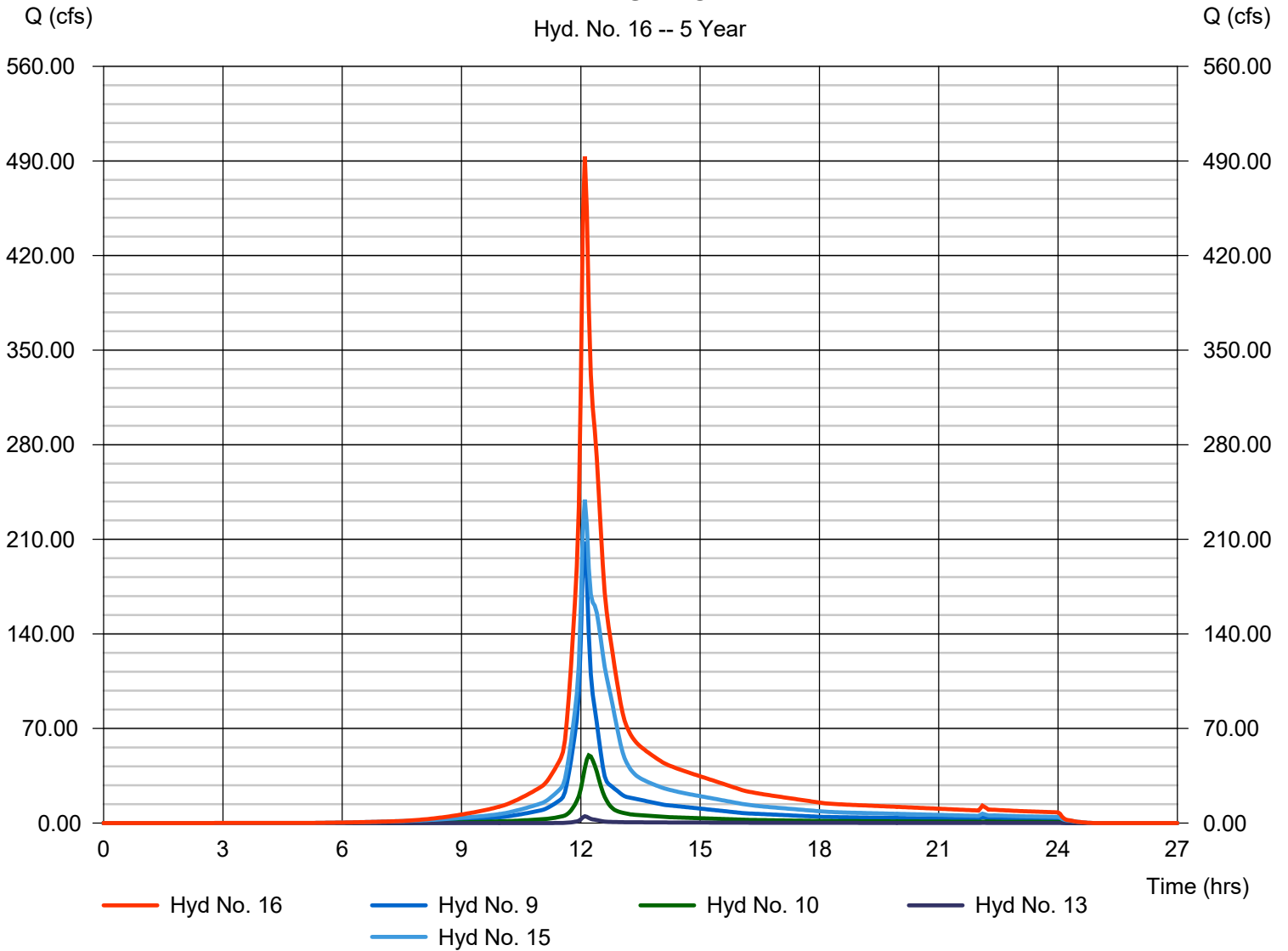
## Hyd. No. 16

PR-AP-2 - SE CORNER

Hydrograph type	= Combine	Peak discharge	= 493.34 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 2,157,699 cuft
Inflow hyds.	= 9, 10, 13, 15	Contrib. drain. area	= 92.180 ac

### PR-AP-2 - SE CORNER

Hyd. No. 16 -- 5 Year



# Hydrograph Report

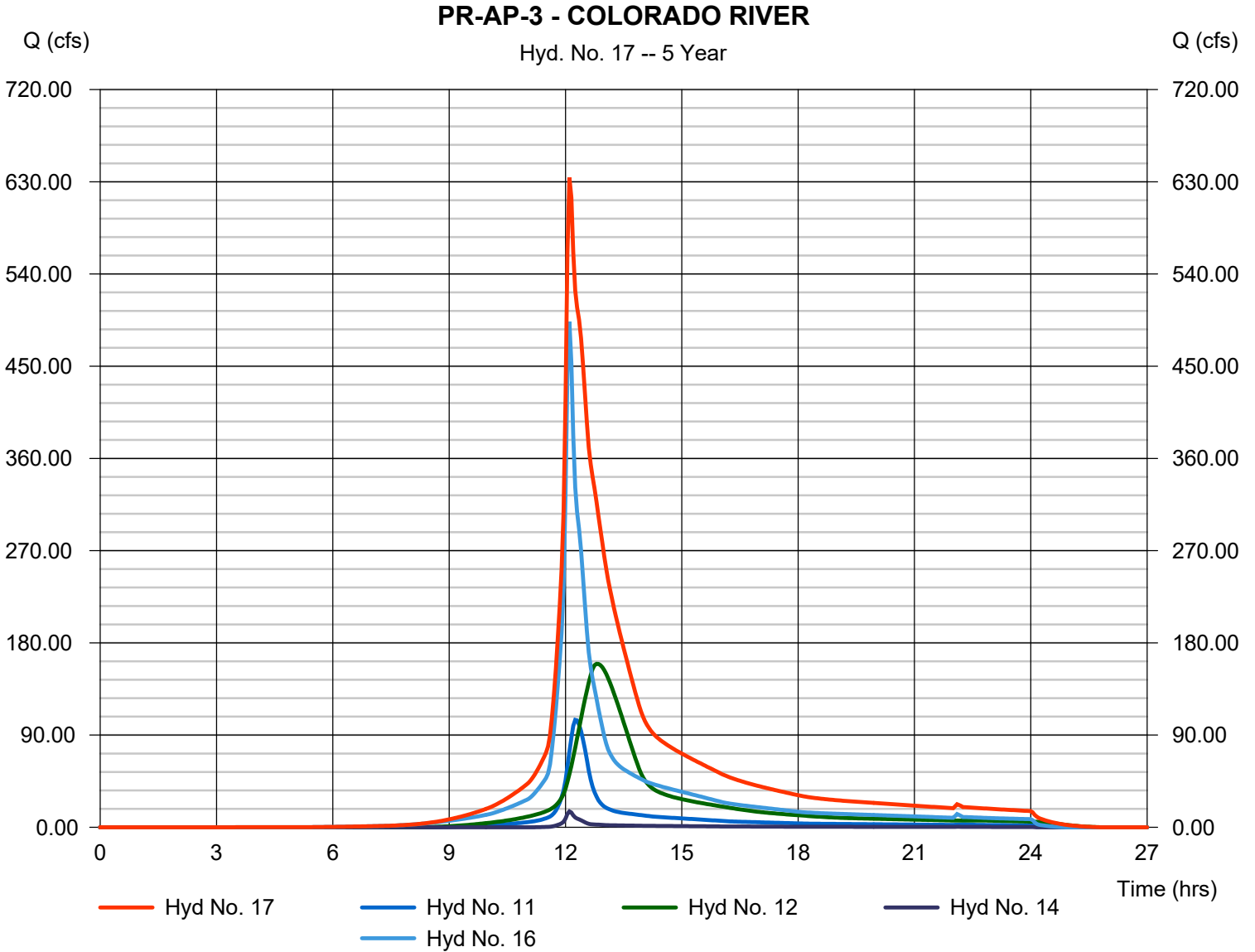
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## Hyd. No. 17

PR-AP-3 - COLORADO RIVER

Hydrograph type	= Combine	Peak discharge	= 634.13 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 4,101,151 cuft
Inflow hyds.	= 11, 12, 14, 16	Contrib. drain. area	= 197.870 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	59.56	3	789	668,998	----	----	----	EX-DA-1 / EX-AP-1	
2	SCS Runoff	127.94	3	747	763,829	----	----	----	EX-DA-OFFSITE	
3	SCS Runoff	140.32	3	780	1,400,815	----	----	----	EX-DA-2	
4	SCS Runoff	36.56	3	753	253,845	----	----	----	EX-DA-3	
5	Combine	257.24	3	759	2,418,488	2, 3, 4	----	----	EX-AP-2	
6	SCS Runoff	149.45	3	726	515,193	----	----	----	PR-DA-1	
7	SCS Runoff	90.92	3	726	313,443	----	----	----	PR-DA-2	
8	SCS Runoff	9.764	3	726	37,655	----	----	----	PR-DA-3	
9	SCS Runoff	275.24	3	726	922,160	----	----	----	PR-DA-4	
10	SCS Runoff	66.42	3	732	297,386	----	----	----	PR-DA-5	
11	SCS Runoff	142.77	3	735	681,119	----	----	----	PR-DA-6	
12	SCS Runoff	213.43	3	768	1,851,061	----	----	----	PR-DA-7	
13	SCS Runoff	7.881	3	726	27,244	----	----	----	PR-DA-8	
14	SCS Runoff	24.36	3	726	84,207	----	----	----	PR-DA-9	
15	Combine	312.95	3	726	1,630,120	2, 6, 7, 8,	----	----	PR-AP-1 - AGNES RD	
16	Combine	650.57	3	726	2,876,911	9, 10, 13, 15	----	----	PR-AP-2 - SE CORNER	
17	Combine	850.01	3	726	5,493,296	11, 12, 14, 16	----	----	PR-AP-3 - COLORADO RIVER	
CHANNEL (05-16-18).gpw					Return Period: 10 Year			Wednesday, 05 / 16 / 2018		

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

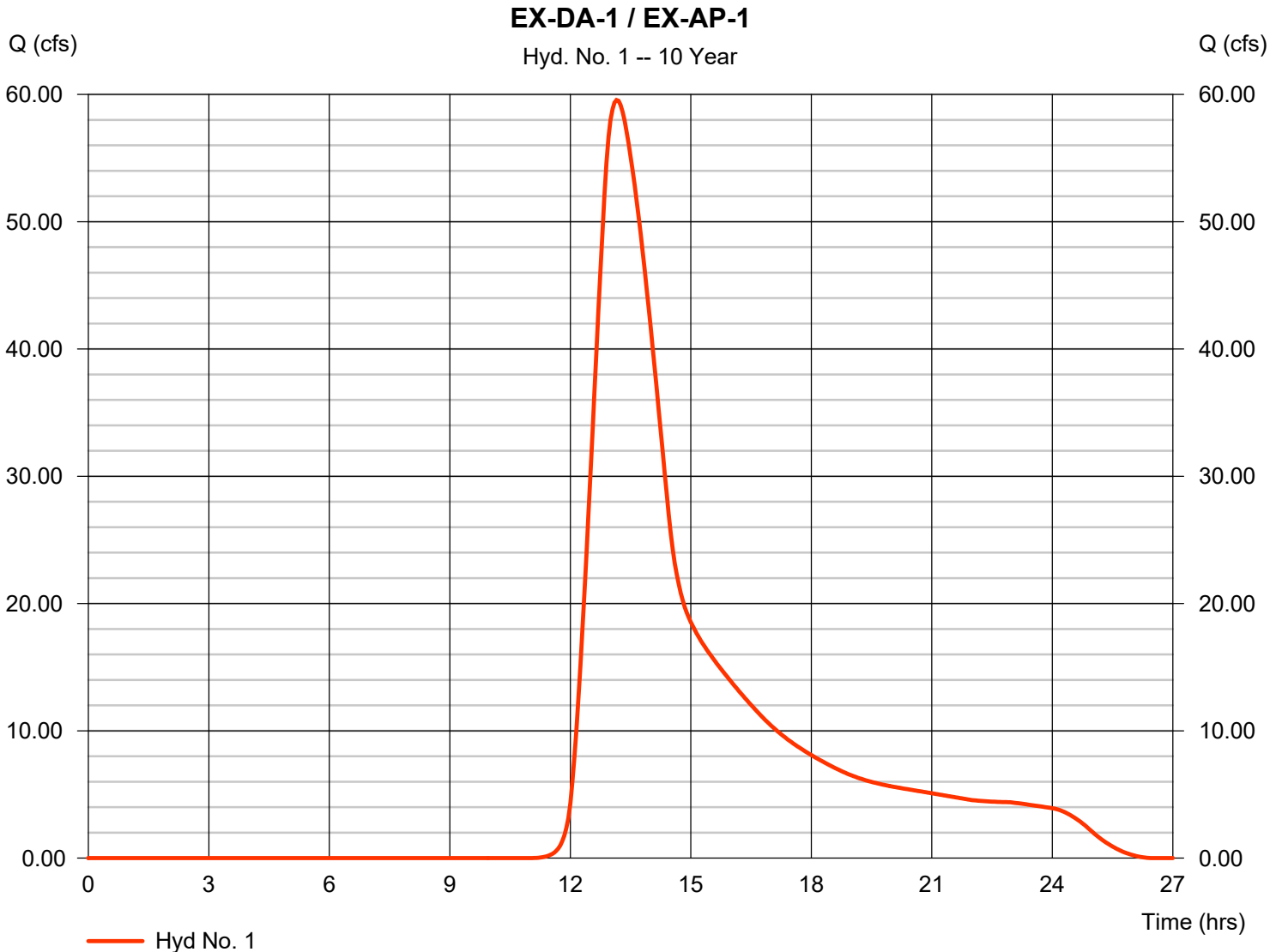
## Hyd. No. 1

EX-DA-1 / EX-AP-1

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 3 min  
 Drainage area = 101.790 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 6.20 in  
 Storm duration = 24 hrs

Peak discharge = 59.56 cfs  
 Time to peak = 13.15 hrs  
 Hyd. volume = 668,998 cuft  
 Curve number = 57\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 94.50 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(84.000 x 61) + (17.790 x 39)] / 101.790



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

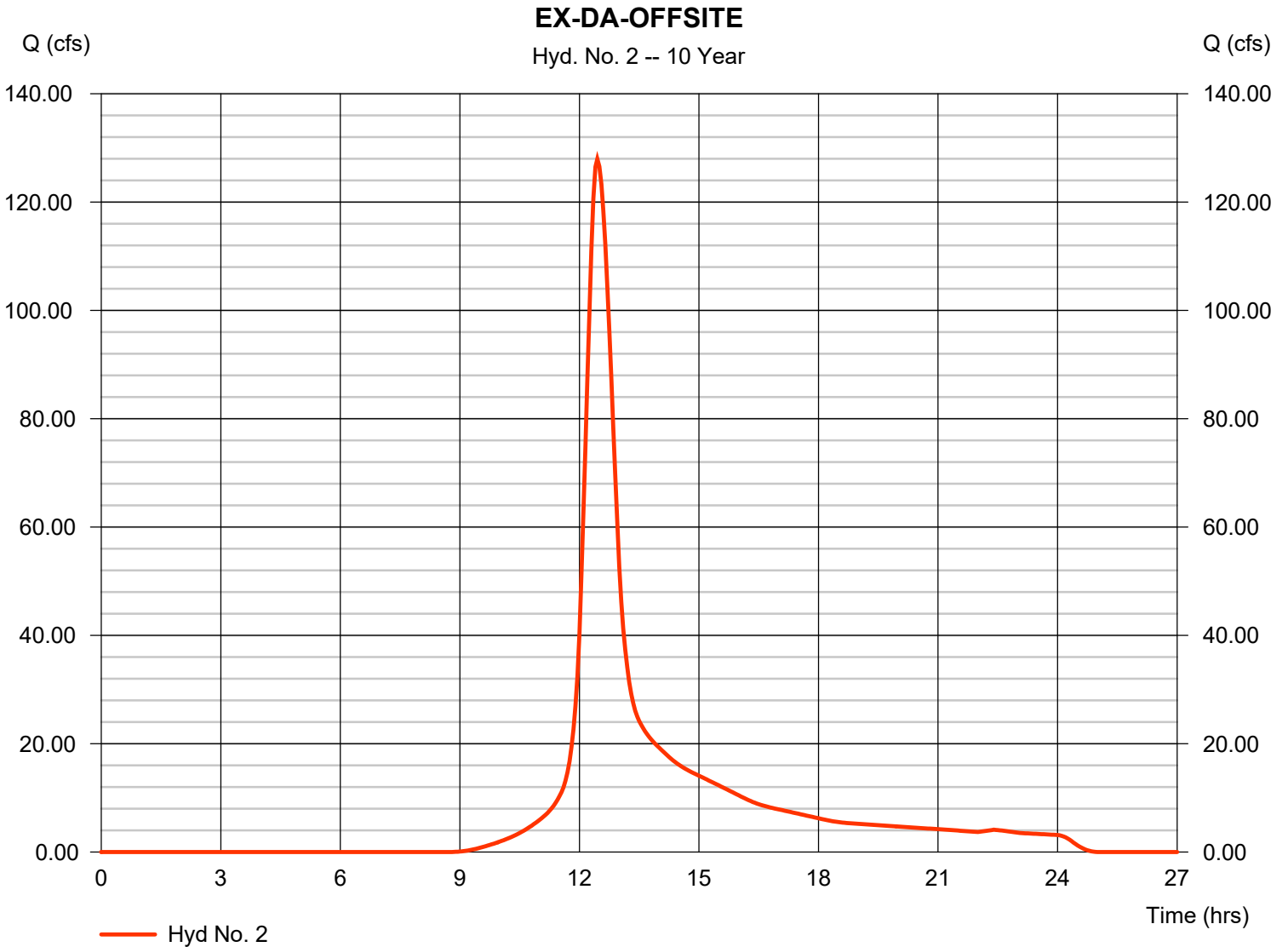
## Hyd. No. 2

EX-DA-OFFSITE

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 3 min  
 Drainage area = 69.840 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 6.20 in  
 Storm duration = 24 hrs

Peak discharge = 127.94 cfs  
 Time to peak = 12.45 hrs  
 Hyd. volume = 763,829 cuft  
 Curve number = 71\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 39.80 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(19.230 x 98) + (50.610 x 61)] / 69.840



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

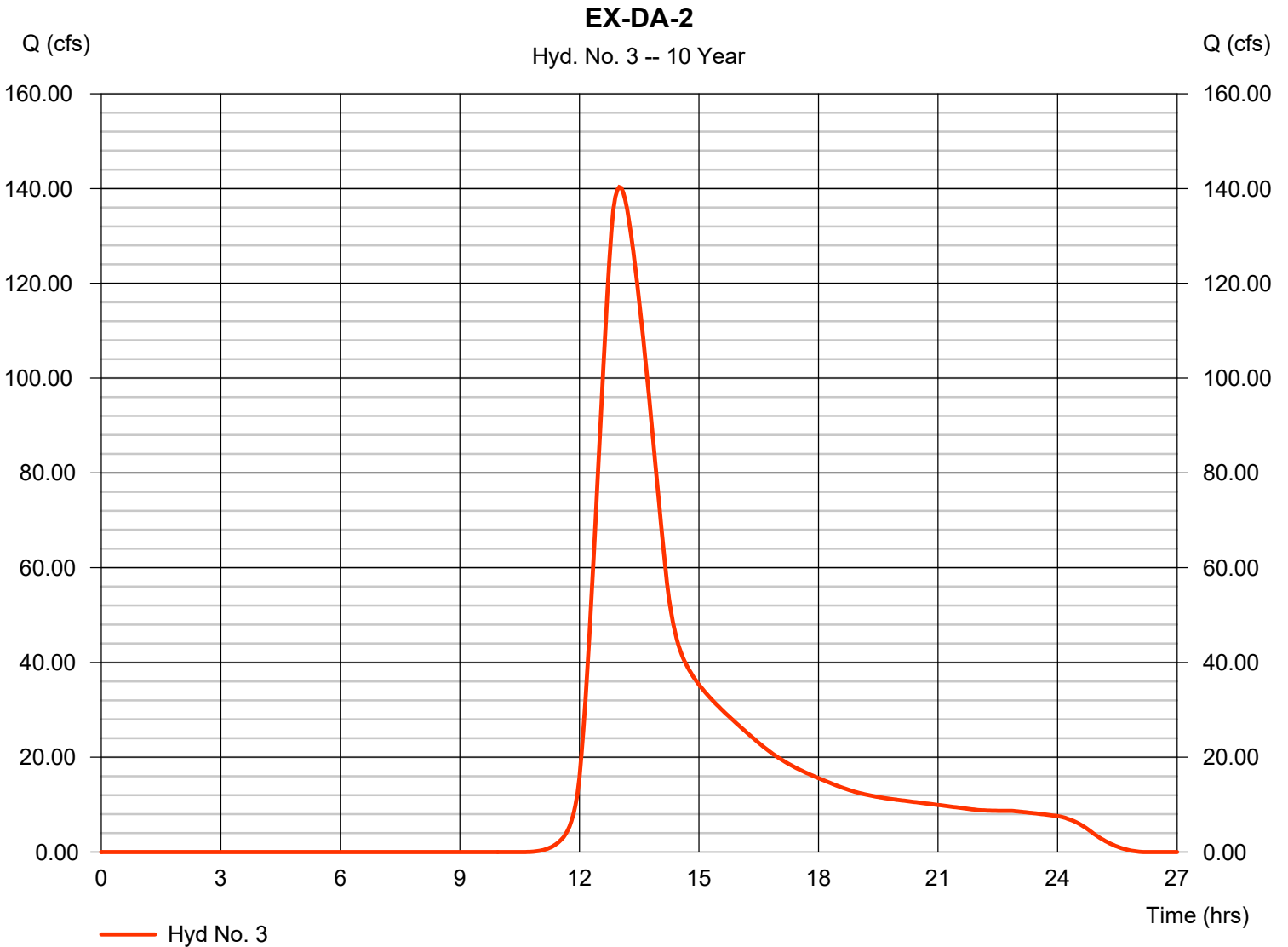
Wednesday, 05 / 16 / 2018

## Hyd. No. 3

EX-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 140.32 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.00 hrs
Time interval	= 3 min	Hyd. volume	= 1,400,815 cuft
Drainage area	= 189.310 ac	Curve number	= 60*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 83.86 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(183.470 x 61) + (5.840 x 39)] / 189.310



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

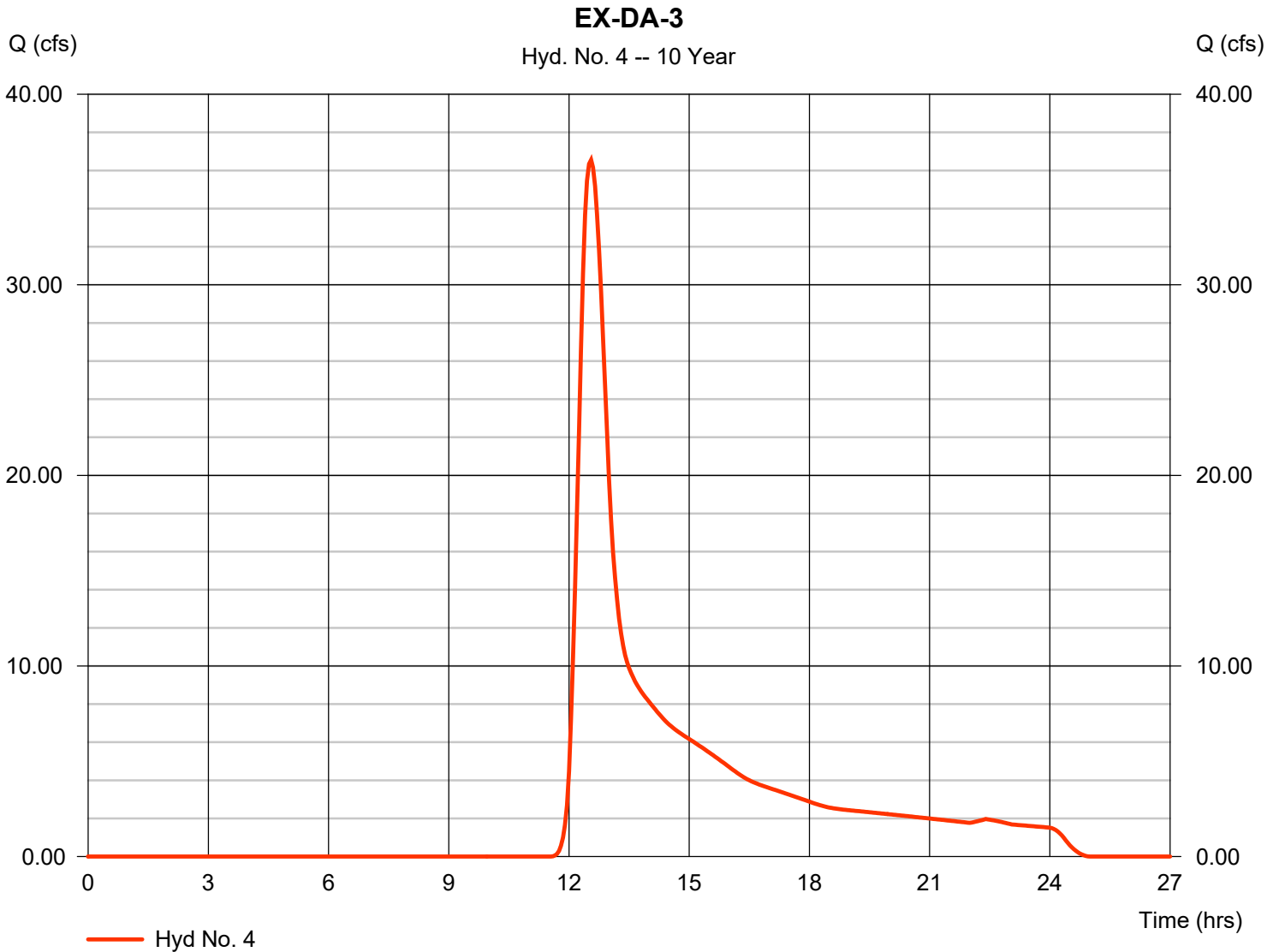
Wednesday, 05 / 16 / 2018

## Hyd. No. 4

EX-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 36.56 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.55 hrs
Time interval	= 3 min	Hyd. volume	= 253,845 cuft
Drainage area	= 50.910 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 38.30 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(30.546 x 61) + (20.364 x 39)] / 50.910





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

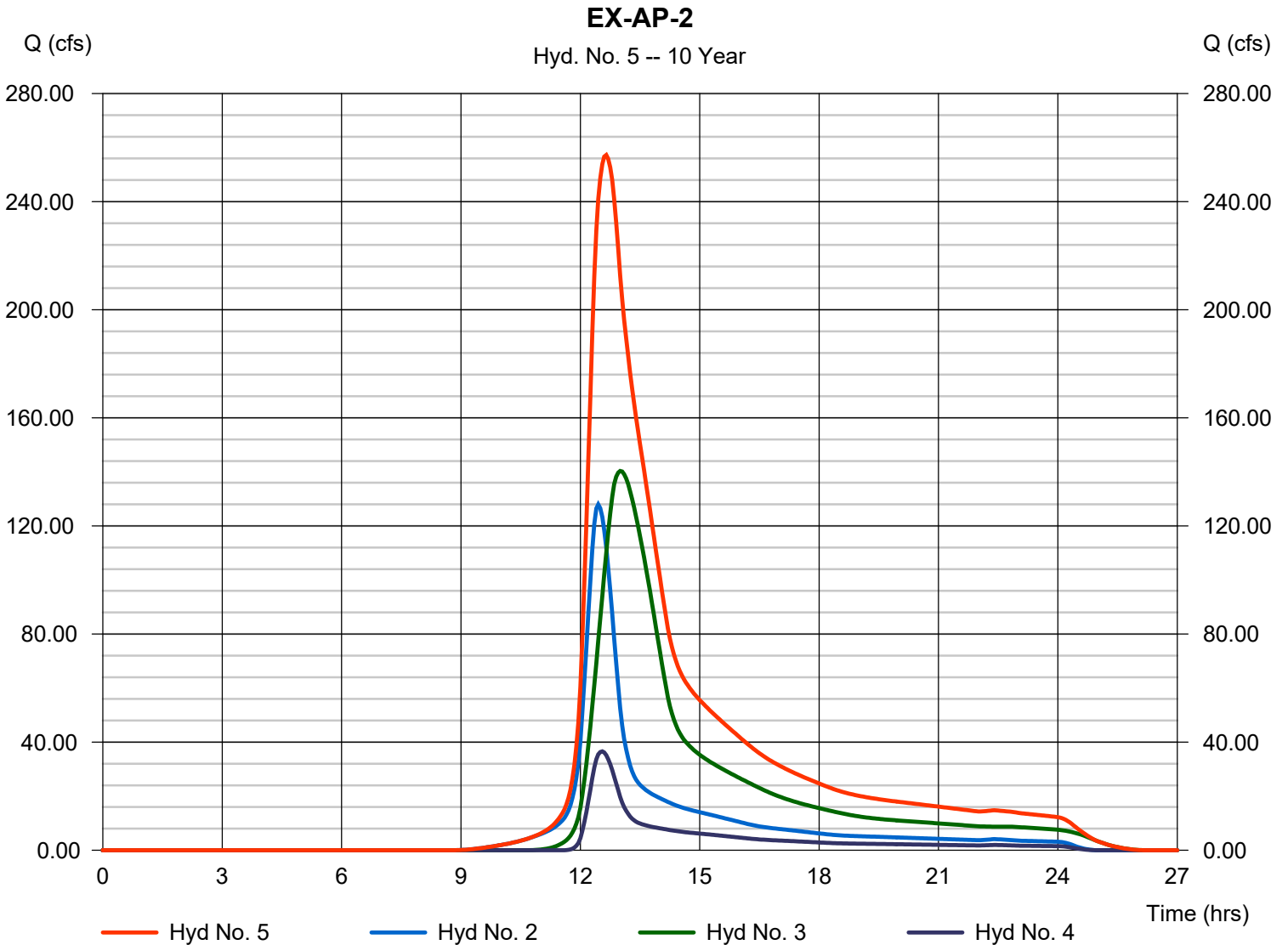
Wednesday, 05 / 16 / 2018

## Hyd. No. 5

EX-AP-2

Hydrograph type = Combine  
 Storm frequency = 10 yrs  
 Time interval = 3 min  
 Inflow hyds. = 2, 3, 4

Peak discharge = 257.24 cfs  
 Time to peak = 12.65 hrs  
 Hyd. volume = 2,418,488 cuft  
 Contrib. drain. area = 310.060 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

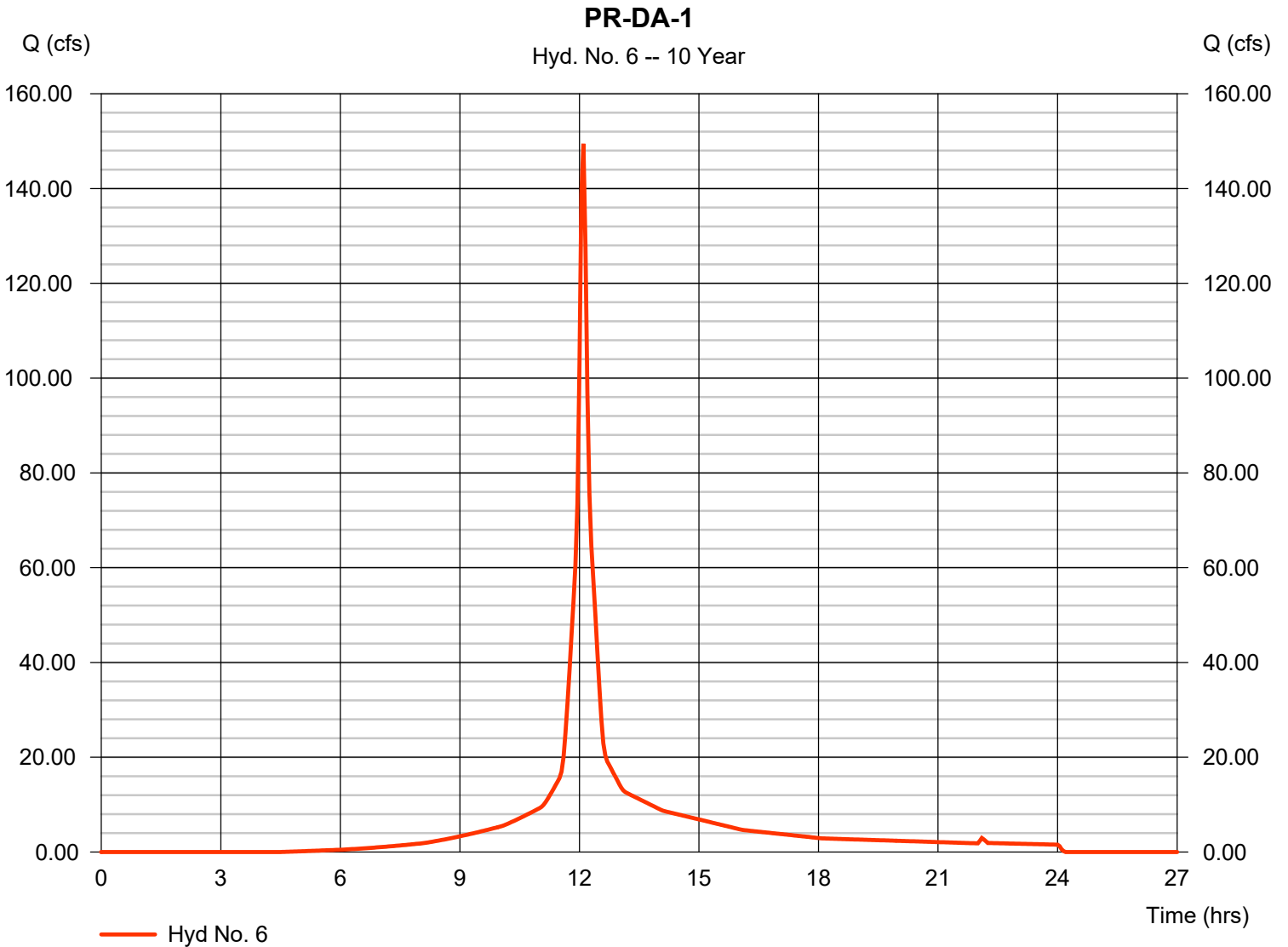
## Hyd. No. 6

PR-DA-1

Hydrograph type = SCS Runoff  
 Storm frequency = 10 yrs  
 Time interval = 3 min  
 Drainage area = 32.150 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 6.20 in  
 Storm duration = 24 hrs

Peak discharge = 149.45 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 515,193 cuft  
 Curve number = 87\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 7.60 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(22.300 x 98) + (9.560 x 61)] / 32.150



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

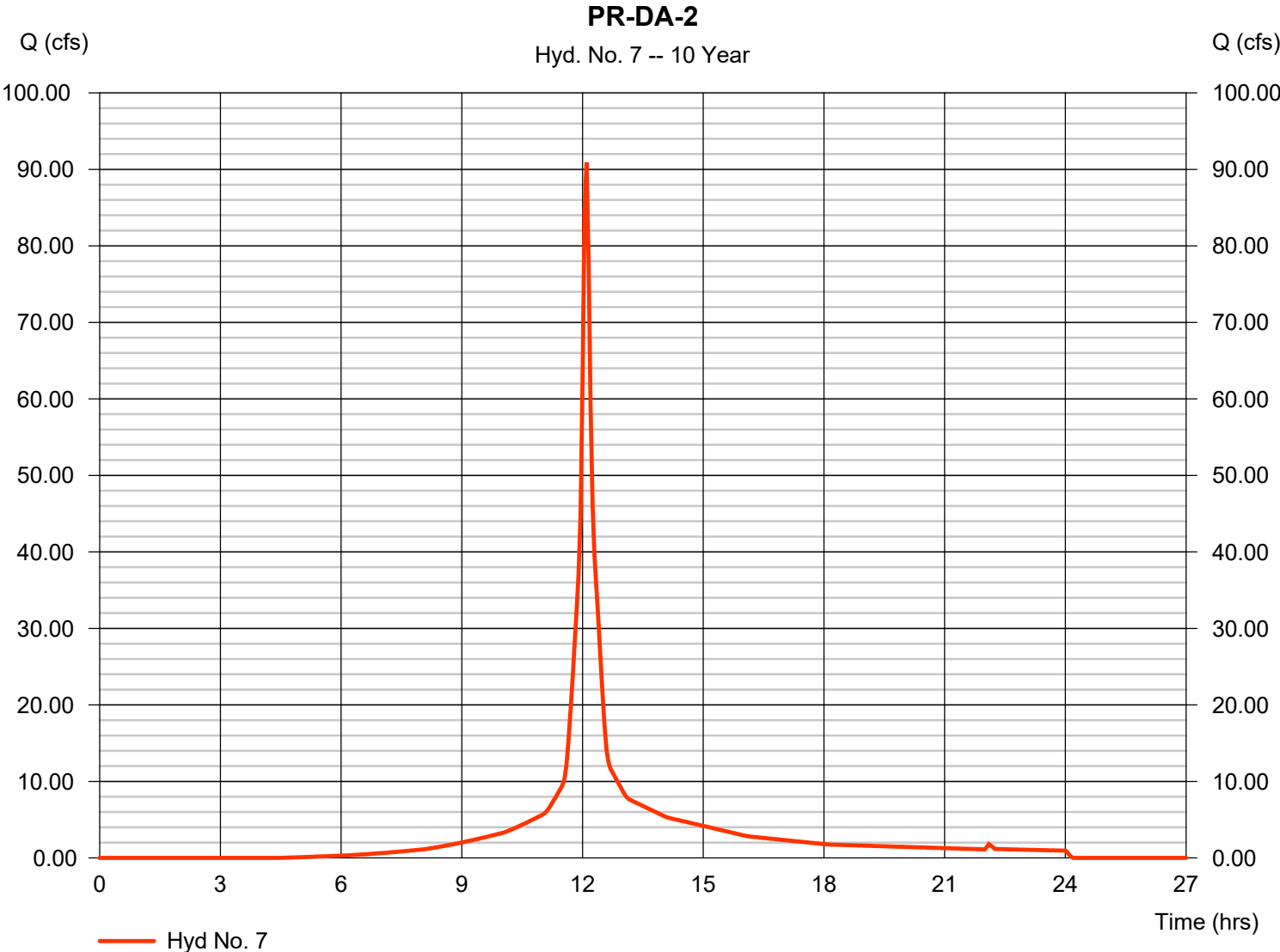
Wednesday, 05 / 16 / 2018

## Hyd. No. 7

PR-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 90.92 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 313,443 cuft
Drainage area	= 19.560 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(13.580 x 98) + (5.820 x 61)] / 19.560



# Hydrograph Report

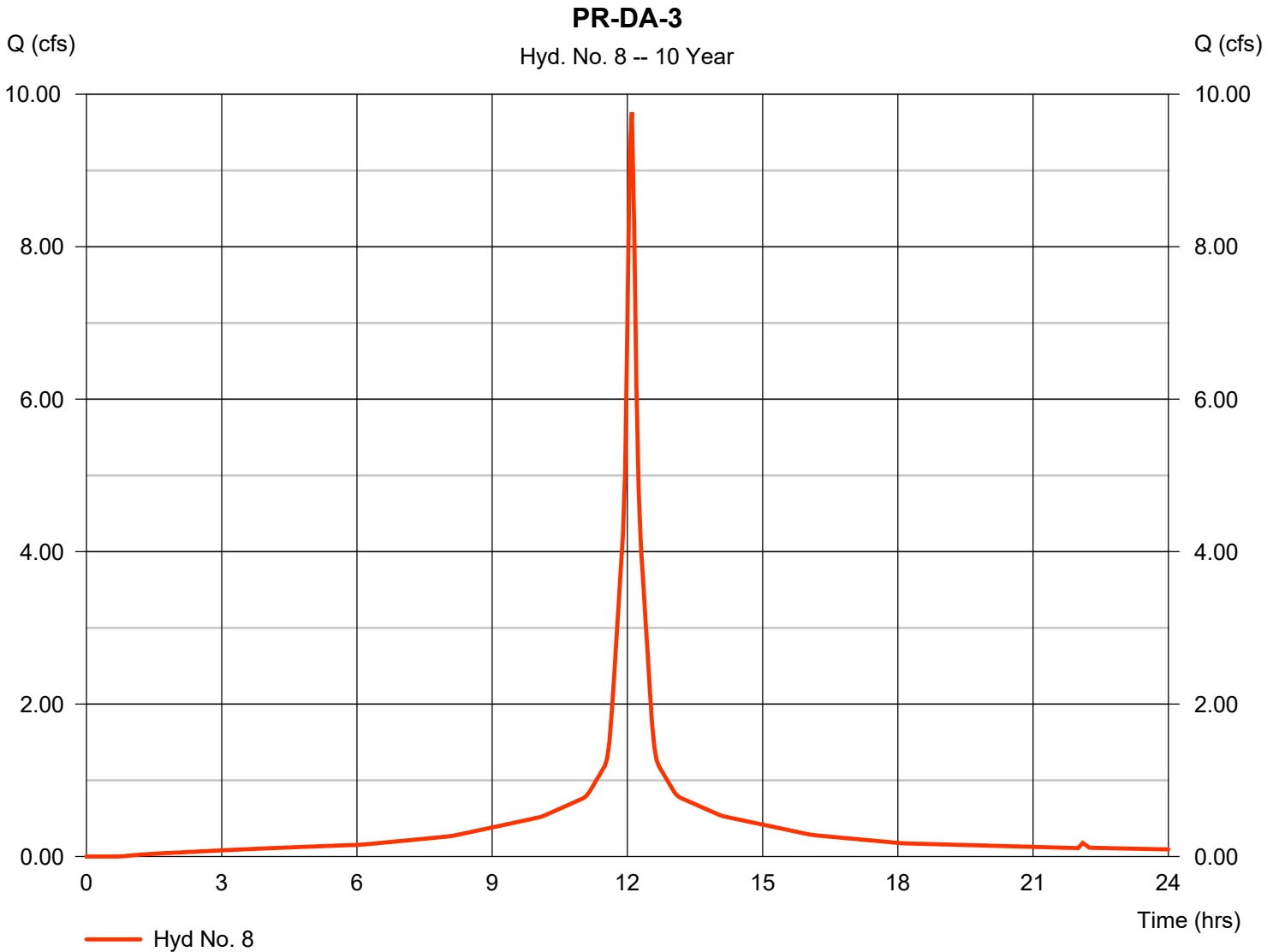
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 8

PR-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.764 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 37,655 cuft
Drainage area	= 1.856 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.80 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

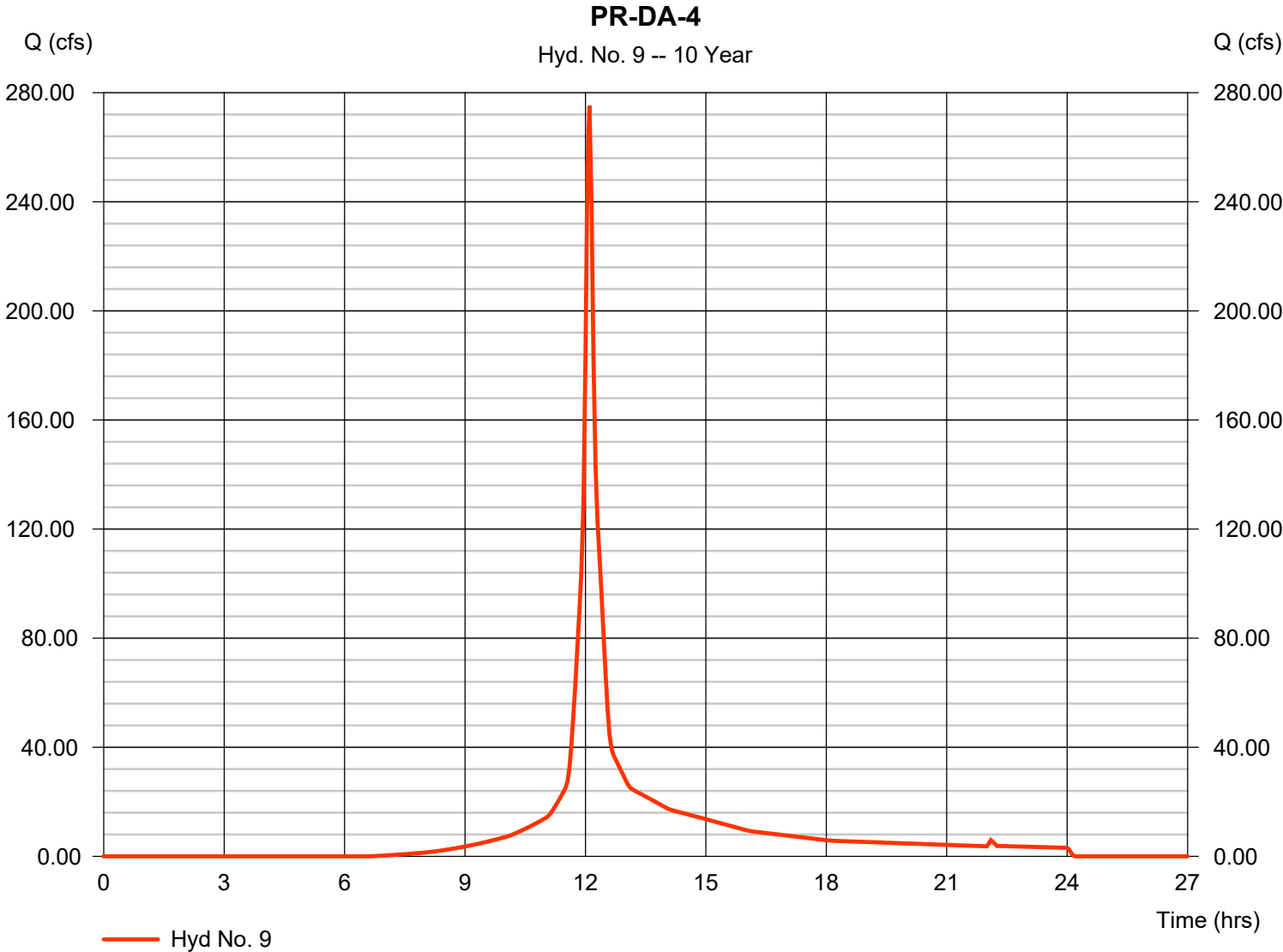
Wednesday, 05 / 16 / 2018

## Hyd. No. 9

PR-DA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 275.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 922,160 cuft
Drainage area	= 68.390 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.10 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(34.190 x 98) + (34.200 x 61)] / 68.390



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

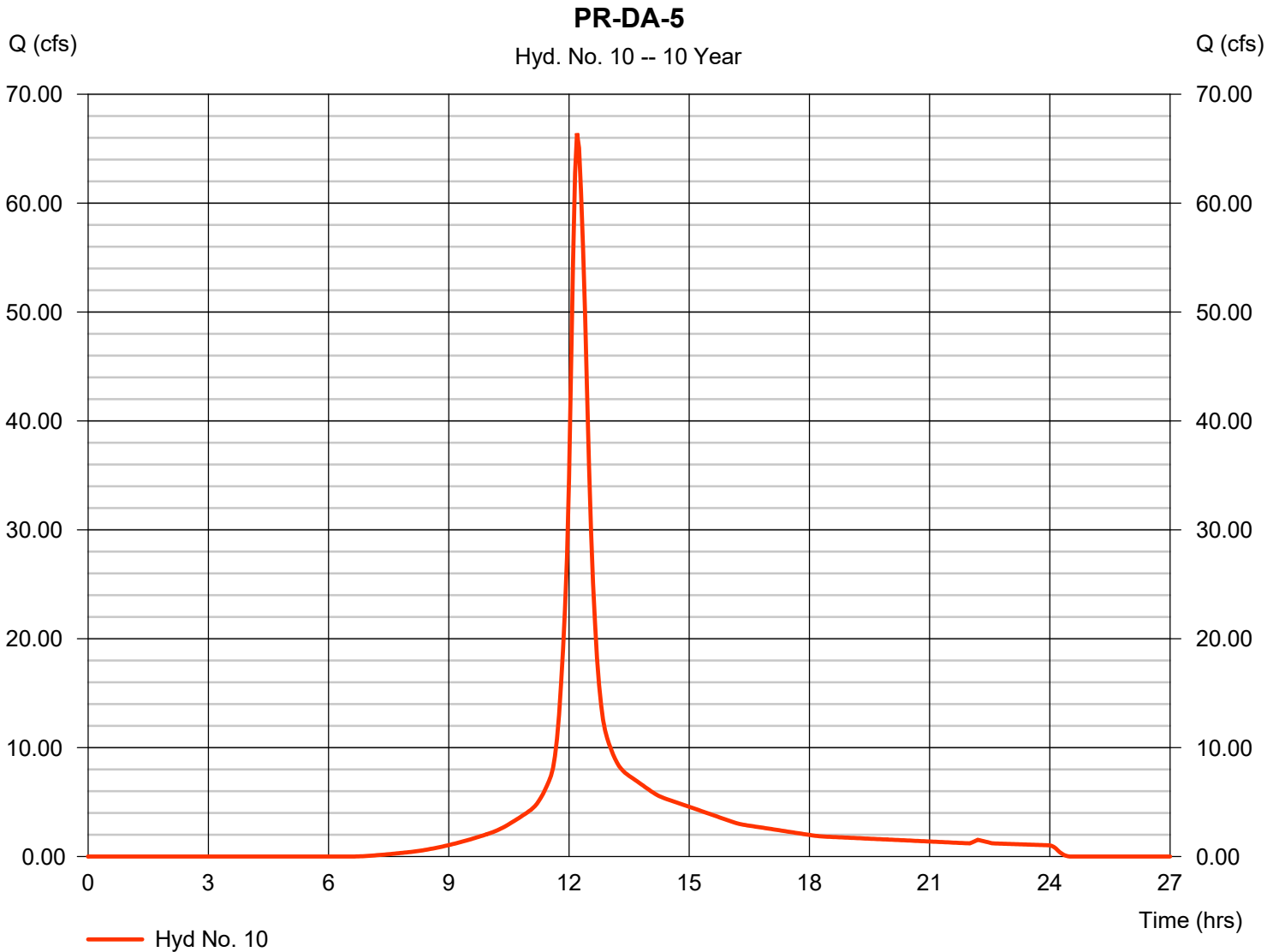
Wednesday, 05 / 16 / 2018

## Hyd. No. 10

PR-DA-5

Hydrograph type	= SCS Runoff	Peak discharge	= 66.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.20 hrs
Time interval	= 3 min	Hyd. volume	= 297,386 cuft
Drainage area	= 20.050 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.40 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(10.167 x 98) + (10.167 x 61)] / 20.050



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

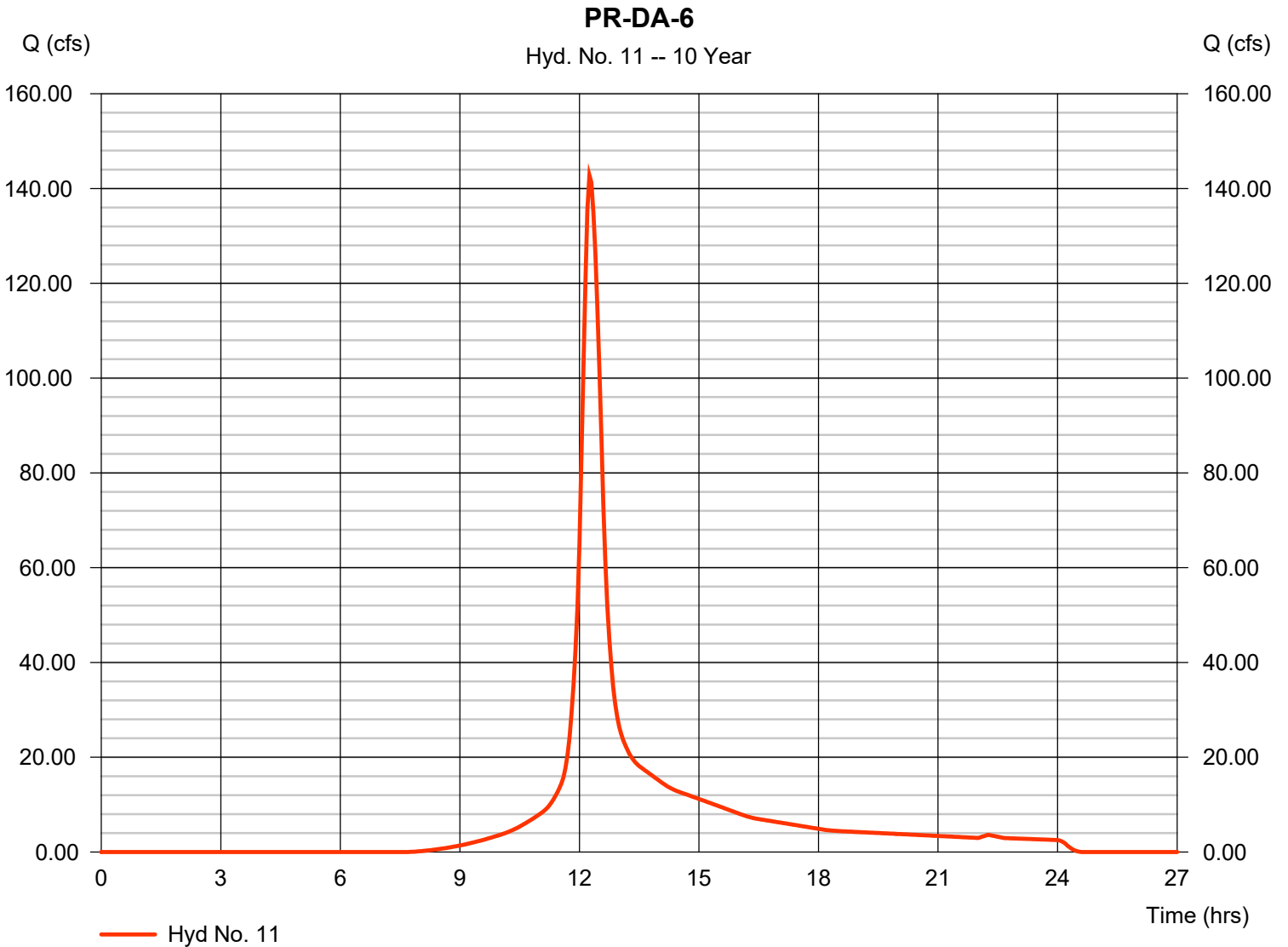
Wednesday, 05 / 16 / 2018

## Hyd. No. 11

PR-DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 142.77 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 681,119 cuft
Drainage area	= 54.160 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.60 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.630 x 61) + (7.450 x 39) + (27.080 x 98)] / 54.160



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

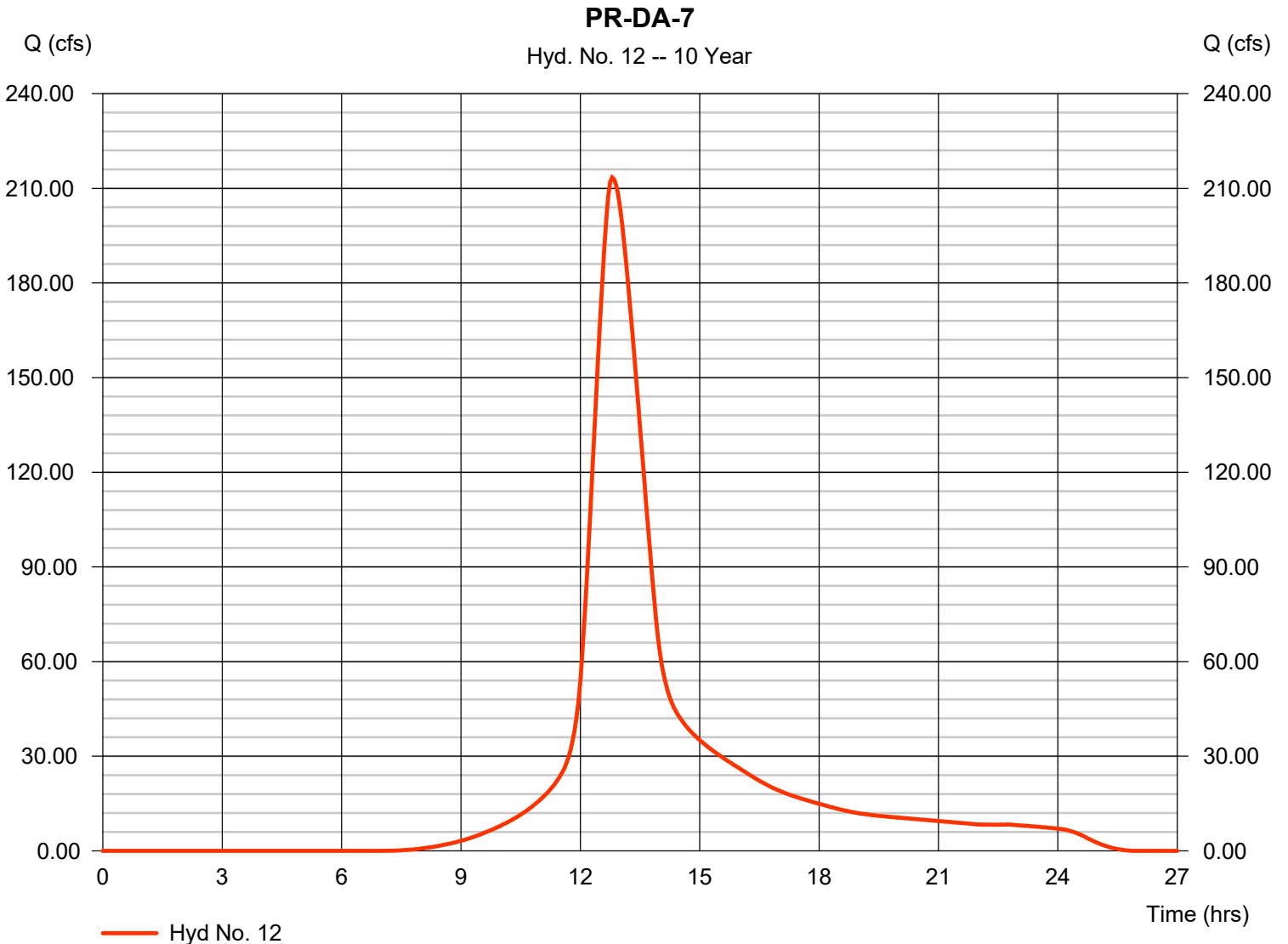
Wednesday, 05 / 16 / 2018

## Hyd. No. 12

PR-DA-7

Hydrograph type	= SCS Runoff	Peak discharge	= 213.43 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.80 hrs
Time interval	= 3 min	Hyd. volume	= 1,851,061 cuft
Drainage area	= 132.150 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 71.80 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(66.080 x 98) + (66.070 x 61)] / 132.150





# Hydrograph Report

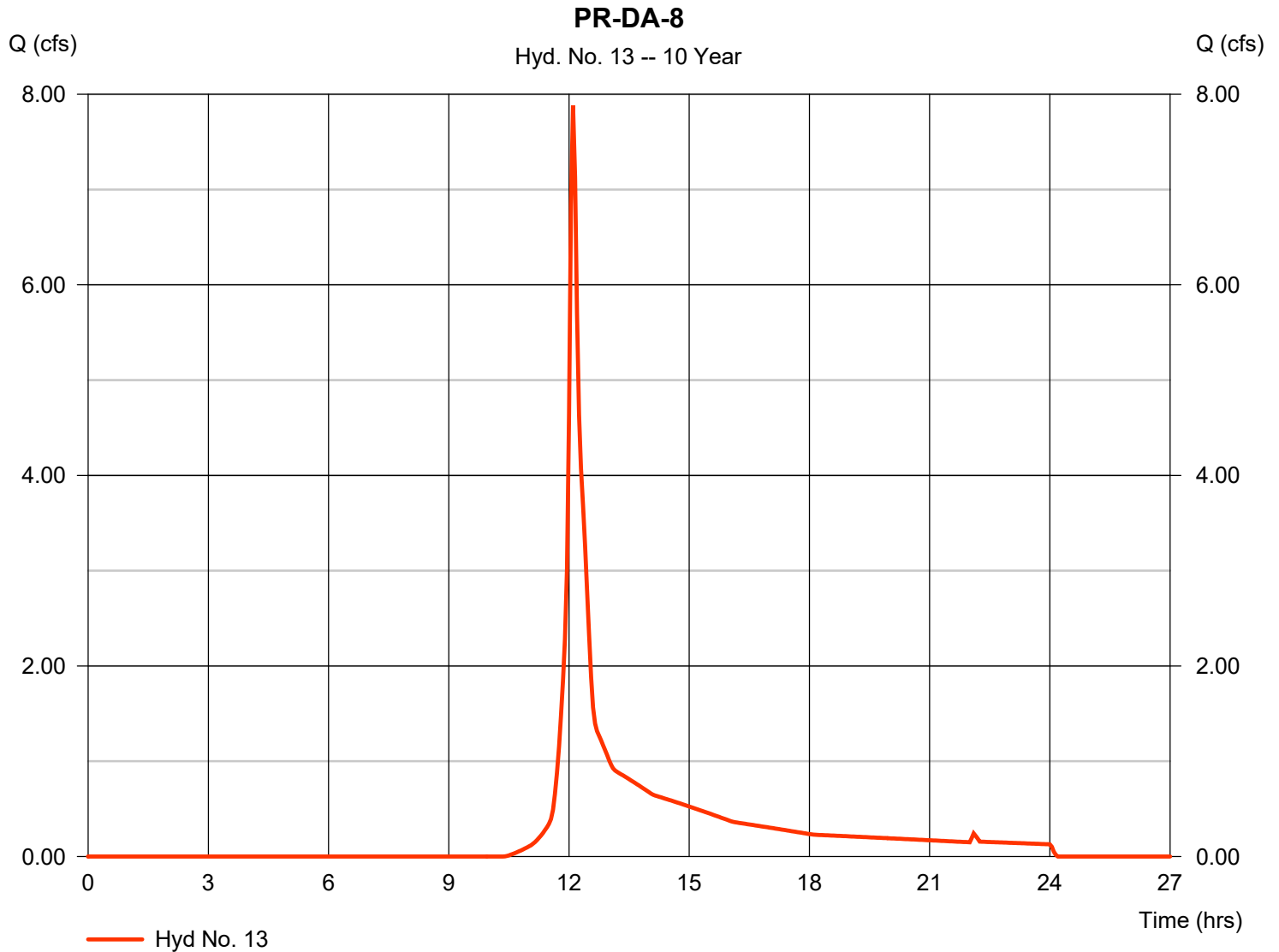
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 13

PR-DA-8

Hydrograph type	= SCS Runoff	Peak discharge	= 7.881 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 27,244 cuft
Drainage area	= 3.740 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.90 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

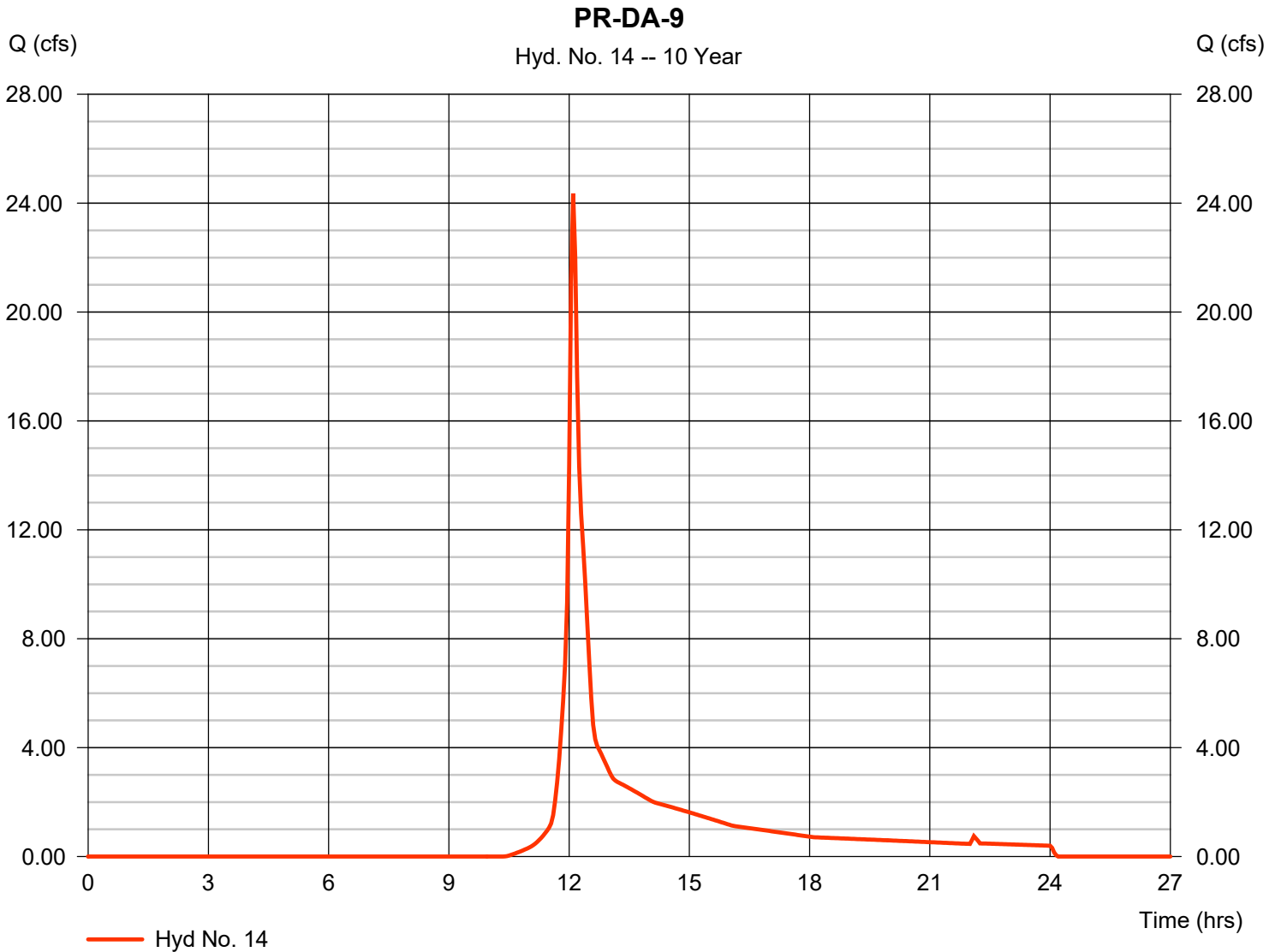
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 14

PR-DA-9

Hydrograph type	= SCS Runoff	Peak discharge	= 24.36 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 84,207 cuft
Drainage area	= 11.560 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.70 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 15

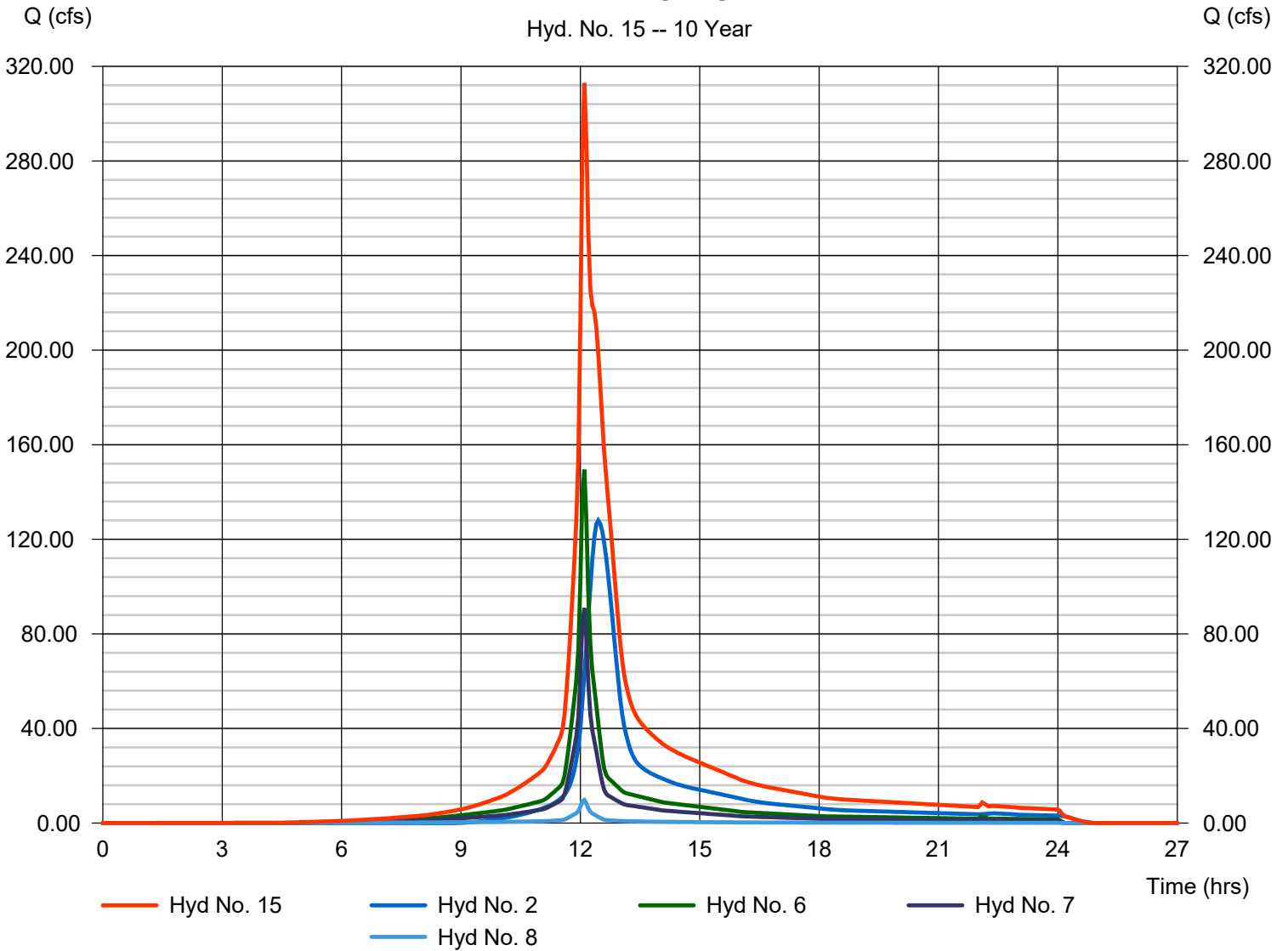
PR-AP-1 - AGNES RD

Hydrograph type = Combine  
 Storm frequency = 10 yrs  
 Time interval = 3 min  
 Inflow hyds. = 2, 6, 7, 8

Peak discharge = 312.95 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 1,630,120 cuft  
 Contrib. drain. area = 123.406 ac

### PR-AP-1 - AGNES RD

Hyd. No. 15 -- 10 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

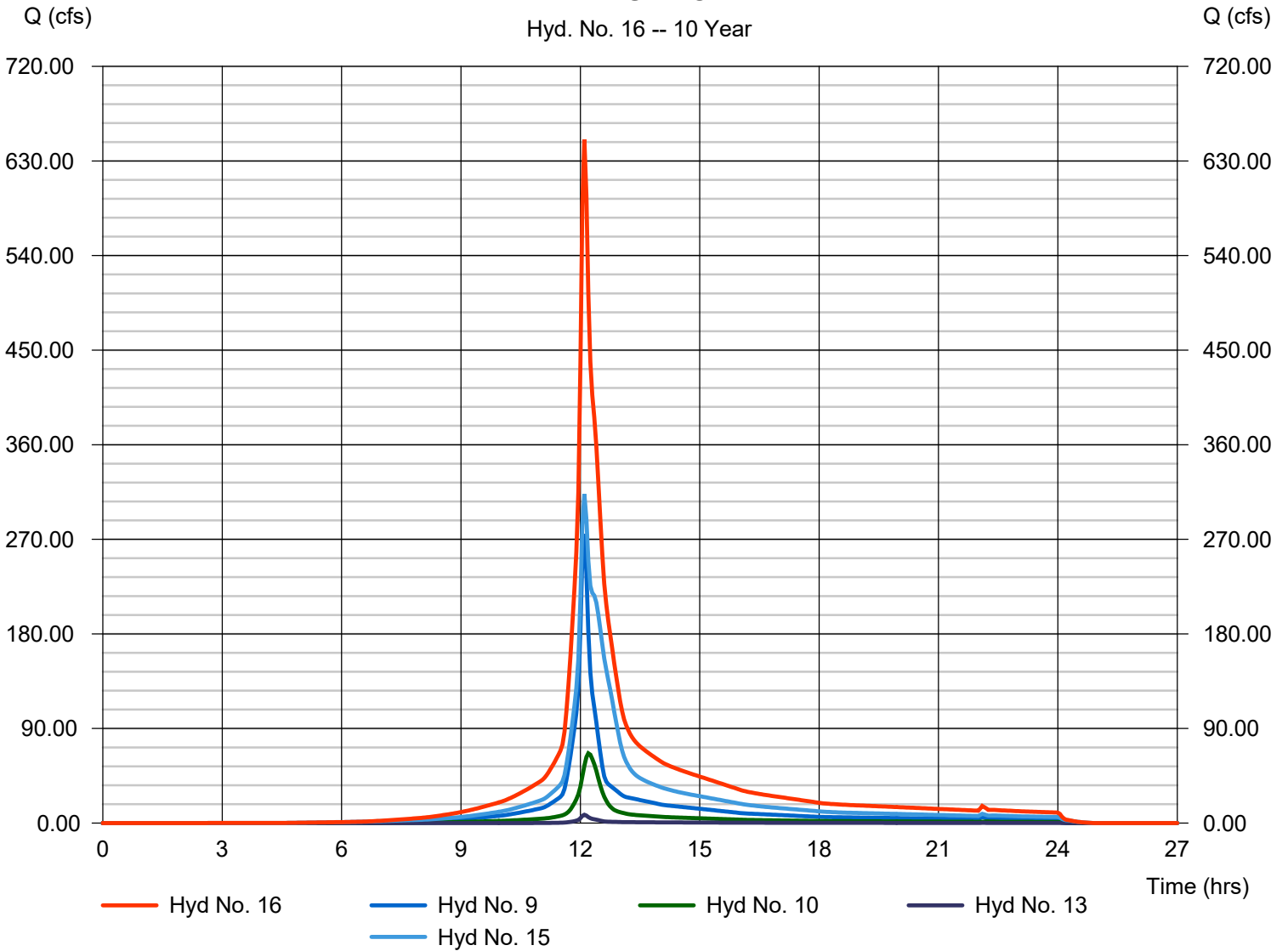
## Hyd. No. 16

PR-AP-2 - SE CORNER

Hydrograph type	= Combine	Peak discharge	= 650.57 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 2,876,911 cuft
Inflow hyds.	= 9, 10, 13, 15	Contrib. drain. area	= 92.180 ac

### PR-AP-2 - SE CORNER

Hyd. No. 16 -- 10 Year



# Hydrograph Report

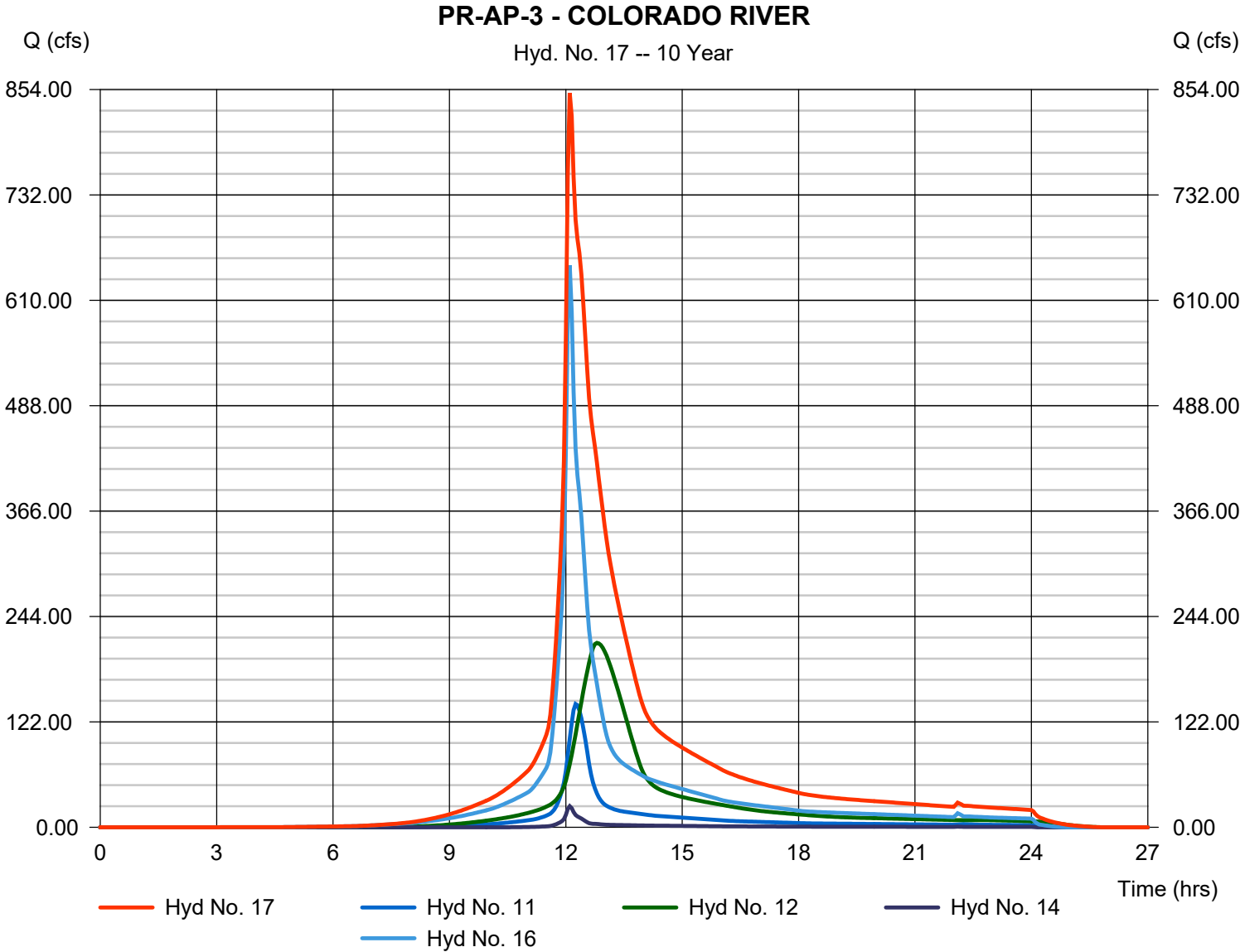
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 17

PR-AP-3 - COLORADO RIVER

Hydrograph type	= Combine	Peak discharge	= 850.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 5,493,296 cuft
Inflow hyds.	= 11, 12, 14, 16	Contrib. drain. area	= 197.870 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	97.12	3	786	1,037,961	----	----	----	EX-DA-1 / EX-AP-1	
2	SCS Runoff	181.31	3	747	1,078,021	----	----	----	EX-DA-OFFSITE	
3	SCS Runoff	219.91	3	780	2,121,502	----	----	----	EX-DA-2	
4	SCS Runoff	64.30	3	750	413,255	----	----	----	EX-DA-3	
5	Combine	395.87	3	756	3,612,778	2, 3, 4	----	----	EX-AP-2	
6	SCS Runoff	192.56	3	726	673,739	----	----	----	PR-DA-1	
7	SCS Runoff	117.15	3	726	409,901	----	----	----	PR-DA-2	
8	SCS Runoff	12.14	3	726	47,121	----	----	----	PR-DA-3	
9	SCS Runoff	367.46	3	726	1,243,838	----	----	----	PR-DA-4	
10	SCS Runoff	88.96	3	732	401,124	----	----	----	PR-DA-5	
11	SCS Runoff	195.94	3	735	936,516	----	----	----	PR-DA-6	
12	SCS Runoff	288.18	3	768	2,508,478	----	----	----	PR-DA-7	
13	SCS Runoff	12.16	3	726	40,953	----	----	----	PR-DA-8	
14	SCS Runoff	37.58	3	726	126,582	----	----	----	PR-DA-9	
15	Combine	414.96	3	726	2,208,784	2, 6, 7, 8,	----	----	PR-AP-1 - AGNES RD	
16	Combine	868.31	3	726	3,894,697	9, 10, 13, 15	----	----	PR-AP-2 - SE CORNER	
17	Combine	1151.75	3	726	7,466,272	11, 12, 14, 16	----	----	PR-AP-3 - COLORADO RIVER	
CHANNEL (05-16-18).gpw					Return Period: 25 Year			Wednesday, 05 / 16 / 2018		

# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

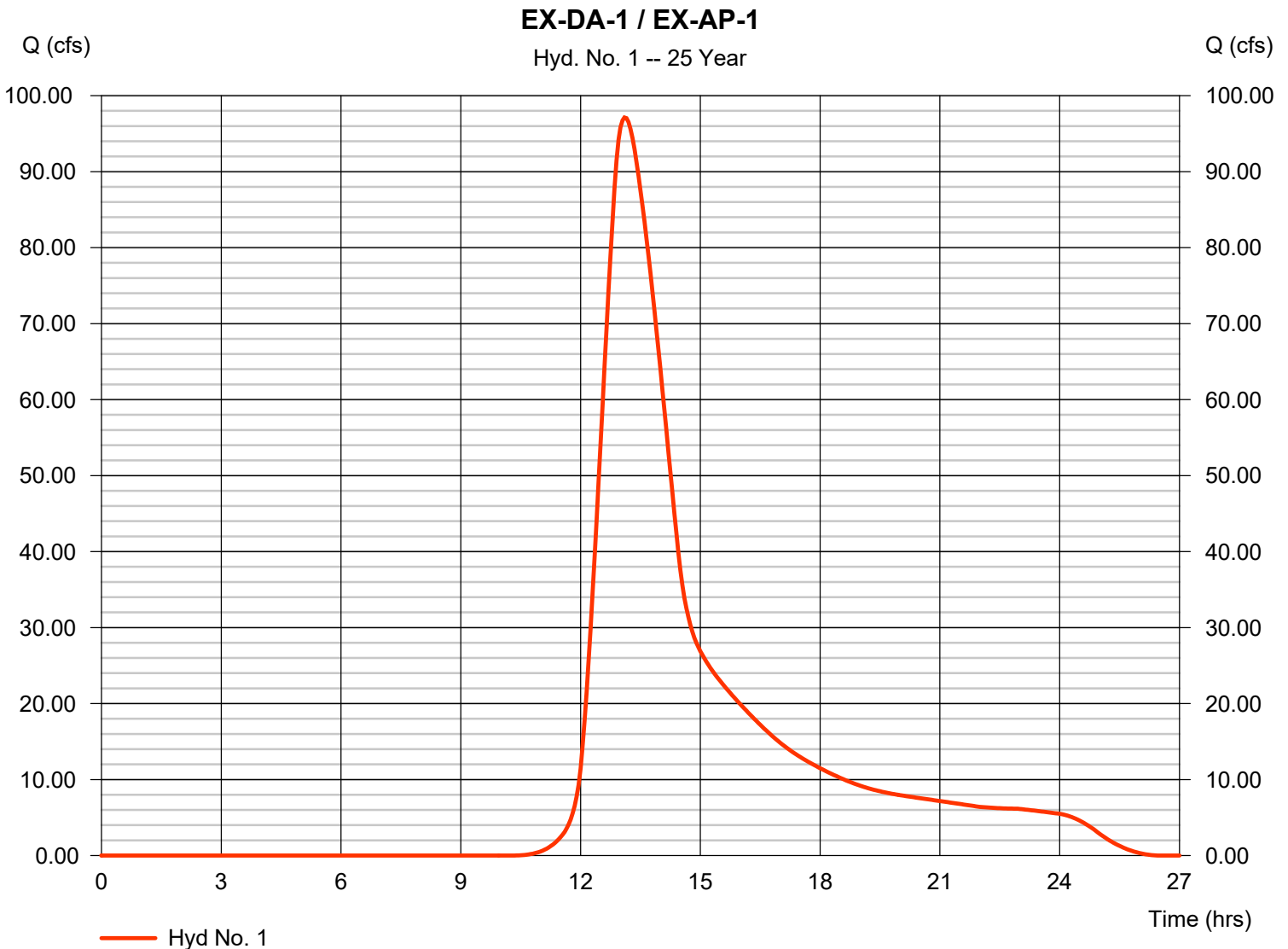
Wednesday, 05 / 16 / 2018

## Hyd. No. 1

EX-DA-1 / EX-AP-1

Hydrograph type	= SCS Runoff	Peak discharge	= 97.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 13.10 hrs
Time interval	= 3 min	Hyd. volume	= 1,037,961 cuft
Drainage area	= 101.790 ac	Curve number	= 57*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 94.50 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(84.000 x 61) + (17.790 x 39)] / 101.790



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

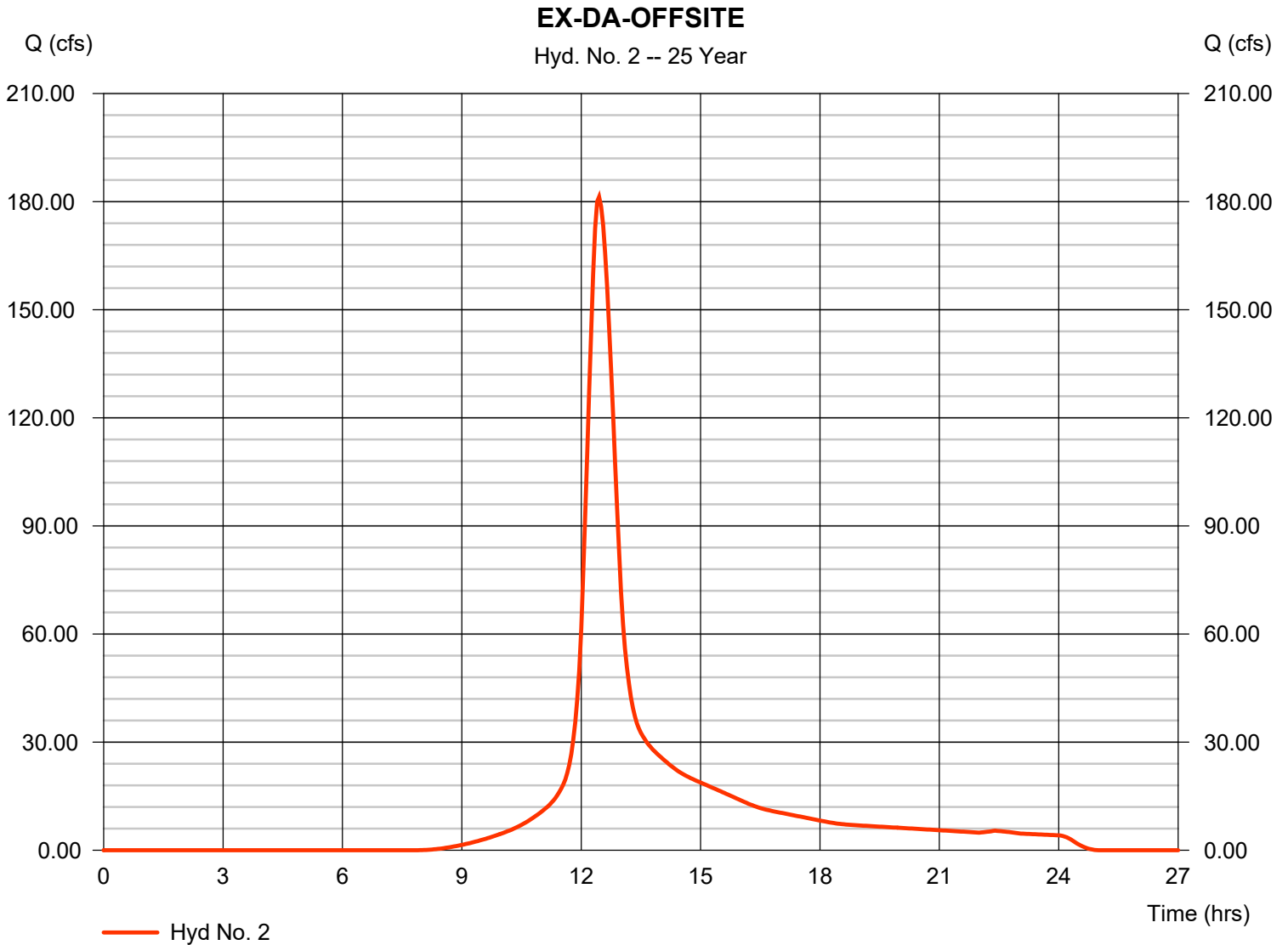
Wednesday, 05 / 16 / 2018

## Hyd. No. 2

EX-DA-OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 181.31 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.45 hrs
Time interval	= 3 min	Hyd. volume	= 1,078,021 cuft
Drainage area	= 69.840 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 39.80 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.230 x 98) + (50.610 x 61)] / 69.840





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

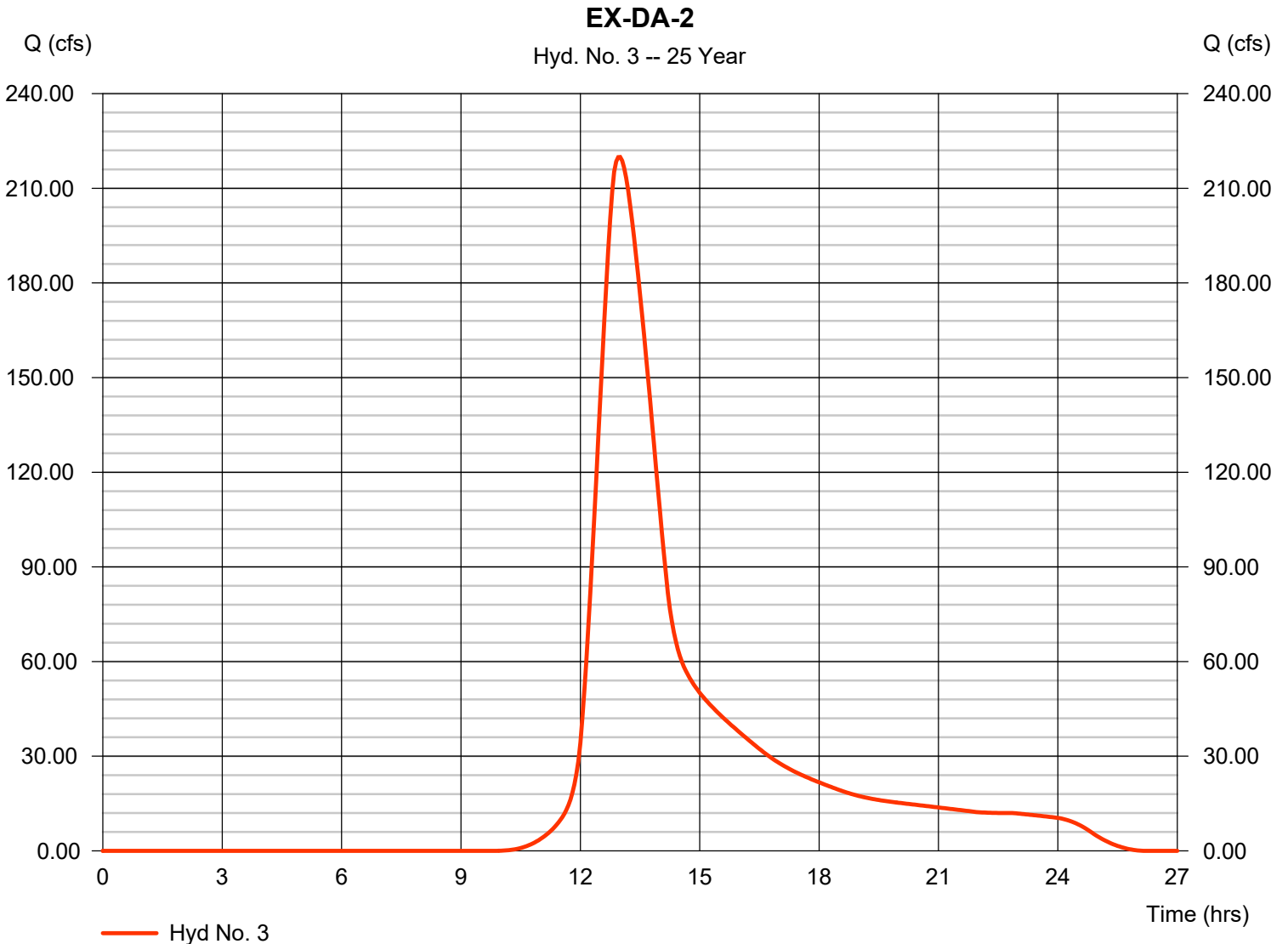
Wednesday, 05 / 16 / 2018

## Hyd. No. 3

EX-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 219.91 cfs
Storm frequency	= 25 yrs	Time to peak	= 13.00 hrs
Time interval	= 3 min	Hyd. volume	= 2,121,502 cuft
Drainage area	= 189.310 ac	Curve number	= 60*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 83.86 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(183.470 x 61) + (5.840 x 39)] / 189.310



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

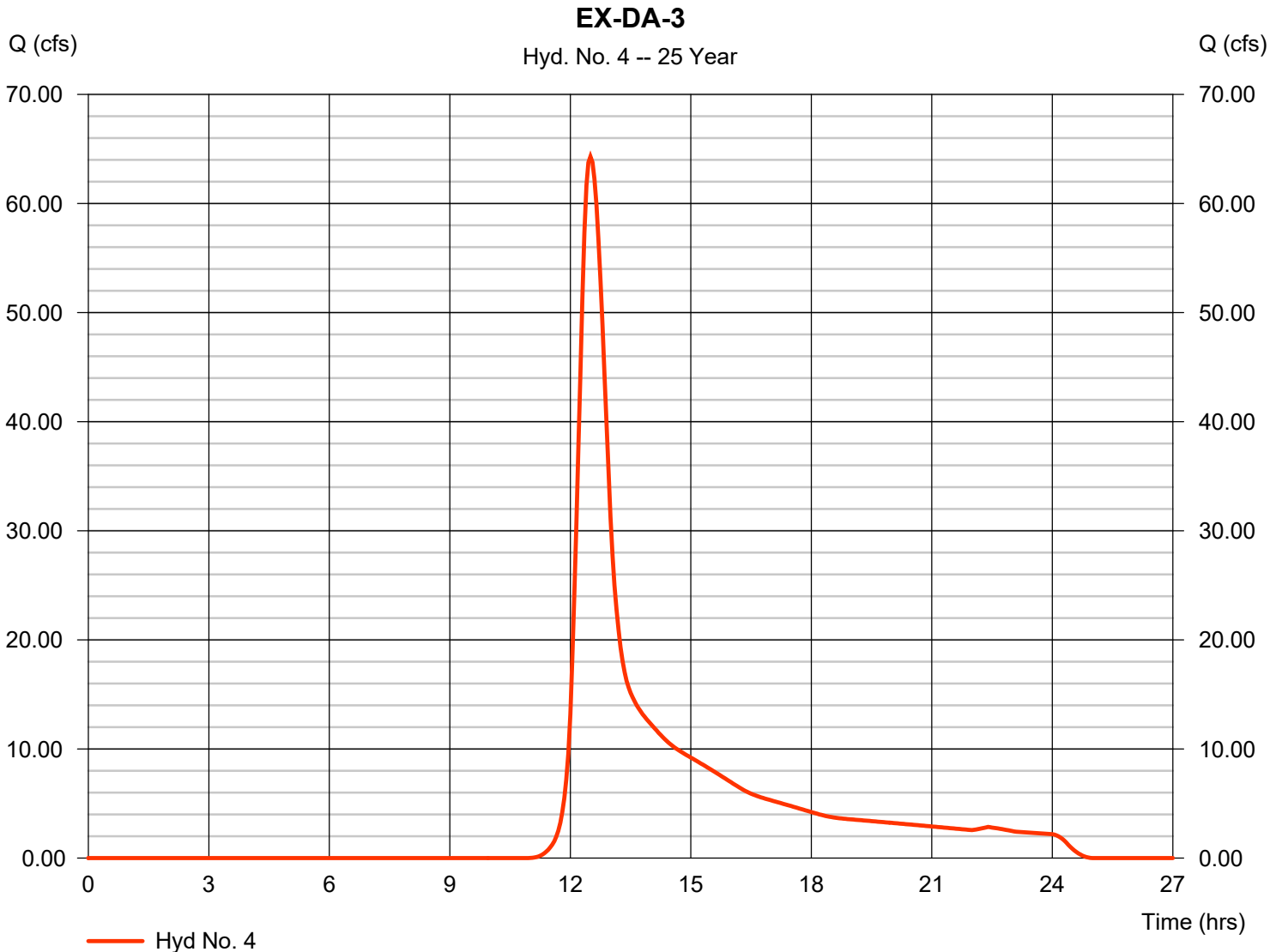
## Hyd. No. 4

EX-DA-3

Hydrograph type = SCS Runoff  
 Storm frequency = 25 yrs  
 Time interval = 3 min  
 Drainage area = 50.910 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 7.70 in  
 Storm duration = 24 hrs

Peak discharge = 64.30 cfs  
 Time to peak = 12.50 hrs  
 Hyd. volume = 413,255 cuft  
 Curve number = 52\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 38.30 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(30.546 x 61) + (20.364 x 39)] / 50.910



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

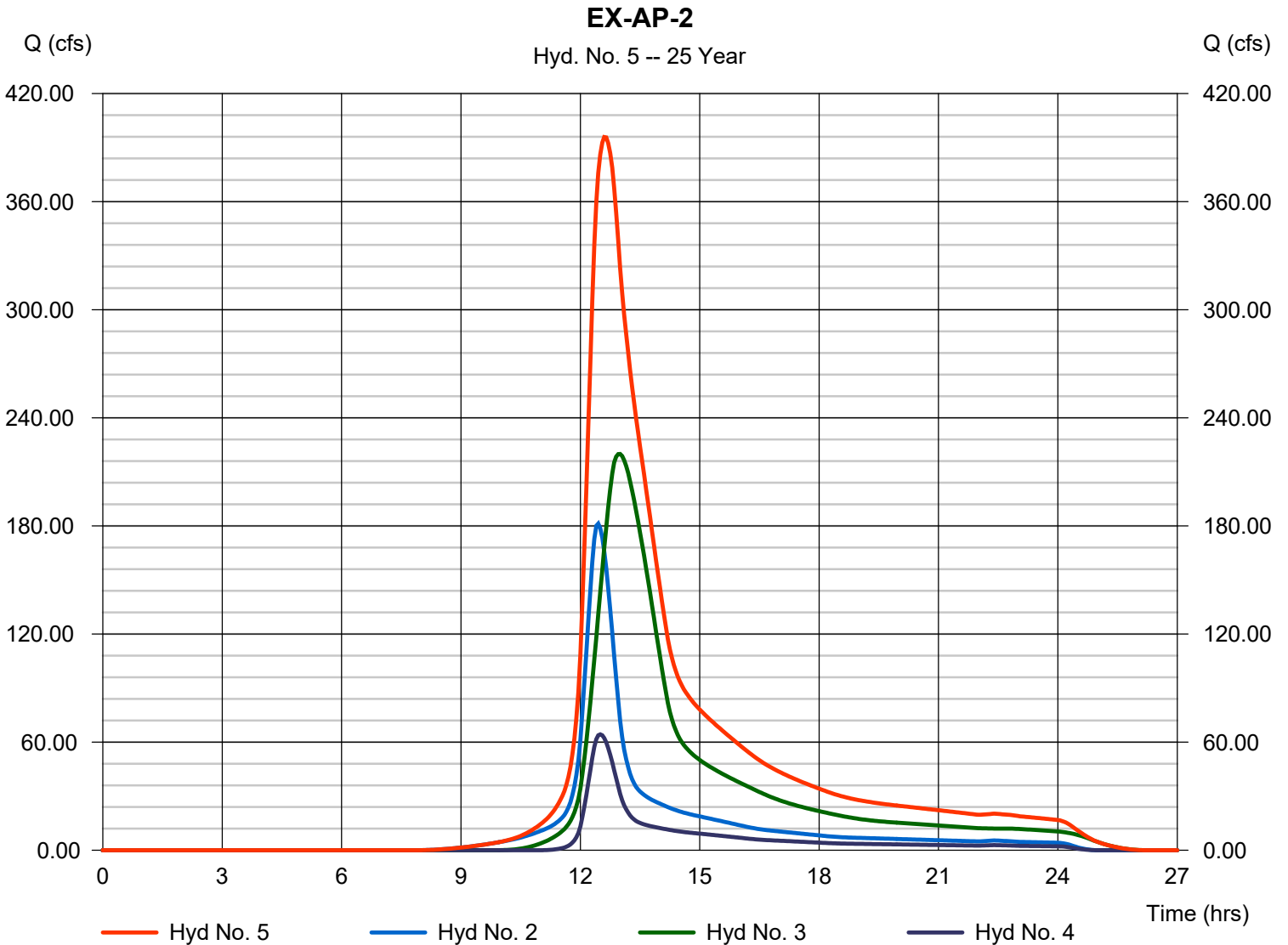
Wednesday, 05 / 16 / 2018

## Hyd. No. 5

EX-AP-2

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 3 min  
Inflow hyds. = 2, 3, 4

Peak discharge = 395.87 cfs  
Time to peak = 12.60 hrs  
Hyd. volume = 3,612,778 cuft  
Contrib. drain. area = 310.060 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

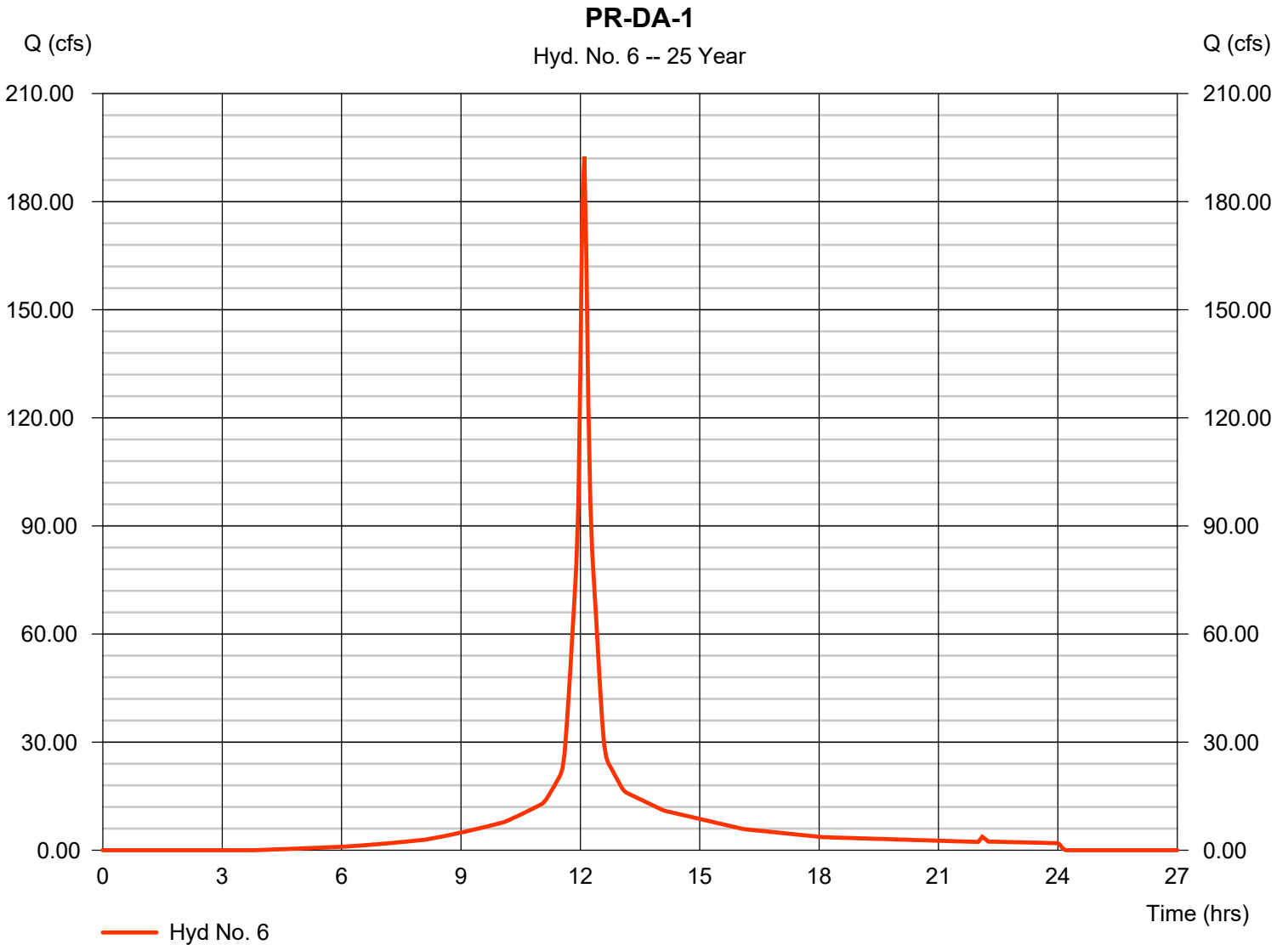
## Hyd. No. 6

PR-DA-1

Hydrograph type = SCS Runoff  
 Storm frequency = 25 yrs  
 Time interval = 3 min  
 Drainage area = 32.150 ac  
 Basin Slope = 0.0 %  
 Tc method = TR55  
 Total precip. = 7.70 in  
 Storm duration = 24 hrs

Peak discharge = 192.56 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 673,739 cuft  
 Curve number = 87\*  
 Hydraulic length = 0 ft  
 Time of conc. (Tc) = 7.60 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(22.300 x 98) + (9.560 x 61)] / 32.150



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

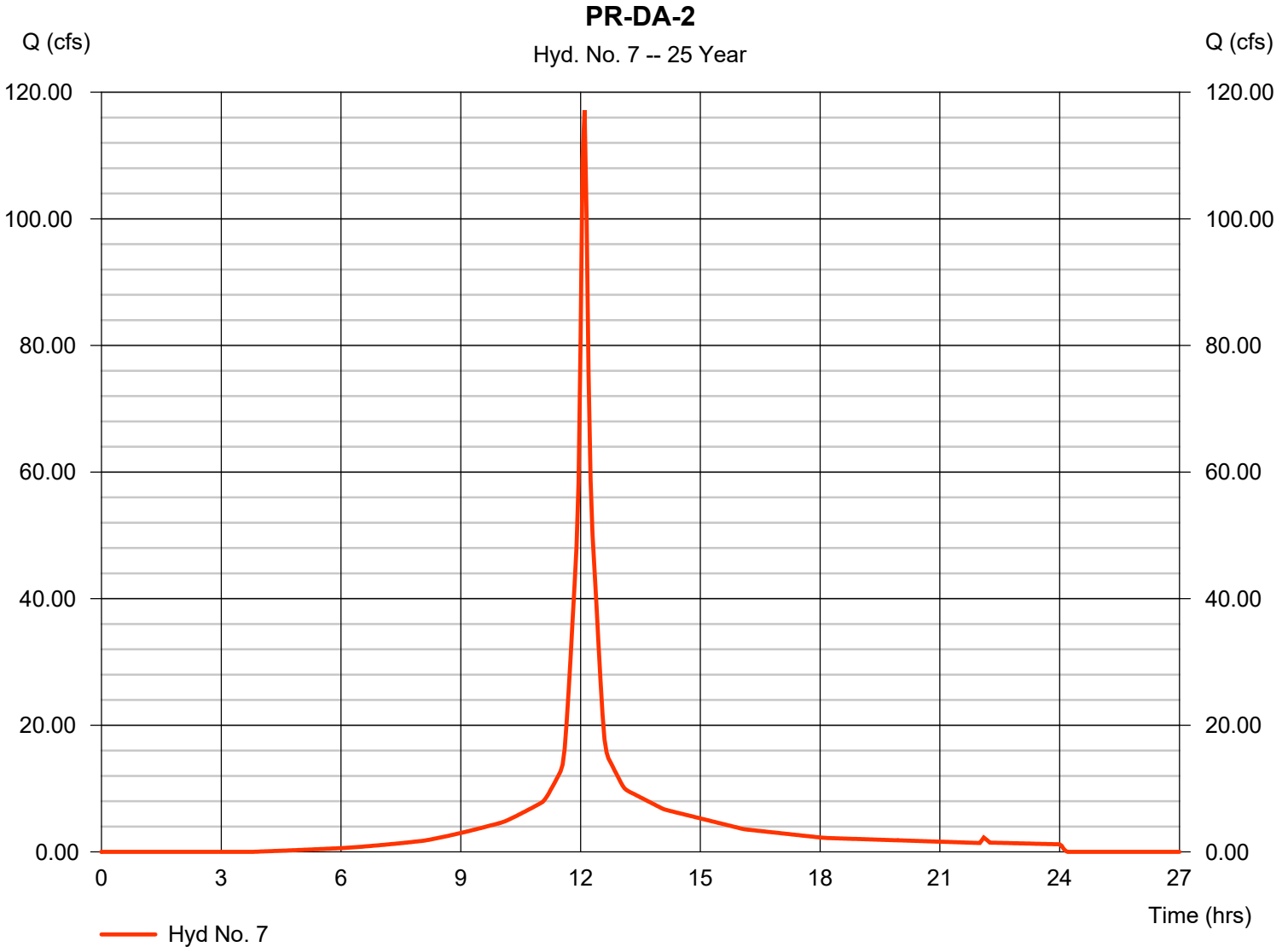
Wednesday, 05 / 16 / 2018

## Hyd. No. 7

PR-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 117.15 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 409,901 cuft
Drainage area	= 19.560 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(13.580 x 98) + (5.820 x 61)] / 19.560



# Hydrograph Report

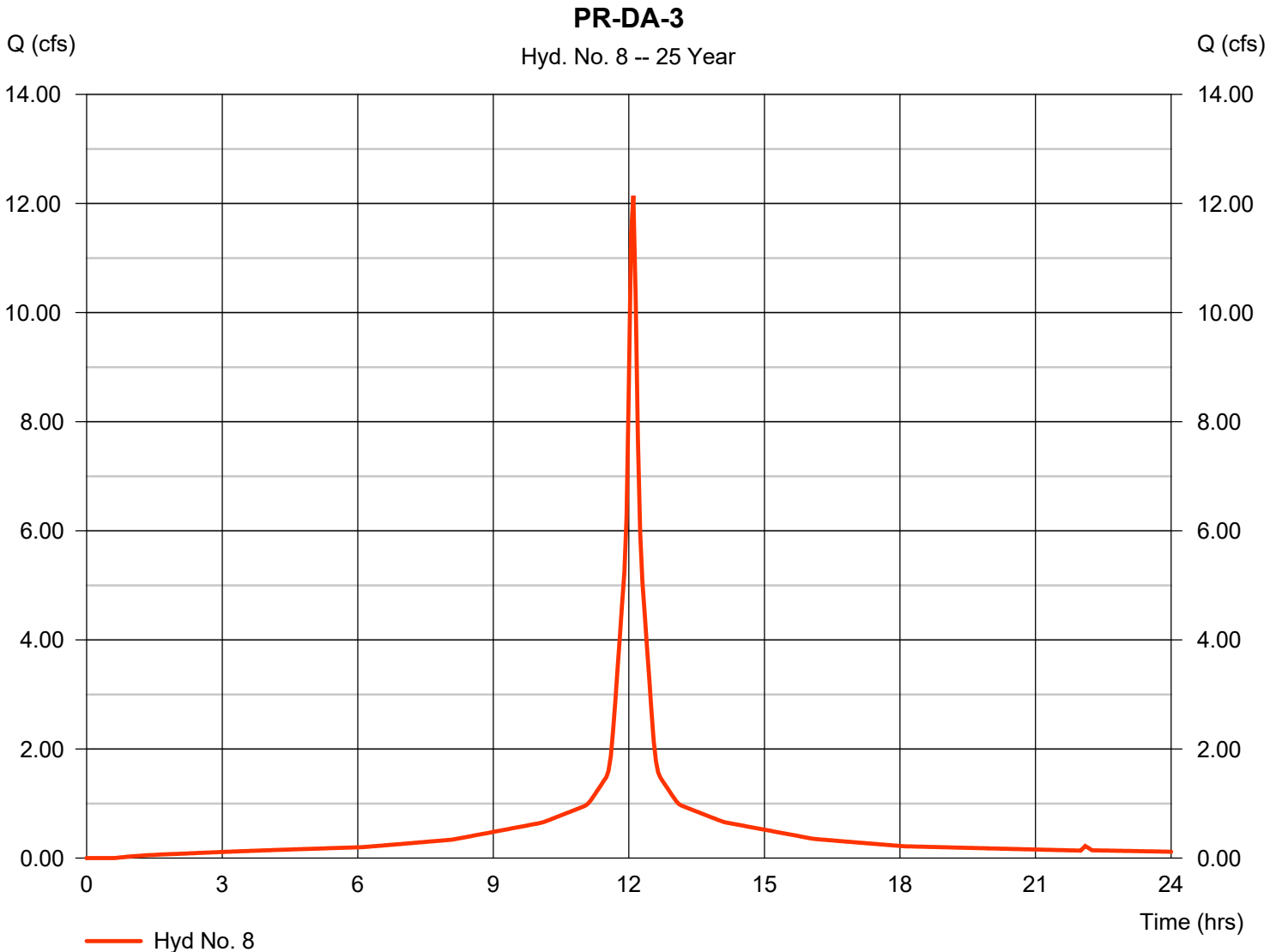
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 8

PR-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 12.14 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 47,121 cuft
Drainage area	= 1.856 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.80 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

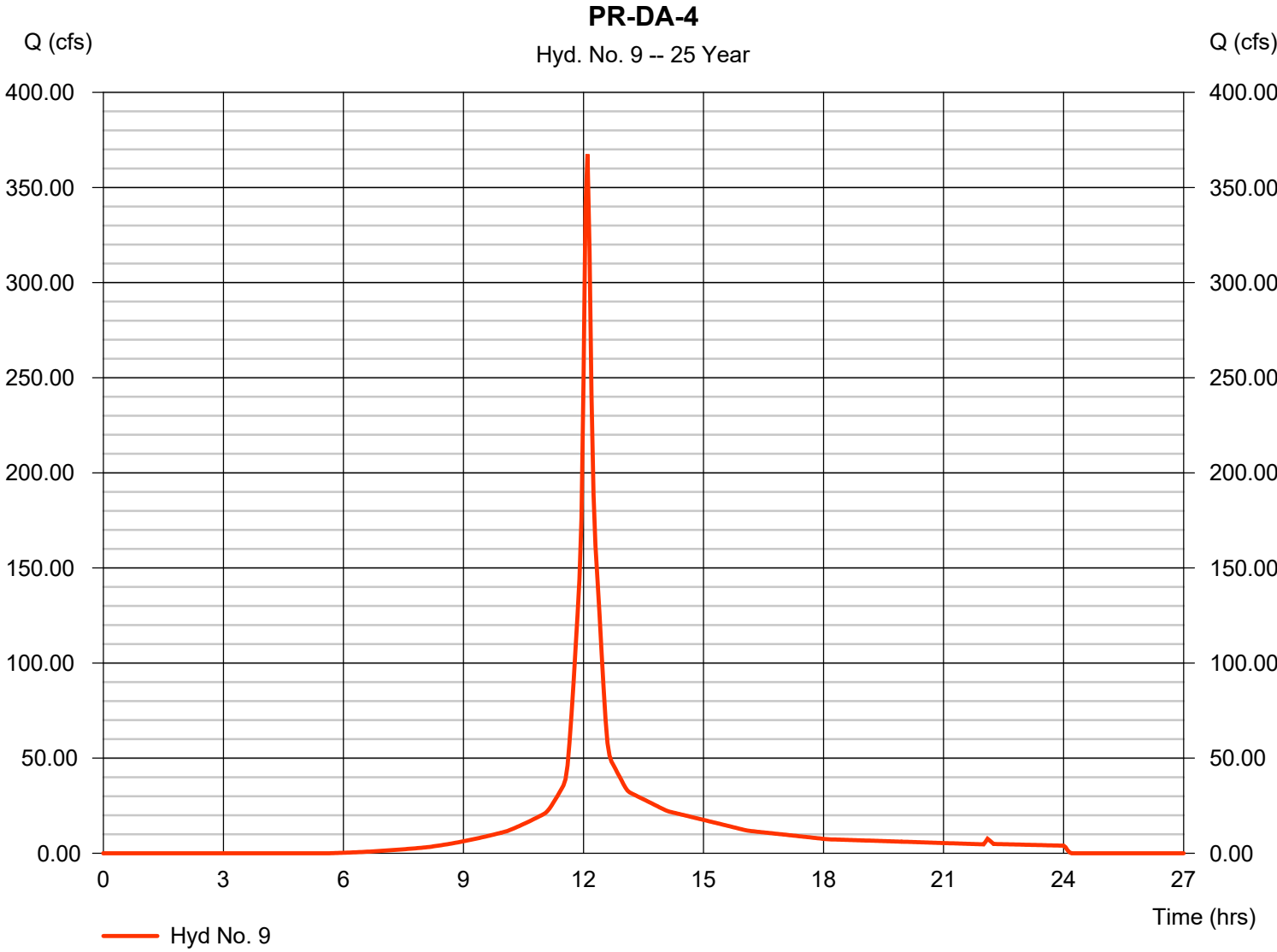
Wednesday, 05 / 16 / 2018

## Hyd. No. 9

PR-DA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 367.46 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 1,243,838 cuft
Drainage area	= 68.390 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.10 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(34.190 x 98) + (34.200 x 61)] / 68.390



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

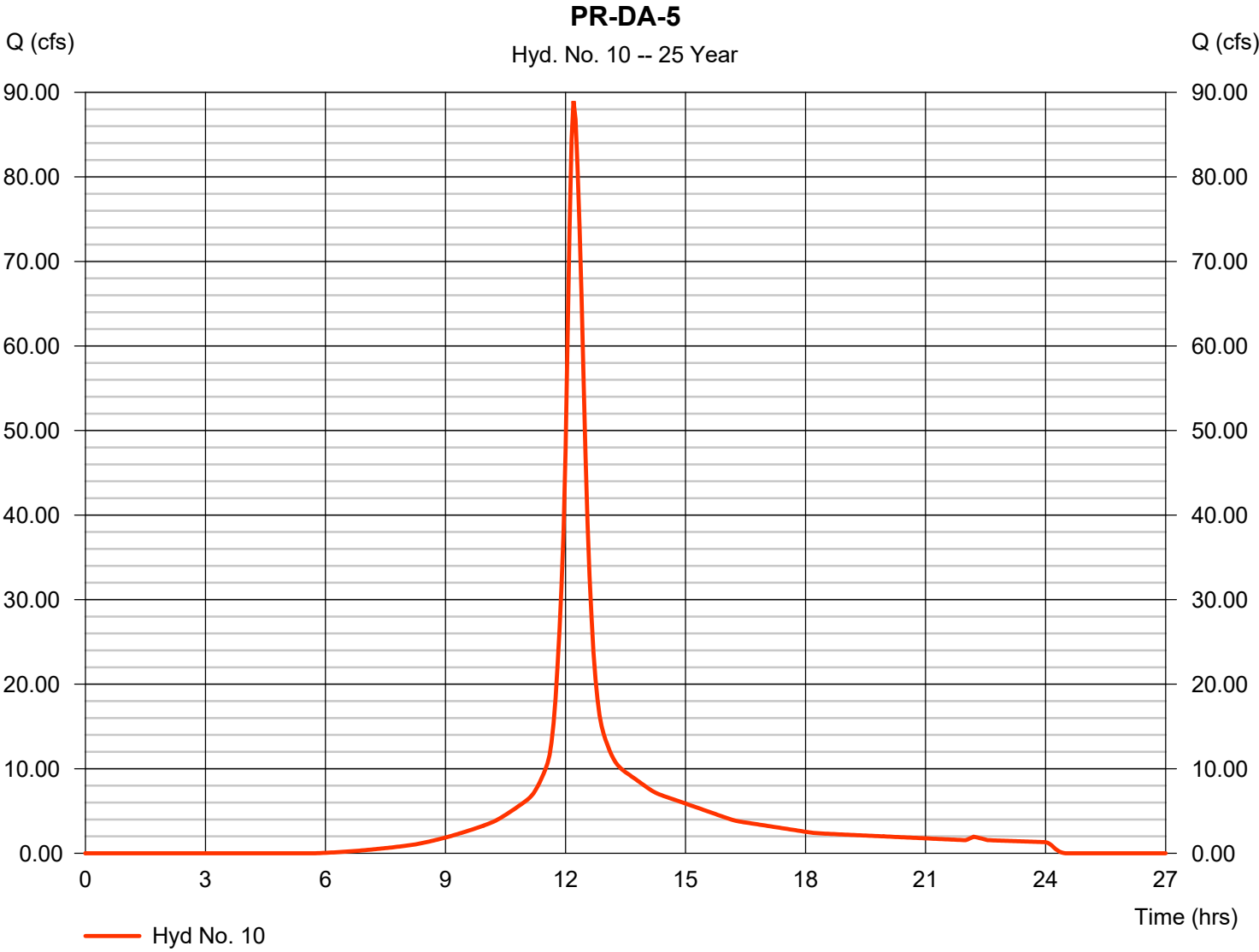
## Hyd. No. 10

PR-DA-5

Hydrograph type = SCS Runoff  
Storm frequency = 25 yrs  
Time interval = 3 min  
Drainage area = 20.050 ac  
Basin Slope = 0.0 %  
Tc method = TR55  
Total precip. = 7.70 in  
Storm duration = 24 hrs

Peak discharge = 88.96 cfs  
Time to peak = 12.20 hrs  
Hyd. volume = 401,124 cuft  
Curve number = 80\*  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 18.40 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(10.167 x 98) + (10.167 x 61)] / 20.050





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

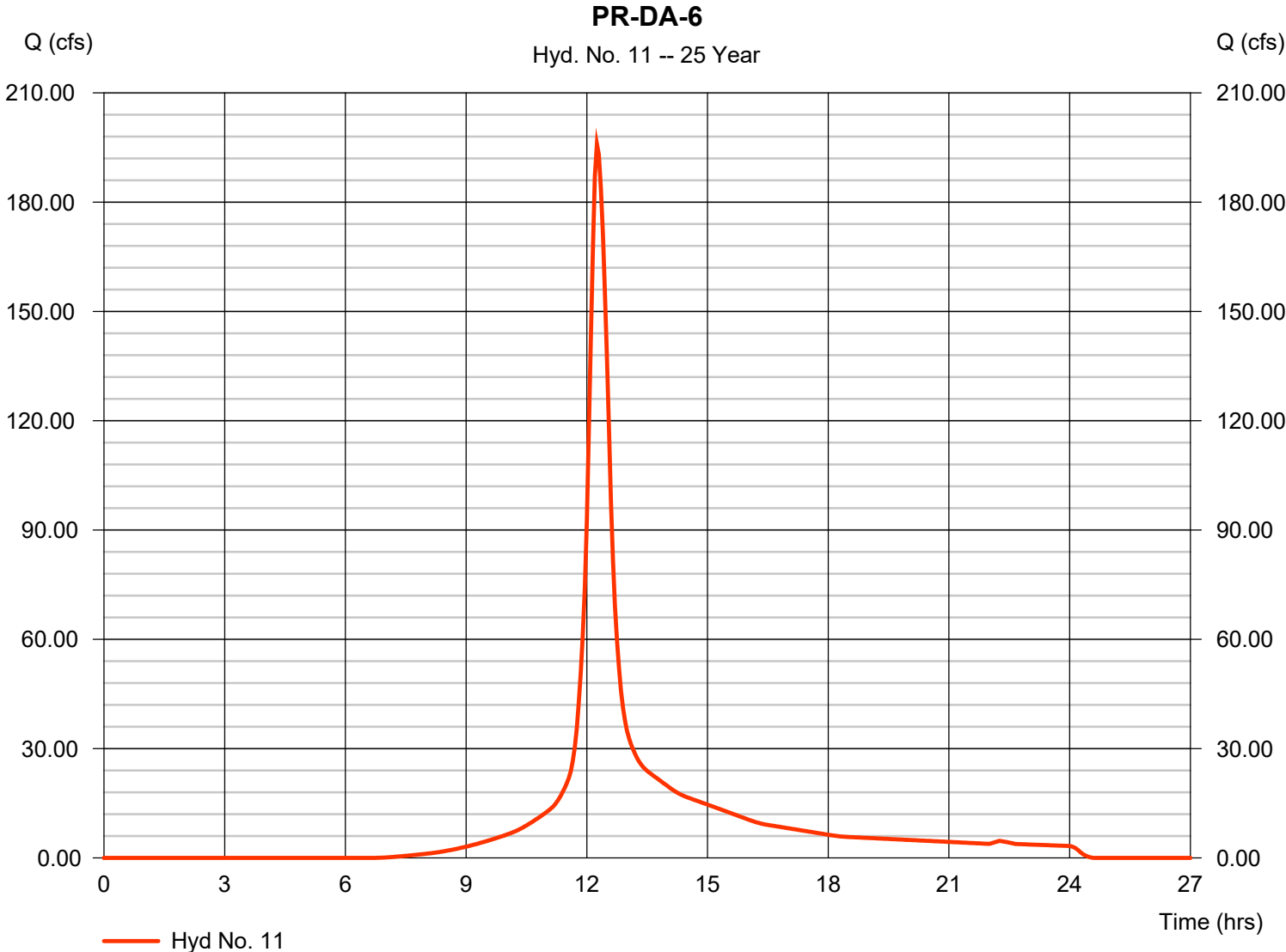
Wednesday, 05 / 16 / 2018

## Hyd. No. 11

PR-DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 195.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 936,516 cuft
Drainage area	= 54.160 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.60 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.630 x 61) + (7.450 x 39) + (27.080 x 98)] / 54.160



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

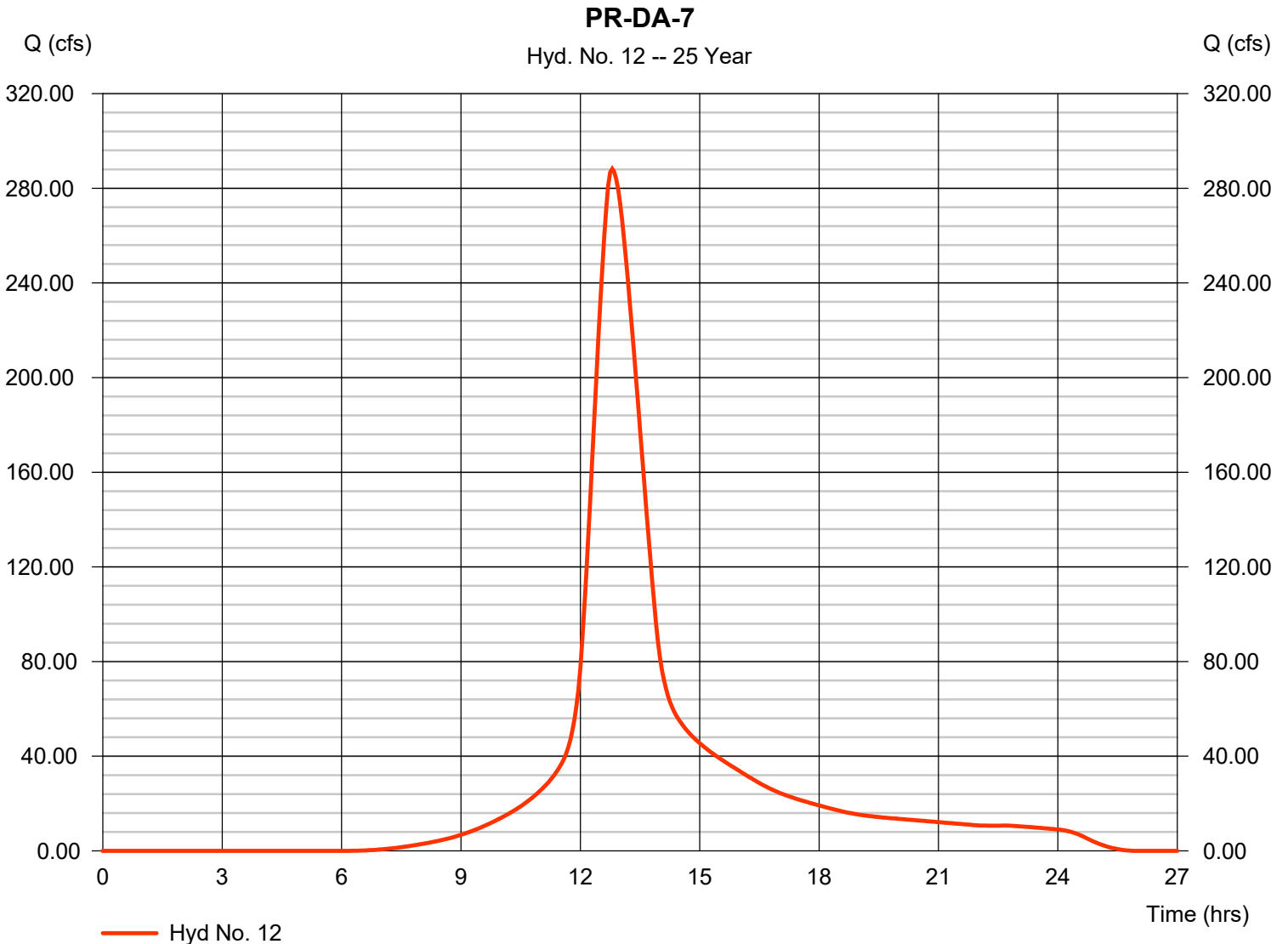
Wednesday, 05 / 16 / 2018

## Hyd. No. 12

PR-DA-7

Hydrograph type	= SCS Runoff	Peak discharge	= 288.18 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.80 hrs
Time interval	= 3 min	Hyd. volume	= 2,508,478 cuft
Drainage area	= 132.150 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 71.80 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(66.080 x 98) + (66.070 x 61)] / 132.150



# Hydrograph Report

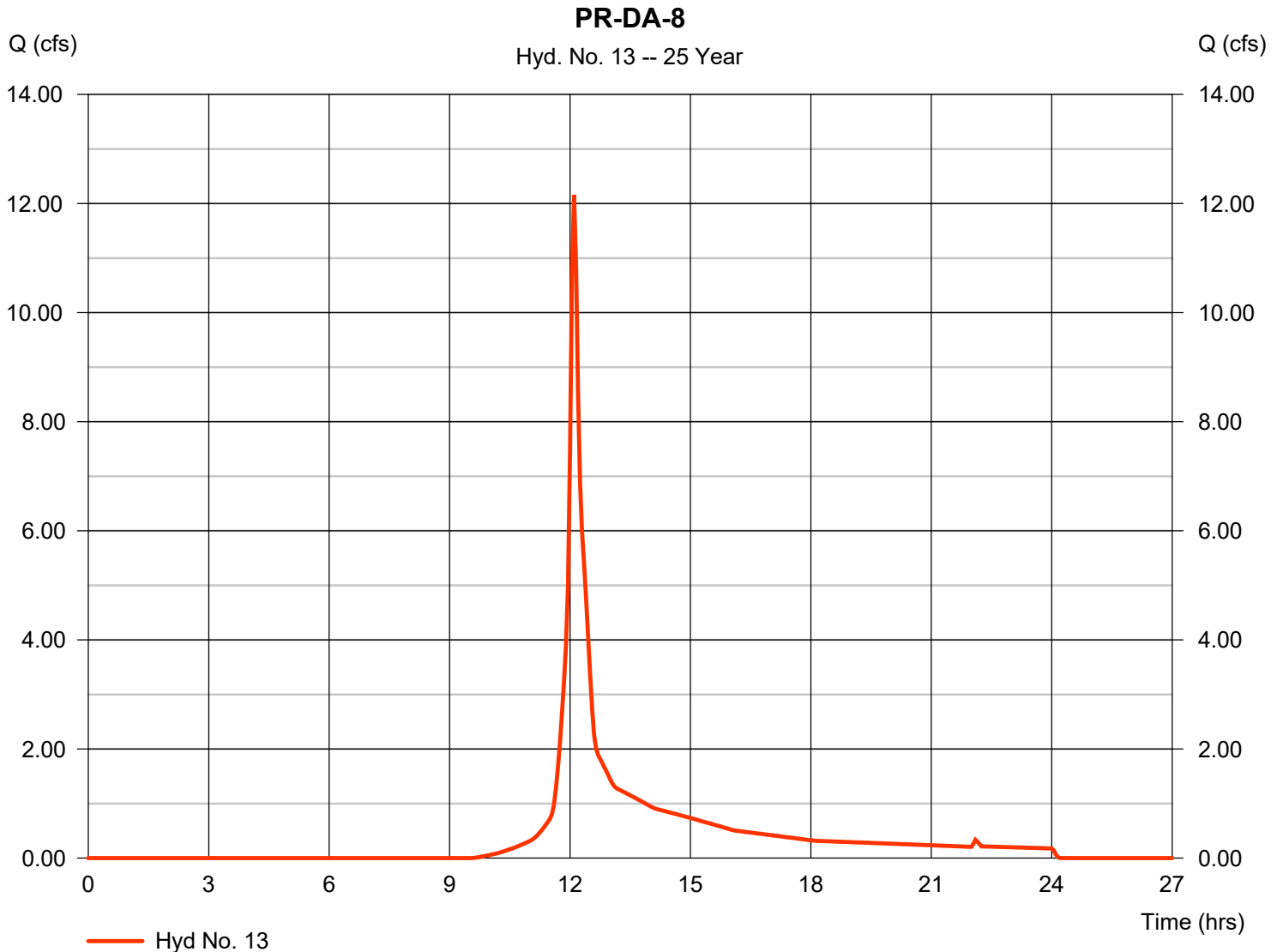
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 13

PR-DA-8

Hydrograph type	= SCS Runoff	Peak discharge	= 12.16 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 40,953 cuft
Drainage area	= 3.740 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.90 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

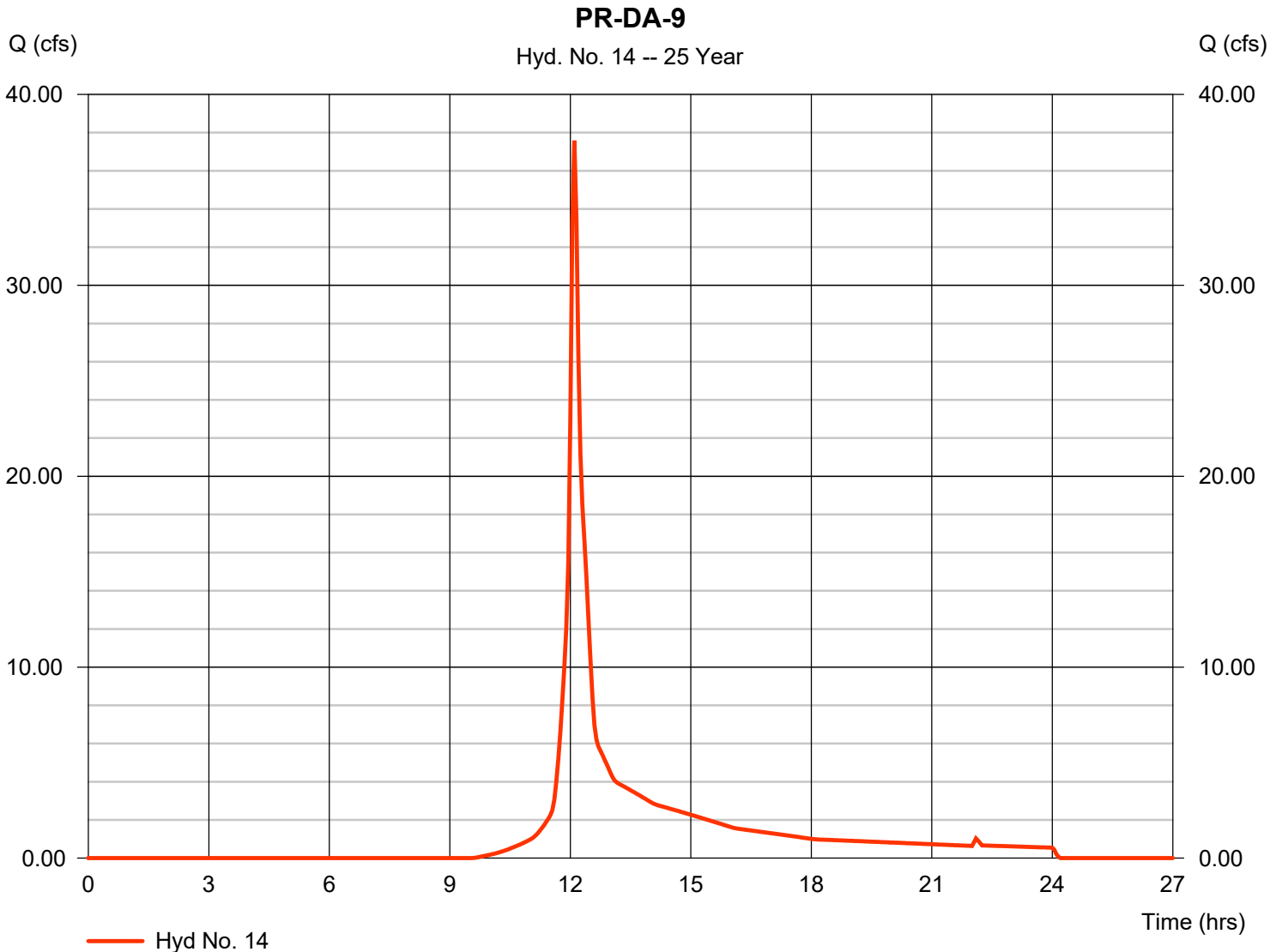
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 14

PR-DA-9

Hydrograph type	= SCS Runoff	Peak discharge	= 37.58 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 126,582 cuft
Drainage area	= 11.560 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.70 min
Total precip.	= 7.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

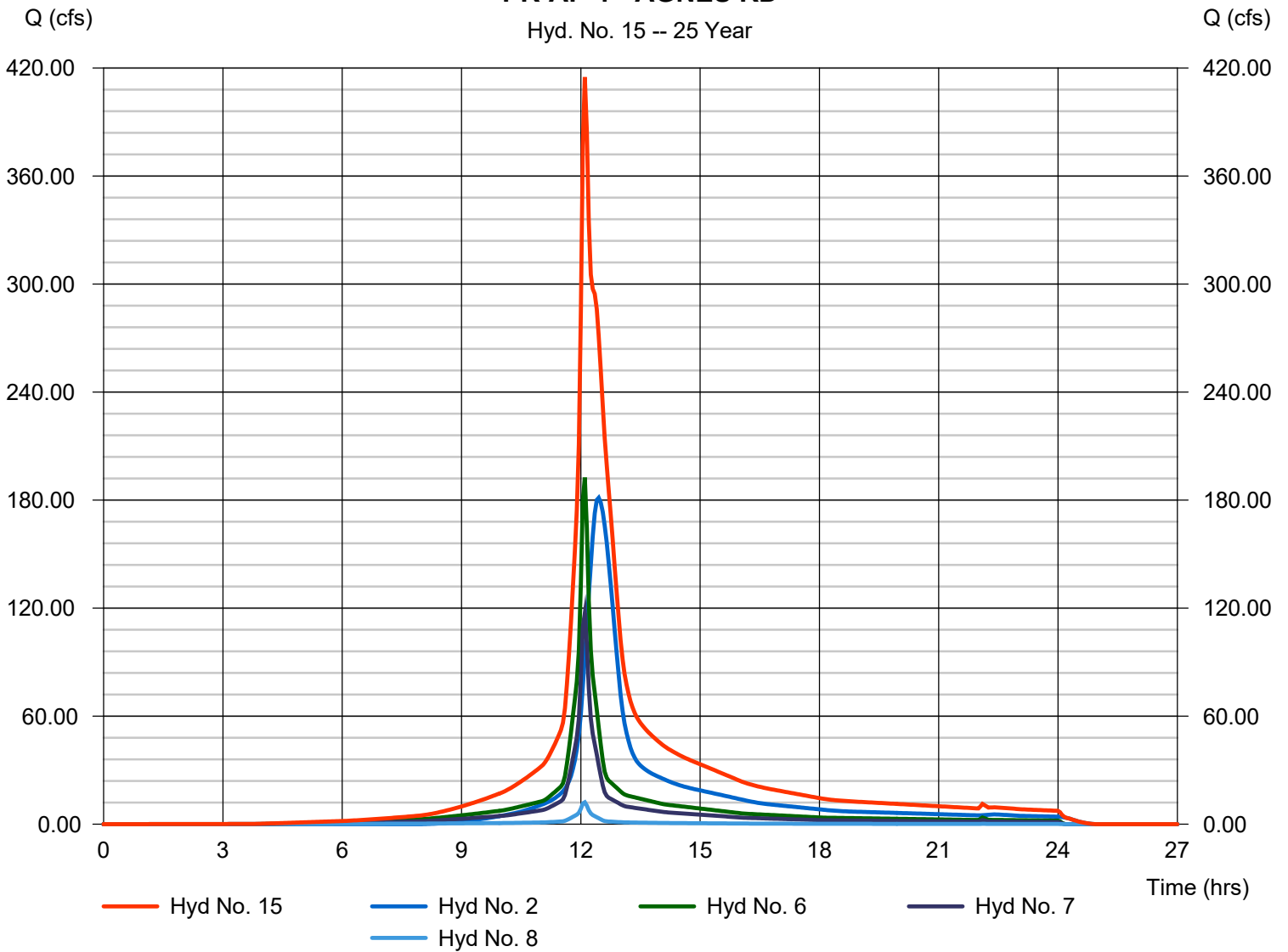
## Hyd. No. 15

PR-AP-1 - AGNES RD

Hydrograph type	= Combine	Peak discharge	= 414.96 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 2,208,784 cuft
Inflow hyds.	= 2, 6, 7, 8	Contrib. drain. area	= 123.406 ac

### PR-AP-1 - AGNES RD

Hyd. No. 15 -- 25 Year



# Hydrograph Report

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Wednesday, 05 / 16 / 2018

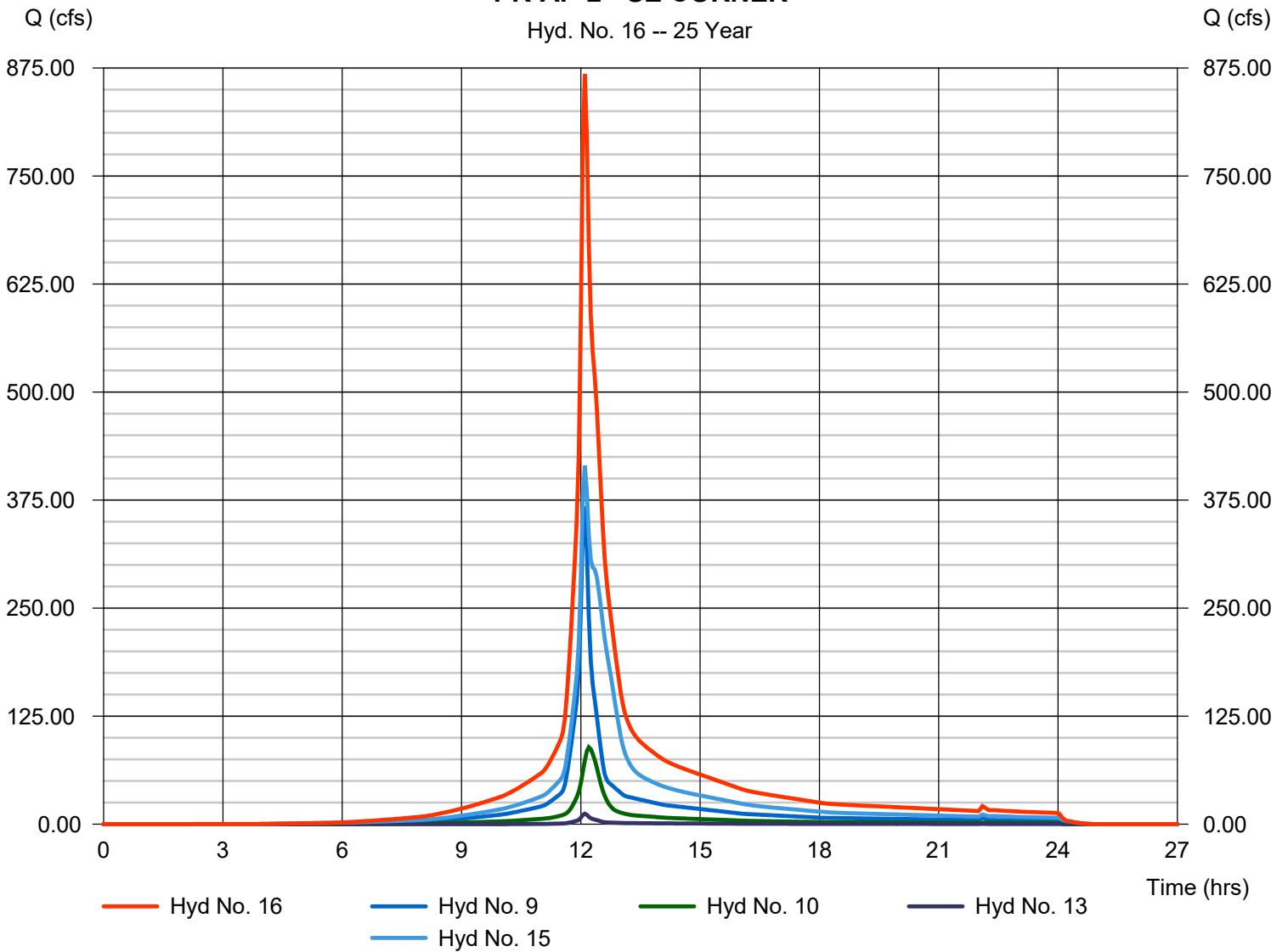
## Hyd. No. 16

PR-AP-2 - SE CORNER

Hydrograph type	= Combine	Peak discharge	= 868.31 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 3,894,697 cuft
Inflow hyds.	= 9, 10, 13, 15	Contrib. drain. area	= 92.180 ac

### PR-AP-2 - SE CORNER

Hyd. No. 16 -- 25 Year



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

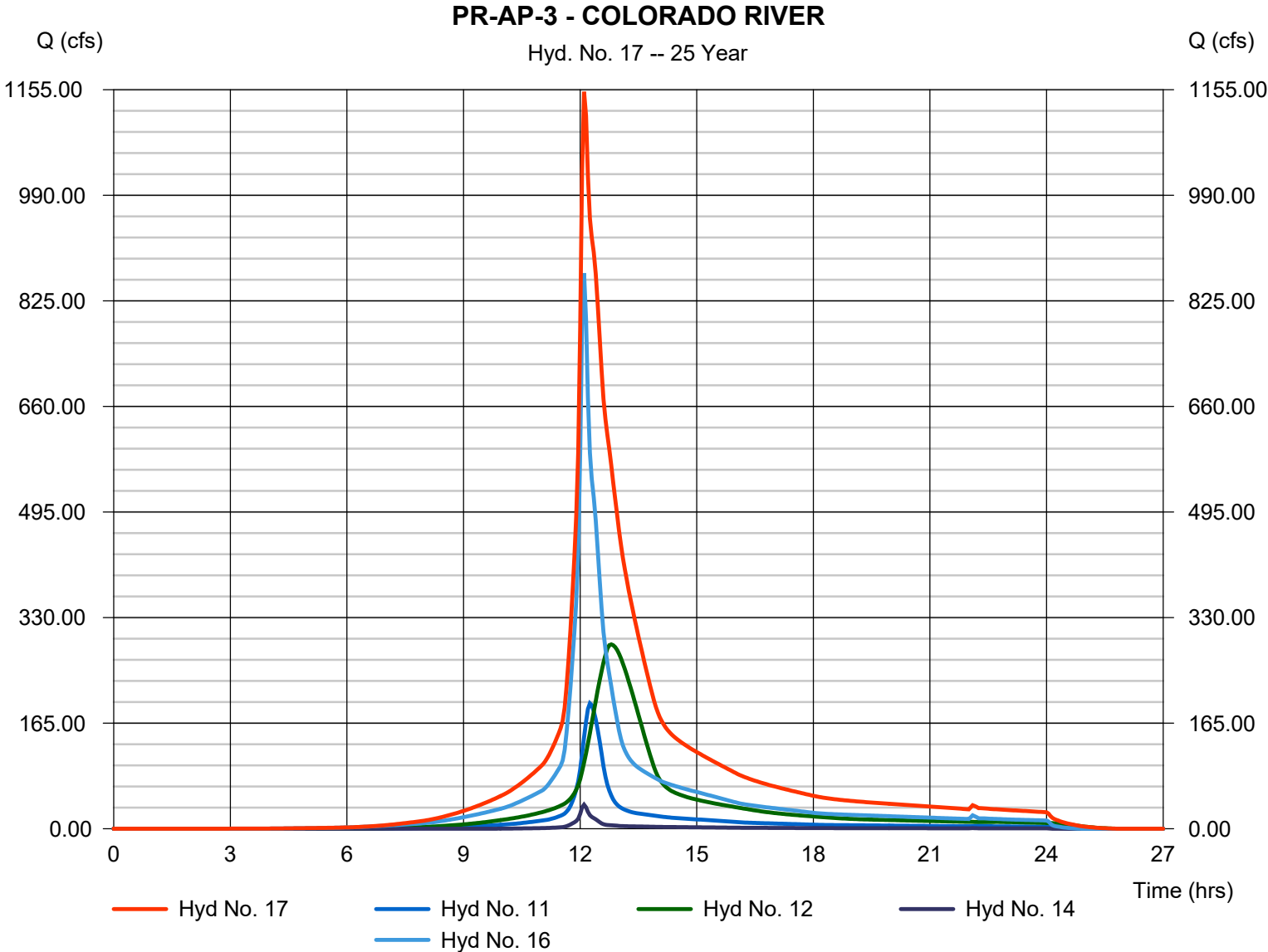
Wednesday, 05 / 16 / 2018

## Hyd. No. 17

PR-AP-3 - COLORADO RIVER

Hydrograph type = Combine  
Storm frequency = 25 yrs  
Time interval = 3 min  
Inflow hyds. = 11, 12, 14, 16

Peak discharge = 1151.75 cfs  
Time to peak = 12.10 hrs  
Hyd. volume = 7,466,272 cuft  
Contrib. drain. area = 197.870 ac



# Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	167.35	3	783	1,730,482	----	----	----	EX-DA-1 / EX-AP-1	
2	SCS Runoff	273.30	3	747	1,631,448	----	----	----	EX-DA-OFFSITE	
3	SCS Runoff	366.23	3	777	3,452,475	----	----	----	EX-DA-2	
4	SCS Runoff	117.99	3	747	721,955	----	----	----	EX-DA-3	
5	Combine	648.66	3	756	5,805,873	2, 3, 4	----	----	EX-AP-2	
6	SCS Runoff	263.76	3	726	941,240	----	----	----	PR-DA-1	
7	SCS Runoff	160.47	3	726	572,648	----	----	----	PR-DA-2	
8	SCS Runoff	16.10	3	726	62,904	----	----	----	PR-DA-3	
9	SCS Runoff	521.27	3	726	1,794,956	----	----	----	PR-DA-4	
10	SCS Runoff	126.64	3	732	578,854	----	----	----	PR-DA-5	
11	SCS Runoff	285.88	3	735	1,379,011	----	----	----	PR-DA-6	
12	SCS Runoff	413.80	3	768	3,637,777	----	----	----	PR-DA-7	
13	SCS Runoff	19.88	3	726	66,145	----	----	----	PR-DA-8	
14	SCS Runoff	61.45	3	726	204,448	----	----	----	PR-DA-9	
15	Combine	587.02	3	726	3,208,240	2, 6, 7, 8,	----	----	PR-AP-1 - AGNES RD	
16	Combine	1234.19	3	726	5,648,194	9, 10, 13, 15	----	----	PR-AP-2 - SE CORNER	
17	Combine	1662.89	3	726	10,869,425	11, 12, 14, 16	----	----	PR-AP-3 - COLORADO RIVER	
CHANNEL (05-16-18).gpw					Return Period: 100 Year			Wednesday, 05 / 16 / 2018		



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

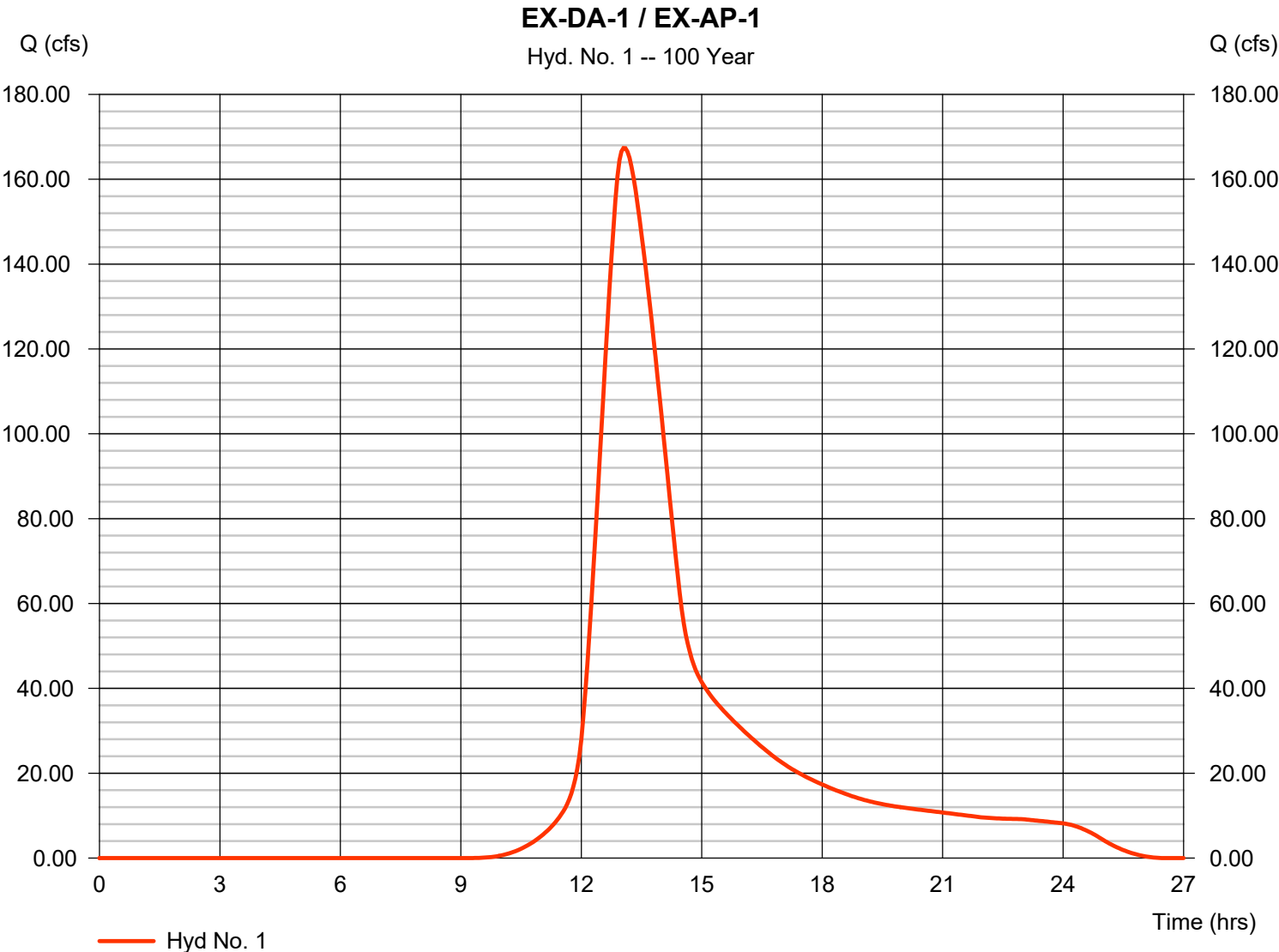
Wednesday, 05 / 16 / 2018

## Hyd. No. 1

EX-DA-1 / EX-AP-1

Hydrograph type	= SCS Runoff	Peak discharge	= 167.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.05 hrs
Time interval	= 3 min	Hyd. volume	= 1,730,482 cuft
Drainage area	= 101.790 ac	Curve number	= 57*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 94.50 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(84.000 x 61) + (17.790 x 39)] / 101.790



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

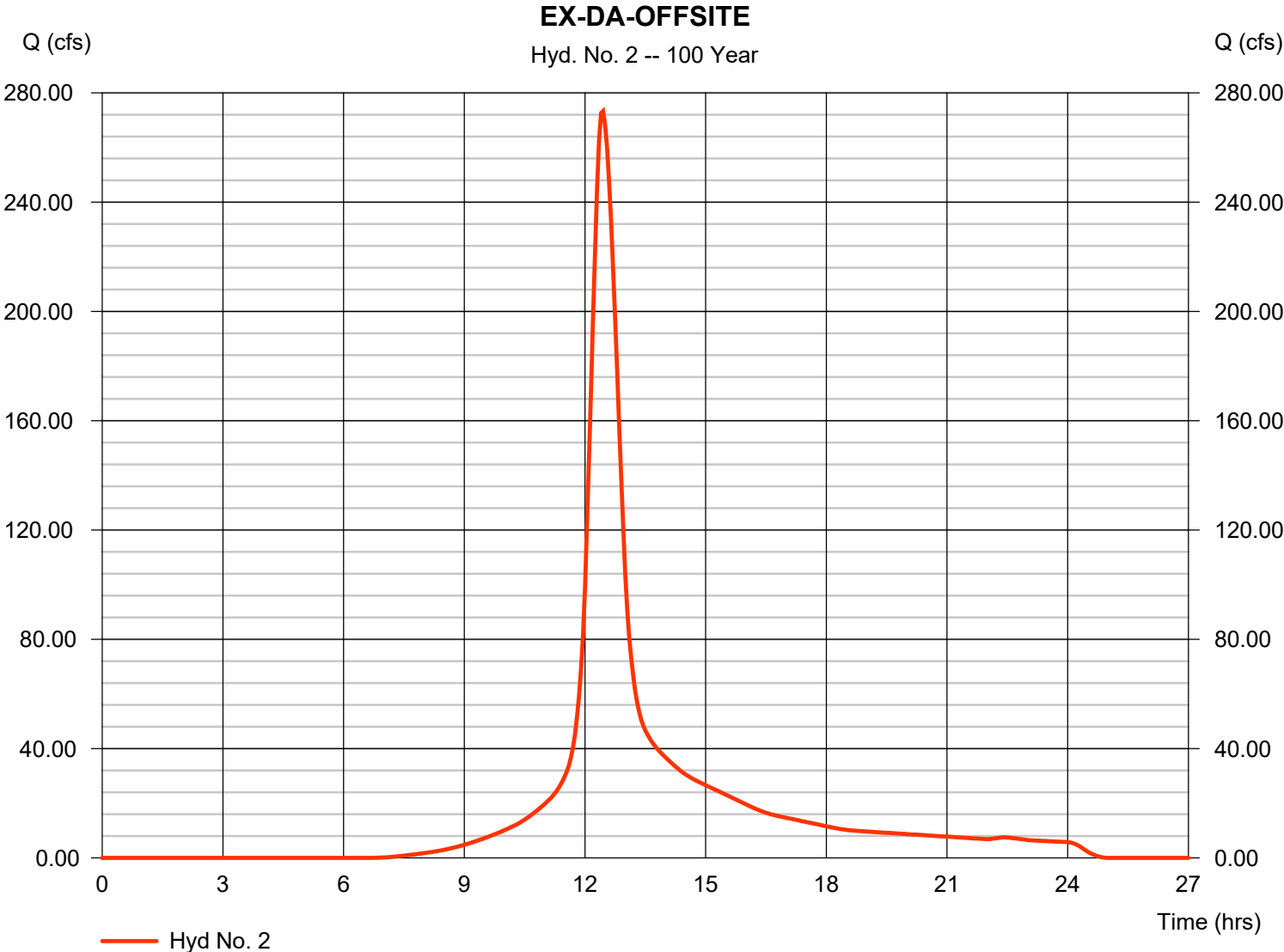
Wednesday, 05 / 16 / 2018

## Hyd. No. 2

EX-DA-OFFSITE

Hydrograph type	= SCS Runoff	Peak discharge	= 273.30 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.45 hrs
Time interval	= 3 min	Hyd. volume	= 1,631,448 cuft
Drainage area	= 69.840 ac	Curve number	= 71*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 39.80 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.230 x 98) + (50.610 x 61)] / 69.840



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

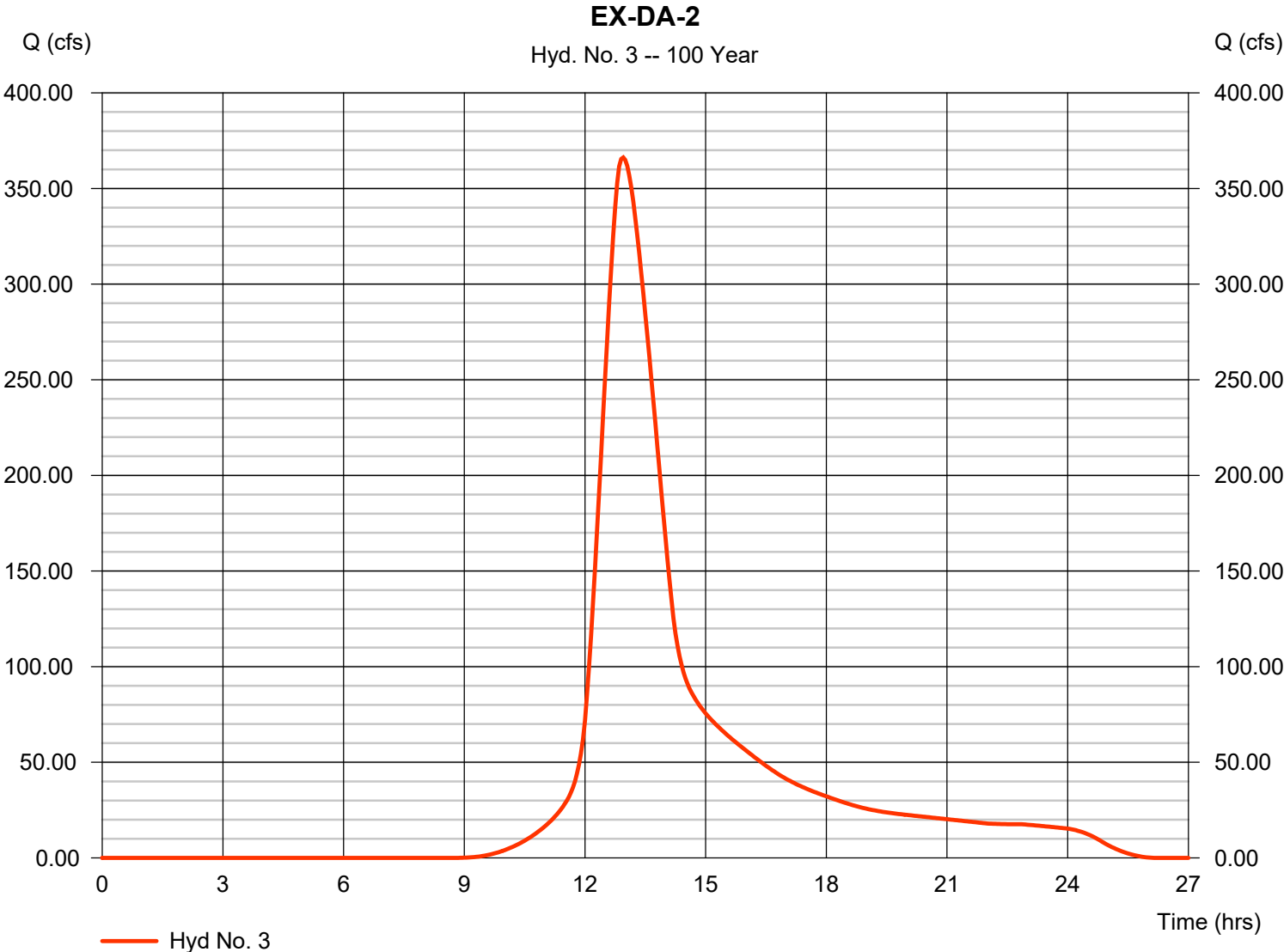
Wednesday, 05 / 16 / 2018

## Hyd. No. 3

EX-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 366.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.95 hrs
Time interval	= 3 min	Hyd. volume	= 3,452,475 cuft
Drainage area	= 189.310 ac	Curve number	= 60*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 83.86 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(183.470 x 61) + (5.840 x 39)] / 189.310



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

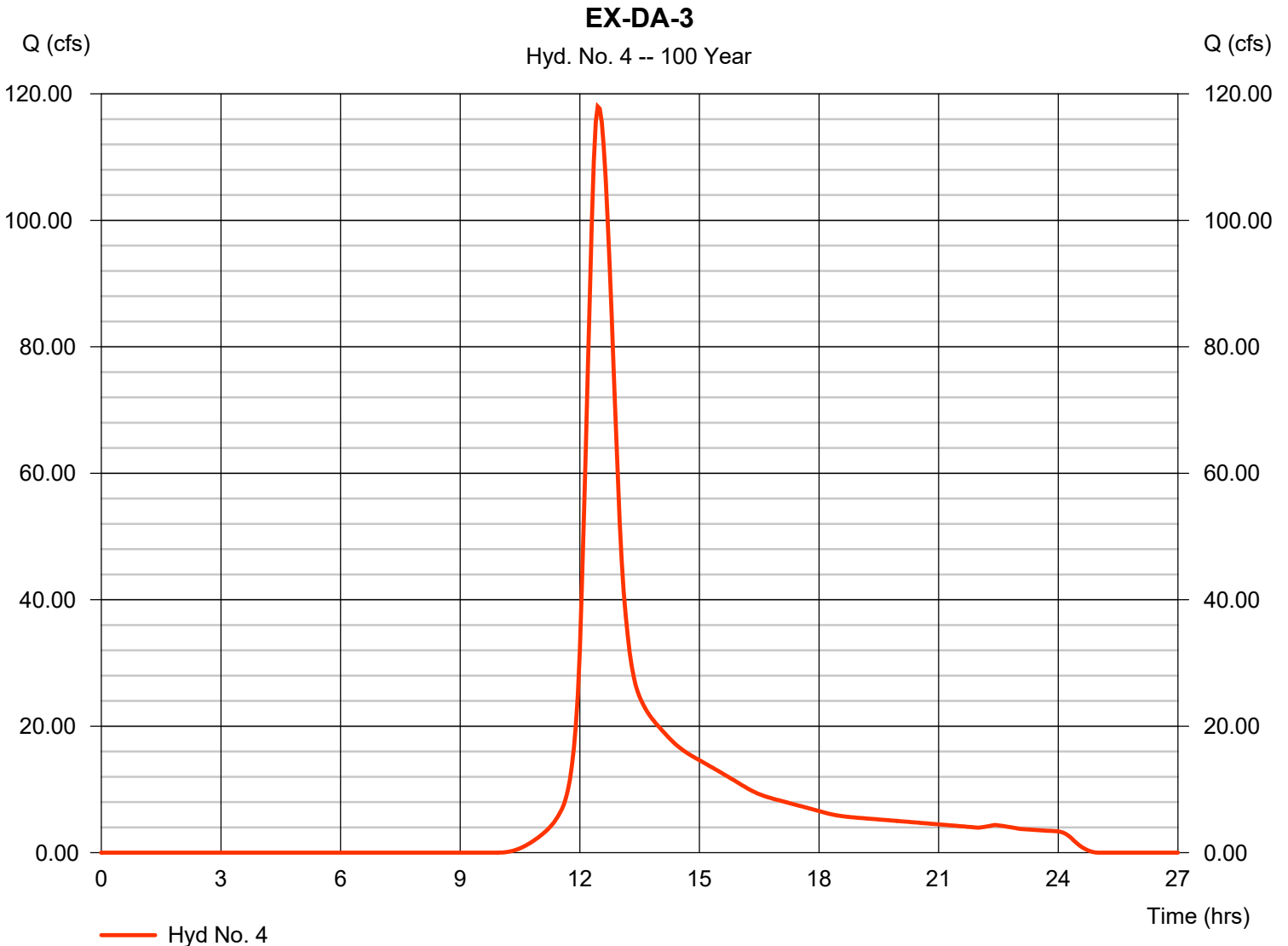
Wednesday, 05 / 16 / 2018

## Hyd. No. 4

EX-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 117.99 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.45 hrs
Time interval	= 3 min	Hyd. volume	= 721,955 cuft
Drainage area	= 50.910 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 38.30 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(30.546 x 61) + (20.364 x 39)] / 50.910



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

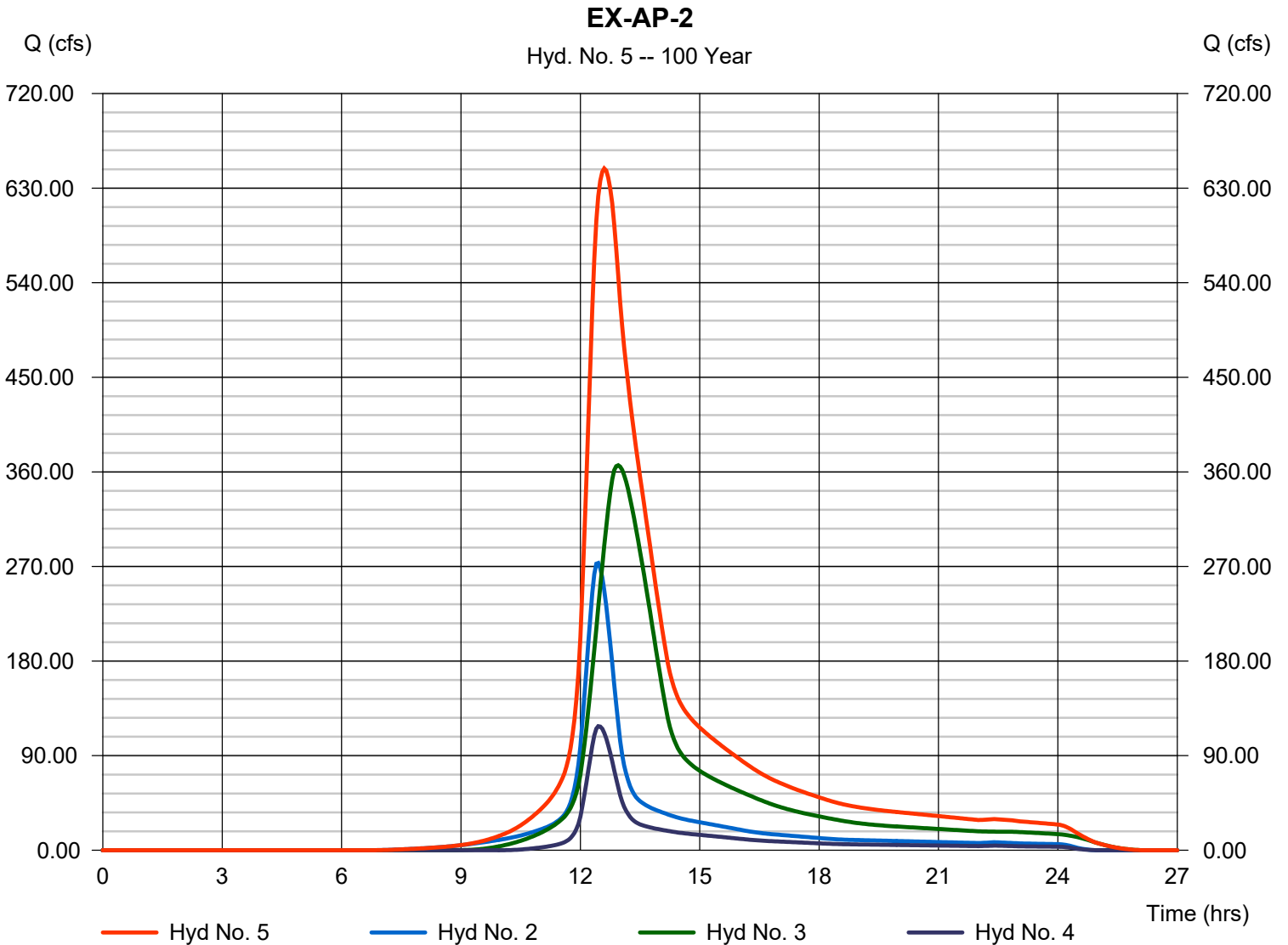
Wednesday, 05 / 16 / 2018

## Hyd. No. 5

EX-AP-2

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 3 min  
 Inflow hyds. = 2, 3, 4

Peak discharge = 648.66 cfs  
 Time to peak = 12.60 hrs  
 Hyd. volume = 5,805,873 cuft  
 Contrib. drain. area = 310.060 ac



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

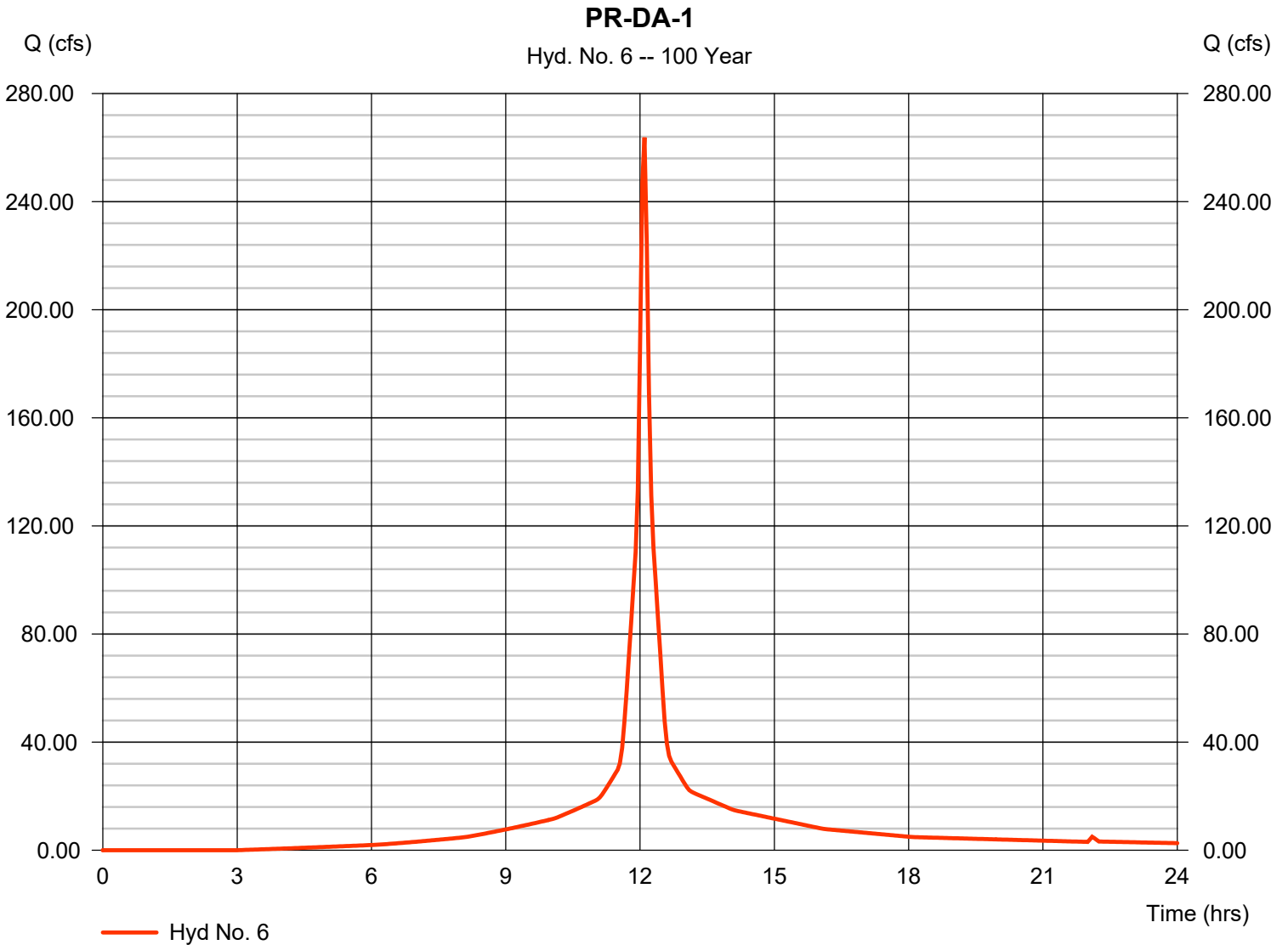
Wednesday, 05 / 16 / 2018

## Hyd. No. 6

PR-DA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 263.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 941,240 cuft
Drainage area	= 32.150 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(22.300 x 98) + (9.560 x 61)] / 32.150



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

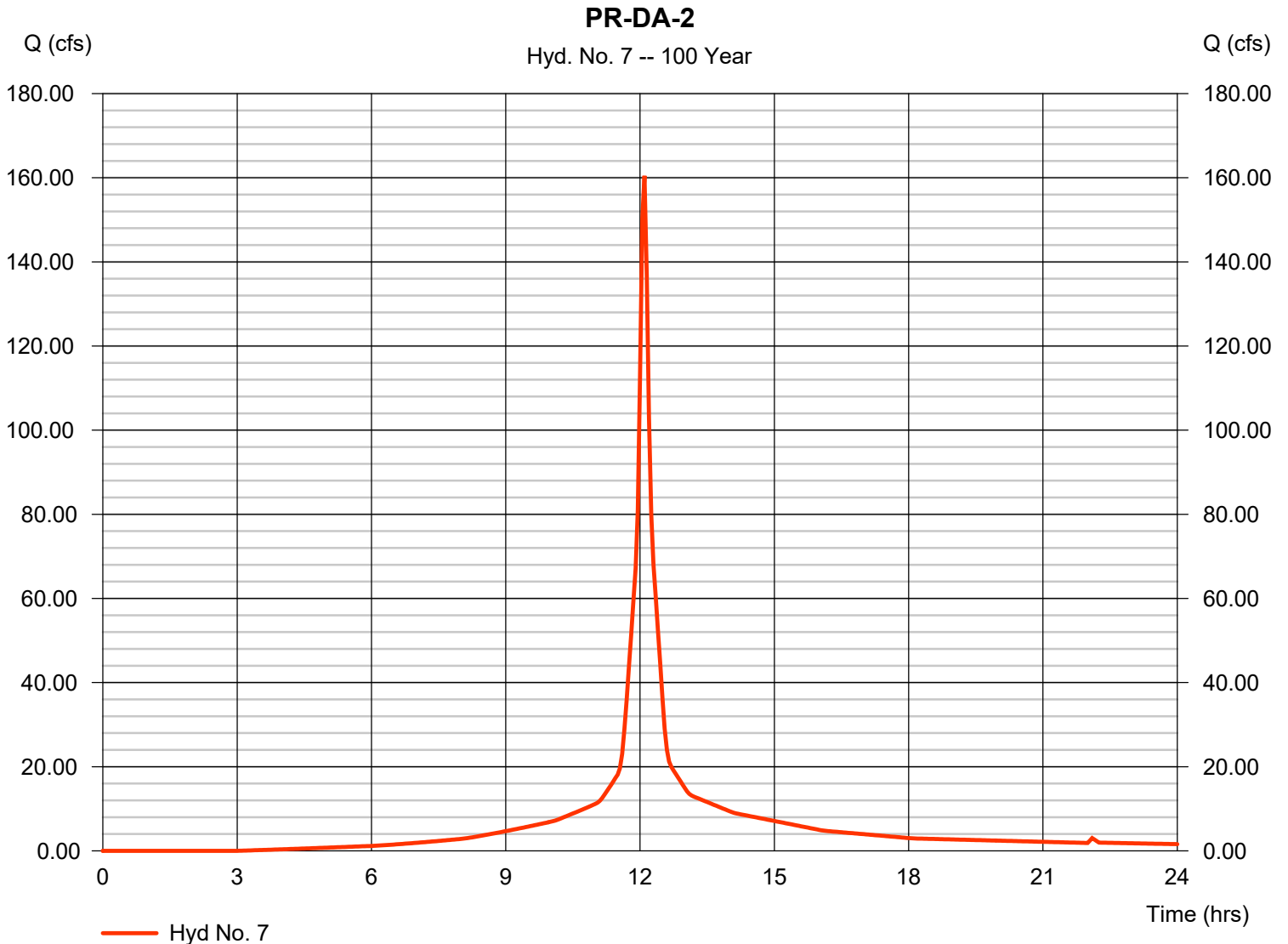
Wednesday, 05 / 16 / 2018

## Hyd. No. 7

PR-DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 160.47 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 572,648 cuft
Drainage area	= 19.560 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 7.60 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(13.580 x 98) + (5.820 x 61)] / 19.560



# Hydrograph Report

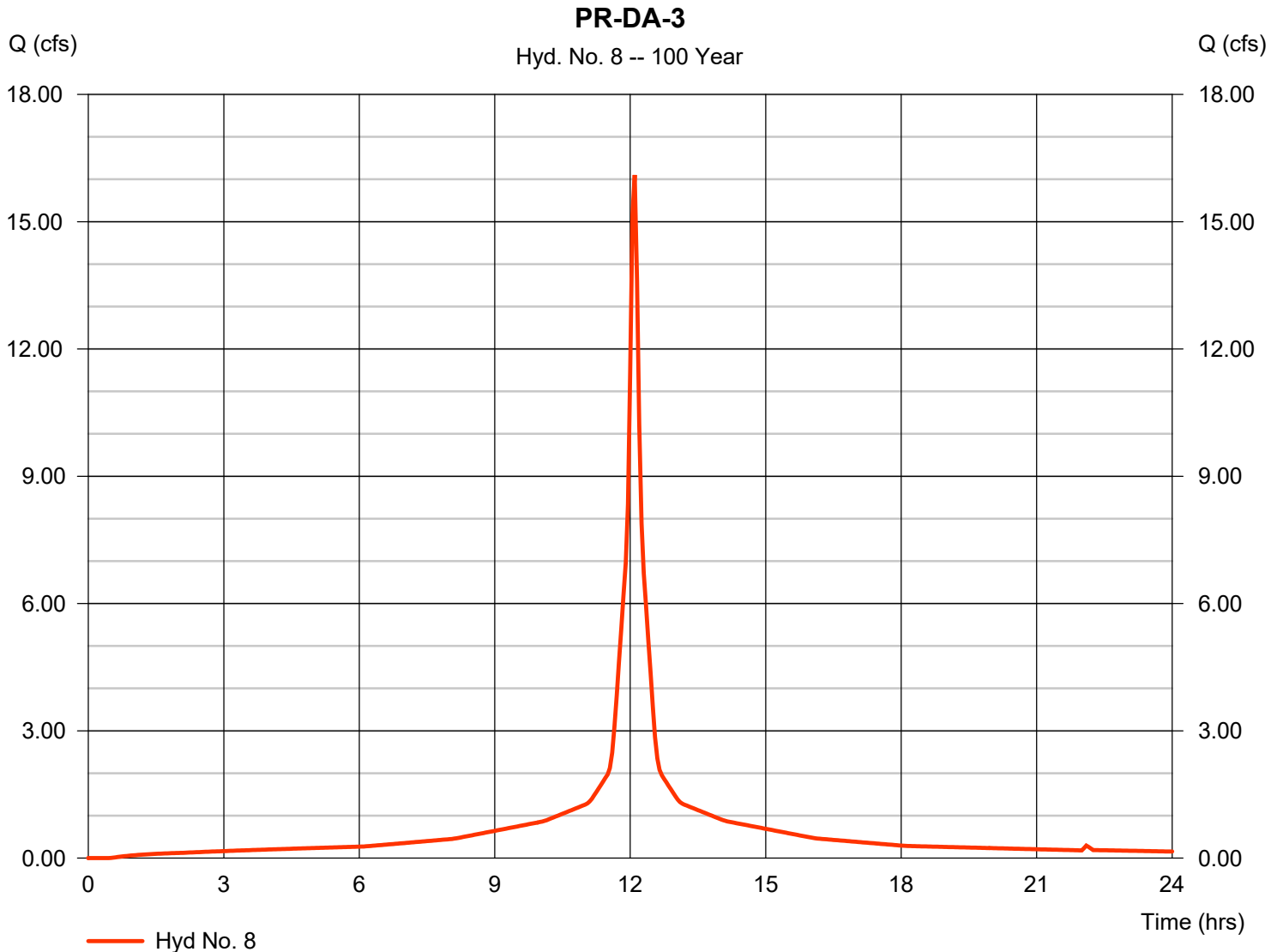
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 8

PR-DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 16.10 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 62,904 cuft
Drainage area	= 1.856 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.80 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484





# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

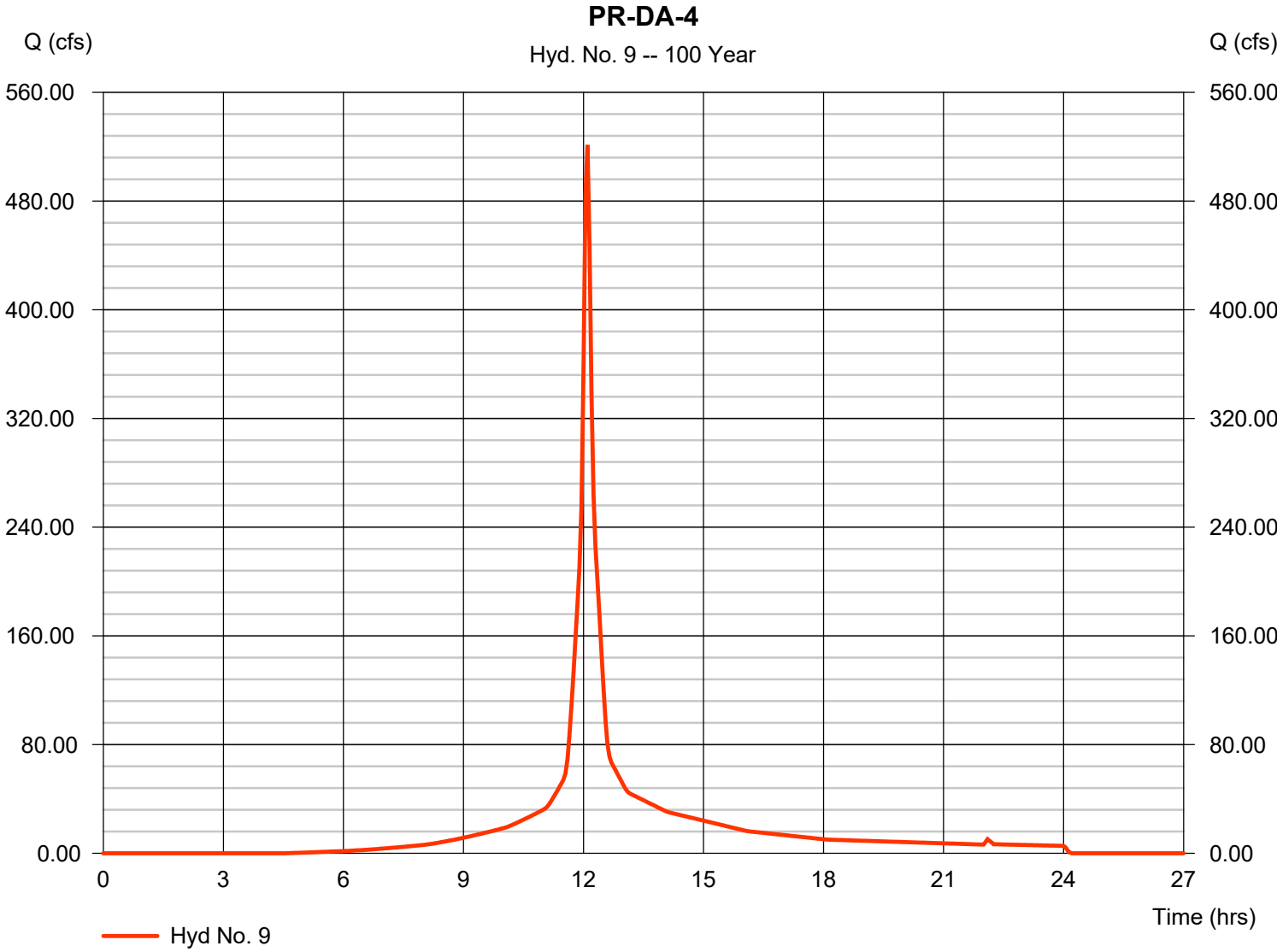
Wednesday, 05 / 16 / 2018

## Hyd. No. 9

PR-DA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 521.27 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 1,794,956 cuft
Drainage area	= 68.390 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 8.10 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(34.190 x 98) + (34.200 x 61)] / 68.390



# Hydrograph Report

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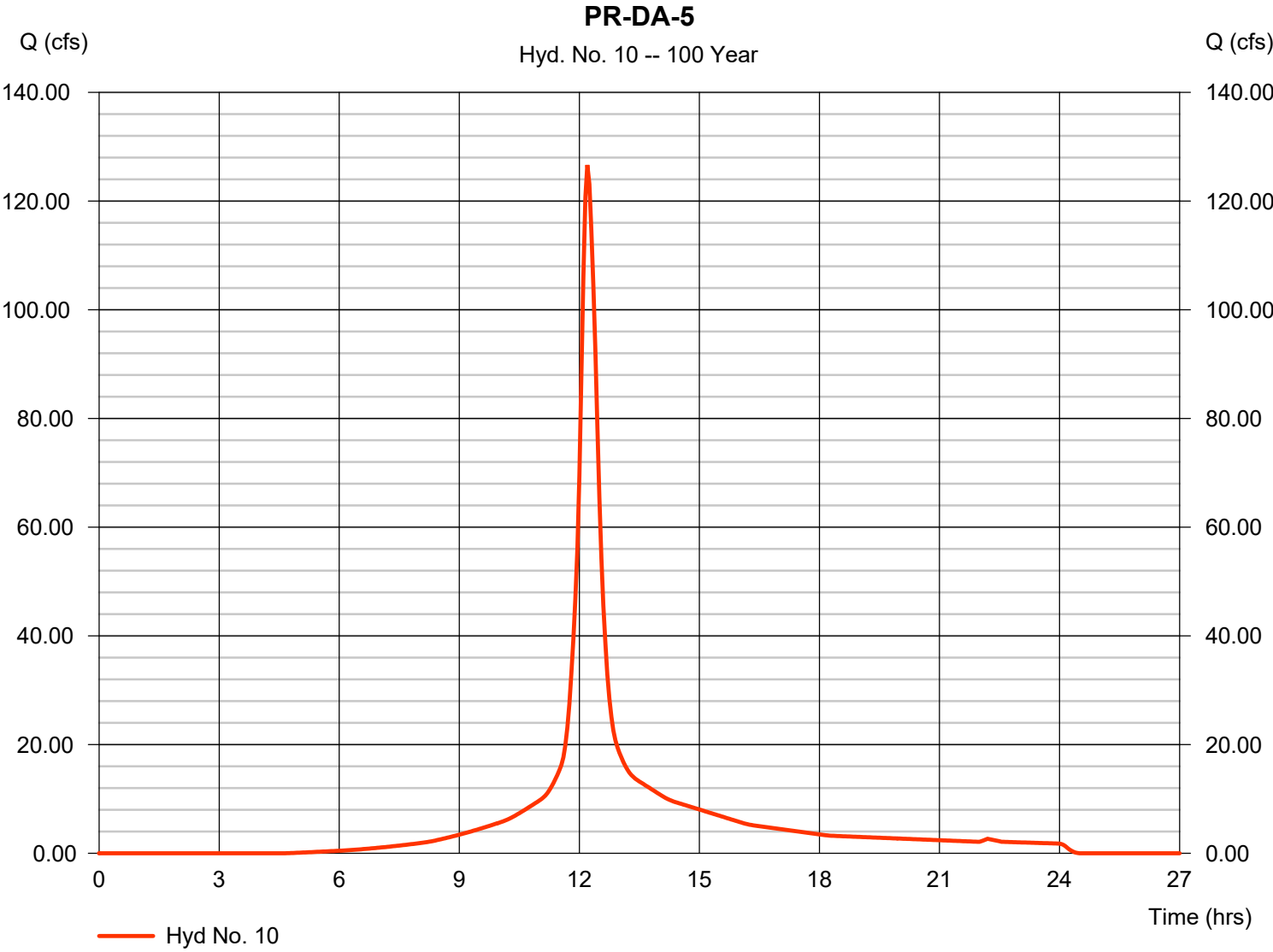
Wednesday, 05 / 16 / 2018

## Hyd. No. 10

PR-DA-5

Hydrograph type	= SCS Runoff	Peak discharge	= 126.64 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.20 hrs
Time interval	= 3 min	Hyd. volume	= 578,854 cuft
Drainage area	= 20.050 ac	Curve number	= 80*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 18.40 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(10.167 x 98) + (10.167 x 61)] / 20.050



# Hydrograph Report

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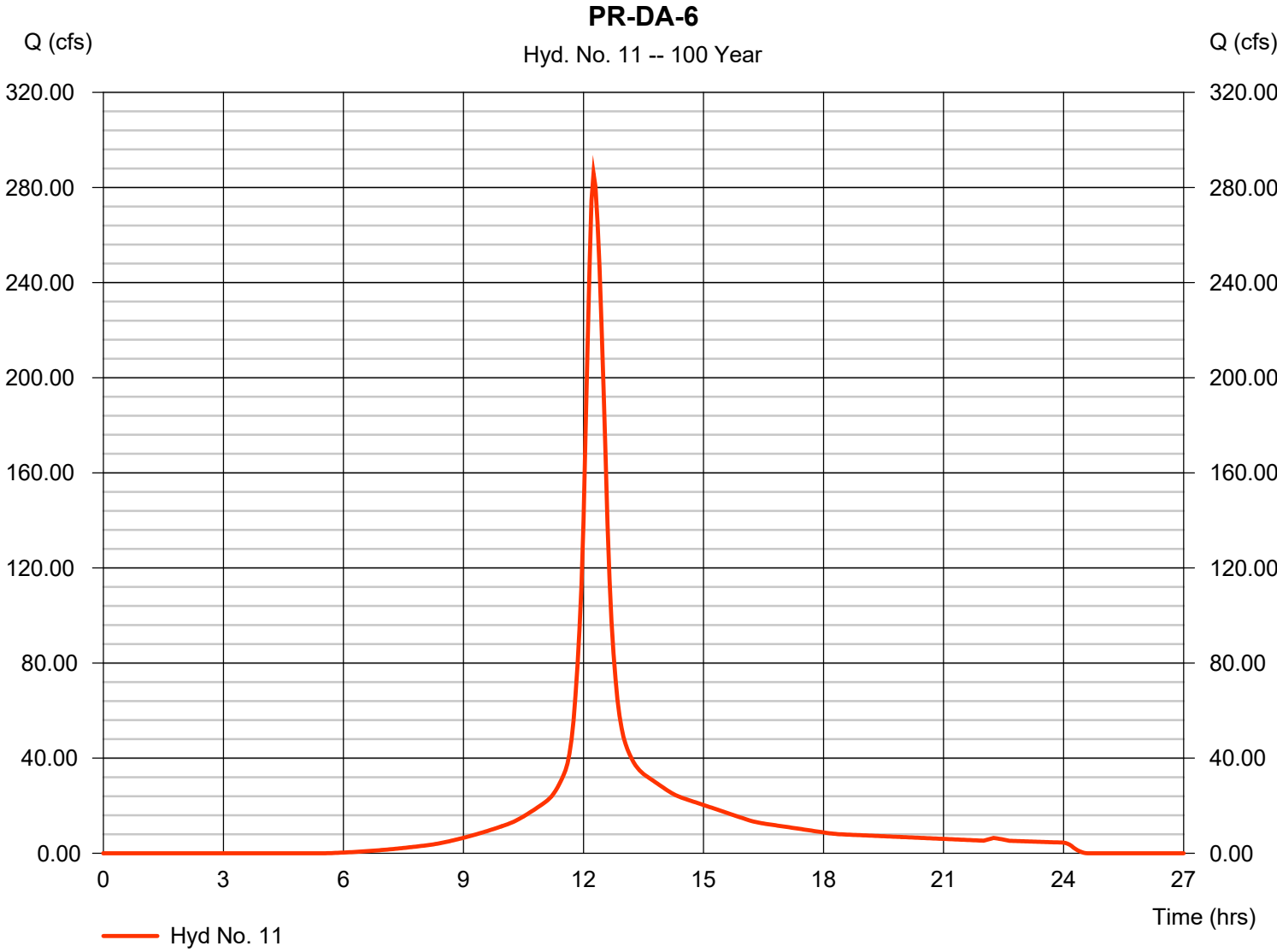
Wednesday, 05 / 16 / 2018

## Hyd. No. 11

PR-DA-6

Hydrograph type	= SCS Runoff	Peak discharge	= 285.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.25 hrs
Time interval	= 3 min	Hyd. volume	= 1,379,011 cuft
Drainage area	= 54.160 ac	Curve number	= 76*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 24.60 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(19.630 x 61) + (7.450 x 39) + (27.080 x 98)] / 54.160



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

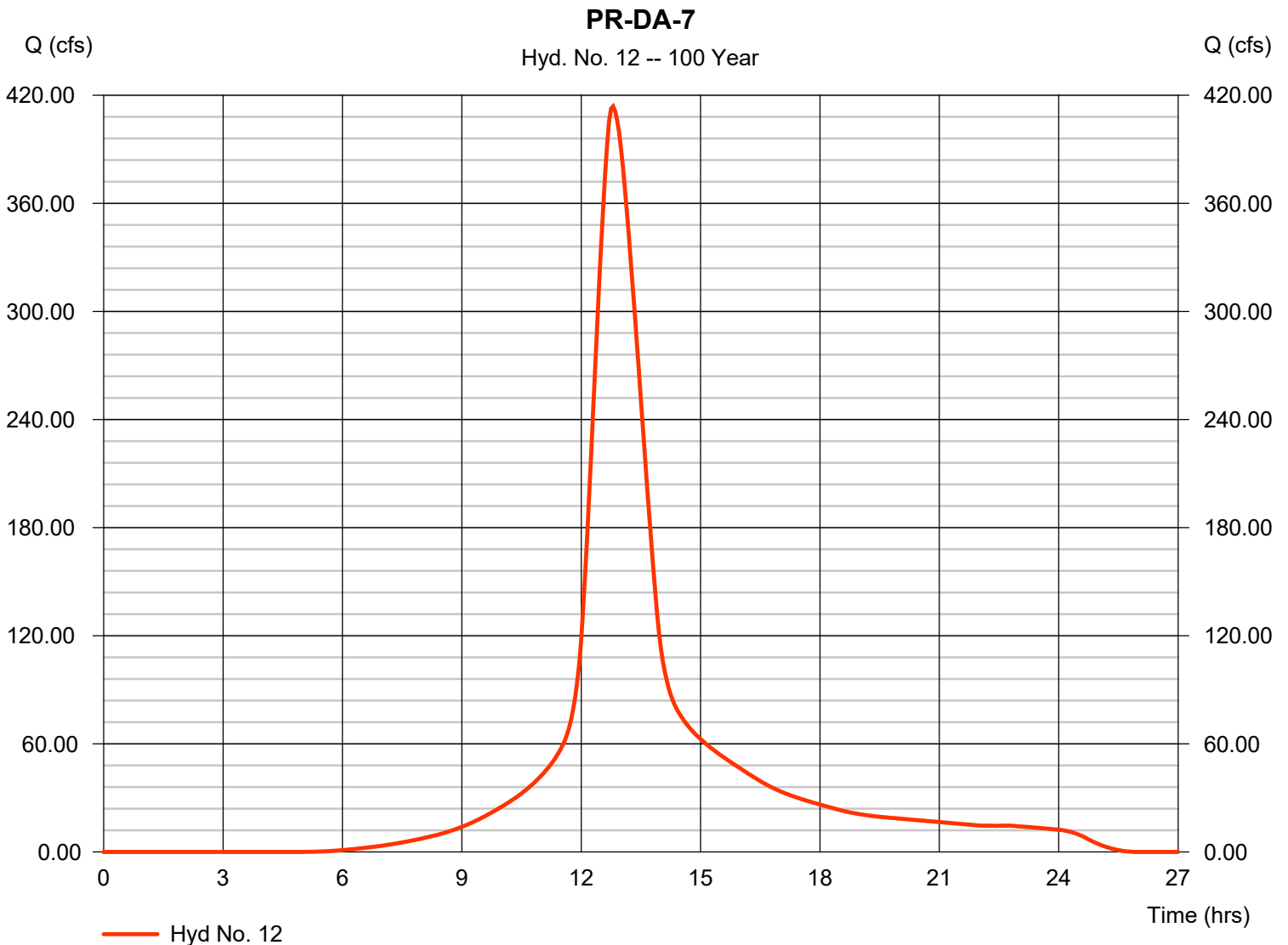
Wednesday, 05 / 16 / 2018

## Hyd. No. 12

PR-DA-7

Hydrograph type	= SCS Runoff	Peak discharge	= 413.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.80 hrs
Time interval	= 3 min	Hyd. volume	= 3,637,777 cuft
Drainage area	= 132.150 ac	Curve number	= 79*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 71.80 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

\* Composite (Area/CN) = [(66.080 x 98) + (66.070 x 61)] / 132.150



# Hydrograph Report

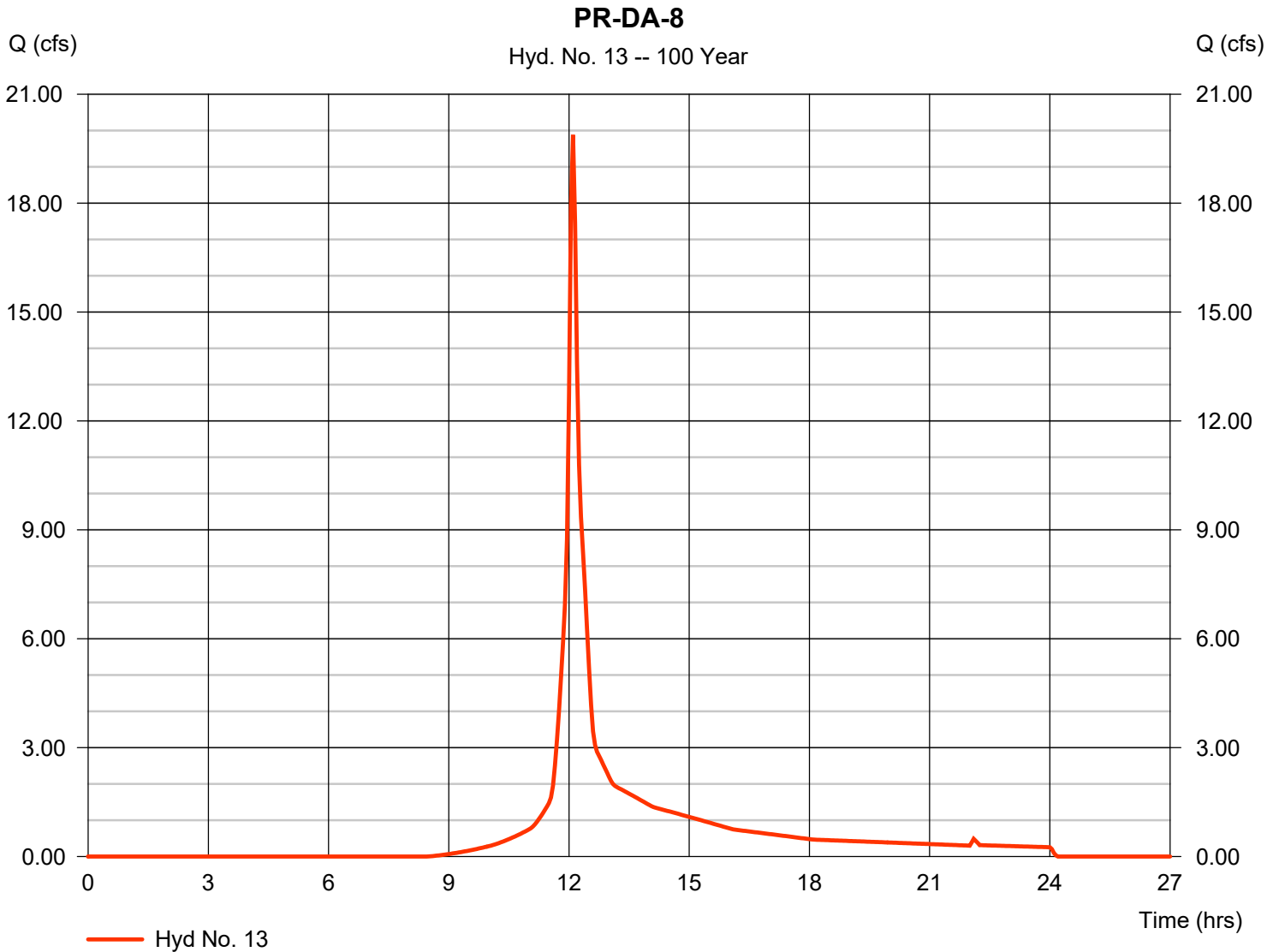
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 13

PR-DA-8

Hydrograph type	= SCS Runoff	Peak discharge	= 19.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 66,145 cuft
Drainage area	= 3.740 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.90 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

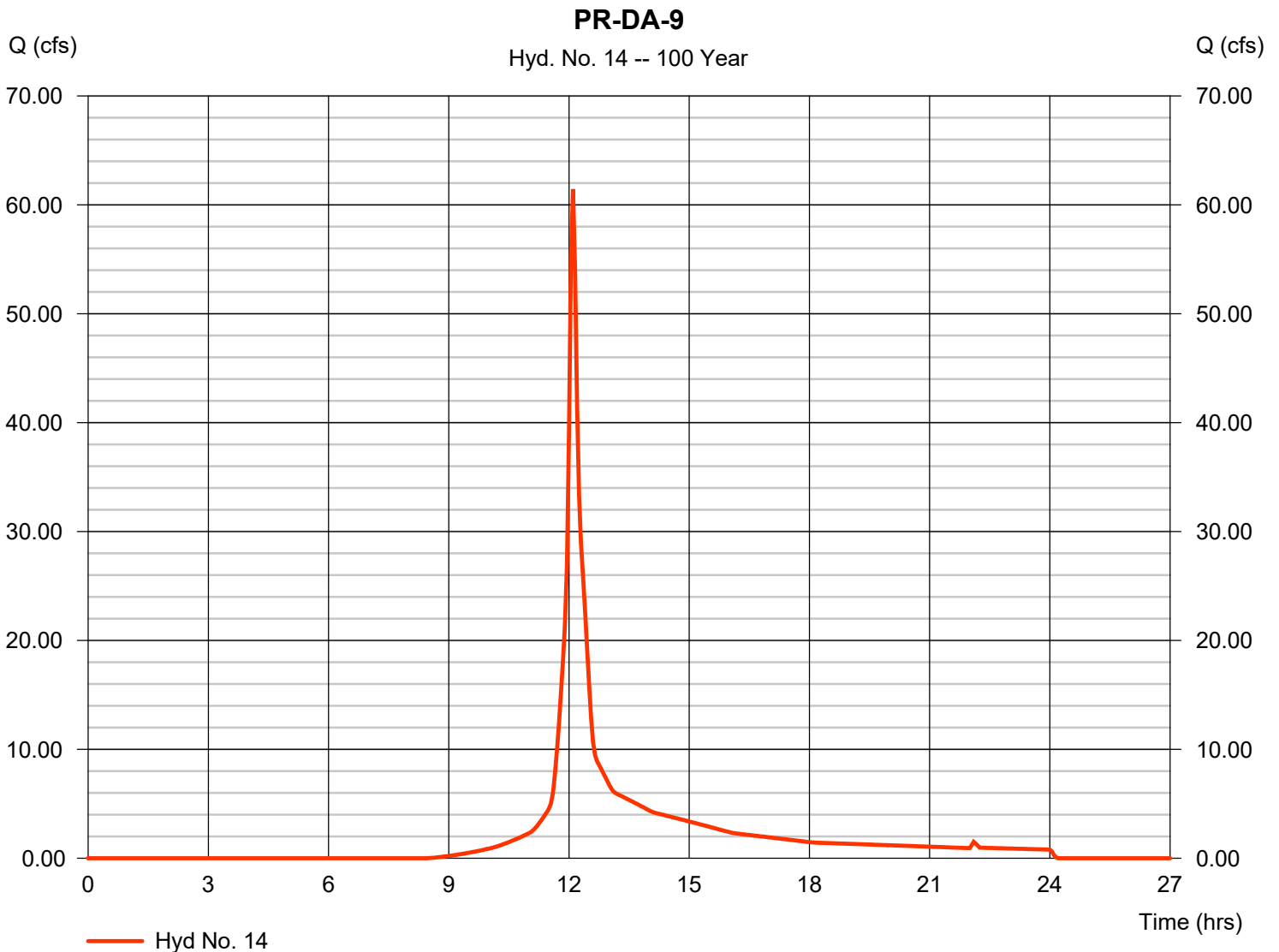
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 14

PR-DA-9

Hydrograph type	= SCS Runoff	Peak discharge	= 61.45 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 204,448 cuft
Drainage area	= 11.560 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.70 min
Total precip.	= 10.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



# Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

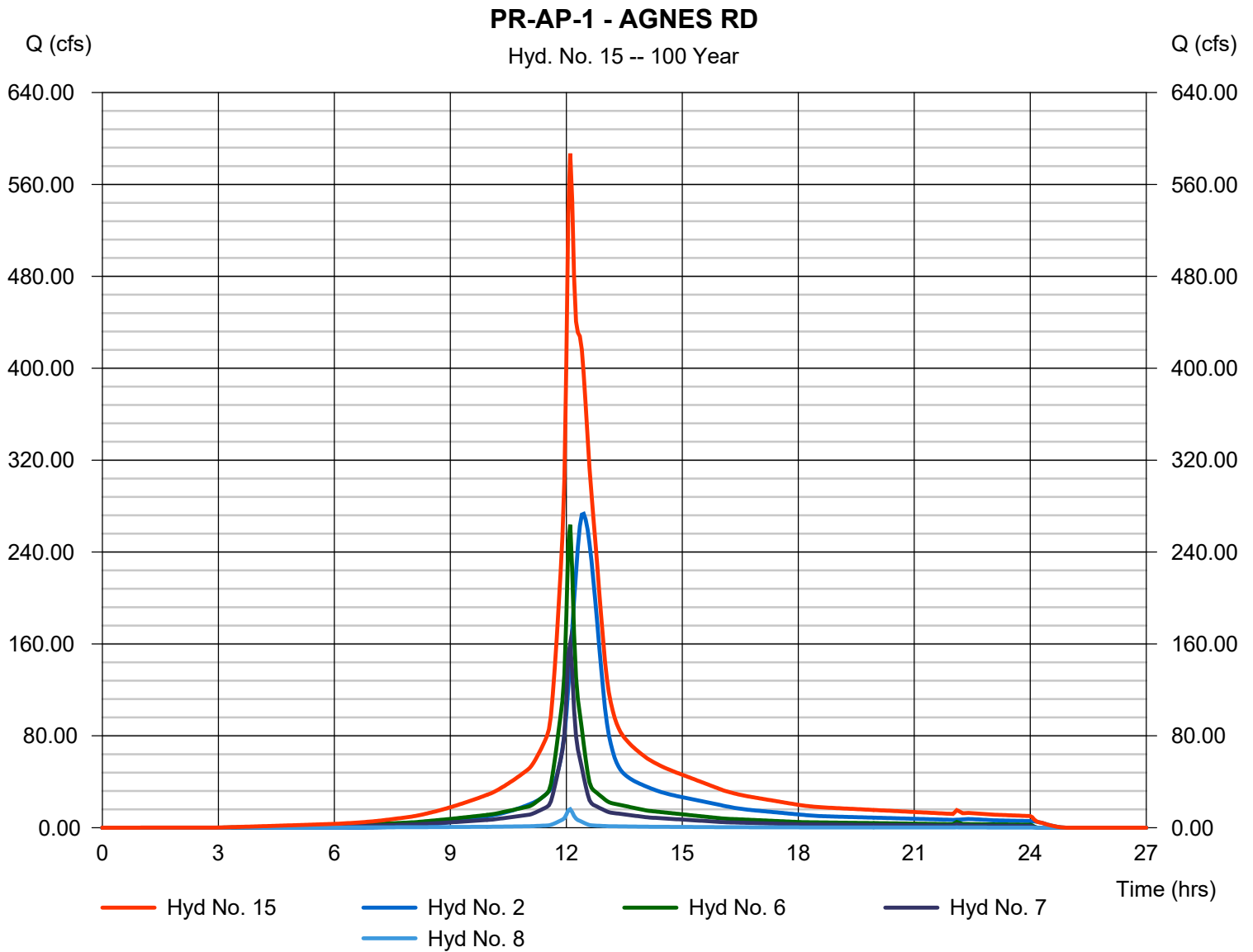
Wednesday, 05 / 16 / 2018

## Hyd. No. 15

PR-AP-1 - AGNES RD

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 3 min  
 Inflow hyds. = 2, 6, 7, 8

Peak discharge = 587.02 cfs  
 Time to peak = 12.10 hrs  
 Hyd. volume = 3,208,240 cuft  
 Contrib. drain. area = 123.406 ac



# Hydrograph Report

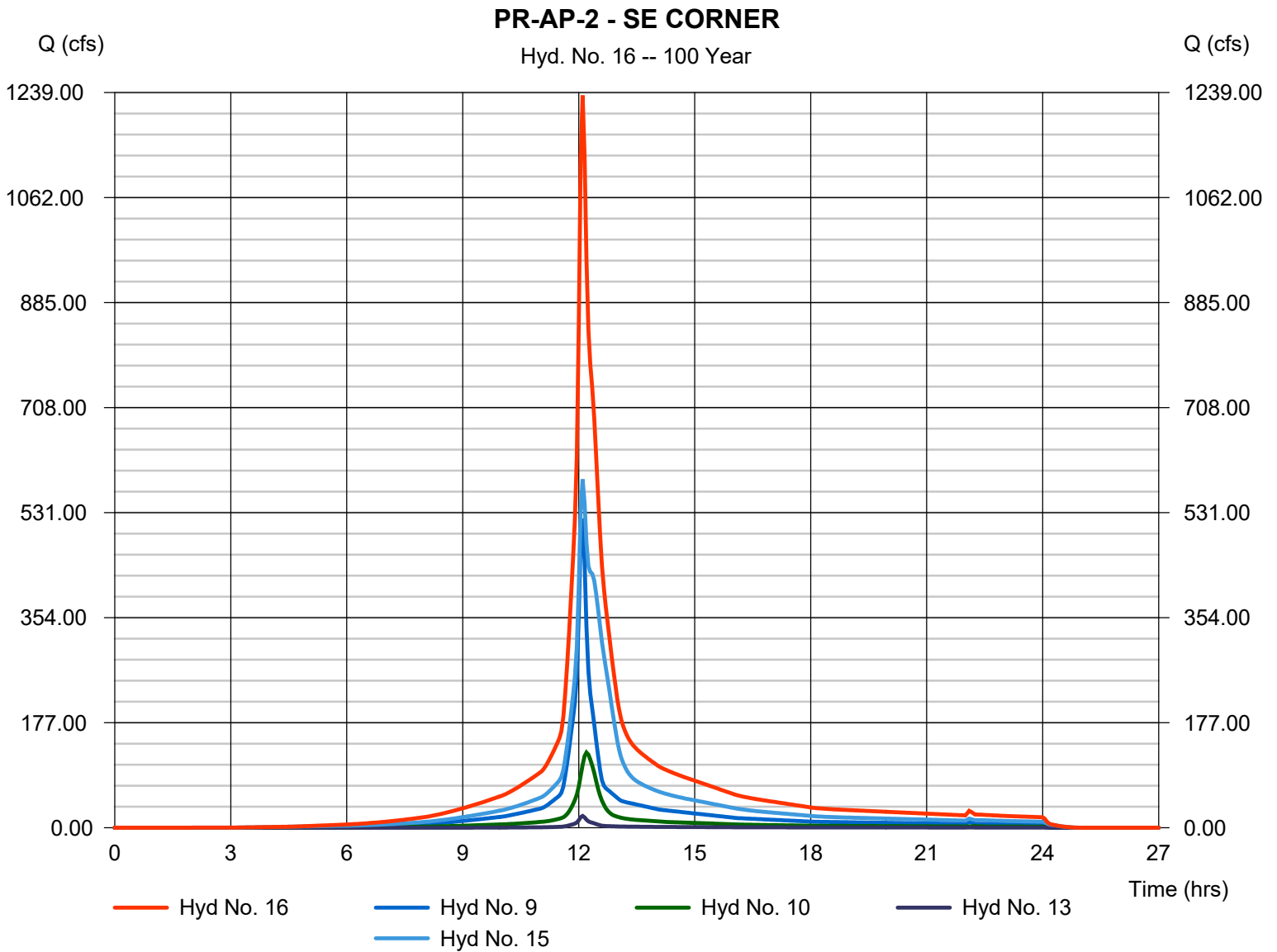
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 16

PR-AP-2 - SE CORNER

Hydrograph type	= Combine	Peak discharge	= 1234.19 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 5,648,194 cuft
Inflow hyds.	= 9, 10, 13, 15	Contrib. drain. area	= 92.180 ac





# Hydrograph Report

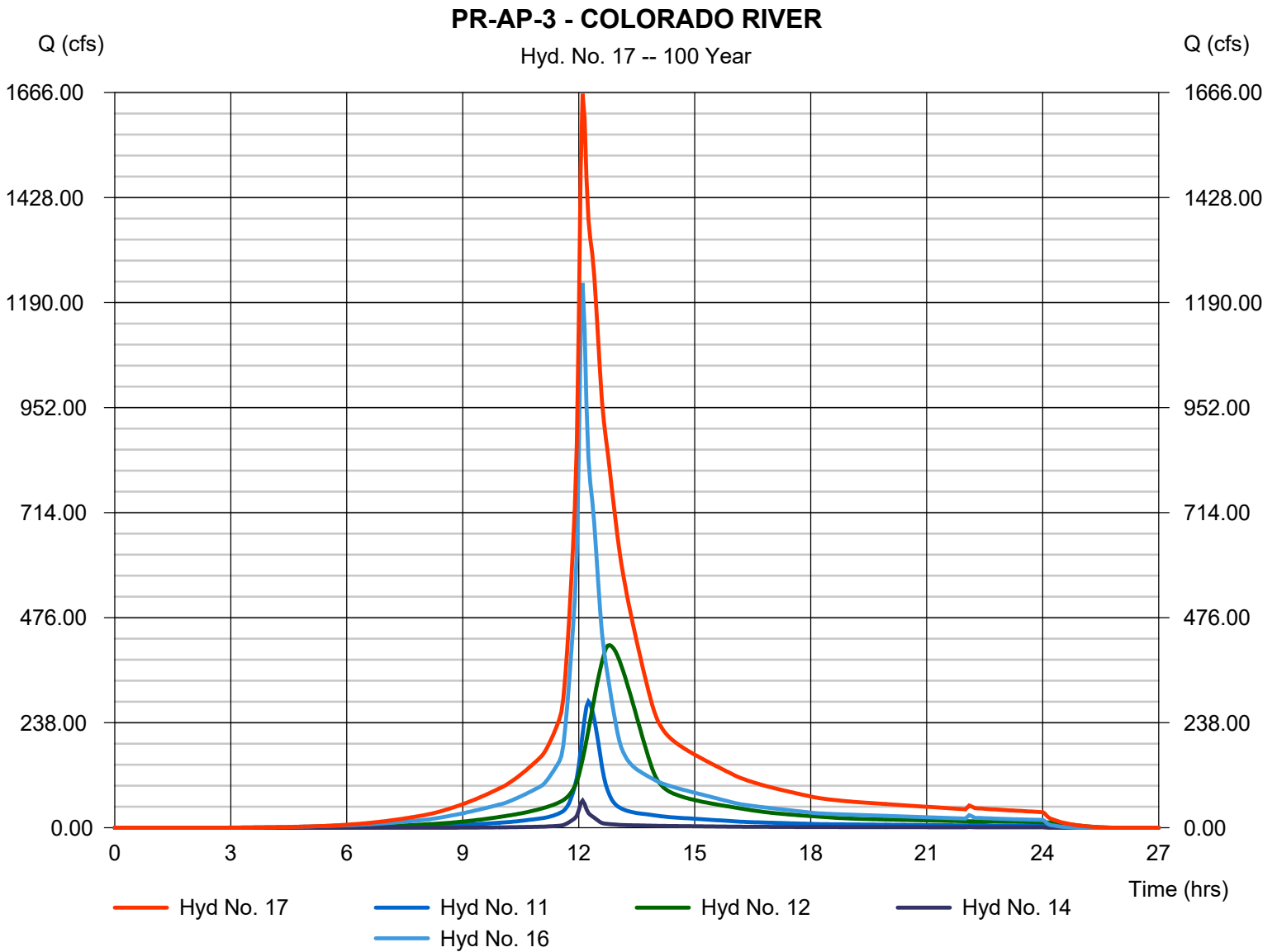
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Wednesday, 05 / 16 / 2018

## Hyd. No. 17

PR-AP-3 - COLORADO RIVER

Hydrograph type	= Combine	Peak discharge	= 1662.89 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 10,869,425 cuft
Inflow hyds.	= 11, 12, 14, 16	Contrib. drain. area	= 197.870 ac





## **F. Channel Design**

### DESIGN BACKGROUND

The proposed channel design is supported by the previously approved Pecan Park Drainage Study by Espey Consultants, Inc. (Appendix B) and Pecan Crossing Offsite Drainage Improvements Report by Cunningham Allen, Inc. (Appendix C).

The Pecan Park Drainage Study was provided by the City of Bastrop and demonstrates the benefits of direct outfall to the Colorado without detention for developments that are proximal to the river. Efficient conveyance of the site's storm runoff will ensure non-coinciding peaks with the Colorado River and will lessen the on-site flooding potential due to upstream developments. See Section G for a discussion of the flooding potential under tailwater conditions assuming coinciding and non-coinciding peaks.

The Pecan Crossing Offsite Drainage Improvements Report provides the basis for the 11.563-acre drainage easement (Volume 1819, Page 840, O.P.R.B.C.TX.) established across the Cantrell Property. The channel and culvert improvements proposed by Cunningham Allen, Inc., are designed to contain the 100-year storm runoff from upstream developments. This report therefore established a baseline design for the proposed channel developed by CBD.

### CHANNEL GEOMETRY

The proposed 4,691-foot long earthen drainage ditch begins south of Agnes Road and is fed by a 12'x5' box culvert with an outfall flowline at 352.17' (designed by others). The channel is designed with a bottom width of 8' and 3:1 side slopes extending to meet existing grade at a slope of 0.30% along the flowline of the existing channel within the designated drainage easements where possible. Approaching the low water crossing, the bottom width expands to 20' and side slopes flatten to 6:1. After the low water crossing the bottom width tapers to 8' and side slopes steepen to 3:1. When the proposed channel bottom is graded at approximately 338', a low point in the existing channel, the proposed channel shifts to a slope of 0.89% and transitions to a bottom width of 24' until the apron of the upstream headwall. The aprons and culvert are designed at approximately 2.0% slope. The culvert discharges onto a concrete apron with dissipater blocks and into the channel bed that shall be graded at approximately 2:1 until it intersects with the existing channel bed. This existing channel outfalls at the Colorado River.

### CHANNEL SURFACING

The selected erosion matting to be installed along the channel effectively protects against scour due to the channelization of upstream runoff, 100-year flooding of the Colorado River, and vehicle traffic along the low river crossing. Permissible flow velocities and corresponding channel surfaces are presented in Table F.1.

**Table F.1 – Erosion Control Matting Selection**

<b>Channel Location</b>	<b>Maximum Channel Velocity (fps)</b>	<b>Erosion Control Matting</b>	<b>Design Permissible Velocity (fps)</b>
<b>12'x5' Box Culvert Outfall</b>	11.53 (by others)	North American Green ShoreMax Transition Mat <sup>1</sup>	18.0 (unvegetated & vegetated)
<b>Low Water Crossing</b>	4.55	Flexamat Flexible Concrete Blocks Mat <sup>2</sup>	20.0
<b>1 – 8'x10' &amp; 2 – 6'x10' Box Culverts</b>	13.81	North American Green ShoreMax Transition Mat <sup>1</sup>	18.0 (unvegetated & vegetated)
<b>Channel (before proposed box culverts)</b>	9.83	North American Green SC250 TRM <sup>3</sup>	9.5 (unvegetated) 15.0 (vegetated)

<sup>1</sup> North American Green RevetMax Specification Sheet – ShoreMax Transition Mat

<sup>2</sup> Flexamat, Tied Concrete Block Mats Specification Sheet

<sup>3</sup> North American Green RollMax Product Selection Chart – SC250

### LOW WATER CROSSING

The 212' long by 10' wide low water crossing is designed to provide a stabilized vehicular access route for the property owners adjacent to the dedicated drainage easement during low water conditions. This crossing is created by flattening the proposed channel side slopes to a maximum of 6:1, expanding the channel bottom to 20', and installing the Flexamat flexible concrete blocks mat. The Flexamat will be installed along the alignment of the existing low water crossing and shall intersect with existing ranch roads on either side of the dedicated drainage easement. The Flexamat will be installed from elevation 348.7' to 349.7' to protect against scour during the maximum potential flooding event while remaining within the dedicated drainage easement.

### CULVERT

The existing drainage channel discharging the site's runoff into the Colorado River is regulated by a 4'x4' box culvert followed by a 10'x20' flood control structure on the downstream side of the dirt driveway. Survey data suggest that the flood control structure is broken and/or buried, and the upstream dirt road has experienced scour. CBD proposes to replace these structures with the intent of providing efficient drainage of runoff from proposed upstream developments into the Colorado River while mimicking existing channel hydrology. For this reason, a structure, containing one 8'x10' and two 6'x10' box culverts, is proposed along the alignment and within the footprint of the existing structures. The culvert outfalls to the existing channel bed as soon as possible while providing sufficient space for the proposed 14' concrete driveway and culvert wingwalls.

The culvert design is intended to minimize disturbance of existing ground cover within and around the channel.

The proposed culvert was designed to provide sufficient conveyance of design storms. A comparison of existing and proposed flows modeled at the culvert location can be found in Table F.1 below.

**Table F.1 – Existing vs. Proposed Flows Discharging into Colorado River**

Storm Frequencies	Flow (cfs)	
	EX-AP-2	PR-AP-3
25-year	395.87	1,115.75
100-year	648.66	1,662.89

Source: Hydraflow Report (Section E)

Hydraulic analyses, included in Section G, confirm that the culvert has sufficient capacity to convey runoff without causing flooding at Agnes Road. The minimum surface elevation of Agnes Road is estimated at 359.50'. Regardless of tailwater conditions utilized (see Section G), the realized water surface elevation within the proposed channel at Agnes Road is modeled at 356.87' for 100-year storm. Sufficient freeboard is thus provided to protect against flooding at Agnes Road.

### DRIVEWAY

The proposed 258' long by 14' wide concrete driveway provides a vehicular access route across the proposed box culverts for the property owners adjacent to the dedicated drainage easement during flood events. To prevent against scour such as the existing dirt driveway experienced, the crest of the proposed driveway is designed at 1' above the existing 100-year base flood elevation as per FEMA Flood Map (see Part III). The beginning and end sections of the proposed driveway lower to meet existing grade while remaining within the dedicated drainage easement. The minimum driveway elevation is subject to approximately flooding due to the rise of the Colorado River during the 100-year storm; however, flooding with an anticipated tailwater (see Section G) due to the site's 100-year storm event is not expected to overtop the minimum surface elevation of the proposed driveway at 347.74'.

## G. Hydraulic Analysis

### METHODOLOGY & INPUT VARIABLES

The capacity and the proposed channel was evaluated using the Autodesk River and Flood Analysis Module and HEC-RAS. The proposed channel was modeled with 39 river stations between Agnes Road and the Colorado River, as shown on the cross-section map. Section lengths were generally extended beyond the dedicated drainage easements to evaluate the full extents of potential flooding. Overbank stations were selected at the boundary of proposed channel grading. The Manning’s n-values in Table G.1 were selected as per the ranges provided in the HEC-RAS Reference Manual, version 5.0.

**Table G.1 - Manning’s N-Values**

Surface Description	N
Main channel – clean straight, full, no rifts or deep pools	0.026
Floodplain – pasture, no brush, short grass	0.035
Lined channel – concrete, trowel finish	0.011

Source: HEC-RAS Reference Manual, version 5.0.

Flow inputs varied along the length of the proposed channel as per the proposed hydrology described by the Hydraflow report in Section E. The flow inputs utilized for the HEC-RAS model are found in Table G.2.

**Table G.2 – HEC-RAS Flow Inputs at River Stations**

Storm Frequency	Flow (cfs)		
	Stations 1 to 28	Stations 23 to 30	Stations 31 to 39
<b>25-Year</b>	414.96	868.31	1,151.75
<b>100-Year</b>	587.02	1,234.19	1,662.89

The 25-year and 100-year flows through the channel were evaluated under three different tailwater conditions as shown in Table G.3.

**Table G.3 – Tailwater Conditions**

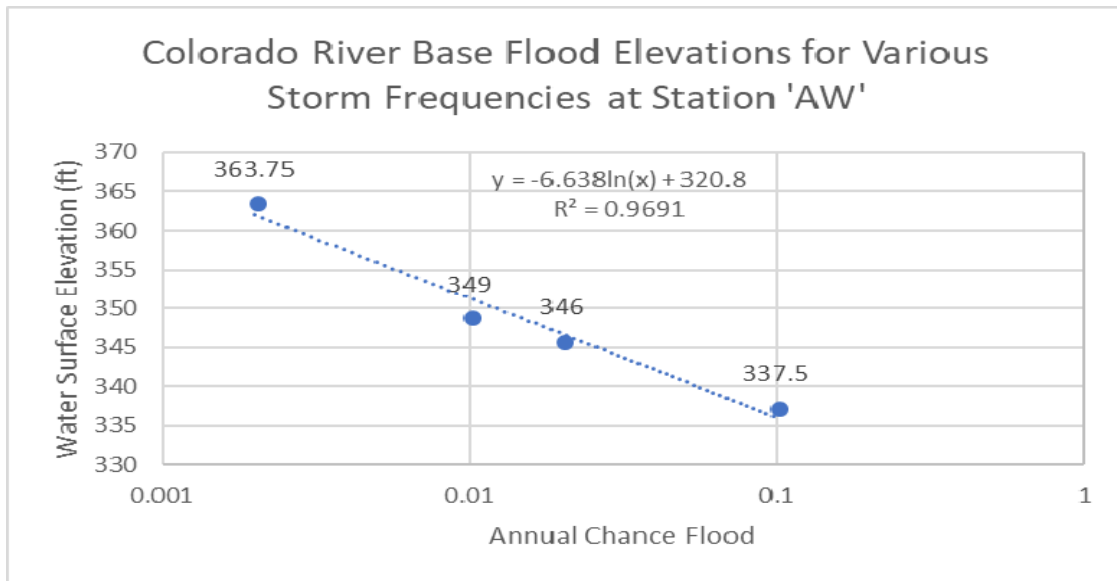
Storm Frequency	Maximum Potential Tailwater Assuming Coinciding Peaks	Anticipated Tailwater Assuming Non-Coinciding Peaks	Tailwater Assuming Gravity Outfall
<b>25-Year</b>	342.17’	331.96’	0’
<b>100-Year</b>	349.00’	338.59’	0’

The 25-year and 100-year flows through the channel were evaluated under three different tailwater conditions as shown in Table G.3. Water surface elevation data and time to peak of the Colorado River are based on FEMA Flood Insurance Map & Study (Appendix A) and the Pecan Park Drainage Study (Appendix B), which utilizes the United States Geological Survey gage 08159200 located at State Highway 71 approximately two miles

upstream of the proposed channel's outfall. Tailwater justifications and assumptions are provided below.

#### *Maximum Potential Tailwater Assuming Coinciding Peaks*

The existing 100-year base flood elevation is at 349.00' MSL (see Appendix A). The Colorado River's peak 25-yr water surface elevation is estimated at 342.17'. This water surface elevation was extrapolated from a logarithmic trend of base flood elevations for various annual chance floods in the graph below, which uses data from the FEMA Flood Insurance Study at Station 'AW'.



Data Source: FEMA Flood Insurance Study 48021CV000B (Appendix A)

Time to peak for the Colorado River is approximated at 31:45 hours for the 100-year event (see Appendix B), whereas the proposed channel's time to peak is modeled at approximately 12:06 hours (see Hydraflow report in Section E). These peaks are non-coinciding and therefore these water surface elevations overestimate expected flooding for the 100-year and 25-year events.

The maximum potential tailwater assuming coinciding peaks was used to design the extents of the proposed erosion control measures to ensure stability of the proposed channel during worst possible conditions of the 100-year storm event. As shown in the HEC-RAS report, under this tailwater condition, the proposed culvert and low points along the proposed concrete driveway are inundated only during the 100-year storm.

#### *Anticipated Tailwater Assuming Non-Coinciding Peaks*

As mentioned above, the Colorado River and proposed channel's peaks are non-coinciding; therefore, an estimated reduction of 10.41' is expected to be realized in actual water surface elevation at 12:06 hours. The 100-year water surface elevation is estimated

at 338.59'. This reduced water surface elevation is based on graphical interpolations of Figures 1 and 2 in Appendix B. The anticipated 25-year water surface elevation of the Colorado River realized at 12:06 hours at the proposed channel's outfall is estimated at 331.96'. This was calculated using a proportional reduction equivalent to the change in 100-year water surface elevations realized at a time to peak of 31:45 hours as compared to 12:06 hours, as shown below:

$$342.17' / 349.00' = x / 338.59'$$

The anticipated tailwater assuming non-coinciding peaks was used to evaluate the capacity of the channel and realistic site flooding. As shown in the HEC-RAS section drawings and profile tables, under this tailwater condition, the proposed culvert and concrete driveway are not inundated during for the 25-year or 100-year storms.

#### *Tailwater Assuming Gravity Outfall*

Gravity outfall calculations provide maximum velocities which are used for the appropriate material selection of erosion control matting downstream of the proposed culvert and across the low water crossing. Flow characteristics of this tailwater condition are the same as those using the anticipated tailwater assuming non-coinciding peaks at every station upstream of Station 5.



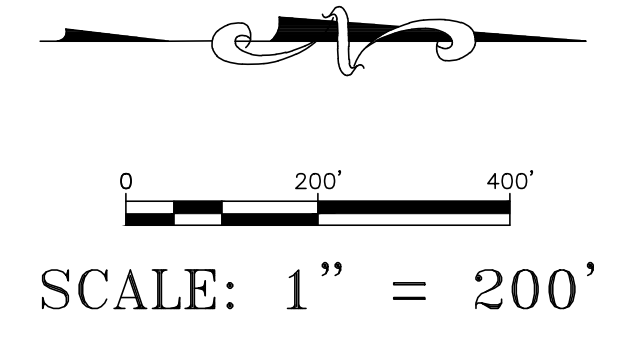
CROSS-SECTION MAP & GEOMETRIES

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**LEGEND**

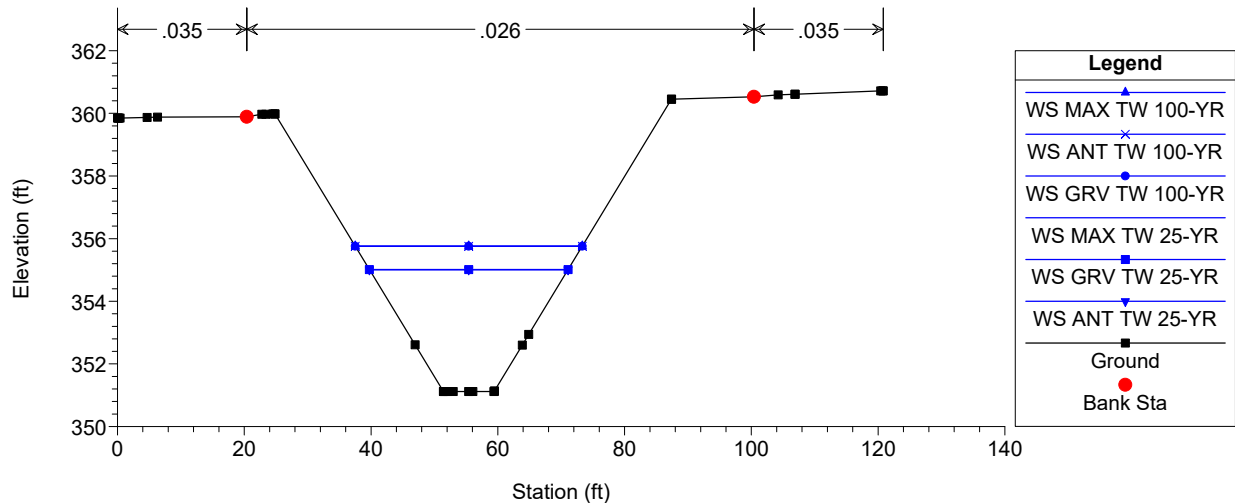
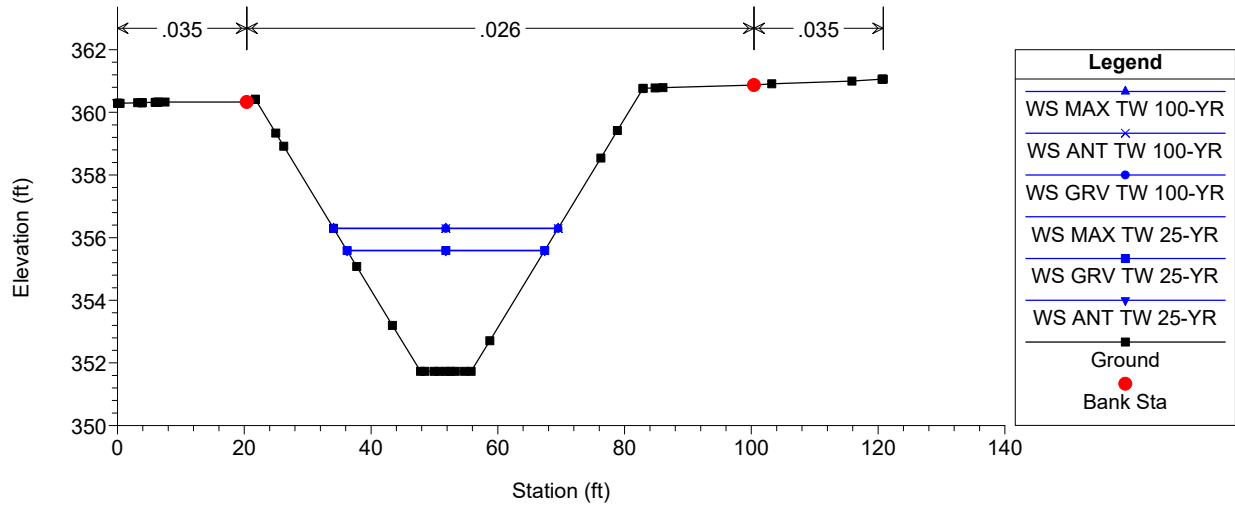
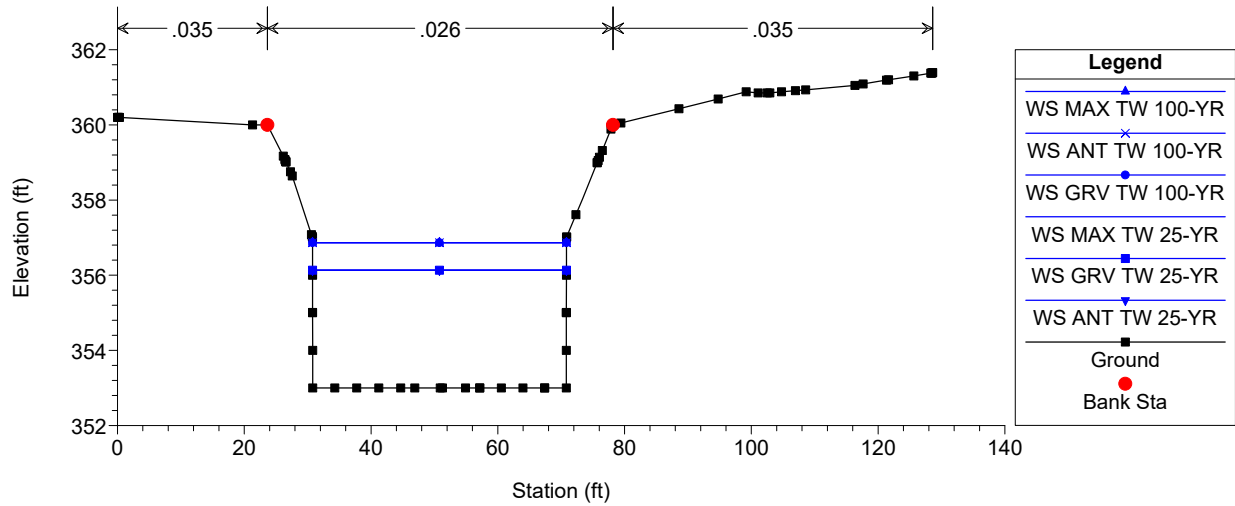
- DRAINAGE EASEMENT BOUNDARY
- - - 350 - - - EXISTING CONTOUR MAJOR
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- PROPOSED CONTOUR MINOR
- ⊕ CHANNEL CROSS-SECTION

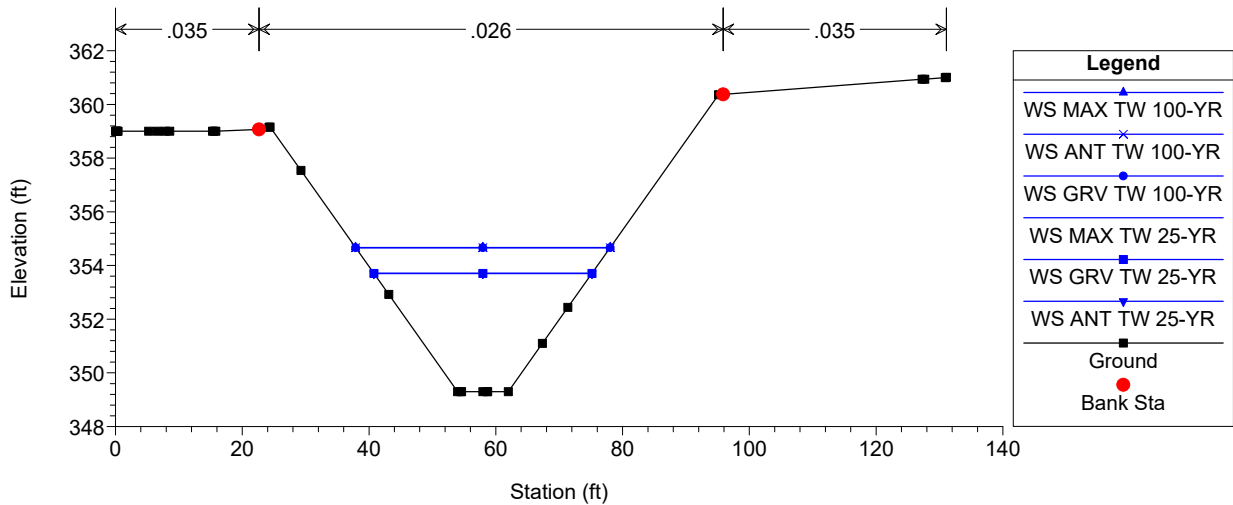
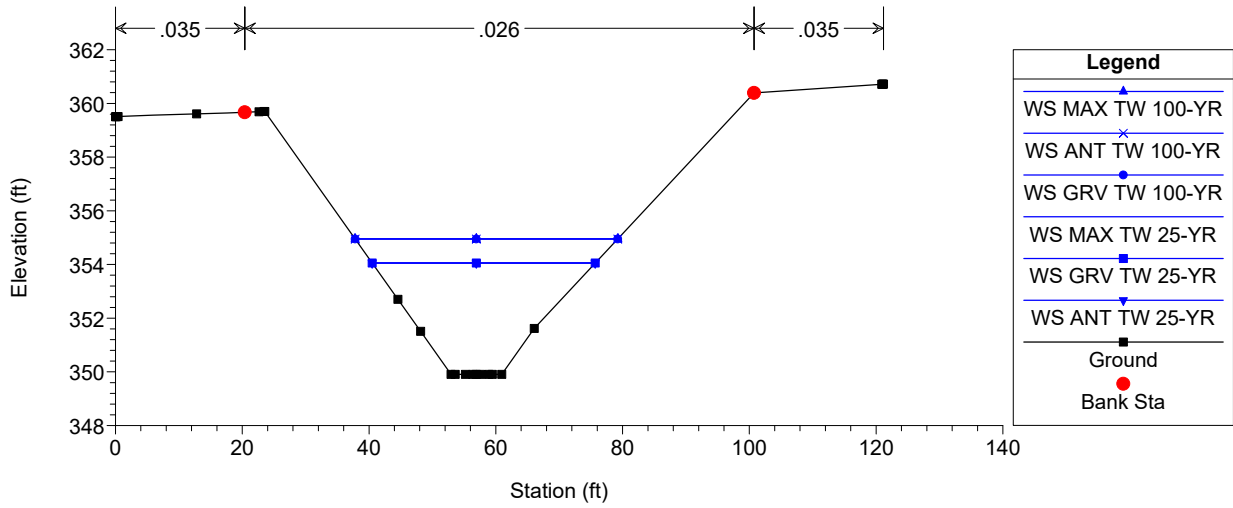
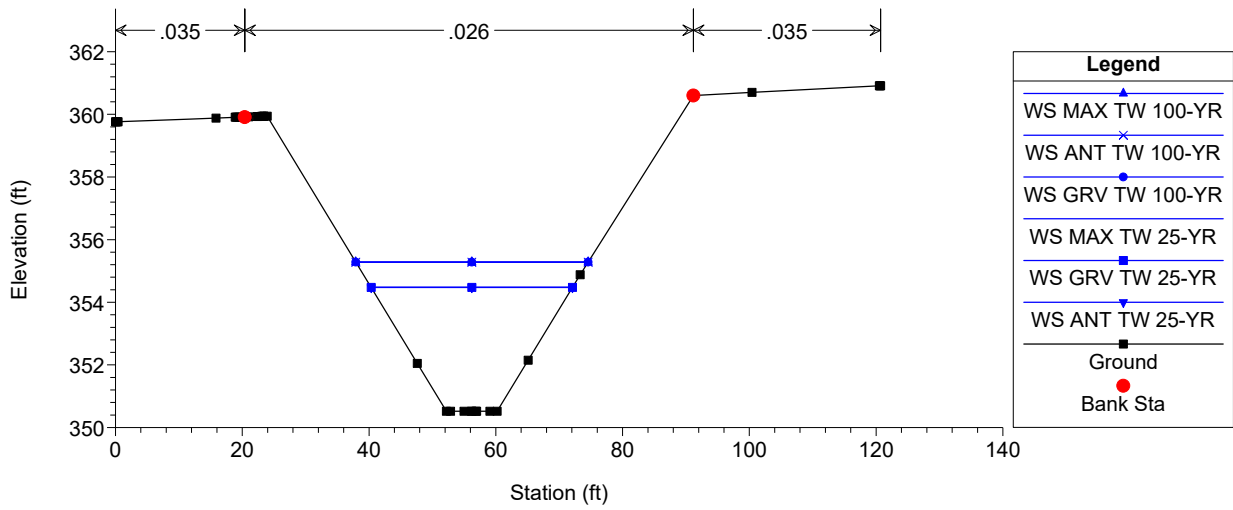


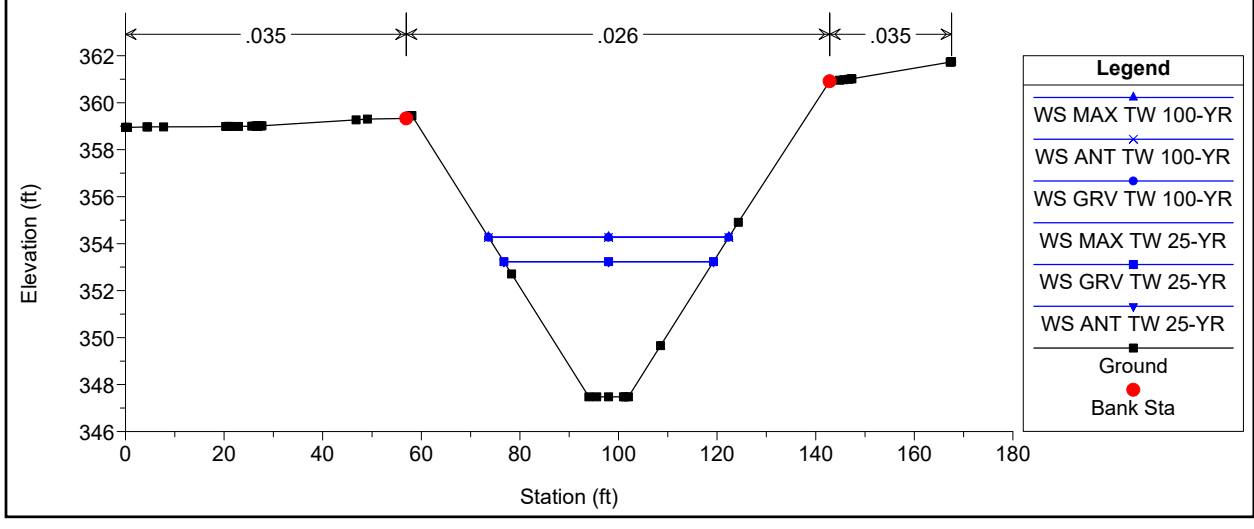
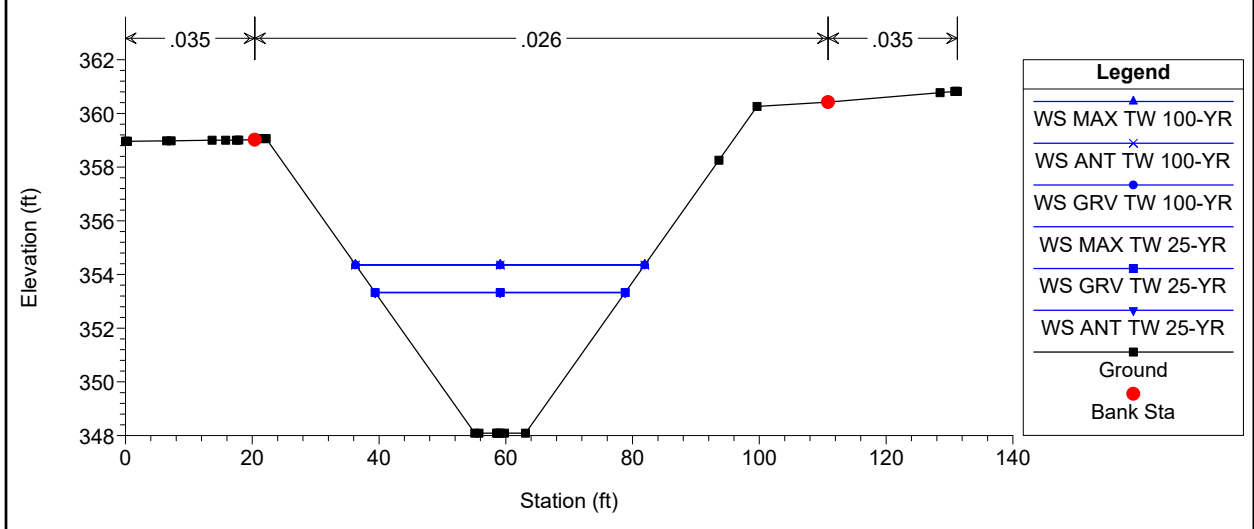
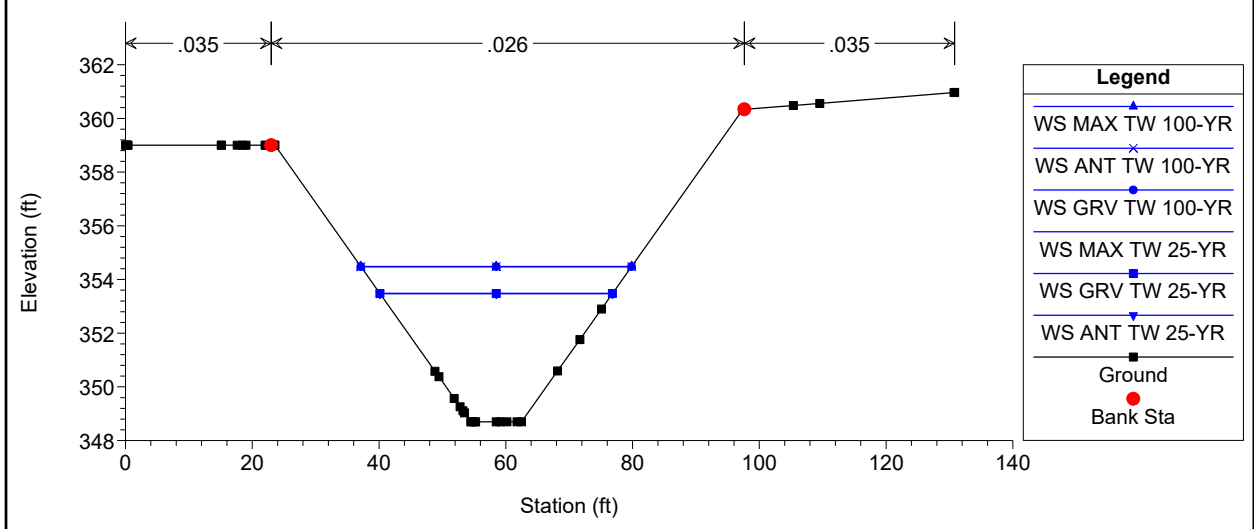
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DATE:			
REVISION:			

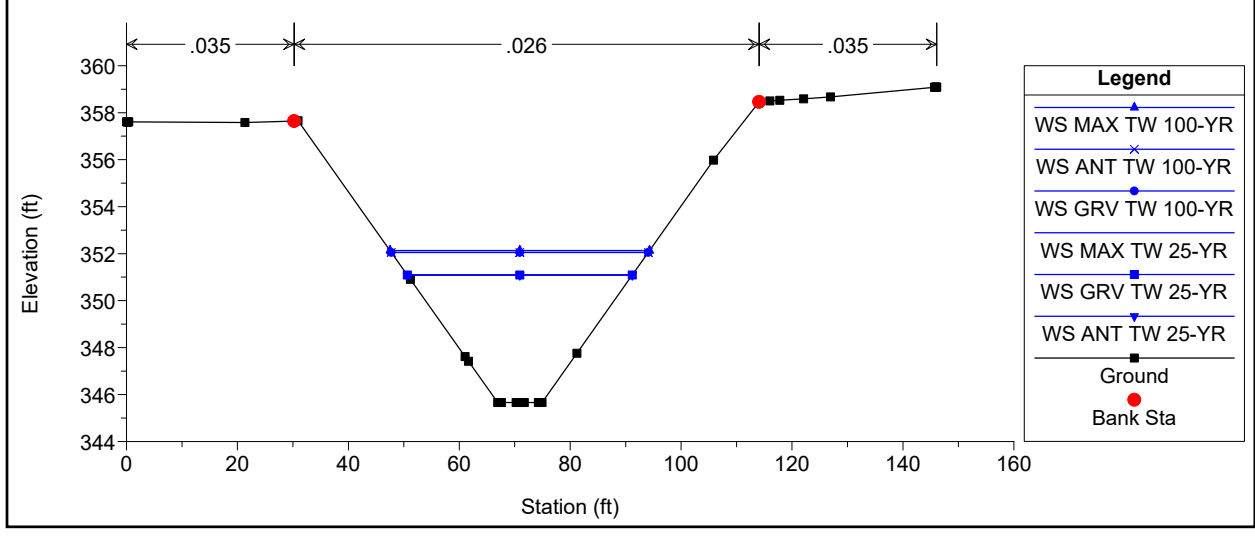
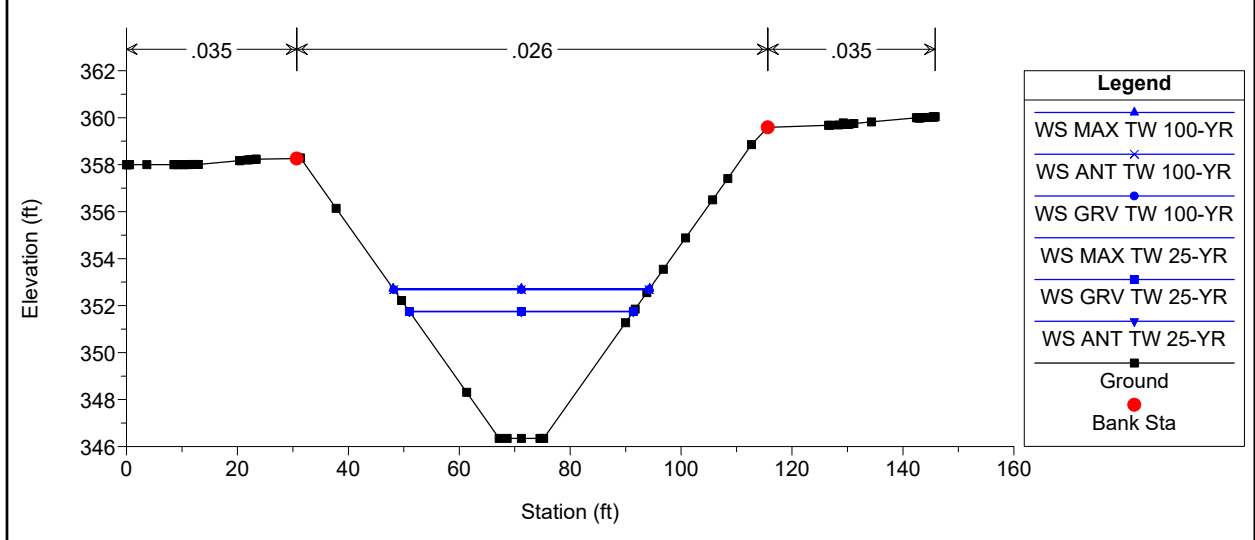
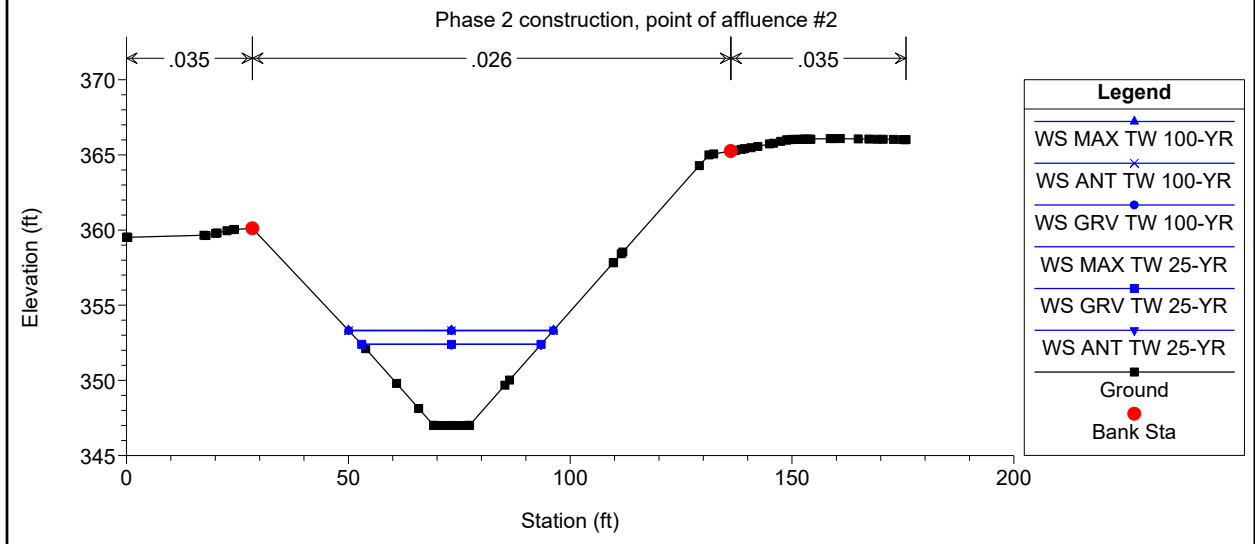
**Carlson, Brigrance & Doering, Inc.**  
 FIRM ID #13791  
 Civil Engineering ♦ Surveying  
 5501 West William Cannon Dr. ♦ Austin, Texas 78749  
 Phone No. (512) 280-5160 ♦ Fax No. (512) 280-5165

<b>CHANNEL CROSS-SECTION MAP</b>	
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JOB NAME:	DRAINAGE IMPROVEMENTS
PROJECT:	
SHEET NO.:	4697
DATE:	APRIL 2018
JOB NUMBER:	
SHEET:	MAP
SHEET NO.:	

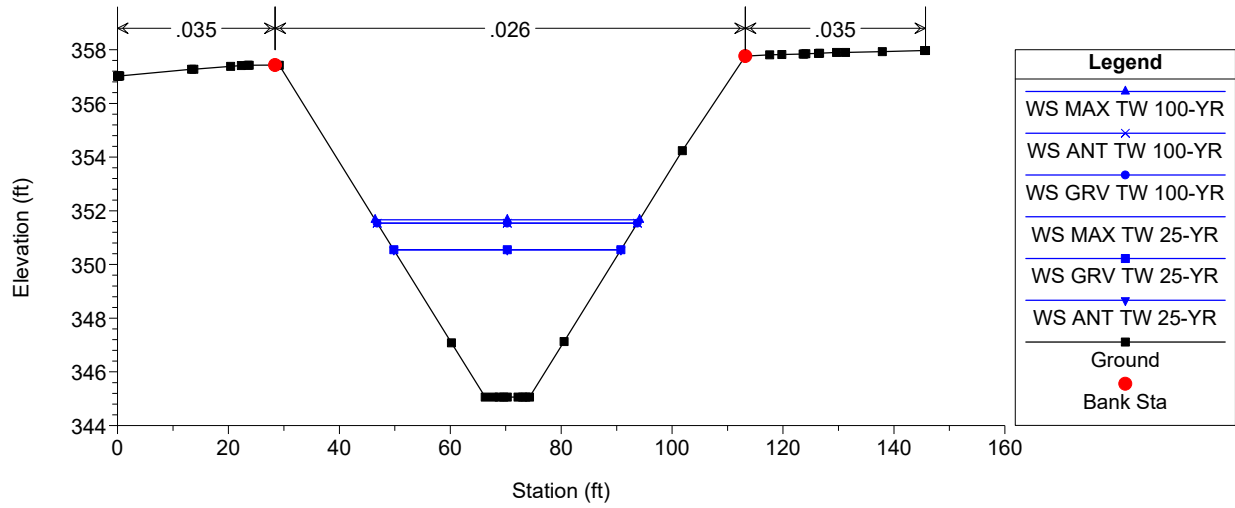




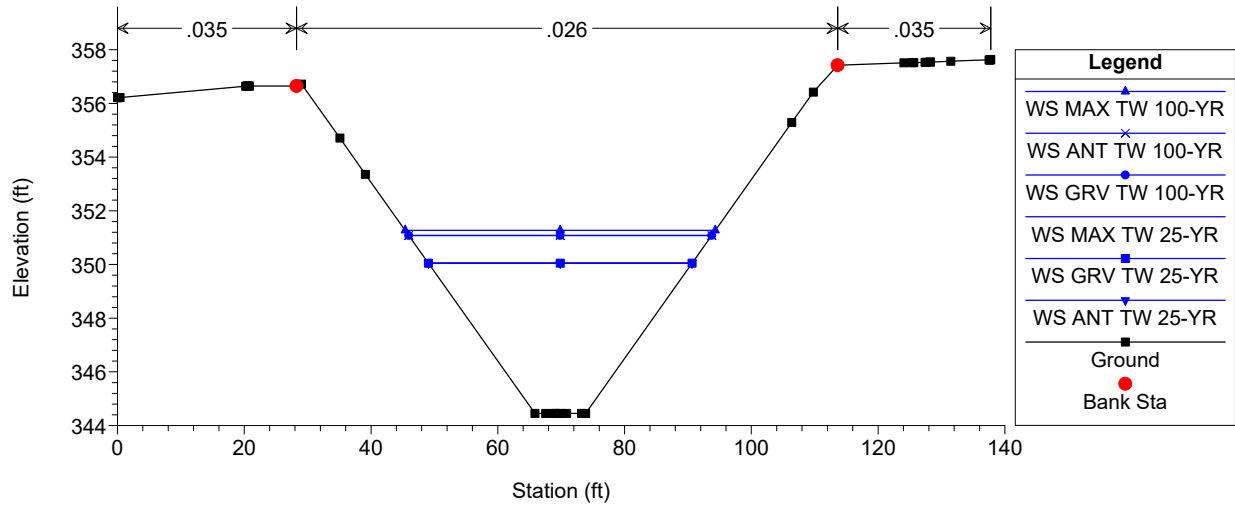




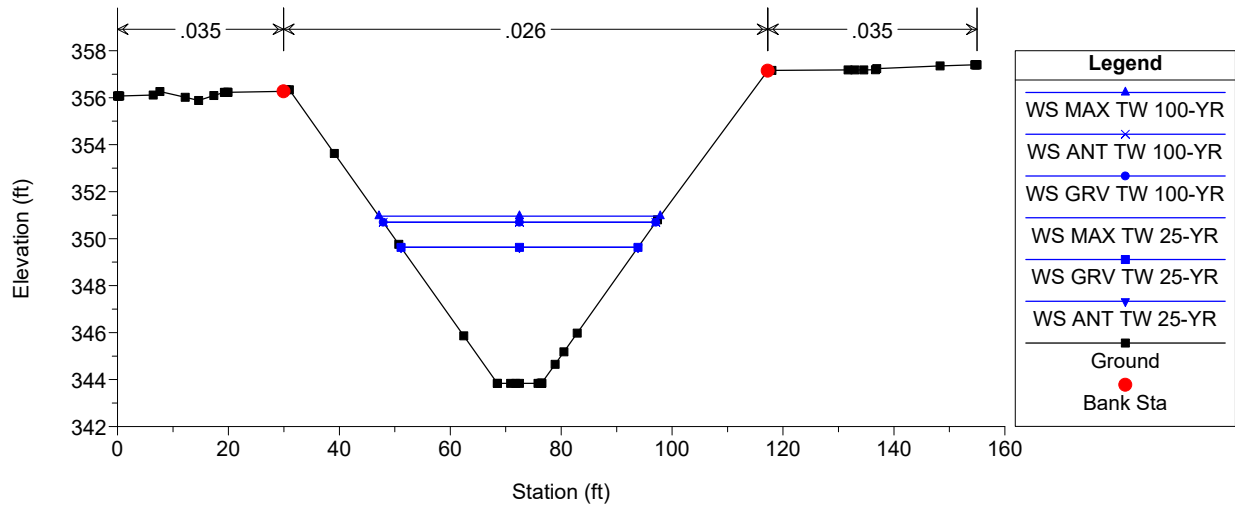
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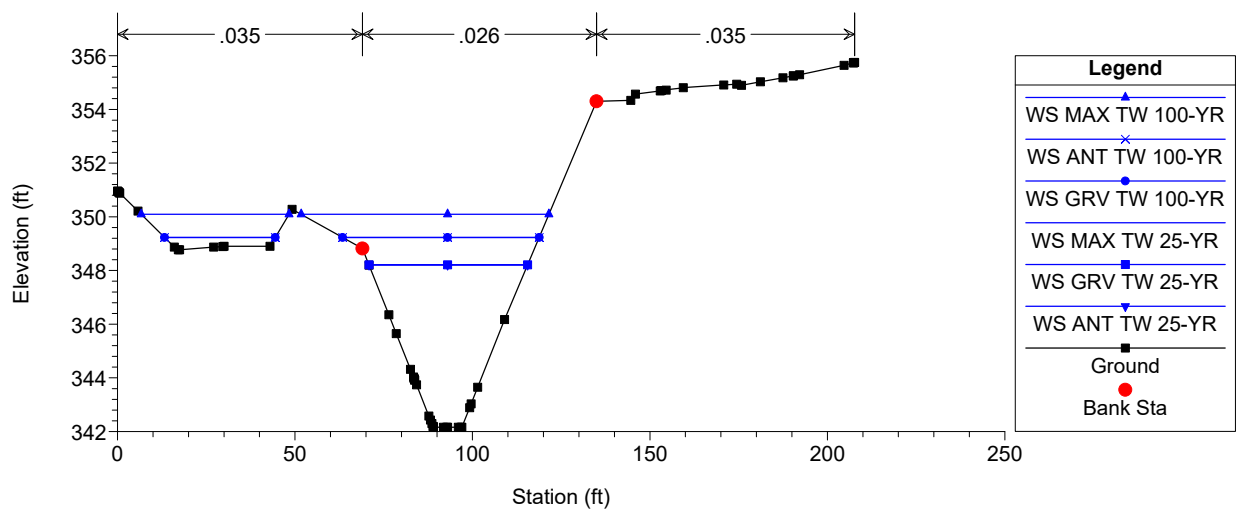
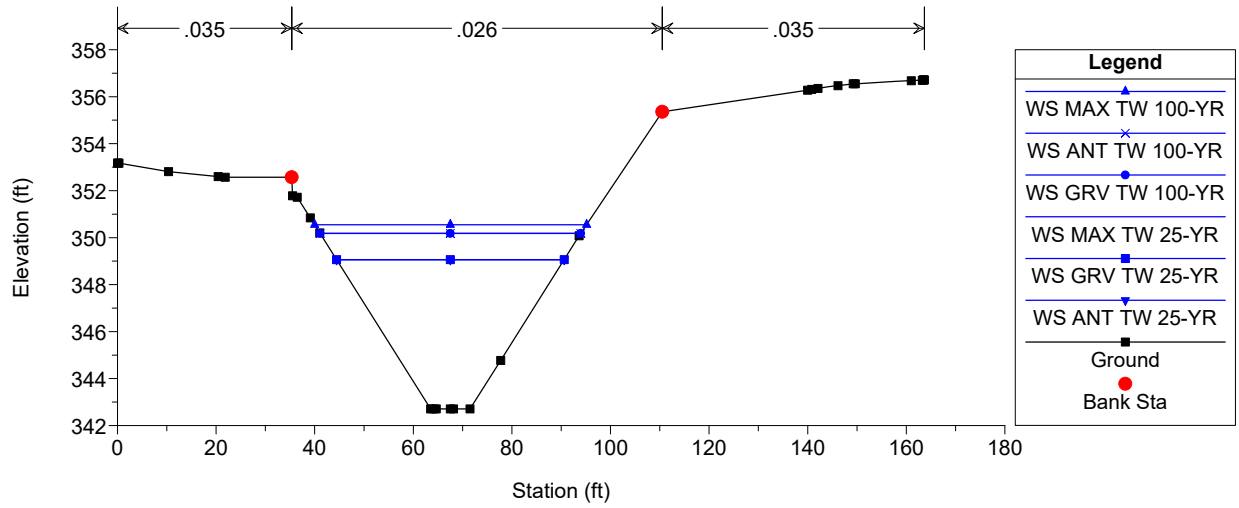
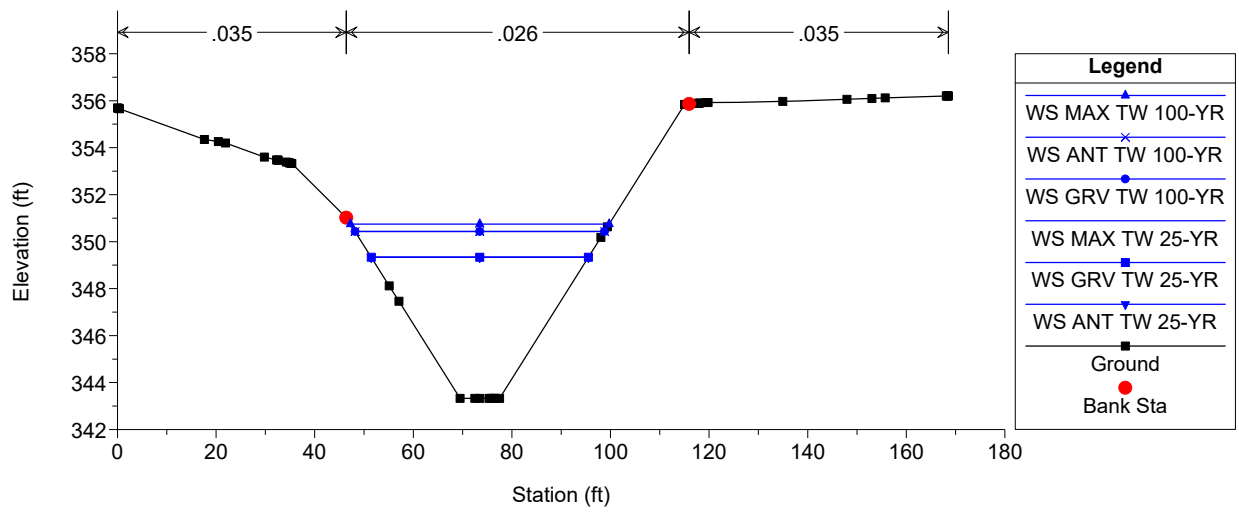


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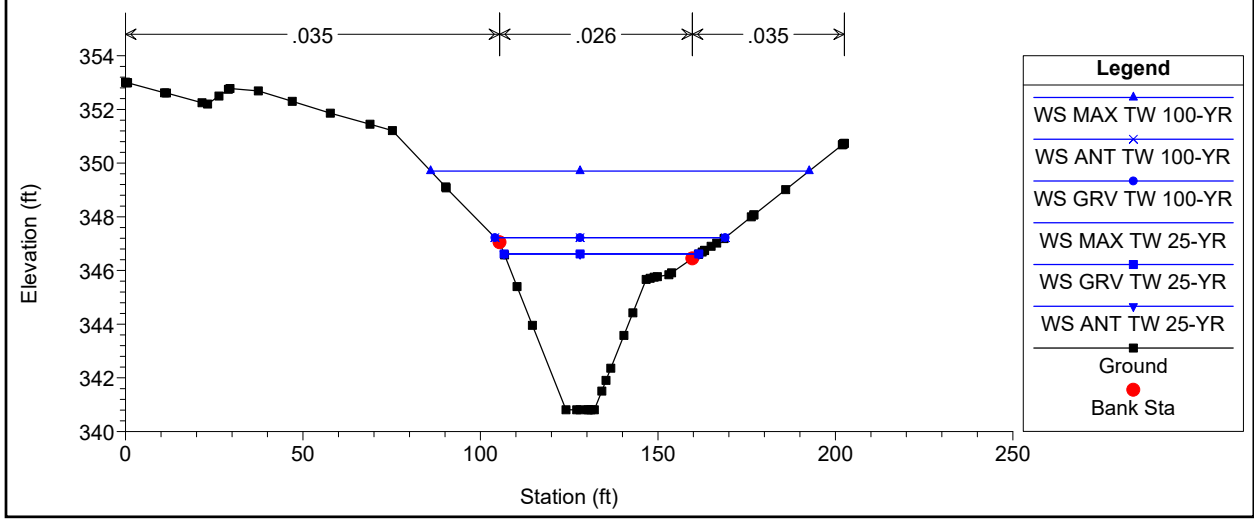
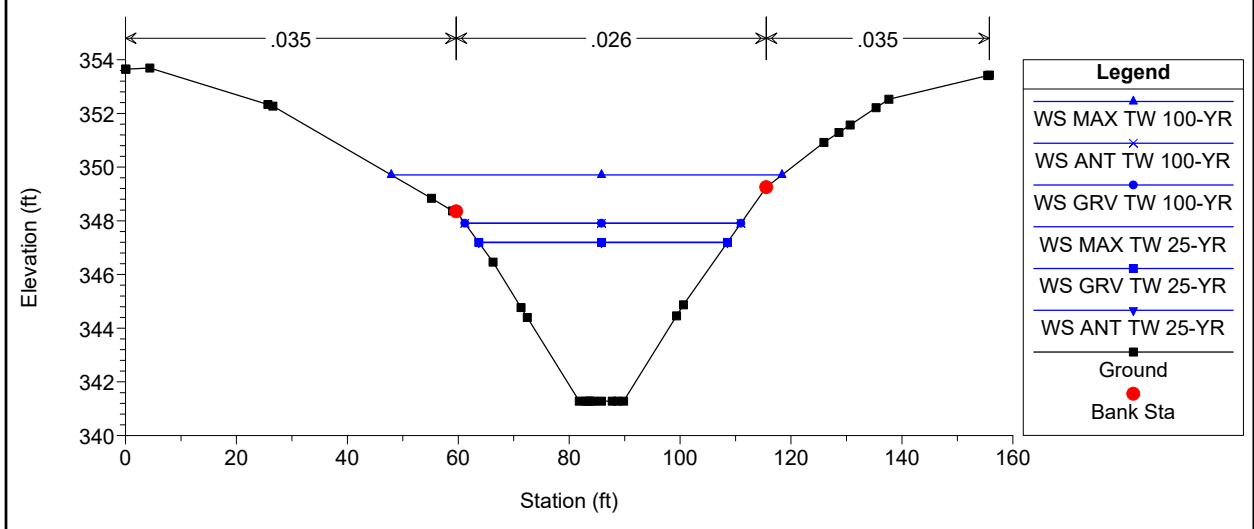
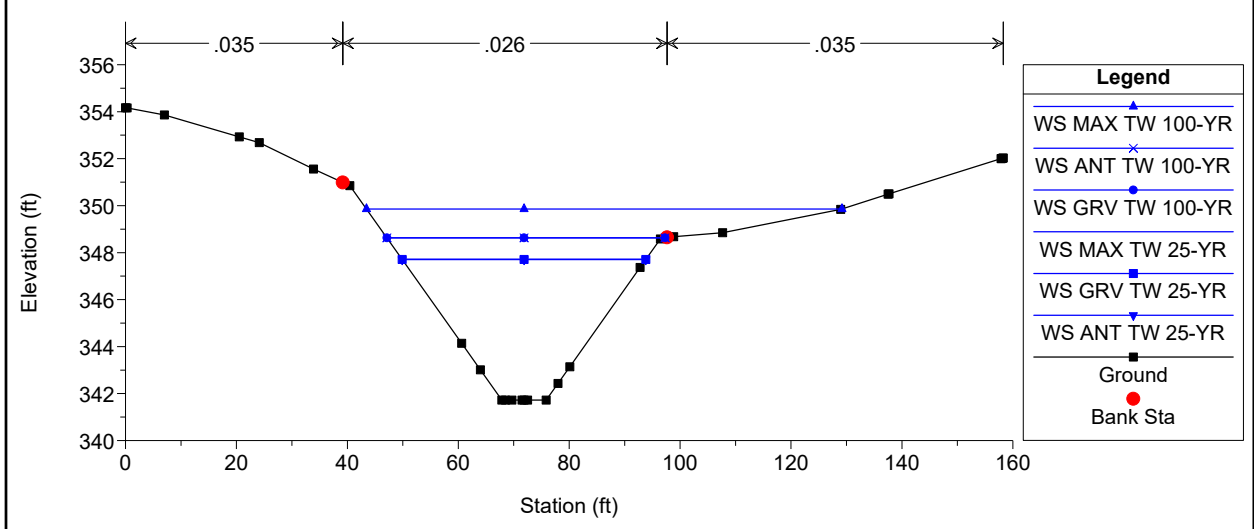


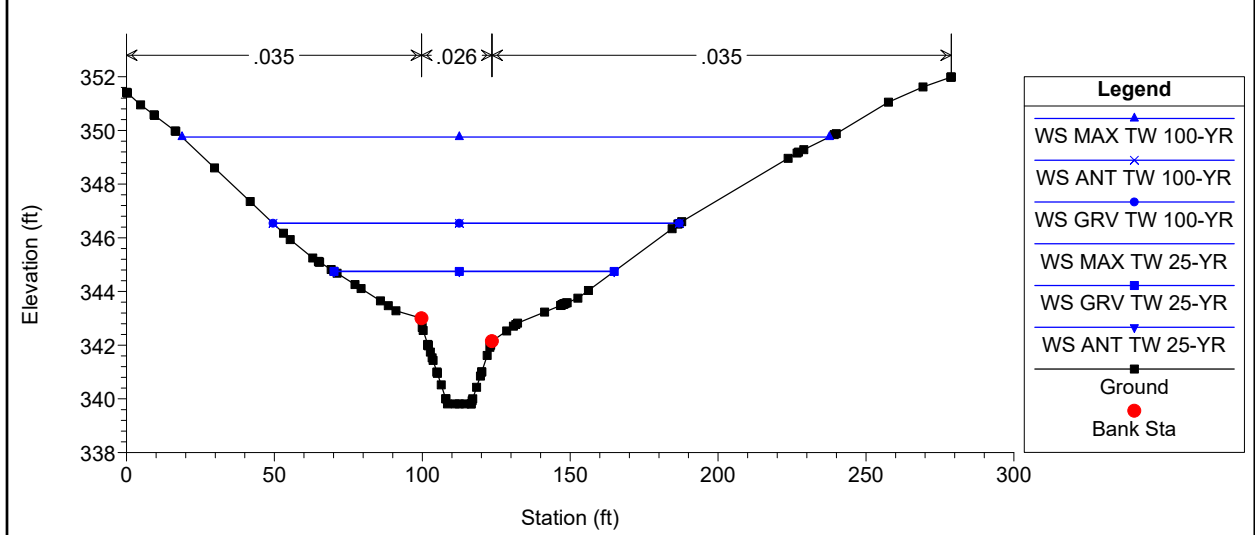
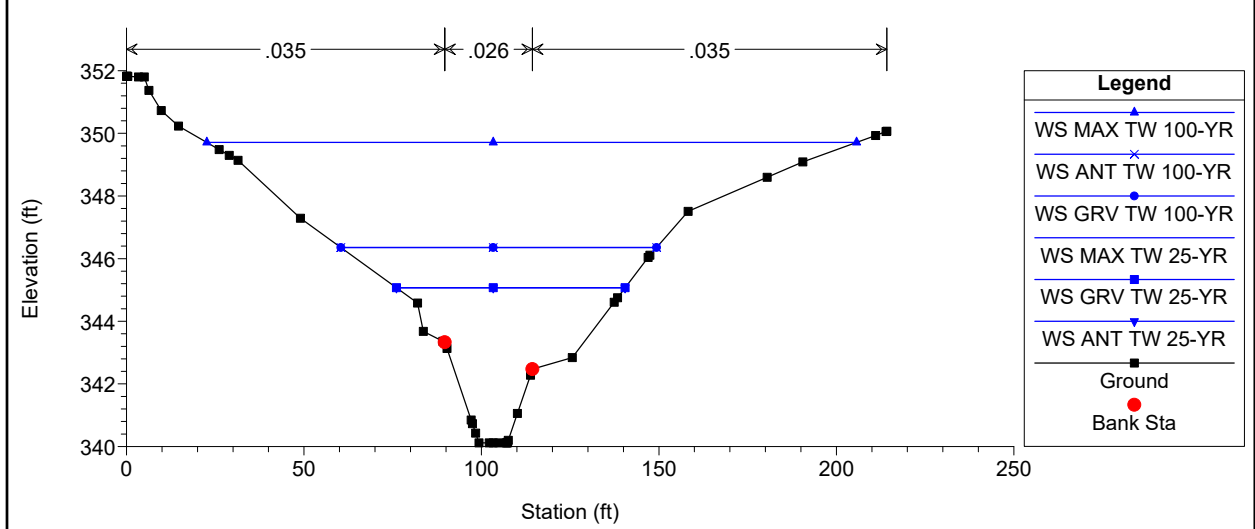
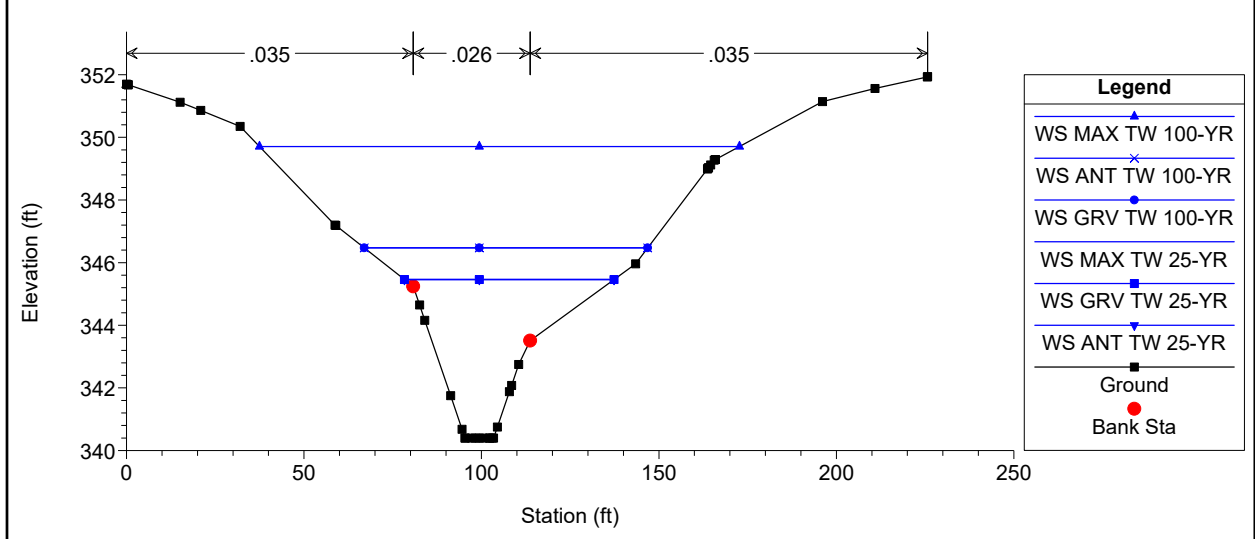
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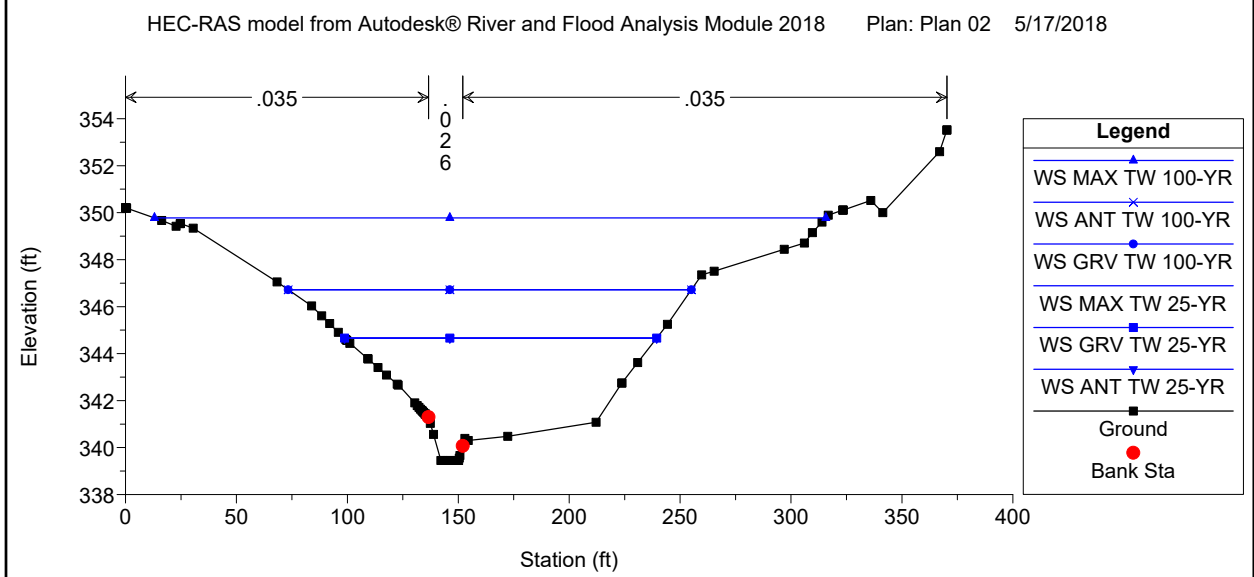
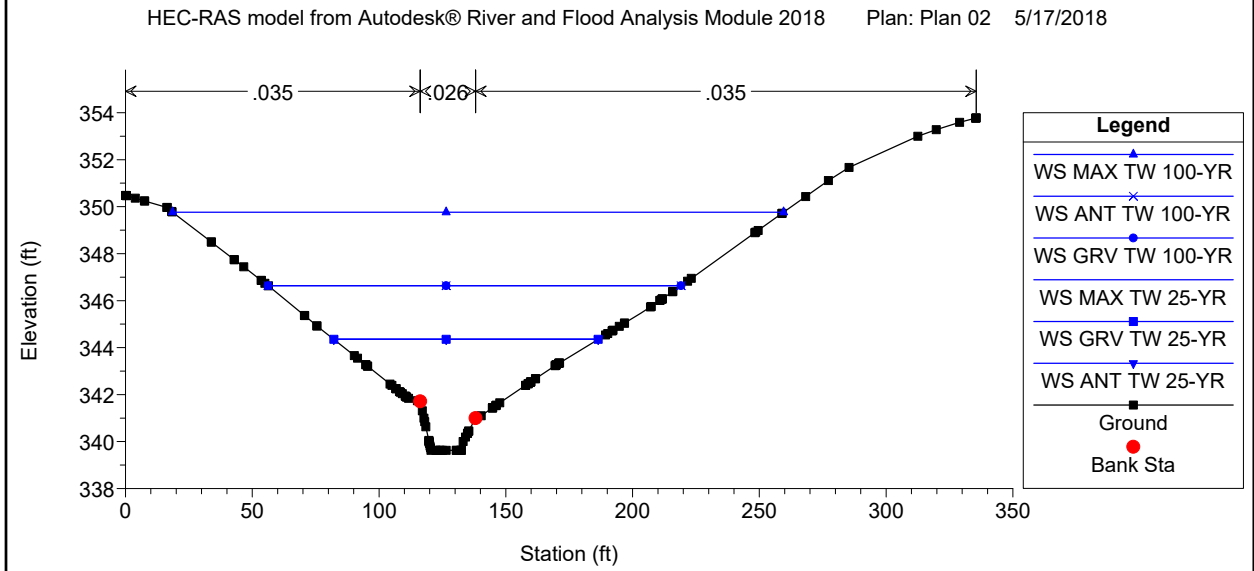
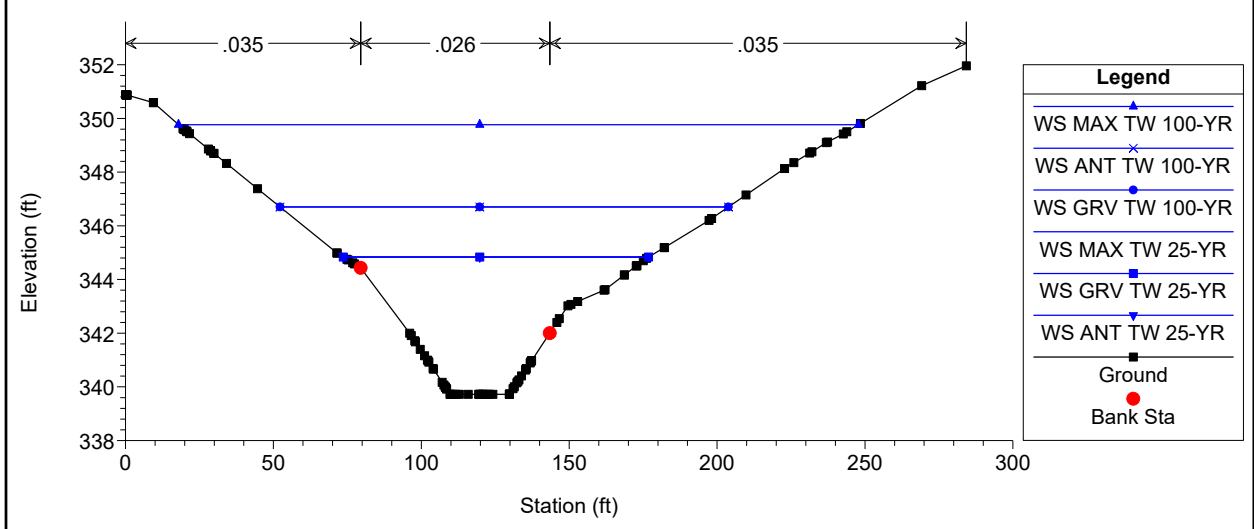


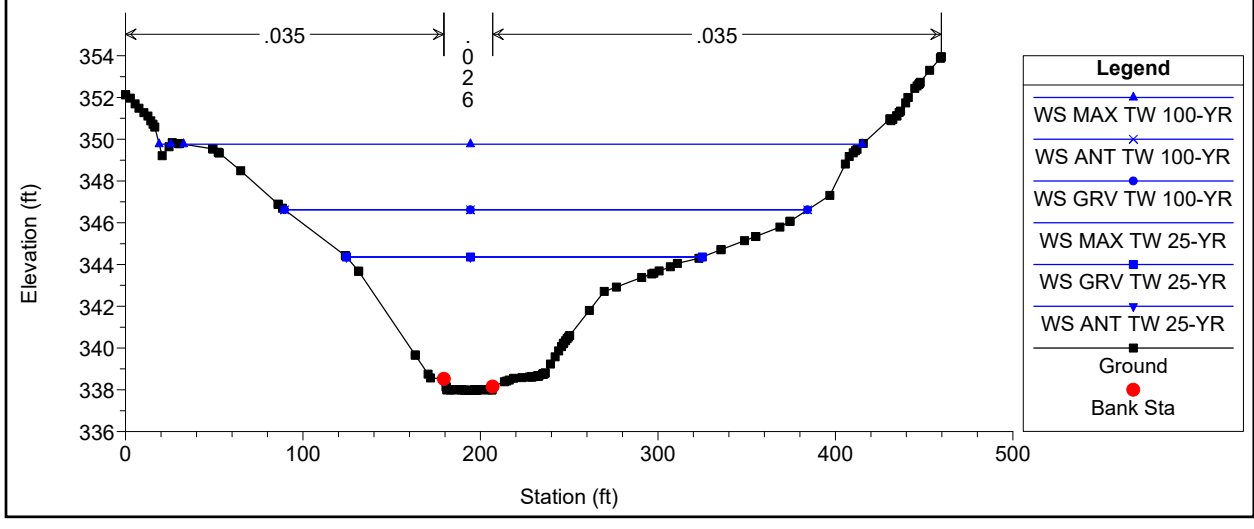
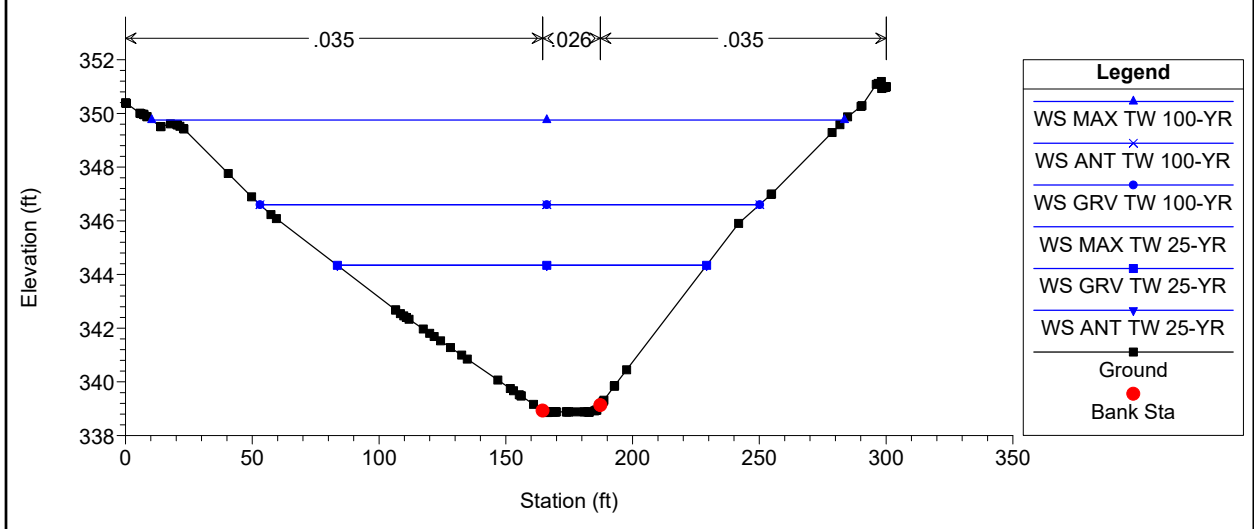
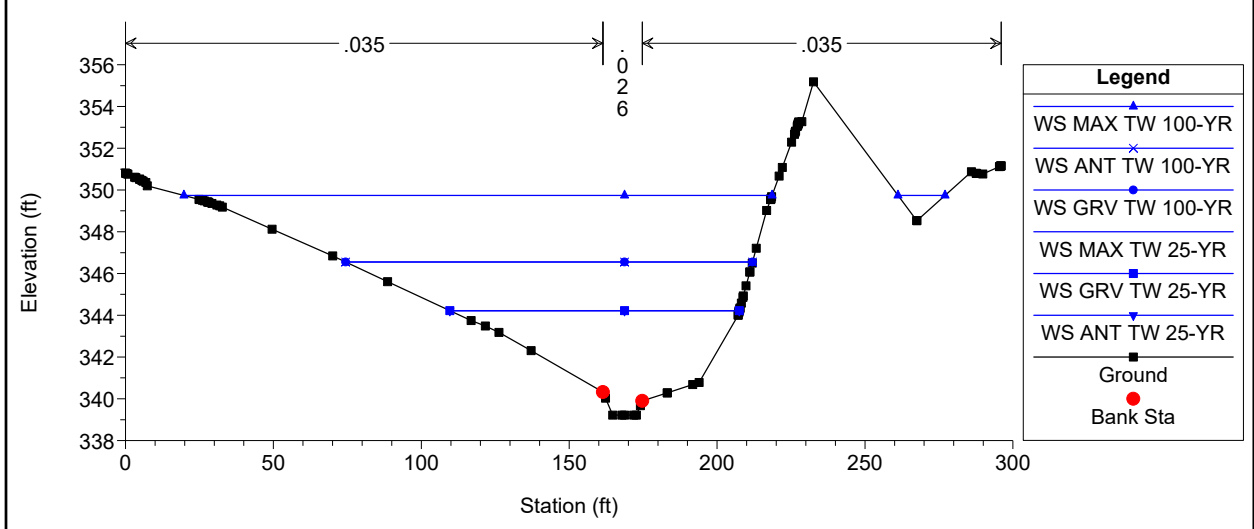


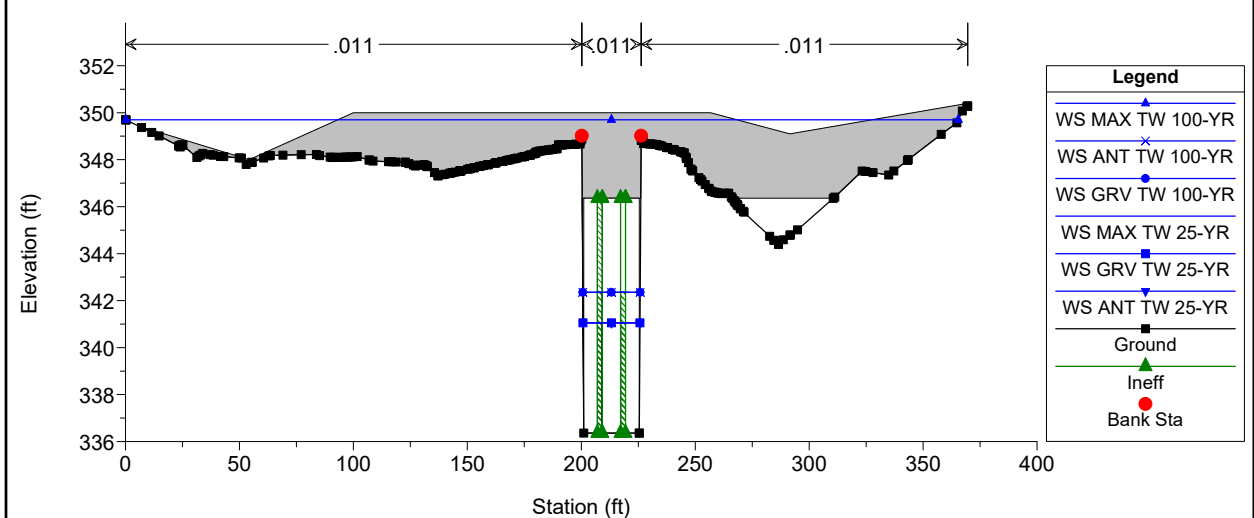
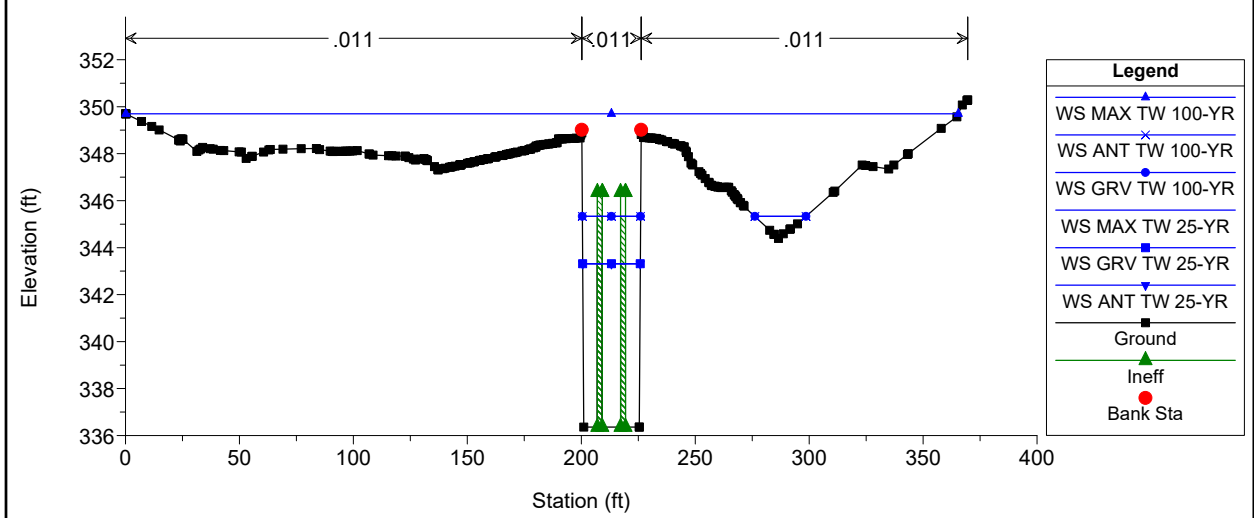
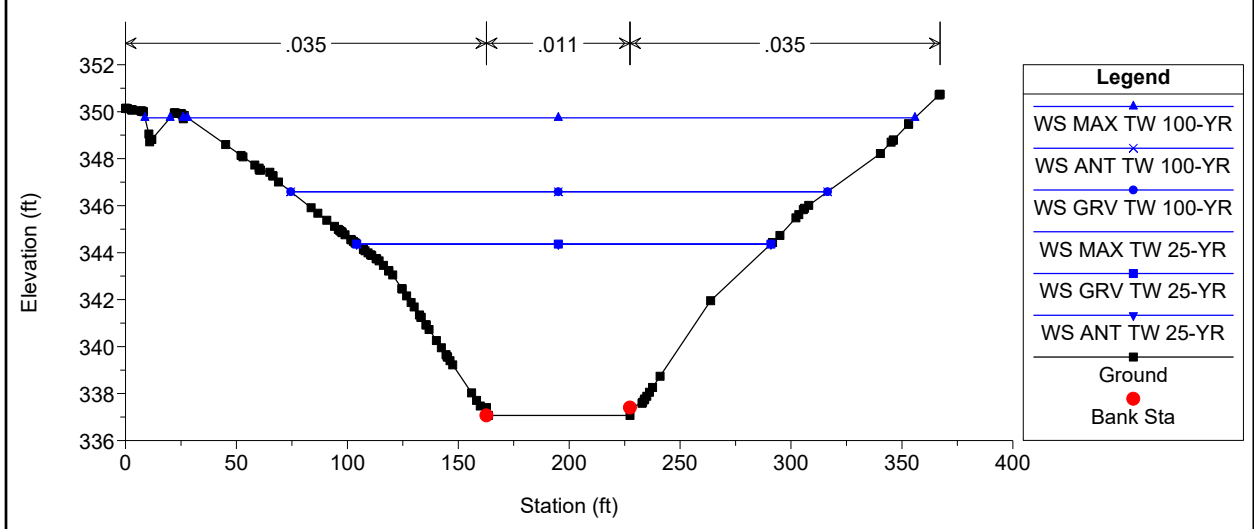


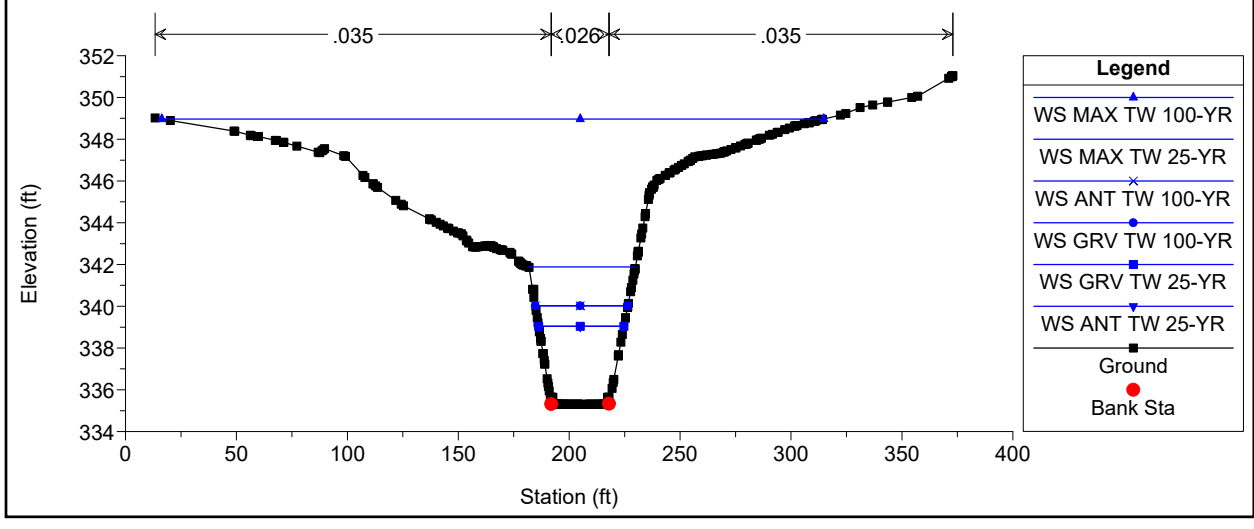
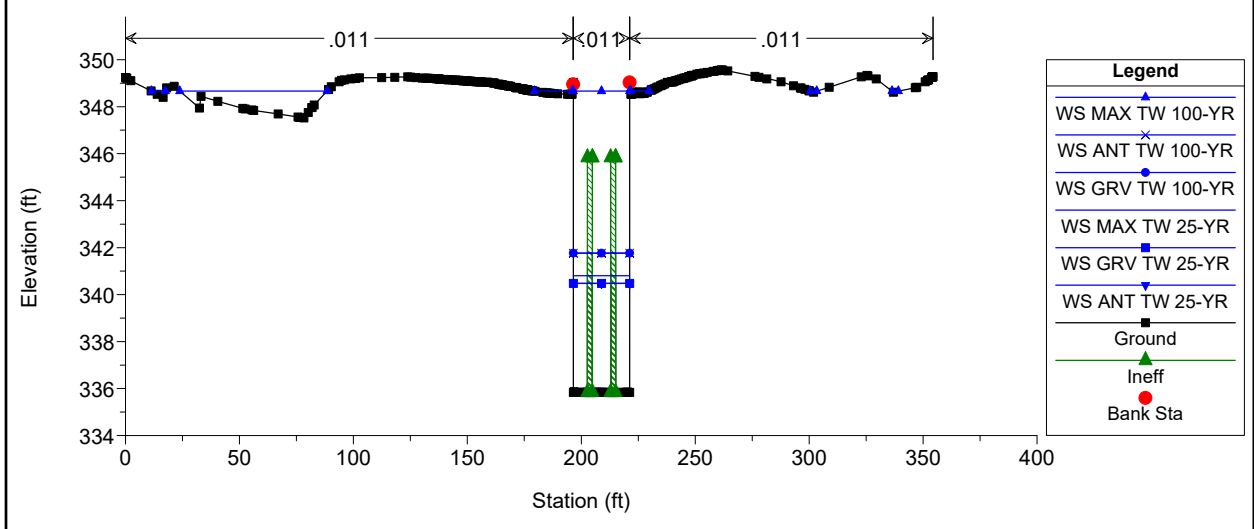
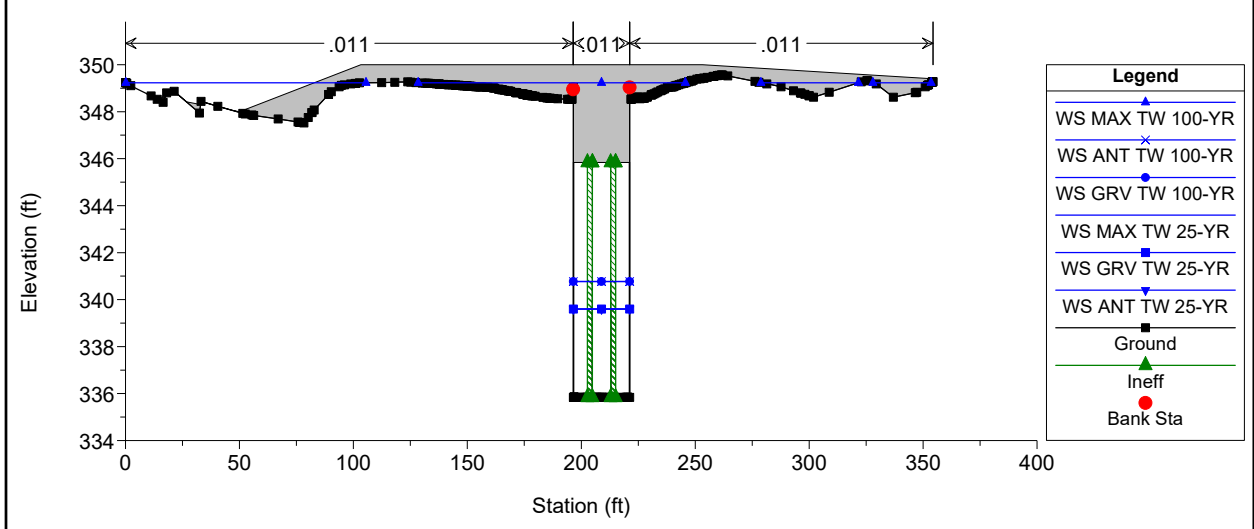


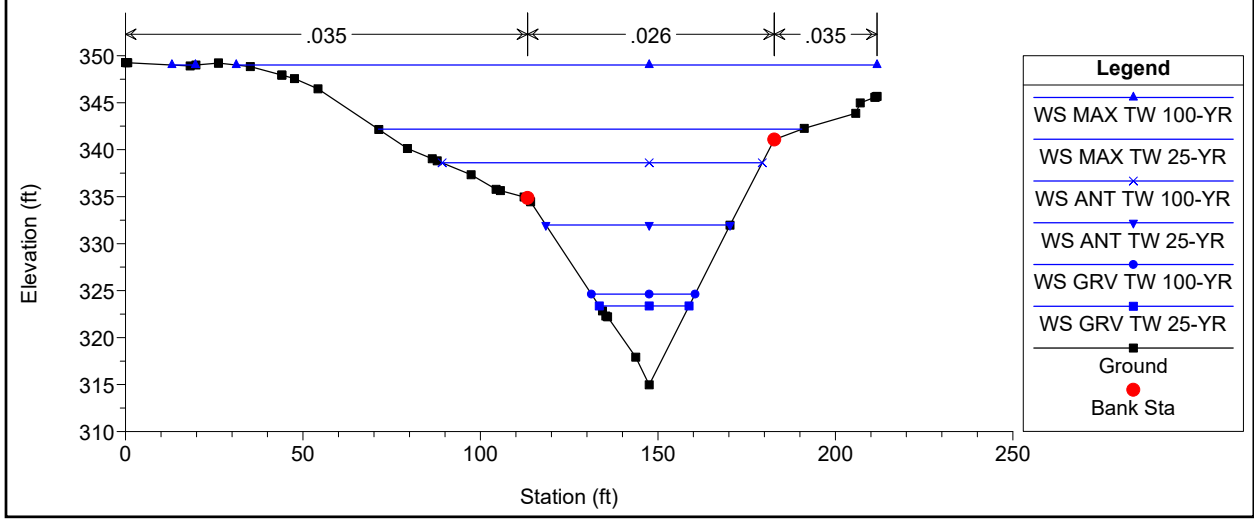
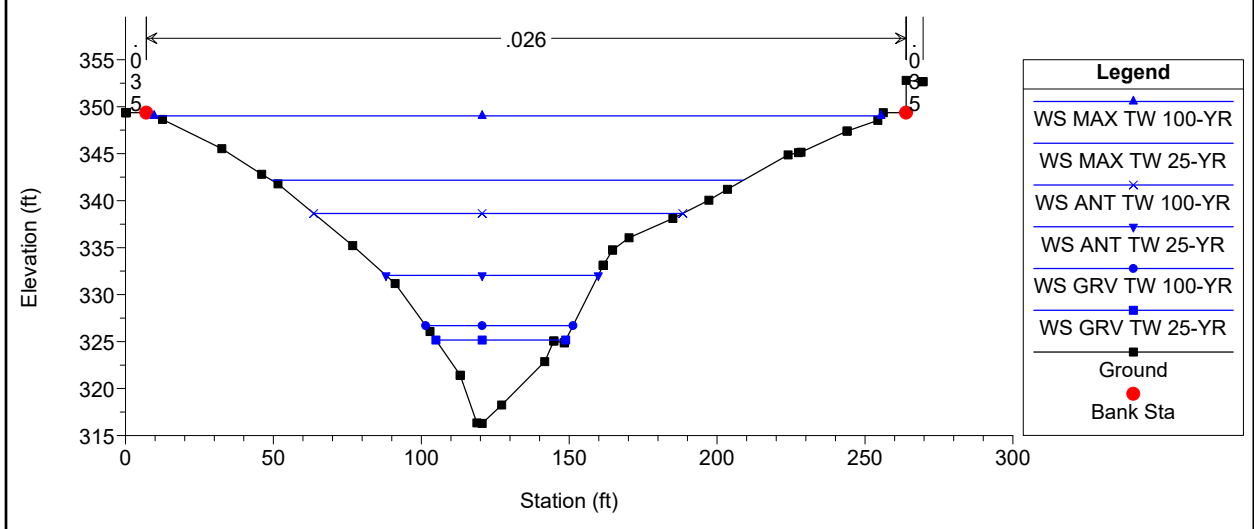
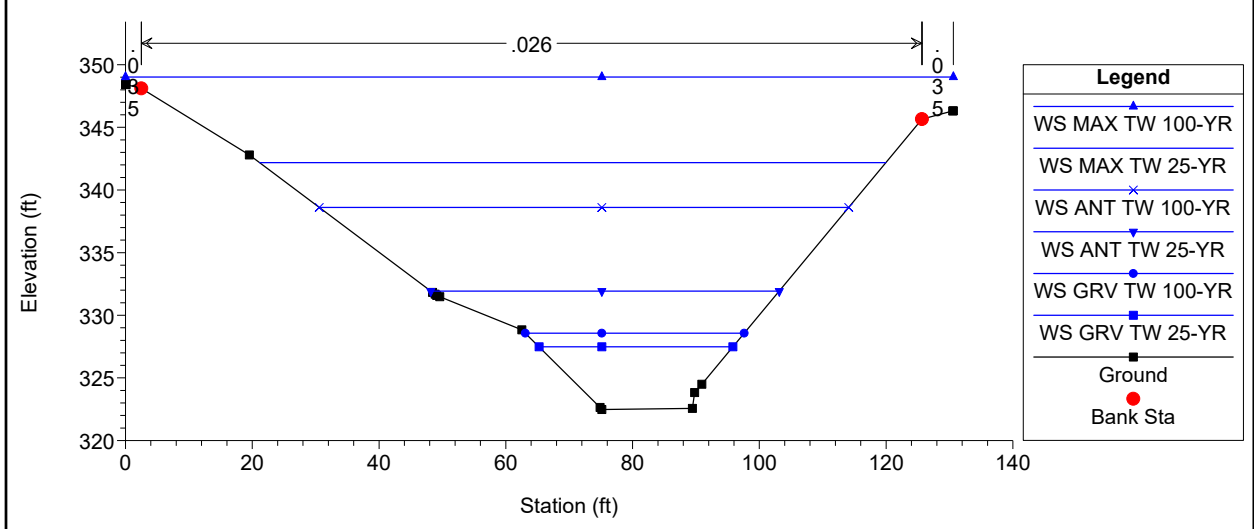


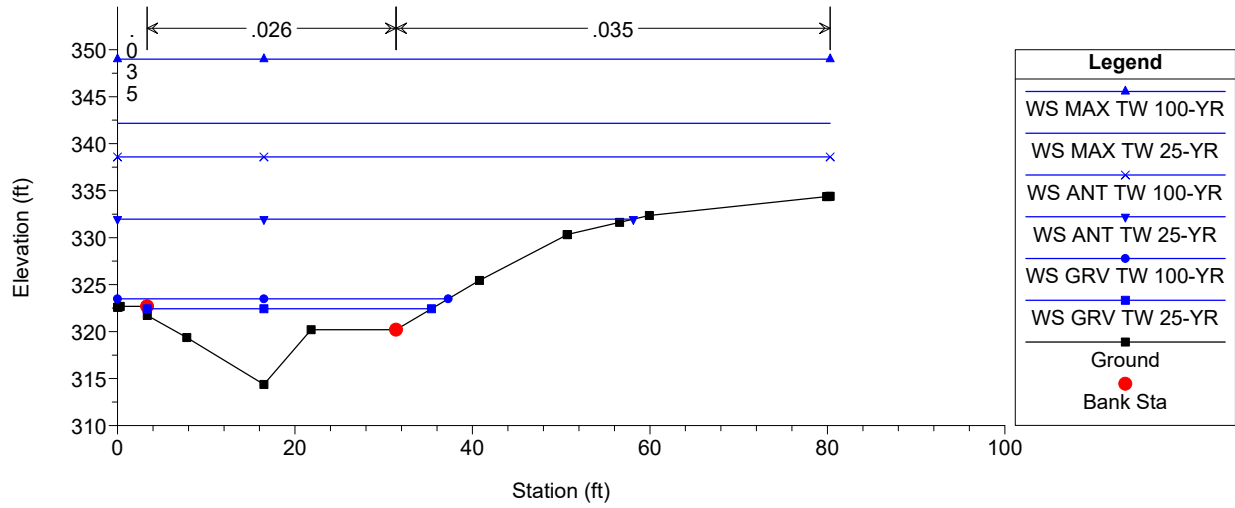
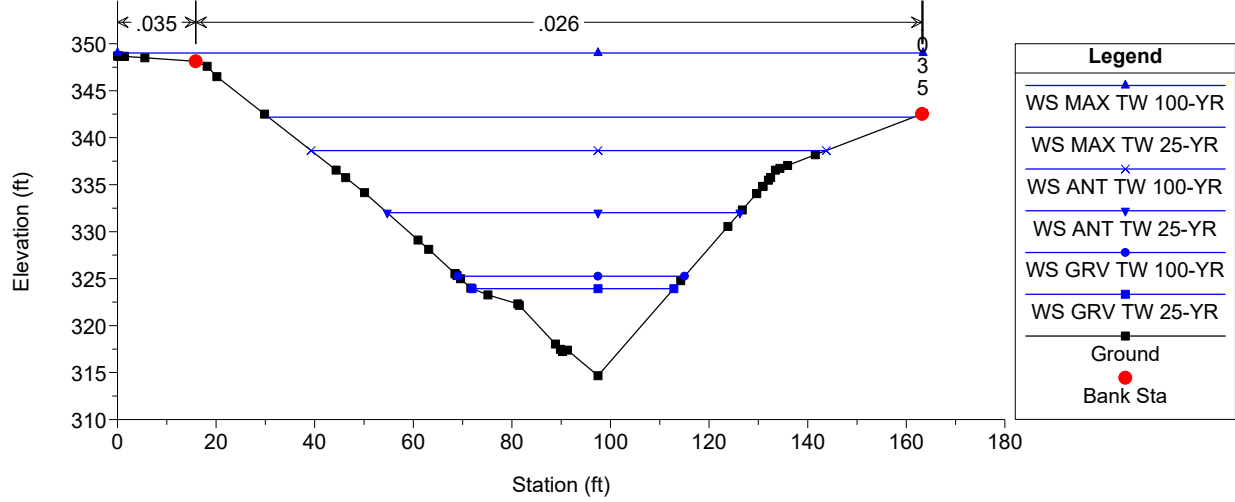














PROFILE TABLES







HEC-RAS Plan: Plan 02 River: Proposed Channel Reach: Proposed Channel (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Proposed Channel	4	ANT TW 25-YR	1151.75	316.30	332.04		332.10	0.000084	1.97	584.07	71.75	0.12
Proposed Channel	4	ANT TW 100-YR	1662.89	316.30	338.64		338.67	0.000031	1.38	1203.81	124.76	0.08
Proposed Channel	4	GRV TW 25-YR	1151.75	316.30	325.16		325.74	0.001821	6.06	189.93	43.89	0.51
Proposed Channel	4	GRV TW 100-YR	1662.89	316.30	326.70		327.32	0.001550	6.36	261.60	49.78	0.49
Proposed Channel	3	MAX TW 25-YR	1151.75	314.97	342.18		342.19	0.000010	1.01	1252.89	119.28	0.05
Proposed Channel	3	MAX TW 100-YR	1662.89	314.97	349.01		349.02	0.000005	0.91	2285.71	187.15	0.03
Proposed Channel	3	ANT TW 25-YR	1151.75	314.97	331.98		332.09	0.000162	2.66	433.60	51.87	0.16
Proposed Channel	3	ANT TW 100-YR	1662.89	314.97	338.61		338.66	0.000051	1.97	882.79	90.21	0.10
Proposed Channel	3	GRV TW 25-YR	1151.75	314.97	323.36	323.36	325.38	0.008034	11.39	101.11	25.31	1.00
Proposed Channel	3	GRV TW 100-YR	1662.89	314.97	324.62	324.62	326.97	0.007635	12.28	135.43	29.19	1.01
Proposed Channel	2	MAX TW 25-YR	1151.75	314.67	342.18		342.19	0.000006	0.72	1610.67	130.89	0.04
Proposed Channel	2	MAX TW 100-YR	1662.89	314.67	349.01		349.02	0.000003	0.65	2582.57	163.42	0.03
Proposed Channel	2	ANT TW 25-YR	1151.75	314.67	332.01		332.07	0.000067	1.84	626.83	71.54	0.11
Proposed Channel	2	ANT TW 100-YR	1662.89	314.67	338.62		338.65	0.000027	1.39	1192.05	104.50	0.07
Proposed Channel	2	GRV TW 25-YR	1151.75	314.67	323.94		324.63	0.002310	6.67	172.57	40.93	0.57
Proposed Channel	2	GRV TW 100-YR	1662.89	314.67	325.25		326.06	0.002170	7.24	229.78	45.99	0.57
Proposed Channel	1	MAX TW 25-YR	1151.75	314.38	342.17	322.44	342.19	0.000008	1.20	1326.58	80.31	0.04
Proposed Channel	1	MAX TW 100-YR	1662.89	314.38	349.00	323.48	349.02	0.000006	1.24	1875.09	80.31	0.04
Proposed Channel	1	ANT TW 25-YR	1151.75	314.38	331.96	322.44	332.06	0.000087	2.65	535.90	58.13	0.13
Proposed Channel	1	ANT TW 100-YR	1662.89	314.38	338.59	323.48	338.65	0.000034	2.19	1039.07	80.31	0.09
Proposed Channel	1	GRV TW 25-YR	1151.75	314.38	322.43	322.43	324.21	0.007630	10.78	109.83	32.04	0.98
Proposed Channel	1	GRV TW 100-YR	1662.89	314.38	323.48	323.48	325.65	0.006817	11.95	147.31	37.27	0.96

## OUTPUT REPORT

HEC-RAS HEC-RAS 5.0.3 September 2016  
U.S. Army Corps of Engineers  
Hydrologic Engineering Center  
609 Second Street  
Davis, California

```
X   X  XXXXXX   XXXX       XXXX       XX       XXXX
X   X  X        X   X      X   X      X   X      X
X   X  X        X          X   X      X   X      X
XXXXXXXX XXXX   X          XXX XXXX   XXXXXXXX   XXXX
X   X  X        X          X   X      X   X          X
X   X  X        X   X      X   X      X   X      X
X   X  XXXXXX   XXXX       X   X      X   X      XXXXX
```

PROJECT DATA

Project Title: HEC-RAS model from Autodesk® River and Flood Analysis Module 2018  
Project File : 4697 - FLOOD MAP2.prj  
Run Date and Time: 5/17/2018 8:58:10 AM

Project in English units

PLAN DATA

Plan Title: Plan 02  
Plan File : j:\AutoCad 2004 Land Projects\4697\dwg\Channel\4697 - FLOOD MAP2.p02

Geometry Title: Base Conditions Geometry  
Geometry File : j:\AutoCad 2004 Land Projects\4697\dwg\Channel\4697 - FLOOD

MAP2.G01

Flow Title : 6 Flow Profiles  
Flow File : j:\AutoCad 2004 Land Projects\4697\dwg\Channel\4697 - FLOOD

MAP2.f02

Plan Summary Information:

Number of:	Cross Sections =	39	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary  
 Conveyance Calculation Method: At breaks in n values only  
 Friction Slope Method: Average Conveyance  
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: 6 Flow Profiles  
 Flow File : j:\AutoCad 2004 Land Projects\4697\dwg\Channel\4697 - FLOOD MAP2.f02

Flow Data (cfs)

River	Reach	RS	MAX TW 25-YR	MAX TW 100-YR	ANT TW 25-YR	ANT TW 100-YR	GRV TW 25-YR	GRV TW 100-YR
Proposed Channel	Proposed Channel	39	414.96	587.02	414.96	587.02	414.96	587.02
Proposed Channel	Proposed Channel	30	868.31	1234.19	868.31	1234.19	868.31	1234.19
Proposed Channel	Proposed Channel	22	1151.75	1662.89	1151.75	1662.89	1151.75	1662.89

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Proposed Channel	Proposed Channel	MAX TW 25-YR		Known WS = 342.17
Proposed Channel	Proposed Channel	MAX TW 100-YR		Known WS = 349
Proposed Channel	Proposed Channel	ANT TW 25-YR		Known WS = 331.96
Proposed Channel	Proposed Channel	ANT TW 100-YR		Known WS = 338.59
Proposed Channel	Proposed Channel	GRV TW 25-YR		Known WS = 0
Proposed Channel	Proposed Channel	GRV TW 100-YR		Known WS = 0

GEOMETRY DATA

Geometry Title: Base Conditions Geometry  
 Geometry File : j:\AutoCad 2004 Land Projects\4697\dwg\Channel\4697 - FLOOD MAP2.G01

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 39



INPUT

Description:

Station Elevation Data num= 73									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.2	.1	360.2	.2	360.2	.3	360.2	21.3	360
23.65	360	26.16	359.17	26.4	359.08	26.49	359.04	26.53	359.03
26.55	359.02	26.57	359.01	27.28	358.75	27.57	358.64	30.59	357.08
30.72	357.03	30.76	357	30.77	356.01	30.77	356	30.78	355.01
30.78	355	30.79	354	30.8	353	34.27	353	37.74	353
41.21	353	44.68	353	46.9	353	50.91	353	51.27	353
54.91	353	57.14	353	57.15	353	60.56	353	63.97	353
67.38	353	67.39	353	70.8	353	70.81	354	70.82	355
70.82	355.01	70.83	356	70.83	356.01	70.84	357	70.85	357.01
70.87	357.02	72.31	357.61	75.67	358.99	75.69	359	75.82	359.05
76.04	359.14	76.48	359.32	77.85	359.89	78.19	360	79.42	360.05
88.59	360.43	94.76	360.69	99.18	360.88	101.08	360.85	102.51	360.85
102.91	360.85	104.76	360.88	106.95	360.91	108.58	360.93	116.34	361.05
117.64	361.09	121.31	361.19	121.66	361.2	125.64	361.3	128.31	361.38
128.41	361.38	128.51	361.38	128.61	361.39				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	23.65	.026	78.19	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	23.65	78.19		145.12	144.81	144.93	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 38

INPUT

Description:

Station Elevation Data num= 43									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.29	.1	360.29	.2	360.29	.4	360.29	3.17	360.31
3.83	360.31	3.86	360.31	3.89	360.31	5.93	360.32	6.17	360.32
6.3	360.32	6.43	360.33	7.5	360.33	20.4	360.33	21.74	360.42
21.77	360.41	24.96	359.34	26.23	358.92	34.09	356.3	37.75	355.08
43.38	353.2	47.8	351.73	48.47	351.73	49.93	351.73	50.75	351.73
51.8	351.73	52.46	351.73	53.29	351.73	54.75	351.73	55.8	351.73
58.75	352.71	76.25	358.54	78.87	359.42	82.91	360.76	82.92	360.77
84.83	360.78	86.05	360.79	100.41	360.87	103.23	360.91	115.86	361
120.61	361.06	120.71	361.06	120.81	361.06				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.4	.026	100.41	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	20.4	100.41		200	200	200	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 37

INPUT

Description:

Station Elevation Data		num=		36					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.85	.1	359.85	.2	359.85	.4	359.85	4.67	359.87
6.32	359.88	20.4	359.89	22.77	359.97	23.4	359.97	24.52	359.98
24.82	359.98	24.85	359.98	46.95	352.61	51.41	351.12	51.42	351.12
51.48	351.12	51.71	351.12	52.08	351.12	52.96	351.12	55.42	351.12
55.48	351.12	56.07	351.12	59.41	351.12	59.42	351.12	59.48	351.14
63.86	352.6	64.88	352.94	87.4	360.45	87.43	360.45	100.41	360.53
104.24	360.59	106.88	360.61	106.91	360.61	120.41	360.72	120.71	360.72
120.81	360.72								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.4	.026	100.41	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	20.4	100.41		200	200		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 36

INPUT

Description:

Station Elevation Data		num=		35					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.76	.1	359.76	.3	359.76	.4	359.76	15.85	359.88
18.89	359.91	19.05	359.91	19.26	359.91	19.57	359.91	20.4	359.91
20.46	359.92	21.02	359.92	22.36	359.93	22.52	359.93	23.08	359.94
23.37	359.94	23.38	359.94	23.92	359.94	47.61	352.05	52.21	350.52
52.86	350.52	54.98	350.52	56.2	350.52	56.21	350.52	56.86	350.52
56.98	350.52	59.06	350.52	60.21	350.52	65.11	352.15	73.31	354.88
91.17	360.6	100.41	360.7	120.51	360.91	120.61	360.91	120.71	360.91

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.4	.026	91.17	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	20.4	91.17		200	200		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 35

INPUT

Description:

Station Elevation Data		num= 26							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.5	.1	359.51	.2	359.51	.4	359.51	12.79	359.61
20.4	359.67	22.65	359.69	23.42	359.7	23.56	359.7	44.56	352.7
48.13	351.51	52.93	349.91	53.59	349.91	55.21	349.91	56.36	349.91
56.93	349.91	57.59	349.91	58.89	349.91	59.45	349.91	60.93	349.91
66.06	351.62	100.75	360.39	120.88	360.71	120.98	360.71	121.08	360.72
121.18	360.72								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.4	.026	100.75	.035

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	20.4	100.75		200	200	200		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 34

INPUT

Description:

Station Elevation Data		num= 33							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359	.1	359	.2	359	.3	359	.4	359
5.22	359	6.61	359	7.85	359	8.55	359	15.3	359
15.53	359	15.84	359	22.65	359.07	24.2	359.15	24.39	359.16
29.25	357.54	43.12	352.92	53.96	349.3	54.48	349.3	54.61	349.3
57.96	349.3	58.61	349.3	58.72	349.3	61.96	349.3	67.34	351.1
71.37	352.44	95.13	360.36	95.88	360.37	127.25	360.94	127.68	360.94
130.91	361	130.98	361	131.08	361.01				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	22.65	.026	95.88	.035

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	22.65	95.88		200	200	200		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 33

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359	.1	359	.2	359	.3	359	.4	359
15.09	359	15.14	359	17.62	359	18.49	359	19.02	359
22	359	22.2	359	23	359	23.33	359	23.51	359
23.57	359	48.82	350.58	49.44	350.38	51.86	349.57	52.78	349.26
53.23	349.11	53.5	349.03	54.48	348.7	54.62	348.7	55.14	348.7
55.22	348.7	58.48	348.7	59.14	348.7	60.18	348.7	61.77	348.7
62.48	348.7	68.16	350.59	71.68	351.76	75.1	352.9	97.39	360.33
97.65	360.34	105.37	360.48	109.53	360.56	130.71	360.96	130.81	360.97

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	23	.026	97.65	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	23	97.65		200	200		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 32

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.96	.1	358.96	.2	358.96	.3	358.96	6.49	358.98
7.19	358.98	13.66	359	15.8	359	17.5	359	17.87	359.01
20.4	359.02	21.67	359.06	21.89	359.06	22.18	359.06	55.11	348.09
55.77	348.09	58.54	348.09	58.7	348.09	59.11	348.09	59.77	348.09
63.11	348.09	93.63	358.26	99.63	360.26	110.84	360.42	128.52	360.77
130.84	360.82	130.94	360.82	131.04	360.82	131.14	360.82	131.24	360.82

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.4	.026	110.84	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	20.4	110.84		210.32	198.97		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 31

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.95	.1	358.95	.2	358.95	.3	358.95	.4	358.95

4.36	358.97	4.48	358.97	7.74	358.97	20.33	358.99	20.79	358.99
21.12	358.99	21.22	358.99	22.92	358.99	25.61	359	26.39	359
26.46	359	26.69	359	26.73	359	26.84	359	26.95	359.01
27.48	359.01	27.69	359.02	46.76	359.27	49.06	359.3	56.97	359.33
57.72	359.44	58.1	359.45	78.33	352.71	94	347.48	95.57	347.48
98	347.48	100.99	347.48	101.35	347.48	102	347.48	108.54	349.66
124.29	354.91	142.83	360.91	144.86	360.96	145.71	360.98	146.69	361
147.24	361.02	147.34	361.02	167.28	361.73	167.38	361.74	167.48	361.74
167.58	361.74								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	56.97	.026	142.83	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	56.97	142.83		148.65	159.48		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 30

INPUT

Description: Phase 2 construction, point of affluence #2

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.52	.1	359.52	.2	359.52	.3	359.52	17.44	359.66
17.91	359.63	20.1	359.78	20.4	359.8	22.64	359.95	24.13	360.03
24.19	360.04	24.24	360.04	24.3	360.04	28.37	360.11	53.93	352.11
60.86	349.8	65.86	348.13	69.22	347.01	69.26	347	69.32	347
70.07	347	71.75	347	73.22	347	73.26	347	74.06	347
75.86	347	77.22	347	77.26	347	77.31	347.01	85.3	349.68
86.32	350.02	109.71	357.82	109.79	357.84	111.52	358.42	111.88	358.54
129.1	364.28	131.27	365	132.33	365.06	136.22	365.25	136.8	365.28
137.35	365.31	138.57	365.37	139.32	365.41	140.74	365.48	142.29	365.56
144.94	365.73	145.81	365.78	147.45	365.9	148.75	365.99	148.88	366
149.75	366.02	149.79	366.02	149.91	366.03	150.47	366.03	151.44	366.03
152.13	366.04	152.67	366.05	153.43	366.05	154.17	366.04	154.23	366.04
158.6	366.08	159.36	366.08	160.86	366.08	164.92	366.06	167.31	366.05
169.22	366.04	170.53	366.04	172.84	366.03	174.93	366.02	175.29	366.02
175.39	366.02	175.49	366.02	175.59	366.02	175.69	366.02		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	28.37	.026	136.22	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28.37	136.22		203.91	215.5		.1	.3

CROSS SECTION

RIVER: Proposed Channel

REACH: Proposed Channel RS: 29

INPUT

Description:

Station Elevation Data num= 67									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358	.1	358	.2	358	.3	358	.4	358
.56	358	3.67	358	8.54	358	8.68	358	9.26	358
10.24	358	10.37	358	11.32	358	11.92	358.01	12.16	358.01
12.28	358.01	12.95	358.01	20.4	358.17	20.46	358.17	21.82	358.2
22.23	358.21	23.18	358.22	23.32	358.23	23.38	358.23	30.7	358.26
30.91	358.29	31.35	358.29	37.8	356.14	49.59	352.22	61.32	348.31
67.2	346.35	68.62	346.35	71.2	346.35	74.55	346.35	75.2	346.35
89.98	351.27	91.71	351.85	93.82	352.55	96.8	353.55	100.8	354.88
105.67	356.5	108.41	357.41	112.7	358.85	115.62	359.59	126.59	359.68
126.78	359.68	128.37	359.69	129.26	359.78	129.42	359.71	129.96	359.72
130.15	359.72	130.4	359.73	131.14	359.75	134.32	359.82	142.43	360
142.72	360	142.74	360	142.9	360	143.04	360	143.12	360
143.24	360	144.27	360.01	145.4	360.03	145.5	360.03	145.6	360.04
145.7	360.04	145.8	360.04						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	30.7	.026	115.62	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	30.7	115.62		224.36	224.72	224.36	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
REACH: Proposed Channel RS: 28

INPUT

Description:

Station Elevation Data num= 31									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.61	.1	357.61	.2	357.61	.3	357.61	.4	357.61
21.35	357.58	30.24	357.64	30.43	357.65	30.93	357.66	51.18	350.91
61.06	347.62	61.64	347.42	66.92	345.66	67.6	345.66	70.26	345.66
70.92	345.66	71.73	345.66	74.26	345.66	74.92	345.66	81.2	347.76
105.86	355.98	114.06	358.46	116	358.5	117.78	358.53	122.09	358.59
126.95	358.67	145.7	359.08	145.8	359.09	145.9	359.09	146	359.09
146.1	359.09								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	30.24	.026	114.06	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	30.24	114.06		199.82	197.88	198.18	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 27

INPUT

Description:

Station Elevation Data num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.01	.1	357.02	.2	357.02	.3	357.02	.4	357.02
13.37	357.27	13.75	357.27	20.4	357.38	22.34	357.41	23.52	357.42
23.73	357.42	28.41	357.43	28.63	357.42	29.18	357.42	60.22	347.08
66.29	345.06	67.79	345.06	68.8	345.06	69.63	345.06	70.29	345.06
72.21	345.06	73.05	345.06	73.63	345.06	74.29	345.06	80.52	347.13
101.84	354.24	113.22	357.76	117.59	357.81	119.79	357.82	123.61	357.84
123.8	357.84	124.12	357.85	126.38	357.86	126.6	357.87	129.66	357.9
131.27	357.9	137.91	357.93	145.51	357.97	145.6	357.97	145.7	357.97

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	28.41	.026	113.22	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28.41	113.22		200.46	198.55		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 26

INPUT

Description:

Station Elevation Data num= 39									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.21	.1	356.22	.2	356.22	.3	356.22	.4	356.22
20.23	356.64	20.4	356.64	20.47	356.64	20.49	356.64	20.5	356.64
20.78	356.65	20.79	356.65	28.25	356.65	29.03	356.72	35.09	354.71
39.11	353.36	65.85	344.45	67.55	344.45	68.87	344.45	69.2	344.45
69.85	344.45	70.87	344.45	73.2	344.45	73.85	344.45	106.38	355.29
109.78	356.42	113.61	357.42	124.06	357.51	125.4	357.52	125.63	357.52
127.41	357.53	127.48	357.53	128.22	357.54	128.26	357.54	131.46	357.57
137.49	357.62	137.59	357.62	137.69	357.62	137.79	357.63		

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	28.25	.026	113.61	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28.25	113.61		199.32	197.75		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 25

INPUT

Description:

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.07	.1	356.07	.2	356.07	.3	356.07	.4	356.07
6.44	356.11	7.65	356.26	12.2	356.02	14.62	355.88	17.37	356.09
19.26	356.23	19.33	356.22	19.49	356.22	19.83	356.23	19.89	356.23
19.92	356.23	29.96	356.27	30.45	356.34	30.98	356.34	39.1	353.63
50.73	349.76	62.43	345.86	68.48	343.84	68.5	343.84	70.89	343.84
71.82	343.84	72.48	343.84	75.82	343.84	76.22	343.84	76.47	343.84
76.48	343.84	76.48	343.85	78.89	344.65	80.48	345.18	82.89	345.98
97.36	350.8	117.25	357.15	117.99	357.16	131.73	357.18	132.95	357.18
134.55	357.18	136.65	357.19	136.89	357.24	148.33	357.35	154.58	357.4
154.68	357.4	154.78	357.4	154.88	357.4	154.98	357.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	29.96	.026	117.25	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	29.96	117.25		168.67	167.76		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 24

INPUT

Description:

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.69	.1	355.68	.2	355.68	.3	355.67	.4	355.66
17.62	354.35	20.44	354.26	21.92	354.2	29.81	353.6	32.27	353.48
32.5	353.47	32.58	353.47	34.24	353.39	34.82	353.36	34.91	353.35
35.3	353.33	35.35	353.33	46.42	351.02	55.11	348.12	57.1	347.46
69.49	343.33	72.47	343.33	73.49	343.33	75.37	343.33	75.84	343.33
76.47	343.33	76.6	343.33	77.49	343.33	98.04	350.18	99.38	350.63
115.02	355.84	115.95	355.86	117.3	355.88	117.33	355.88	117.35	355.88
117.8	355.89	117.9	355.89	118.15	355.9	119.38	355.92	119.5	355.92
119.79	355.92	134.96	355.97	147.98	356.06	153.02	356.09	155.72	356.12
168.13	356.2	168.23	356.2	168.33	356.2	168.43	356.2	168.53	356.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	46.42	.026	115.95	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	46.42	115.95		213	204.72		.1	.3

CROSS SECTION



RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 23

INPUT

Description:

Station Elevation Data num= 31									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	353.18	.2	353.17	.3	353.17	10.35	352.81	20.4	352.6
21.84	352.57	35.34	352.57	35.51	351.78	36.46	351.72	39.1	350.84
41.04	350.2	63.51	342.71	64.17	342.71	64.65	342.71	67.51	342.71
68.17	342.71	71.51	342.71	77.72	344.77	93.65	350.08	110.52	355.36
139.97	356.28	140.83	356.31	142.1	356.35	146.16	356.47	149.22	356.55
149.64	356.55	161	356.68	163.26	356.7	163.46	356.71	163.56	356.71
163.66	356.71								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	35.34	.026	110.52	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	35.34	110.52		180.58	180.39		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 22

INPUT

Description:

Station Elevation Data num= 63									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.96	.1	350.95	.23	350.93	.36	350.92	.49	350.9
.62	350.88	5.79	350.21	16	348.87	17.13	348.77	17.5	348.77
27.1	348.87	29.64	348.89	30	348.9	42.95	348.9	49.18	350.28
69.03	348.82	70.87	348.2	76.44	346.35	78.51	345.65	82.53	344.32
83.38	344.03	83.5	343.99	83.6	343.96	83.71	343.92	83.72	343.92
84.24	343.74	87.74	342.58	88.18	342.43	88.59	342.3	88.92	342.19
88.93	342.18	89	342.16	91.82	342.16	92.74	342.16	93	342.16
96.02	342.16	96.75	342.16	97	342.16	99.2	342.89	99.63	343.03
101.49	343.65	109.04	346.17	134.96	354.3	144.59	354.34	145.9	354.57
152.92	354.69	153.21	354.7	154.55	354.72	159.41	354.81	170.8	354.91
174.46	354.94	175.81	354.9	181.12	355.03	187.47	355.18	190.4	355.25
190.41	355.25	192.15	355.29	204.68	355.64	207.3	355.74	207.34	355.74
207.43	355.74	207.56	355.75	207.69	355.75				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	69.03	.026	134.96	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	69.03	134.96		144.57	143.8		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 21

INPUT

Description:

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.17	.3	354.16	7.02	353.86	20.51	352.93	24.12	352.68
33.9	351.56	39.17	350.99	40.46	350.85	60.61	344.14	63.98	343.01
67.85	341.72	68.51	341.72	69.67	341.72	71.49	341.72	71.85	341.72
72.51	341.72	75.85	341.72	77.99	342.43	80.12	343.14	92.79	347.37
96.43	348.58	97.65	348.65	98.83	348.68	107.67	348.85	128.95	349.84
137.51	350.49	137.67	350.5	157.86	352	157.96	352	158.06	352.01
158.16	352.02	158.26	352.03						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.17	.026	97.65	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	39.17	97.65		137.33	145.29	153.36	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 20

INPUT

Description:

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	353.65	.1	353.65	4.38	353.69	25.67	352.33	26.57	352.27
55.16	348.84	58.97	348.37	59.62	348.35	66.26	346.46	71.33	344.77
72.43	344.4	81.82	341.28	82.97	341.28	83.5	341.28	83.77	341.28
84.47	341.28	85.82	341.28	87.75	341.28	88.69	341.28	89.82	341.28
99.36	344.46	100.61	344.87	115.53	349.25	125.94	350.92	128.64	351.29
130.66	351.57	135.33	352.21	137.65	352.53	155.46	353.41	155.56	353.41
155.66	353.42	155.76	353.42						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	59.62	.026	115.53	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.62	115.53		164.3	152.27	149.67	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 19

INPUT

Description:

Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	353.01	.1	353.01	.23	353	.35	353	.48	352.99
.6	352.99	11.02	352.62	11.54	352.61	21.55	352.25	23.12	352.2
26.34	352.5	29	352.75	29.42	352.78	37.42	352.69	46.95	352.3
57.69	351.86	68.89	351.45	75.2	351.21	90.18	349.11	90.34	349.08
105.37	347.05	106.77	346.58	110.31	345.4	114.64	343.96	124.08	340.81
127.12	340.81	128.08	340.81	130.38	340.81	130.39	340.81	131.12	340.81
132.08	340.81	134.18	341.51	135.39	341.91	136.74	342.36	140.4	343.58
142.93	344.42	146.66	345.67	147.8	345.71	148.95	345.75	149.83	345.77
153.09	345.84	153.87	345.91	159.72	346.45	161.36	346.6	161.47	346.61
162.46	346.69	163.14	346.74	163.15	346.75	164.99	346.9	166.54	347.02
168.65	347.19	176.32	348	177.01	348.07	177.02	348.07	185.99	349.01
201.95	350.68	202.07	350.69	202.2	350.71	202.32	350.72	202.45	350.73
202.55	350.74								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	105.37	.026	159.72	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

105.37	159.72	125.2	136.45	142.49	.1	.3
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CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 18

INPUT

Description:

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.7	.1	351.69	.2	351.69	.3	351.69	.4	351.68
.5	351.68	15.09	351.12	20.9	350.86	31.99	350.35	58.74	347.2
58.95	347.19	80.77	345.24	80.81	345.23	82.57	344.65	84.04	344.16
91.31	341.75	94.53	340.68	95.38	340.4	95.39	340.4	97.23	340.4
98.25	340.4	99.4	340.4	100.48	340.4	102.28	340.4	102.33	340.4
103.04	340.4	103.42	340.4	104.48	340.75	107.88	341.88	108.48	342.08
110.5	342.75	113.74	343.51	143.42	345.96	163.67	348.99	163.77	349
163.87	349.02	163.97	349.03	164.58	349.12	165.55	349.27	165.91	349.29
196.08	351.14	210.86	351.56	225.61	351.93	225.71	351.94		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	80.77	.026	113.74	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

80.77	113.74	98.1	92.44	88.69	.1	.3
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CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 17

INPUT

Description:

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.82	.1	351.82	.22	351.82	.34	351.82	3.38	351.8
4.99	351.8	6.33	351.37	9.79	350.73	14.66	350.23	26.11	349.48
28.92	349.3	31.43	349.14	49.02	347.29	82	344.58	83.6	343.68
89.14	343.36	89.67	343.33	90.27	343.13	97.1	340.85	97.48	340.73
98.35	340.43	99.31	340.12	102.21	340.12	103.31	340.12	104.82	340.12
106.98	340.12	107.17	340.12	107.31	340.12	107.38	340.14	107.57	340.2
110.13	341.06	113.81	342.28	114.37	342.47	125.59	342.84	137.4	344.61
138.33	344.75	146.97	346.04	147.45	346.11	158.22	347.51	180.48	348.6
190.56	349.09	211.07	349.93	214	350.06	214.13	350.06	214.23	350.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	89.67	.026	114.37	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	89.67	114.37		107.38	99.59	92.13	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 16

INPUT

Description:

Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.42	.1	351.41	.2	351.4	.3	351.39	4.78	350.95
9.29	350.58	9.49	350.56	16.47	349.98	16.68	349.97	29.75	348.6
41.79	347.35	53.08	346.17	55.33	345.93	62.95	345.25	64.84	345.12
64.98	345.11	65.02	345.11	65.1	345.1	65.27	345.09	69.16	344.82
70.13	344.75	71.19	344.68	77.24	344.26	79.29	344.11	85.84	343.65
88.49	343.47	91.09	343.28	99.73	343	99.96	342.66	100.3	342.55
101.87	342.03	101.87	342.02	101.9	342	101.92	341.99	101.97	341.98
101.98	341.98	102.7	341.74	103.31	341.53	103.63	341.43	104.92	341
104.97	340.99	105.09	340.95	106.38	340.52	107.94	340	107.96	340
108.51	339.81	111.11	339.81	112.51	339.81	114.41	339.81	116.51	339.81
116.52	339.81	116.86	339.93	117.08	340	118.38	340.43	119.63	340.85
120.07	341	120.1	341.01	121.95	341.62	122.84	341.92	123.09	342
123.53	342.15	128.55	342.53	130.79	342.71	131.6	342.77	132.2	342.82
141.36	343.23	146.76	343.48	147.03	343.49	147.29	343.51	147.51	343.52
147.8	343.53	147.86	343.53	147.93	343.54	148.24	343.55	148.62	343.57
148.98	343.58	152.6	343.75	156.17	344.04	184.47	346.34	186.43	346.51

186.8	346.53	187.71	346.6	223.7	348.96	226.7	349.16	227.17	349.19
228.97	349.28	239.25	349.84	239.94	349.88	257.57	351.05	269.3	351.62
278.67	351.98	278.77	351.99	278.87	351.99				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.73	.026	123.53	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	99.73	123.53		32.36	29.69		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 15

INPUT

Description:

Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.88	.1	350.88	.2	350.88	.3	350.87	.4	350.87
.6	350.87	9.42	350.59	9.47	350.59	19.4	349.62	19.65	349.6
19.83	349.58	20.54	349.53	20.6	349.52	20.85	349.5	21.62	349.43
28.03	348.86	28.75	348.8	28.76	348.79	29.84	348.7	29.85	348.7
34.12	348.32	44.62	347.38	71.47	344.99	71.57	344.98	74.89	344.75
75.23	344.73	76.83	344.62	77.4	344.58	79.51	344.43	96.08	342
96.61	341.91	97.78	341.72	98.02	341.68	99.66	341.4	101.11	341.16
102.08	341	102.28	340.97	102.54	340.92	103.99	340.68	104.11	340.66
107.06	340.17	107.67	340.07	108.08	340	108.2	339.98	108.51	339.93
108.56	339.92	109.75	339.72	109.77	339.72	109.86	339.72	110.62	339.72
111.7	339.72	112.82	339.72	115.86	339.72	119.36	339.72	119.75	339.72
119.78	339.72	120.59	339.72	120.85	339.72	121.4	339.72	122.57	339.72
123.06	339.72	124.19	339.72	129.75	339.72	129.76	339.72	129.85	339.74
130.99	339.93	131.43	340	132.31	340.15	132.63	340.2	132.99	340.26
133.87	340.41	135.22	340.63	135.27	340.64	135.49	340.68	136.78	340.89
137.02	340.93	137.2	340.96	137.31	340.98	143.43	342	145.83	342.4
146.67	342.54	149.55	343.02	150.61	343.07	152.88	343.18	161.81	343.6
162.14	343.62	168.66	344.17	168.67	344.17	172.68	344.5	172.83	344.51
172.9	344.52	175.06	344.7	176.12	344.79	182.14	345.19	182.2	345.19
197.27	346.2	198.13	346.27	209.79	347.15	222.8	348.13	225.94	348.35
231.3	348.71	232.06	348.76	236.93	349.1	237.34	349.12	242.67	349.42
243.84	349.5	248.47	349.81	269.17	351.22	284.24	351.96		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	79.51	.026	143.43	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	79.51	143.43		29.84	29.08		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 14

INPUT

Description:

Station Elevation Data num= 142

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.48	.1	350.48	.2	350.47	.3	350.47	.4	350.47
3.87	350.36	7.47	350.25	7.57	350.24	16.29	349.97	16.44	349.97
18.18	349.8	18.38	349.78	33.82	348.5	33.92	348.49	42.82	347.75
42.92	347.74	46.62	347.44	53.51	346.86	53.61	346.86	54.96	346.74
56.33	346.63	70.54	345.37	70.66	345.36	75.48	344.93	75.5	344.92
90.24	343.66	91.51	343.55	94.77	343.27	94.78	343.27	95.5	343.21
95.51	343.21	104.3	342.45	105.07	342.39	106.59	342.26	106.68	342.25
106.69	342.25	108.05	342.13	108.44	342.1	109.18	342.04	110.32	341.94
110.44	341.93	110.71	341.91	110.89	341.89	111.66	341.84	115.11	341.74
116.12	341.71	116.18	341.71	116.25	341.71	117.07	341.31	117.69	341
117.99	340.85	118.45	340.63	119.63	340.05	119.68	340.03	119.73	340
119.78	339.98	119.79	339.97	119.89	339.92	120.12	339.81	120.26	339.74
120.48	339.63	122.47	339.63	122.48	339.63	124.07	339.63	124.17	339.63
125.03	339.63	126.48	339.63	130.47	339.63	130.49	339.63	131.93	339.63
132.42	339.63	132.48	339.63	133.13	340	134.1	340.19	134.89	340.35
134.9	340.36	135.34	340.44	135.35	340.45	138.07	341	138.1	341
140.31	341.1	144.68	341.43	144.71	341.43	144.78	341.44	144.81	341.44
146.03	341.53	146.14	341.54	146.24	341.55	147.61	341.65	157.75	342.39
157.85	342.39	158.75	342.46	158.85	342.46	159.64	342.52	159.77	342.53
159.83	342.54	159.84	342.54	161.67	342.67	161.75	342.68	169.43	343.23
169.5	343.24	169.55	343.24	169.76	343.26	169.78	343.26	169.91	343.27
170.86	343.33	170.91	343.33	171.01	343.34	171.23	343.35	189.3	344.54
190.19	344.6	191.91	344.71	192.01	344.72	192.3	344.74	194.78	344.91
196.76	345.04	196.85	345.04	207.08	345.73	207.36	345.75	210.78	346.01
210.79	346.01	211.51	346.06	211.67	346.07	211.77	346.08	215.77	346.38
215.87	346.39	221.7	346.83	223.17	346.95	248.2	348.89	248.57	348.92
249.52	348.99	258.89	349.71	258.99	349.72	268.28	350.43	277.21	351.11
285.37	351.67	312.52	353	319.79	353.28	328.96	353.59	335.32	353.77
335.42	353.77	335.52	353.78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.25	.026	138.07	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	116.25	138.07		58.57	59.23		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 13

INPUT

Description:

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
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0	350.21	.1	350.21	.2	350.2	.3	350.2	.4	350.2
.5	350.19	16.32	349.67	22.8	349.42	24.65	349.53	24.75	349.54
30.51	349.34	68.32	347.05	83.88	346.03	88.43	345.61	92	345.28
95.96	344.91	99.35	344.6	99.74	344.56	101.15	344.44	109.19	343.79
109.36	343.77	113.82	343.41	117.65	343.09	122.5	342.7	122.89	342.66
130.43	341.9	131.49	341.79	132.3	341.71	132.92	341.64	133.57	341.58
133.86	341.55	134.35	341.5	135.01	341.43	135.07	341.43	135.13	341.42
136.06	341.36	136.08	341.36	136.35	341.33	136.61	341.3	137.42	341.03
138.83	340.56	142.16	339.45	143.21	339.45	144.07	339.45	145.11	339.45
146.16	339.45	147.67	339.45	148.39	339.45	149.09	339.45	150.16	339.45
150.46	339.55	150.77	339.66	152.03	340.07	152.96	340.39	154.47	340.3
172.27	340.48	212.09	341.08	223.71	342.75	223.76	342.75	230.87	343.62
244.29	345.25	259.72	347.35	265.35	347.51	296.93	348.44	306	348.71
309.63	349.15	313.96	349.6	316.8	349.89	323.34	350.11	323.44	350.11
323.54	350.11	335.96	350.52	341.39	350	366.97	352.6	370.2	353.51
370.3	353.53								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	136.61	.026	152.03	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	136.61	152.03		71.67	74.84		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 12

INPUT

Description:

Station Elevation Data		num= 98							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.81	.1	350.8	.2	350.79	.46	350.78	.8	350.76
3.1	350.61	3.51	350.59	4.75	350.52	4.82	350.51	5.52	350.46
5.97	350.42	6.89	350.36	7.38	350.2	24.87	349.55	24.91	349.55
25.03	349.54	26	349.51	26.64	349.48	27.72	349.43	27.84	349.42
28.18	349.41	29.23	349.36	30.89	349.28	31.85	349.24	32.75	349.18
49.54	348.12	70.05	346.84	88.59	345.61	116.84	343.75	121.65	343.49
126.25	343.18	137.11	342.31	161.42	340.32	162.29	340.03	164.72	339.22
167.79	339.22	168.72	339.22	171.79	339.22	172.72	339.22	174.06	339.67
174.74	339.9	183.16	340.28	183.18	340.28	191.77	340.68	193.95	340.78
207.1	344	207.12	344.02	207.33	344.13	207.47	344.2	207.49	344.21
207.51	344.22	207.55	344.24	207.59	344.26	207.71	344.32	207.76	344.35
208.21	344.58	208.74	344.86	208.87	344.93	209.79	345.41	211.06	346.07
211.09	346.08	211.9	346.5	213.26	347.21	216.74	349.02	218.09	349.54
218.1	349.55	218.17	349.57	218.22	349.59	218.44	349.68	220.99	350.67
222.04	351.08	225.17	352.29	226.14	352.67	226.4	352.77	226.52	352.82
227.1	353.04	227.26	353.1	227.29	353.11	227.43	353.17	227.44	353.18
227.5	353.2	227.64	353.25	227.65	353.26	228.63	353.27	232.61	355.18
267.49	348.54	267.56	348.53	285.97	350.87	287.63	350.8	287.64	350.8
287.78	350.79	289.83	350.77	295.43	351.12	295.6	351.13	295.73	351.14
295.86	351.15	295.96	351.15	296.06	351.16				

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 161.42 .026 174.74 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 161.42 174.74 105.29 105.72 114.8 .1 .3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 11

INPUT

Description:

Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.39	.1	350.39	.3	350.37	.4	350.37	5.69	350.01
5.9	350	6.15	349.99	7.06	349.97	7.14	349.97	7.33	349.95
8.47	349.88	8.48	349.88	13.84	349.51	13.85	349.51	13.98	349.51
17.76	349.61	20.24	349.58	20.49	349.57	21.46	349.52	22.84	349.44
23.02	349.42	40.52	347.76	49.72	346.89	57.39	346.23	59.52	346.08
106.51	342.68	106.52	342.68	108.44	342.54	109.72	342.46	110.78	342.4
110.79	342.4	111.85	342.33	117.47	341.97	119.99	341.81	121.76	341.69
124.28	341.53	128.15	341.28	132.57	341	134.77	340.85	146.88	340.07
151.8	339.75	153.05	339.67	155.32	339.52	156.03	339.48	156.04	339.48
160.95	339.16	164.24	338.95	164.54	338.93	165.37	338.88	165.64	338.86
166.2	338.86	166.62	338.86	166.7	338.86	166.75	338.88	166.83	338.88
168.66	338.88	168.67	338.88	169.22	338.88	169.44	338.88	169.71	338.88
169.74	338.88	169.89	338.88	173.87	338.88	174.03	338.88	174.04	338.88
174.76	338.88	174.79	338.88	177.64	338.88	180.91	338.88	180.92	338.88
182.23	338.88	182.77	338.88	182.81	338.87	182.82	338.87	185.01	338.92
185.57	338.94	185.58	338.94	185.9	338.95	187.28	339.13	187.88	339.21
188.38	339.27	188.72	339.32	192.77	339.84	192.86	339.85	192.88	339.86
192.91	339.86	197.66	340.45	241.86	345.9	254.65	346.98	254.84	347
278.67	349.29	281.75	349.58	284.81	349.87	290.1	350.26	290.46	350.29
296.08	351.08	296.86	351.12	298.14	351.19	298.26	350.93	298.87	350.95
299.63	350.98	299.64	350.98	299.72	350.98	299.82	350.98	299.91	350.99
300.01	350.99	300.11	350.99						

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 164.54 .026 187.28 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 164.54 187.28 96.08 103.13 116.02 .1 .3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 10



INPUT

Description:

Station Elevation Data		num= 162							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.13	.1	352.13	2.67	351.97	5.38	351.69	7.59	351.49
10.36	351.27	12.62	351.11	14.24	350.88	15.48	350.72	16.49	350.58
20.63	349.21	24.56	349.64	26.36	349.84	29.92	349.79	30.02	349.79
30.13	349.79	30.24	349.79	30.36	349.79	49.08	349.54	49.27	349.53
52.29	349.37	52.3	349.37	52.49	349.36	52.81	349.34	64.95	348.49
85.98	346.89	85.99	346.88	88.41	346.7	123.91	344.42	123.92	344.42
131.35	343.68	131.36	343.68	163.24	339.66	163.25	339.66	170.46	338.75
171.83	338.57	179.43	338.52	180.7	338.14	180.71	338.14	181.09	338
181.12	338	182.86	338	183.06	338	185.4	338	185.6	338
189.44	338	189.45	338	189.54	338	190.84	337.99	191.14	337.98
193.73	337.97	194.44	337.97	194.5	337.97	194.97	337.97	195.03	337.97
195.29	337.98	195.43	337.98	196.37	337.98	196.38	337.98	196.42	337.98
196.82	337.99	196.91	337.99	196.92	337.99	196.98	337.99	197.26	337.99
197.27	337.99	197.28	337.99	197.45	337.99	197.49	337.99	198.18	338
198.19	338	198.5	338	200.73	338	202.3	338	204.58	338
206.28	338	206.46	338	206.49	338	206.91	338.15	213.51	338.38
214.83	338.42	216.15	338.47	218.61	338.55	223.38	338.58	227.57	338.61
228.92	338.62	228.93	338.62	228.94	338.62	229.92	338.63	231.24	338.64
231.98	338.65	232.23	338.66	232.28	338.66	232.36	338.66	232.42	338.66
232.58	338.67	232.83	338.67	232.87	338.68	234.99	338.74	235.15	338.75
235.49	338.76	235.5	338.76	235.9	338.77	236.22	338.78	236.23	338.78
236.44	338.81	239.47	339.23	242.08	339.58	244.07	339.86	245.65	340.07
246.66	340.21	246.92	340.24	247.98	340.35	248.86	340.45	249.62	340.53
250.27	340.6	261.34	341.8	269.78	342.71	276.6	342.92	290.86	343.38
296.48	343.55	297.71	343.59	300.65	343.69	307	343.89	310.93	344.05
323.09	344.3	335.56	344.71	335.57	344.71	348.8	345.14	355.09	345.34
355.1	345.34	368.7	345.79	374.37	346.07	374.38	346.07	396.87	347.31
405.65	348.81	407.73	349.17	409.99	349.35	411.29	349.45	412.2	349.52
415.69	349.8	430.74	350.97	430.75	350.97	431.33	350.89	432.36	350.95
434.59	351.12	434.6	351.12	435.89	351.28	436.75	351.35	439.57	351.74
440.92	352	440.93	352	444.7	352.44	446.01	352.55	446.98	352.63
447.37	352.67	447.83	352.73	453.13	353.3	459.2	353.88	459.48	353.92
459.58	353.94	459.68	353.95						

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.035	179.43	.026	206.91	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	179.43	206.91		101.74	100.81		.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 9

INPUT

Description:

Station Elevation Data		num= 122	
------------------------	--	----------	--

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.14	.1	350.14	.2	350.14	.3	350.14	.4	350.14
.95	350.13	2.74	350.08	2.75	350.08	3.22	350.07	6.93	350.03
7.04	350.03	7.49	350.02	7.77	350.02	8.06	350	10.51	349.05
10.87	348.72	11.77	348.82	11.81	348.82	21.97	349.94	22.22	349.94
22.3	349.94	22.37	349.94	23.19	349.93	25.12	349.92	25.58	349.86
26.04	349.7	26.47	349.84	45.14	348.6	52.06	348.14	52.94	348.08
58.25	347.73	60.21	347.6	60.26	347.52	60.84	347.51	65.06	347.42
66.38	347.28	66.51	347.26	68.97	347.01	83.69	345.91	86.66	345.68
90.76	345.38	94.2	345.12	95.93	344.99	96.54	344.94	97.22	344.89
97.23	344.89	97.72	344.85	98.96	344.76	101.58	344.56	101.86	344.54
102.67	344.48	103.43	344.42	103.77	344.4	107.25	344.14	107.26	344.14
108	344.08	109.33	343.99	110.46	343.91	111	343.88	112.92	343.75
113.21	343.73	114.34	343.65	116.3	343.46	118.57	343.24	118.58	343.23
118.71	343.22	120.44	343.05	124.54	342.47	124.68	342.45	126.71	342.16
128.71	341.88	130.09	341.69	132.48	341.35	133.21	341.25	133.21	341.24
135.43	340.93	135.5	340.92	136.82	340.73	140.15	340.26	142.38	339.95
144.43	339.66	144.9	339.59	145.17	339.55	146.24	339.4	147.52	339.22
155.97	338.03	158.22	337.71	159.92	337.47	162.71	337.4	162.72	337.07
162.74	337.07	163.58	337.07	227.42	337.07	227.43	337.4	232.84	337.59
233.09	337.63	233.84	337.73	234.05	337.77	234.95	337.89	236.18	338.06
237.57	338.26	240.96	338.74	263.76	341.95	291.64	344.43	294.99	344.73
302.21	345.48	303.51	345.62	305.51	345.83	306.09	345.89	307.95	346.01
340.28	348.22	345.12	348.7	346.09	348.79	346.1	348.79	352.94	349.47
352.95	349.47	352.98	349.48	366.76	350.71	366.86	350.72	366.97	350.73
367.07	350.74	367.17	350.74						

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 162.74 .011 227.43 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 162.74 227.43 40.29 34.96 40.34 .1 .3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 8

INPUT

Description:

Station	Elevation	Data	num=	225					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.7	.1	349.7	.3	349.69	7.05	349.37	11.54	349.16
14.77	349.01	23.35	348.58	23.36	348.58	24.03	348.54	24.32	348.62
24.37	348.62	24.94	348.63	25.2	348.61	31.33	348.1	32.24	348.16
32.93	348.2	33.87	348.27	37.15	348.21	38.46	348.19	41.63	348.14
43.12	348.13	49.87	348.08	50.8	348.07	52.95	347.8	55.38	347.88
55.6	347.89	60.59	348.07	62.93	348.16	63.54	348.18	69.09	348.19
77.1	348.21	83.77	348.22	85.17	348.17	89.78	348.11	90.56	348.1
91.2	348.09	91.48	348.1	92.56	348.1	93.68	348.1	93.84	348.1
95.38	348.1	96.44	348.11	97.29	348.11	98.54	348.11	99.7	348.12
101.67	348.13	106.89	347.99	107.09	347.98	108.61	347.94	115.42	347.91

116.89	347.91	118.68	347.9	122.7	347.89	122.73	347.89	124.38	347.83
126.31	347.77	127.24	347.73	129.58	347.77	130.99	347.79	131.73	347.75
132.06	347.73	132.28	347.72	132.52	347.7	135.58	347.45	137.05	347.32
137.2	347.31	139.36	347.36	140.19	347.38	142.2	347.42	142.71	347.43
143.39	347.45	144.62	347.47	146.66	347.52	146.76	347.52	146.86	347.52
146.92	347.52	147.08	347.53	147.1	347.53	147.33	347.53	150.1	347.59
150.93	347.61	151.28	347.62	152.8	347.65	153.1	347.66	155.24	347.71
155.74	347.72	157.08	347.75	158.67	347.78	159.08	347.79	159.21	347.79
162.07	347.85	162.46	347.86	162.61	347.87	165.06	347.92	165.7	347.93
167.17	347.97	168.05	347.98	168.77	348	170.14	348.03	171.04	348.05
171.17	348.05	171.85	348.07	173.97	348.11	174.94	348.13	175.18	348.14
177.01	348.18	177.74	348.2	177.81	348.2	179.21	348.25	179.99	348.28
180.03	348.28	180.23	348.33	181.14	348.35	181.64	348.36	182.15	348.37
183.26	348.38	184.25	348.4	185.47	348.41	185.94	348.42	187.33	348.44
187.37	348.44	188.91	348.46	189.3	348.47	189.39	348.47	190	348.63
190.49	348.63	191.42	348.63	191.87	348.63	193.12	348.64	193.64	348.64
196.93	348.65	197.8	348.66	199.45	348.67	199.72	348.79	200.24	349.02
200.24	348.88	201.08	336.36	225.43	336.36	225.44	336.36	226.27	348.82
226.27	349.02	227.13	348.91	227.28	348.69	227.32	348.69	227.52	348.69
227.59	348.69	228.06	348.68	229.7	348.67	230.61	348.67	231.15	348.66
232.52	348.65	233.14	348.65	234.29	348.61	234.51	348.61	235.32	348.58
237.42	348.52	237.78	348.51	237.91	348.51	239.96	348.44	240.82	348.42
240.95	348.41	243.49	348.34	243.98	348.32	244.98	348.29	245.19	348.29
245.94	348.11	246.18	348.05	246.98	347.87	248.11	347.6	248.62	347.55
248.89	347.52	251.61	347.23	252.35	347.16	252.95	347.09	254.38	346.94
255.9	346.78	256.14	346.76	257.07	346.66	257.23	346.64	258.62	346.61
258.85	346.61	259.81	346.59	259.98	346.58	261.17	346.56	261.78	346.56
262.87	346.57	263.87	346.57	264.65	346.57	264.7	346.56	265.83	346.42
266.27	346.36	267.12	346.26	267.43	346.22	267.81	346.17	268.35	346.1
268.47	346.08	268.8	346.04	269.76	345.92	269.9	345.91	271.11	345.8
271.42	345.77	282.69	344.74	284.5	344.57	284.72	344.56	286.54	344.39
288.67	344.59	291.54	344.78	291.81	344.8	294.92	345.01	310.58	346.35
311.25	346.41	323.26	347.52	324.77	347.5	328.06	347.45	334.93	347.35
337.15	347.52	343.14	347.97	343.47	348	357.97	349.08	364.82	349.57
367.18	350.07	369.28	350.26	369.38	350.27	369.48	350.28	369.58	350.29

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .011 200.24 .011 226.27 .011

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 200.24 226.27 26 26 26 .1 .3

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 207.08 209.25 346.36 T  
 217.25 219.42 346.36 F

CULVERT

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 7.5

INPUT

Description:

Distance from Upstream XS = 1  
 Deck/Roadway Width = 14  
 Weir Coefficient = 2.6  
 Upstream Deck/Roadway Coordinates

num= 6		Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord							
0	349.6	346.36	54.27	348	346.36	100.01	350	346.36	256.77	350	346.36	291.52	349.1	346.36	369.58	350.4	346.36

Upstream Bridge Cross Section Data

Station Elevation Data		num= 225																	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
0	349.7	.1	349.7	.3	349.69	7.05	349.37	11.54	349.16	14.77	349.01	23.35	348.58	23.36	348.58	24.03	348.54	24.32	348.62
24.37	348.62	24.94	348.63	25.2	348.61	31.33	348.1	32.24	348.16	32.93	348.2	33.87	348.27	37.15	348.21	38.46	348.19	41.63	348.14
43.12	348.13	49.87	348.08	50.8	348.07	52.95	347.8	55.38	347.88	55.6	347.89	60.59	348.07	62.93	348.16	63.54	348.18	69.09	348.19
77.1	348.21	83.77	348.22	85.17	348.17	89.78	348.11	90.56	348.1	91.2	348.09	91.48	348.1	92.56	348.1	93.68	348.1	93.84	348.1
95.38	348.1	96.44	348.11	97.29	348.11	98.54	348.11	99.7	348.12	101.67	348.13	106.89	347.99	107.09	347.98	108.61	347.94	115.42	347.91
116.89	347.91	118.68	347.9	122.7	347.89	122.73	347.89	124.38	347.83	126.31	347.77	127.24	347.73	129.58	347.77	130.99	347.79	131.73	347.75
132.06	347.73	132.28	347.72	132.52	347.7	135.58	347.45	137.05	347.32	137.2	347.31	139.36	347.36	140.19	347.38	142.2	347.42	142.71	347.43
143.39	347.45	144.62	347.47	146.66	347.52	146.76	347.52	146.86	347.52	146.92	347.52	147.08	347.53	147.1	347.53	147.33	347.53	150.1	347.59
150.93	347.61	151.28	347.62	152.8	347.65	153.1	347.66	155.24	347.71	155.74	347.72	157.08	347.75	158.67	347.78	159.08	347.79	159.21	347.79
162.07	347.85	162.46	347.86	162.61	347.87	165.06	347.92	165.7	347.93	167.17	347.97	168.05	347.98	168.77	348	170.14	348.03	171.04	348.05
171.17	348.05	171.85	348.07	173.97	348.11	174.94	348.13	175.18	348.14	177.01	348.18	177.74	348.2	177.81	348.2	179.21	348.25	179.99	348.28
180.03	348.28	180.23	348.33	181.14	348.35	181.64	348.36	182.15	348.37	183.26	348.38	184.25	348.4	185.47	348.41	185.94	348.42	187.33	348.44
187.37	348.44	188.91	348.46	189.3	348.47	189.39	348.47	190	348.63	190.49	348.63	191.42	348.63	191.87	348.63	193.12	348.64	193.64	348.64
196.93	348.65	197.8	348.66	199.45	348.67	199.72	348.79	200.24	349.02	200.24	348.88	201.08	336.36	225.43	336.36	225.44	336.36	226.27	348.82
226.27	349.02	227.13	348.91	227.28	348.69	227.32	348.69	227.52	348.69	227.59	348.69	228.06	348.68	229.7	348.67	230.61	348.67	231.15	348.66
232.52	348.65	233.14	348.65	234.29	348.61	234.51	348.61	235.32	348.58	237.42	348.52	237.78	348.51	237.91	348.51	239.96	348.44	240.82	348.42
240.95	348.41	243.49	348.34	243.98	348.32	244.98	348.29	245.19	348.29	245.94	348.11	246.18	348.05	246.98	347.87	248.11	347.6	248.62	347.55
248.89	347.52	251.61	347.23	252.35	347.16	252.95	347.09	254.38	346.94	255.9	346.78	256.14	346.76	257.07	346.66	257.23	346.64	258.62	346.61
258.85	346.61	259.81	346.59	259.98	346.58	261.17	346.56	261.78	346.56	262.87	346.57	263.87	346.57	264.65	346.57	264.7	346.56	265.83	346.42
266.27	346.36	267.12	346.26	267.43	346.22	267.81	346.17	268.35	346.1	268.47	346.08	268.8	346.04	269.76	345.92	269.9	345.91	271.11	345.8
271.42	345.77	282.69	344.74	284.5	344.57	284.72	344.56	286.54	344.39										

288.67	344.59	291.54	344.78	291.81	344.8	294.92	345.01	310.58	346.35
311.25	346.41	323.26	347.52	324.77	347.5	328.06	347.45	334.93	347.35
337.15	347.52	343.14	347.97	343.47	348	357.97	349.08	364.82	349.57
367.18	350.07	369.28	350.26	369.38	350.27	369.48	350.28	369.58	350.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.011	200.24	.011	226.27	.011

Bank Sta: Left Right Coeff Contr. Expan.

200.24	226.27	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
207.08	209.25	346.36	T
217.25	219.42	346.36	F

Downstream Deck/Roadway Coordinates

num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	348.9	345.84	50	348	345.84	103.29	350	345.84
253.18	350	345.84	354.33	349.4	345.84	387	349.1	345.84

Downstream Bridge Cross Section Data

Station Elevation Data num= 286

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.24	.1	349.24	.19	349.23	.56	349.21	2.35	349.11
11.22	348.67	13.87	348.53	16.49	348.4	18.01	348.8	21.34	348.87
32.44	347.94	33.12	348.44	40.54	348.23	51.49	347.93	52.51	347.9
55.48	347.86	56.27	347.84	66.99	347.69	75.71	347.56	76.42	347.54
78.31	347.52	80.2	347.75	81.81	347.96	81.82	347.96	82.76	348.07
89.1	348.73	90.32	348.85	93.71	349.06	94.7	349.12	96.05	349.14
98.87	349.18	100.74	349.2	100.98	349.2	102.62	349.23	112.41	349.24
118.17	349.25	123.88	349.27	125.19	349.26	127.45	349.24	130.23	349.22
131.61	349.22	132.43	349.21	133.02	349.21	133.91	349.2	136.43	349.18
137.54	349.18	137.63	349.18	137.75	349.17	139.74	349.16	141.4	349.15
141.68	349.15	141.89	349.15	143.28	349.14	144.77	349.13	144.9	349.13
145.07	349.13	146.16	349.12	146.17	349.12	146.63	349.12	147.7	349.11
147.71	349.11	148.32	349.11	148.61	349.1	149.56	349.1	149.93	349.1
150.05	349.09	151.05	349.09	151.41	349.09	151.96	349.08	153.55	349.07
153.65	349.07	153.72	349.07	154.33	349.07	154.75	349.06	155.27	349.06
155.61	349.06	155.62	349.06	156.43	349.05	158.3	349.04	158.86	349.04
159	349.04	161.38	349.01	161.54	349.01	162.05	349	163.67	348.96
164.05	348.96	164.76	348.94	165.15	348.94	165.49	348.93	166.34	348.91
167.91	348.88	168.15	348.88	168.84	348.86	168.85	348.86	168.99	348.86
169.01	348.86	171.14	348.82	171.34	348.81	171.57	348.81	171.77	348.81
174.12	348.76	174.3	348.76	174.53	348.75	174.59	348.75	175.01	348.74
176.01	348.72	176.02	348.72	176.09	348.72	176.12	348.72	176.14	348.72
176.15	348.72	176.37	348.71	176.38	348.71	176.67	348.71	178.02	348.68
178.49	348.68	178.69	348.67	179.73	348.66	183.19	348.61	184.8	348.59
185.18	348.58	186.13	348.57	186.42	348.57	186.44	348.57	188.04	348.56
189.65	348.55	194.03	348.53	194.81	348.53	195.59	348.53	195.88	348.53
195.88	348.54	196.44	348.95	196.55	349.03	196.55	335.84	196.57	335.84
196.69	335.84	196.71	335.84	196.78	335.84	196.79	335.84	196.8	335.84
196.82	335.84	196.85	335.84	196.86	335.84	196.87	335.84	196.88	335.84

196.9	335.84	196.91	335.84	196.92	335.84	196.94	335.84	199.68	335.84
199.69	335.84	199.89	335.84	200.01	335.84	201.89	335.84	202.55	335.84
202.57	335.84	203.21	335.84	203.48	335.84	204.42	335.84	204.44	335.84
204.84	335.84	205.35	335.84	206.23	335.84	206.88	335.84	206.94	335.84
207.1	335.84	207.25	335.84	207.88	335.84	208.2	335.84	208.87	335.84
208.88	335.84	209.15	335.84	210.57	335.84	211.09	335.84	211.97	335.84
212.17	335.84	213.91	335.84	214.01	335.84	214.69	335.84	214.7	335.84
216.98	335.84	217.18	335.84	219.52	335.84	219.57	335.84	220.32	335.84
220.33	335.84	220.39	335.84	220.42	335.84	220.43	335.84	221.21	335.84
221.21	349.03	221.88	348.54	221.88	348.53	221.95	348.53	222.05	348.54
223.55	348.58	223.76	348.59	224.48	348.61	225.08	348.63	225.31	348.61
225.78	348.55	226.49	348.56	226.83	348.56	226.84	348.56	227.22	348.57
227.72	348.57	228.8	348.62	229.05	348.63	230.7	348.71	230.75	348.71
230.8	348.71	231.32	348.74	231.96	348.76	232.79	348.8	233.58	348.84
234.82	348.89	235.11	348.91	235.81	348.94	236.6	348.97	237.74	349.03
238.11	349.03	238.12	349.03	239.48	349.05	239.49	349.05	240.03	349.06
240.39	349.07	240.4	349.07	240.66	349.08	241.27	349.1	241.89	349.12
242.89	349.15	243.88	349.18	245.04	349.21	245.06	349.22	246	349.24
247.05	349.28	247.31	349.28	248.28	349.31	248.42	349.32	248.45	349.32
248.51	349.32	249.09	349.34	250.76	349.39	251.94	349.41	252.25	349.41
252.26	349.41	253.62	349.43	253.89	349.43	255.3	349.46	257.82	349.5
258.22	349.5	259.69	349.54	259.86	349.54	260.46	349.55	261.52	349.57
262.07	349.56	264.26	349.52	276.23	349.29	278	349.25	281.4	349.18
287.66	349.06	293.17	348.89	296.16	348.8	296.45	348.79	298.11	348.74
299.98	348.68	299.99	348.68	301.88	348.62	308.77	348.83	322.81	349.27
325.35	349.33	325.8	349.31	329.44	349.18	336.93	348.62	346.58	348.81
347.18	348.83	350.95	349.06	351.92	349.12	352.42	349.15	353.77	349.25
353.86	349.25	353.95	349.26	354.13	349.27	354.14	349.27	354.23	349.28
354.33	349.28								

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .011 196.44 .011 221.21 .011

Bank Sta: Left Right Coeff Contr. Expan.  
 196.44 221.21 .1 .3

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 202.71 204.88 345.84 T  
 212.88 215.05 345.84 T

Upstream Embankment side slope = 3 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 2 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .95  
 Elevation at which weir flow begins = 350  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 2

Culvert Name Shape Rise Span  
 CULVERT#1 Box 10 8  
 FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet

FHWA Scale # 1 - Inlet edges chamfered 3/4 inch

Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	0	26	.011	.011	0	.4	1

Upstream Elevation = 336.36  
Centerline Station = 213.25  
Downstream Elevation = 335.84  
Centerline Station = 208.88

Culvert Name	Shape	Rise	Span
CULVERT#2	Box	10	6

FHWA Chart # 8 - flared wingwalls

FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)

Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	0	26	.011	.011	0	.4	1

Number of Barrels = 2  
Upstream Elevation = 336.36  
Centerline Stations  
Sta. Sta.  
204.08 222.42  
Downstream Elevation = 335.84  
Centerline Stations  
Sta. Sta.  
199.71 218.05

CULVERT OUTPUT Profile #MAX TW 25-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	460.07	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	12.28
Q Barrel (cfs)	460.07	Culv Vel DS (ft/s)	15.44
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.83	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	340.81	Culv Exit Loss (ft)	0.44
Delta EG (ft)	1.50	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.51	Q Weir (cfs)	
E.G. IC (ft)	344.03	Weir Sta Lft (ft)	
E.G. OC (ft)	344.32	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.04	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.57	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.33	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.68	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #MAX TW 100-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	562.67	Culv Full Len (ft)	26.00
# Barrels	1	Culv Vel US (ft/s)	7.03

Q Barrel (cfs)	562.67	Culv Vel DS (ft/s)	7.03
E.G. US. (ft)	349.77	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	349.70	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	349.18	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	348.66	Culv Exit Loss (ft)	0.25
Delta EG (ft)	0.59	Culv Entr Loss (ft)	0.31
Delta WS (ft)	1.04	Q Weir (cfs)	256.66
E.G. IC (ft)	345.14	Weir Sta Lft (ft)	0.00
E.G. OC (ft)	349.76	Weir Sta Rgt (ft)	331.44
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	346.36	Weir Max Depth (ft)	1.76
Culv WS Outlet (ft)	345.84	Weir Avg Depth (ft)	0.68
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	109.47
Culv Crt Depth (ft)	5.36	Min El Weir Flow (ft)	350.00

CULVERT OUTPUT Profile #ANT TW 25-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	460.10	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	12.28
Q Barrel (cfs)	460.10	Culv Vel DS (ft/s)	15.44
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.80	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	340.48	Culv Exit Loss (ft)	0.47
Delta EG (ft)	1.53	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.83	Q Weir (cfs)	
E.G. IC (ft)	344.03	Weir Sta Lft (ft)	
E.G. OC (ft)	344.32	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.04	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.57	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.33	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.68	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #ANT TW 100-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	664.38	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	13.88
Q Barrel (cfs)	664.38	Culv Vel DS (ft/s)	16.99
E.G. US. (ft)	346.54	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	345.33	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	344.73	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	341.77	Culv Exit Loss (ft)	0.48
Delta EG (ft)	1.81	Culv Entr Loss (ft)	1.20
Delta WS (ft)	3.56	Q Weir (cfs)	
E.G. IC (ft)	346.17	Weir Sta Lft (ft)	
E.G. OC (ft)	346.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	342.34	Weir Max Depth (ft)	
Culv WS Outlet (ft)	340.73	Weir Avg Depth (ft)	



Culv Nml Depth (ft)	3.03	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.98	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #GRV TW 25-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	460.10	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	12.28
Q Barrel (cfs)	460.10	Culv Vel DS (ft/s)	15.44
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.80	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	340.48	Culv Exit Loss (ft)	0.47
Delta EG (ft)	1.53	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.83	Q Weir (cfs)	
E.G. IC (ft)	344.03	Weir Sta Lft (ft)	
E.G. OC (ft)	344.32	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.04	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.57	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.33	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.68	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #GRV TW 100-YR Culv Group: CULVERT#1

Q Culv Group (cfs)	664.38	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	13.88
Q Barrel (cfs)	664.38	Culv Vel DS (ft/s)	16.99
E.G. US. (ft)	346.54	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	345.33	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	344.73	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	341.77	Culv Exit Loss (ft)	0.48
Delta EG (ft)	1.81	Culv Entr Loss (ft)	1.20
Delta WS (ft)	3.56	Q Weir (cfs)	
E.G. IC (ft)	346.17	Weir Sta Lft (ft)	
E.G. OC (ft)	346.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	342.34	Weir Max Depth (ft)	
Culv WS Outlet (ft)	340.73	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.03	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.98	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #MAX TW 25-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	691.68	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	12.29

Q Barrel (cfs)	345.84	Culv Vel DS (ft/s)	15.34
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.83	Culv Frctn Ls (ft)	0.00
W.S. DS (ft)	340.81	Culv Exit Loss (ft)	0.42
Delta EG (ft)	1.50	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.51	Q Weir (cfs)	
E.G. IC (ft)	344.25	Weir Sta Lft (ft)	
E.G. OC (ft)	344.34	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.05	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.60	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.46	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.69	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #MAX TW 100-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	843.55	Culv Full Len (ft)	26.00
# Barrels	2	Culv Vel US (ft/s)	7.03
Q Barrel (cfs)	421.78	Culv Vel DS (ft/s)	7.03
E.G. US. (ft)	349.77	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	349.70	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	349.18	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	348.66	Culv Exit Loss (ft)	0.25
Delta EG (ft)	0.59	Culv Entr Loss (ft)	0.31
Delta WS (ft)	1.04	Q Weir (cfs)	256.66
E.G. IC (ft)	345.40	Weir Sta Lft (ft)	0.00
E.G. OC (ft)	349.77	Weir Sta Rgt (ft)	331.44
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (ft)	346.36	Weir Max Depth (ft)	1.76
Culv WS Outlet (ft)	345.84	Weir Avg Depth (ft)	0.68
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	109.47
Culv Crt Depth (ft)	5.36	Min El Weir Flow (ft)	350.00

CULVERT OUTPUT Profile #ANT TW 25-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	691.65	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	12.29
Q Barrel (cfs)	345.83	Culv Vel DS (ft/s)	15.34
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.80	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	340.48	Culv Exit Loss (ft)	0.46
Delta EG (ft)	1.53	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.83	Q Weir (cfs)	
E.G. IC (ft)	344.25	Weir Sta Lft (ft)	
E.G. OC (ft)	344.34	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.05	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.60	Weir Avg Depth (ft)	

Culv Nml Depth (ft)	2.46	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.69	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #ANT TW 100-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	998.51	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	13.89
Q Barrel (cfs)	499.26	Culv Vel DS (ft/s)	16.88
E.G. US. (ft)	346.54	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	345.33	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	344.73	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	341.77	Culv Exit Loss (ft)	0.47
Delta EG (ft)	1.81	Culv Entr Loss (ft)	1.20
Delta WS (ft)	3.56	Q Weir (cfs)	
E.G. IC (ft)	346.51	Weir Sta Lft (ft)	
E.G. OC (ft)	346.55	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	342.35	Weir Max Depth (ft)	
Culv WS Outlet (ft)	340.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.24	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.99	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #GRV TW 25-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	691.65	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	12.29
Q Barrel (cfs)	345.83	Culv Vel DS (ft/s)	15.34
E.G. US. (ft)	344.33	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	343.31	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	342.80	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	340.48	Culv Exit Loss (ft)	0.46
Delta EG (ft)	1.53	Culv Entr Loss (ft)	0.94
Delta WS (ft)	2.83	Q Weir (cfs)	
E.G. IC (ft)	344.25	Weir Sta Lft (ft)	
E.G. OC (ft)	344.34	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	341.05	Weir Max Depth (ft)	
Culv WS Outlet (ft)	339.60	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.46	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.69	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #GRV TW 100-YR Culv Group: CULVERT#2

Q Culv Group (cfs)	998.51	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	13.89

Q Barrel (cfs)	499.26	Culv Vel DS (ft/s)	16.88
E.G. US. (ft)	346.54	Culv Inv El Up (ft)	336.36
W.S. US. (ft)	345.33	Culv Inv El Dn (ft)	335.84
E.G. DS (ft)	344.73	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	341.77	Culv Exit Loss (ft)	0.47
Delta EG (ft)	1.81	Culv Entr Loss (ft)	1.20
Delta WS (ft)	3.56	Q Weir (cfs)	
E.G. IC (ft)	346.51	Weir Sta Lft (ft)	
E.G. OC (ft)	346.55	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	342.35	Weir Max Depth (ft)	
Culv WS Outlet (ft)	340.77	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.24	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.99	Min El Weir Flow (ft)	350.00

Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: Proposed Channel  
REACH: Proposed Channel RS: 7

INPUT

Description:

Station Elevation Data		num=		286					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.24	.1	349.24	.19	349.23	.56	349.21	2.35	349.11
11.22	348.67	13.87	348.53	16.49	348.4	18.01	348.8	21.34	348.87
32.44	347.94	33.12	348.44	40.54	348.23	51.49	347.93	52.51	347.9
55.48	347.86	56.27	347.84	66.99	347.69	75.71	347.56	76.42	347.54
78.31	347.52	80.2	347.75	81.81	347.96	81.82	347.96	82.76	348.07
89.1	348.73	90.32	348.85	93.71	349.06	94.7	349.12	96.05	349.14
98.87	349.18	100.74	349.2	100.98	349.2	102.62	349.23	112.41	349.24
118.17	349.25	123.88	349.27	125.19	349.26	127.45	349.24	130.23	349.22
131.61	349.22	132.43	349.21	133.02	349.21	133.91	349.2	136.43	349.18
137.54	349.18	137.63	349.18	137.75	349.17	139.74	349.16	141.4	349.15
141.68	349.15	141.89	349.15	143.28	349.14	144.77	349.13	144.9	349.13
145.07	349.13	146.16	349.12	146.17	349.12	146.63	349.12	147.7	349.11
147.71	349.11	148.32	349.11	148.61	349.1	149.56	349.1	149.93	349.1
150.05	349.09	151.05	349.09	151.41	349.09	151.96	349.08	153.55	349.07
153.65	349.07	153.72	349.07	154.33	349.07	154.75	349.06	155.27	349.06
155.61	349.06	155.62	349.06	156.43	349.05	158.3	349.04	158.86	349.04
159	349.04	161.38	349.01	161.54	349.01	162.05	349	163.67	348.96
164.05	348.96	164.76	348.94	165.15	348.94	165.49	348.93	166.34	348.91
167.91	348.88	168.15	348.88	168.84	348.86	168.85	348.86	168.99	348.86
169.01	348.86	171.14	348.82	171.34	348.81	171.57	348.81	171.77	348.81
174.12	348.76	174.3	348.76	174.53	348.75	174.59	348.75	175.01	348.74
176.01	348.72	176.02	348.72	176.09	348.72	176.12	348.72	176.14	348.72
176.15	348.72	176.37	348.71	176.38	348.71	176.67	348.71	178.02	348.68
178.49	348.68	178.69	348.67	179.73	348.66	183.19	348.61	184.8	348.59
185.18	348.58	186.13	348.57	186.42	348.57	186.44	348.57	188.04	348.56
189.65	348.55	194.03	348.53	194.81	348.53	195.59	348.53	195.88	348.53

195.88	348.54	196.44	348.95	196.55	349.03	196.55	335.84	196.57	335.84
196.69	335.84	196.71	335.84	196.78	335.84	196.79	335.84	196.8	335.84
196.82	335.84	196.85	335.84	196.86	335.84	196.87	335.84	196.88	335.84
196.9	335.84	196.91	335.84	196.92	335.84	196.94	335.84	199.68	335.84
199.69	335.84	199.89	335.84	200.01	335.84	201.89	335.84	202.55	335.84
202.57	335.84	203.21	335.84	203.48	335.84	204.42	335.84	204.44	335.84
204.84	335.84	205.35	335.84	206.23	335.84	206.88	335.84	206.94	335.84
207.1	335.84	207.25	335.84	207.88	335.84	208.2	335.84	208.87	335.84
208.88	335.84	209.15	335.84	210.57	335.84	211.09	335.84	211.97	335.84
212.17	335.84	213.91	335.84	214.01	335.84	214.69	335.84	214.7	335.84
216.98	335.84	217.18	335.84	219.52	335.84	219.57	335.84	220.32	335.84
220.33	335.84	220.39	335.84	220.42	335.84	220.43	335.84	221.21	335.84
221.21	349.03	221.88	348.54	221.88	348.53	221.95	348.53	222.05	348.54
223.55	348.58	223.76	348.59	224.48	348.61	225.08	348.63	225.31	348.61
225.78	348.55	226.49	348.56	226.83	348.56	226.84	348.56	227.22	348.57
227.72	348.57	228.8	348.62	229.05	348.63	230.7	348.71	230.75	348.71
230.8	348.71	231.32	348.74	231.96	348.76	232.79	348.8	233.58	348.84
234.82	348.89	235.11	348.91	235.81	348.94	236.6	348.97	237.74	349.03
238.11	349.03	238.12	349.03	239.48	349.05	239.49	349.05	240.03	349.06
240.39	349.07	240.4	349.07	240.66	349.08	241.27	349.1	241.89	349.12
242.89	349.15	243.88	349.18	245.04	349.21	245.06	349.22	246	349.24
247.05	349.28	247.31	349.28	248.28	349.31	248.42	349.32	248.45	349.32
248.51	349.32	249.09	349.34	250.76	349.39	251.94	349.41	252.25	349.41
252.26	349.41	253.62	349.43	253.89	349.43	255.3	349.46	257.82	349.5
258.22	349.5	259.69	349.54	259.86	349.54	260.46	349.55	261.52	349.57
262.07	349.56	264.26	349.52	276.23	349.29	278	349.25	281.4	349.18
287.66	349.06	293.17	348.89	296.16	348.8	296.45	348.79	298.11	348.74
299.98	348.68	299.99	348.68	301.88	348.62	308.77	348.83	322.81	349.27
325.35	349.33	325.8	349.31	329.44	349.18	336.93	348.62	346.58	348.81
347.18	348.83	350.95	349.06	351.92	349.12	352.42	349.15	353.77	349.25
353.86	349.25	353.95	349.26	354.13	349.27	354.14	349.27	354.23	349.28
354.33	349.28								

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .011 196.44 .011 221.21 .011

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 196.44 221.21 26.79 26.79 26.79 .1 .3

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 202.71 204.88 345.84 T  
 212.88 215.05 345.84 T

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 6

INPUT

Description:  
 Station Elevation Data num= 303  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

13.35	349.02	20.2	348.9	48.88	348.39	49.24	348.38	56.26	348.19
56.69	348.17	59.47	348.13	59.93	348.13	67.5	347.95	68.04	347.94
71.22	347.85	71.23	347.85	71.24	347.85	71.25	347.85	71.26	347.85
71.27	347.85	77.21	347.67	86.87	347.38	87.54	347.36	88.6	347.45
89.04	347.49	89.73	347.55	98.41	347.21	99.16	347.18	107.04	346.27
107.88	346.17	111.61	345.86	111.62	345.86	112.71	345.76	113.6	345.69
121.84	345.07	124.28	344.89	125.25	344.81	137.06	344.18	137.07	344.18
137.08	344.18	137.8	344.14	140.06	344.02	141.79	343.93	143.25	343.85
145.26	343.74	145.27	343.74	145.78	343.72	147.86	343.6	149.76	343.52
150.19	343.51	151.38	343.47	152.09	343.37	153.62	343.17	153.74	343.15
153.92	343.13	154.69	343.03	156.41	342.86	156.51	342.85	157.63	342.84
157.76	342.84	157.77	342.84	158.38	342.84	159.64	342.86	161.74	342.88
161.75	342.88	162.98	342.9	163.07	342.9	163.15	342.9	164.36	342.91
164.44	342.91	165.26	342.87	165.27	342.87	165.73	342.84	166.06	342.83
167.24	342.76	168.91	342.71	169.69	342.69	169.7	342.69	170.09	342.68
173.25	342.58	173.67	342.54	174.13	342.49	177.13	342.17	177.41	342.14
177.95	342.08	177.96	342.08	178.35	342.04	178.83	341.99	179.47	341.97
180.46	341.94	180.59	341.94	180.9	341.93	181.89	341.86	183.49	340.81
184.07	340.81	184.08	340.43	185.05	339.8	185.56	339.46	185.95	339.21
186.59	338.79	186.6	338.78	186.61	338.78	187.1	338.46	187.31	338.33
187.31	338.32	188.2	337.74	188.21	337.73	188.22	337.73	188.72	337.41
188.98	337.23	188.99	337.23	190.06	336.53	190.38	336.32	190.63	336.16
190.95	335.95	191.47	335.61	191.91	335.32	191.94	335.31	191.94	335.64
192.19	335.64	192.46	335.64	192.61	335.64	192.61	335.31	192.9	335.31
192.91	335.31	192.94	335.31	193.72	335.31	193.96	335.31	194.35	335.31
194.36	335.31	195.28	335.31	195.48	335.31	195.82	335.31	196.42	335.31
196.64	335.31	196.77	335.31	197.33	335.31	197.6	335.31	199.7	335.31
200.17	335.31	200.26	335.31	200.3	335.31	200.84	335.31	203.68	335.31
203.71	335.31	203.72	335.31	204.43	335.31	204.56	335.31	207.68	335.31
208.79	335.31	208.8	335.31	209.67	335.31	210.75	335.31	211.92	335.31
212.86	335.31	213.22	335.31	213.23	335.31	214.84	335.31	215.42	335.31
215.52	335.31	216.19	335.31	216.94	335.31	217.27	335.31	217.27	335.64
217.58	335.64	217.69	335.64	217.94	335.64	217.94	335.31	217.95	335.31
217.99	335.33	219.33	336.07	219.83	336.35	220.09	336.5	222.12	337.62
222.21	337.67	222.22	337.67	223.32	338.28	223.98	338.65	225.41	339.44
225.42	339.45	226.31	339.94	226.67	340.14	227.68	340.7	228.05	340.9
228.68	341.25	229.21	341.55	229.5	341.71	229.63	341.78	229.66	341.8
229.67	341.8	230.76	342.41	231.06	342.57	231.16	342.63	231.17	342.63
231.18	342.63	232.32	343.27	232.67	343.46	233.18	343.75	234.17	344.29
234.42	344.43	234.43	344.44	235.67	345.12	236	345.3	236.13	345.38
236.24	345.44	237.16	345.61	237.77	345.7	237.78	345.71	237.78	345.72
237.8	345.72	237.81	345.72	237.85	345.73	238.3	345.81	239.54	346.03
240.3	346.08	240.59	346.1	240.95	346.12	243.34	346.27	243.35	346.27
245.02	346.38	245.4	346.4	245.41	346.4	247.26	346.52	247.96	346.57
249.34	346.65	250.61	346.74	250.67	346.74	251.86	346.82	253.58	346.93
253.95	346.95	254.65	346.99	254.68	347	255.7	347.08	256.64	347.16
258.37	347.18	258.38	347.18	259.28	347.2	260.23	347.21	261.85	347.24
261.86	347.24	263.92	347.27	264.96	347.28	266.22	347.3	267.34	347.32
268.27	347.33	269.46	347.38	270.02	347.4	270.03	347.4	270.95	347.44
272.93	347.51	274.99	347.59	275	347.59	275.15	347.6	277.27	347.68
279.18	347.75	279.87	347.78	279.96	347.78	279.97	347.78	280.54	347.81
280.55	347.81	284.36	347.95	284.37	347.96	285.46	348	286.07	348.02
286.08	348.02	286.67	348.05	290.26	348.19	291.62	348.24	293.74	348.32
294.23	348.34	297.17	348.46	299.27	348.54	301.56	348.63	301.71	348.63

302.17	348.64	302.67	348.66	305.93	348.74	308.13	348.8	308.14	348.8
308.17	348.8	308.18	348.8	308.2	348.8	308.21	348.8	310.4	348.86
310.77	348.87	311.24	348.88	313.71	348.94	313.72	348.94	313.88	348.95
314	348.95	314.07	348.95	314.13	348.95	322.26	349.16	324.72	349.23
331.15	349.52	336.79	349.64	343.5	349.78	343.51	349.78	354.39	350
357.09	350.06	371.11	350.92	372.22	350.99	372.46	351.01	372.59	351.02
372.73	351.02	372.82	351.03	372.92	351.04				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
13.35	.035	191.91	.026	217.99	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	191.91	217.99		91.04	35.85	21.93	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 5

INPUT

Description:

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.42	.1	348.41	2.51	348.11	19.53	342.8	48.43	331.83
48.85	331.69	49.1	331.58	49.58	331.48	62.54	328.84	74.88	322.65
75.15	322.48	89.44	322.57	89.79	323.83	90.93	324.49	125.66	345.66
130.5	346.31	130.6	346.32						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	2.51	.026	125.66	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2.51	125.66		70.97	79.09	147.51	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 4

INPUT

Description:

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.37	.1	349.37	.2	349.37	.3	349.37	7.04	349.36
12.49	348.65	32.58	345.54	46.06	342.81	51.54	341.78	76.81	335.22
91.12	331.18	102.95	326.07	113.17	321.42	113.17	321.41	118.79	316.34
120.58	316.3	127.18	318.26	141.7	322.87	144.82	325.06	144.83	325.06
148.35	324.87	148.36	324.87	161.53	333.11	161.53	333.12	161.54	333.12
164.65	334.74	164.65	334.75	170.23	336.04	185.07	338.11	197.22	340.05
203.52	341.21	223.98	344.86	227.49	345.1	228.37	345.16	243.94	347.4

243.95	347.4	254.35	348.54	256.21	349.37	263.91	349.37	263.92	352.81
269.46	352.67	269.56	352.67	269.66	352.67				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	7.04	.026	263.91	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	7.04	263.91		54.16	63.01	122.53	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 3

INPUT

Description:

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.26	.1	349.26	.37	349.26	.65	349.25	18.19	348.91
19.84	349.02	26.2	349.21	26.21	349.21	35.17	348.85	44.02	347.94
44.03	347.94	47.58	347.57	54.22	346.47	71.38	342.15	79.42	340.13
86.43	339.03	87.82	338.82	97.37	337.33	104.41	335.78	105.6	335.65
112.29	334.96	113.28	334.86	114.13	334.45	134.37	322.84	135.31	322.3
135.83	322.21	143.74	317.91	147.53	314.97	170.29	331.97	182.79	341.07
191.22	342.27	205.75	343.87	207.01	344.98	211.1	345.57	211.38	345.61
211.65	345.65	211.75	345.67						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	113.28	.026	182.79	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	113.28	182.79		37.13	64.73	76.92	.1	.3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 2

INPUT

Description:

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.69	.2	348.69	.3	348.68	1.37	348.65	1.38	348.65
5.54	348.5	15.86	348.12	18.18	347.6	20.14	346.5	29.84	342.51
44.32	336.54	46.27	335.74	50.12	334.15	60.95	329.11	63.12	328.11
68.47	325.53	68.47	325.52	68.87	325.33	69.59	324.98	71.65	323.99
75.14	323.27	81.22	322.31	81.49	322.15	88.83	318.04	89.84	317.47
90.27	317.23	91.26	317.39	97.45	314.67	114.25	324.78	123.82	330.55
126.73	332.3	129.64	334.05	129.65	334.06	130.89	334.8	130.89	334.81
130.9	334.81	132.02	335.48	132.5	335.77	133.46	336.55	134.36	336.73



135.93 337.04 141.55 338.18 163.22 342.52 163.32 342.56 163.42 342.58

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 15.86 .026 163.22 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 15.86 163.22 96.24 79.9 64.17 .1 .3

CROSS SECTION

RIVER: Proposed Channel  
 REACH: Proposed Channel RS: 1

INPUT

Description:

Station Elevation Data num= 20  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 322.59 .1 322.62 .2 322.65 .3 322.68 3.34 322.69  
 3.35 321.71 7.81 319.37 16.49 314.38 21.82 320.2 31.39 320.2  
 40.78 325.45 50.68 330.32 50.68 330.33 56.59 331.62 59.94 332.36  
 79.91 334.36 80.01 334.37 80.11 334.38 80.21 334.39 80.31 334.4

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .035 3.34 .026 31.39 .035

Bank Sta: Left Right Coeff Contr. Expan.  
 3.34 31.39 .1 .3

SUMMARY OF MANNING'S N VALUES

River: Proposed Channel

Reach	River Sta.	n1	n2	n3
Proposed Channel	39	.035	.026	.035
Proposed Channel	38	.035	.026	.035
Proposed Channel	37	.035	.026	.035
Proposed Channel	36	.035	.026	.035
Proposed Channel	35	.035	.026	.035
Proposed Channel	34	.035	.026	.035
Proposed Channel	33	.035	.026	.035
Proposed Channel	32	.035	.026	.035
Proposed Channel	31	.035	.026	.035
Proposed Channel	30	.035	.026	.035
Proposed Channel	29	.035	.026	.035
Proposed Channel	28	.035	.026	.035
Proposed Channel	27	.035	.026	.035
Proposed Channel	26	.035	.026	.035
Proposed Channel	25	.035	.026	.035

Proposed Channel	24	.035	.026	.035
Proposed Channel	23	.035	.026	.035
Proposed Channel	22	.035	.026	.035
Proposed Channel	21	.035	.026	.035
Proposed Channel	20	.035	.026	.035
Proposed Channel	19	.035	.026	.035
Proposed Channel	18	.035	.026	.035
Proposed Channel	17	.035	.026	.035
Proposed Channel	16	.035	.026	.035
Proposed Channel	15	.035	.026	.035
Proposed Channel	14	.035	.026	.035
Proposed Channel	13	.035	.026	.035
Proposed Channel	12	.035	.026	.035
Proposed Channel	11	.035	.026	.035
Proposed Channel	10	.035	.026	.035
Proposed Channel	9	.035	.011	.035
Proposed Channel	8	.011	.011	.011
Proposed Channel	7.5	Culvert		
Proposed Channel	7	.011	.011	.011
Proposed Channel	6	.035	.026	.035
Proposed Channel	5	.035	.026	.035
Proposed Channel	4	.035	.026	.035
Proposed Channel	3	.035	.026	.035
Proposed Channel	2	.035	.026	.035
Proposed Channel	1	.035	.026	.035

SUMMARY OF REACH LENGTHS

River: Proposed Channel

Reach	River Sta.	Left	Channel	Right
Proposed Channel	39	145.12	144.81	144.93
Proposed Channel	38	200	200	200
Proposed Channel	37	200	200	200
Proposed Channel	36	200	200	200
Proposed Channel	35	200	200	200
Proposed Channel	34	200	200	200
Proposed Channel	33	200	200	200
Proposed Channel	32	210.32	198.97	186.62
Proposed Channel	31	148.65	159.48	174.49
Proposed Channel	30	203.91	215.5	230.32
Proposed Channel	29	224.36	224.72	224.36
Proposed Channel	28	199.82	197.88	198.18
Proposed Channel	27	200.46	198.55	198.87
Proposed Channel	26	199.32	197.75	200.13
Proposed Channel	25	168.67	167.76	167.64
Proposed Channel	24	213	204.72	192.9
Proposed Channel	23	180.58	180.39	178.93
Proposed Channel	22	144.57	143.8	144.85
Proposed Channel	21	137.33	145.29	153.36

Proposed Channel	20	164.3	152.27	149.67
Proposed Channel	19	125.2	136.45	142.49
Proposed Channel	18	98.1	92.44	88.69
Proposed Channel	17	107.38	99.59	92.13
Proposed Channel	16	32.36	29.69	29.39
Proposed Channel	15	29.84	29.08	29.9
Proposed Channel	14	58.57	59.23	59.39
Proposed Channel	13	71.67	74.84	71.63
Proposed Channel	12	105.29	105.72	114.8
Proposed Channel	11	96.08	103.13	116.02
Proposed Channel	10	101.74	100.81	109.13
Proposed Channel	9	40.29	34.96	40.34
Proposed Channel	8	26	26	26
Proposed Channel	7.5	Culvert		
Proposed Channel	7	26.79	26.79	26.79
Proposed Channel	6	91.04	35.85	21.93
Proposed Channel	5	70.97	79.09	147.51
Proposed Channel	4	54.16	63.01	122.53
Proposed Channel	3	37.13	64.73	76.92
Proposed Channel	2	96.24	79.9	64.17
Proposed Channel	1			

**III.**

**APPENDIX A**

**FEMA FLOOD INSURANCE MAP & STUDY**

**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projection used in the preparation of this map was State Plane Central zone (FIPS zone 4203). The horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov) or contact the National Geodetic Survey at the following address:

Spatial Reference System Division  
National Geodetic Survey, NOAA  
Silver Spring Metro Center  
1315 East-West Highway  
Silver Spring, Maryland 20910  
(301) 713-3191

To obtain current elevation, description, and/or location information about the bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

Base map information shown on this map was provided in digital format by Texas Department of Transportation. This information was digitized from USGS 7.5 minute quadrangle maps at a scale of 1:15840.

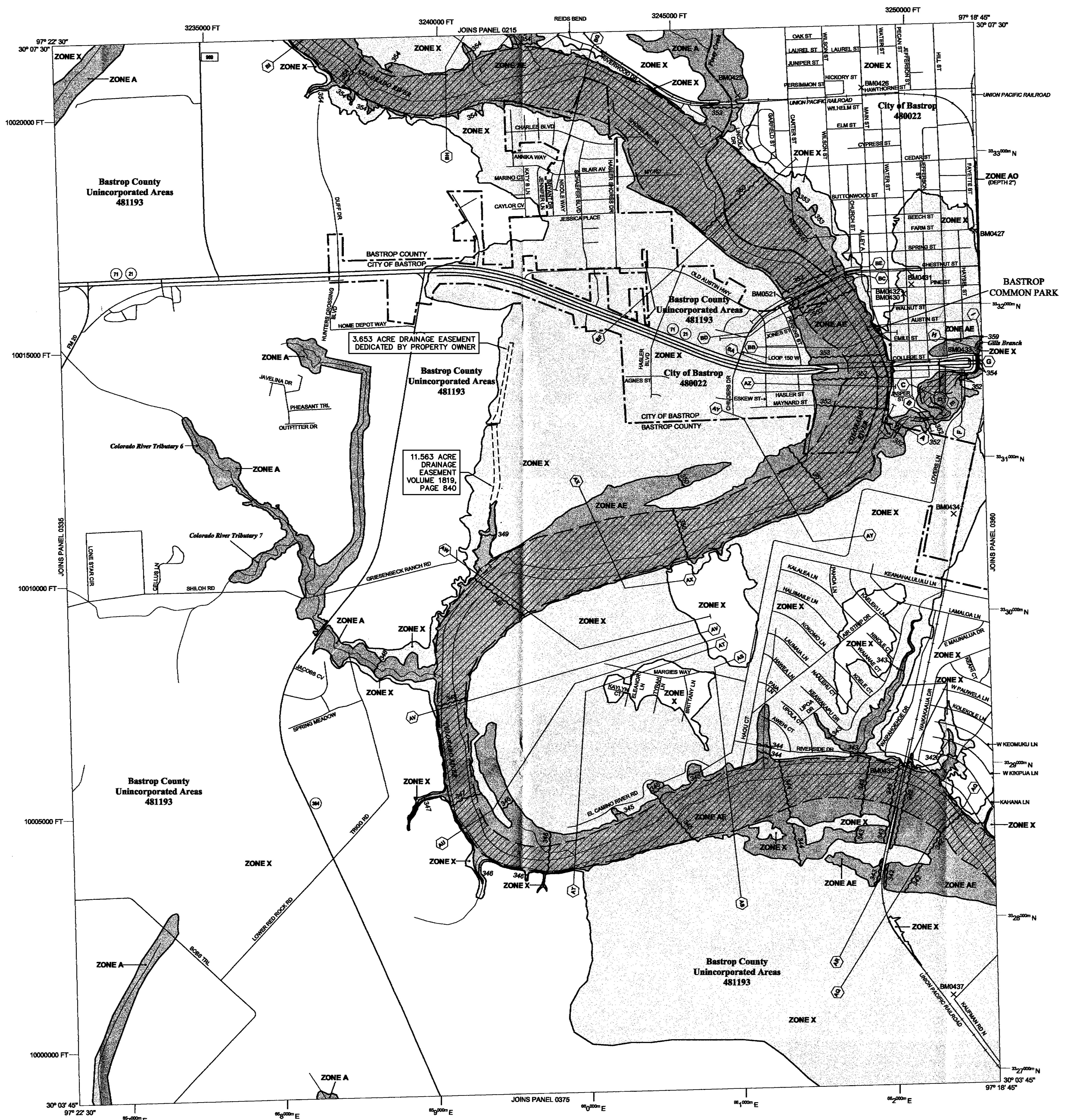
This map reflects more detailed up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at [www.fema.gov/msc](http://www.fema.gov/msc).

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at [www.fema.gov](http://www.fema.gov).



**LEGEND**

- SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AO, AH, AR, AV, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
  - ZONE AE** Base Flood Elevations determined.
  - ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
  - ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined; for areas of abutment flooding, velocities also determined.
  - ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
  - ZONE AV** Areas to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
  - ZONE VE** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE**
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
  - OTHER AREAS** Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- CBRS areas and OFAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
  - Floodway boundary
  - Zone D boundary
  - CBRS and OFA boundary
  - Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
  - Base Flood Elevation line and value; elevation in feet\*
  - (EL 987) Base Flood Elevation values where uniform within zone; elevation in feet\*

\*Referenced to the North American Vertical Datum of 1988

- (A) Cross section line
- (2) Tiesheet line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

5000-foot grid ticks: Texas State Plane coordinate system, Central zone (FIPS Zone 4203), Transverse Mercator Projection

1000-meter Universal Transverse Mercator grid ticks, zone 18

Bench mark (see explanation in Notes to Users section of the FIS report)

River mile

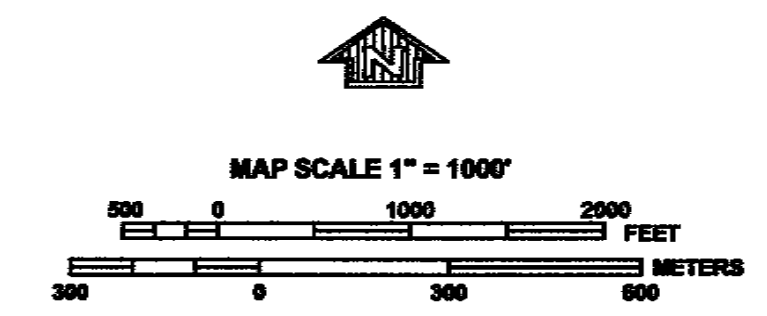
MAP REPOSITORIES  
Refer to listing of Map Repositories on Map Index.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP  
August 19, 1991

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL  
December 5, 1998 - to change Base Flood Elevations, to add Special Flood Hazard Areas, and to change zone designations.  
January 19, 2006 - to decrease Base Flood Elevations, to add Base Flood Elevations, floodways, and to add names to change Special Flood Hazard Areas. Floodway and zone designations, to update corporate limits, to incorporate previously issued Letters of Map Change, and to reflect updated topographic information.

For Community map revision history prior to countywide mapping, refer to the community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-9620.



**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0355E

**FIRM**  
FLOOD INSURANCE RATE MAP

**BASTROP COUNTY, TEXAS AND INCORPORATED AREAS**

PANEL 355 OF 625  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BASTROP, CITY OF	48022	0355	E
BASTROP COUNTY	48119	0355	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER 48021C0355E**  
**MAP REVISED JANUARY 19, 2006**

Federal Emergency Management Agency

# FLOOD INSURANCE STUDY



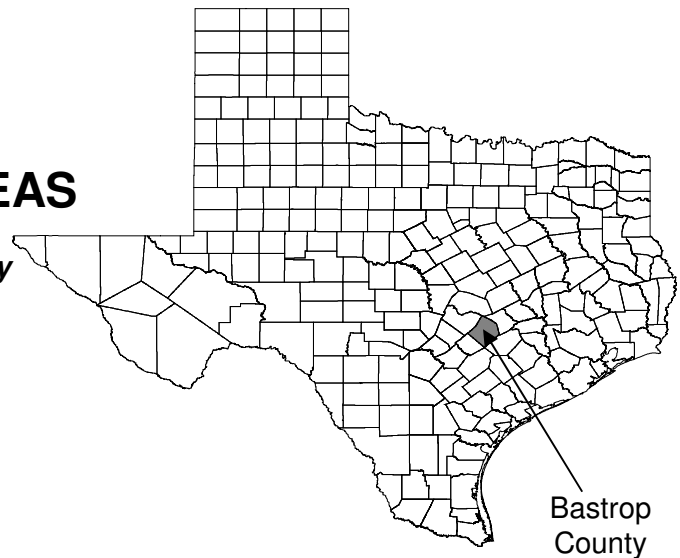
## BASTROP COUNTY, TEXAS AND INCORPORATED AREAS

***Community  
Name***

BASTROP, CITY OF  
BASTROP COUNTY  
(UNINCORPORATED AREAS)  
ELGIN, CITY OF  
SMITHVILLE, CITY OF

***Community  
Number***

480022  
481193  
480023  
480024



Revised: January 6, 2016



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

48021CV000B

**NOTICE TO  
FLOOD INSURANCE STUDY USERS**

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

This FIS report was revised on January 6, 2016. Users should refer to Section 10.0, Revisions Description, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Effective Date: August 19, 1991

Revised Countywide FIS Date(s): December 8, 1998  
January 19, 2006  
January 6, 2016

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**EXHIBITS**

Exhibit 1 - Flood Profiles

Cedar Creek	Panels 01P-04P
Colorado River	Panels 05P-20P
Dry Creek East	Panels 21Pa-21Pb
Gills Branch	Panels 22P-23P
Piney Creek	Panels 24P-25P
Sandy Creek	Panels 26P-27P

Exhibit 2 - Flood Insurance Rate Map Index

Flood Insurance Rate Map

**FLOOD INSURANCE STUDY  
BASTROP COUNTY AND INCORPORATED AREAS, TEXAS**

**1.0 INTRODUCTION**

**1.1 Purpose of Study**

This countywide-format Flood Insurance Study investigates the existence and severity of flood hazards in, or revises previous Flood Insurance Studies/Flood Insurance Rate Maps for the geographic area of Bastrop County, Texas, including: the Cities of Bastrop, Elgin, and Smithville; and the unincorporated areas of Bastrop County (hereinafter referred to collectively as Bastrop County). This study aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. This information will also be used by Bastrop County to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program (NFIP). Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

**1.2 Authority and Acknowledgments**

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for Cedar Creek, Gills Branch, and the Colorado River were prepared by Lockwood, Andrews & Newnam, Inc. for the Federal Emergency Management Agency (FEMA), under Contract No. EMT-87-C-0156. This work was completed in July 1989. The hydrologic and hydraulic analyses for Dry Creek South were taken from the Flood Insurance Study for the unincorporated areas of Travis County.

**1.3 Coordination**

On October 9, 1986, an Initial Consultation Coordination Officer's (CCO) meeting was held with representatives of FEMA, the City of Bastrop, Bastrop County, and Lockwood, Andrews & Newnam, Inc. (the study contractor) to identify the streams to be studied by detailed methods.

On August 27, 1990, a final CCO meeting was with representatives of FEMA, the communities, and the study contractor to review the results of the study.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

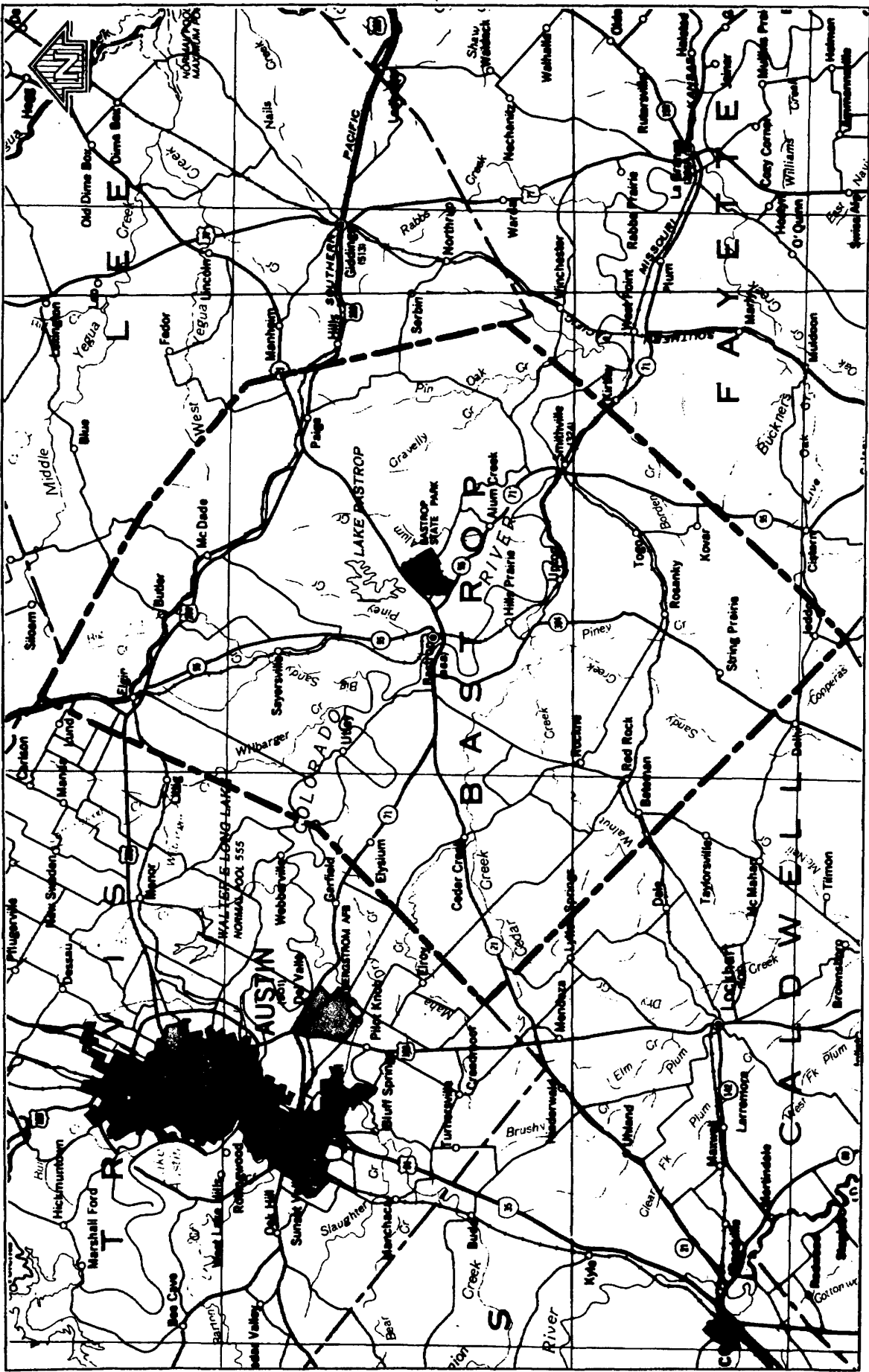
This Flood Insurance Study covers the geographic area of Bastrop County, Texas. The area of study is shown on the Vicinity Map (Figure 1).

The following tabulation shows the limits of study for the streams studied by detailed methods.

<u>Stream</u>	<u>Limits of Detailed Study</u>
Colorado River	From approximately 4.2 miles downstream of the Kansas-Missouri-Texas Railroad to a point approximately 9.5 miles upstream of Loop 150
Gills Branch	From its confluence with the Colorado River to a point just downstream of State Route 95
Cedar Creek	From approximately 1.1 miles downstream of FM 535 to a point approximately 3.7 miles upstream of FM 535
Dry Creek South	From a point approximately 2.0 miles upstream of the confluence with the Colorado River to a point approximately 3.6 miles upstream of the confluence with the Colorado River.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1994.

All or portions of the following flooding sources were studied by approximate methods: Long Hollow, Lytton Spring Creek, Maha Creek, Cottonwood Creek, Red Gully Creek, Moss Creek, Dry Creek, Coleman Branch, Wilbargers Creek, Little Sandy Creek, Elm Creek, Dogwood Creek, Burlson Creek, Big Sandy Creek, Lytton Creek, Walnut Creek, Town Creek, Little Alum Creek, Alum Creek, Cedar Hollow Creek, Habbs Creek, Long Branch, Lake Bastrop, McLaughlin Creek, Piney Creek, West Yegua Creek, Rocky Creek, Paint Creek, Marshy Branch, Upper Elm



FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FIGURE 1**

Creek, Lower Elm Creek, Brushy Creek, Sandy Creek, Lentz Branch, Waterhole Branch, Little Piney Creek, Copperas Creek, Pigeonroost Hollow, Reeds Creek, Mill Creek, Line Creek, Wolf Creek, Puss Hollow, JD Creek, Hunt Brook, Price Creek, West Fork Gravelly Creek, East Fork Gravelly Creek, Sprawling Branch, Pin Oak Creek, Spring Creek, Bluff Creek, Orts Branch, Little Copperas Creek, Peach Creek, Rocky Creek, Hickory Creek, Bartons Creek, Buckners Creek, Pricklypear Creek, Gazley Creek, Willow Creek, Lake Creek, Stagners Lake, Shipp's Lake, Gravelly Creek, Grassy Creek, Alum Branch, Little Pin Oak Creek, Dreissner Branch, Long Prairie Branch, Live Oak Branch, Spicy Creek, Trigg Lake, Bee Creek, Buescher Lake, Turner Creek, the Colorado River, and Cedar Creek.

## 2.2 Community Description

Bastrop County is located in central Texas, approximately 30 miles southeast of the City of Austin. It is bordered by Lee County to the east, Fayette County to the southeast, Caldwell County to the southwest, Travis County to the Northwest, and Williamson County to the North.

Bastrop County is primarily an agricultural community with a population of approximately 24,726. The City of Bastrop is the county seat and has a population of approximately 3,789 (Reference 1). Recent development in both communities is mainly residential in nature.

The physical features of the county include rolling hills, alluvial and sandy loam soils, and the Colorado River bisecting the county. The City of Bastrop is located on the eastern bank of the Colorado River and is relatively flat in the interior regions of the urbanized area. The city lies in a large depression, which drains poorly.

The primary drainage system in the City of Bastrop consists of Piney Creek to the north, Gills Branch to the south, and the Colorado River to the west. A majority of the storm runoff contributes to Piney Creek or Gills Branch. A relatively small drainage area immediately adjacent to the river contributes directly to the Colorado River.

The climate of the county is reasonably mild. The average annual precipitation is approximately 37 inches. The largest storm events are usually the result of tropical systems which move inland from the Gulf of Mexico. However, major thunderstorms can also be generated from frontal systems which typically approach from the northwest. The mean maximum and minimum temperatures for July and January are 96 degrees Fahrenheit ( $^{\circ}$ F) and 40 $^{\circ}$ F, respectively (Reference 1).

## 2.3 Principal Flood Problems

The City of Bastrop can experience some local flooding due to Piney Creek and Gills Branch. However, due to the lack of gage records, no frequency information is available. The Colorado River can

experience significant increases in stage. Some of the more significant storms on record include those of May 1975, June 1981, and October 1961. These were approximately 10-year, 10-year, and 20-year storms respectively. These storms have all occurred since the construction of Lake Travis, approximately 80 river miles upstream, in the early 1940's. Lake Travis, Buchanan, and other reservoirs in the Highland Lake System provide a significant amount of flood protection for the Colorado River near the City of Bastrop. Prior to the construction of Lake Travis, extremely large floods were experienced in July 1869, June 1935, and December 1913. These events exceeded the stage of the October 1961 flood of 34.4 feet by 25.9 feet, 22.6 feet, and 18.9 feet respectively. If events such as these were to occur today, without the upstream control provided by the Highland Lakes as discussed above, widespread flooding and property damage would result.

#### 2.4 Flood Protection Measures

As residential development continues to occur, the demand for aesthetically pleasing stream or riverfront property will increase. However, the adoption of local regulations concerning floodplain management, as a part of the requirements for NFIP participation, and the determination of floodways, will help alleviate storm-related losses. The construction of Lakes Travis and Buchanan, discussed in the previous section, provided Bastrop County with a significant reduction in flood magnitude. No other major structural flood protection measures exist or are currently planned for the county.

### 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

Flow frequencies for the Colorado River were based on a statistical analysis of USGS streamflow gage data. The Colorado River analysis was performed in accordance with criteria outlined in the Water Resources Council Bulletin No. 17B (Reference 2). The U. S. Army Corps of Engineers computer model, HECWRC was used to develop the frequency-discharge relationships (Reference 3). The analysis was based on a systematic record of 26 years and a generalized skew coefficient of  $-0.26$  as shown on Plate 1 in Bulletin No. 17B. With the concurrence of FEMA, the expected probability values were used in the hydraulic analysis rather than the computed values normally used. These values account for some of the uncertainty encountered in this previously unstudied reach of the stream.

There exists a series of seven reservoirs upstream of the study location. This reservoir system provides a substantial amount of flood regulation. The primary control for the Colorado River in this lake system is Lake Travis, which is approximately 80 river miles upstream of the City of Bastrop. Although there exists some regulation of flood flows in the Colorado River basin, flood frequency analysis of the Bastrop gage records provides a reliable estimate of the frequency-discharge relationship at the City of Bastrop.

The Gills Branch hydrology was performed using the Soil Conservation Service (SCS) computer program TR-20 (Reference 4). This program allows ponding, basin storage, and diversion of flow to be modeled as a part of the hydrologic system. The program uses the procedures described in Section 4 of the National Engineering Handbook to develop synthetic flood hydrographs and determine peak flows at selected locations. Hydrologic data required for the model includes storm rainfall frequency information and drainage basin characteristics such as basin size, time of concentration and SCS runoff curve numbers.

The hydrologic analysis for Cedar Creek was performed using the USGS Publication 77-110 previously referenced for the 10-, 50-, and 100-year storm events. The 500-year discharge was determined graphically from an extrapolation of 10-, 50-, and 100-year events on log-probability paper.

The hydrologic analyses for Dry Creek South were taken from the Flood Insurance for Travis County (Reference 5). The SCS method was used in determining peak flood flows for Dry Creek South. The SCS method of estimating direct runoff from storm rainfall is based on procedures developed by SCS hydrologists over the last three decades. Time of travel, peak flows, and accumulated runoff ratios

from SCS dimensionless hydrographs were used to tabulate the design flood hydrographs and peak discharges for the 10-, 50-, and 100-year storms. The 500-year discharge was determined by a log-normal extrapolation of the 10-, 50-, and 100-year flows.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

### 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the Colorado River were obtained from aerial surveys. Typical subsurface streambed geometry was obtained by field survey. The three bridges within the study reach were surveyed to obtain elevation data. Bridge geometry was taken from construction drawings. Cross-section data for Gills Branch were obtained from field surveys in conjunction with USGS topographic



Table 1 – Summary of Discharges

<u>Flooding Source and Location</u>	<u>Drainage Area (sq. miles)</u>	Peak Discharges (cubic feet per second)			
		<u>10-Percent-Annual-Chance</u>	<u>2-Percent-Annual-Chance</u>	<u>1-Percent-Annual-Chance</u>	<u>0.2-Percent-Annual-Chance</u>
<b>Cedar Creek</b>					
Downstream of Maha Creek	88.0	11,490	22,230	28,290	46,760
Upstream of Maha Creek	49.0	7,390	15,400	20,100	34,910
<b>Colorado River</b>					
Bastrop Gage (USGS Gage No. 08159200)	39,980.0	71,975	120,920	142,020	319,352
<b>Dry Creek South</b>					
At confluence with the Colorado River	57.3	11,379	17,292	19,813	25,719
<b>Gills Branch</b>					
At confluence with the Colorado River	2.8	2,300	3,221	3,873	5,000
At State Route 71	2.3	1,525	2,013	2,215	2,750
At Loop 150	1.2	850 <sup>1</sup>	850 <sup>1</sup>	850 <sup>1</sup>	850 <sup>1</sup>
At State Route 95	1.0	1,076	1,700	1,981	2,700
<b>Piney Creek</b>					
At confluence of Sandy Creek	17.7	8,499	12,821	16,360	19,599
Approximately 4 miles upstream of the confluence with Sandy Creek	3.0	8,078	12,078	15,388	18,297
<b>Sandy Creek</b>					
At confluence with Piney Creek	39.9	20,650	30,916	39,539	46,887
Approximately 4 miles upstream of the confluence with Piney Creek	31.7	15,091	22,906	29,365	35,207

<sup>1</sup>Approximate capacity of upstream channel

maps (Reference 6). All bridges and culverts were surveyed to obtain elevation data and structural geometry. Cross-section data for Cedar Creek was obtained from aerial surveys. The FM 535 bridge was field surveyed to obtain elevation and geometry data. Cross section data for Dry Creek South was taken from the Travis County Flood Insurance Study (Reference 5). These cross sections were obtained from field surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2). Along certain portions of streams, a profile base line is shown on the maps to represent channel distances as indicated on the flood profiles and floodway data tables.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the analysis were determined by the slope-area method. However, the Colorado River backwater was considered in the floodplain mapping for Gills Branch. For Dry Creek South, the water-surface elevations were computed using the Slope-Area Method as outlined in the Travis County Flood Insurance Study (Reference 5).

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen based on field observations or model calibration of the stream and floodplain areas. The following tabulation lists Channel and overbank "n" values for the streams studied by detailed methods.

<u>Stream</u>	<u>Channel "n"</u>	<u>Overbank "n"</u>
Colorado River	0.0365	0.060-0.120
Gills Branch	0.015-0.060	0.070-0.100
Cedar Creek	0.060	0.050-0.010
Dry Creek South	0.032-0.055	0.045-0.092

Several unique circumstances were encountered while analyzing and mapping the floodplains for Gills Branch. After reviewing the hydraulic model results, the energy grade line elevation was determined to be more representative of the actual water-surface elevations at two cross sections along Gills Branch where weir flow occurs. At these two locations, the flow can be categorized as being in the transition range between pressure flow and as a combination of pressure and weir flow. In the case of these two bridges, this approach provides the more correct solution. Therefore, the water-surface elevations at the upstream face of the Marion Street Bridge and the Pine Street Bridge were set equal to the energy grade line at these locations.

Along the west bank of Gills Branch north of Chestnut Street, the 100-year and 500-year floodplain boundaries correspond to the west channel bank location. This location represents the highest point west of the channel.

A broad area of 100-year shallow flooding is located west of Gills Branch due to the overflow from this channel north of Chestnut Street. The majority of the shallow flooding consists of sheet flow across the sloping terrain of the west overbank eventually ponding along the eastern side of the Missouri Kansas and Texas railroad tracks. Cross section and slope information for those areas outside the limits of the surveys was obtained from the USGS topographic maps (Reference 6). Delineation of the ponded areas and the base flood elevations along the railroad tracks was based on site reconnaissance and interpretation of the USGS maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study, and their descriptions, are shown on the maps.

#### **4.0 FLOODPLAIN MANAGEMENT APPLICATIONS**

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

##### **4.1 Floodplain Boundaries**

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with contour intervals of 10 and 20 feet (Reference 6).

For the streams studied by approximate methods, 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Maps for the City of Bastrop, and the unincorporated areas of Bastrop County

(References 8 and 9); and the previously printed Flood Insurance Studies for the Cities of Elgin and Smithville (References 10 and 11).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

#### 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. For Gills Branch, the water-surface elevation at the upstream face of the Marion Street Bridge and the Pine Street Bridge

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR CREEK								
A	0	833	9,913	2.9	411.0	411.0	412.0	1.0
B	400	1,000	10,886	2.6	412.1	412.1	413.1	1.0
C	5,608	900	6,895	4.1	415.6	415.6	416.6	1.0
D	7,200	1,400	8,300	2.4	417.5	417.5	418.5	1.0
E	9,050	1,100	5,923	3.4	419.5	419.5	420.5	1.0
F	9,900	1,400	8,581	2.3	420.5	420.5	421.5	1.0
G	16,050	1,600	9,327	2.2	422.2	422.2	423.2	1.0
H	17,350	900	6,672	3.0	423.3	423.3	424.2	0.9
I	18,850	975	6,740	3.0	424.4	424.4	425.4	1.0
J	20,400	660	4,390	4.6	426.4	426.4	427.4	1.0
K	21,450	450	3,929	5.1	428.1	428.1	429.0	0.9
L	22,500	500	3,735	5.4	430.0	430.0	430.9	0.9
M	24,500	1,050	8,918	2.3	431.5	431.5	432.5	1.0
N	25,100	500	3,167	6.3	432.1	432.1	432.9	0.8
O	25,330	550	3,242	6.2	432.8	432.8	433.6	0.8
P	26,300	600	4,672	4.3	435.1	435.1	436.1	1.0
Q	27,400	1,226	7,155	2.8	436.7	436.7	437.7	1.0
R	30,000	1,000	8,303	2.4	438.9	438.9	439.8	0.9
S	33,500	880	9,099	2.2	441.6	441.6	442.5	0.9

<sup>1</sup> Feet above limit of detailed study located approximately 5,808 feet downstream of FM 535

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**CEDAR CREEK**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
CEDAR CREEK (CONTINUED)								
T	35,200	1,243	8,087	2.5	443.6	443.6	444.4	0.8
U	38,700	1,500	8,430	2.4	447.1	447.1	448.1	1.0
V	39,800	1,500	8,860	2.3	448.4	448.4	449.4	1.0
W	40,800	948	4,502	4.5	451.1	451.1	452.1	1.0

<sup>1</sup> Feet above limit of detailed study located approximately 5,808 feet downstream of FM 535

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX**  
AND INCORPORATED AREAS

**FLOODWAY DATA**

**CEDAR CREEK**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER								
A	1,085,903	1,679	33,099	4.38	297.7	297.7	298.2	0.5
B	1,087,867	2,098	40,747	3.55	298.5	298.5	299.0	0.5
C	1,091,987	1,304	36,949	3.92	299.4	299.4	300.0	0.6
D	1,097,080	2,600	54,564	2.65	300.4	300.4	301.2	0.8
E	1,101,892	2,500	52,857	2.74	301.1	301.1	301.9	0.8
F	1,106,195	5,900	96,112	1.51	301.6	301.6	302.4	0.8
G	1,110,142	6,300	73,119	1.98	301.9	301.9	302.8	0.9
H	1,115,026	1,600	35,142	4.15	302.9	302.9	303.8	0.9
I	1,117,254	2,500	37,910	3.86	303.8	303.8	304.6	0.8
J	1,118,198	1,175	26,744	5.47	304.1	304.1	305.1	1.0
K	1,118,345	1,175	26,992	5.43	304.2	304.2	305.2	1.0
L	1,119,744	925	21,899	6.69	304.6	304.6	305.4	0.8
M	1,120,708	840	21,494	6.83	305.2	305.2	306.1	0.9
N	1,121,886	750	20,423	7.20	305.9	305.9	306.8	0.9
O	1,123,511	1,060	29,466	5.00	307.4	307.4	308.3	0.9
P	1,127,754	2,380	45,287	3.25	309.0	309.0	309.8	0.8
Q	1,130,204	2,800	51,755	2.85	309.5	309.5	310.3	0.8
R	1,133,016	2,010	39,221	3.76	310.0	310.0	310.9	0.9

<sup>1</sup> Feet above mouth at Matagorda Bay

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX**  
AND INCORPORATED AREAS

**FLOODWAY DATA**

**COLORADO RIVER**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (CONTINUED)								
S	1,135,961	1,772	40,768	3.62	310.7	310.7	311.7	1.0
T	1,138,769	1,505	23,578	6.26	311.4	311.4	312.3	0.9
U	1,143,510	3,833	51,525	2.87	313.9	313.9	314.7	0.8
V	1,146,181	5,310	65,537	2.26	314.6	314.6	315.3	0.7
W	1,148,519	3,712	44,578	3.32	314.9	314.9	315.6	0.7
X	1,151,455	5,442	61,682	2.40	315.5	315.5	316.4	0.9
Y	1,154,267	6,275	57,531	2.58	316.3	316.3	317.2	0.9
Z	1,158,495	5,800	79,859	1.87	317.3	317.3	318.3	1.0
AA	1,162,642	3,160	43,754	3.42	318.1	318.1	319.1	1.0
AB	1,167,120	3,739	53,262	2.83	319.4	319.4	320.4	1.0
AC	1,171,513	3,755	39,383	3.83	320.6	320.6	321.4	0.8
AD	1,176,755	4,550	72,538	2.09	322.1	322.1	322.9	0.8
AE	1,178,498	5,450	80,945	1.87	322.3	322.3	323.1	0.8
AF	1,181,045	5,400	75,519	2.01	322.5	322.5	323.4	0.9
AG	1,184,092	4,600	53,638	2.83	322.9	322.9	323.9	1.0
AH	1,186,865	4,310	49,004	3.11	323.6	323.6	324.7	1.1
AI	1,190,104	3,313	31,859	4.80	325.0	325.0	325.9	0.9
AJ	1,196,209	1,560	23,189	6.08	329.1	329.1	329.7	0.6
AK	1,203,862	646	22,116	6.38	333.4	333.4	334.1	0.7

<sup>1</sup> Feet above mouth at Matagorda Bay

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COLORADO RIVER**



FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (CONTINUED)								
AL	1,206,494	1,197	24,824	5.68	334.2	334.2	335.0	0.8
AM	1,211,260	1,124	31,796	4.44	336.4	336.4	337.1	0.7
AN	1,215,066	1,080	25,045	5.64	337.6	337.6	338.2	0.6
AO	1,219,159	818	25,750	5.49	339.4	339.4	339.9	0.5
AP	1,223,050	753	23,256	6.08	340.7	340.7	341.2	0.5
AQ	1,226,009	648	20,706	6.83	342.0	342.0	342.5	0.5
AR	1,227,473	898	23,341	6.06	342.6	342.6	343.2	0.6
AS	1,231,270	1,277	31,365	4.51	344.6	344.6	345.5	0.9
AT	1,235,031	618	19,910	7.11	345.6	345.6	346.4	0.8
AU	1,237,640	485	18,456	7.68	346.8	346.8	347.5	0.7
AV	1,240,216	612	20,708	6.84	347.8	347.8	348.5	0.7
AW	1,243,238	1,375	32,779	4.32	349.0	349.0	349.7	0.7
AX	1,246,272	1,336	34,501	4.11	349.6	349.6	350.3	0.7
AY	1,250,328	927	23,080	6.15	350.6	350.6	351.2	0.6
AZ	1,253,864	1,064	26,572	3.08	352.3	352.3	352.8	0.5
BA	1,254,380	923	25,824	3.17	352.3	352.3	352.8	0.5
BB	1,254,927	984	26,218	3.12	352.4	352.4	352.9	0.5
BC	1,256,293	1,172	29,545	2.77	352.6	352.6	353.1	0.5
BD	1,256,462	1,083	29,658	2.76	352.6	352.6	353.1	0.5

<sup>1</sup> Feet above mouth at Matagorda Bay

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COLORADO RIVER**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (CONTINUED)								
BE	1,256,595	1,070	28,885	2.84	352.7	352.7	353.2	0.5
BF	1,259,200	1,720	51,553	1.70	353.0	353.0	353.4	0.4
BG	1,263,864	1,180	24,318	3.60	353.2	353.2	353.6	0.4
BH	1,267,038	860	23,264	3.76	353.6	353.6	353.9	0.3
BI	1,270,548	910	25,321	3.45	354.0	354.0	354.2	0.2
BJ	1,272,597	1,250	36,869	2.59	354.3	354.3	354.5	0.2
BK	1,275,058	715	18,649	5.11	354.4	354.4	354.6	0.2
BL	1,277,251	700	20,152	4.92	354.7	354.7	354.9	0.2
BM	1,282,305	1,615	23,965	5.71	355.5	355.5	356.1	0.6
BN	1,290,762	1,025	25,148	5.43	357.3	357.3	358.3	1.0
BO	1,295,024	645	18,482	7.38	358.4	358.4	359.3	0.9
BP	1,297,534	910	17,285	7.89	358.8	358.8	359.7	0.9
BQ	1,301,763	2,255	24,402	5.35	361.1	361.1	362.1	1.0
BR	1,304,422	965	20,183	6.47	361.6	361.6	362.6	1.0
BS	1,309,137	500	15,203	8.58	362.7	362.7	363.7	1.0
BT	1,311,372	675	18,675	6.99	363.8	363.8	364.8	1.0
BU	1,317,217	520	15,267	8.55	365.4	365.4	366.4	1.0
BV	1,321,274	6,050	47,265	2.36	367.6	367.6	368.6	1.0
BW	1,325,899	6,000	60,485	1.84	368.2	368.2	369.1	0.9

<sup>1</sup> Feet above mouth at Matagorda Bay

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COLORADO RIVER**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (CONTINUED)								
BX	1,328,438	5,950	49,640	2.24	368.3	368.3	369.2	0.9
BY	1,333,143	3,300	41,060	2.71	368.9	368.9	369.8	0.9
BZ	1,335,504	1,746	16,839	6.62	368.9	368.9	369.8	0.9
CA	1,336,204	1,870	21,075	5.29	369.2	369.2	370.1	0.9
CB	1,337,188	2,075	22,355	5.00	369.6	369.6	370.5	0.9
CC	1,343,300	1,359	15,674	7.19	371.5	371.5	372.3	0.8
CD	1,346,839	705	18,876	6.01	373.7	373.7	374.6	0.9
CE	1,350,669	460	13,782	8.25	375.0	375.0	375.8	0.8
CF	1,352,843	695	19,165	5.94	375.9	375.9	376.8	0.9
CG	1,355,282	530	15,457	7.37	376.5	376.5	377.4	0.9
CH	1,357,639	740	19,315	5.90	377.3	377.3	378.2	0.9
CI	1,358,984	715	16,923	6.73	377.7	377.7	378.5	0.8
CJ	1,360,952	605	15,617	7.30	378.2	378.2	379.1	0.9
CK	1,362,079	640	16,244	7.02	378.9	378.9	379.8	0.9
CL	1,365,260	610	16,847	6.77	379.8	379.8	380.6	0.8
CM	1,367,983	785	16,894	6.75	381.1	381.1	382.0	0.9
CN	1,371,605	555	16,555	6.89	382.3	382.3	383.2	0.9
CO	1,374,089	550	13,548	8.42	382.7	382.7	383.7	1.0
CP	1,375,883	620	16,050	7.11	383.5	383.5	384.4	0.9

<sup>1</sup> Feet above mouth at Matagorda Bay

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX**  
AND INCORPORATED AREAS

**FLOODWAY DATA**

**COLORADO RIVER**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
COLORADO RIVER (CONTINUED)								
CQ	1,379,366	995	20,052	5.69	385.0	385.0	385.9	0.9
CR	1,381,622	1,368	15,150	7.53	385.3	385.3	386.2	0.9
CS	1,383,693	1,110	17,992	6.34	385.9	385.9	386.8	0.9
CT	1,386,708	1,243	19,181	5.95	386.9	386.9	387.9	1.0
CU	1,389,663	4,805	67,999	1.68	388.0	388.0	388.9	0.9
CV	1,393,376	4,980	69,757	1.57	388.2	388.2	389.1	0.9
CW	1,396,157	3,270	26,521	4.15	388.4	388.4	389.3	0.9
CX	1,399,205	2,786	25,943	4.26	389.3	389.3	390.1	0.8
CY	1,400,662	1,761	22,350	4.97	389.7	389.7	390.6	0.9
CZ	1,407,078	2,935	54,369	2.06	391.1	391.1	392.0	0.9

<sup>1</sup> Feet above mouth at Matagorda Bay

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COLORADO RIVER**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
DRY CREEK EAST								
A	11,556	340	5,266	3.3	396.8	396.8	397.6	0.8
B	15,679	275	4,042	4.2	400.2	400.2	401.1	0.9
C	20,325	290	2,702	6.2	402.1	402.1	403.1	1.0

<sup>1</sup>Feet above confluence with Colorado River

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**DRY CREEK EAST**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
DRY CREEK SOUTH								
A	10,930	720	8,197	2.4	392.8	392.8	393.7	0.9
B	13,880	281	3,934	5.0	397.3	397.3	398.3	1.0
C	19,110	302	4,048	4.5	404.2	404.2	405.1	0.9

<sup>1</sup> Feet above confluence with Colorado River

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**DRY CREEK SOUTH**

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD)	WITHOUT FLOODWAY (FEET NAVD)	WITH FLOODWAY (FEET NAVD)	INCREASE (FEET)
<b>GILLS BRANCH</b>								
A	750	112	746	5.2	353.0	327.4 <sup>2</sup>	327.5	0.1
B	1,550	53	427	9.1	353.0	331.9 <sup>2</sup>	331.9	0.0
C	2,888	293	1,099	3.5	353.0	342.3 <sup>2</sup>	342.3	0.0
D	3,274	284	34	5.3	353.0	344.4 <sup>2</sup>	344.4	0.0
E	3,573	474	1,100	3.5	353.0	346.9 <sup>2</sup>	346.9	0.0
F	3,888	50	285	13.6	353.0	349.4 <sup>2</sup>	349.4	0.0
G	4,550	53	290	13.4	353.7	353.7	353.7	0.0
H	4,800	72	683	5.7	357.4	357.4	358.1	0.2
I	4,900	69	572	3.9	358.7	358.7	358.7	0.0
J	5,880	68	387	5.7	364.4	364.4	394.4	0.0
K	6,611	52	303	5.7	366.0	366.0	366.6	0.6
L	7,021	96	258	3.3	370.0	370.0	370.3	0.3
M	7,540	113	294	2.9	372.7	372.7	372.8	0.1
N	8,000	24	174	4.9	375.4	375.4	375.5	0.1
O	8,686	39	174	4.9	380.1	380.1	380.4	0.3
P	9,236	53	254	7.8	394.8	394.8	395.1	0.3
Q	9,634	65	392	5.0	397.2	397.2	397.7	0.5

<sup>1</sup> Feet above confluence with Colorado River

<sup>2</sup> Elevation computed without consideration of backwater effects from Colorado River

**TABLE 2**

FEDERAL EMERGENCY MANAGEMENT AGENCY

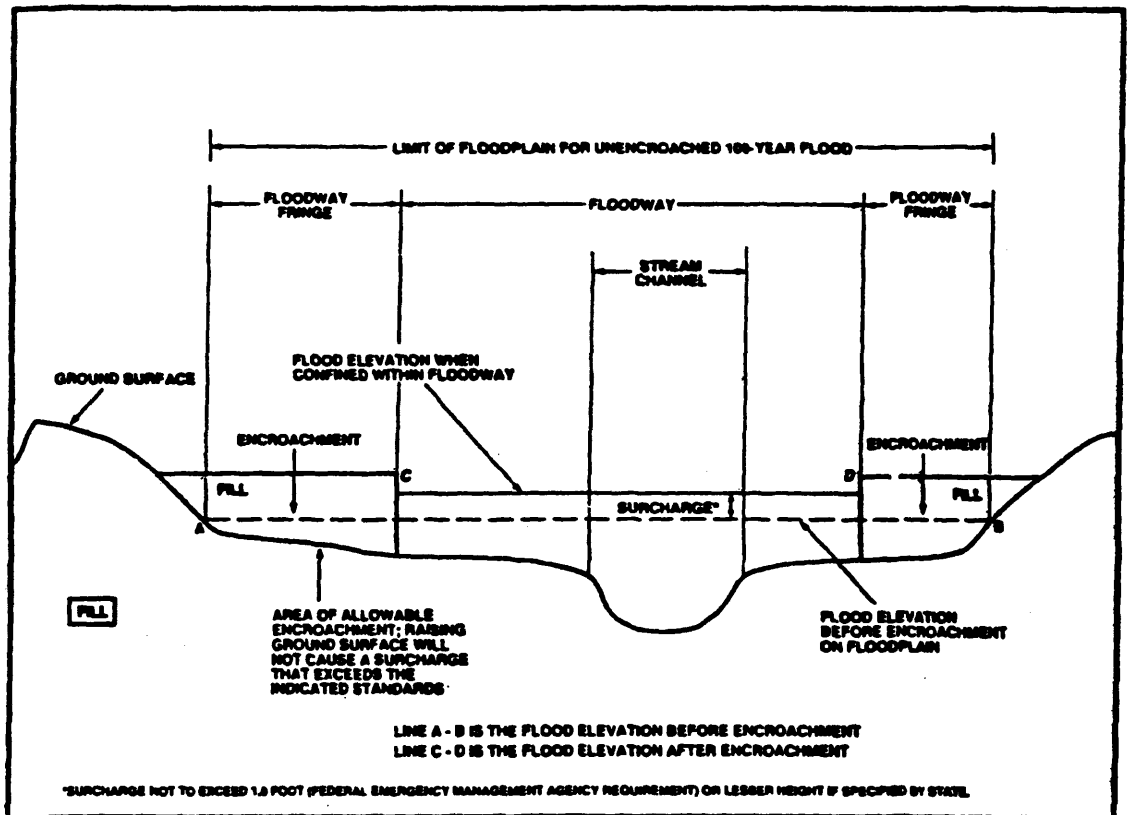
**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**GILLS BRANCH**

were set equal to the energy grade line (as described in Section 3.2). Consistent with that approach, the water-surface elevation rise resulting from the floodway encroachment was maintained at a maximum of one foot greater than the energy grade line at these locations.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.



FLOODWAY SCHEMATIC

Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 2 for certain downstream cross sections of Gills Branch are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.



## 5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

### Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

### Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

### Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

### Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

### Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

### Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-

year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

#### **Zone VE**

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

#### **Zone X**

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

#### **Zone D**

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

### **6.0 FLOOD INSURANCE RATE MAP**

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current Flood Insurance Rate Map (FIRM) presents flooding information for the entire geographic area of Bastrop County, Texas. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each

identified flood-prone incorporated community and the unincorporated areas of the county. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community are presented in Table 3, "Community Map History."

## 7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the unincorporated areas of Travis, Caldwell, and Fayette Counties, Texas (References 5, 12, and 13).

Because it is based on more up-to-date and detailed analysis, this study supersedes the Flood Hazard Boundary Maps for the City of Bastrop and the unincorporated areas of Bastrop County (References 8 and 9); and the previously printed Flood Insurance Studies for the Cities of Elgin and Smithville (Reference 10 and 11).

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting FEMA, Mitigation Division, Federal Regional Center, Room 206, 800 North Loop 288, Denton, Texas 76201-3698.

## 9.0 BIBLIOGRAPHY AND REFERENCES

1. Dallas Morning News, 1988-1989 Texas Almanac, Dallas, Texas, 1987.
2. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.
3. U. S. Army Corps of Engineers, Computer Program, HECWRC, Users Manual, Flood Flow Frequency Analysis, Hydrologic Engineering Center, Davis, California, February 1982.
4. U. S. Department of Agriculture, Soil Conservation Service, Technical Release No. 20, Computer Program, Project Formulation, Hydrology, Washington, D. C., 1965.
5. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Travis County, Texas, Washington, D. C., September 27, 1985.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
Bastrop, City of	March 19, 1976	None	August 19, 1991	
Bastrop County (Unincorporated Areas)	August 9, 1977	June 3, 1980	August 19, 1991	
Elgin, City of	June 21, 1974	February 27, 1976	July 1, 1988	
Smithville, City of	April 5, 1974	May 21, 1976	January 16, 1979	

**TABLE 3**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

6. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Intervals 10 and 20 Feet: Smithville NW, Texas, 1982; Lake Bastrop, Texas, 1982; Bastrop, Texas, 1982; Red Rock, Texas 1964, Photorevised 1981; Cistern, Texas, 1965, Photorevised, 1981; Couplano, Texas, 1982; Creedmoor, Texas, 1968, Photorevised 1973; Dale, Texas, 1964, Photorevised 1981; Delhi, Texas, 1964, Photorevised, 1981; Fedor, Texas, 1982; Jeddo, Texas, 1964, Photorevised, 1981; McDade, Texas, 1982; Paige, Texas, 1982; Rosanky, Texas, 1964, Photorevised 1981; Structure, Texas, 1982; Utley, Texas, 1982; Webberville, Texas, 1987; West Point, Texas, 1958, Photorevised 1981; Winchester, Texas, 1982; Lytton Springs, Texas, 1968, Photorevised 1994; Elgin West, Texas, 1982; Elgin East, Texas, 1982; Bastrop SW, Texas, 1982; Togo, Texas, 1964, Photorevised, 1981.
7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.
8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Bastrop, Bastrop County, Texas, March 19, 1976.
9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of Bastrop County, Texas, June 3, 1980.
10. Federal Emergency Management Agency, Flood Insurance Study, City of Elgin, Bastrop County, Texas, Washington, D. C., July 1, 1988.
11. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Smithville, Bastrop County, Texas, Washington, D. C., January 16, 1979.
12. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Caldwell County, Texas, Washington, D. C., March 15, 1982.
13. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Fayette County, Texas, Washington, D. C., June 1, 1987.

14. Schroeder, E. E. and Massey, B. C., U. S. Department of the Interior, Geological Survey, Water Resources Investigations Report 77-11, Techniques for Estimating the Magnitude and Frequency of Floods in Texas, 1977.
15. Jennings, M. E., Thomas, W. O., and Riggs, H. C., U. S. Department of the Interior, Geological Survey, Water Resources Investigations Report 94-4002, 1994 Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, 1993.
16. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, 1991.

## 10.0 REVISION DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data located at the City of Bastrop City Hall, Bastrop, Texas; the City of Elgin City Hall, Elgin, Texas; the City of Smithville City Hall, Smithville, Texas; or the Bastrop County Courthouse, 804 Pecan, Bastrop, Texas.

### 10.1 First Revision

This restudy was revised on December 8, 1998, to show modifications to flood hazards along Cedar Creek from approximately 1.1 miles downstream of FM 535 to the upstream FM 812. This restudy includes a complete revision of the reach previously studied along Cedar Creek. The previous study reach extended from the same downstream beginning of detailed study to approximately 3.7 miles upstream of FM 535.

The hydrologic and hydraulic analyses for this revision were performed for FEMA by the U.S. Geological Survey (USGS), under Interagency Agreement No. EMW-95-E-4757, Project Order No. 3.

The results of this revision were reviewed at a final CCO meeting held on September 30, 1997, and attended by representatives of FEMA, Bastrop County, the USGS, and the TNRCC. All problems raised at that meeting have been addressed in this restudy.

Equations from USGS Water Resources Investigations Report 77-11, "Techniques for Estimating the Magnitude and Frequency of Floods in Texas" (Reference 14), were used to estimate the 10-, 50-, and 100-year- flood peak discharges for Cedar Creek. The 500-year-flood peak discharges were estimated using USGS Water Resources Investigations Report 94-4002, "1994 Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites" (Reference 15). The study reach was divided into two subreaches, below and above the confluence with Maha Creek (just above FM 535). While the two watersheds may peak at different times, a conservative direct arithmetic sum of the two peaks was used in estimating the flood peak discharges downstream from the confluence. The flood peak discharges calculated for Cedar Creek above the confluence were used for the entire subreach above the confluence because no substantial single tributary exists in that subreach.

Cross-section data from the previous Cedar Creek study were retained for use in this revision. Additional upstream cross-section data were field surveyed by the USGS. All USGS-surveyed cross sections were referenced to RM1 of the previous study.

Water-surface elevations of the floods for the selected recurrence intervals were computed using the U.S. Army Corps of Engineers HEC-2 computer program (Reference 16). Between cross sections, the floodplain and floodway boundaries were interpolated using topographic mapping at a scale of 1:24,000, with a contour interval of 10 feet (Reference 6).

Roughness values (Manning's "n") for cross sections from the previous study were retained for those sections. Channel and overbank roughness values for the additional upstream cross sections were chosen based on field observations and photographs of Cedar Creek and ranged from 0.05 to 0.07 and 0.04 to 0.10, respectively.

Table 1, "Summary of Discharges," Table 2, "Floodway Data," Table 3, "Community Map History," and Exhibit 1, "Flood Profiles," were also revised to reflect changes as a result of the restudy.

10.2 Second Revision  
Colorado River (January 19, 2006)

a. Purpose of Revision

This revision updates and revises the previous Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for Bastrop County, Texas, including the cities of Bastrop, Elgin, and Smithville. This information will be used by the communities to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development

b. Authority and Acknowledgements

The Colorado River revision was completed and submitted to FEMA on March 17, 2003, by Halff Associates, Inc., on behalf of the Lower Colorado River Authority under Contract No. EMT-2001-CO-0029. The revision to the streams studied by limited detail methods was submitted to FEMA on August 3, 2004, by Watershed Concepts, under Contract No. TA-04, Task Order 1.

c. Coordination

The Initial Consultation and Coordination Officer's (CCO) meeting was held on June 20, 2002, and attended by representatives of Bastrop County, City of Bastrop, City of Smithville, City of Elgin, the Lower Colorado River Authority, and the study contractors. All comments and concerns raised at the CCO meeting have been addressed. A final CCO meeting was held on October 26, 2004, to review the revised report with representatives of Halff Associates, Inc., Watershed Concepts, LCRA, FEMA, and officials of incorporated communities.

d. Scope of Revision

The Colorado River was restudied by detailed hydrologic and hydraulic methods for a total of approximately 60.5 miles from the Bastrop County-Travis County line to the Bastrop County-Fayette County line. The streams studied by limited detail methods, approximate Zone A, were divided into 10 sub-basins: Bartons Creek, Cedar Creek, Lower Pin-Oak, North Piney-Alum, Sandy Creek, Southeast Tributaries, South Piney-Sandy, Upper Pin-Oak, Walnut Creek and Willbarger Creek. This revision also converts the vertical datum reference for the entire county to the North American Vertical Datum of 1988 (NAVD 88).



This revision also incorporates the following Letters of Map Revision (LOMRs) that affect the 1-percent-annual-chance floodplain delineation:

<u>Case No.</u>	<u>Effective Date</u>	<u>Project Identifier</u>
01-06-1939P	08/15/2002	Elgin Wastewater Treatment Plant Channel Improvement
01-06-1169P	12/05/2002	La Reata Subdivision
04-06-1182P	07/08/2004	Hunter's Crossing
04-06-1736P	02/02/2005	Highway 290 to Brenham Street

e. Hydrologic Analysis

For this revision, the peak discharges for the Colorado River were developed by a flood frequency analysis of the annual peak floods for the stream flow data recorded over a 70-year period of record (Reference 17). The USACE HEC-HMS computer program (Reference 18) was used to create hydrographs for each of the resulting peaks. The peak discharge-drainage area relationship for the Colorado River is shown Table 1.

Peak flood discharges for streams restudied by limited detail methods were estimated following the regional regression approach described in USGS Water Resource Investigation (WRI) report 98-4015 (Reference 19). Drainage area and main channel slope were found to be the two parameters significant to the regression equation development. The basin delineations and drainage areas were determined using a 50' x 50' grid size digital elevation model (DEM) generated from a USGS topographic map with a 10-foot contour interval.

f. Hydraulic Analysis

For this revision, cross section data for the Colorado River was taken from 2-foot contour interval topographic maps of Bastrop County and 1-foot contour interval topographic maps for the City of Bastrop (Reference 17). The mapping was supplemented with field surveys conducted in the summer of 2001 as a part of the Lower Colorado River Basin-wide study (Reference 17) as well as Texas Department of Transportation roadway and bridge construction plans.

The water surface elevations (WSEL) for the Colorado River were computed using the USACE HEC-RAS step-backwater computer program unsteady flow option (Reference 20). Starting downstream boundary conditions (stage hydrographs) were determined in the Lower Colorado River Basin-Wide Study (Reference 17).

For the streams studied by limited detail methods, topographic data for the floodplain models were developed using USGS topographic maps with a 10-foot contour interval, field measurements of structures, and updated hydrologic information.

The floodplain models were generated through use of the USACE HEC-RAS step-backwater computer program (Reference 21). The starting WSELs for the hydraulic models were set to normal depth by estimating the slope of the energy grade line from USGS topographic maps with a 10-foot contour interval or, where applicable, derived from the water surface profile of existing effective flood elevations.

Channel roughness factors (Manning's "n") for the hydraulic computations were assigned on the basis of visual inspection and analysis of aerial photographs. The Manning's "n" values for the Colorado River ranged from 0.03-0.046 for the channel, and 0.040-0.10 for the overbank. The Manning's "n" values for the limited detail streams ranged from 0.030-0.060 for channels and 0.070 to 1.0 for overbank areas.

The Floodway Data Tables and Flood Profiles for the Colorado River have been updated as a part of the revised hydrologic and hydraulic analysis.

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports, and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in BFEs across the corporate limits between the communities. The average conversion of +0.2 feet was applied to convert all effective Base Flood Elevations (BFEs). The Floodway Data Tables and Flood Profiles for Cedar Creek, Gills Branch, and Dry Creek South have been updated to reflect the new vertical datum reference (NAVD 88).

g. Floodplain Boundaries

For this revision, the boundaries for the Colorado River, Cedar Creek, Gills Branch, and Dry Creek South were interpolated between cross sections using orthophotography flown in 1998 and 1999. The orthophotography consists of 4-foot contour interval topographic mapping that was interpolated to 2-foot contours in rural areas and 1-foot contours in the City of Bastrop (Reference 17). Floodplain boundaries for streams studied by limited detail methods were also redelineated based on this topographic data.

h. Bibliography and References

17. Halff Associates, Incorporated, Mapping the Colorado River, Technical Support Data Notebook, Fort Worth, Texas, September 2002.
18. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-HMS Hydrologic Modeling System Version 2.0, Davis, California, March 1990.
19. U.S. Geological Survey, Water Resources Investigations Report 98-4015, Peak Flow Frequency for Tributaries of the Colorado River Downstream of Austin, Texas, USGS, 1998.
20. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System Version 3.1, Davis, California, November 2002.
21. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System Version 3.0, Davis, California, 2001.

### 10.3 Third Revision (January 6, 2016)

**a. Authority and Acknowledgments**

The hydrologic and hydraulic analyses, for Dry Creek East, were performed by Halff and Associates for FEMA, under Contract No. EMT-2010-CA-011. The work was completed in August 2013.

**b. Coordination**

No initial meeting was held. A final meeting was held on June 18, 2014, and was attended by representatives of Bastrop County, FEMA Region VI, and Atkins. All issues raised at the meeting were addressed.

**c. Scope of Study**

As part of this revised countywide FIS, updated analyses were performed for Dry Creek East.

The following tabulation lists streams that have names in this revised countywide FIS other than those used in the previously printed FIS reports for the communities in which they are located.

<u>Old Name</u>	<u>New Name</u>
Dry Creek South	Dry Creek East

Figure 4 presents important considerations for using the information contained in this FIS report and the FIRM and is provided in response to changes in format and content.

**d. Hydrologic Analyses**

Flow data for Dry Creek East was based on aerially reduced peak discharges. Peak discharges at key locations along the study streams were placed approximately one-half to one-third upstream of the reach between the key flow break locations.

Peak discharge-drainage area relationships for the 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance floods are presented in Table 4.

**Table 4 – Revised Summary of Discharges**

Peak Discharges (cubic feet per second)

<u>Flooding Source and Location</u>	<u>Drainage Area (square miles)</u>	<u>10-Percent- Annual- Chance</u>	<u>4-Percent- Annual-Chance</u>	<u>2-Percent- Annual-Chance</u>	<u>1-Percent- Annual-Chance</u>	<u>0.2-Percent- Annual-Chance</u>
Dry Creek East At confluence with Colorado River	55.660	11,200	14,100	15,900	19,200	28,900
Just downstream of confluence of Moss Branch	54.850	11,200	14,100	15,800	19,000	28,600
Approximately 700 feet upstream of confluence of Moss Branch	52.730	11,100	13,900	15,700	17,900	27,300
Just downstream of confluence of Red Gully Creek	52.140	11,100	13,900	15,700	17,500	26,800
Approximately 0.35 miles upstream of confluence of Red Gully Creek	45.280	10,800	13,500	15,100	16,800	20,700
Approximately 0.59 miles downstream of Empedrado Lane	44.370	10,800	13,500	15,100	16,800	20,600
Approximately 0.28 miles downstream of Empedrado Lane	44.130	10,800	13,500	15,100	16,800	20,600
Approximately 385 feet downstream of Travis/Bastrop County Line	43.790	10,800	13,500	15,100	16,700	20,600
Approximately 0.57 miles upstream of Tucker Hill Lane	42.990	12,900	17,400	20,500	23,500	29,800

**e. Hydraulic Analyses**

Field surveys of bridges, culverts, cross sections, and the channel of Dry Creek East were conducted. HEC-RAS 3.1.3 was used to calculate water surface elevations (Reference 22). Bridges and culverts were modeled using field surveys, field measurements, and State Highway 130 construction plans. Manning’s “n” values were assigned by visual inspection and analysis of digital orthophotos.

The Manning’s “n” values for all streams newly studied, for this countywide revision, are presented in the following table.

<u>Stream Name</u>	<u>Channel “n” values</u>	<u>Overbank “n” values</u>
Dry Creek East	0.050-0.070	0.040-0.150

**f. Floodplain Boundaries**

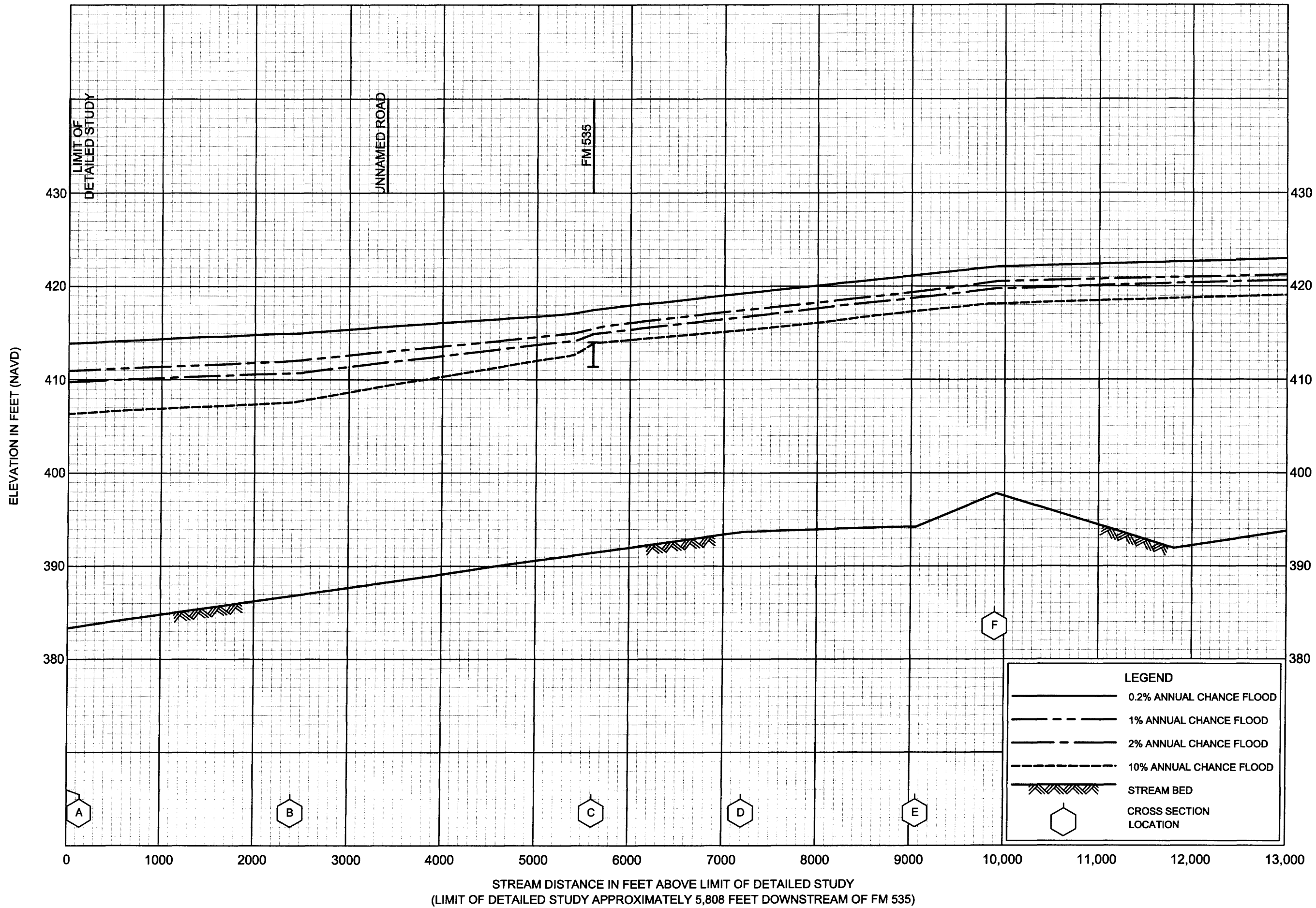
Floodplain boundaries for Dry Creek East were delineated between cross-sections using 2-foot contour interval topographic data based on LiDAR (Reference 23).

**g. Floodways**

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

**h. Bibliography and References**

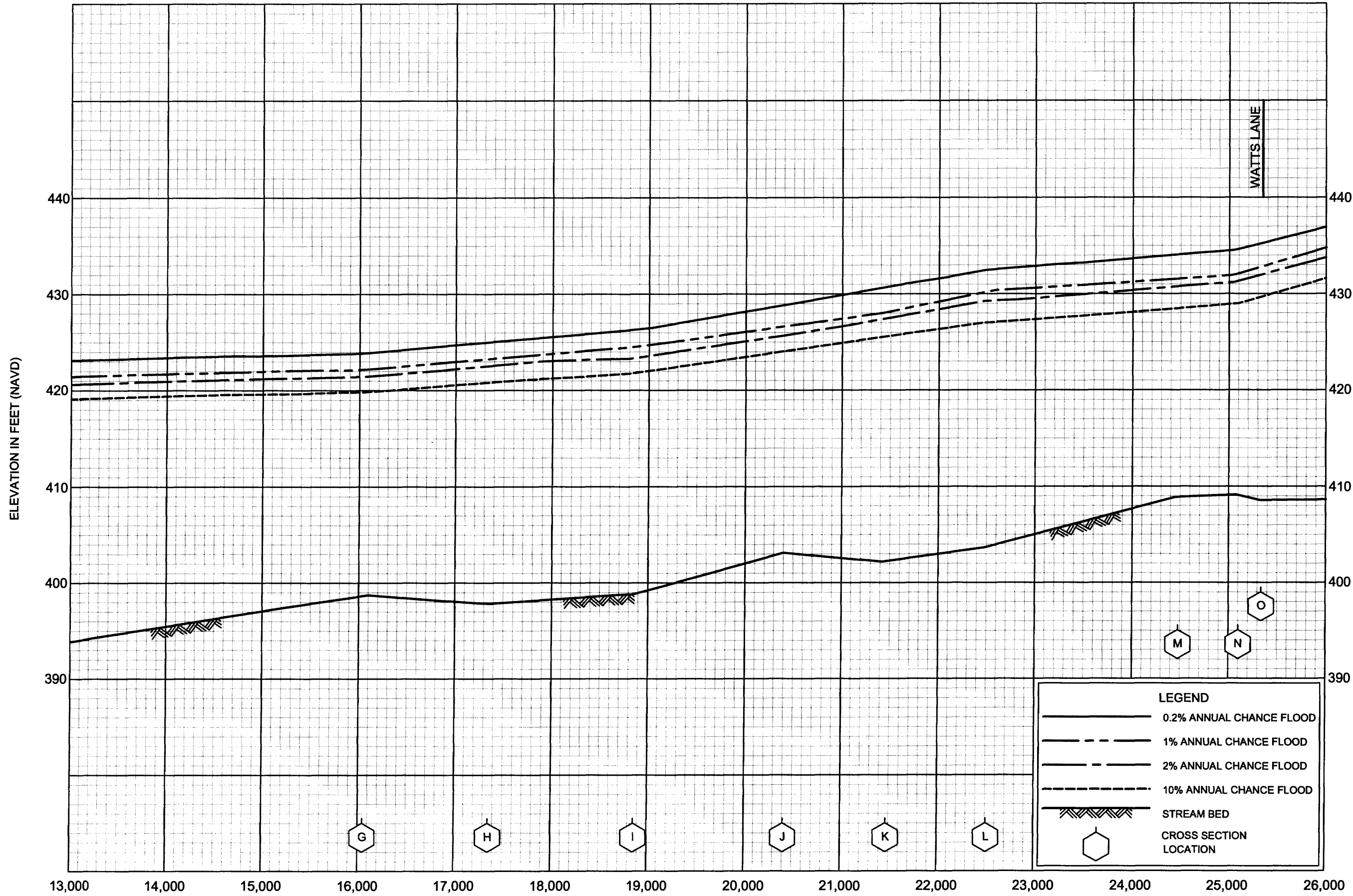
22. Hydrologic Engineering Center, HEC-RAS River Analysis System, Version 3.1.3, U.S. Army Corps of Engineers, Davis, California, May 2005.
23. The Sanborn Map Company, Inc., Topographic Maps Compiled from LiDAR, Contour Interval 2-Feet, City of Austin and Travis County, Texas, January 2003.



FLOOD PROFILES

CEDAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 BASTROP COUNTY, TX  
 AND INCORPORATED AREAS

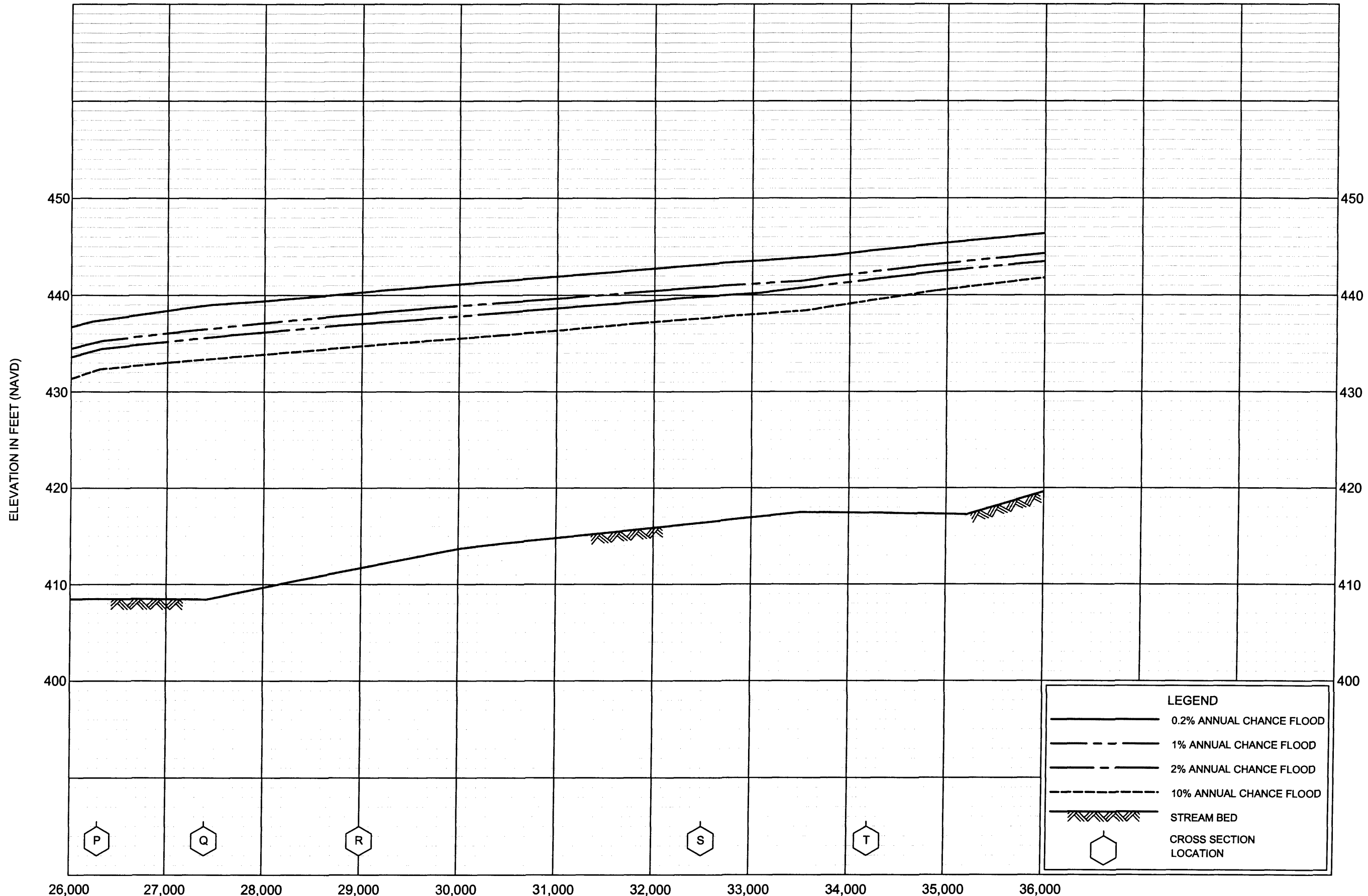


STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY  
 (LIMIT OF DETAILED STUDY APPROXIMATELY 5,808 FEET DOWNSTREAM OF FM 535)

FLOOD PROFILES  
 CEDAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
 BASTROP COUNTY, TX  
 AND INCORPORATED AREAS

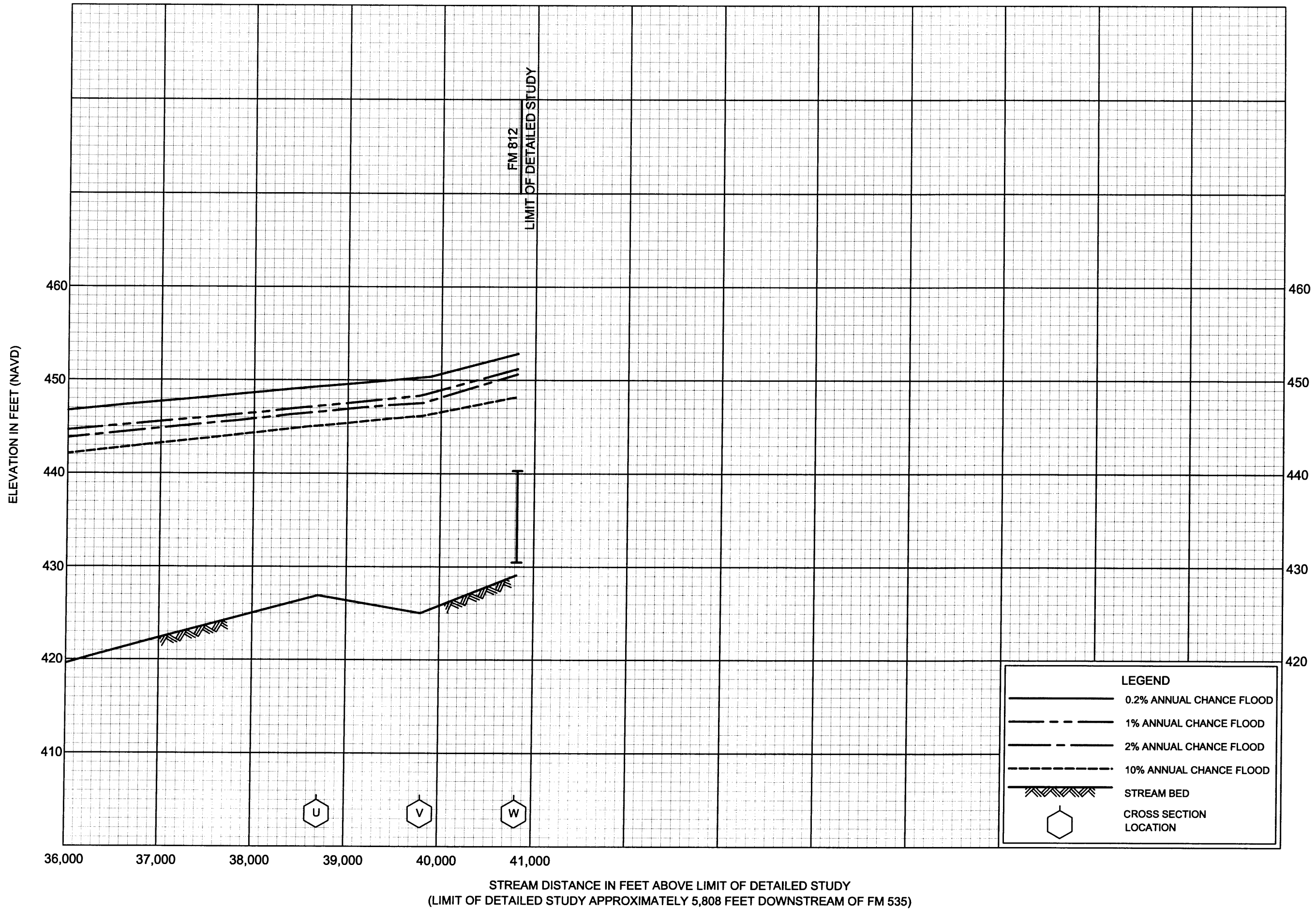




STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAILED STUDY  
 (LIMIT OF DETAILED STUDY APPROXIMATELY 5,808 FEET DOWNSTREAM OF FM 535)

FLOOD PROFILES  
 CEDAR CREEK

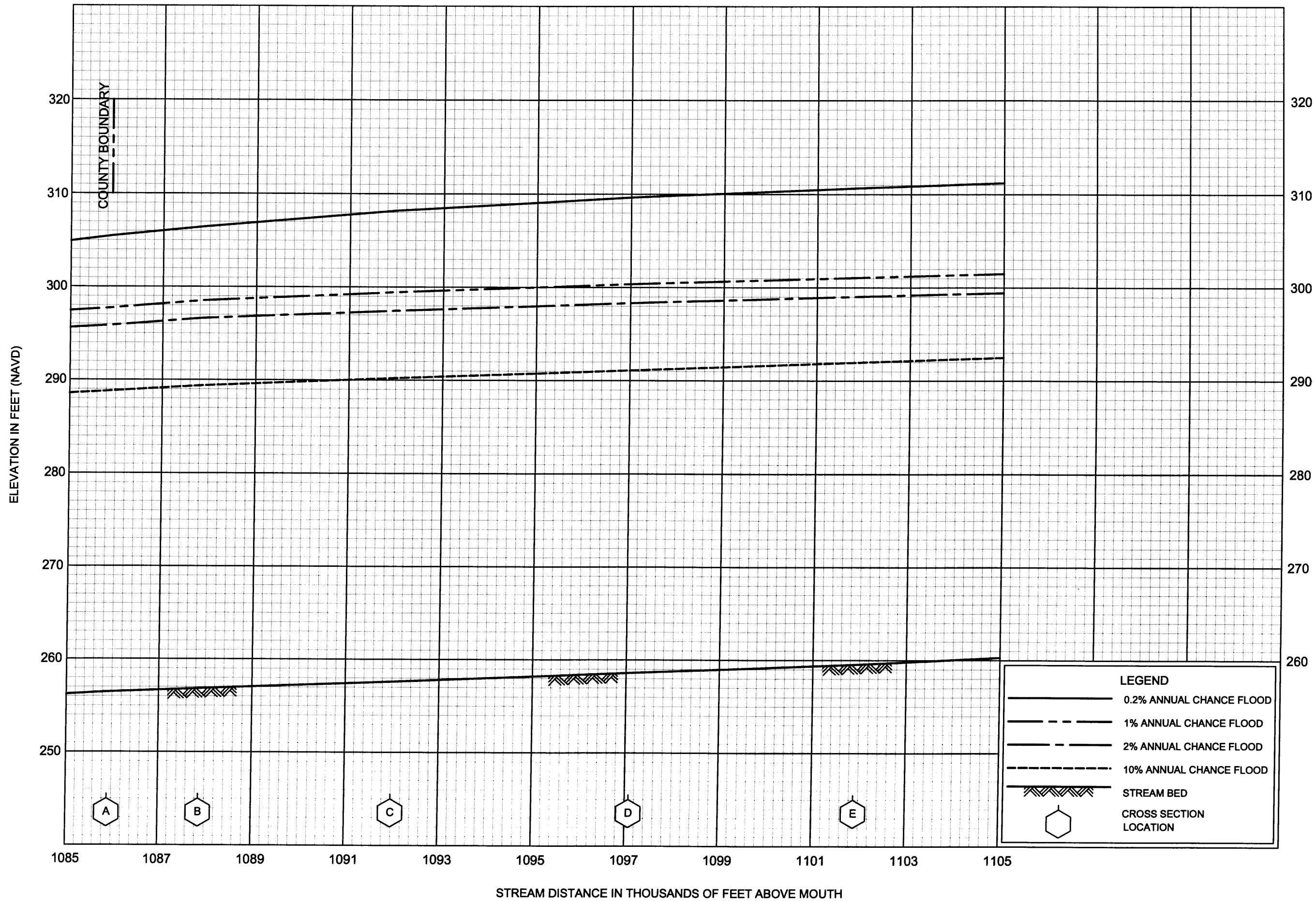
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 BASTROP COUNTY, TX  
 AND INCORPORATED AREAS



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**CEDAR CREEK**

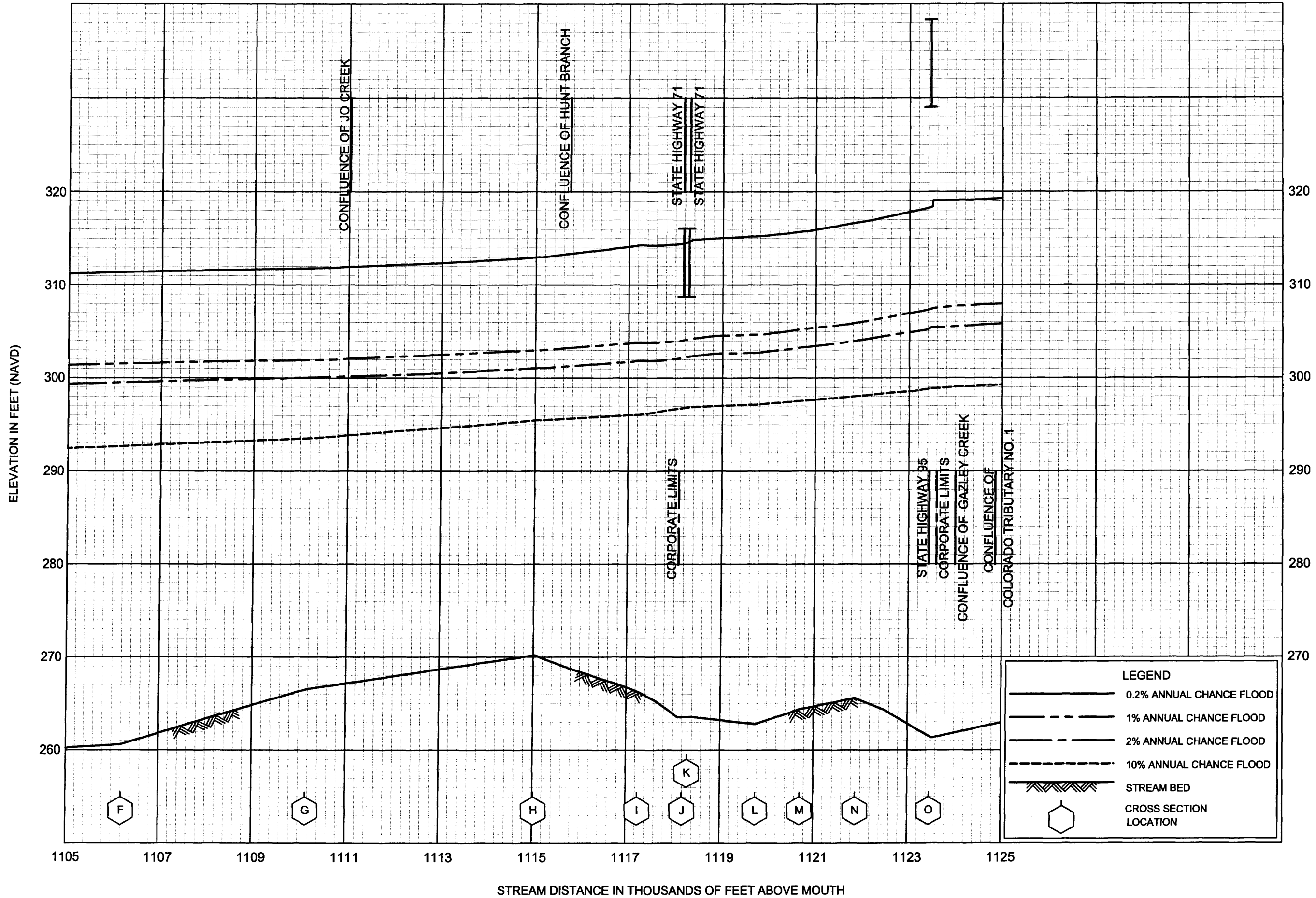
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AND INCORPORATED AREAS**



**FLOOD PROFILES**

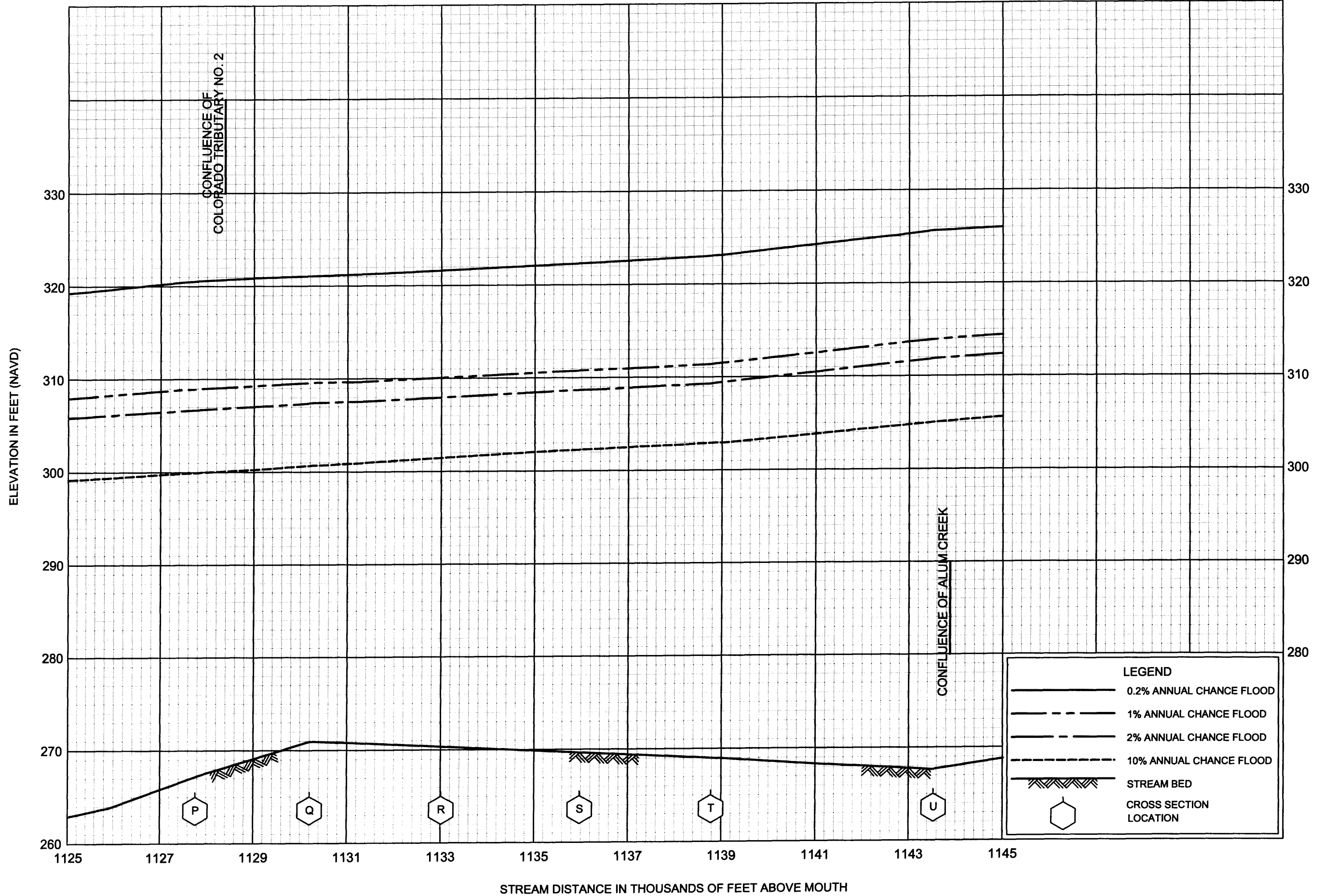
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FEDERAL EMERGENCY MANAGEMENT AGENCY  
**BASTROP COUNTY, TX**  
 AND INCORPORATED AREAS



FLOOD PROFILES  
COLORADO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY  
BASTROP COUNTY, TX  
AND INCORPORATED AREAS



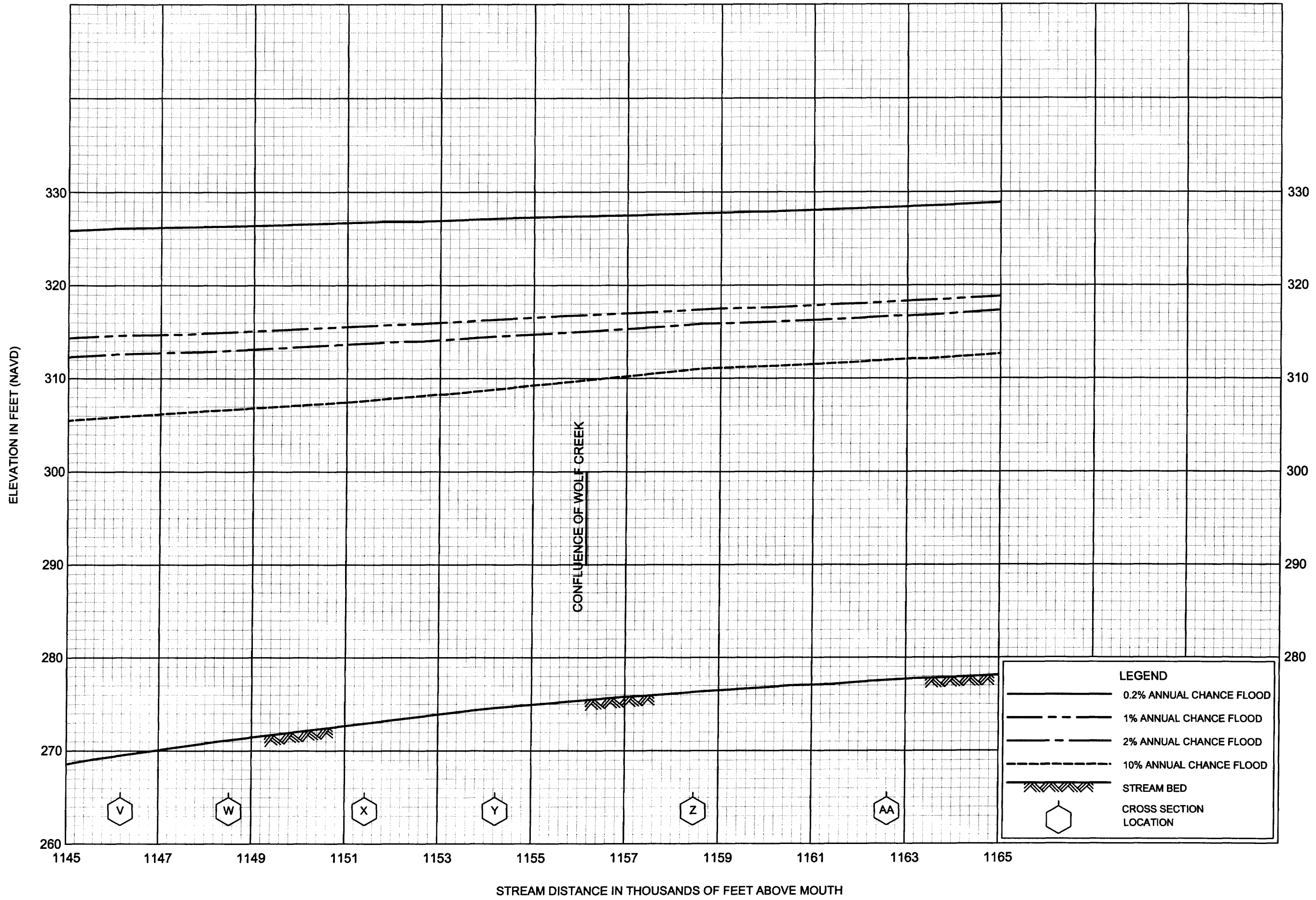
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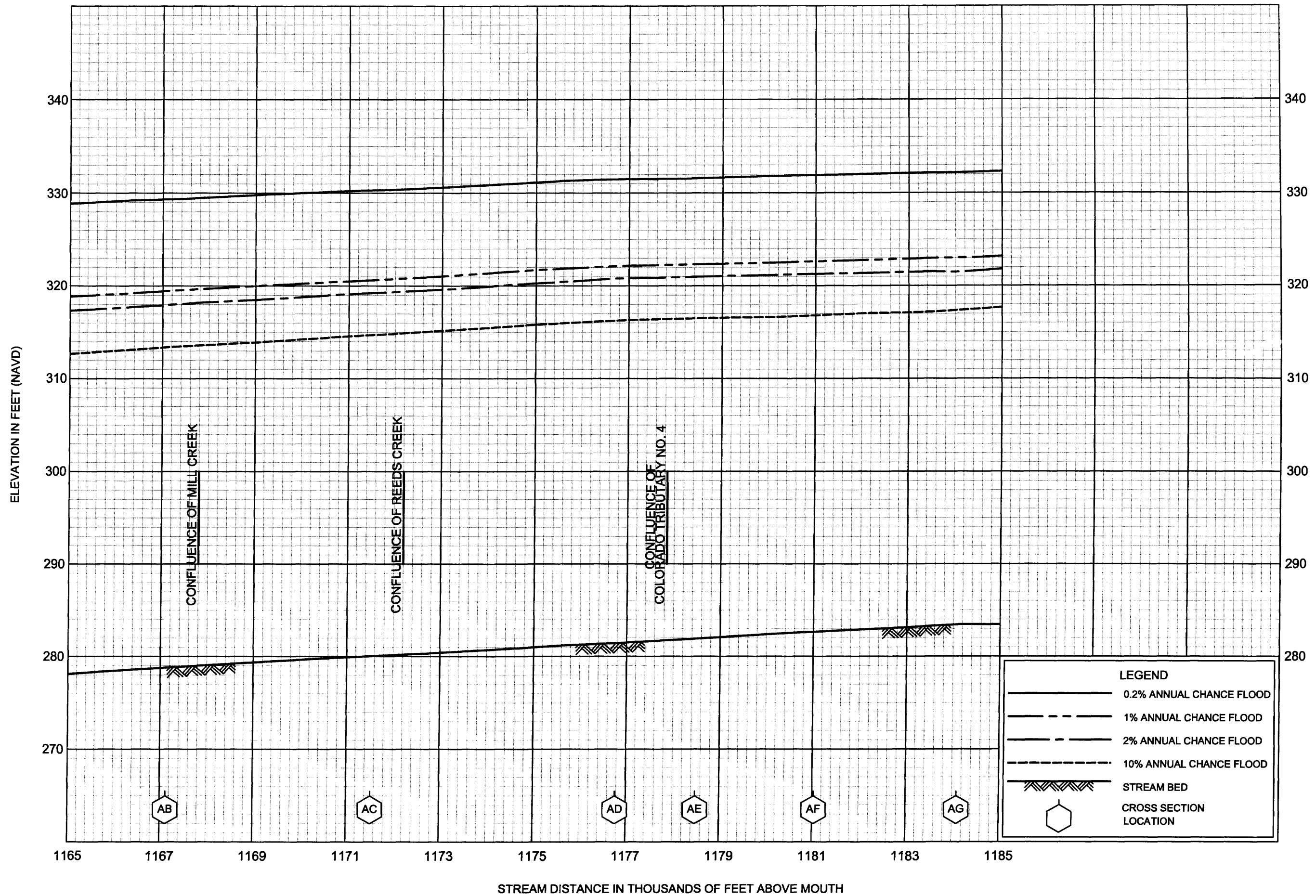
BASTROP COUNTY, TX

AND INCORPORATED AREAS



FLOOD PROFILES  
COLORADO RIVER

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BASTROP COUNTY, TX  
AND INCORPORATED AREAS



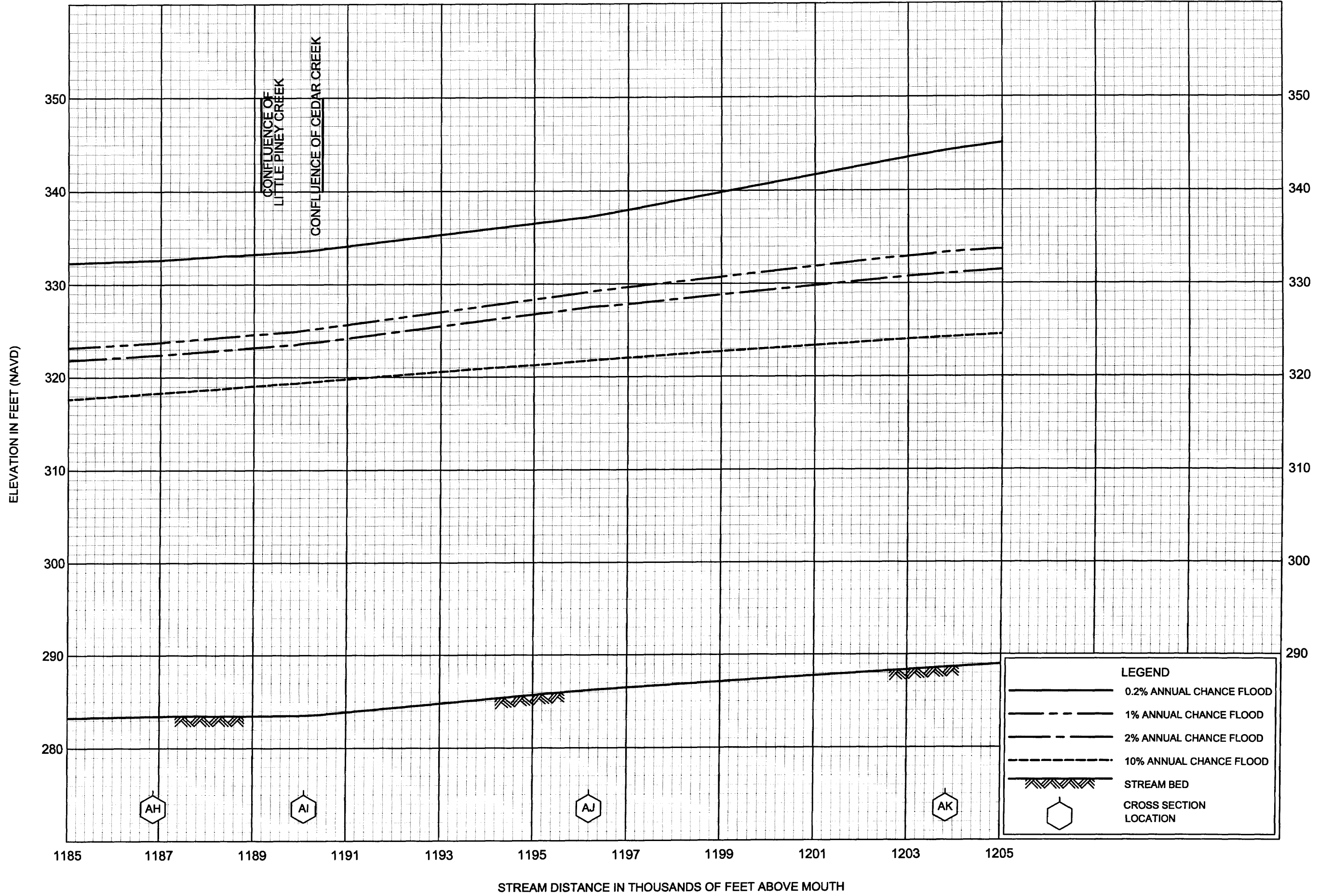
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**COLORADO RIVER**

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**BASTROP COUNTY, TX**

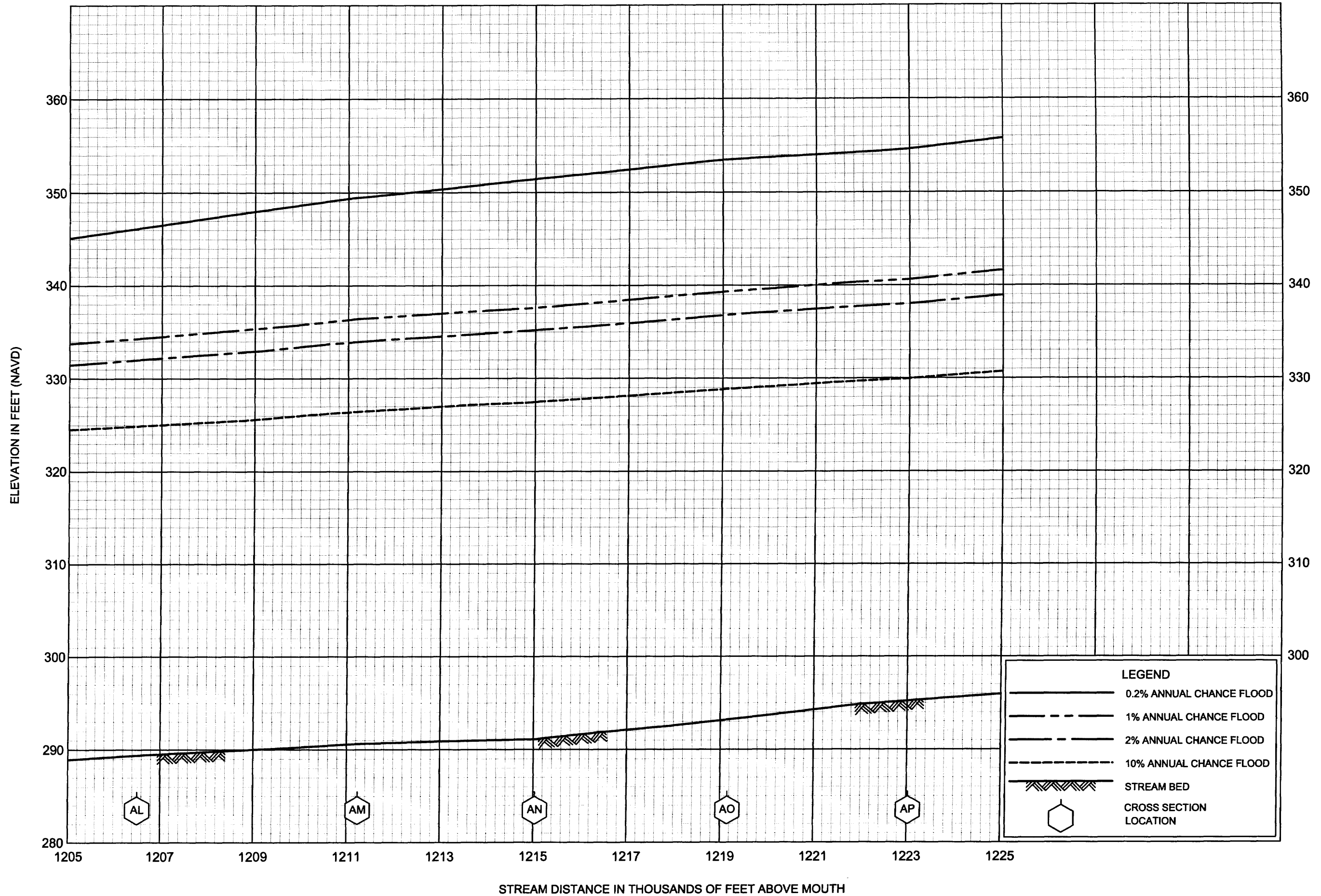
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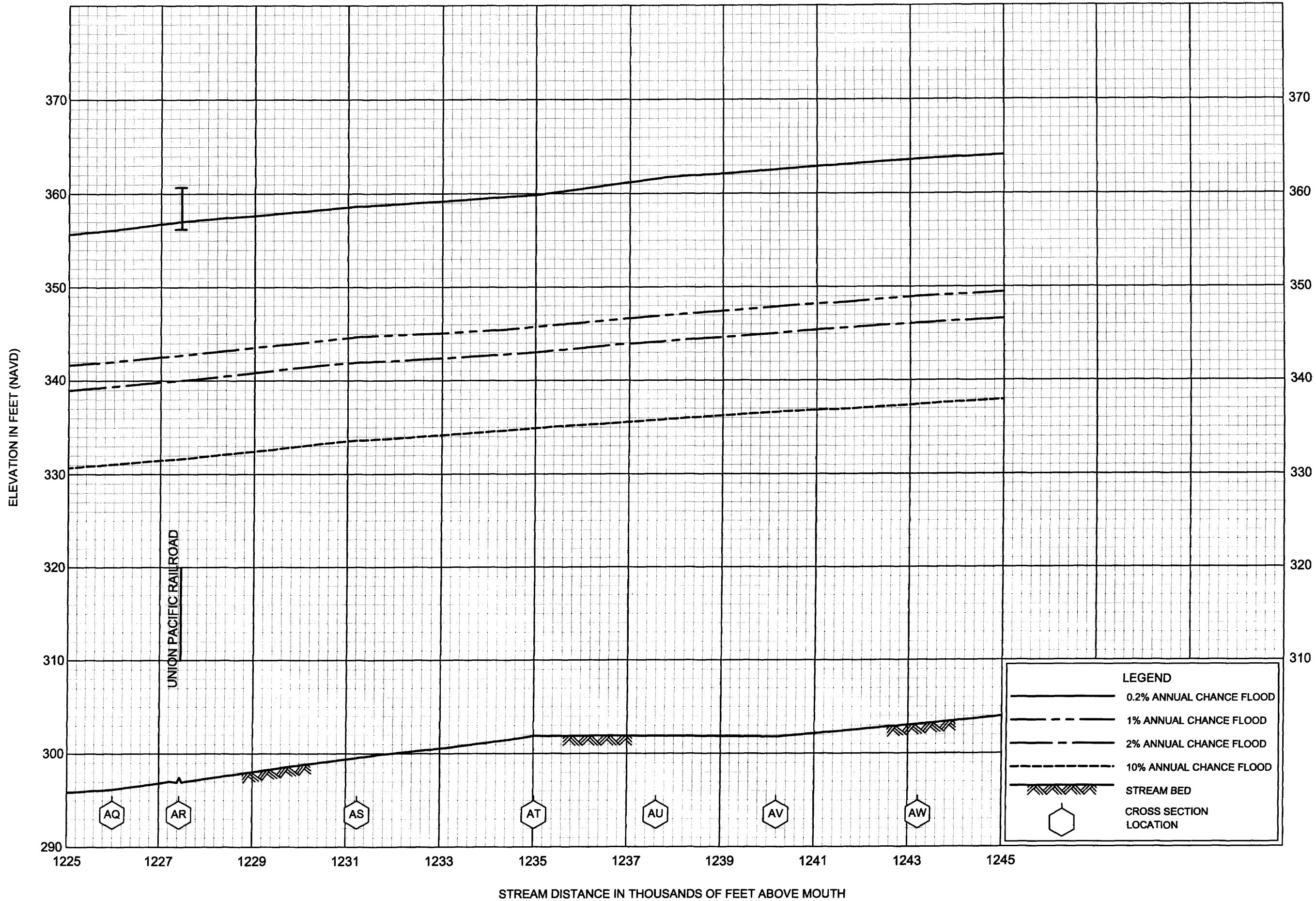
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AND INCORPORATED AREAS





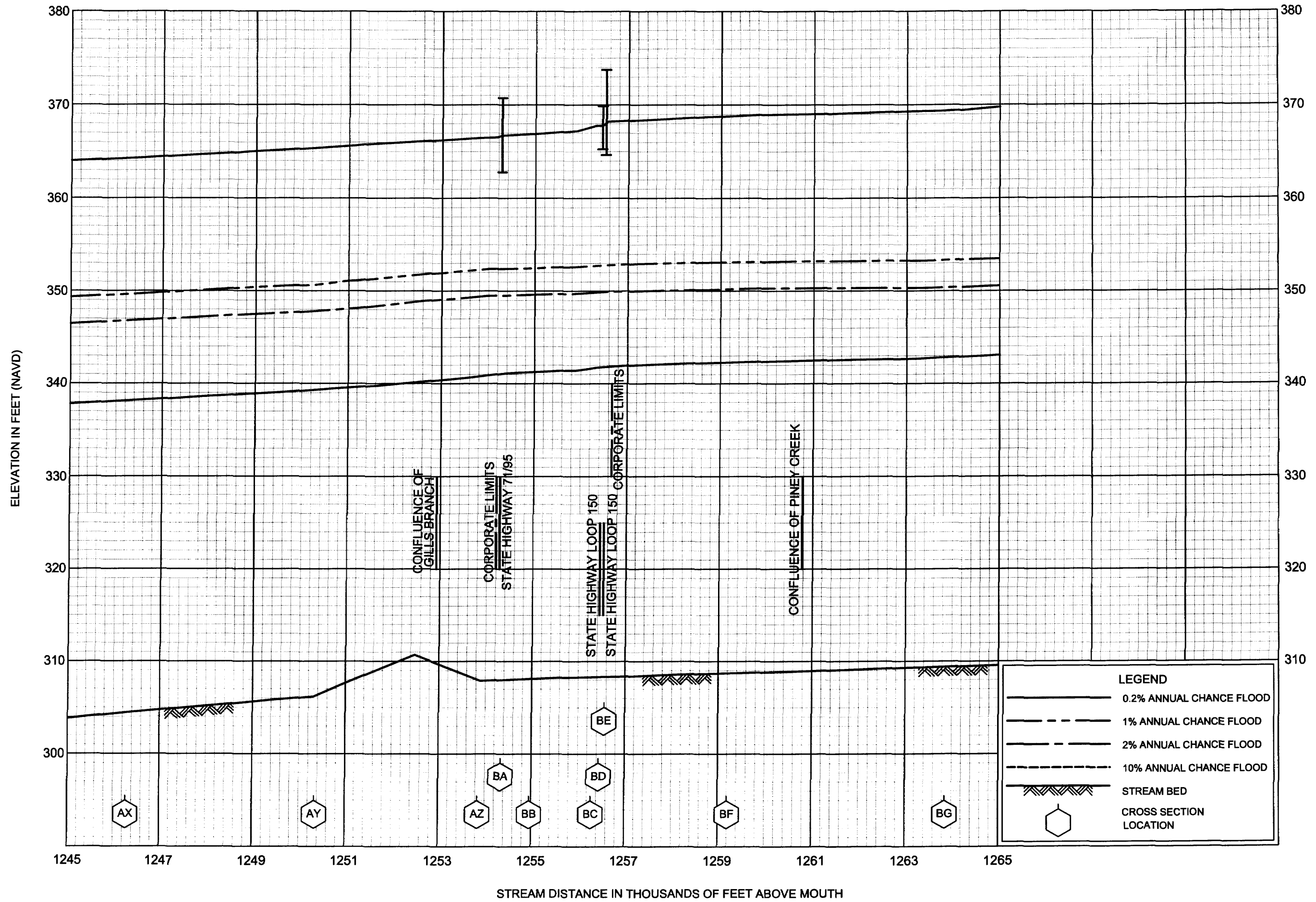
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 AND INCORPORATED AREAS



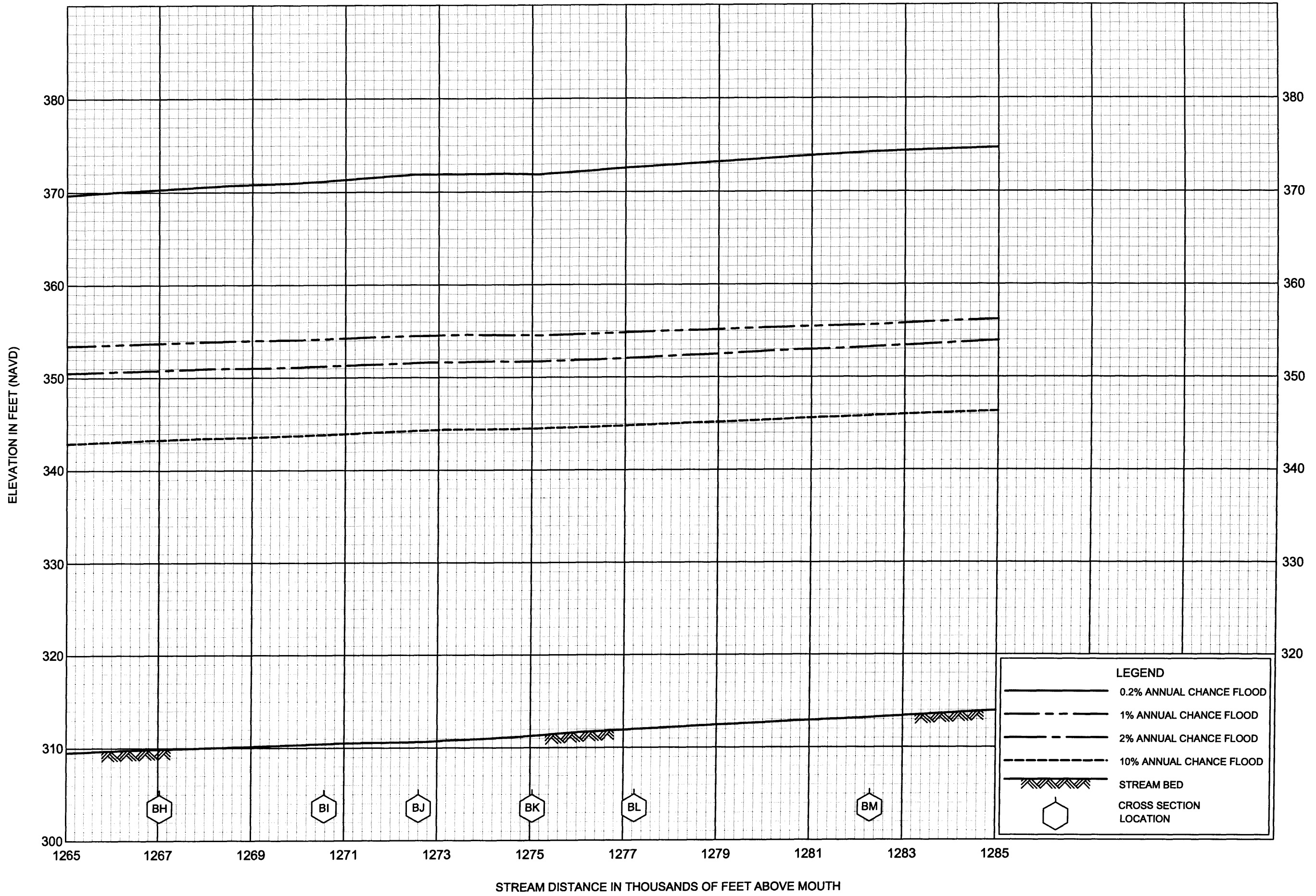
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FEDERAL EMERGENCY MANAGEMENT AGENCY  
 BASTROP COUNTY, TX  
 AND INCORPORATED AREAS



**FLOOD PROFILES**  
**COLORADO RIVER**

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**BASTROP COUNTY, TX**  
 AND INCORPORATED AREAS



**LEGEND**

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

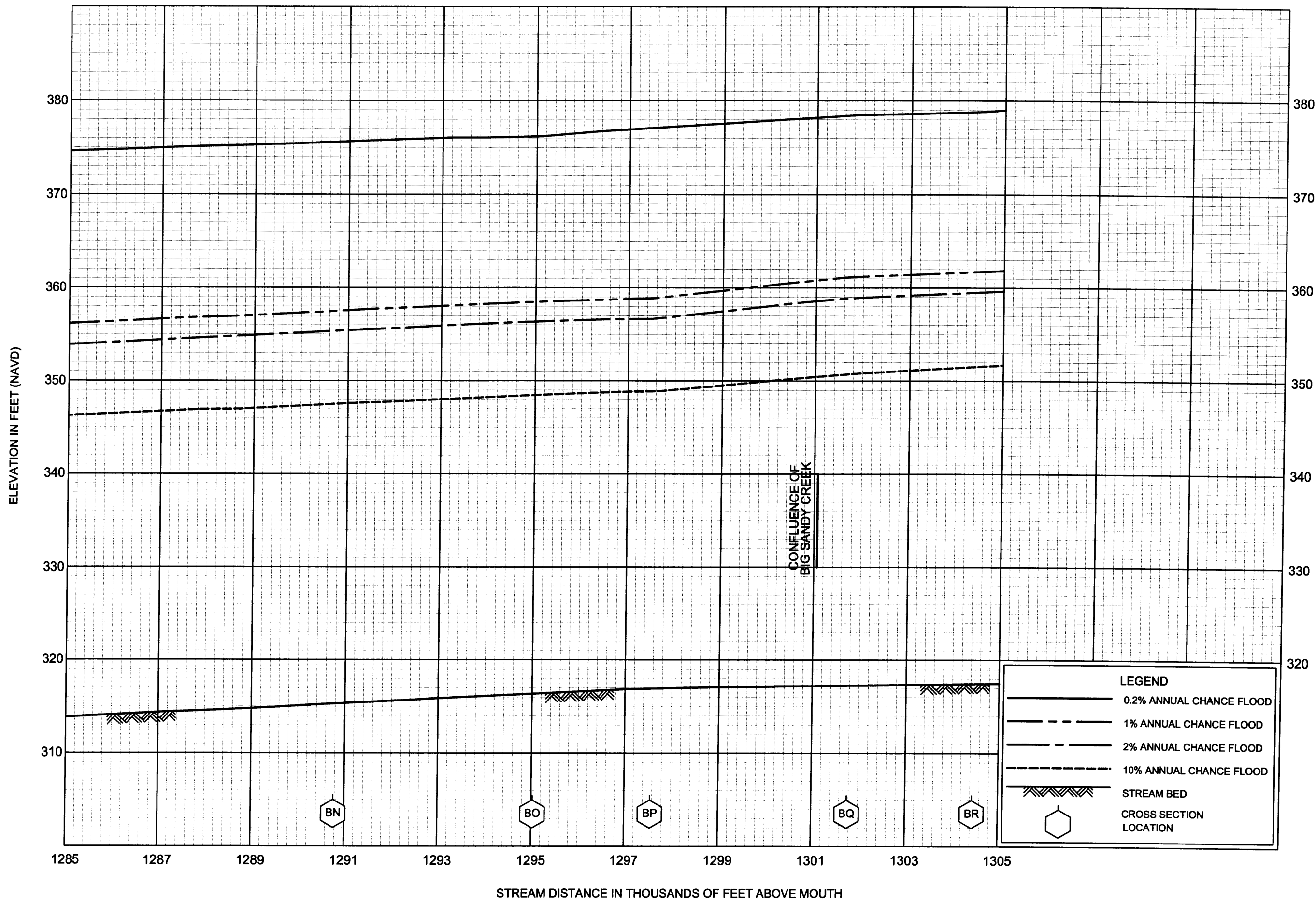
FLOOD PROFILES

COLORADO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

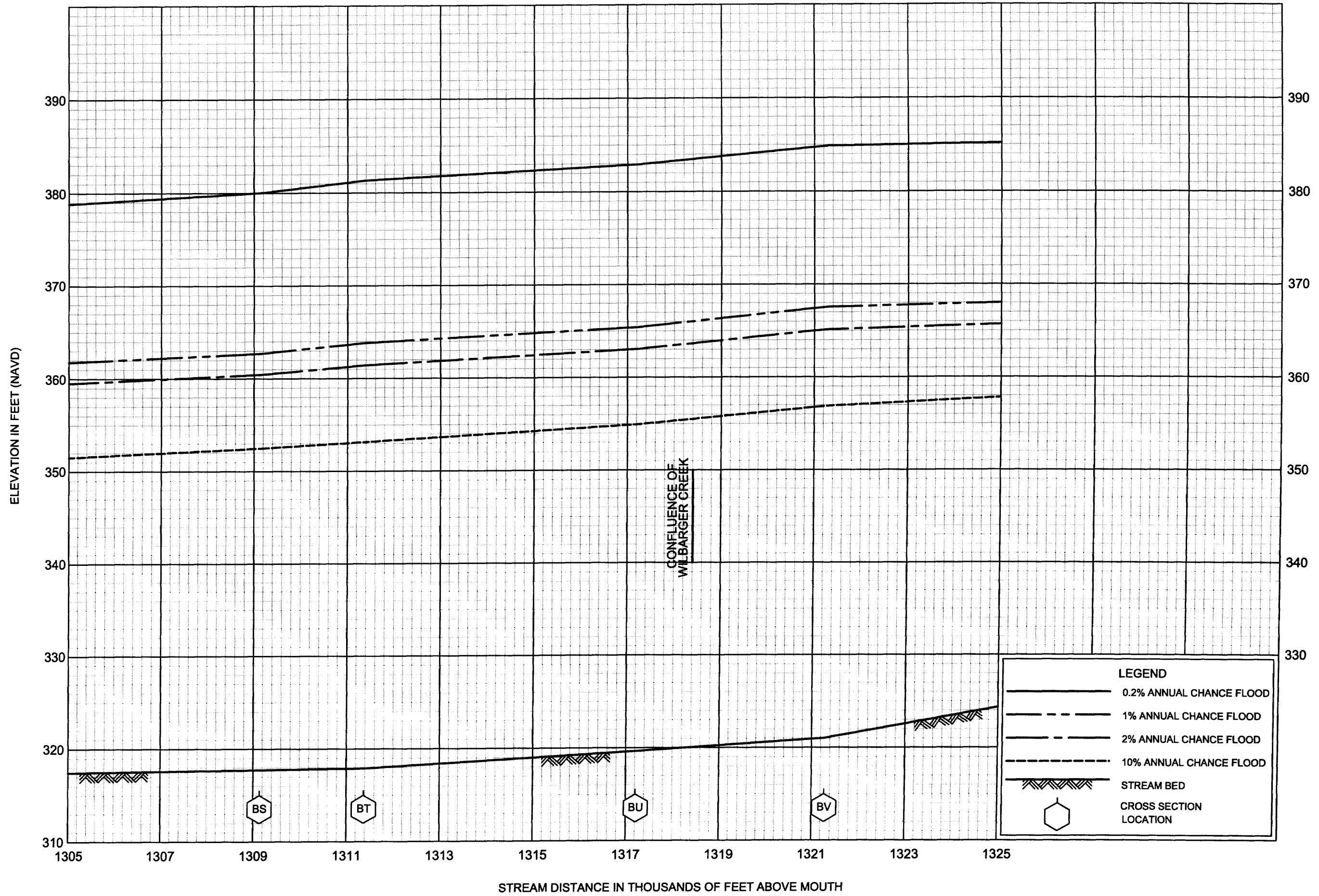
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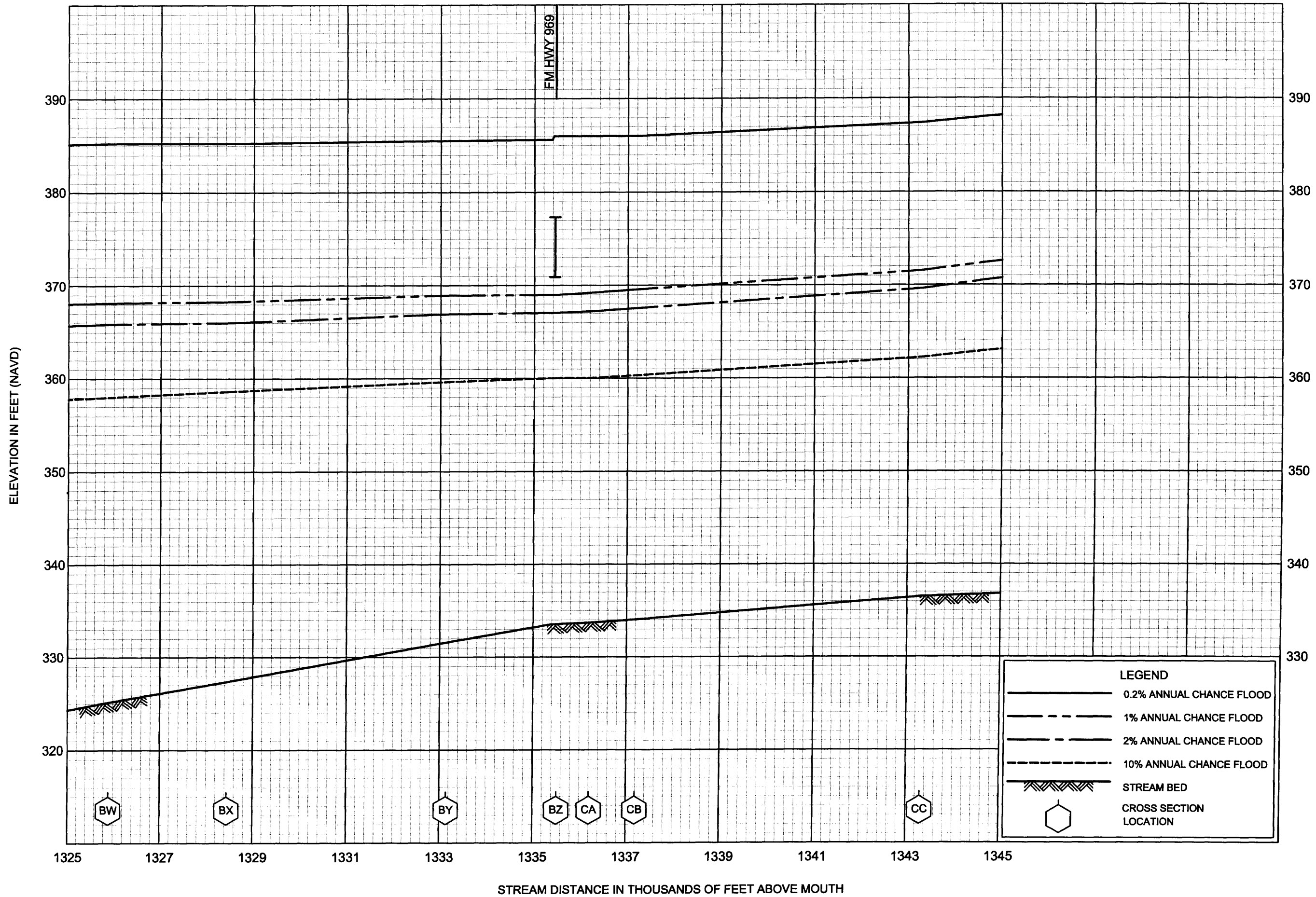
AND INCORPORATED AREAS



FLOOD PROFILES  
COLORADO RIVER

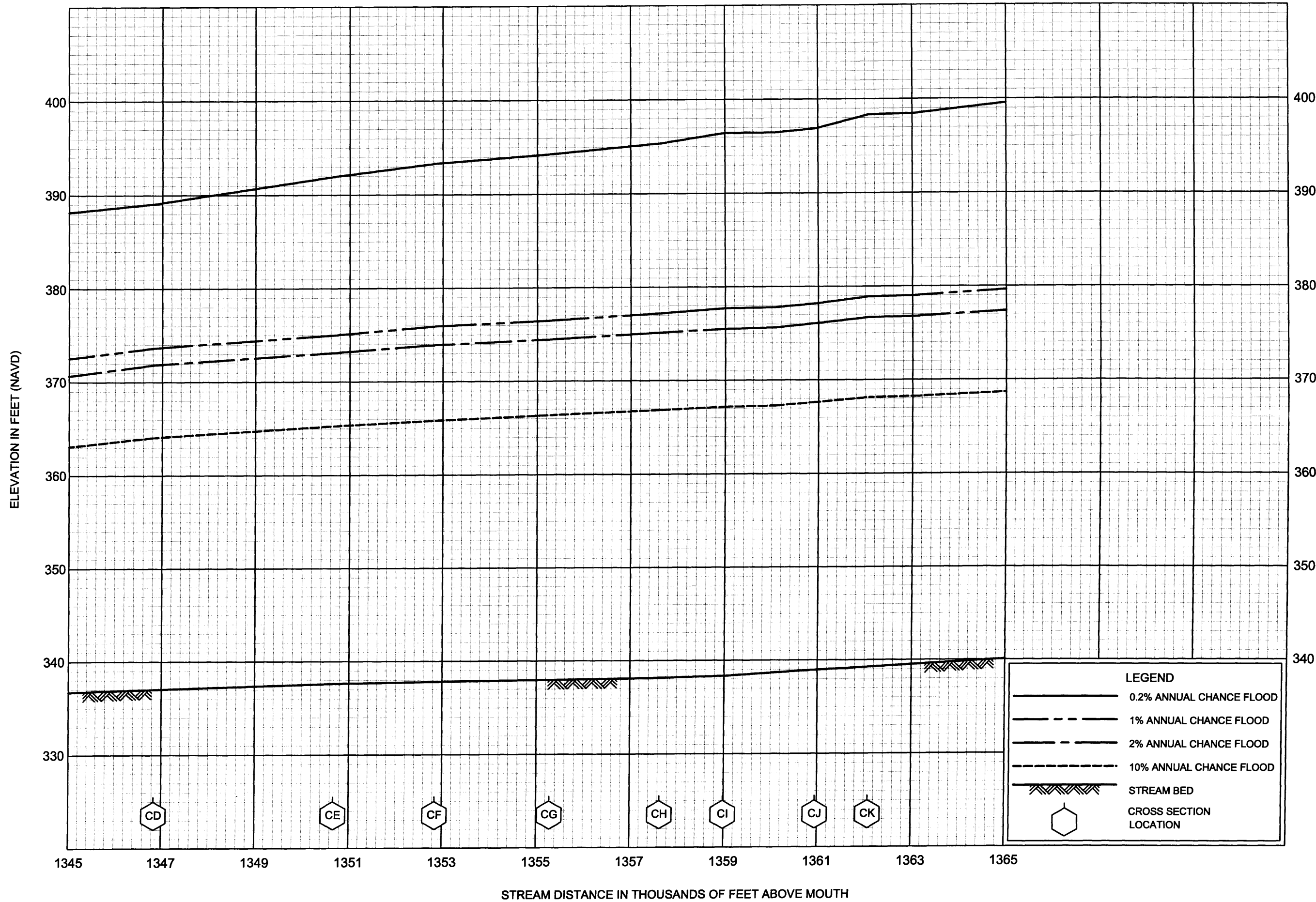
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BASTROP COUNTY, TX  
AND INCORPORATED AREAS



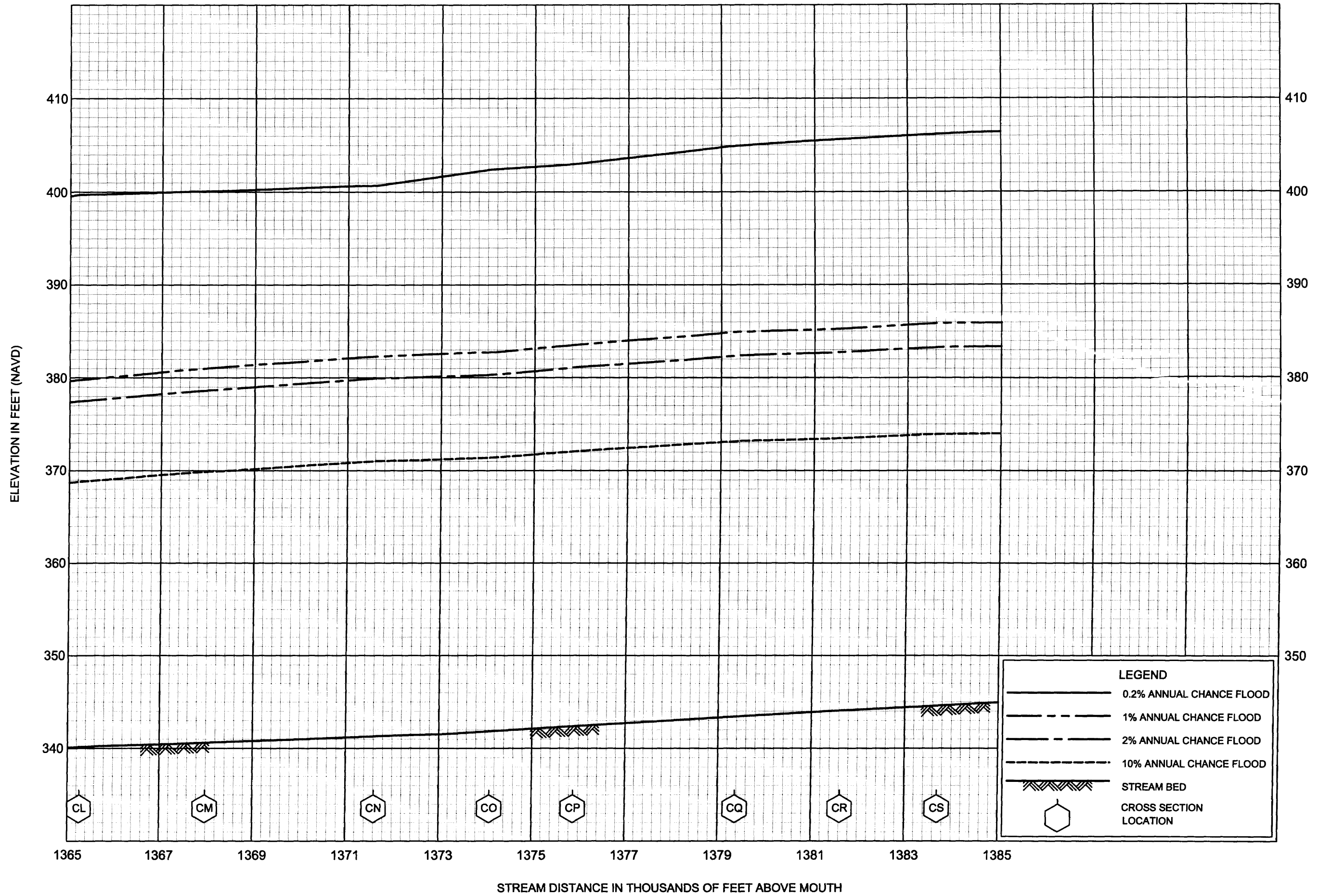


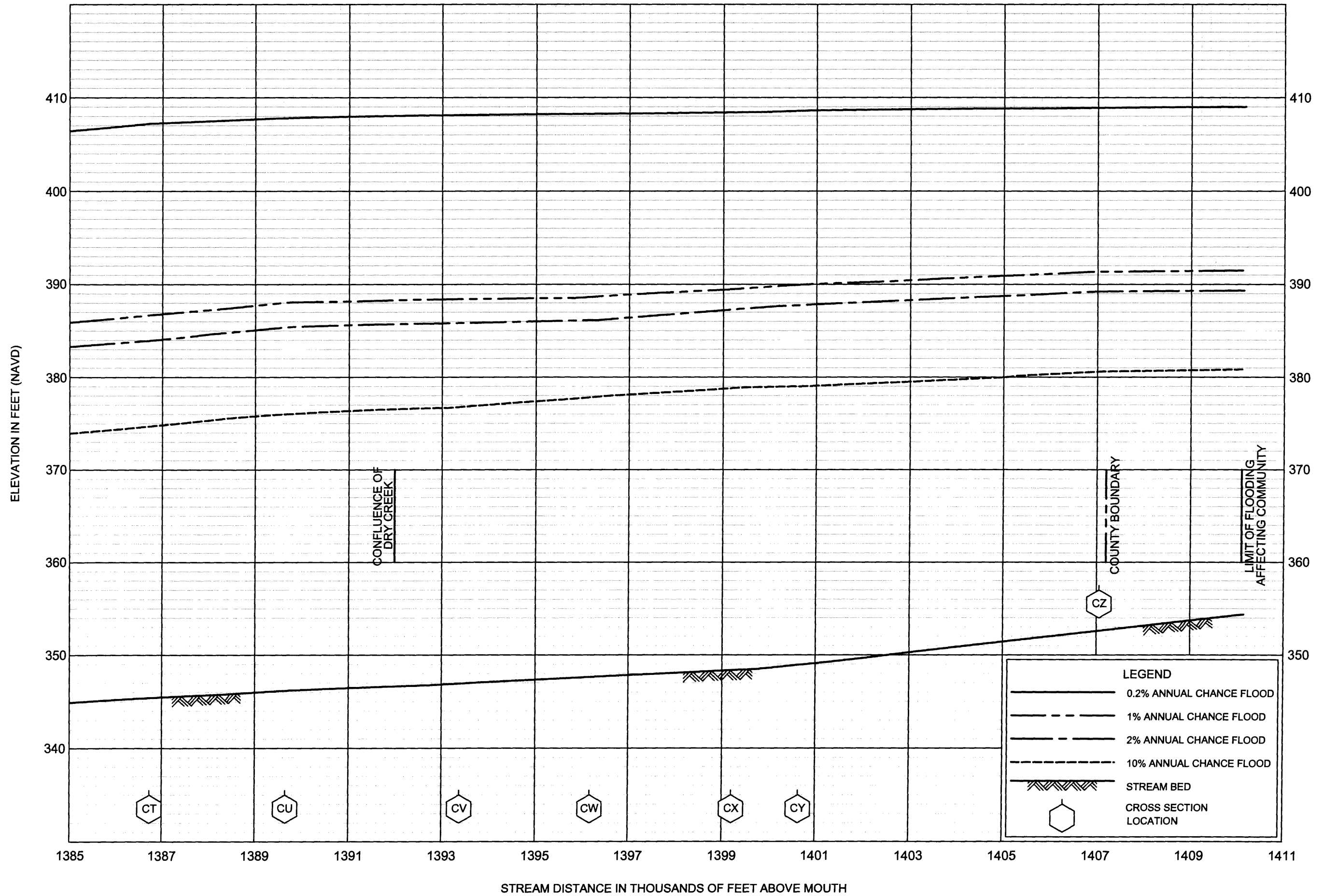
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FEDERAL EMERGENCY MANAGEMENT AGENCY  
BASTROP COUNTY, TX  
AND INCORPORATED AREAS









**FLOOD PROFILES**

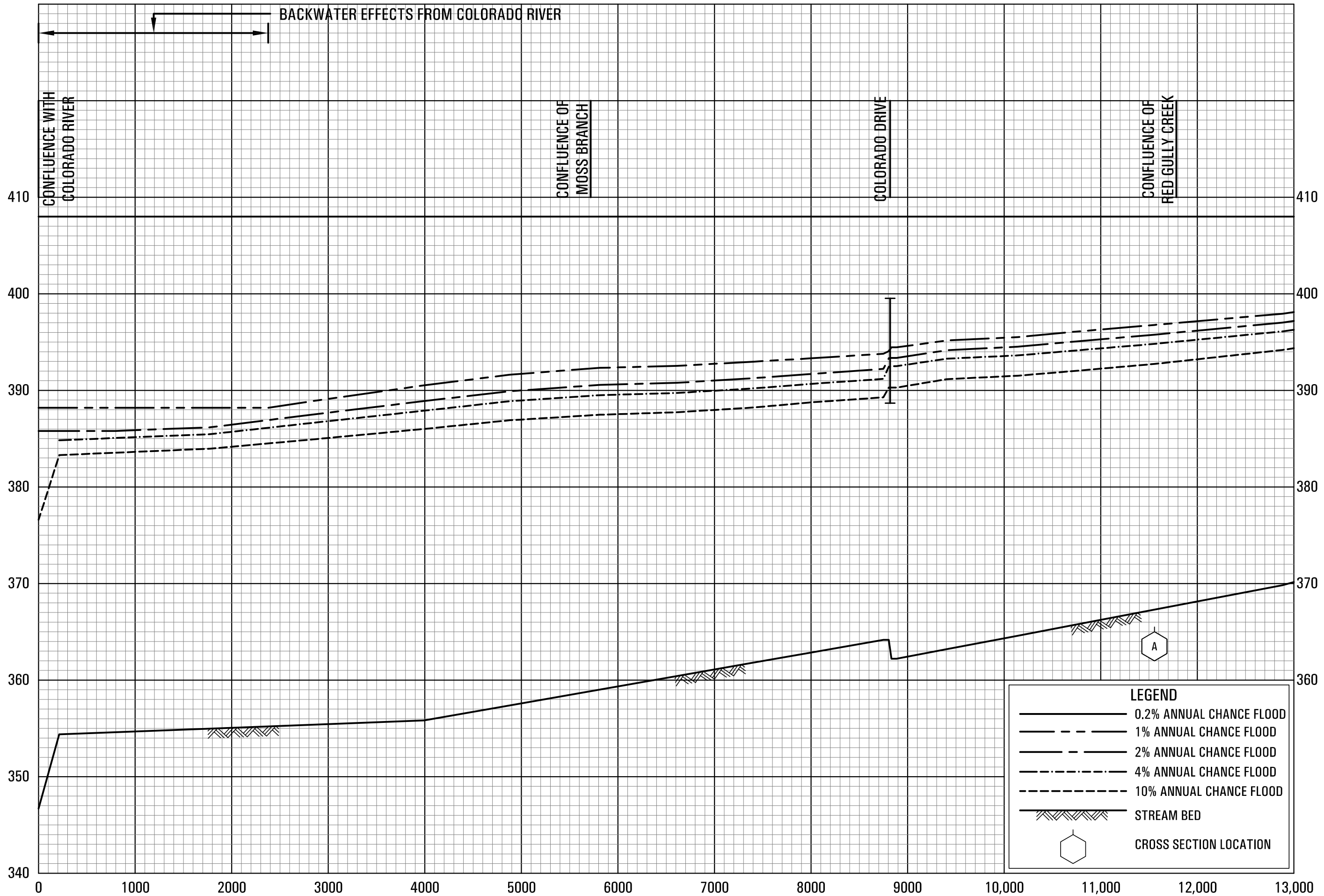
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**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**BASTROP COUNTY, TX**

**AND INCORPORATED AREAS**

ELEVATION IN FEET (NAVD 88)



**LEGEND**

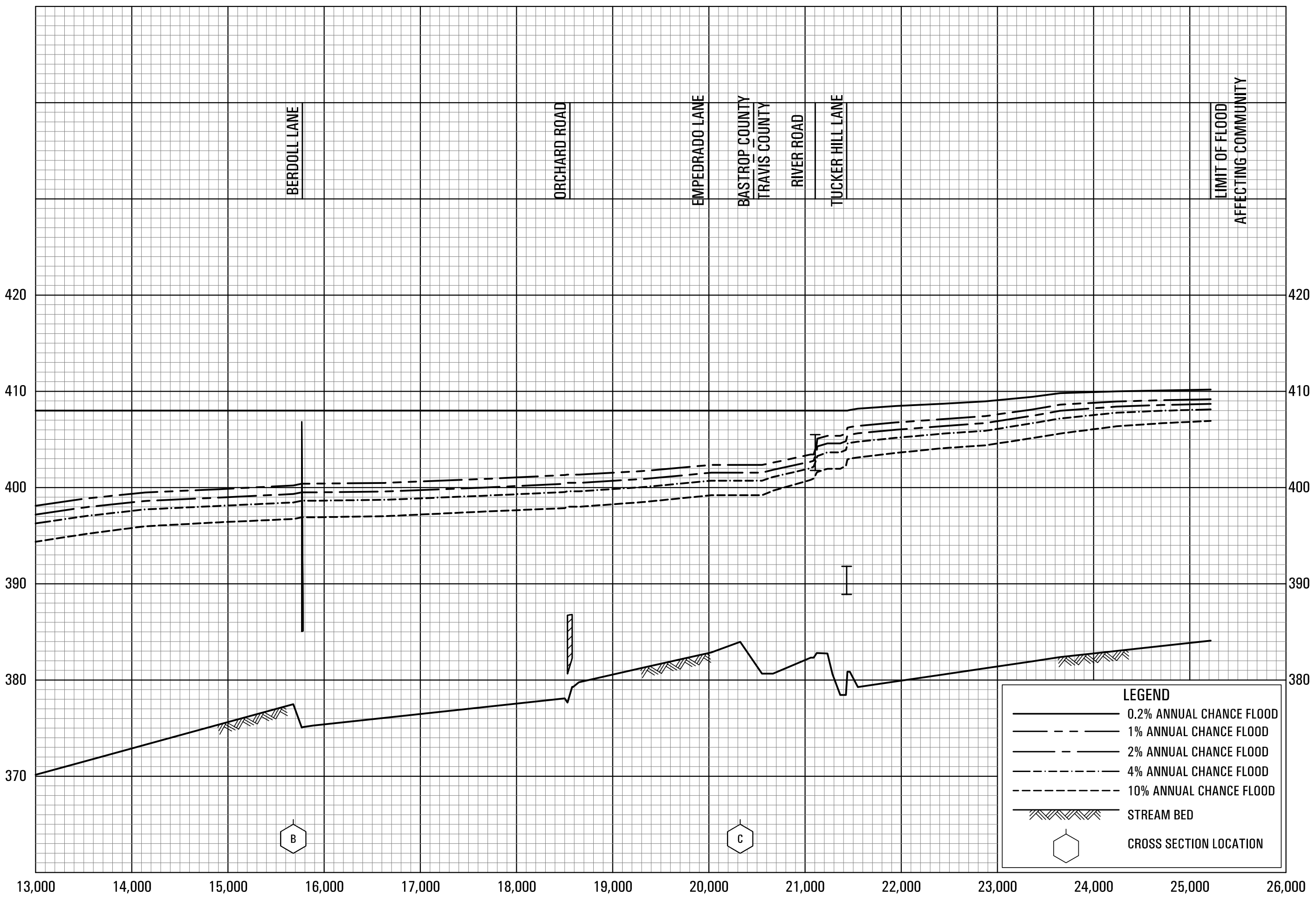
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- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

**FLOOD PROFILES**

**DRY CREEK EAST**

FEDERAL EMERGENCY MANAGEMENT AGENCY  
**BASTROP COUNTY, TX**  
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD 88)



13,000 14,000 15,000 16,000 17,000 18,000 19,000 20,000 21,000 22,000 23,000 24,000 25,000 26,000

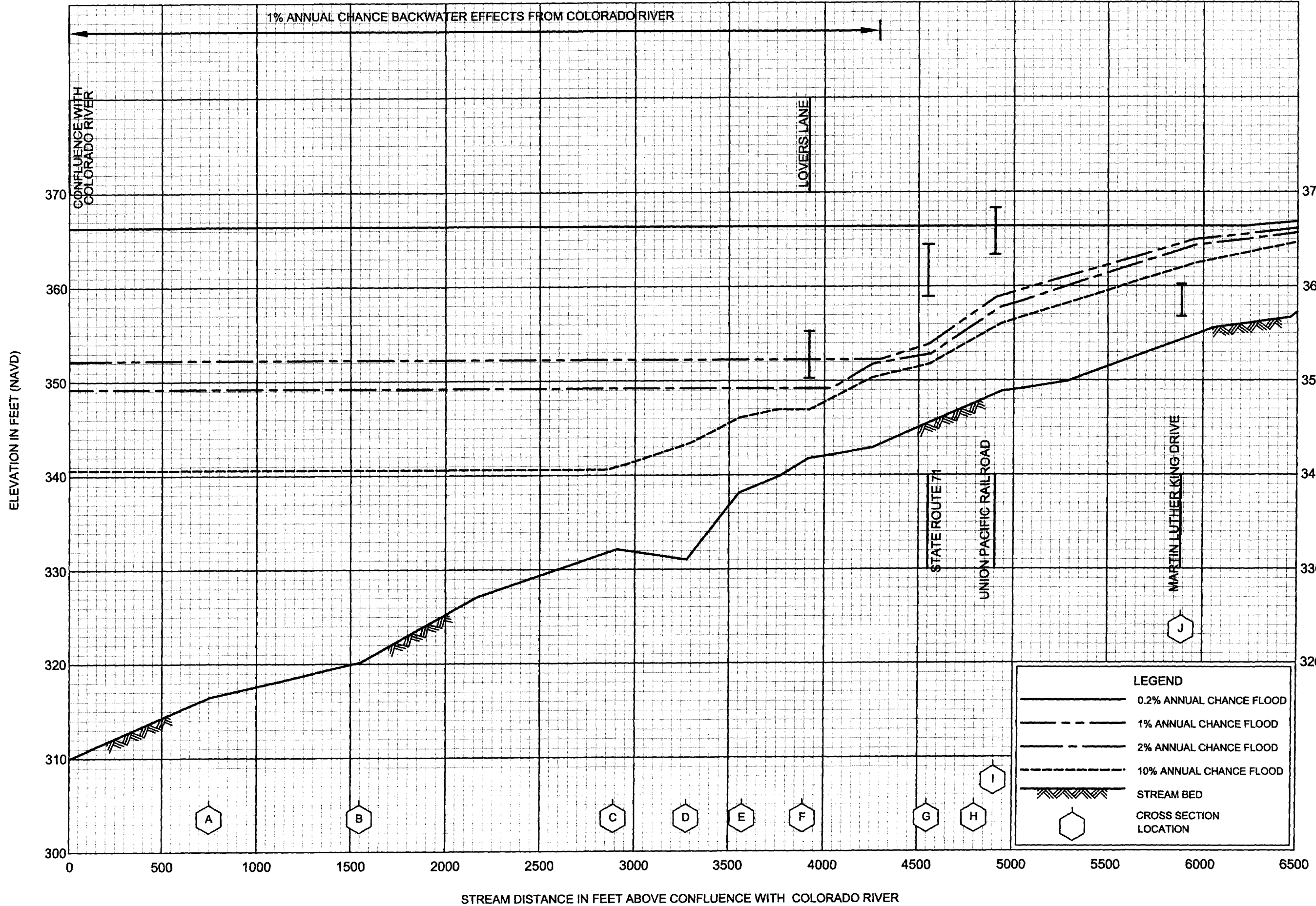
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH COLORADO RIVER

**FLOOD PROFILES**

**DRY CREEK EAST**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BASTROP COUNTY, TX  
AND INCORPORATED AREAS**



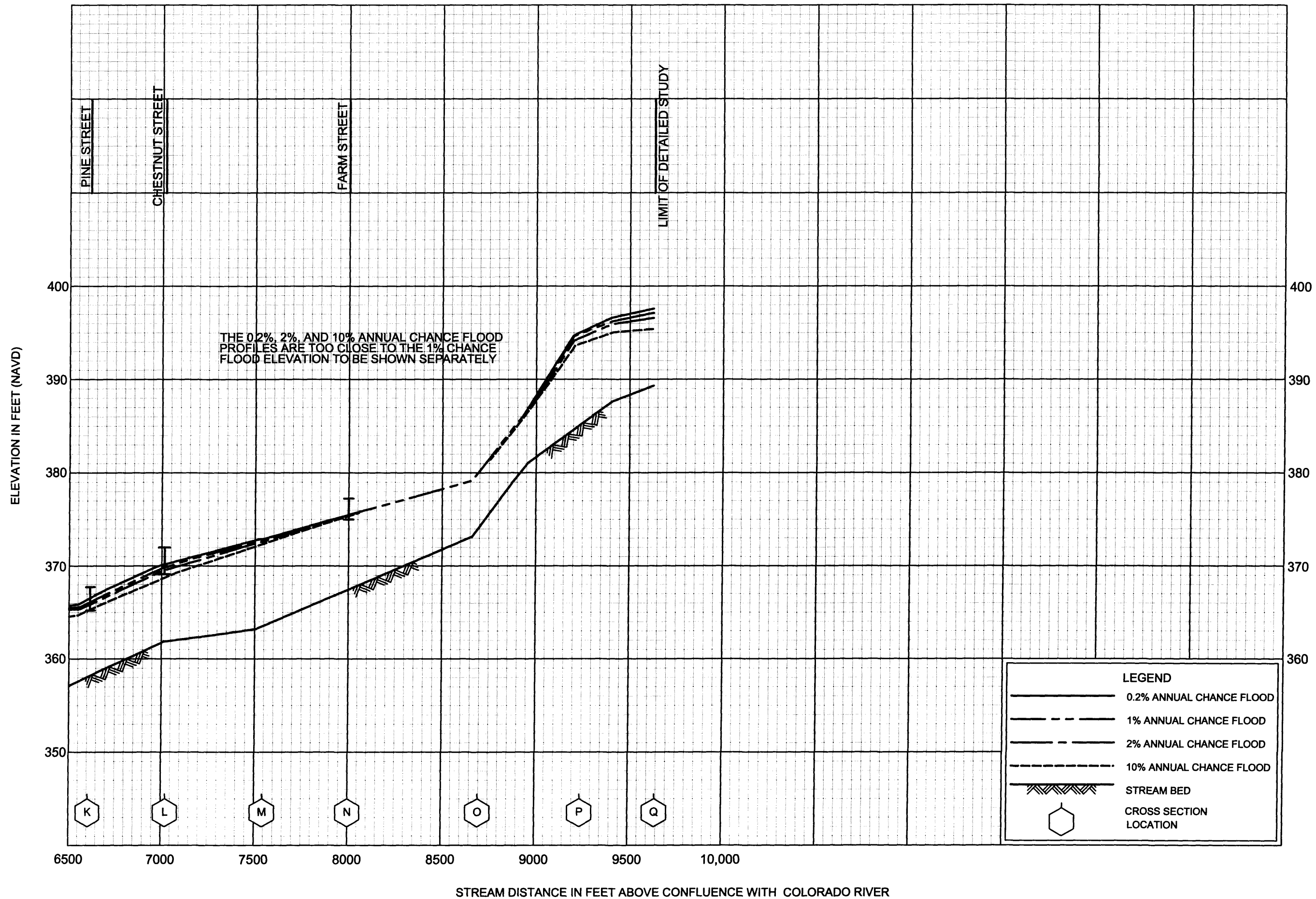
FLOOD PROFILES

GILLS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

BASTROP COUNTY, TX

AND INCORPORATED AREAS

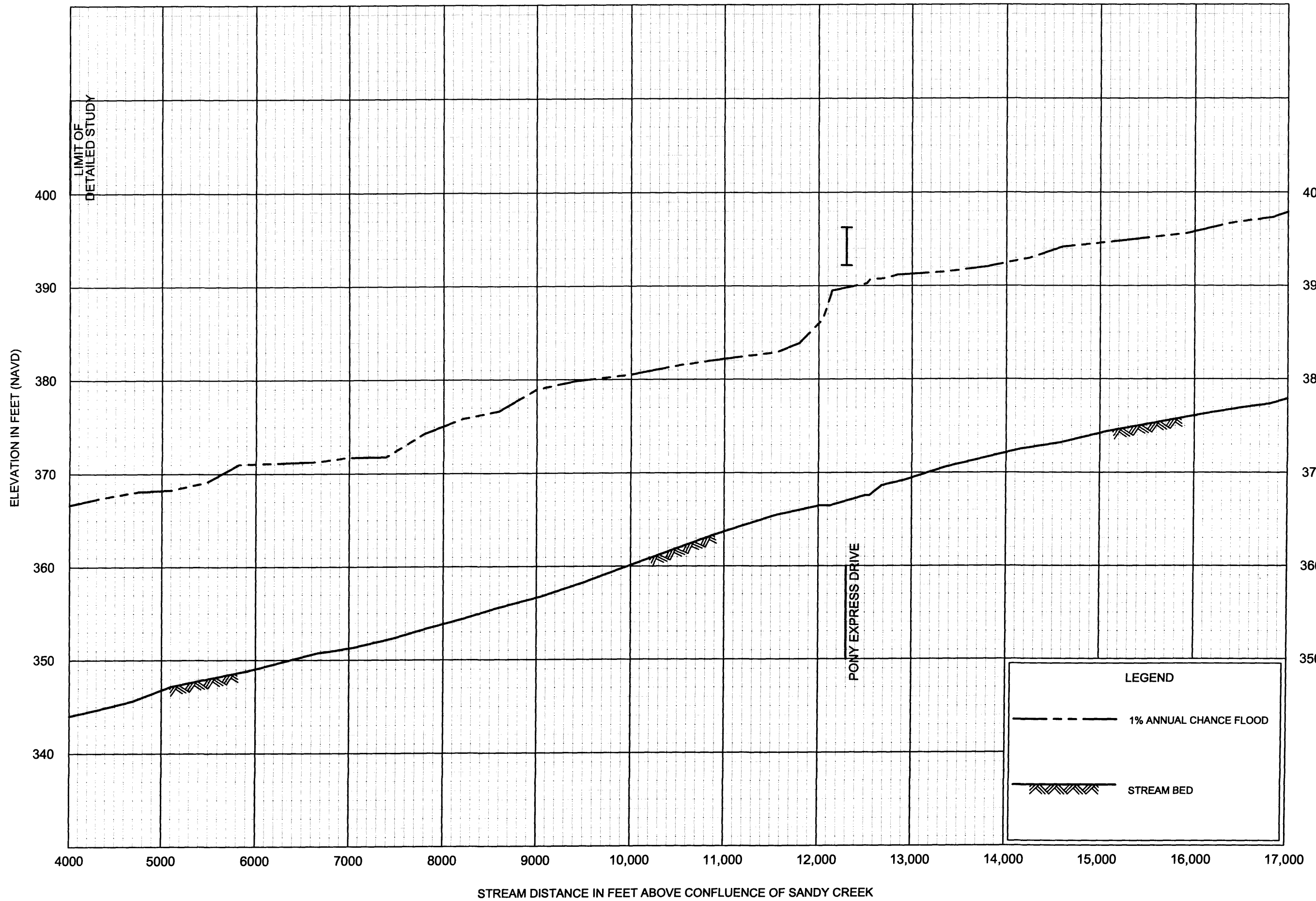


LEGEND	
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	1% ANNUAL CHANCE FLOOD
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	10% ANNUAL CHANCE FLOOD
	STREAM BED
	CROSS SECTION LOCATION

FLOOD PROFILES

GILLS BRANCH

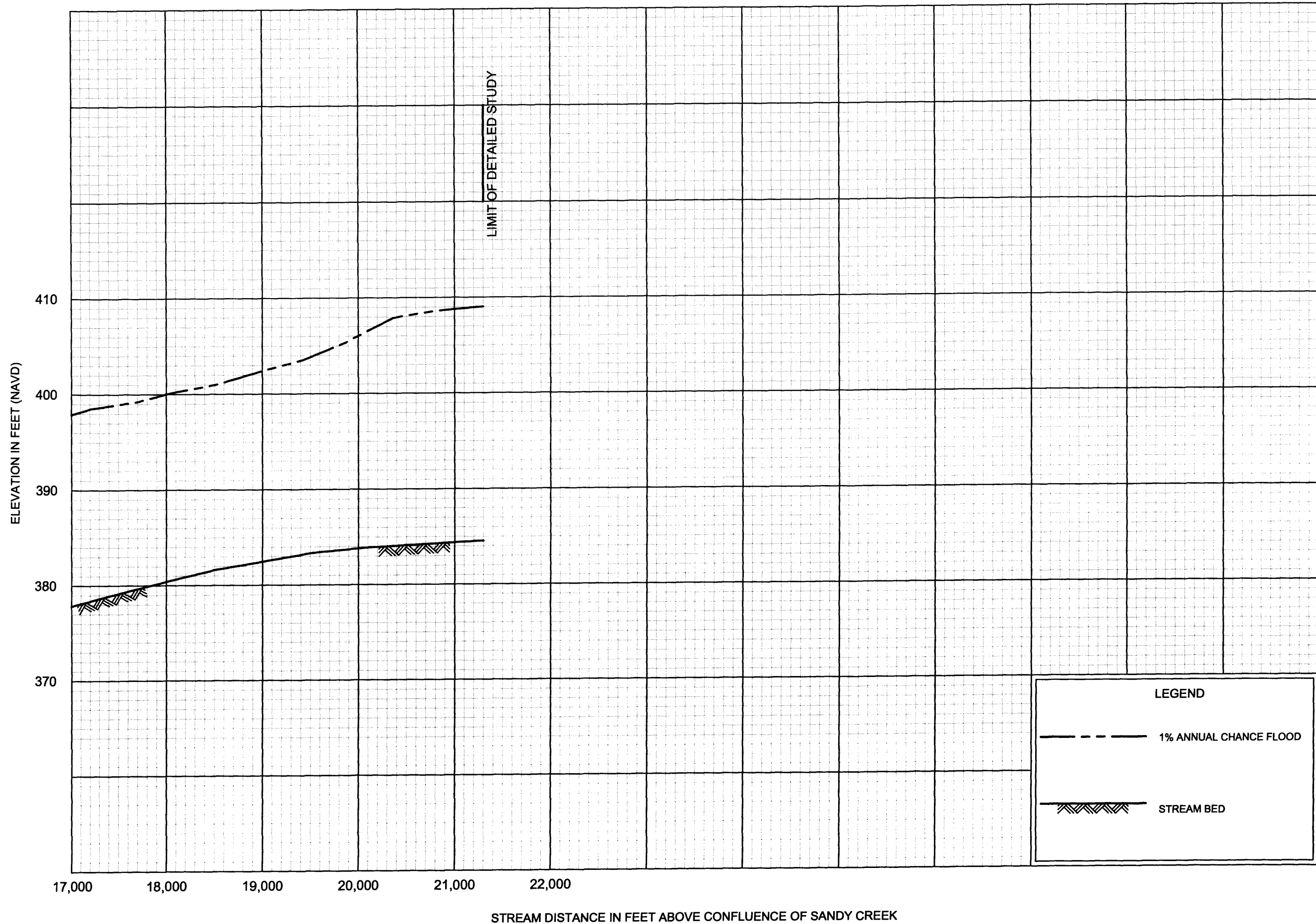
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 BASTROP COUNTY, TX  
 AND INCORPORATED AREAS



**FLOOD PROFILES**

**PINEY CREEK**

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**BASTROP COUNTY, TX**  
 AND INCORPORATED AREAS

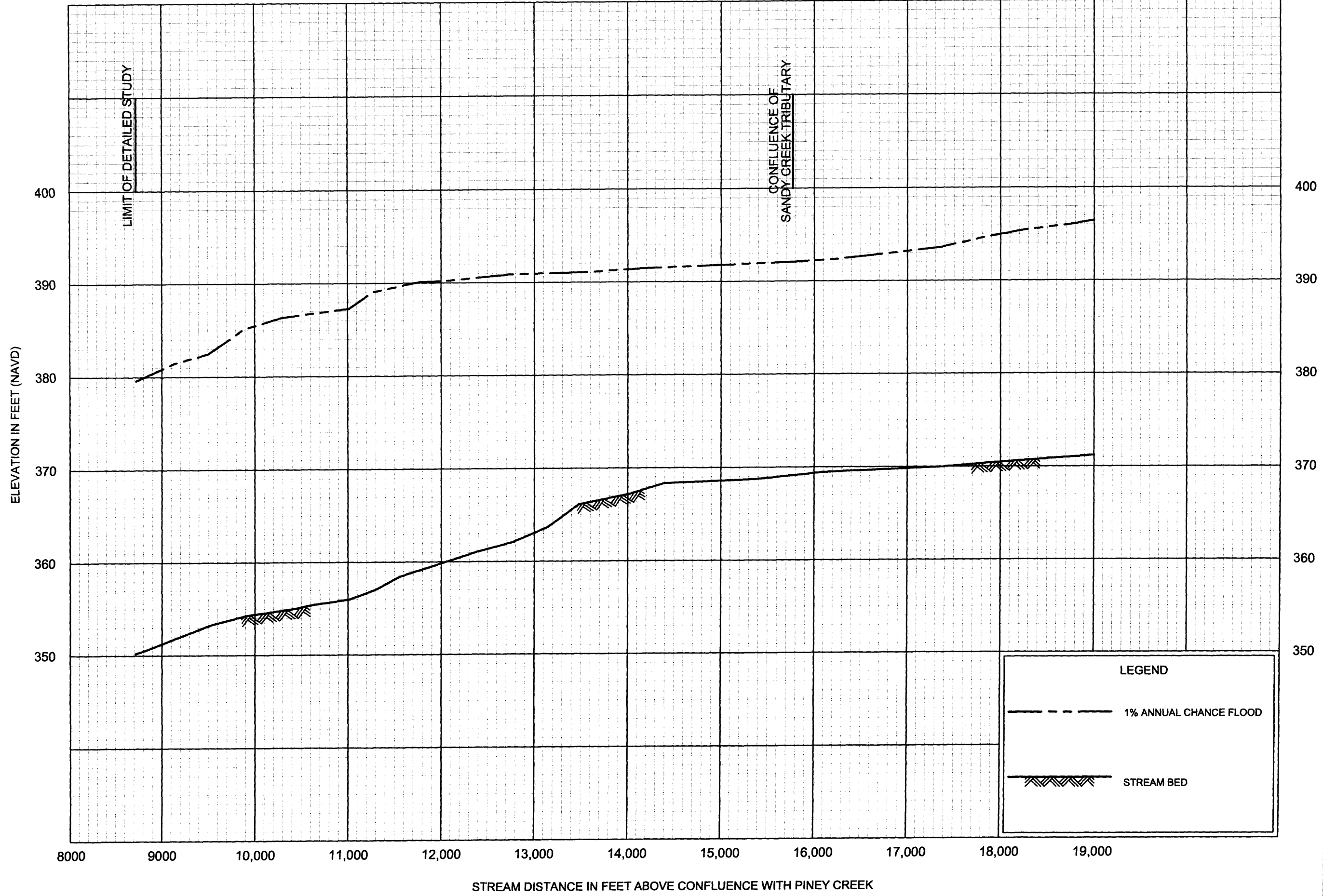


FLOOD PROFILES

PINEY CREEK

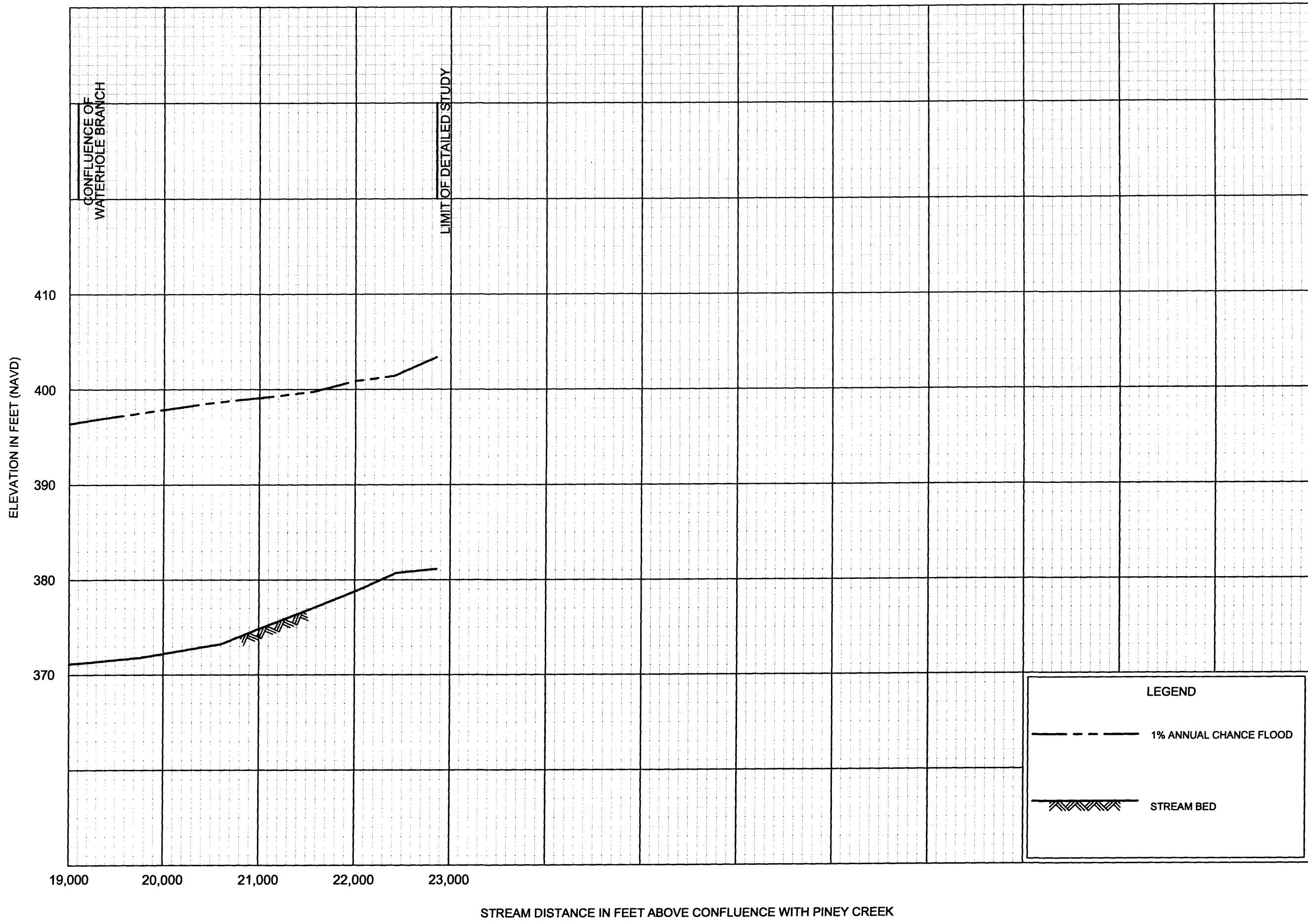
FEDERAL EMERGENCY MANAGEMENT AGENCY  
**BASTROP COUNTY, TX**  
 AND INCORPORATED AREAS





FLOOD PROFILES  
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
BASTROP COUNTY, TX  
AND INCORPORATED AREAS



FLOOD PROFILES  
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY  
BASTROP COUNTY, TX  
AND INCORPORATED AREAS

**IV.**

**APPENDIX B**

**DRAINAGE TECHNICAL MEMORANDUM FOR PECAN PARK  
DEVELOPMENT**



Espey Consultants, Inc.  
Environmental & Engineering Services

## TECHNICAL MEMORANDUM

Date: February 22, 2010

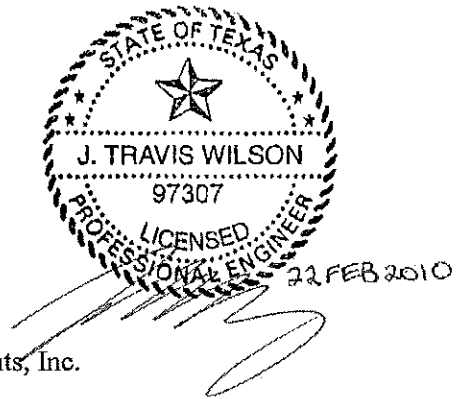
To: Lynn Alderson, P.E. – Alderson Group, Inc.

From: J. Travis Wilson, P.E., C.F.M.

Re: Drainage Technical Memorandum  
Pecan Park Development  
Bastrop, Bastrop County, Texas  
EC Project No. 09080.00

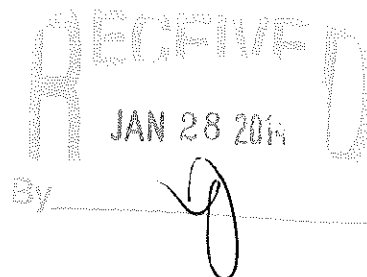
cc: Dale W. Gray, P.E., Vice President – Espey Consultants, Inc.

Attachments: 1 – Site Location Map  
2 – Floodplain Map  
3 – Time of Concentration Computations  
4 – Existing and Proposed Conditions 1% Annual Chance Hydrologic Model



Espey Consultants, Inc. (EC) is pleased to submit this technical memorandum documenting the results of the hydrologic and hydraulic analysis of the proposed Pecan Park Development located adjacent to the Colorado River along State Highway 71 (SH 71) in the City of Bastrop, Bastrop County, Texas. Specifically, the Pecan Park Development is located on 311 acres of land as shown on the Site Location Map attached with this memorandum. A portion of the site lies within the 1% annual chance (100-year) floodplain of the Colorado River as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) 48021C0355E dated January 19, 2006. The site is not impacted by any floodplain or creek systems other than the Colorado River. An exhibit showing the regulatory floodplain relative to the Pecan Park site is included with this memorandum as Attachment 2.

The intent of this memorandum is to demonstrate that development of the Pecan Park property does not adversely impact the regulatory floodplain of the Colorado River. This memorandum does not include an analysis of the internal (local) drainage system of the Pecan Park site. The sections that follow present a drainage analysis of Pecan Park and the drainage relationship of Pecan Park to the Colorado River.



## 1.0 DRAINAGE ANALYSIS OF PECAN PARK

The Pecan Park Development is a 311-acre site located along the Colorado River. The City of Bastrop Drainage Design Ordinance states that the 1% annual chance event be used to evaluate flooding impacts; therefore, this analysis only considers the 1% annual chance event. Existing conditions and developed conditions flows for the 1% annual chance storm event for the site are calculated using the United States Army Corps of Engineers (USACE) HEC-1 computer program utilizing the NRCS unit hydrograph method. This analysis only pertains to on-site flows—off-site flows are assumed to convey through or around the property and do not affect the premise of this analysis.

### 1.1 PRECIPITATION AND RAINFALL DISTRIBUTION

The precipitation depth of 10.2 inches for the 1% annual chance event is taken from the City of Bastrop Drainage Design Ordinance. This precipitation depth is distributed as a hyetograph assuming a 24-hour NRCS Type III rainfall distribution.

### 1.2 INFILTRATION LOSSES

The U.S. Department of Agriculture Natural Resource Conservation Service (NRCS, formerly the Soil Conservation Service, SCS) has developed a rainfall runoff index called the runoff curve number (CN), which takes into account such factors as soil characteristics, land use/land condition, and antecedent soil moisture to derive a generalized rainfall/runoff relationship for a given area. A description of these components and the equations for calculating runoff depth from rainfall are provided below.

The NRCS classifies soils into four hydrologic soil groups: A, B, C, and D. These groups indicate the runoff potential of a soil, ranging from a low runoff potential (group A) to a high runoff potential (group D). The NRCS provides runoff curve numbers for three Antecedent Moisture Conditions (AMC): I, II and III. AMC I represents dry soil conditions and AMC III represents saturated soil conditions. AMC II is normally considered to be the average soil condition; however, studies have indicated that AMC II is not the average throughout Texas. Investigations have shown that the average condition ranges from AMC I in west Texas to between AMC II and III for east Texas. Runoff curve numbers vary from 0 to 100, with the smaller values representing soils with lower runoff potential and the larger values representing soils with higher runoff potential. This study assumes an AMC II to represent average conditions.

For this analysis, curve numbers are evaluated independently of impervious cover (i.e., these curve numbers reflect good condition range land). According to the soil survey of Bastrop County, Texas, most of the soils within the study area are classified as NRCS Group B soils with a smaller portion of the site near the Colorado River classified as NRCS Group A soils. A runoff curve number (CN) of 57 is representative for the study area.

HEC-HMS computes 100 percent runoff from impervious areas, while runoff from pervious areas is computed using the selected CN value and the following equations:

$$Q = (P - 0.2 \times S)^2 / (P + 0.8 \times S) \quad \text{Equation 1}$$

And

$$CN = 1000 / (10 + S) \quad \text{Equation 2}$$

Where:

- Q = depth of runoff (in),
- P = depth of precipitation (in),
- S = potential maximum retention after runoff begins (in)<sup>1</sup>, and
- CN = runoff curve number.

Land use (impervious cover) is another key component of the infiltration losses in the hydrologic model. Most of the existing land area of the study area is undeveloped land with no impervious cover. Under proposed conditions, the impervious cover for the project site is increased to reflect proposed usage. The assumed proposed impervious cover for this tract is 80 percent. The actual impervious cover will be determined as part of the proposed site design and does not affect the premise of this technical memorandum.

### 1.3 UNIT HYDROGRAPH METHOD

#### 1.3.1 Background

A rainfall/runoff transformation is required to convert rainfall excess (total rainfall minus infiltration losses) into runoff from a particular subarea. The NRCS unit hydrograph option in HEC-1 is used in this analysis to generate a runoff hydrograph for the defined subarea. The unit hydrograph method represents a hydrograph for one unit [inch] of direct runoff and is a nationally accepted, standard engineering practice approach.

The dimensionless unit hydrograph developed by the NRCS (figure below) was developed by Victor Mockus and presented in *National Engineering Handbook, Section 4, Hydrology*. The dimensionless unit hydrograph has its ordinate values expressed in a dimensionless ratio,  $q/q_p$ , and its abscissa values as  $t/T_p$ . This unit hydrograph has a point of inflection approximately 1.7 times the time to peak ( $T_p$ ), and the time-to-peak 0.2 of the time-of-base ( $T_b$ ) (NRCS 1985).

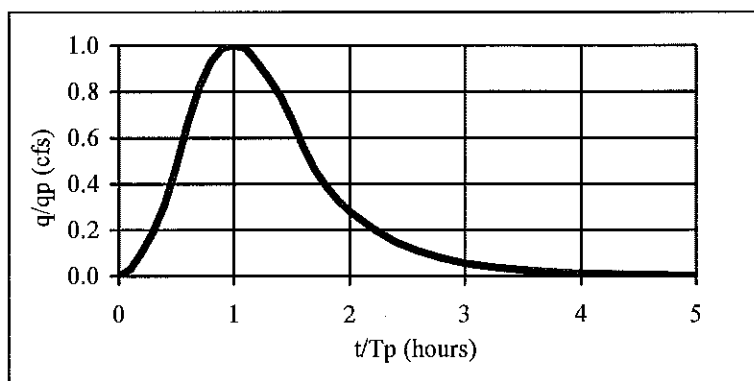


Figure 2. NRCS Unit Graph

In HEC-1, input data for this method consists of a single input parameter,  $T_{LAG}$ , which is equal to the time (hours) between the center of mass of rainfall excess and the peak of the unit hydrograph (NRCS 1985). In other words, there is a delay in time after a rain event before the runoff reaches its maximum peak. This delay is known as lag.

<sup>1</sup> Solve for S based on known CN

The time to peak is computed using the following equation:

$$T_{PEAK} = \Delta t/2 + T_{LAG} \quad \text{Equation 3}$$

Where:

- $T_{PEAK}$  = time to peak of the unitgraph (hours),
- $\Delta t$  = computation interval or duration of unit excess (hours), and
- $T_{LAG}$  = watershed lag (hours).

The peak flow rate of the unit graph is computed using the following equation:

$$qp = 484A/T_{PEAK} \quad \text{Equation 4}$$

Where:

- $qp$  = peak flow rate of the unit graph (cubic feet per second [cfs] / inch),
- $A$  = watershed area (square miles), and
- 484 = peak rate factor (dimensionless)<sup>2</sup>

### 1.3.2 Time of Concentration

The NRCS method assumes that the lag time of a watershed is 60 percent of the watershed's time of concentration. The time of concentration is the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed (NRCS 1985). The time of concentration may be estimated by calculating and summing the travel time defined by the flow type: sheet flow, shallow concentrated flow, and channelized flow (including roadways, storm sewers, and natural/manmade channels). The methods prescribed in the NRCS' Technical Release 55 (TR-55) are used to determine the times of concentration for each flow segment in this analysis. Attachment 3 shows the results of the calculations for this analysis utilizing each typical flow segment presented below.

#### Sheet Flow ( $\leq 300$ feet)

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's  $n$ ) is an effective roughness coefficient that includes the effect of raindrop impact, of drag over the plane surface and obstacles such as litter, crop ridges, and rocks, and of erosion and transportation of sediment. These  $n$  values are for very shallow flow depths of approximately 0.1 foot. Assuming sheet flow of less than or equal to 300 feet, travel time is computed as follows:

$$T_t = (0.007 \times (n \times L)^{0.8}) / (P_2^{0.5} \times s^{0.4}) \quad \text{Equation 5}$$

Where:

- $T_t$  = travel time (hr),
- $n$  = Manning's roughness coefficient,
- $L$  = flow length (ft),
- $P_2$  = 2-year, 24-hour rainfall (in), and
- $s$  = slope of hydraulic grade line (land slope, ft/ft).

---

<sup>2</sup> The peak rate factor of 484 has been known to vary from 600 in steep terrain to 300 in very flat, swampy terrain. The 484 value is standard engineering practice and is utilized in this analysis.

### Shallow Concentrated Flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from the following figure in which average velocity is a function of watercourse slope and type of channel (TR-55). The flow is still considered shallow in depth and flows in a swale or gutter instead of a channel, which has greater depth.

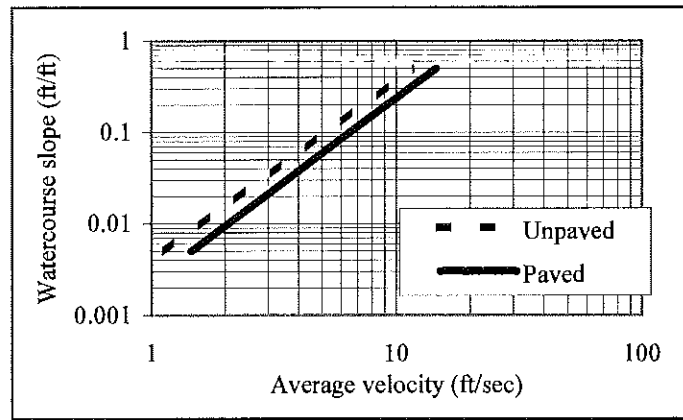


Figure 3. Avg. Velocities for Estimating Travel Time in Shallow Concentrated Flow Segments

After determining the average velocity, the following equation is used to compute travel time:

$$T_t = L / (3600 \times V) \quad \text{Equation 6}$$

Where:

- Tt = travel time (hr),
- L = flow length (ft),
- V = average velocity (ft/sec), and
- 3,600 = conversion factor from seconds to hours.

### Channelized Flow

As the depth of concentrated flow increases, the shallow concentrated flow evolves into channelized flow. Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle maps. Under proposed conditions, shallow concentrated flow is assumed to evolve more quickly into channel flow than under existing conditions.

## 1.4 HYDROGRAPH ROUTING

This analysis includes one drainage area and does not include any stormwater management facilities. There is no hydrograph routing (stream routing, storage routing, diversion routing, or the like) associated with this analysis.



## 1.5 HYDROLOGIC ANALYSIS RESULTS

The table shown below summarizes the existing conditions and proposed conditions results obtained from HEC-1 for the Pecan Park Development. The results of this analysis are compared to the drainage characteristics of the Colorado River later in this memorandum for the purpose of evaluating the potential runoff impact from the Pecan Park Development on the Colorado River. The existing and proposed hydrologic models are included with this technical memorandum as Attachment 4.

**Table 6. Computed Peak Flow Rates from Pecan Park Development**

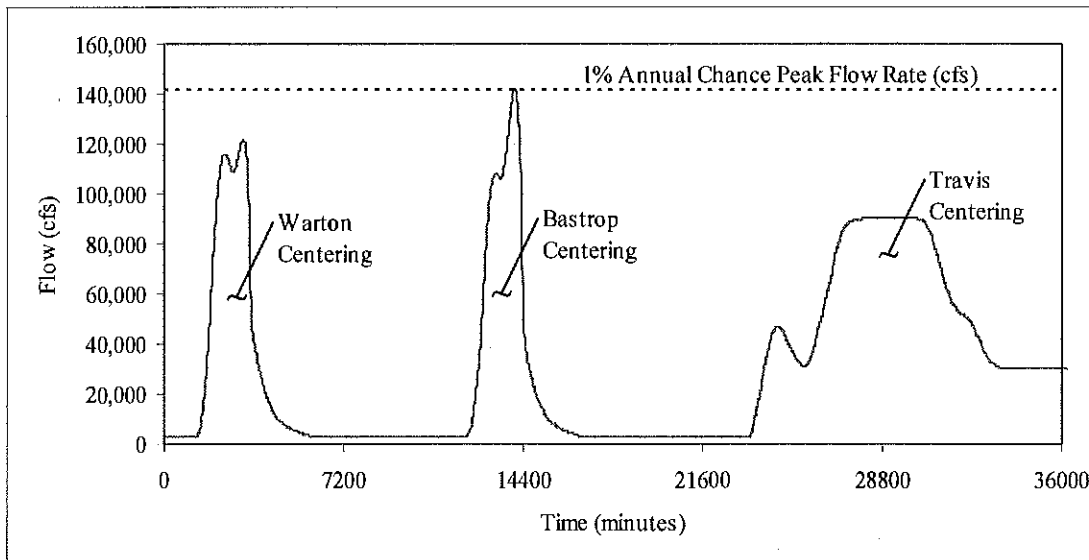
HEC-1 Node	Area (acres)	1% Annual Chance Peak Flow Rate (cfs)	
		Existing	Proposed
Site	314	535	1,670

## 2.0 DRAINAGE CHARACTERISTICS OF THE COLORADO RIVER

The Colorado River is adjacent to the Pecan Park property and accepts the runoff from the site. According to the Bastrop County Flood Insurance Study (FIS) dated January 19, 2006, the Colorado River has a drainage area of approximately 39,980 square miles at USGS gage 08159200 located at SH 71 just upstream of the Pecan Park site. Of the 39,980 square miles of drainage area, approximately 11,403 square miles is estimated to be non-contributing according to the United States Geological Survey (USGS). Flow in the Bastrop County section of the Colorado River is also heavily influenced by the Highland Lakes as well as other flow control structures upstream.

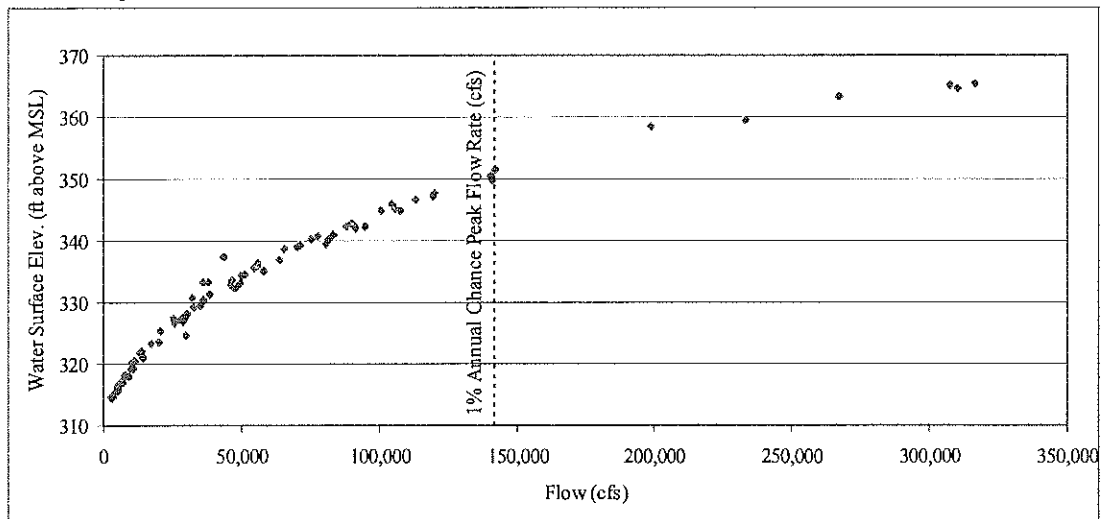
According to the FIS, the 1% annual chance peak at the USGS gage near the site is 142,020 cfs, which was derived by a flood frequency analysis of the annual peak flow rates at this gage location over a 70-year period of record. The USACE HEC-HMS computer program was then used to create a hydrograph of this peak flow rate. This hydrograph is then input into the unsteady hydraulic model for this section of the Colorado River using the USACE HEC-RAS computer program. The figure below presents the resulting hydrograph that is input into the hydraulic model at SH 71 just upstream of the Pecan Park site. This is a three-peak hydrograph to represent centering the storm simulation at three points of interest. The first peak represents centering over the Warton County point of interest, the second peak represents centering over the Bastrop County point of interest, and the third represents centering over the Travis County point of interest. The highest of the three peaks, and thus the regulatory 1% annual chance peak flow rate, is represented by centering over the Bastrop County point of interest.

Figure 1. Colorado River 1% Annual Chance Hydrograph at SH 71 near Pecan Park Site



The hydraulic model for Bastrop County is divided into two sections including 1) from Lady Bird Lake to the USGS gage at Bastrop and 2) from the USGS gage at Bastrop to the USGS gage at La Grange. The Pecan Park site lies near the upstream end of the Bastrop – La Grange section of the Colorado River hydraulic model near Cross Section 12503+28 (FEMA Lettered Cross Section AY). This hydraulic model was developed as a one-dimensional unsteady flow model as part of the Lower Colorado River Basin-Wide Study in 2002. The regulatory floodplain elevation adjacent to the Pecan Park site is 350.60 feet above mean sea level (MSL) and corresponds to the peak flow rate from centering the simulation at the Bastrop County point of interest. The figure below presents the hydraulic rating curve on the Colorado River at the Pecan Park site.

**Figure 2. Hydraulic Rating Curve for Cross Section 12503+28 near Pecan Park Site**



### 3.0 RELATIONSHIP OF PECAN PARK SITE TO COLORADO RIVER

The sections above describe the drainage characteristics of the Pecan Park site and the Colorado River near the site. The 1% annual chance flood event for the site is statistically independent of the 1% annual chance flood event for the Colorado River—the events are non-coincident. This rationale is consistent with FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, which states that the assumption of coincident peaks (peak-on-peak scenario) may be appropriate if all of the following are true:

- The ratio of drainage areas lies between 0.6 and 1.4.
  - The drainage area ratio of the Pecan Park site to the Colorado River is 0.00001. The figure shown below is a graphical relationship of the site relative to the overall Colorado River watershed (within the State of Texas).

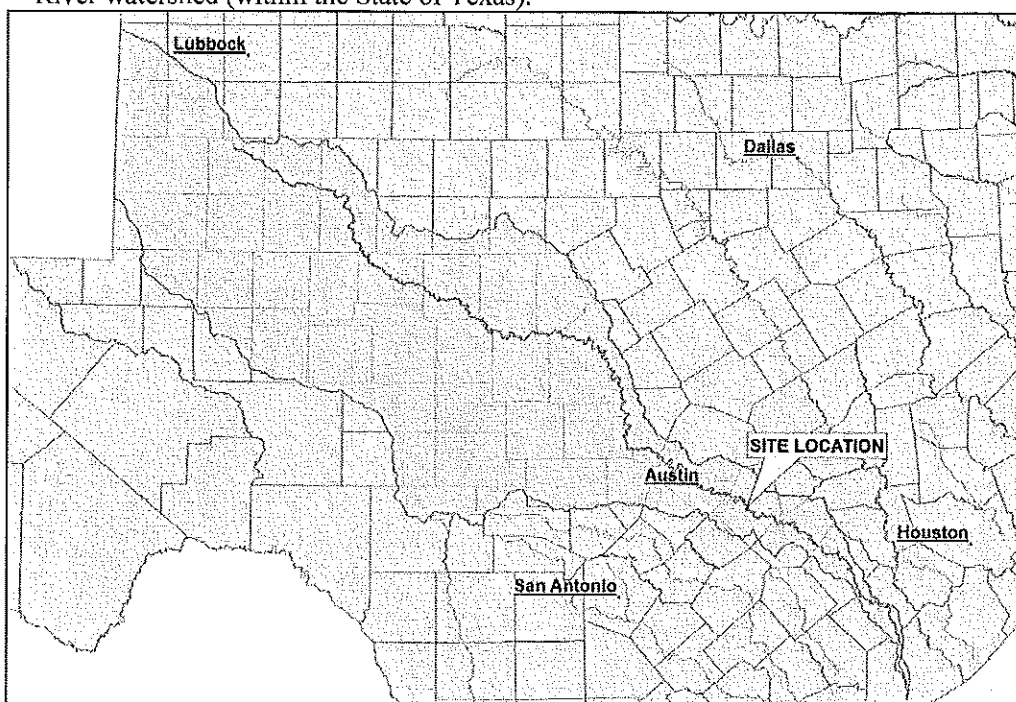


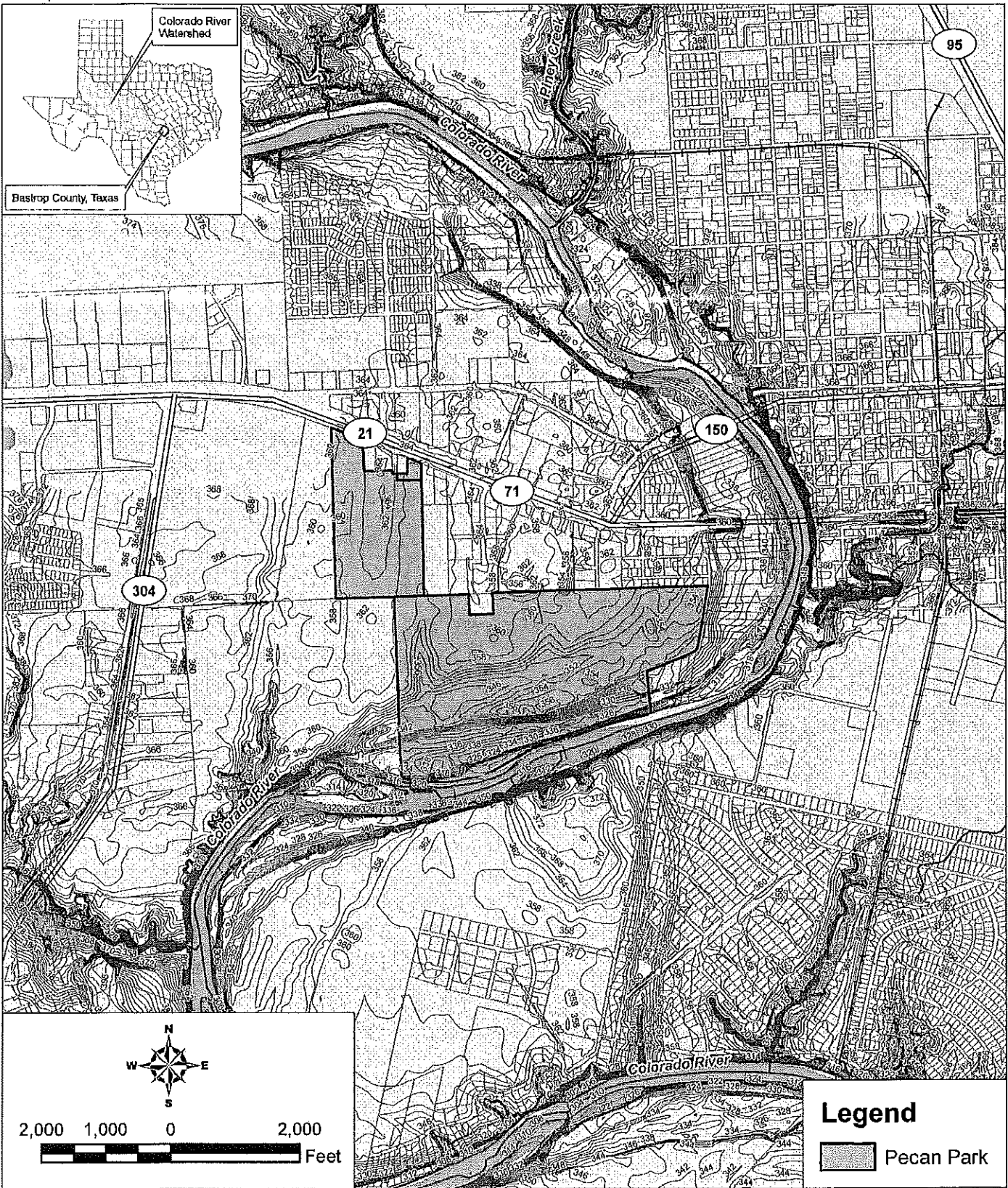
Figure 3. Pecan Park Site Location within Colorado River Watershed

- The times of peak flow are similar for the two combining watersheds.
  - The time of peak for the Colorado River is at approximately 31:45 hours as measured from the beginning of the Bastrop-centered simulation described earlier in this memorandum.
  - The Pecan Park site drainage is simulated based on a 24-hour design storm as described in the City of Bastrop Drainage Design Ordinance and is not directly comparable to the time of peak for the Colorado River. Based on a 24-hour design storm, the time of peak for the site is at approximately 12:20 under proposed conditions as measured from the beginning of the simulation.
- The likelihood of both watersheds being covered by the storm event being modeled is high.
  - The likelihood of the Pecan Park site experiencing a 100-year event as modeled above is a 1% annual chance. The likelihood of the Colorado River experiencing a 100-year event as described above is a 1% annual chance. However, the likelihood of both events

occurring simultaneously in a peak-on-peak scenario is less than a 1% annual chance, and therefore, does not qualify as a 100-year event.

None of the above conditions are met; therefore, the assumption of coincident peaks is not appropriate for the Pecan Park site relative to the Colorado River. Given the conditions outlined above and the drainage characteristics of the Pecan Park site relative to the Colorado River, increases in runoff from the development of the Pecan Park site will not adversely impact the 1% annual chance peak flow rate or regulatory floodplain elevation on the Colorado River. Therefore, site detention for the development of the Pecan Park site is not necessary to mitigate any impacts to peak flow rates along the Colorado River. This rationale is consistent with the City of Austin drainage criteria for development that discharges into and is immediately adjacent to the Colorado River (reference Austin *Drainage Criteria Manual* §1.2.2(F)).

*P:\Active\09080.00\_Pecan\_Park\_Dev\Documents\100222\_TMemo\_PecanParkDetention.doc*

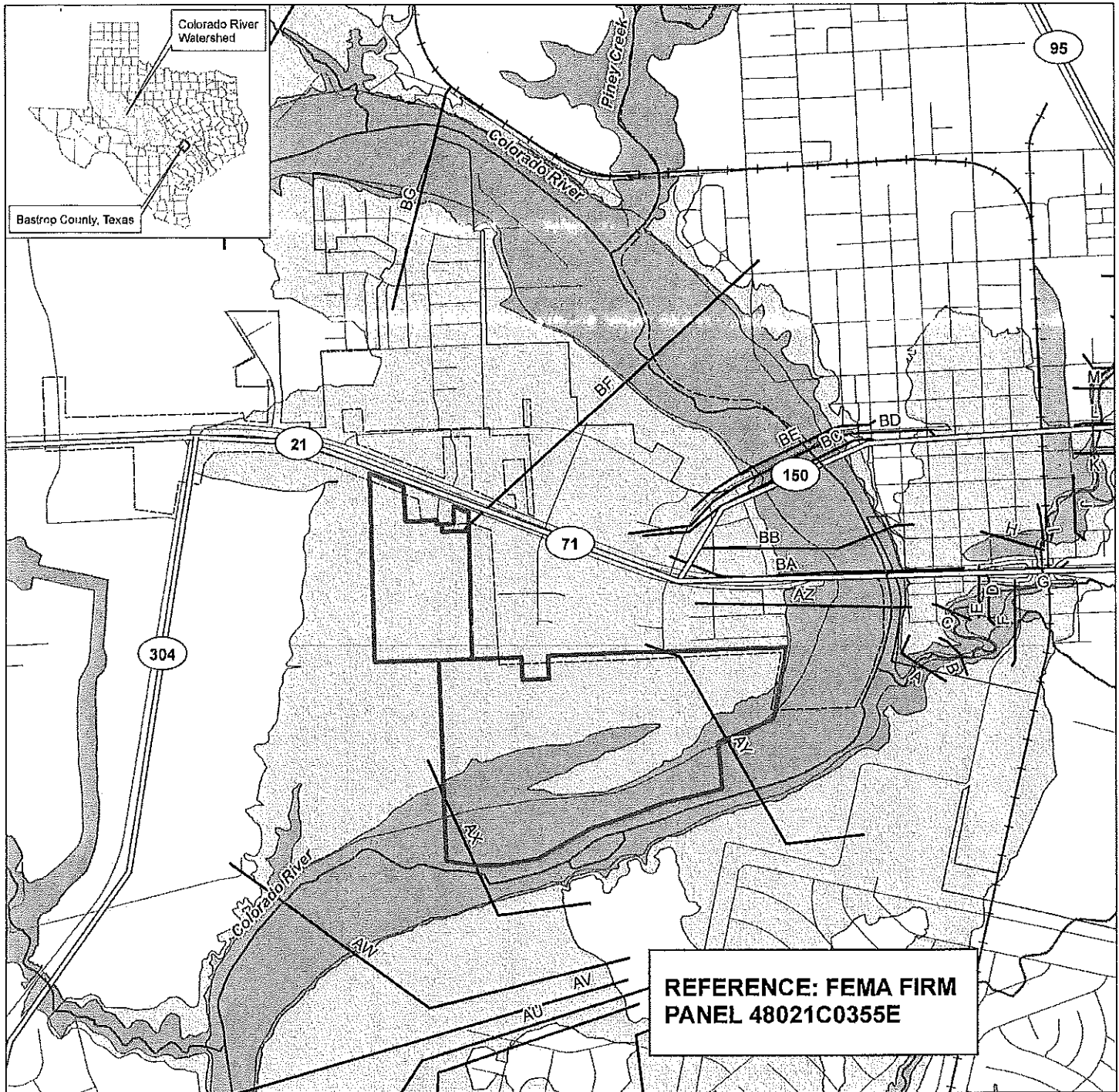


**E** Espey Consultants, Inc.  
**C** Environmental & Engineering Services

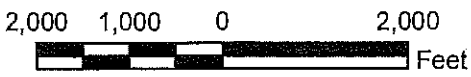
**ATTACHMENT 1**  
**SITE LOCATION MAP**  
 PECAN PARK DEVELOPMENT

FEBRUARY 2010

PROJECT NUMBER 09080.00



**REFERENCE: FEMA FIRM  
PANEL 48021C0355E**



**Legend**

- Pecan Park
- FEMA LETTERED CROSS SECTION
- 0.2 % ANNUAL CHANCE FLOODPLAIN (SHADED ZONE X)
- 1 % ANNUAL CHANCE FLOODPLAIN (ZONE AE)

**Espey Consultants, Inc.**  
Environmental & Engineering Services

**ATTACHMENT 2  
FLOODPLAIN MAP**

FEBRUARY 2010

PROJECT NUMBER 09080.00

**PECAN PARK DEVELOPMENT**  
**TIME OF CONCENTRATION CALCULATIONS**

ATTACHMENT 3

**EXISTING CONDITIONS**  
**TR-55 Method of Computing the Time of Concentration**

			Site
<b>Sheet Flow</b>	variable	units	
Manning's roughness coef.	n	n/a	0.24
Flow Length	L	feet	300
2-year, 24-hour rainfall	P2	inches	3.6
Slope	s	ft/ft	0.0110
Travel time (equation 3-3)	Tt	hours	0.686
<b>Shallow Concentrated Flow</b>		min.	41.2
Flow Length	L	feet	2,000
Slope	s	ft/ft	0.003
Surface (1=paved or 2=unpaved)		n/a	2
Velocity (figure 3-1)	V	ft/sec	0.89
Travel time	Tt	hours	0.626
<b>Manning's Equation</b>		min.	37.6
Flow Length	L	feet	2,750
Slope	S	ft/ft	0.0130
roughness	n	n/a	0.08
<b>Open Channel</b>			
Bottom Width	BW	feet	10
Side Slopes (H:1)	H	feet	3
Depth	d	feet	4
<b>...or Closed Conduit</b>			
Rise / Diameter	R / D	feet	
Span (0 if circular)	S	feet	
Cross-Sectional Area	X-A	feet <sup>2</sup>	88.00
Flow Rate	Q	cfs	342.66
Velocity (figure 3-1)	V	ft/sec	3.89
Travel time	Tt	hours	0.196
Flow Length	L	feet	
Slope	S	ft/ft	
roughness	n	n/a	
<b>Open Channel</b>			
Bottom Width	BW	feet	
Side Slopes (H:1)	H	feet	
Depth	d	feet	
<b>...or Closed Conduit</b>			
Rise / Diameter	R / D	feet	
Span (0 if circular)	S	feet	
Cross-Sectional Area	X-A	feet <sup>2</sup>	0.00
Flow Rate	Q	cfs	n/a
Velocity (figure 3-1)	V	ft/sec	n/a
Travel time	Tt	hours	-
<b>Total Travel Time</b>	TC	hours	1.508
	TC	min.	90.5
<b>Lag Time</b>	TL	hours	0.9049
	TL	min.	54.3



**PECAN PARK DEVELOPMENT**  
**TIME OF CONCENTRATION CALCULATIONS**

ATTACHMENT 3

**PROPOSED CONDITIONS**  
**TR-55 Method of Computing the Time of Concentration**

			Site
<b>Sheet Flow</b>			
Manning's roughness coef.	n	n/a	0.24
Flow Length	L	feet	50
2-year, 24-hour rainfall	P2	inches	3.6
Slope	s	ft/ft	0.0110
Travel time (equation 3-3)	Tt	hours	0.164
<b>Shallow Concentrated Flow</b>			
		min.	9.8
Flow Length	L	feet	500
Slope	s	ft/ft	0.003
Surface (1=paved or 2=unpaved)		n/a	1
Velocity (figure 3-1)	V	ft/sec	1.13
Travel time	Tt	hours	0.123
<b>Manning's Equation</b>			
		min.	7.4
Flow Length	L	feet	4,500
Slope	S	ft/ft	0.0130
roughness	n	n/a	0.04
<b>Open Channel</b>			
Bottom Width	BW	feet	10
Side Slopes (H:1)	H	feet	3
Depth	d	feet	4
<b>...or Closed Conduit</b>			
Rise / Diameter	R / D	feet	
Span (0 if circular)	S	feet	
Cross-Sectional Area	X-A	feet <sup>2</sup>	88.00
Flow Rate	Q	cfs	685.33
Velocity (figure 3-1)	V	ft/sec	7.79
Travel time	Tt	hours	0.161
<b>Open Channel</b>			
Flow Length	L	feet	
Slope	S	ft/ft	
roughness	n	n/a	
<b>Open Channel</b>			
Bottom Width	BW	feet	
Side Slopes (H:1)	H	feet	
Depth	d	feet	
<b>...or Closed Conduit</b>			
Rise / Diameter	R / D	feet	
Span (0 if circular)	S	feet	
Cross-Sectional Area	X-A	feet <sup>2</sup>	0.00
Flow Rate	Q	cfs	n/a
Velocity (figure 3-1)	V	ft/sec	n/a
Travel time	Tt	hours	-
<b>Total Travel Time</b>			
	TC	hours	0.447
	TC	min.	26.8
<b>Lag Time</b>			
	TL	hours	0.2683
	TL	min.	16.1

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* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION  
 NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,  
 DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION  
 KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-I INPUT PAGE 1

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5 ID Project No. 09080.00.....Espey Consultants
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43 ZZ
    
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1
SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
    
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8 DA\_1

(\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION  
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 \* JUN 1998 \*  
 \* VERSION 4.1 \*  
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 \* RUN DATE 15FEB10 TIME 13:11:40 \*  
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 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 756-1104 \*  
 \*  
 \*\*\*\*\*

Pecan Park Development.....Bastrop, Bastrop County, TX  
 Existing Conditions.....February 2010  
 100-Year Event (1% Event).....File name: E\_100.IH1  
 NRCS Type III Distribution (24-HR Duration)  
 Project No. 09080.00.....Espey Consultants

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 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA  
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 ITIME 0000 STARTING TIME  
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES  
 NDDATE 2JAN10 ENDING DATE  
 NDTIME 0055 ENDING TIME  
 ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS  
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS  
 DRAINAGE AREA SQUARE MILES  
 PRECIPITATION DEPTH INCHES  
 LENGTH, ELEVATION FEET  
 FLOW CUBIC FEET PER SECOND  
 STORAGE VOLUME ACRE-FEET  
 SURFACE AREA ACRES  
 TEMPERATURE DEGREES FAHRENHEIT

1

RUNOFF SUMMARY  
 FLOW IN CUBIC FEET PER SECOND  
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
+									
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\*\*\* NORMAL END OF HEC-1 \*\*\*

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*      VERSION 4.1
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* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KM.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMSKK- ON RM-CARD HAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT

PAGE 1

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2 ID Proposed Conditions.....February 2010
3 ID 100-Year Event (1% Event).....File name: F_100.IH1
4 ID NRCS Type III Distribution (24-HR Duration)
5 ID Project No. 09080.00.....Espey Consultants
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7 IO      5
*
8 KK      DA 1
9 BA      0.491
10 PB     10.2
* SCS Type 3 Rainfall Pattern
11 IN     5 01JAN10      0
12 PC     0 0.0008 0.0017 0.0025 0.0033 0.0042 0.005 0.0058 0.0067 0.0075
13 PC     0.0083 0.0092 0.01 0.0108 0.0117 0.0125 0.0133 0.0142 0.015 0.0158
14 PC     0.0167 0.0175 0.0183 0.0192 0.02 0.0208 0.0217 0.0225 0.0234 0.0243
15 PC     0.0252 0.0261 0.027 0.0279 0.0289 0.0298 0.0308 0.0317 0.0327 0.0337
16 PC     0.0347 0.0357 0.0367 0.0377 0.0388 0.0398 0.0408 0.0419 0.043 0.0441
17 PC     0.0452 0.0463 0.0474 0.0485 0.0497 0.0509 0.052 0.0532 0.0544 0.0555
18 PC     0.0567 0.0579 0.0592 0.0604 0.0617 0.063 0.0642 0.0654 0.0668 0.068
19 PC     0.0693 0.0707 0.072 0.0733 0.0747 0.0761 0.0776 0.0791 0.0806 0.0822
20 PC     0.0838 0.0854 0.0871 0.0887 0.0905 0.0922 0.0941 0.0959 0.0978 0.0997
21 PC     0.1016 0.1036 0.1056 0.1076 0.1097 0.1118 0.114 0.1163 0.1185 0.1208
22 PC     0.1233 0.1258 0.1284 0.1311 0.1339 0.1367 0.1397 0.1427 0.1458 0.149
23 PC     0.1522 0.1555 0.1589 0.1624 0.1659 0.1696 0.1733 0.1771 0.181 0.185
24 PC     0.189 0.1931 0.1975 0.202 0.2067 0.2115 0.2165 0.2216 0.227 0.2325
25 PC     0.2382 0.244 0.25 0.2564 0.2634 0.2711 0.2795 0.2884 0.298 0.3111
26 PC     0.3298 0.3559 0.3848 0.4273 0.5 0.5727 0.6152 0.6441 0.6702 0.6889
27 PC     0.702 0.7116 0.7205 0.7289 0.7366 0.7436 0.75 0.756 0.7618 0.7675
28 PC     0.773 0.7784 0.7835 0.7885 0.7933 0.798 0.8025 0.8069 0.811 0.815
29 PC     0.819 0.8229 0.8267 0.8304 0.8341 0.8376 0.8411 0.8445 0.8478 0.8511
30 PC     0.8543 0.8573 0.8603 0.8633 0.8661 0.8689 0.8716 0.8742 0.8767 0.8792
31 PC     0.8815 0.8837 0.886 0.8882 0.8903 0.8924 0.8944 0.8964 0.8984 0.9003
32 PC     0.9022 0.9041 0.9059 0.9078 0.9095 0.9113 0.9129 0.9146 0.9162 0.9178
33 PC     0.9194 0.9209 0.9224 0.9239 0.9253 0.9267 0.928 0.9293 0.9307 0.9319
34 PC     0.9332 0.9346 0.9358 0.937 0.9383 0.9396 0.9408 0.9421 0.9433 0.9445
35 PC     0.9456 0.9468 0.948 0.9491 0.9503 0.9515 0.9526 0.9537 0.9548 0.9559
36 PC     0.957 0.9581 0.9592 0.9603 0.9613 0.9623 0.9634 0.9644 0.9654 0.9664
37 PC     0.9674 0.9684 0.9694 0.9704 0.9714 0.9723 0.9733 0.9743 0.9752 0.9762
38 PC     0.9771 0.978 0.979 0.9799 0.9808 0.9816 0.9825 0.9834 0.9843 0.9852
39 PC     0.986 0.9868 0.9877 0.9885 0.9893 0.9902 0.9909 0.9917 0.9925 0.9933
40 PC     0.9941 0.9948 0.9956 0.9964 0.9971 0.9979 0.9986 0.9992 1
*
41 LS     0 57 80
42 UD     0.27
*
43 ZZ
    
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW
NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW
    
```

8 DA\_1  
 (\*\*\*) RUNOFF ALSO COMPUTED AT THIS LOCATION  
 1\*\*\*\*\*  
 \* FLOOD HYDROGRAPH PACKAGE (HEC-1) \*  
 \* JUN 1998 \*  
 \* VERSION 4.1 \*  
 \* RUN DATE 17FEB10 TIME 11:45:58 \*  
 \*\*\*\*\*

\*\*\*\*\*  
 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET \*  
 \* DAVIS, CALIFORNIA 95616 \*  
 \* (916) 756-1104 \*  
 \*\*\*\*\*

Pecan Park Development.....Bastrop, Bastrop County, TX  
 Proposed Conditions.....February 2010  
 100-Year Event (1% Event).....File name: P\_100.IH1  
 NRCS Type III Distribution (24-HR Duration)  
 Project No. 09080.00.....Espey Consultants

7 IO OUTPUT CONTROL VARIABLES  
 IPRT 5 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE  
 IT HYDROGRAPH TIME DATA  
 NMIN 5 MINUTES IN COMPUTATION INTERVAL  
 IDATE 1JAN10 STARTING DATE  
 ITIME 0000 STARTING TIME  
 NQ 300 NUMBER OF HYDROGRAPH ORDINATES  
 NDDATE 2JAN10 ENDING DATE  
 NDTIME 0055 ENDING TIME  
 ICENT 19 CENTURY MARK  
 COMPUTATION INTERVAL .08 HOURS  
 TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS  
 DRAINAGE AREA SQUARE MILES  
 PRECIPITATION DEPTH INCHES  
 LENGTH, ELEVATION FEET  
 FLOW CUBIC FEET PER SECOND  
 STORAGE VOLUME ACRE-Feet  
 SURFACE AREA ACRES  
 TEMPERATURE DEGREES FAHRENHEIT

1

RUNOFF SUMMARY  
 FLOW IN CUBIC FEET PER SECOND  
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
+									
+	HYDROGRAPH AT DA_1	1670.	12.33	343.	120.	116.	.49		

\*\*\* NORMAL END OF HEC-1 \*\*\*

**V.**

**APPENDIX C**

**ENGINEERING REPORT FOR PECAN CROSSING OFFSITE  
DRAINAGE IMPROVEMENTS**

ENGINEERING REPORT

FOR

PECAN CROSSING  
OFFSITE  
DRAINAGE IMPROVEMENTS

MAY 2007

Prepared By:



Cunningham | Allen

---

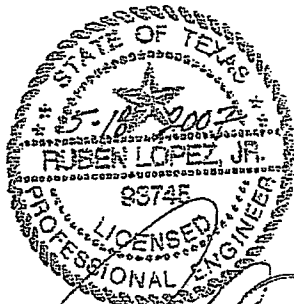
Engineers • Surveyors

ENGINEERING REPORT

FOR

PECAN CROSSING  
OFFSITE  
DRAINAGE IMPROVEMENTS

MAY 2007



A handwritten signature in black ink, appearing to read "Ruben Lopez, Jr.", written over the bottom portion of the professional seal.

Cunningham | Allen, Inc.

Engineers • Surveyors

3103 Bee Cave Road, Suite 202  
Austin, Texas 78746-6819  
Tel.: (512) 327-2946 • Fax: (512) 327-2973  
[www.cunningham-allen.com](http://www.cunningham-allen.com)



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<u>SECTION DESCRIPTION</u>	<u>PAGE</u>
SUMMARY .....	1

EXHIBITS

- A. FEMA FLOOD INSURANCE RATE MAP
- B. DRAINAGE AREA MAP
- C. HEC-1 ANALYSIS -100YR
- D. HECRAS CROSS SECTION WITH 100 YR DELINEATION
- E. HECRAS ANALYSIS

## PECAN CROSSING DRAINAGE IMPROVEMENTS

### INTRODUCTION

This report outlines the proposed improvements required to convey run-off generated by the 100 year storm event across the Cantrell Property as outlined in the "*OPTION AGREEMENT FOR SALE AND PURCHASE OF DRAINAGE EASEMENT*". The area that was included for sizing the improvements consists of what is considered the Bastrop Grove Partners (BGP) Property and The Cantrell Property. The tracts that are included in the study are outlined in exhibit B. The tracts are depicted as "Drainage Areas" in the following manner:

Drainage Area 1 – the Cantrell Tract

Drainage Area 2, 3 and 4 – the BGP Tract

Drainage Area 5 – Offsite Area conveyed to BGP tract by the Texas Department of Transportation TXDOT

The National Weather Service Maps based on the Hydro-35 and TP-40 data and were used to determine the 24 hour rainfall in inches for the county of Bastrop, Texas. This rainfall was used in the SCS (soils conservation service) 24 hour rainfall storm duration - type III rainfall distribution.

The Drainage Areas are assumed to be fully developed in order to size the proposed channel accordingly. Assumptions in terms of time of concentration are based on "redirecting" flows to the proposed channel. The CN value for the drainage areas is based on the SCS soils conservation survey for Bastrop County, Texas. The CN value was based on a type B soil as a majority of the area is Smithville or Bosque soil classification. The generated fully developed flows as assumed in exhibit B (the Drainage Area Map) were calculated using the U.S. Army Corp of Engineers' Hydrologic Engineering Center hydrology program HEC-1. The report is included in exhibit C.

One of the parameters of the analysis was the existing Federal Emergency Management Agency (FEMA) floodplain for the Colorado River. This existing floodplain inundates the southern portion of the Cantrell Tract (referred to Drainage Area 1 on exhibit B). The current FEMA map 48021C0355E, dated January 19, 2006 for Bastrop County, Texas is included as exhibit A. The limit of the floodplain as it affects the channel design is identified on exhibit D (elevation 349 ft mean sea level). It extends into the limit of the proposed channel improvements (between cross sections 10 and 11).

Other constraints are outlined by the agreement and requirements of the City of Bastrop for channel design. Thus the channel is both grass lined and maintains side slopes of 3ft vertical to 1ft horizontal and a bottom width of 6 ft for the majority of the improvements. The proposed channel design also has provisions for a low water crossing with a maximum slope of 6 ft vertical to 1ft horizontal. This low water crossing is proposed between cross sections 9 and 8 (on exhibit D). The channel was designed with a slope of 0.3%. The channel widens/transitions to a bottom width of 6ft to 24 ft from cross section 7 to 6 (as identified on exhibit D) to minimize the abrupt change and connectivity to the proposed culverts. Based on visual observations of the Cantrell tract and the type of vegetation that exists, the n value for the proposed channel was assumed to be 0.35.

The proposed culverts were designed by utilizing the U.S. Army Corp of Engineers' Hydrologic Engineering Center - River Analysis system (HEC-RAS). These culverts were included to preserve the existing dam/crossing structure located on the southern portion of the Cantrell Tract. In it's current

condition, the crossing is submerged during the 100 year flood according to FEMA. On average it is submerged by 2 ft.

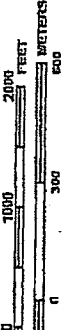
In fully developed conditions, the channel was designed to have the least amount of impact on the existing 100 year floodplain elevation of 349 ft msl (mean sea level). With the known water surface elevation of 349, the proposed improvements raised the floodplain in this area by a depth no greater than 0.2 ft (approximately 2.4 inches). The HEC-RAS analysis for the design of the channel is provided in exhibit E.

Though the 100 yr floodplain elevation impacts are minimized, erosion measures will be proposed at the existing crossing. This will be achieved by rock rip rap (24" diameter minimum) on the downstream side of the embankment and culvert outlet. The extents are outline in exhibit D. In the same manner, the existing 10 ft dirt road crossing will be improved to a 14 ft wide concrete road. This will be achieved within the same embankment extents and is also depicted in exhibit D.

EXHIBIT A

FEMA FLOOD INSURANCE RATE MAP

MAP SCALE 1" = 1000'



PANEL 0355E

# FIRM FLOOD INSURANCE RATE MAP BASTROP COUNTY, TEXAS AND INCORPORATED AREAS PANEL 355 OF 625

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	DATE	SUFFIX
BASTROP, CITY OF	480222	0355	E
BASTROP COUNTY	481193	0356	E

Notice to User: This Map Number shown below should be used when placing rmp orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
48021C0355E  
**MAP REVISED**  
JANUARY 19, 2006



Federal Emergency Management Agency

This is an update of a portion of the above referenced flood map. It was submitted using Form FD-10. This map does not reflect changes to the flood hazard areas shown on the original map. For the most current information about flood hazards, please check the FEMA Flood Map Data at [www.mafdata.com](http://www.mafdata.com).

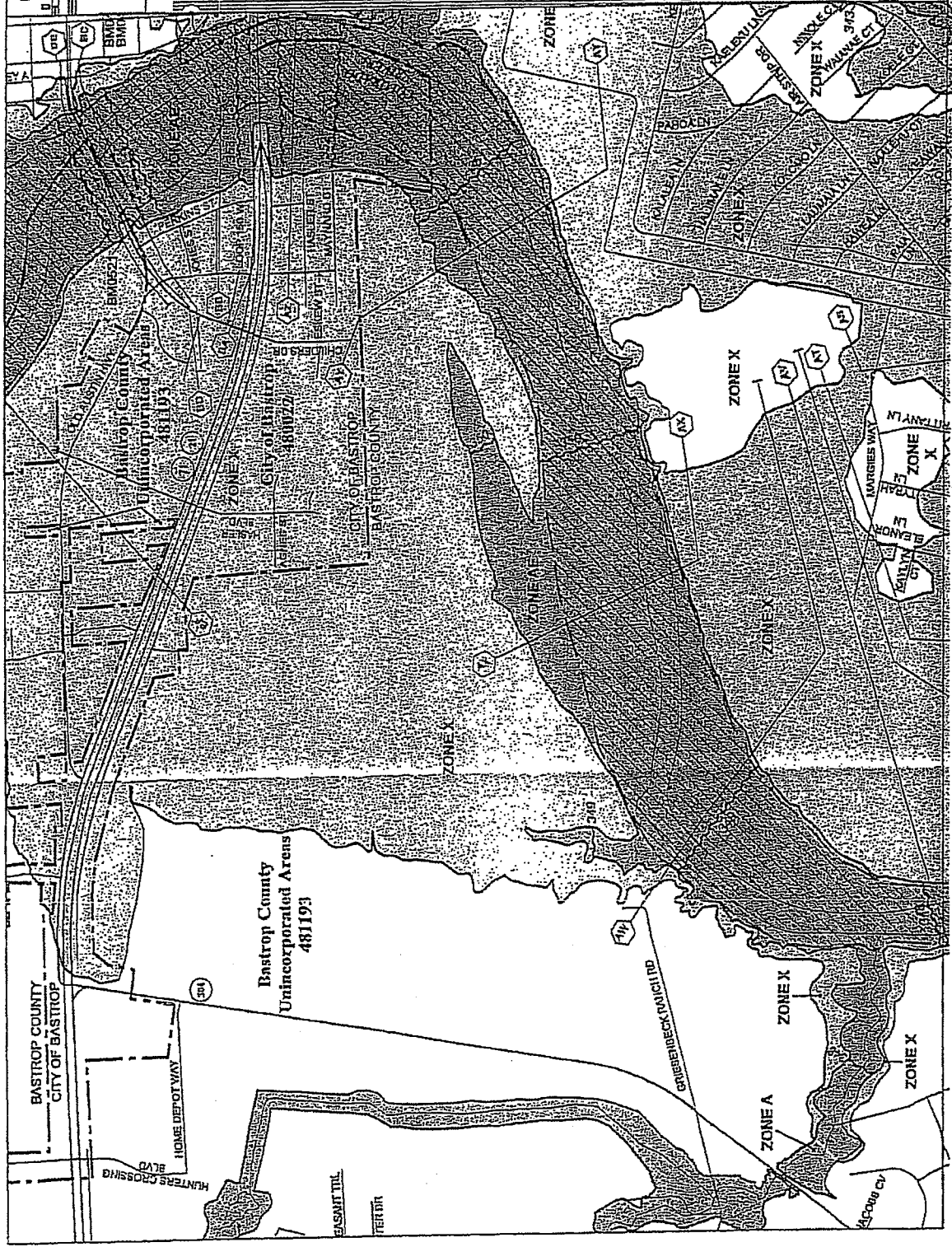
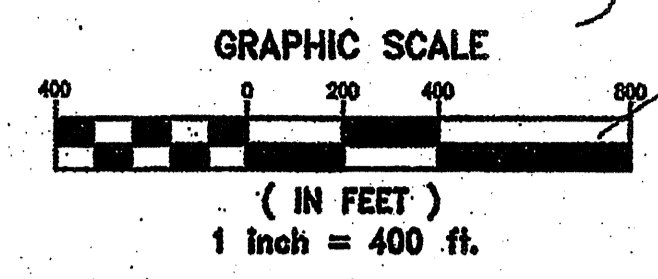
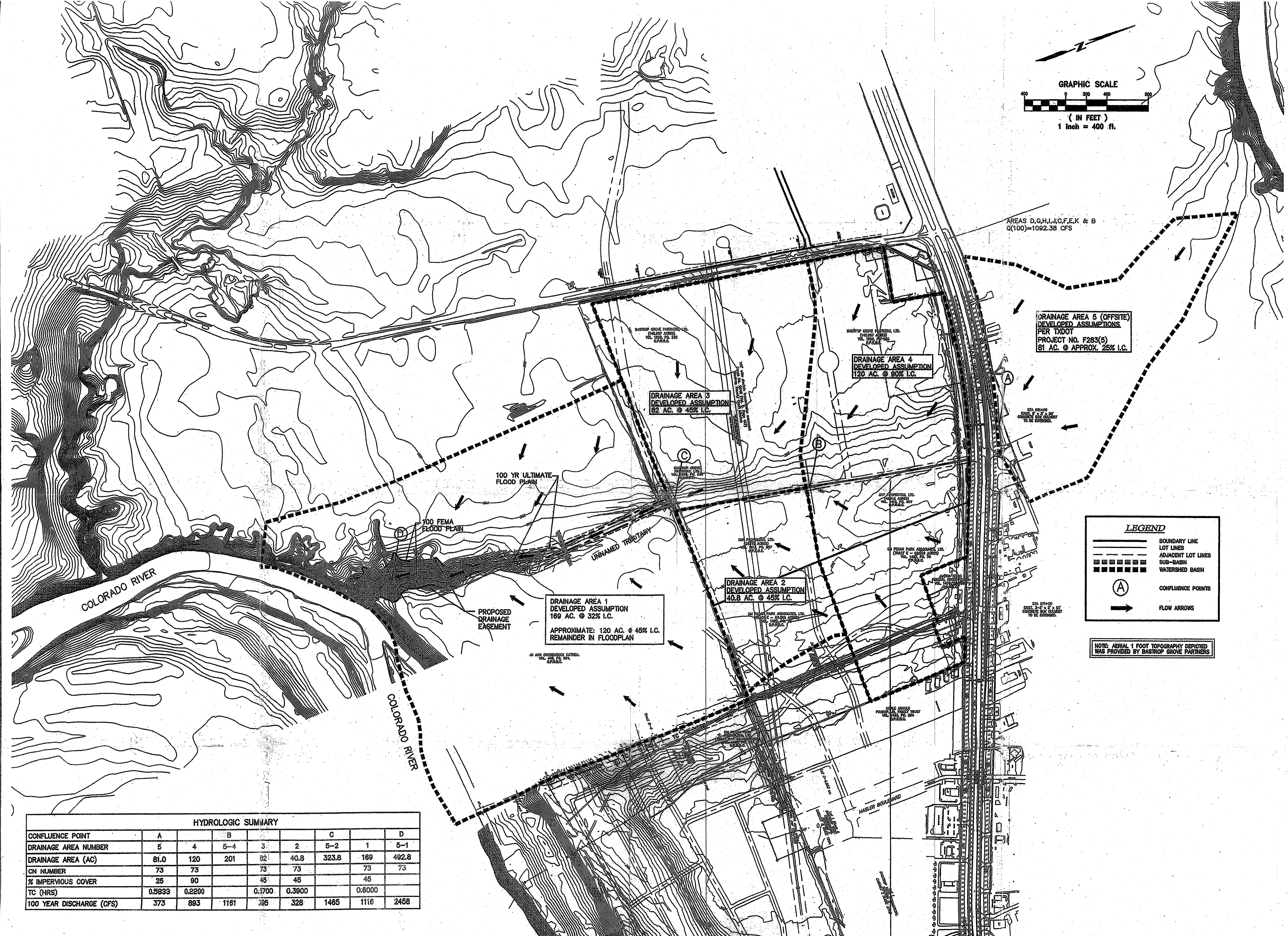


EXHIBIT B  
DRAINAGE AREA MAP



AREAS D,G,H,I,J,C,F,E,K & B  
Q(100)=1092.38 CFS

DRAINAGE AREA 5 (OFFSITE)  
DEVELOPED ASSUMPTIONS  
PER TxDOT  
PROJECT NO. F283(6)  
61 AC. @ APPROX. 25% I.C.

DRAINAGE AREA 4  
DEVELOPED ASSUMPTION  
120 AC. @ 90% I.C.

DRAINAGE AREA 3  
DEVELOPED ASSUMPTION  
82 AC. @ 45% I.C.

DRAINAGE AREA 2  
DEVELOPED ASSUMPTION  
40.8 AC. @ 45% I.C.

DRAINAGE AREA 1  
DEVELOPED ASSUMPTION  
169 AC. @ 32% I.C.  
APPROXIMATE: 120 AC. @ 45% I.C.  
REMAINDER IN FLOODPLAIN

**LEGEND**

—	BOUNDARY LINE
---	LOT LINES
---	ADJACENT LOT LINES
--- ---	SUB-BASIN
■	WATERSHED BASIN
(A)	CONFLUENCE POINTS
→	FLOW ARROWS

NOTE: AERIAL 1 FOOT TOPOGRAPHY DEPICTED  
WAS PROVIDED BY BASTROP GROVE PARTNERS

**HYDROLOGIC SUMMARY**

CONFLUENCE POINT	A	B	C	D
DRAINAGE AREA NUMBER	5	4	3	2
DRAINAGE AREA (AC)	81.0	120	82	40.8
CN NUMBER	73	73	73	73
% IMPERVIOUS COVER	25	90	45	45
TC (HRS)	0.5893	0.2200	0.3700	0.3900
100 YEAR DISCHARGE (CFS)	373	893	1161	328



EXHIBIT C

HEC-1 ANALYSIS - 100 YR



Pecan Crossing 277.2001

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1)
* MAY 1991
* VERSION 4.0.1E
* RUN DATE 05/04/2007 TIME 12:52:13
*****

```

```

*****
* U.S. ARMY CORPS OF ENGINEERS
* HYDROLOGIC ENGINEERING CENTER
* 609 SECOND STREET
* DAVIS, CALIFORNIA 95616
* (916) 756-1104
*****

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X X XXXXXXX XXXXX X
X X X X X XX
X X X X X X
XXXXXXXX XXXX XXXXX X X
X X X X X X
X X X X X X
X X XXXXXX XXXXX XXX

```

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*****
::: Full Microcomputer Implementation :::
::: by
::: Haestad Methods, Inc.
:::
*****

```

37 Brookside Road + Waterbury, Connecticut 06708 + (203) 755-1566

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1DB, AND HEC1KW. THE DEFINITIONS OF VARIABLES -RTIME- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -MSSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION NEW OPTIONS: BAMBREAK OUTFLOW SUBMERGENCE, SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY, DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL. LOSS RATE:GREEN AND WAPT INFILTRATION KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM



Pecan Crossing 277.2001

48	PC	0.0083	0.0092	0.01	0.0108	0.0117	0.0125	0.0133	0.0142	0.015	0.0158
49	PC	0.0167	0.0175	0.0183	0.0192	0.02	0.0208	0.0217	0.0225	0.0234	0.0243
50	PC	0.0252	0.0261	0.027	0.0279	0.0289	0.0298	0.0308	0.0317	0.0327	0.0337
51	PC	0.0347	0.0357	0.0367	0.0377	0.0389	0.0399	0.0408	0.0418	0.043	0.0441
52	PC	0.0452	0.0463	0.0474	0.0485	0.0497	0.0509	0.052	0.0532	0.0544	0.0555
53	PC	0.0567	0.0579	0.0592	0.0604	0.0617	0.063	0.0642	0.0654	0.0668	0.068

PAGE 2

HEC-1 INPUT

LINE	ID	1	2	3	4	5	6	7	8	9	10
54	PC	0.0693	0.0707	0.072	0.0733	0.0747	0.0761	0.0776	0.0791	0.0806	0.0822
55	PC	0.0838	0.0854	0.0871	0.0887	0.0905	0.0922	0.0941	0.0959	0.0978	0.0997
56	PC	0.1016	0.1036	0.1056	0.1076	0.1097	0.1118	0.114	0.1163	0.1185	0.1208
57	PC	0.1233	0.1258	0.1284	0.1311	0.1339	0.1367	0.1397	0.1427	0.1458	0.149
58	PC	0.1522	0.1555	0.1589	0.1624	0.1659	0.1696	0.1733	0.1771	0.181	0.185
59	PC	0.189	0.1931	0.1975	0.202	0.2067	0.2115	0.2165	0.2216	0.227	0.2325
60	PC	0.2382	0.244	0.25	0.2564	0.2634	0.2711	0.2795	0.2884	0.298	0.3111
61	PC	0.3298	0.3559	0.3848	0.4273	0.5	0.5727	0.6152	0.6441	0.6702	0.6889
62	PC	0.702	0.7116	0.7205	0.7289	0.7366	0.7436	0.75	0.756	0.7618	0.7675
63	PC	0.773	0.7784	0.7835	0.7885	0.7933	0.798	0.8025	0.8069	0.811	0.815
64	PC	0.819	0.8229	0.8267	0.8304	0.8341	0.8376	0.8411	0.8445	0.8478	0.8511
65	PC	0.8543	0.8573	0.8603	0.8633	0.8661	0.8689	0.8716	0.8742	0.8767	0.8792
66	PC	0.8815	0.8837	0.886	0.8882	0.8903	0.8924	0.8944	0.8964	0.8984	0.9003
67	PC	0.9022	0.9041	0.9059	0.9078	0.9095	0.9113	0.9129	0.9146	0.9162	0.9178
68	PC	0.9194	0.9209	0.9224	0.9239	0.9253	0.9267	0.928	0.9293	0.9307	0.9319
69	PC	0.9332	0.9346	0.9358	0.937	0.9383	0.9396	0.9408	0.9421	0.9433	0.9445
70	PC	0.9456	0.9468	0.948	0.9491	0.9503	0.9515	0.9526	0.9537	0.9548	0.9559
71	PC	0.957	0.9581	0.9592	0.9603	0.9613	0.9623	0.9634	0.9644	0.9654	0.9664
72	PC	0.9674	0.9684	0.9694	0.9704	0.9714	0.9723	0.9733	0.9743	0.9752	0.9762
73	PC	0.9771	0.978	0.979	0.9799	0.9808	0.9816	0.9825	0.9834	0.9843	0.9852
74	PC	0.986	0.9868	0.9877	0.9885	0.9893	0.9902	0.9909	0.9917	0.9925	0.9933
75	PC	0.9941	0.9948	0.9956	0.9964	0.9971	0.9979	0.9986	0.9992		
76	LS		73								
77	UD	0.132		90							

78	KK	DA	5-4								
79	KK										
80	KO										
81	HC		2								
82	KK	DA	3								
83	KK										
84	KO										
85	BA	0.1281									
86	PH	10.5									
87	IN	5									
88	PC	0	0.0008	0.0017	0.0025	0.0033	0.0042	0.005	0.0058	0.0067	0.0075
89	PC	0.0083	0.0092	0.01	0.0108	0.0117	0.0125	0.0133	0.0142	0.015	0.0158
90	PC	0.0167	0.0175	0.0183	0.0192	0.02	0.0208	0.0217	0.0225	0.0234	0.0243
91	PC	0.0252	0.0261	0.027	0.0279	0.0289	0.0298	0.0308	0.0317	0.0327	0.0337
92	PC	0.0347	0.0357	0.0367	0.0377	0.0388	0.0398	0.0408	0.0419	0.043	0.0441
93	PC	0.0452	0.0463	0.0474	0.0485	0.0497	0.0509	0.052	0.0532	0.0544	0.0555

22

22

Pecan Crossing 277.2001

94	PC	0.0567	0.0579	0.0592	0.0604	0.0617	0.063	0.0642	0.0654	0.0668	0.068
95	PC	0.0693	0.0707	0.072	0.0733	0.0747	0.0761	0.0776	0.0791	0.0806	0.0822
96	PC	0.0838	0.0854	0.0871	0.0887	0.0905	0.0922	0.0941	0.0959	0.0978	0.0997
97	PC	0.1016	0.1036	0.1056	0.1076	0.1097	0.1118	0.114	0.1163	0.1185	0.1208
98	PC	0.1233	0.1258	0.1284	0.1311	0.1339	0.1367	0.1397	0.1427	0.1458	0.149
99	PC	0.1522	0.1555	0.1589	0.1624	0.1659	0.1696	0.1733	0.1771	0.181	0.185
100	PC	0.189	0.1931	0.1975	0.202	0.2067	0.2115	0.2165	0.2216	0.227	0.2325
101	PC	0.2382	0.244	0.25	0.2564	0.2634	0.2711	0.2795	0.2884	0.298	0.3111
102	PC	0.3298	0.3559	0.3848	0.4273	0.5	0.5727	0.6152	0.6441	0.6702	0.6989
103	PC	0.702	0.7116	0.7205	0.7289	0.7366	0.7436	0.75	0.756	0.7618	0.7675
104	PC	0.773	0.7784	0.7835	0.7885	0.7933	0.798	0.8025	0.8069	0.811	0.815
105	PC	0.819	0.8229	0.8267	0.8304	0.8341	0.8376	0.8411	0.8445	0.8478	0.8511
106	PC	0.8543	0.8573	0.8603	0.8633	0.8661	0.8689	0.8716	0.8742	0.8767	0.8792

PAGE 3

HEC-1 INFUY

LINE	ID	1	2	3	4	5	6	7	8	9	10
107	PC	0.8815	0.8837	0.886	0.8882	0.8903	0.8924	0.8944	0.8964	0.8984	0.9003
108	PC	0.9022	0.9041	0.9059	0.9078	0.9095	0.9113	0.9129	0.9146	0.9162	0.9178
109	PC	0.9194	0.9209	0.9224	0.9239	0.9253	0.9267	0.928	0.9293	0.9307	0.9319
110	PC	0.9332	0.9346	0.9358	0.937	0.9383	0.9396	0.9408	0.9421	0.9433	0.9445
111	PC	0.9456	0.9468	0.948	0.9491	0.9503	0.9515	0.9526	0.9537	0.9548	0.9559
112	PC	0.957	0.9581	0.9592	0.9603	0.9613	0.9623	0.9634	0.9644	0.9654	0.9664
113	PC	0.9674	0.9684	0.9694	0.9704	0.9714	0.9723	0.9733	0.9743	0.9752	0.9762
114	PC	0.9771	0.978	0.979	0.9799	0.9808	0.9816	0.9825	0.9834	0.9842	0.9852
115	PC	0.986	0.9868	0.9877	0.9885	0.9893	0.9902	0.9909	0.9917	0.9925	0.9933
116	PC	0.9941	0.9948	0.9956	0.9964	0.9971	0.9979	0.9986	0.9992		1
117	LS		73	45							
118	UD	0.352									

119	KK	DA	2								
120	KM										
121	KO										
122	BA	0.0638									
123	PB	10.5									
124	IN	5									
125	PC	0.0000	0.00101	0.00202	0.00305	0.00408	0.00513	0.00618	0.00725	0.00832	0.00941
126	PC	0.0105	0.01161	0.01272	0.01385	0.01498	0.01613	0.01728	0.01845	0.01962	0.02081
127	PC	0.0220	0.02321	0.02442	0.02565	0.02688	0.02813	0.02938	0.03065	0.03192	0.03321
128	PC	0.0345	0.03581	0.03712	0.03845	0.03978	0.04113	0.04248	0.04385	0.04522	0.04661
129	PC	0.0480	0.04941	0.05084	0.05229	0.05376	0.05525	0.05676	0.05829	0.05984	0.06141
130	PC	0.0630	0.06461	0.06624	0.06789	0.06956	0.07125	0.07296	0.07469	0.07644	0.07821
131	PC	0.0800	0.08181	0.08364	0.08549	0.08736	0.08925	0.09115	0.09309	0.09504	0.09701
132	PC	0.0990	0.10101	0.10304	0.10509	0.10716	0.10925	0.11136	0.11349	0.11564	0.11781
133	PC	0.1200	0.12225	0.12460	0.12705	0.12960	0.13225	0.13500	0.13785	0.14080	0.14385
134	PC	0.1470	0.15020	0.15340	0.15660	0.15980	0.16300	0.16628	0.16972	0.17332	0.17708
135	PC	0.1810	0.18512	0.18948	0.19408	0.19892	0.20400	0.20940	0.21520	0.22140	0.22800
136	PC	0.2350	0.24268	0.25132	0.26092	0.27148	0.28300	0.30684	0.35436	0.43079	0.56786
137	PC	0.5630	0.60196	0.69864	0.71304	0.72516	0.73500	0.74344	0.75136	0.75876	0.76564
138	PC	0.7720	0.77796	0.78364	0.78904	0.79416	0.79900	0.80360	0.80800	0.81220	0.81620
139	PC	0.8200	0.82367	0.82726	0.83079	0.83424	0.83763	0.84094	0.84419	0.84736	0.85047
140	PC	0.8535	0.85647	0.85936	0.86219	0.86494	0.86763	0.87024	0.87279	0.87526	0.87767

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Pecan Crossing 277-2001

141	PC	0.8800	0.88229	0.88455	0.88679	0.88900	0.89119	0.89335	0.89549	0.89760	0.89969
142	PC	0.9018	0.90379	0.90560	0.90779	0.90975	0.91169	0.91360	0.91549	0.91735	0.91919
143	PC	0.9210	0.92279	0.92455	0.92629	0.92800	0.92969	0.93135	0.93299	0.93460	0.93619
144	PC	0.9377	0.93929	0.94080	0.94229	0.94375	0.94519	0.94660	0.94799	0.94935	0.95069
145	PC	0.9520	0.95330	0.95459	0.95588	0.95716	0.95844	0.95971	0.96098	0.96224	0.96350
146	PC	0.9647	0.96600	0.96724	0.96848	0.96971	0.97094	0.97216	0.97338	0.97459	0.97580
147	PC	0.9770	0.97820	0.97939	0.98058	0.98176	0.98294	0.98411	0.98528	0.98644	0.98760
148	PC	0.9887	0.98990	0.99104	0.99218	0.99331	0.99444	0.99556	0.99668	0.99779	0.99890
149	PC	1.0000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
150	LS		73								
151	UD	0.234									
152	KK	DA	5-2								
153	KM										
154	KO										
155	HC		3								

PAGE 4

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

156	KK	DA	1	0.0008	0.0017	0.0025	0.0033	0.0042	0.005	0.0058	0.0067	0.0075
157	KM	Catrell	Tract	0.0092	0.01	0.0108	0.0117	0.0125	0.0133	0.0142	0.015	0.0150
158	KO			0.0167	0.0175	0.0183	0.0192	0.02	0.0208	0.0217	0.0225	0.0234
159	BA	0.3766		0.0252	0.0261	0.027	0.0279	0.0289	0.0298	0.0308	0.0317	0.0327
160	PB	10.5		0.0347	0.0357	0.0367	0.0377	0.0388	0.0398	0.0408	0.0419	0.043
161	IN	5		0.0452	0.0463	0.0474	0.0485	0.0497	0.0509	0.052	0.0532	0.0544
162	PC	0		0.0567	0.0579	0.0592	0.0604	0.0617	0.063	0.0642	0.0654	0.0668
163	PC	0.0083		0.0693	0.0707	0.072	0.0733	0.0747	0.0761	0.0776	0.0791	0.0806
164	PC	0.0167		0.0838	0.0854	0.0871	0.0887	0.0905	0.0922	0.0941	0.0959	0.0978
165	PC	0.0252		0.1016	0.1036	0.1056	0.1076	0.1097	0.1118	0.114	0.1163	0.1185
166	PC	0.0347		0.1233	0.1258	0.1284	0.1311	0.1339	0.1367	0.1397	0.1427	0.1458
167	PC	0.0452		0.1522	0.1555	0.1589	0.1624	0.1659	0.1696	0.1733	0.1771	0.181
168	PC	0.0567		0.189	0.1931	0.1975	0.202	0.2067	0.2115	0.2165	0.2216	0.227
169	PC	0.0693		0.2382	0.244	0.25	0.2564	0.2634	0.2711	0.2795	0.2884	0.298
170	PC	0.0838		0.3298	0.3559	0.3848	0.4273	0.5	0.5727	0.6152	0.6441	0.6702
171	PC	0.1016		0.702	0.7116	0.7205	0.7289	0.7366	0.7436	0.75	0.756	0.7618
172	PC	0.1233		0.773	0.7784	0.7835	0.7885	0.7933	0.798	0.8025	0.8069	0.811
173	PC	0.1522		0.819	0.8229	0.8267	0.8304	0.8341	0.8376	0.8411	0.8445	0.8478
174	PC	0.189		0.8543	0.8573	0.8603	0.8633	0.8661	0.8689	0.8716	0.8742	0.8767
175	PC	0.2382		0.8815	0.8837	0.886	0.8882	0.8903	0.8924	0.8944	0.8964	0.8984
176	PC	0.3298		0.9022	0.9041	0.9059	0.9078	0.9095	0.9113	0.9129	0.9146	0.9162
177	PC	0.702		0.9194	0.9209	0.9224	0.9239	0.9253	0.9267	0.928	0.9293	0.9307
178	PC	0.773		0.9332	0.9346	0.9358	0.937	0.9383	0.9396	0.9408	0.9421	0.9433
179	PC	0.819		0.9456	0.9468	0.948	0.9491	0.9503	0.9515	0.9526	0.9537	0.9548
180	PC	0.8543		0.957	0.9581	0.9592	0.9603	0.9613	0.9623	0.9634	0.9644	0.9654
181	PC	0.8815										
182	PC	0.9022										
183	PC	0.9194										
184	PC	0.9332										
185	PC	0.9456										
186	PC	0.957										

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187	PC	0.9674	0.9684	0.9694	0.9704	0.9714	0.9723	0.9733	0.9743	0.9752	0.9762
188	PC	0.9771	0.9778	0.979	0.9799	0.9808	0.9816	0.9825	0.9834	0.9843	0.9852
189	PC	0.986	0.9868	0.9877	0.9885	0.9893	0.9902	0.9909	0.9917	0.9925	0.9933
190	PC	0.9941	0.9948	0.9956	0.9964	0.9971	0.9979	0.9986	0.9992		
191	LS		73								1
192	UD	0.360									
193	KK	DA	5-1								
194	KN										
195	KO										
196	HC		2								
197	ZZ										

22

HEC1 S/N: 1343001909 HMVersion: 6.33 Data File: C:\WINDOWS\TEMP\--vph0878.TMP

```

*****
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* MAY 1991 *
* VERSION 4.0.1E *
* RUN DATE 05/04/2007 TIME 12:52:13 *
*****
+
+ U.S. ARMY CORPS OF ENGINEERS
+ HYDROLOGIC ENGINEERING CENTER
+ 609 SECOND STREET
+ DAVIS, CALIFORNIA 95616
+ (916) 756-1104
+
*****

```

```

3 IO OUTPUT CONTROL VARIABLES
IERPT 5 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

```

```

IT HYDROGRAPH TIME DATA
NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 STARTING DATE
YTIME 0000 STARTING TIME
NQ 300 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 2 ENDING DATE
NDTIME 0055 ENDING TIME
ICENT 19 CENTURY MARK

```

```

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 24.92 HOURS

```

```

ENGLISH UNITS
DRAINAGE AREA. SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET

```

Pecan Crossing 277.2001

FLOW STORAGE VOLUME CUBIC FEET PER SECOND  
SUREFACE AREA ACRES- FEET  
TEMPERATURE DEGREES FAHRENHEIT

\*\*\* \*\*

\*\*\*\*\*  
\* \*  
\* DA 5 \*  
\* \*  
\*\*\*\*\*

6 KO OUTPUT CONTROL VARIABLES  
IPRINT 5 PRINT CONTROL  
IPLOT 0 PLOT CONTROL  
OSCAL 0. HYDROGRAPH PLOT SCALE  
IPNCH 0 PUNCH COMPUTED HYDROGRAPH  
IOUT 22 SAVE HYDROGRAPH ON THIS UNIT  
ISAV1 1 FIRST ORDINATE PUNCHED OR SAVED  
ISAV2 300 LAST ORDINATE PUNCHED OR SAVED  
TIMINT 0.083 TIME INTERVAL IN HOURS

\*\*\* \*\*

\*\*\*\*\*  
\* \*  
\* DA 4 \*  
\* \*  
\*\*\*\*\*

43 KO OUTPUT CONTROL VARIABLES  
IPRINT 5 PRINT CONTROL  
IPLOT 0 PLOT CONTROL  
OSCAL 0. HYDROGRAPH PLOT SCALE  
IPNCH 0 PUNCH COMPUTED HYDROGRAPH  
IOUT 22 SAVE HYDROGRAPH ON THIS UNIT  
ISAV1 1 FIRST ORDINATE PUNCHED OR SAVED  
ISAV2 300 LAST ORDINATE PUNCHED OR SAVED  
TIMINT 0.083 TIME INTERVAL IN HOURS

\*\*\* \*\*

Pecan Crossing 277.2001

```

IPLOT      0 PLOT CONTROL
QSCAL     0.0 HYDROGRAPH PLOT SCALE
IPNCH     0 PUNCH COMPUTED HYDROGRAPH
IOUT      22 SAVE HYDROGRAPH ON THIS UNIT
ISAV1     1 FIRST ORDINATE PUNCHED OR SAVED
ISAV2     300 LAST ORDINATE PUNCHED OR SAVED
TIMINT    0.083 TIME INTERVAL IN HOURS

```

\*\*\* \*\*

```

*****
*
* DA 5-2 *
*
*****

```

152 KK

```

154 KO      OUTPUT CONTROL VARIABLES
IPRNT      5 PRINT CONTROL
IPLOT      0 PLOT CONTROL
QSCAL     0.0 HYDROGRAPH PLOT SCALE
IPNCH     0 PUNCH COMPUTED HYDROGRAPH
IOUT      22 SAVE HYDROGRAPH ON THIS UNIT
ISAV1     1 FIRST ORDINATE PUNCHED OR SAVED
ISAV2     300 LAST ORDINATE PUNCHED OR SAVED
TIMINT    0.083 TIME INTERVAL IN HOURS

```

\*\*\* \*\*

```

*****
*
* DA 1 *
*
*****

```

156 KK

```

158 KO      OUTPUT CONTROL VARIABLES
IPRNT      5 PRINT CONTROL
IPLOT      0 PLOT CONTROL
QSCAL     0.0 HYDROGRAPH PLOT SCALE
IPNCH     0 PUNCH COMPUTED HYDROGRAPH
IOUT      22 SAVE HYDROGRAPH ON THIS UNIT
ISAV1     1 FIRST ORDINATE PUNCHED OR SAVED
ISAV2     300 LAST ORDINATE PUNCHED OR SAVED
TIMINT    0.083 TIME INTERVAL IN HOURS

```

\*\*\* \*\*



Pecan Crossing 277.2001

\*\*\*\*\*  
 \*  
 \* DA 5-1 \*  
 \*  
 \*\*\*\*\*

195 KO OUTPUT CONTROL VARIABLES  
 IPRINT 5 PRINT CONTROL  
 IELOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE  
 IENCH 0 PUNCH COMPUTED HYDROGRAPH  
 IOUT 22 SAVE HYDROGRAPH ON THIS UNIT  
 ISAV1 1 FIRST ORDINATE PUNCHED OR SAVED  
 ISAV2 300 LAST ORDINATE PUNCHED OR SAVED  
 TIMINT 0.083 TIME INTERVAL IN HOURS

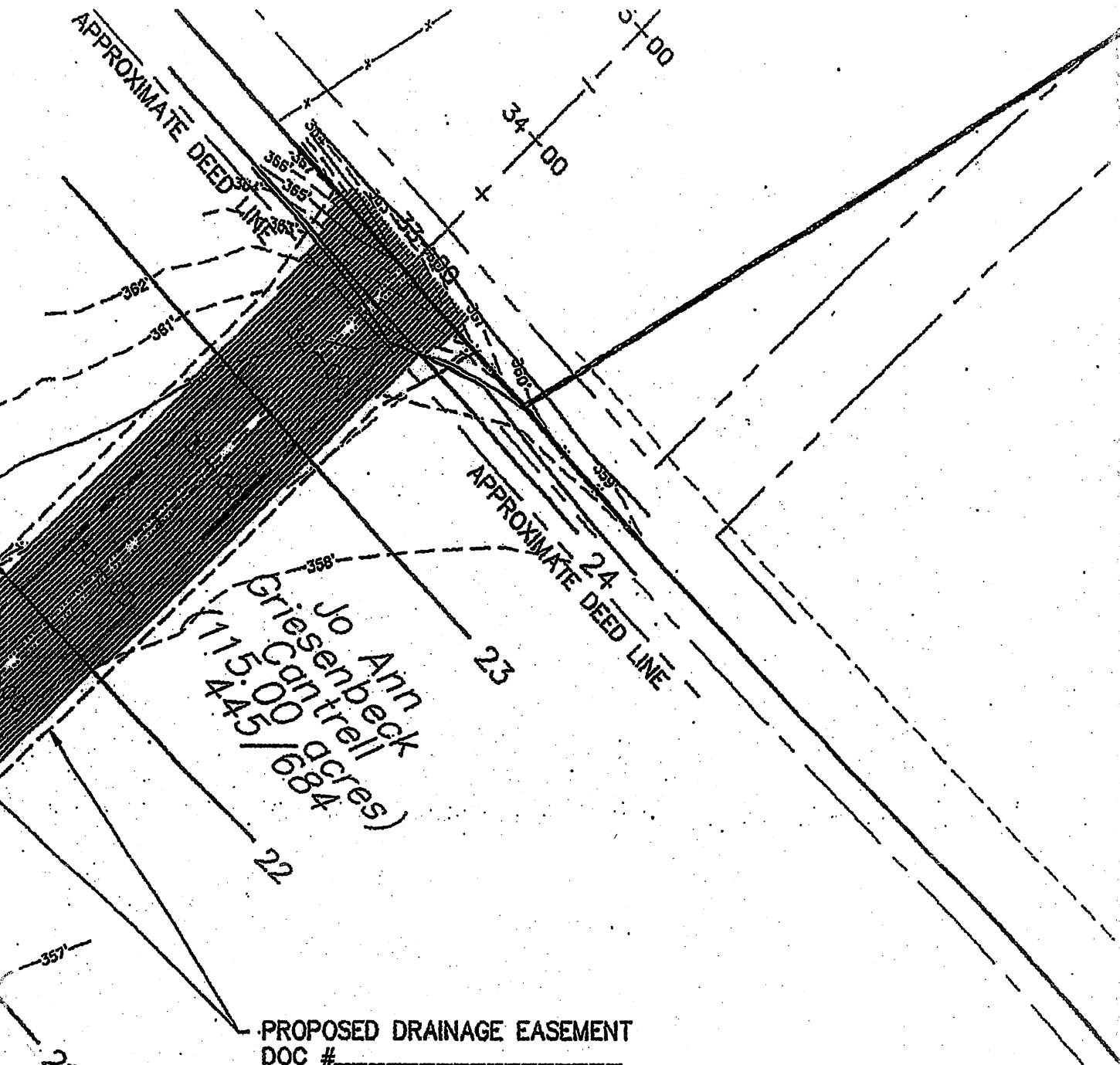
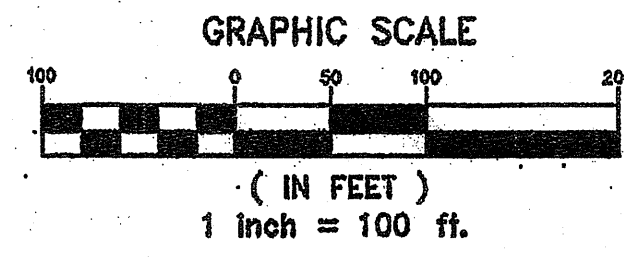
RUNOFF SUMMARY  
 FLOW IN CUBIC FEET PER SECOND  
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	DA 5	373.	12.42	83.	27.	25.	0.13		
HYDROGRAPH AT	DA 4	893.	12.17	146.	51.	49.	0.19		
2 COMBINED AT	DA 5-4	1161.	12.17	228.	78.	75.	0.31		
HYDROGRAPH AT	DA 3	395.	12.42	88.	30.	29.	0.13		
HYDROGRAPH AT	DA 2	328.	10.08	46.	15.	14.	0.06		
3 COMBINED AT	DA 5-2	1465.	12.17	360.	123.	118.	0.51		
HYDROGRAPH AT	DA 1	1116.	12.42	251.	83.	80.	0.38		
2 COMBINED AT	DA 5-1	2458.	12.33	608.	205.	198.	0.80		

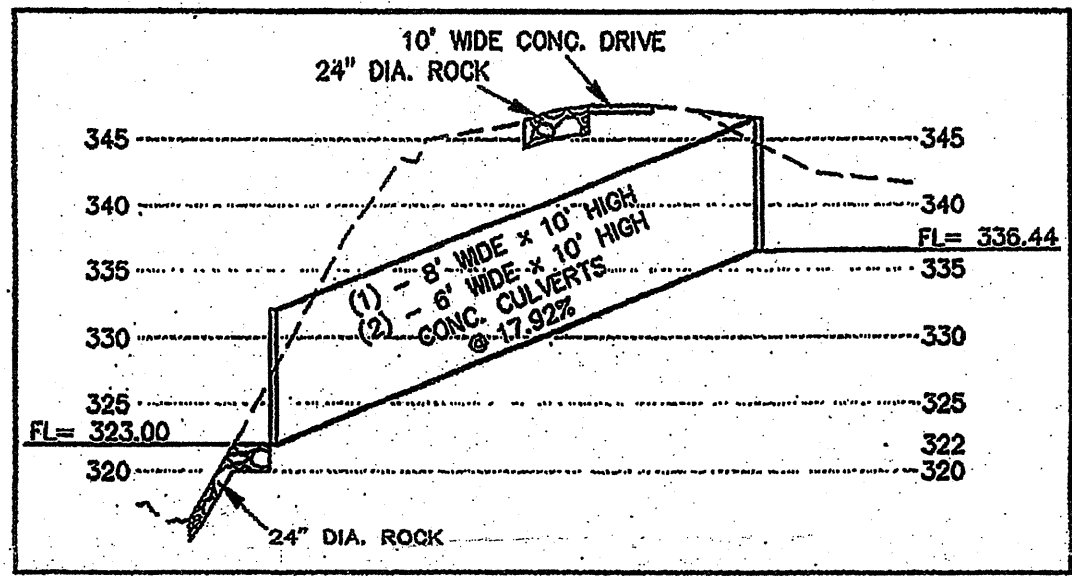
\*\*\* NORMAL END OF REC-1 \*\*\*

EXHIBIT D

HEC-RAS CROSS SECTION WITH 100 YR DELINEATION



CHANNEL SIDE SLOPES @ 3:1 BOTH SIDES (UNLESS NOTED)



SECTION A-A

PROPOSED DRAINAGE EASEMENT DOC #

CONTOUR ELEVATION 349' APPROXIMATE LOCATION OF FEMA 100-YR FLOODPLAIN

CHANNEL CROSSING W/6:1 CHANNEL SIDE SLOPES (BOTH SIDES)

APPROXIMATE DRAINAGE EASEMENT AREA = ±11.28 AC.

CONTOUR ELEVATION 349' APPROXIMATE LOCATION OF FEMA 100-YR FLOODPLAIN

FEMA 100 YR FLOODPLAIN

CONTOUR ELEVATION 349' APPROXIMATE LOCATION OF FEMA 100-YR FLOODPLAIN

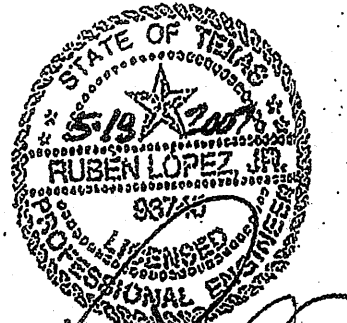
(CROSS SECTION-7) 6' FLAT BOTTOM CHANNEL WIDENS TO 24' FLAT BOTTOM CHANNEL

CANTRELL REACH TREES TO BE REMOVED #1618, #1617, AND #1618

LIMITS OF PROPOSED 14' WIDE CONCRETE DRIVE

TREE LIST

TAG #	DESCRIPTION	TAG #	DESCRIPTION
1600	13' OAK BUNNELIA	1691	14' 10" ELM
1601	9' OAK BUNNELIA	1692	13' HICKBERRY
1602	10' OAK BUNNELIA	1693	15' ELM
1603	30' PECAN	1694	9' ELM
1604	15' HACKBERRY	1695	10' ELM
1605	8' HACKBERRY	1696	12' ELM
1606	14' ELM	1697	9' ELM
1607	24' ELM	1698	10' ELM
1608	16' ELM	1699	8' ELM
1609	15' HACKBERRY	1700	8' ELM
1610	15' HACKBERRY	1801	40' PECAN
1611	21' ELM	1802	30' PECAN
1612	21' ELM	1803	23' PECAN
1613	17' ELM	1804	25' 17" PECAN
1614	11' OAK BUNNELIA	1805	21' PECAN
1615	10' ELM	1806	10' ELM
1616	10' ELM	1807	10' PECAN
1617	10' ELM	1808	10' PECAN
1618	20' COTTONWOOD	1809	15' PECAN
1619	20' COTTONWOOD	1810	15' PECAN
1620	21' ELM	1811	15' PECAN
1621	9' ELM	1812	15' PECAN
1622	11' OAK BUNNELIA	1813	15' PECAN
1623	10' ELM	1814	15' PECAN
1624	10' ELM	1815	15' PECAN
1625	30' COTTONWOOD	1816	10' ELM
1626	10' ELM	1817	10' PECAN
1627	20' HACKBERRY	1818	15' PECAN
1628	10' ELM	1819	15' PECAN
1629	10' ELM	1820	15' PECAN
1630	10' ELM	1821	15' PECAN
1631	17' ELM	1822	15' 10" PECAN
1632	8' 6" ELM	1823	20' 10" PECAN
1633	9' ELM	1824	25' PECAN
1634	9' ELM	1825	14' ELM
1635	10' ELM	1826	10' 10" ELM
1636	10' ELM	1827	10' ELM
1637	10' ELM	1828	10' ELM
1638	10' ELM	1829	10' ELM
1639	10' ELM	1830	10' ELM
1640	10' ELM	1831	10' ELM
1641	10' ELM	1832	10' ELM
1642	9' HACKBERRY	1833	11' OAK BERRY
1643	14' ELM	1834	25' COTTONWOOD
1644	14' ELM	1835	20' COTTONWOOD
1645	14' ELM	1836	20' COTTONWOOD
1646	14' ELM	1837	20' COTTONWOOD
1647	14' ELM	1838	11' COTTONWOOD
1648	14' ELM	1839	11' COTTONWOOD
1649	14' ELM	1840	11' COTTONWOOD
1650	14' ELM	1841	11' COTTONWOOD
1651	14' ELM	1842	11' COTTONWOOD
1652	14' ELM	1843	11' COTTONWOOD
1653	14' ELM	1844	11' COTTONWOOD
1654	14' ELM	1845	11' COTTONWOOD
1655	14' ELM	1846	11' COTTONWOOD
1656	14' ELM	1847	11' COTTONWOOD
1657	14' ELM	1848	11' COTTONWOOD
1658	14' ELM	1849	11' COTTONWOOD
1659	14' ELM	1850	11' COTTONWOOD
1660	14' ELM	1851	11' COTTONWOOD
1661	14' ELM	1852	11' COTTONWOOD
1662	14' ELM	1853	11' COTTONWOOD
1663	14' ELM	1854	11' COTTONWOOD
1664	14' ELM	1855	11' COTTONWOOD
1665	14' ELM	1856	11' COTTONWOOD
1666	14' ELM	1857	11' COTTONWOOD
1667	14' ELM	1858	11' COTTONWOOD
1668	14' ELM	1859	11' COTTONWOOD
1669	14' ELM	1860	11' COTTONWOOD
1670	14' ELM	1861	11' COTTONWOOD
1671	14' ELM	1862	11' COTTONWOOD
1672	14' ELM	1863	11' COTTONWOOD
1673	14' ELM	1864	11' COTTONWOOD
1674	14' ELM	1865	11' COTTONWOOD
1675	14' ELM	1866	11' COTTONWOOD
1676	14' ELM	1867	11' COTTONWOOD
1677	14' ELM	1868	11' COTTONWOOD
1678	14' ELM	1869	11' COTTONWOOD
1679	14' ELM	1870	11' COTTONWOOD
1680	14' ELM	1871	11' COTTONWOOD
1681	14' ELM	1872	11' COTTONWOOD
1682	14' ELM	1873	11' COTTONWOOD
1683	14' ELM	1874	11' COTTONWOOD
1684	14' ELM	1875	11' COTTONWOOD
1685	14' ELM	1876	11' COTTONWOOD
1686	14' ELM	1877	11' COTTONWOOD
1687	14' ELM	1878	11' COTTONWOOD
1688	14' ELM	1879	11' COTTONWOOD
1689	14' ELM	1880	11' COTTONWOOD
1690	14' ELM	1881	11' COTTONWOOD
1691	14' ELM	1882	11' COTTONWOOD
1692	14' ELM	1883	11' COTTONWOOD
1693	14' ELM	1884	11' COTTONWOOD
1694	14' ELM	1885	11' COTTONWOOD
1695	14' ELM	1886	11' COTTONWOOD
1696	14' ELM	1887	11' COTTONWOOD
1697	14' ELM	1888	11' COTTONWOOD
1698	14' ELM	1889	11' COTTONWOOD
1699	14' ELM	1890	11' COTTONWOOD



COLORADO RIVER APPROXIMATE LOCATION OF 24" DIA. ROCK

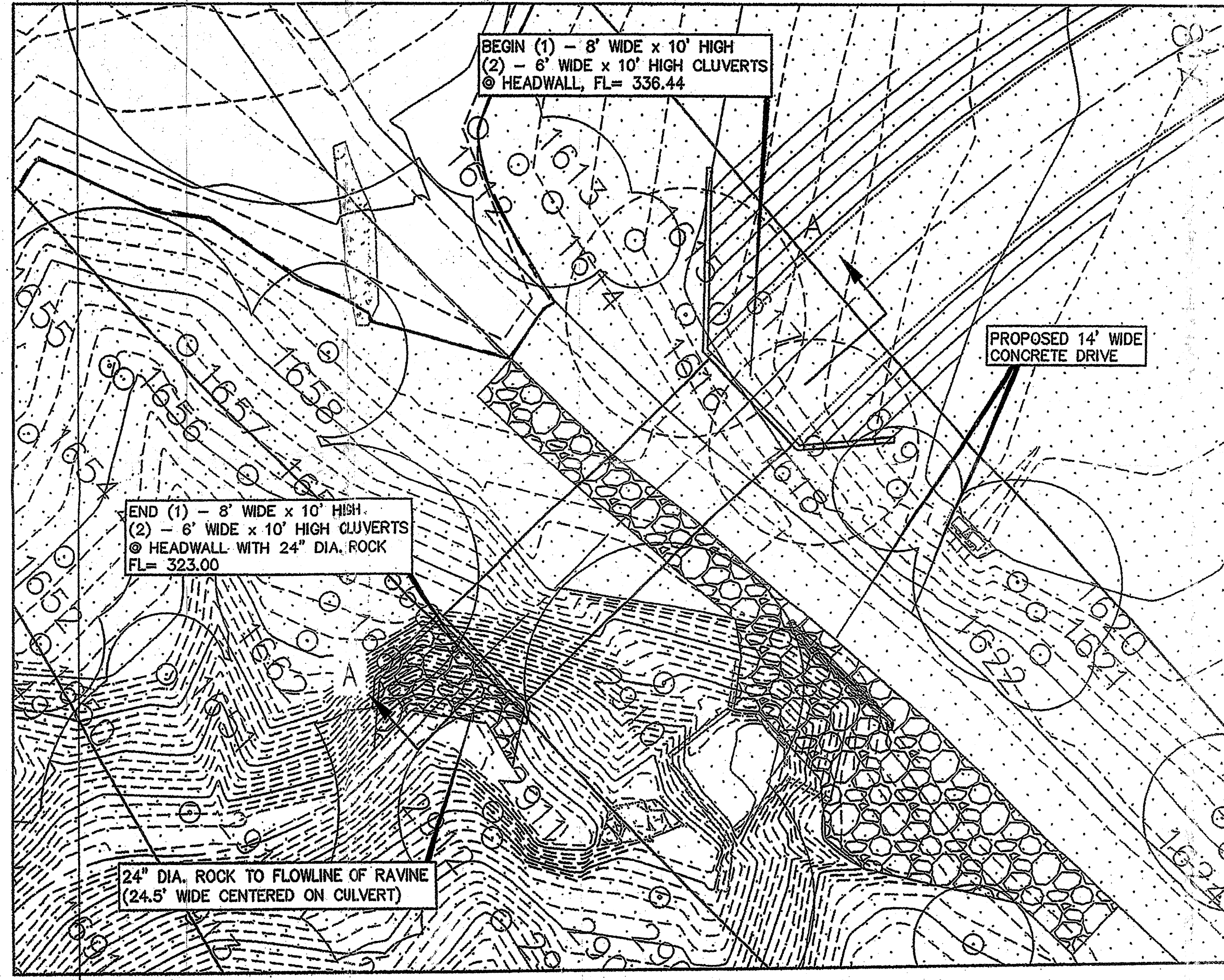


EXHIBIT E

HEC-RAS ANALYSIS



HRC-RAS Version 4.0 Beta  
 U.S. Army Corp of Engineers  
 Hydrologic Engineering Center  
 609 Second Street  
 Davis, California

```

X   X   XXXXX   XXXX   XXXX   XX   XXXX
X   X   X     X   X   X   X   X   X
X   X   X     X   X   X   X   X   X
XXXXXX XXXX   X     XXX XXXX XXXXXX XXXX
X   X   X     X     X   X   X   X   X
X   X   X     X   X   X   X   X   X
X   X   XXXXX   XXXX   X   X   X   X   XXXX
  
```

PROJECT DATA

Project Title: Proposed Pecan Crossing channel  
 Project File : HecRas100yrUltimate.prj  
 Run Date and Time: 5/18/2007 11:49:13 AM

Project in English units

Project Description:

Ultimate 100 year flood plain with proposed channel - Curall Reach Unnamed  
 Tributary Colorado R.

PLAN DATA

Plan Title: Plan 03  
 Plan File : e:\2772001\\_Eng\\_Documents\HecRas-4-11-07\HecRas100yrUltimate.p03

Geometry Title: Add topo 1-10  
 Geometry File : e:\2772001\\_Eng\\_Documents\HecRas-4-11-07\HecRas100yrUltimate.g01

Flow Title : 100 YR  
 Flow File : e:\2772001\\_Eng\\_Documents\HecRas-4-11-07\HecRas100yrUltimate.f02

Plan Summary Information:

Number of: Cross Sections =	24	Multiple Openings =	0
Culverts =	1	Inline Structures =	0
Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary	
Conveyance Calculation Method:	At breaks in n values only
Friction Slope Method:	Average Conveyance
Computational Flow Regime:	Subcritical Flow

FLOW DATA

Flow Title: 100 YR  
 Flow File : e:\2772001\\_Eng\\_Documents\HecRas-4-11-07\HecRas100yrUltimate.f02

Flow Data (cfs)

River	Reach	RS	100 yr
Unnamed-Trib-ColCantrell	Reach	24.	1465
Unnamed-Trib-ColCantrell	Reach	18.	2458

Boundary Conditions

River Reach Profile Upstream Downstream  
 Unnamed-Trib-ColCantrell Reach 100 yr Known WS = 349

GEOMETRY DATA

Geometry Title: Add topo 1-10  
 Geometry File : e:\2772001\\_Eng\\_Documents\HecRas-4-11-07\HecRas100yrUltimate.g01

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 24.

INPUT

Description:

Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.23	5.72	358.27	9.04	358.32	15.87	358.31	64.55	358.51
77.3	358.59	120.62	359.42	124.19	360.45	127.97	360.48	132.4	359.65
137.13	359.65	140.78	359.66	152.77	359.66	153.17	359.86	155.03	359.14
170	354.15	197	345.15	203	345.15	254.27	362.24	257.16	363.2
262.37	363.34	266.17	363.4	315.78	364.82				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	155.03	.035	254.27	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	155.03	254.27		100.04	100	100.17	.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 23.

INPUT

Description:

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.96	37.43	357.97	61.46	357.85	82.81	358.09	87.45	358.17
96.21	358.15	132.59	358.57	153.39	358.58	153.43	358.72	153.57	358.69
153.7	358.66	154.11	358.6	154.46	358.61	155.6	358.63	168.59	354.3
169.95	353.85	196.95	344.85	202.95	344.85	249.01	360.2	251.03	360.65
255.74	360.85	271.49	360.7	271.61	360.7	272.1	360.72	272.48	360.73
272.58	360.72	274.93	360.78	322.67	362.26	331.61	352.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	155.6	.035	251.03	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	155.6	251.03		200	200	200.01	.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 22.

INPUT

Description:

Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
11.77	357.36	69.7	357.71	127.06	357.84	129.7	357.77	150.04	357.93
151.67	358.09	155.16	358.18	168.56	353.71	169.95	353.25	196.95	344.25
202.95	344.25	245.25	358.35	246.86	358.66	247.85	358.76	248.6	358.86
249.53	358.85	249.79	358.84	254.31	359.21	255.14	359.28	256.98	359.15
297.59	359.81	305.96	360.03	365.04	361.51				





Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 41.3 .035 155.27 .035 248.33 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 155.27 248.33 198.97 200 200.17 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 15.

INPUT

Description:

Station Elevation Data num= 24  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
29.38	357.4	58.42	356.95	67.62	356.7	71.96	356.56	94.34	355.64		
117.31	354.84	125.33	354.96	128.97	355.07	134.02	355.42	153.62	356.24		
153.76	355.59	194.01	342.85	197	341.85	203	341.85	227.19	349.91		
249.43	357.32	249.59	357.33	249.89	357.42	250.17	357.42	260.74	357.5		
267.73	357.54	318.02	358.35	321.37	358.38	375.64	358.61				

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 25.38 .035 153.83 .035 250.17 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 153.83 250.17 157.85 150 141.28 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 17.

INPUT

Description:

Station Elevation Data num= 20  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
19.31	361.17	80.78	360.95	83.23	360.83	124.94	359.58	136.7	359.05		
140.23	358.92	143.99	359.07	167.67	351.18	170	350.4	172.62	349.53		
197	341.4	203	341.4	227.52	349.57	230	350.4	232.96	351.39		
233.03	351.41	260.67	360.62	263.63	360.66	290.39	360.85	333.73	361.81		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 15.31 .035 143.99 .035 260.67 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 143.99 260.67 142.15 134.6 125.25 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 16.

INPUT

Description:

Station Elevation Data num= 18  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
47.76	359.2	75	359.02	94.78	358.51	136.18	357.3	142.99	357.27		
146.31	357.2	148.15	357.1	148.36	357.09	148.8	357.07	197.01	341		
203.01	341	247.43	355.81	260.12	360.13	260.34	360.2	260.44	360.24		
261.05	360.44	261.6	360.63	261.71	360.72						

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 47.76 .035 148.8 .035 247.43 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 148.8 247.43 114.96 115.4 117.45 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 15.

INPUT

Description:

Station Elevation Data			num= 30							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
20.13	358.78	47.4	357.86	55.73	357.77	76.93	357.43	83.25	357.41	
84.37	357.36	86.95	357.1	105.87	355.71	113.53	354.78	125.22	354.75	
148.78	354.36	150.81	354.24	150.91	354.24	151.19	354.23	151.25	354.22	
151.81	354.23	152.96	355.17	153.23	355.16	167.1	350.51	168.82	350.02	
169.36	349.86	170.01	349.64	171.19	349.25	197.01	340.64	203.01	340.64	
233.09	350.67	235.74	351.53	262.96	360.6	263.29	360.47	272.17	360.6	

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
20.13	.035	153.23	.035	235.74	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 153.23 235.74 158.4 158.35 157.45 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 14.

INPUT

Description:

Station Elevation Data			num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
76.23	359.44	116.96	356.83	117.64	356.8	136.62	355.15	137.13	355.11	
156.89	352.72	157.03	352.71	157.34	352.69	158.58	352.6	159.3	352.55	
159.96	352.5	196.96	340.17	202.96	340.17	254.86	357.47	256.95	357.54	
262.34	357.7	268.95	357.91	281.91	357.75					

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
76.23	.035	136.62	.035	254.86	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 136.62 254.86 135.07 141.65 149.54 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 13.

INPUT

Description:

Station Elevation Data			num= 23							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
115.49	359	131.61	358.35	133.62	358.22	137.85	358.01	137.92	357.86	
136.7	357.79	139.43	357.91	139.56	357.92	143.38	357.63	145.83	356.8	
170	348.75	172.48	347.92	197	339.75	203	339.75	205.48	340.58	
248.18	354.81	248.36	354.89	248.68	355.48	248.73	355.49	253.89	356.14	
254.63	356.24	256.68	356.56	296.45	359.23					

Manning's n Values			num= 3		
Sta	n Val	Sta	n Val	Sta	n Val
115.49	.035	145.83	.035	248.38	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 145.83 248.38 92.29 97.78 103.08 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 12.

INPUT

Description:

Station Elevation Data				num=	23					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
108.84	358.35	125	357.96	137.38	357.22	138.19	357.18	138.34	357.16	
139.82	357.01	141.29	357.17	148.28	356.36	197	339.46	203	339.46	
249.11	354.83	249.49	354.67	249.72	354.89	250.11	354.93	250.71	355.3	
251.77	355.62	253.32	355.26	255.77	355.79	257.32	355.68	273.25	356.39	
286.92	356.43	303.14	357.22	303.66	357.06					

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
108.84	.035	146.28	.035	249.49	.035					

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 146.28 249.49 102.36 102.22 102.49 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 11.

INPUT

Description:

Station Elevation Data				num=	15					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
106.07	357.79	114.08	357.59	143.18	356.94	143.79	356.79	144.12	356.77	
197	339.15	203	339.15	236.84	351.1	243.35	351.31	244.29	350.61	
244.36	350.61	257.56	352.17	277.79	354.2	289.67	355	318	356.8	

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
106.07	.035	143.79	.035	236.84	.035					

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 143.79 236.84 131.27 131.31 131.28 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 10.

INPUT

Description:

Station Elevation Data				num=	19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
102.62	356.55	122.64	355.91	156.23	355.34	205	339.09	206	338.75	
212	338.75	213	339.09	240.28	348.16	242.53	348.1	242.66	348.09	
245.94	347.97	249.5	348.23	254.78	348.37	262.86	349.08	279.49	351.69	
293.89	354.08	301.03	353.09	311.03	355.04	331.86	357.03			

Manning's n Values				num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
102.62	.035	156.23	.035	279.49	.035					

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 156.23 279.49 181.57 168.69 158.11 .1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 9.

INPUT

Description:

Station Elevation Data		num= 24		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5.75	356	68.91	352.73	86.94	351.53	104.82	350.51	134.66	346.72
151.39	344.84	162.42	343.87	164.91	343.81	170.21	343.88	171.15	343.82
190.71	343.35	205.91	338.28	206.01	338.25	212.01	338.25	212.91	338.55
213.01	338.58	228.76	342.83	227.24	343.29	230.26	343.49	255.51	346.36
275.34	347.95	298.62	349.1	309.57	350.76	386.87	354		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-5.75	.035	134.66	.035	275.34	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	134.66	275.34		161.36	152.96		.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 8.

INPUT

Description:

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.5	163.5	346	181.5	346	205	338.12	206	337.79
212	337.79	213	338.12	215.5	340	231.03	341.02	231.66	340.99
243.14	340.56	257.14	340.49	285.1	340.73	285.84	340.75	288.97	340.95
304.07	341.78	309.13	342.22	316.85	343.17	329.08	344.77	334.75	345.25
347.32	346.6	444.15	353						

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	163.5	.035	316.85	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	163.5	316.85		97.08	97.04		.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 7.

INPUT

Description:

Station Elevation Data		num= 26		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.25	171.9	343	185.54	338.46	187.5	337.83	188.4	337.53
188.5	337.5	212.5	337.5	213.4	337.8	213.5	337.83	214.27	338.09
223.51	340.53	223.59	340.52	223.75	341.2	237.82	339.82	245.42	339.55
255.49	339.61	272.37	341.25	301.54	343.54	311.73	345.14	331.59	347.83
333.17	348.04	344.23	349.49	350.97	350.36	355.36	351.35	360.61	351.66
403.46	353.6								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	171.9	.035	311.73	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	171.9	311.73		97.39	97.21		.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 6.

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-42.29	353.5	88.4	346.41	114.16	344.46	127.2	343.06	151.06	341.59
178.34	340.28	178.46	340.05	187	337.54	188	337.21	212	337.21
213	337.54	217.27	336.96	218.85	339.03	218.94	339.04	221.29	339.33
234.38	340.98	235.97	340.96	238.57	341.48	255.6	343.51	283.89	346.43
286.63	346.78	293.79	347.59	311.14	349.5	367.92	353	367.92	356

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
-42.29	.035	127.2	.035	255.6	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	127.2	255.6		91.28	102.79	114.23	.1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 5.

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-48.65	352	45.59	347.23	81.48	345.85	85.9	345.61	87.13	345.52
135.97	341.58	135.24	340.64	144.34	340.25	145.71	340.25	148.92	340.06
170.54	338.41	170.89	338.48	173.34	338.19	174.8	338.22	178.08	338.3
183.43	338.42	186.67	337.34	186.99	337.23	187.08	337.2	187.99	336.9
211.99	336.9	212.89	337.2	212.99	337.23	221.62	340.11	222.23	340.17
226.43	340.55	228.48	340.68	229.75	340.79	230.56	340.87	230.92	340.78
243.77	341.3	252.55	344.2	341.95	350	384.95	358		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
-48.65	.035	135.24	.035	243.77	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	135.24	243.77		105.32	120.08	132.36	.1 .3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 4.

INPUT

Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-90.43	350.5	-70.7	350	-29.43	349	-9.02	348	18.3	347
62.91	343.43	68.16	343.04	78.03	342.26	113.34	340.19	145.91	339.4
156.41	339.08	163.76	339.53	165.07	339.14	168.9	339.28	174.12	340.15
180.34	339.34	180.93	338.89	185.47	340.63	186.99	336.87	187.08	336.84
187.99	336.54	211.99	336.54	212.99	336.87	214.32	337.32	216.91	343.09
273.9	349	350.07	358						

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
-90.43	.035	68.16	.035	216.91	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	68.16	216.91		104.3	104	106	.1 .3

CULVERT

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 3.25

INPUT

Description: proposed culvert  
 Distance from Upstream XS = 45  
 Deck/Roadway Width = 10  
 Weir Coefficient = 3  
 Upstream Deck/Roadway Coordinates

num= 13											
Sta	Hi	Cord	Lo Cord	Sta	Hi	Cord	Lo Cord	Sta	Hi	Cord	Lo Cord
-166.91	352	336.41	-129.8	351	336.41	-63.91	350	336.41			
-34.85	349	336.41	-6.19	348	336.41	22.99	347	336.41			
200	347	336.41	209.36	348	336.41	241.24	349	336.41			
273.31	350	336.41	300.24	351	336.41	321.89	352	336.41			
348.35	353	336.41									

Upstream Bridge Cross Section Data

Station Elevation Data num= 27											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-90.43	350.5	-70.7	350	-29.43	349	-9.02	348	18.3	347		
62.91	343.42	68.16	343.04	78.03	342.26	113.34	340.19	145.91	339.4		
156.41	339.08	163.76	339.53	165.07	339.14	166.9	339.28	174.12	340.15		
180.34	339.34	180.93	336.89	185.47	340.63	186.99	336.87	187.08	336.84		
187.99	336.54	211.99	336.54	212.99	336.87	214.32	337.32	216.91	343.09		
273.9	349	350.07	356								

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-90.43	.035	68.16	.035	216.91	.035

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	68.16	216.91		.1	.3

Downstream Deck/Roadway Coordinates

num= 14											
Sta	Hi	Cord	Lo Cord	Sta	Hi	Cord	Lo Cord	Sta	Hi	Cord	Lo Cord
-166.91	352	322	-129.8	351	322	-63.91	350	322			
-34.85	349	322	-6.19	348	322	22.99	347	322			
200	347	322	209.36	348	322	241.24	349	322			
273.31	350	322	300.24	351	322	321.89	352	322			
348.35	353	322	357.82	353	322						

Downstream Bridge Cross Section Data

Station Elevation Data num= 43											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
17.17	349	46.08	346	66.17	345.23	68.31	345.18	101.7	343.33		
104.94	343.06	115.85	337.5	116.08	337.39	129.65	330.48	136.17	328.82		
138.15	326.26	142.27	325.37	144.83	325.57	150.87	322.14	153.1	322.75		
161.65	322.6	161.76	322.49	161.92	322.47	162.33	322.5	175.94	323.1		
185.54	322.02	188.92	322.52	198.72	327.25	215.02	337.23	215.46	337.49		
215.84	337.84	216.05	337.86	217.14	337.93	259.39	341.06	277.47	342.06		
283.14	342.29	290.32	341.87	306.97	344.36	321.14	347.03	323.89	347.57		
324.79	347.61	326.68	347.71	332.51	346.91	350.32	351.41	354.01	352		
357.62	353	389.25	354	401.81	354.5						

Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
17.17	.035	116.08	.1	217.14	.035

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	116.08	217.14		.1	.3

E.G. OC (ft)	349.21	Weir Sta Rgt (ft)	246.02
Culvert Control	Outlet	Weir Submerg	0.90
Culv WS Inlet (ft)	346.54	Weir Max Depth (ft)	2.21
Culv WS Outlet (ft)	333.00	Weir Avg Depth (ft)	1.74
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	499.14
Culv Crt Depth (ft)	2.81	Min El Weir Flow (ft)	347.01

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 3.

INPUT

Description:

Station Elevation Data num= 43									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
17.17	349	46.08	346	66.17	345.23	68.31	345.16	101.7	343.33
104.94	343.06	115.85	337.5	116.08	337.39	129.65	330.48	136.17	328.82
136.15	326.26	142.27	325.37	144.83	325.57	150.87	322.14	153.1	322.75
161.65	322.6	161.76	322.49	161.92	322.47	162.33	322.5	175.94	323.1
185.54	322.02	188.92	322.52	198.72	327.25	215.02	337.23	215.46	337.49
215.84	337.84	216.05	337.86	217.14	337.93	259.39	341.06	277.47	342.06
283.14	342.29	290.32	341.87	306.97	344.36	321.14	347.03	323.89	347.57
324.79	347.61	326.68	347.71	332.51	348.91	350.32	351.41	354.01	352
357.82	353	389.25	354	401.81	354.5				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
17.17	.035	116.08	.1	217.14	.035

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	116.08	217.14		90.79	77.86	64.21		.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 2.

INPUT

Description:

Station Elevation Data num= 41									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
42.41	347.85	46.54	348.57	48.92	348.82	49.33	348.91	58.99	349.22
71.14	349.36	79.86	348.95	85.12	348.4	103.34	346.25	107.75	345.52
123.54	341.86	127.47	341.33	140.7	338.81	144.15	338.1	146.66	337.49
147.15	337.42	149.93	336.92	156.11	334.04	159.97	332.18	177.2	320.65
181.82	315.59	183.06	315.82	185.34	315.88	186.86	316.29	188.73	316.79
196.34	319.72	200.61	321.87	204.71	324.6	213	330.04	218.81	332.73
226.36	337.17	238.45	339.36	240.99	339.95	246.41	341.01	257.8	342.62
282.15	345.71	294.4	346.36	297.17	348.76	304.06	349.52	311.09	349.69
315.8	350.36								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
42.41	.035	140.7	.1	246.41	.035

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	140.7	246.41		58.27	99.43	111.65		.1	.3

CROSS SECTION

RIVER: Unnamed-Trib-Col  
 REACH: Cantrell Reach RS: 1

INPUT

Description:

Station Elevation Data num= 21			
--------------------------------	--	--	--

Cantrell Reach	10.	281.57	168.69	158.11
Cantrell Reach	9.	161.36	152.96	141.6
Cantrell Reach	8.	97.08	97.04	97.05
Cantrell Reach	7.	97.39	97.21	97.35
Cantrell Reach	6.	91.28	102.79	114.33
Cantrell Reach	5.	105.32	120.08	132.36
Cantrell Reach	4.	104.3	104	106
Cantrell Reach	3.25	Culvert		
Cantrell Reach	3.	90.79	77.86	64.21
Cantrell Reach	2.	56.27	99.43	111.65
Cantrell Reach	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS  
River: Unnamed-Trib-Col

Reach	River Sta.	Contr.	Expan.
Cantrell Reach	24.	.1	.3
Cantrell Reach	23.	.1	.3
Cantrell Reach	22.	.1	.3
Cantrell Reach	21.	.1	.3
Cantrell Reach	20.	.1	.3
Cantrell Reach	19.	.1	.3
Cantrell Reach	18.	.1	.3
Cantrell Reach	17.	.1	.3
Cantrell Reach	16.	.1	.3
Cantrell Reach	15.	.1	.3
Cantrell Reach	14.	.1	.3
Cantrell Reach	13.	.1	.3
Cantrell Reach	12.	.1	.3
Cantrell Reach	11.	.1	.3
Cantrell Reach	10.	.1	.3
Cantrell Reach	9.	.1	.3
Cantrell Reach	8.	.1	.3
Cantrell Reach	7.	.1	.3
Cantrell Reach	6.	.1	.3
Cantrell Reach	5.	.1	.3
Cantrell Reach	4.	.1	.3
Cantrell Reach	3.25	Culvert	
Cantrell Reach	3.	.1	.3
Cantrell Reach	2.	.1	.3
Cantrell Reach	1	.1	.3



## Process Overview

1. Pre-Application Meeting
    - a. Discuss your project with staff prior to submitting an application. Staff can help identify opportunities and constraints on the proposed project, as well as provide more information on the process and code requirements.
  2. Complete Submittal Package\*, which includes: Application and all Checklist Items
  3. Staff review, with comments issued as needed
  4. City Council meeting for approval by Resolution or Ordinance
- \*Incomplete submittals will not be accepted

## Submittal Package Checklist Items

Staff	Applicant	Item
<input type="checkbox"/>	<input type="checkbox"/>	Completed and signed Application
<input type="checkbox"/>	<input type="checkbox"/>	Agent Authorization Form
<input type="checkbox"/>	<input type="checkbox"/>	Project Description Letter listing the following: <ul style="list-style-type: none"> <li>• Type of improvements proposed</li> <li>• Scope of improvements</li> <li>• How the project will affect areas within the scope of work</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	A signed, sealed and dated letter from a registered engineer certifying that they have personally reviewed the topography and completed a field investigation of the existing and proposed flow patterns for stormwater runoff from the subject development to the main stem of all creeks that may impact the project, and build-out conditions allowable by zoning, restrictive covenant or plat note, that the stormwater flows from the subject development will not cause any additional adverse flooding impacts for storms of magnitude up through the one-hundred (100) year event.
<input type="checkbox"/>	<input type="checkbox"/>	Map of Affected Area and/or Concept Plan as requested by Staff
<input type="checkbox"/>	<input type="checkbox"/>	Detailed plans of proposed drainage improvements signed, sealed, and dated by a registered engineer
<input type="checkbox"/>	<input type="checkbox"/>	Digital Submittal – Provide pdf copies of all documents listed above via email, CD, or flash drive



**Carlson, Brigrance & Doering, Inc.**  
Civil Engineering ♦ Surveying

5501 West William Cannon Drive  
Austin, Texas 78749  
(512) 280-5160 Office (512) 583-0903 Fax

**Delivery Receipt & Letter of Transmittal**

TO: City of Bastrop  
Planning & Development Dept.  
ATTN: Vivianna Nicole Hamilton  
City Hall, 1311 Chestnut Street  
Bastrop, TX 78602

SENT BY: Christine Methvin  
christine@cbdeng.com  
(512) 280-5160 x175 office (512) 484-6591 cell

<b>DATE:</b>	April 4, 2019
<b>ATTENTION:</b>	Vivianna Nicole Hamilton
<b>REFERENCE:</b>	Bastrop Grove Section 2
<b>Exemption Application</b>	
<b>CBD PROJECT NO:</b>	4697

**THESE ITEMS ARE TRANSMITTED AS INDICATED BELOW:**

- For Action
- For Signature(s)
- For Approval
- For Information/Files
- For Review & Comment
- Other \_\_\_\_\_
- Contact Christine Methvin for pick up when processed
- Submit \_\_\_\_\_ copies for distribution
- Other \_\_\_\_\_
- Other \_\_\_\_\_


**REMARKS:**

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NO.	COPIES	DATE	DESCRIPTION
1	1	4/2/19	Alternate Design Standards Checklist
2	1	4/2/19	Exemption Application (Alternative Drainage Plan)
3	1	1/7/2019	Owner Agent Authorization Form
4	1	4/4/2019	Project Description Letter
5	1	4/4/2019	Certification Letter
6	1	1/22/2019	Proposed Preliminary Plat
7	1	Feb. 2019	Drainage Improvement Plan
8	1	2/13/2019	Copy of Pre-Application Meeting Minutes
9	1	Feb-19	Drainage Improvements Report: Developed Conditions Hydrology Revision Report
10	1	May-19	Bastrop Grove Drainage Improvements Engineering Report

Received by: \_\_\_\_\_

Date: \_\_\_\_\_

  
4/4/19



# Owner's Agent Authorization

### Property Owner's Information

Owner's Name(s): MC BASTROP 71, LP

Property Address(s): PARCEL #R78736

Owner's Email Address: DM@MORANCAP.COM

Owner's Phone Number: (      ) (214) 622-6525

The individuals listed below are hereby authorized to apply for, sign for, and conduct business for permits, plan, and/or other legal documents with the City of Bastrop Planning and Development Department on behalf of the above identified property owner(s).

The City of Bastrop Planning and Development Department may retain a copy of this form for our records and maintain a file as a courtesy. The form with the most recent date shall supersede all previous authorizations on file and **remain in effect for one (1) year, or until a new form is filed by the property owners, whichever is shorter.**

All signatories understand that it is the property owner's responsibility to provide a copy of this form every time they would like to add or remove authorized agents, and that this form expires one (1) year after it is signed. The property owner's signature designates the agent as the official contact person for projects and the single point of contact. All correspondence and communication will be conducted with the agent.

### Print full name(s) and title(s) of authorized agent(s):

1. ANY EMPLOYEE OF
2. CARLSON, BRIGANCE & DOERING, INC.

[Handwritten Signature]  
Signature(s) of Property Owner(s)

X 1-7-19  
Date

\_\_\_\_\_  
Signature(s) of Property Owner(s)

\_\_\_\_\_  
Date

[Handwritten Signature]  
Signature(s) of Agent(s)

1/3/19  
Date

\_\_\_\_\_  
Signature(s) of Agent(s)

\_\_\_\_\_  
Date

## Process Overview

1. Pre-Application Meeting
    - a. Discuss your project with staff prior to submitting an application. Staff can help identify opportunities and constraints on the proposed project, as well as provide more information on the process and code requirements.
  2. Complete Submittal Package\*, which includes: Application and all Checklist Items
  3. Staff review, with comments issued as needed
  4. City Council meeting for approval by Resolution or Ordinance
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## Submittal Package Checklist Items

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<input type="checkbox"/>	<input checked="" type="checkbox"/>	Digital Submittal – Provide pdf copies of all documents listed above via email, CD, or flash drive

(\*) SEE BASTROP GROVE DRAINAGE IMPROVEMENTS ENGINEERING REPORT DATED MAY 2018 AND BASTROP GROVE DRAINAGE IMPROVEMENTS PLANS DATED APRIL 2018



# Exception Application

## Process Overview

1. Complete Submittal Package\*, which includes: Application and associated Checklist Items
2. Staff review, with comments issued as needed
3. Exception Determination Letter issued by Planning Director
  - a. If determined the project DOES qualify as an Exception, submit permit application for project
  - b. If determined the project DOES NOT qualify as an Exception by the Planning Director, the City Manager will make determination, followed by a City Council determination if needed.

\*Incomplete submittals will not be accepted

## Select your Exception

- No Impact Project
- Ongoing Project
- Grandfathered Project

## Property Owner

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

## Applicant

Name: \_\_\_\_\_ Role (i.e. developer, agent, etc.): \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

## Project Information

Project Name: \_\_\_\_\_

Property Address: \_\_\_\_\_ BCAD Property ID: \_\_\_\_\_

Legal Description: \_\_\_\_\_

Current Use(s) of the Property: \_\_\_\_\_

Nature of the Project: \_\_\_\_\_

Existing Zoning District: \_\_\_\_\_



# Exception Application

Total Property Area (sq ft): 1,127,419.92 SF (25.882 ACRES) Total Number Lots: 12

Total Area of Impervious Surface (sq ft): Existing: 0 Proposed: \_\_\_\_\_

Total Number of Buildings: Existing: 0 Proposed: \_\_\_\_\_

Footprint of Each Building (sq ft):

Existing: \_\_\_\_\_ n/a

Proposed: \_\_\_\_\_ n/a

Total Number of Dwelling Units by Type (single family, duplex, multi-family, etc.):

Existing: \_\_\_\_\_ 0

Proposed: \_\_\_\_\_

Amount of Non-Residential Square Footage (ground floor building footprint only) by Type (office, retail, commercial, industrial, warehouse, etc.). If project is mixed-use (mix of uses on same lot, please specify):

Existing: \_\_\_\_\_ n/a

Proposed: \_\_\_\_\_ n/a

Number of Phases of Development: 1 PHASE

Explain the current drainage pattern on the site (submit attachment if needed): \_\_\_\_\_

See Bastrop Grove Drainage Improvements Engineering Report dated May 2018

Explain the drainage pattern of the site after the project is complete (submit attachment if \_\_\_\_\_

needed): See Bastrop Grove Drainage Improvements Engineering Report dated May 2018

**No Impact Projects: N/A**

- Yes  No Will the project increase density on site?
- Yes  No Will the project increase or impact impervious cover?
- Yes  No Will the project expand the footprint of an existing structure?
- Yes  No Will the project alter the current drainage pattern on the property?

**Ongoing Projects:**

List of Permit(s) and Numbers (if available): LAND-1291-2018 "BASTROP GROVE DRAINAGE IMPROVEMENTS"

**Applicant Certification**

The applicant certifies that the facts stated herein and exhibits attached hereto are true, correct, and complete. Signature below also authorizes the City of Bastrop and its agents to visit and inspect the property for which this application is being submitted.

\_\_\_\_\_  
Signature and Title

Project Coordinator

1/19/19  
Date



# Exception Application

**Additional Information Required for Grandfathered Projects** N/A

1. Please indicate permits or development approvals received that are the basis to establish rights to complete the Project. Please specify all that may be applicable and include copies of the permit.

<b>CONSENT AGREEMENT/DEVELOPMENT AGREEMENT/MEMORANDUM OF UNDERSTANDING</b>		
Name:		Approval Date:
Expiration Date:	Volume No.:	Page No.:
<b>PLANNED DEVELOPMENT DISTRICT (PDD) PLAN</b>		
PDD Name:		Ordinance No.:
Approval Date:	Last Revision Date:	Acreage:
<b>PLAT APPLICATION</b>		
<i>Note: Plat must be approved within 24 months of application submittal date</i>		
Plat Name:		
Legal Description:		
Submittal Date:	Expiration Date:	Acreage:
<b>APPROVED/RECORDED PLAT</b>		
<i>Note: If plat is not recorded within 2 years of plat approval permit rights will expire</i>		
Plat Name:		
Legal Description:		
Approval Date:	Expiration Date:	Acreage:
Recording Date:	Volume No.:	Page No.:
<b>OTHER PERMIT</b>		
Type of Permit:		Submittal Date:
Permit No.:	Date Issued:	Expiration Date:



# Exception Application

2. Date establishing claim of rights for this Project: \_\_\_\_\_

3. **Describe any construction or related actions that have taken place on the property since that date:** *Include the date, nature and extent of each physical improvement to the property including structures, utilities, roads, driveways, etc.*

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4. **Describe how the Project has addressed drainage:** *Include the standards and assumptions used, impact to this property and adjacent properties, stormwater flows from the Project, etc.*

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# Exception Application

### 5. Authorization from Property Owner

I, Douglas MacMahon, swear and affirm that I am the owner of property at Parcel #R78736, as shown in the records of Bastrop County, Texas, which is the subject of this application.

I, Douglas MacMahon, the owner of the property subject to this Grandfathered Project Exception Application, authorize to submit the application and serve as my representative for this request.

X [Signature]  
Property owner's signature

X 1-7-19  
Date

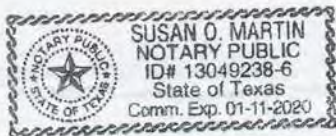
### 6. Sworn statement:

I, the undersigned, hereby certify that all information contained herein and the attached documents are true and correct and that it is my belief that the property owner is entitled to the requested rights for this Project and, during the pending time of this determination, I understand my continuing obligation to notify the Development Services Director in writing of the inaccuracy of any statement or representation which was incorrect when made or which becomes incorrect by virtue of changed circumstances.

Christine M. Methvin [Signature] 1/3/19  
Applicant's Name Applicant's signature Date

Sworn to and subscribed before me by SUSAN O. MARTIN on this 3rd day of January  
2019 in the year \_\_\_\_\_, to certify which witness my hand and seal of office.

[Signature]  
Notary Public, State of Texas





# Owner's Agent Authorization

## Property Owner's Information

Owner's Name(s): MC BASTROP 71, LP  
Property Address(s): PARCEL #R78736  
Owner's Email Address: DM@MORANCAP.COM  
Owner's Phone Number: (      ) (214) 622-6525

The individuals listed below are hereby authorized to apply for, sign for, and conduct business for permits, plan, and/or other legal documents with the City of Bastrop Planning and Development Department on behalf of the above identified property owner(s).

The City of Bastrop Planning and Development Department may retain a copy of this form for our records and maintain a file as a courtesy. The form with the most recent date shall supersede all previous authorizations on file and **remain in effect for one (1) year, or until a new form is filed by the property owners, whichever is shorter.**

All signatories understand that it is the property owner's responsibility to provide a copy of this form every time they would like to add or remove authorized agents, and that this form expires one (1) year after it is signed. The property owner's signature designates the agent as the official contact person for projects and the single point of contact. All correspondence and communication will be conducted with the agent.

### Print full name(s) and title(s) of authorized agent(s):

- ANY EMPLOYEE OF
- CARLSON, BRIGANCE & DOERING, INC.

*[Handwritten Signature]*  
Signature(s) of Property Owner(s)

X 1-7-19  
Date

\_\_\_\_\_  
Signature(s) of Property Owner(s)  
*[Handwritten Signature]*  
Signature(s) of Agent(s)

\_\_\_\_\_  
Date  
1/3/19  
Date

\_\_\_\_\_  
Signature(s) of Agent(s)

\_\_\_\_\_  
Date



# Pre-Application Meeting Request Form

Pre-application meetings are required prior to starting any project in the City of Bastrop. They allow applicants to learn more about the City of Bastrop's code, application process, and to provide answers to questions. Representatives from various departments may be present depending on the project and associated questions.

Pre-application meeting are held on Tuesday afternoons by appointment. Staff suggests scheduling a meeting as soon as possible because requests are processed in the order in which they are received, and appointment times fill quickly. To reserve an appointment, complete this form, attach a location map of the property of interest, and return to Staff. You may return the application in person or by mail to 1311 Chestnut St. Bastrop, TX 78602 or by email to [plan@cityofbastrop.org](mailto:plan@cityofbastrop.org). Staff will contact you to confirm an appointment date and time.

## Property Information

Property Address: \_\_\_\_\_ Tax ID: \_\_\_\_\_

Legal Description: \_\_\_\_\_

Land Use Category: \_\_\_\_\_ Acreage: \_\_\_\_\_

Existing Zoning District: \_\_\_\_\_ (If rezone) Proposed Zoning District: \_\_\_\_\_

Name of Overarching Regulation (PD, MUD, DA, etc.): \_\_\_\_\_

## Project Details

Project Name: \_\_\_\_\_

What is the primary purpose for the meeting?

- Due Diligence/Fact Finding    Project Feasibility    Project Design    Ready to Submit App    Other

If other, please explain: \_\_\_\_\_

Briefly describe your project: \_\_\_\_\_

Have you spoken to City Staff about this project?  Yes  No      If yes, name: \_\_\_\_\_

Have there been previous meetings about this project?  Yes  No      If yes, date: \_\_\_\_\_

## Meeting Details

Requested Meeting Date (must be a Tuesday): \_\_\_\_\_

Backup Meeting Date (must be a Tuesday): \_\_\_\_\_



# Pre-Application Meeting Request Form

## Contact Information

Name: \_\_\_\_\_ Role (i.e. developer, agent, etc): \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Email: \_\_\_\_\_

## Additional Contact Information

Name: \_\_\_\_\_ Role (i.e. engineer, architect, etc): \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_ Email: \_\_\_\_\_

By submitting this request form, the applicant understands that the pre-application meeting is for informational purposes and any preliminary analysis provided by staff during this meeting does not constitute a formal review of the project, imply subsequent approval, nor preclude future comments. It is the responsibility of the applicant to read and comply with all applicable ordinances and requirements in effect on the submittal date.

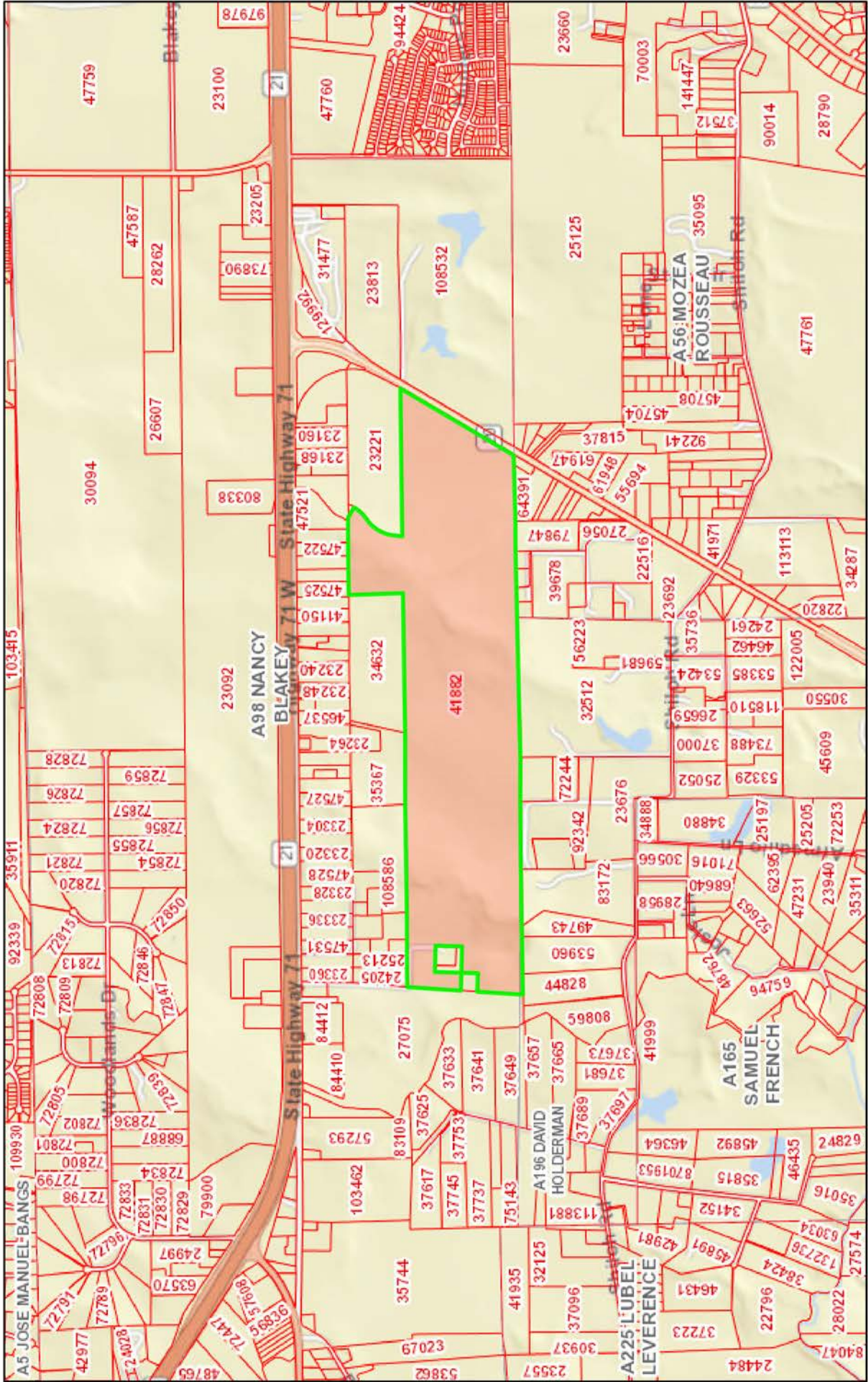
## Staff Use Only

Date Received: \_\_\_\_\_ By: \_\_\_\_\_

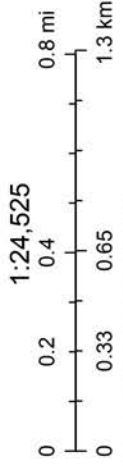
Meeting Date: \_\_\_\_\_ Meeting Time: \_\_\_\_\_

Staff to Attend: \_\_\_\_\_

# BASTROP VILLAGE WEST



January 18, 2019



- Parcels
- Abstracts

Esri, HERE, Garmin, INCREMENT P, NGA, USGS



# Planning Application

## Select your Plan

### Subdivision

- Amending Plat
- Minor Plat
- Replat
- Preliminary Plat
- Final Plat
- Plat Vacation
- Subdivision Variance
- Public Improvement Construction Plans

### Zoning & Development

- Zoning Map Amendment (Rezone)
- New Planned Development (PD)
- Conditional Use Permit (CUP)
- Zoning Variance
- Site Development Plan
- Site Work (On-Site Infrastructure)
- New Agreement: \_\_\_\_\_
- Alternative Plan: \_\_\_\_\_
- Agreement/PD Amendment

### Other

- Abandonment – Easement
- Abandonment – ROW
- License to Encroach
- Nonconforming Structure
- Nonconforming Use
- Planning Appeal
- Voluntary Annexation
- Land Disturbance
- Work in the ROW

**See associated checklists to ensure a complete application.**

## Project Information

Project Name: \_\_\_\_\_

Property Address: \_\_\_\_\_ Tax ID: \_\_\_\_\_

Legal Description: \_\_\_\_\_

Land Use Category: \_\_\_\_\_

Existing Zoning District: \_\_\_\_\_ (If rezone) Proposed Zoning District: \_\_\_\_\_

Name of Overarching Regulation (PD, MUD, DA, etc.): \_\_\_\_\_

Total Acreage: \_\_\_\_\_ Total Lots: \_\_\_\_\_

Acreage Not Designated as Lots: \_\_\_\_\_ Lots Subject to Parkland Fee: \_\_\_\_\_

## Property Owner

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City, State Zip: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_



# Planning Application

## Applicant

Name: \_\_\_\_\_ Role (i.e. developer, agent, etc.): \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

## Additional Contact (Optional)

Name: \_\_\_\_\_ Role (i.e. engineer, architect, etc.): \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

The applicant certifies that the facts stated herein and exhibits attached hereto are true, correct, and complete. **If this application is filed by anyone other than the property owner, an Agent Authorization form signed by all property owners must accompany this application.** Signature below also authorizes the City of Bastrop and its agents to visit and inspect the property for which this application is being submitted.

*CM Methvin*

Christine M. Methvin  
Project Coordinator

Signature and Title

\_\_\_\_\_ Date

## Staff Use Only

Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Fees Paid \$ \_\_\_\_\_

Comments: \_\_\_\_\_

Administratively Complete Date: \_\_\_\_\_

Paper: \_\_\_\_\_

Prop. Owner Notification: \_\_\_\_\_

P&Z: \_\_\_\_\_

City Council: \_\_\_\_\_

# Bastrop CAD

## Property Search Results > 78736 MC BASTROP 71 LP for Year 2019

### Property

#### Account

Property ID:	78736	Legal Description:	ABS A98 Blakey, Nancy,15.3100 ACRES
Geographic ID:	R78736	Agent Code:	A0216794
Type:	Real		
Property Use Code:			
Property Use Description:			

#### Location

Address:		Mapsc0:	
Neighborhood:	BASTROP CITY 006	Map ID:	9-11
Neighborhood CD:	NBHD0206		

#### Owner

Name:	MC BASTROP 71 LP	Owner ID:	758572
Mailing Address:	8214 WESTCHESTER DR STE 550 DALLAS, TX 75225	% Ownership:	100.0000000000%

Exemptions:

### Values

(+) Improvement Homesite Value:	+	N/A	
(+) Improvement Non-Homesite Value:	+	N/A	
(+) Land Homesite Value:	+	N/A	
(+) Land Non-Homesite Value:	+	N/A	Ag / Timber Use Value
(+) Agricultural Market Valuation:	+	N/A	N/A
(+) Timber Market Valuation:	+	N/A	N/A
-----			
(=) Market Value:	=	N/A	
(-) Ag or Timber Use Value Reduction:	-	N/A	
-----			
(=) Appraised Value:	=	N/A	
(-) HS Cap:	-	N/A	
-----			
(=) Assessed Value:	=	N/A	

### Taxing Jurisdiction

Owner: MC BASTROP 71 LP  
 % Ownership: 100.0000000000%



Total Value: N/A

Entity	Description	Tax Rate	Appraised Value	Taxable Value	Estimated Tax
C04	CITY OF BASTROP	N/A	N/A	N/A	N/A
CAD	APPRAISAL DISTRICT	N/A	N/A	N/A	N/A
G01	BASTROP COUNTY	N/A	N/A	N/A	N/A
RD1	COUNTY ROAD	N/A	N/A	N/A	N/A
S04	BASTROP ISD	N/A	N/A	N/A	N/A
Total Tax Rate:		N/A			
Taxes w/Current Exemptions:					N/A
Taxes w/o Exemptions:					N/A

## Improvement / Building

No improvements exist for this property.

## Land

#	Type	Description	Acres	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
1	IP	IMPROVED PASTURE	15.3100	666903.60	0.00	0.00	N/A	N/A

## Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap	Assessed
2019	N/A	N/A	N/A	N/A	N/A	N/A
2018	\$0	\$2,668,310	8,836	8,836	\$0	\$8,836
2017	\$0	\$2,668,310	9,115	9,115	\$0	\$9,115
2016	\$0	\$2,668,310	9,952	9,952	\$0	\$9,952
2015	\$0	\$2,628,296	10,231	10,231	\$0	\$10,231
2014	\$0	\$2,628,296	50,599	50,599	\$0	\$50,599
2013	\$0	\$3,664,417	50,785	50,785	\$0	\$50,785
2012	\$0	\$5,740,000	77,802	77,802	\$0	\$77,802
2011	\$0	\$6,156,864	41,961	41,961	\$0	\$41,961
2010	\$0	\$6,156,864	41,961	41,961	\$0	\$41,961
2009	\$0	\$4,104,576	41,669	41,669	\$0	\$41,669
2008	\$0	\$4,104,576	0	0	\$0	\$0
2007	\$0	\$4,104,576	40,941	40,941	\$0	\$40,941

## Deed History - (Last 3 Deed Transactions)

#	Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Deed Number
1	10/5/2011	SWD	SPECIAL WARRANTY DEED	BASTROP GROVE PARTNERS LTD	MC BASTROP 71 LP	2097	241	0
2	11/29/2006	SWD	SPECIAL WARRANTY DEED	BRUNDAGE BASTROP LTD	BASTROP GROVE PARTNERS LTD	1698	245	0

3	5/10/2001	CONV	CONVERSION	BECK, MARVIN E & ANNE P	BRUNDAGE BASTROP LTD	1130	014	0
---	-----------	------	------------	----------------------------	-------------------------	------	-----	---

### Tax Due

Property Tax Information as of 01/03/2019

Amount Due if Paid on: 

Year	Taxing Jurisdiction	Taxable Value	Base Tax	Base Taxes Paid	Base Tax Due	Discount / Penalty & Interest	Attorney Fees	Amount Due
------	---------------------	---------------	----------	-----------------	--------------	-------------------------------	---------------	------------

NOTE: Penalty & Interest accrues every month on the unpaid tax and is added to the balance. Attorney fees may also increase your tax liability if not paid by July 1. If you plan to submit payment on a future date, make sure you enter the date and RECALCULATE to obtain the correct total amount due.

Questions Please Call (512) 303-1930

**This year is not certified and ALL values will be represented with "N/A".**



**Fee Request Form**

TO: Douglas MacMahon  
MC Bastrop 71, LP  
2828 Routh Street, Suite 500  
Dallas, TX 75201  
[dm@morancap.com](mailto:dm@morancap.com)  
214-622-6525

SENT BY: Christine Methvin  
christine@cbdeng.com  
(512) 280-5160 x117 office (512) 484-6591 cell

<b>DATE:</b>	January 3, 2019
<b>ATTENTION:</b>	Douglas MacMahon
<b>REFERENCE:</b>	Bastrop Grove Section 2 <b>Preliminary Plat</b> <b>APPLICATION FEE</b>
<b>CBD PROJECT NO:</b>	4697

REASON FOR FEE REQUEST: Preliminary Plat Application Fee

See excerpt from City of Bastrop Fee Schedule published 10/1/18 & calculations below

Preliminary Plat	\$1,050 + \$25 per lot + \$25 per acre of right-of-way \$1,200 minimum
------------------	---

<b>Application Fee</b>		<b>\$1,050.00</b>
12 Lots *	\$25.00	<b>\$300.00</b>
1.853 Acres	\$25.00	<b>\$46.33</b>
<b>TOTAL FEES DUE</b>		<b>\$1,396.33</b>

AMOUNT: \$1,396.33

Make Check Payable to: City of Bastrop

REMARKS:

- Contact Christine Methvin for pick up when processed
- Please forward via regular mail

Please forward payment to Christine Methvin at your earliest convenience



# Owner's Agent Authorization

## Property Owner's Information

Owner's Name(s): MC BASTROP 71, LP  
Property Address(s): PARCEL #R78736  
Owner's Email Address: DM@MORANCAP.COM  
Owner's Phone Number: (      ) (214) 622-6525

The individuals listed below are hereby authorized to apply for, sign for, and conduct business for permits, plan, and/or other legal documents with the City of Bastrop Planning and Development Department on behalf of the above identified property owner(s).

The City of Bastrop Planning and Development Department may retain a copy of this form for our records and maintain a file as a courtesy. The form with the most recent date shall supersede all previous authorizations on file and **remain in effect for one (1) year, or until a new form is filed by the property owners, whichever is shorter.**

All signatories understand that it is the property owner's responsibility to provide a copy of this form every time they would like to add or remove authorized agents, and that this form expires one (1) year after it is signed. The property owner's signature designates the agent as the official contact person for projects and the single point of contact. All correspondence and communication will be conducted with the agent.

### Print full name(s) and title(s) of authorized agent(s):

- ANY EMPLOYEE OF
- CARLSON, BRIGANCE & DOERING, INC.

*[Handwritten Signature]*  
Signature(s) of Property Owner(s)

X 1-7-19  
Date

\_\_\_\_\_  
Signature(s) of Property Owner(s)  
*[Handwritten Signature]*  
Signature(s) of Agent(s)

\_\_\_\_\_  
Date  
1/3/19  
Date

\_\_\_\_\_  
Signature(s) of Agent(s)

\_\_\_\_\_  
Date



# Owner's Agent Authorization

## Property Owner's Information

Owner's Name(s): MC BASTROP 71, LP  
 Property Address(s): PARCEL #R78736  
 Owner's Email Address: DM@MORANCAP.COM  
 Owner's Phone Number: (      ) (214) 622-6525

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The City of Bastrop Planning and Development Department may retain a copy of this form for our records and maintain a file as a courtesy. The form with the most recent date shall supersede all previous authorizations on file and **remain in effect for one (1) year, or until a new form is filed by the property owners, whichever is shorter.**

All signatories understand that it is the property owner's responsibility to provide a copy of this form every time they would like to add or remove authorized agents, and that this form expires one (1) year after it is signed. The property owner's signature designates the agent as the official contact person for projects and the single point of contact. All correspondence and communication will be conducted with the agent.

## Print full name(s) and title(s) of authorized agent(s):

1. ANY EMPLOYEE OF
2. CARLSON, BRIGANCE & DOERING, INC.

X  
 \_\_\_\_\_  
 Signature(s) of Property Owner(s)

X  
 \_\_\_\_\_  
 Date

\_\_\_\_\_  
 Signature(s) of Property Owner(s)  
CM Mett  
 \_\_\_\_\_  
 Signature(s) of Agent(s)

\_\_\_\_\_  
 Date  
1/3/19  
 \_\_\_\_\_  
 Date

\_\_\_\_\_  
 Signature(s) of Agent(s)

\_\_\_\_\_  
 Date



# Exception Application

## 5. Authorization from Property Owner

I, Douglas MacMahon, swear and affirm that I am the owner of property at Parcel #R78736, as shown in the records of Bastrop County, Texas, which is the subject of this application.

I, Douglas MacMahon, the owner of the property subject to this Grandfathered Project Exception Application, authorize to submit the application and serve as my representative for this request.

X  
\_\_\_\_\_  
Property owner's signature

X  
\_\_\_\_\_  
Date

## 6. Sworn statement:

I, the undersigned, hereby certify that all information contained herein and the attached documents are true and correct and that it is my belief that the property owner is entitled to the requested rights for this Project and, during the pending time of this determination, I understand my continuing obligation to notify the Development Services Director in writing of the inaccuracy of any statement or representation which was incorrect when made or which becomes incorrect by virtue of changed circumstances.

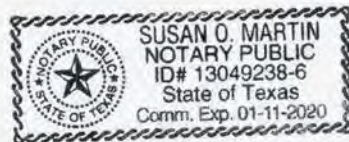
Christine M. Methvin  
Applicant's Name

CM Methvin  
Applicant's signature

1/3/19  
Date

Sworn to and subscribed before me by Susan O. Martin on this 3rd day of January  
in the year 2019, to certify which witness my hand and seal of office.

Susan O. Martin  
Notary Public, State of Texas



Office of Linda Harmon Tax Assessor-Collector  
 Bastrop County Tax Office  
 PO Box 579  
 Bastrop, TX 78602  
 (512) 581-7161  
 (512) 581-7167

# 2018 Tax Statement

Date	QuickRef ID
1/21/2019	R78736
CAD ID	Owner ID
78736	O0103331
Property Description	
Legal A98 BLAKEY, NANCY, ACRES 93.013	
Property Location	

Property ID: R78736



R78736  
 MC BASTROP 71 LP  
 8214 WESTCHESTER DR  
 STE 550  
 DALLAS, TX 75225

County Taxes Reduced By Additional Sales Tax 6.96

Property Values	
Land	0
Improvement	0
AG Market	2,668,310
AG Use	8,836
Timber Market	0
Timber Use	0
Cap Adjustment	0
Assessed	8,836
Exemptions	
AG	

Tax Breakdown							
Tax Year	Taxing Unit	Tax Rate	Exemptions	Taxable	Tax	Tax Paid	Tax Due
2018	Bastrop County	0.474900	0	8,836	41.96	41.96	0.00
2018	Bastrop lsd	1.441000	0	8,836	127.32	127.32	0.00
2018	City Of Bastrop	0.564000	0	8,836	49.83	49.83	0.00
2018	County Road	0.105000	0	8,836	9.28	9.28	0.00
<b>TOTAL</b>					228.39	228.39	See TOTAL DUE

**TOTAL DUE IF PAID BY  
January 31, 2019** 0.00

IF YOU ARE 65 YEARS OF AGE OR OLDER OR ARE DISABLED, AND YOU OCCUPY THE PROPERTY DESCRIBED IN THIS DOCUMENT AS YOUR RESIDENCE HOMESTEAD, YOU SHOULD CONTACT THE APPRAISAL DISTRICT REGARDING ANY ENTITLEMENT YOU MAY HAVE TO A POSTPONEMENT IN THE PAYMENT OF THESE TAXES

Pay by	%	P&I	Total Due
Jan 2019		0.00	0.00
Feb 2019		0.00	0.00
Mar 2019		0.00	0.00
Apr 2019		0.00	0.00
May 2019		0.00	0.00
Jun 2019		0.00	0.00
Jul 2019		0.00	0.00
Aug 2019		0.00	0.00
Sep 2019		0.00	0.00
Oct 2019		0.00	0.00

-----detach and return bottom portion with payment-----

Property ID
R78736
Owner ID
O0103331
Property Location

Make check payable to:  
 Office of Linda Harmon Tax Assessor-Collector  
 Bastrop County Tax Office  
 PO Box 579  
 Bastrop, TX 78602  
 (512) 581-7161  
 (512) 581-7167

**TOTAL DUE IF PAID BY  
January 31, 2019** 0.00



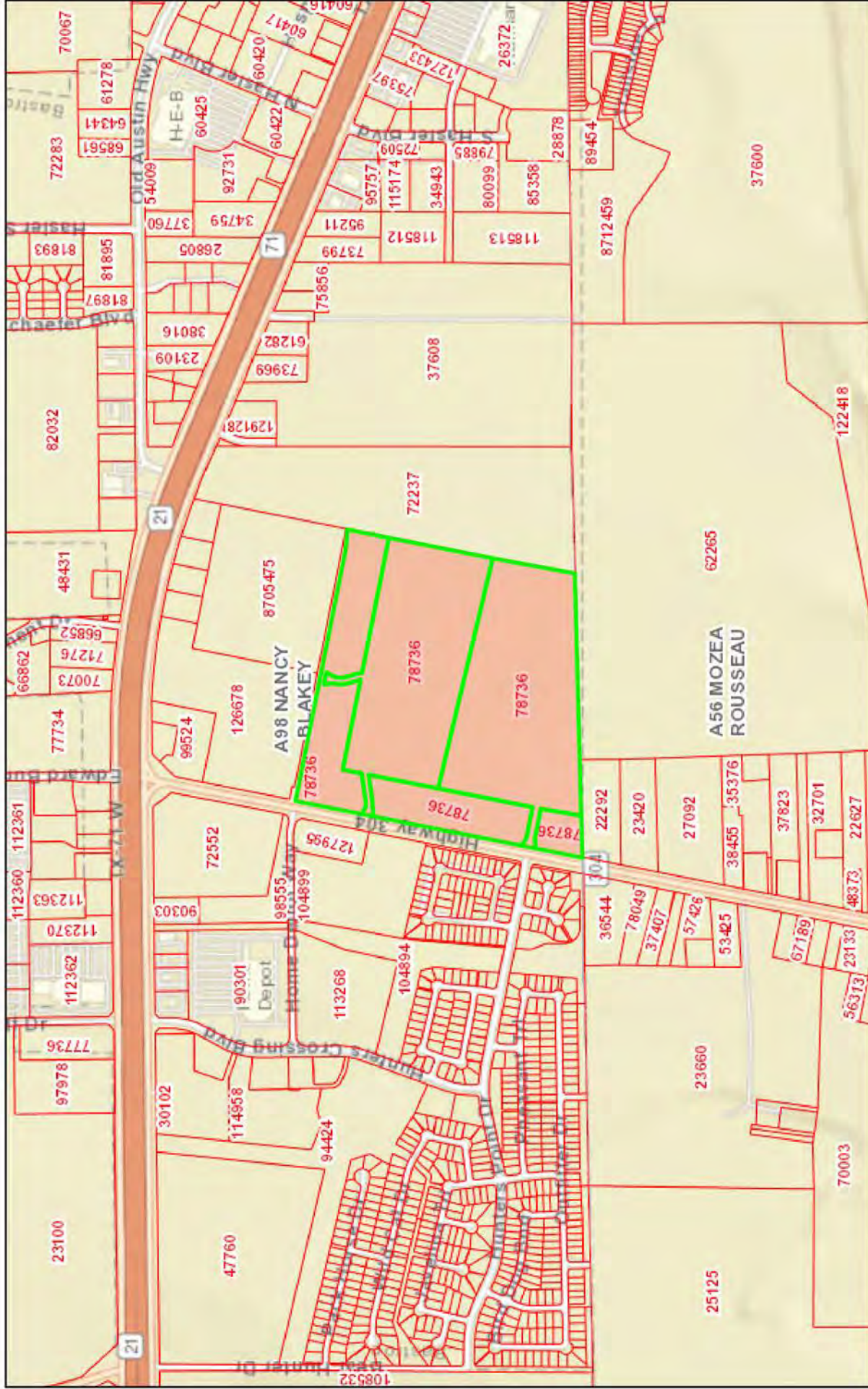
\*%000000220603C0000059266\*

R78736  
 MC BASTROP 71 LP  
 8214 WESTCHESTER DR  
 STE 550  
 DALLAS, TX 75225

20180000R78736000000000000

IF THE PROPERTY DESCRIBED IN THIS DOCUMENT IS YOUR RESIDENCE HOMESTEAD, YOU SHOULD CONTACT THE OFFICE OF LINDA HARMON TAX ASSESSOR-COLLECTOR REGARDING A RIGHT YOU MAY HAVE TO ENTER INTO AN INSTALLMENT AGREEMENT DIRECTLY WITH THE OFFICE OF LINDA HARMON TAX ASSESSOR-COLLECTOR FOR THE PAYMENT OF THESE TAXES.

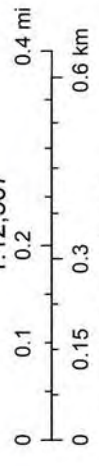
# BASTROP GROVE SECTION 2



January 21, 2019

1:12,507

- Parcels
- Abstracts



Esr1, HERE, Garmin, INCREMENT P, NGA, USGS





# Preliminary Plat Checklists

## Process Overview

1. Pre-Application Meeting
  - a. Discuss your project with staff prior to submitting an application. Staff can help identify opportunities and constraints on the proposed project, as well as provide more information on the process and code requirements.
2. Complete Submittal Package, which includes: Application, Supplemental Forms, and Checklist Items
  - a. Incomplete submittals will not be accepted
3. Staff review, with comments issued as needed
4. Notification of property owners within 200 feet and in newspaper
5. Planning and Zoning (P&Z) Commission review and recommendation to City Council
6. City Council review and action – one meeting
  - a. Approval expires after 180 days; Council may extend up to 180 days in response to written request
7. Signed and sealed mylar, certified tax certificate showing taxes have been paid and remaining fees are submitted to the Planning department.
8. Copies of recorded plat returned to applicant.

## Submittal Package Checklist Items

Check items included in the Applicant column before submitting documents with the project application and supplemental forms. If all checklist items are not present, the submittal will not be accepted.

Staff	Applicant	Item
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Completed and signed Application
<input type="checkbox"/>	<input type="checkbox"/>	Agent Authorization Letter
<input type="checkbox"/>	<input type="checkbox"/>	Copy of Exception Determination Letter or proof of Exemption
<input type="checkbox"/>	<input type="checkbox"/>	Project Description Letter explaining proposed project, including number of lots existing and proposed, and if those lots are residential or commercial
<input type="checkbox"/>	<input type="checkbox"/>	Tax map highlighting the subject property
<input type="checkbox"/>	<input type="checkbox"/>	Copy of deed showing current ownership
<input type="checkbox"/>	<input type="checkbox"/>	Copy of current tax statement showing taxes have been paid
<input type="checkbox"/>	<input type="checkbox"/>	Preliminary Plat prints, collated and folded: One (1) 11"x17"; Eight (8) 24"x36"
<input type="checkbox"/>	<input type="checkbox"/>	<del>Three (3)</del> <sup>5</sup> prints of a drainage study
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<del>Three (3)</del> <sup>5</sup> prints of the utility schematic/plan
<input type="checkbox"/>	<input type="checkbox"/>	Three (3) copies of letter outlining Planned Development requirements and how those requirements are addressed on the plat. <b>If not applicable, check this box:</b> <input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Digital Submittal – See requirements below. Application will not be accepted if not in the specified format listed in requirements.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Preliminary Plat fee
	<input checked="" type="checkbox"/>	Engineering Reports (3 copies)

**Preliminary Plat Details Required**

These details shall be provided in accordance with Section 4.10.2 of the adopted Subdivision Ordinance, unless otherwise approved by the Planning and Development Director in coordination with the City Manager. These details may reference other applicable sections of the Code of Ordinances. Please contact the Planning and Development Department with any questions. A plat that does not contain this information is not considered administratively complete. Additional information may be deemed necessary by staff.

Staff	Applicant	Item
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Name of the subdivision, which shall not duplicate an existing or pending subdivision
<input type="checkbox"/>	<input type="checkbox"/>	Total acreage and the proposed total number of lots and blocks within the subdivision, total acreage of rights-of-way
<input type="checkbox"/>	<input type="checkbox"/>	Name of the licensed public surveyor and licensed engineer (when required) responsible for preparing the plat
<input type="checkbox"/>	<input type="checkbox"/>	Scale: 1" = 100'
<input type="checkbox"/>	<input type="checkbox"/>	North arrow, north to be at top of sheet if possible, located beside the plat sketch
<input type="checkbox"/>	<input type="checkbox"/>	Legend, depicting all symbols, located beside the plat sketch
<input type="checkbox"/>	<input type="checkbox"/>	Date, revision block, and each revision shall bear a new date
<input type="checkbox"/>	<input type="checkbox"/>	Applicable Plat Notes (see Standard Plat Notes)
<input type="checkbox"/>	<input type="checkbox"/>	Ownership boundaries shall be drawn in very heavy lines and shall include overall dimensions and bearings
<input type="checkbox"/>	<input type="checkbox"/>	Adjacent boundary lines and adjacent right-of-way lines of the proposed subdivision drawn with dashed lines.
<input type="checkbox"/>	<input type="checkbox"/>	A tie to an original corner of the tract of land of which subdivision is a part
<input type="checkbox"/>	<input type="checkbox"/>	Name and location of adjacent subdivisions, streets, easements, pipelines, water courses, etc., and the property lines and name of all adjoining property owners
<input type="checkbox"/>	<input type="checkbox"/>	Existing and proposed topographic and planimetric features within the subdivision, including water courses and ravines, high banks, width of existing and proposed easements and any other physical features pertinent to the subdivision. Contour lines at two (2) foot intervals in terrain with a slope of two (2) percent or less and five (5) foot intervals in terrain with slope greater than two (2) percent.
<input type="checkbox"/>	<input type="checkbox"/>	Existing transportation features within the subdivision including the location and width of right-of-way, streets, alleys and easements
<input type="checkbox"/>	<input type="checkbox"/>	Proposed features including location, right-of-way and pavement width, surfacing and name of streets; approximate width and depth of all lots; location of building lines, alleys and public utility easements; and schematic plans for drainage, sanitary facilities, and utilities
<input type="checkbox"/>	<input type="checkbox"/>	Designation of any sites for special uses including churches, sewage disposal plants, water storage/pumping facilities, wells or plants, business, industry or other special land uses. If proposed use is unknown, designate as unrestricted
<input type="checkbox"/>	<input type="checkbox"/>	Regulatory flood elevations and boundaries of flood prone areas, including floodways
<input type="checkbox"/>	<input type="checkbox"/>	A preliminary plan sheet showing proposed on-site sewage disposal systems, or sanitary sewers with grade, pipe size and location of points of discharge or connection to existing collection lines
<input type="checkbox"/>	<input type="checkbox"/>	A preliminary plan of the drainage system, indicating inlet locations, with grade, pipe size and location of points of discharge





# Preliminary Plat Checklists

## Signature Blocks

These signature blocks shall be used as appropriate.

### City Council Approval Format:

Approved this day \_\_\_\_\_ of \_\_\_\_\_, 2018 A.D. by the City Council of the City of Bastrop, Texas.

Approved:

Attest:

\_\_\_\_\_  
Mayor, Connie Schroeder

\_\_\_\_\_  
City Secretary

### The certificate of the licensed public surveyor:

THE STATE OF TEXAS §  
COUNTY OF BASTROP §

KNOW ALL MEN BY THESE PRESENTS

That I, \_\_\_\_\_ do hereby certify that I prepare this plat from an actual and accurate on-the-ground survey of the land and that the corner monuments shown thereon were properly placed under my personal supervision, in accordance with the subdivision regulations of the City of Bastrop, Texas.

\_\_\_\_\_  
Signature and Seal of Registered Public Surveyor with date

### Owner's Signature Block:

THE STATE OF TEXAS §  
COUNTY OF BASTROP §

KNOW ALL MEN BY THESE PRESENTS

That we, \_\_\_\_, being the owners of \_\_\_ acre out of (legal description), according to the map or plat recorded in plat cabinet \_\_, Page \_\_, plat records of Bastrop County, Texas and as conveyed to us by deeds recorded in Instrument no. \_\_\_ of the official public records of said county do hereby subdivide said land with the plat shown hereon, to be known as:

(Subdivision Name)

Subject to easements and restrictions heretofore granted and not released and do hereby dedicate any streets and/or easements shown hereon to the public.

Witness my hand this the \_\_ day of \_\_\_\_, 2018, A.D.

\_\_\_\_\_  
Property owner name  
Property owner address

### County Clerk Signature Block:

THE STATE OF TEXAS §



# Preliminary Plat Checklists

COUNTY OF BASTROP §

I, Rose Pietsch, County Clerk of Bastrop County, Texas, do hereby certify that the foregoing instrument of writing and its certificate of authentication was filed for record in my office on the \_\_\_ day of \_\_\_\_, 2018, A.D. at \_\_\_ o'clock \_\_M., in the plat records of Bastrop County, Texas in plat cabinet \_\_\_\_, page \_\_\_\_.

Filed for record on the \_\_\_ day of \_\_\_\_, 2018, A.D.

\_\_\_\_\_  
Deputy

\_\_\_\_\_  
Rose Pietsch  
County Clerk  
Bastrop County, Texas

### Signed and sealed certification of the licensed engineer who prepared the plat:

THE STATE OF TEXAS §  
COUNTY OF BASTROP §

KNOW ALL MEN BY THESE PRESENTS:

That I, \_\_\_\_\_, do hereby certify that the information contained on this plat complies with the subdivision regulations for the City of Bastrop, Texas and that the 100 year flood plain is as shown and will be contained within the drainage easement and or drainage right-of-way, as shown hereon.

\_\_\_\_\_  
Signature and Seal of Registered Engineer with date

Rose Pietsch

10/6/2011 11:21 AM

FEE: \$68.00 BOOK: 2097 PAGE: 241

ROSE PIETSCH, County Clerk

Bastrop, Texas

DEED 201111002

**NOTICE OF CONFIDENTIALITY: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.**

**SPECIAL WARRANTY DEED****Date:** October 6, 2011**Grantor:** BRUNDAGE GROVE PARTNERS, LTD.,  
a Texas limited partnership**Grantor's Mailing Address:**254 Spencer Lane  
San Antonio, Texas 78201**Grantee:** MC BASTROP 71, LP  
a Texas limited partnership**Grantee's Mailing Address:**2828 Routh Street, Suite 500  
Dallas, Texas 75201**Consideration:**

The sum of Ten and No/100 Dollars (\$10.00) and other good and valuable consideration paid from Grantee to Grantor, the receipt and sufficiency of which are hereby acknowledged.

**Property (including any improvements):**

Being all of that certain tract of land containing 145.697 acres, more or less, situated in the Nancy Blakey Survey No. A-98, Bastrop, County, Texas, said tract being more particularly described in Exhibit "A" attached hereto and made a part hereof (the "Land"), together with (i) all, fixtures, structures and improvements thereon including any wells and trees located on the Land; (ii) all right, title and interest, if any, of Grantor in and to any land lying in the bed of any street, road or access way, opened or proposed, in front of, at a side of or adjoining the Land, to the centerline of such

street, road or access way, and to all strips and gores; (iii) all rights in and to roads, rights-of-way and ingress and egress easements benefiting the Land, if any, whether surface, subsurface or otherwise; (iv) all rights in and to other easements, including, without limitation, that one certain drainage easement estate described in Drainage Easement Agreement dated August 13, 2008, recorded in Volume 1819, Page 840 of the Official Records of Bastrop County, Texas, by and between Jo Ann Griesenbeck Cantrell and William Cantrel, Grantors and Bastrop Grove Partners, Ltd., Grantee, said easement being more particularly described in Exhibit "B" attached hereto and made a part hereof (the "Cantrell Easement"); (v) all governmental or quasi-governmental permits and approvals of any kind or character pertaining to the Land, if any, including, without limitation, any permits to withdraw water from wells on the Land; (vi) all permits, contracts and rights of any kind or character to receive utilities services for the Land, if any; (vii) any water rights belonging or pertaining to the Land owned by Grantor; (viii) any minerals in, on or under the Land or interests therein owned by Grantor including any executive rights owned by Grantor; (ix) all other rights, privileges and appurtenances belonging or in any way pertaining to the Land (the Land together with the aforesaid improvements, rights and appurtenances being hereinafter referred to as the "Property").

**Reservations from and Exceptions to Conveyance and Warranty:**

This conveyance and the warranties of title herein are expressly made subject to the exceptions, easements, restrictive covenants, conditions and encumbrances set forth in Exhibit "C" which is attached hereto and incorporated herein by reference for all purposes.

Ad valorem taxes have been paid through the year 2010, and ad valorem taxes for the year 2011 have been prorated and Grantee, by acceptance of this Special Warranty Deed, assumes the obligation to pay such taxes and all taxes and assessments imposed subsequent to this conveyance, including any rollback taxes incurred as a result of a change in use of the Property upon or subsequent to this conveyance.

**Conveyance:**

Grantor, for the consideration and subject to the above reservations from and exceptions to conveyance and warranty, grants, bargains, sells and conveys to Grantee the Property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and to hold it to Grantee, Grantee's successors and assigns forever. Grantor binds Grantor and Grantor's successors to warrant and forever defend all and singular the Property to Grantee and Grantee's successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof when the claim is by, through, or under Grantor but not otherwise, except as to the Reservations from and Exceptions to Conveyance and Warranty.

[SIGNATURE APPEARS ON FOLLOWING PAGE.]

EXECUTED to be EFFECTIVE as of the date first indicated above.

**GRANTOR:**

BASTROP GROVE PARTNERS, LTD.,  
a Texas limited partnership

By: Bastrop Management Company, L.L.C.  
a Texas limited liability company,  
its General Partner

By: *Thomas O. Brundage*  
Thomas O. Brundage, Manager

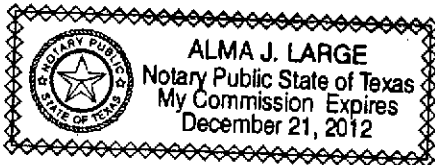
**ACKNOWLEDGMENT**

STATE OF TEXAS

COUNTY OF BEXAR

§  
§  
§

This instrument was acknowledged before me on the 5 day of October 2011, by Thomas O. Brundage, Manager of Bastrop Management Company, L.L.C., a Texas limited liability company, the General Partner of Bastrop Grove Partners, Ltd., a Texas limited partnership, on behalf of said limited partnership.



*Alma J. Large*  
Notary Public, State of Texas  
*Alma J. Large*  
(Name - Typed or Printed)  
*December 21, 2012*  
(My Commission Expires)

AFTER RECORDING RETURN TO:  
Wright, Ginsberg Brusilow  
Attention: Michael H. Saks, Esq.  
14755 Preston Road, Suite 600  
Dallas, Texas 75254

M:\5000\5200\5202\5202.077\Special Warranty Deed\Special Warranty Deed.004.DOC

SPECIAL WARRANTY DEED



## EXHIBIT "A"

STATE OF TEXAS  
COUNTY OF BASTROP

145.691 ACRES  
NANCY BLAKEY SURVEY,  
A-98

## DESCRIPTION

DESCRIPTION OF A 145.691 ACRE TRACT OF LAND OUT OF THE NANCY BLAKEY SURVEY, A-98, BASTROP COUNTY, TEXAS, AND BEING ALL OF THAT CERTAIN TRACT OF LAND CALLED TO BE 145.697 ACRES, DESCRIBED IN A DEED TO BASTROP GROVE PARTNERS, LTD., OF RECORD IN VOLUME 1698, PAGE 245, OF THE OFFICIAL PUBLIC RECORDS OF BASTROP COUNTY, TEXAS, SAID 145.691 ACRES BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a nail found in concrete in the east line of F.M. Highway 304, at the northwest corner of a tract of land called to be 5.0 acres, described in a deed to Codie Smith Wyatt, of record in Volume 165, Page 772, of the Deed Records of Bastrop County, Texas, said nail being the southwest corner of said 145.697 acre tract, and the southwest corner of the herein described tract;

THENCE, N 09° 40' 25" E, with the east right-of-way line of said F. M. 304, at 446.94 feet passing a 5/8 inch iron rod with cap set October 1, 2010, at 2184.81 feet, passing a 5/8 inch iron rod with cap set October 1, 2010, at 2281.29 feet, passing a 1/2 inch iron rod found, and continuing for a total distance of 2901.81 to a 1/2 inch iron rod found at the southwest corner of Lot 1A, Block A, Resubdivision of Lot 1, Block A, Center of Woodland Village Bastrop, a subdivision of record in Cabinet 4, Page 160-A, of the Plat Records of Bastrop County, Texas, said iron rod being the most westerly northwest corner of said 145.697 acre tract and the most westerly northwest corner of the herein described tract;

THENCE, S 80° 19' 00" E, with a northerly line of said 145.697 acre tract, and the southerly line of said Lot 1A, 525.56 feet to a 1/2 inch iron rod found at the southeast corner of said Lot 1A, for an ell corner of said 145.697 acre tract, and an ell corner of the herein described tract;

THENCE, N 09° 41' 29" E, with a westerly line of said 145.697 acre tract, and the easterly line of said Lot 1A, 492.23 feet to an iron rod with cap marked "property corner" found in the southerly right-of-way line of State Highway 71, at the northeast corner of said Lot 1A, said iron rod being the most northerly northwest corner of said 145.697 acre tract, and the most northerly northwest corner of the herein described tract;

THENCE, with the southerly right-of-way line of said State Highway 71, the following two (2) courses:

- 1) N 87° 45' 43" E, 2.05 feet to a calculated point in a large hole (a concrete TXDOT monument with brass cap found disturbed);
- 2) A curve to the right having a radius of 5058.89 feet, an arc distance of 1554.38 feet, a central angle of 17° 36' 16", and a chord which bears S 79° 29' 26" E, 1548.27 feet to an iron rod with cap marked "property corner" found at the northwest corner of a tract of land called to be 43.112 acres, described in a deed to John Alan Nixon, of record in Volume 1908, Page 825, of the Official Public Records of Bastrop County, Texas, said iron rod being the northeast corner of said 145.697 acre tract, and the northeast corner of the herein described tract;

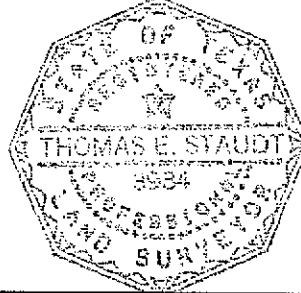
Exhibit "A"  
Page 1 of 2

THENCE, S 09° 40' 03" W, with the east line of said 145.697 acre tract, and the west line of said 43.112 acre tract, at 1090.61 feet, passing a ½ inch iron rod found, at 1168.33 feet, passing a 5/8 inch iron rod with cap set October 1, 2010, at 2821.99 feet, passing a 5/8 inch iron rod with cap set October 1, 2010, and continuing for a total distance of 2903.99 feet to a ½ inch iron rod found in the north line of a tract of land called to be 194.916 acres, described in a deed to Jo Ann Cantrell, of record in Volume 445, Page 684, of the Deed Records of Bastrop County, Texas, at the southwest corner of said 43.112 acre tract, said iron rod being the southeast corner of said 145.697 acre, and the southeast corner of the herein described tract;

THENCE, S 86° 58' 32" W, with the south line of said 145.697 acre tract, at 1406.79 feet, passing a mag nail found 0.89 feet left near the northwest corner of said 194.916 acre tract, and the northeast corner of said 5.0 acre Wyatt tract, and continuing for a total distance of 2128.20 feet to the POINT OF BEGINNING containing 145.961 acres of land within these metes and bounds.

Description accompanied by plat.

Surveyed by: *Staudt Surveying, Inc.*  
*P.O. Box 1273*  
*Dripping Springs, Texas 78620*  
*512-858-2236*



*Th E Staudt*

Thomas E. Staudt

Registered Professional Land Surveyor No. 3984

*6/22/11*

Date

## EXHIBIT "B"

DESCRIPTION

DESCRIPTION OF 11.563 ACRES OF LAND SITUATED IN THE MAZEA ROUSSEAU SURVEY NO. 56, IN BASTROP COUNTY, TEXAS, BEING A PORTION OF THAT CERTAIN TRACT OF LAND SAID TO CONTAIN 194.92 ACRES OF LAND, DESCRIBED IN DEED TO JO ANN GRIESENBECK CANTRELL OF RECORD IN VOLUME 445, PAGE 684 OF THE OFFICIAL RECORDS OF BASTROP COUNTY, TEXAS; SAID 11.563 ACRES OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

COMMENCING at a 1/2 inch iron rod with cap found in the north line of said Cantrell tract, for the southeast corner of that certain tract of land said to contain 145.697 acres of land described in deed to Bastrop Grove Partners, Ltd., of record in Volume 1698, Page 245 of the Official Records of Bastrop County, Texas, and the southwest corner of that certain tract of land said to contain 43.112 acres of land described in deed to CHP Properties, Ltd., of record in Volume 1413, Page 857 of the Official Records of Bastrop County, Texas, from which a 1/2 inch iron rod with cap (Property Corner) found for the southeast corner of said CHP Properties, Ltd., tract, bears N86°58'42"E a distance of 953.42 feet;

THENCE with the north line of said Cantrell tract and the south line of said Bastrop Grove Partners, Ltd., tract, S86°58'42"W a distance of 48.19 feet to a point for the northeast corner and POINT OF BEGINNING of the herein described tract;

THENCE over and across said Cantrell tract, the following, twenty-two (22) courses and distances:

1. S11°42'54"W a distance of 77.13 feet to a point;
2. S03°16'34"E a distance of 853.40 feet to a point;
3. S04°42'31"E a distance of 222.80 feet to a point at the beginning of a curve to the right;
4. With said curve to the right an arc distance of 261.06 feet, having a radius of 800.00 feet, a central angle of 18°41'51", and a chord which bears S04°38'23"W a distance of 259.91 feet to a point;
5. S13°59'18"W a distance of 189.30 feet to a point at the beginning of a curve to the

left;

6. With said curve to the left an arc distance of 363.58 feet, having a radius of 1350.00 feet, a central angle of  $15^{\circ}25'51''$ , and a chord which bears  $S06^{\circ}16'23''W$  a distance of 362.48 feet to a point;
7.  $S01^{\circ}26'33''E$  a distance of 197.06 feet to a point;
8.  $S00^{\circ}37'50''W$  a distance of 100.41 feet to a point;
9.  $S40^{\circ}08'24''E$  a distance of 27.70 feet to a point;
10.  $S11^{\circ}59'14''W$  a distance of 112.49 feet to a point;
11.  $S29^{\circ}36'57''W$  a distance of 147.88 feet to a point;
12.  $S03^{\circ}28'22''W$  a distance of 106.26 feet to a point;
13.  $S18^{\circ}37'19''W$  a distance of 67.03 feet to a point;
14.  $S00^{\circ}30'59''W$  a distance of 70.47 feet to a point;
15.  $S32^{\circ}30'41''E$  a distance of 106.60 feet to a point;
16.  $S05^{\circ}47'43''W$  a distance of 61.84 feet to a point;
17.  $S79^{\circ}48'16''W$  a distance of 28.72 feet to a point;
18.  $S41^{\circ}49'29''W$  a distance of 62.67 feet to a point;
19.  $S33^{\circ}08'04''W$  a distance of 62.47 feet to a point;
20.  $S15^{\circ}58'58''E$  a distance of 18.81 feet to a point;
21.  $N53^{\circ}57'26''E$  a distance of 30.57 feet to a point;
22.  $S39^{\circ}34'27''E$  a distance of 76.96 feet to a point on the north bank of the Colorado River, for the easternmost southeast corner of the herein described tract;

THENCE with the meanders of the north bank of said Colorado River, the following three (3) courses and distances:

1.  $S50^{\circ}25'33''W$  a distance of 114.99 feet to a point;
2.  $S47^{\circ}42'18''W$  a distance of 64.37 feet to a point;
3.  $S50^{\circ}50'58''W$  a distance of 46.53 feet to a point for the southeast corner of that certain tract of land said to contain 3.994 acres of land described in deed to Jack A. Griesenbeck of record in Volume 184, Page 231 of the Official Records of Bastrop County, Texas, and for the south corner of the herein described tract;

THENCE with the east line of said 3.994 acre tract,  $N32^{\circ}38'15''W$  a distance of 314.02 feet to a point, from which a 1/2 inch iron rod found for an interior ell corner of said 3.994 acre tract and an exterior ell corner of that certain tract of land said to contain 10.090 acres of land described in deed to Jack A. Griesenbeck of record in Volume 184, Page 231 of the Official Records of Bastrop County, Texas, bears  $N32^{\circ}38'15''W$  a distance of 28.13 feet to

a calculated point for the northeast corner of said 3.994 acre tract, S85°09'07"W a distance of 205.83 feet to a calculated point for the northernmost northwest corner of said 3.994 acre tract and the northeast corner of said 10.090 acre tract, and S17°30'59"W a distance of 166.37 feet;

THENCE over and across said Cantrell tract, the following, twenty-four (24) courses and distances:

1. N58°46'12"E a distance of 39.85 feet to a point;
2. N63°48'18"E a distance of 64.50 feet to a point;
3. N14°02'29"W a distance of 9.70 feet to a point;
4. N73°33'52"W a distance of 34.96 feet to a point;
5. N26°00'20"W a distance of 129.24 feet to a point;
6. N56°14'37"W a distance of 67.28 feet to a point;
7. N15°37'06"E a distance of 19.22 feet to a point;
8. N68°07'33"E a distance of 87.95 feet to a point;
9. N28°58'56"E a distance of 152.26 feet to a point;
10. N06°19'30"E a distance of 107.74 feet to a point;
11. N19°18'13"E a distance of 42.37 feet to a point;
12. N02°58'19"W a distance of 46.42 feet to a point;
13. N67°25'44"E a distance of 102.32 feet to a point;
14. N43°57'41"E a distance of 133.93 feet to a point;
15. N19°43'55"W a distance of 85.62 feet to a point;
16. N17°20'35"E a distance of 64.34 feet to a point;
17. N00°45'36"W a distance of 150.96 feet to a point;
18. N02°02'28"E a distance of 103.11 feet to a point;
19. N05°05'47"E a distance of 150.36 feet to a point;
20. N12°57'30"E a distance of 202.21 feet to a point at the beginning of a curve to the left;
21. With said curve to the left an arc distance of 350.12 feet, having a radius of 1500.00 feet, a central angle of 13°22'25", and a chord which bears N06°16'17"E a distance of 349.33 feet to a point;
22. N00°24'56"W a distance of 187.14 feet to a point;
23. N03°16'34"W a distance of 853.40 feet to a point;
24. N14°32'22"W a distance of 76.60 feet to a point in the north line of said Cantrell tract and the south line of said Bastrop Grove Partners, Ltd., tract, for the northwest corner of the herein described tract, from which a PK nail found in concrete in the

east right-of-way line of F.M. No. 304 (R.O.W. varies) for the southwest corner of said Bastrop Grove Partners, Ltd., tract, and the northwest corner of that certain tract of land said to contain 5.00 acres of land described in deed to Clodie S. Wyatt of record in Volume 165, Page 772 of the Official Records of Bastrop County, Texas, bears  $S86^{\circ}58'42''W$  a distance of 1940.04 feet;

THENCE with the north line of said Cantrell tract and the south line of said Bastrop Grove Partners, Ltd., tract,  $N86^{\circ}58'42''E$  a distance of 139.91 feet to the POINT OF BEGINNING, containing 11.563 acres of land more or less within these metes and bounds.

Reference is herein made to the sketch accompanying this metes and bounds description.

Bearing basis: Grid North, Texas State Plane Coordinate System NAD83 (CORS) Central Zone.

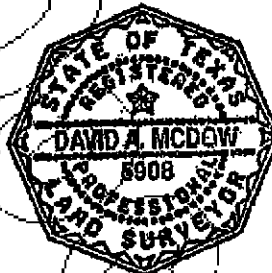
I hereby certify that this description was prepared from a survey made on the ground under my supervision.

CUNNINGHAM-ALLEN, INC.

*David A. McDow*

David A. McDow  
Registered Professional Land Surveyor No. 5908  
State of Texas

Date: *05/18/07*



# SKETCH TO ACCOMPANY DESCRIPTION

## DRAINAGE EASEMENT SHEET 1 OF 3

CHP PROPERTIES, LTD.  
(43.112 ACRES)  
VOL. 1413, PG. 857  
O.R.B.C.

BASTROP GROVE PARTNERS, LTD.  
(145.697 ACRES)  
VOL. 1698, PG. 245  
O.R.B.C.

NANCY BLAKEY SURVEY NO. 98  
P.O.C.

F.M. NO. 304  
(R.O.W. VARIES)

CLODIE S. WYATT  
(5.00 ACRES)  
VOL. 185, PG. 772  
O.R.B.C.

N86°58'42"E 953.42'  
APPROXIMATE SURVEY LINE  
WITH/CAP  
(PROPERTY CORNER)

JO ANN GRIESENBECK CANTRELL  
(194.92 ACRES)  
VOL. 445, PG. 684  
O.R.B.C.

MAZEA ROUSSEAU SURVEY NO. 56

SCALE 1" = 200'

DRAINAGE EASEMENT  
11.583 ACRES

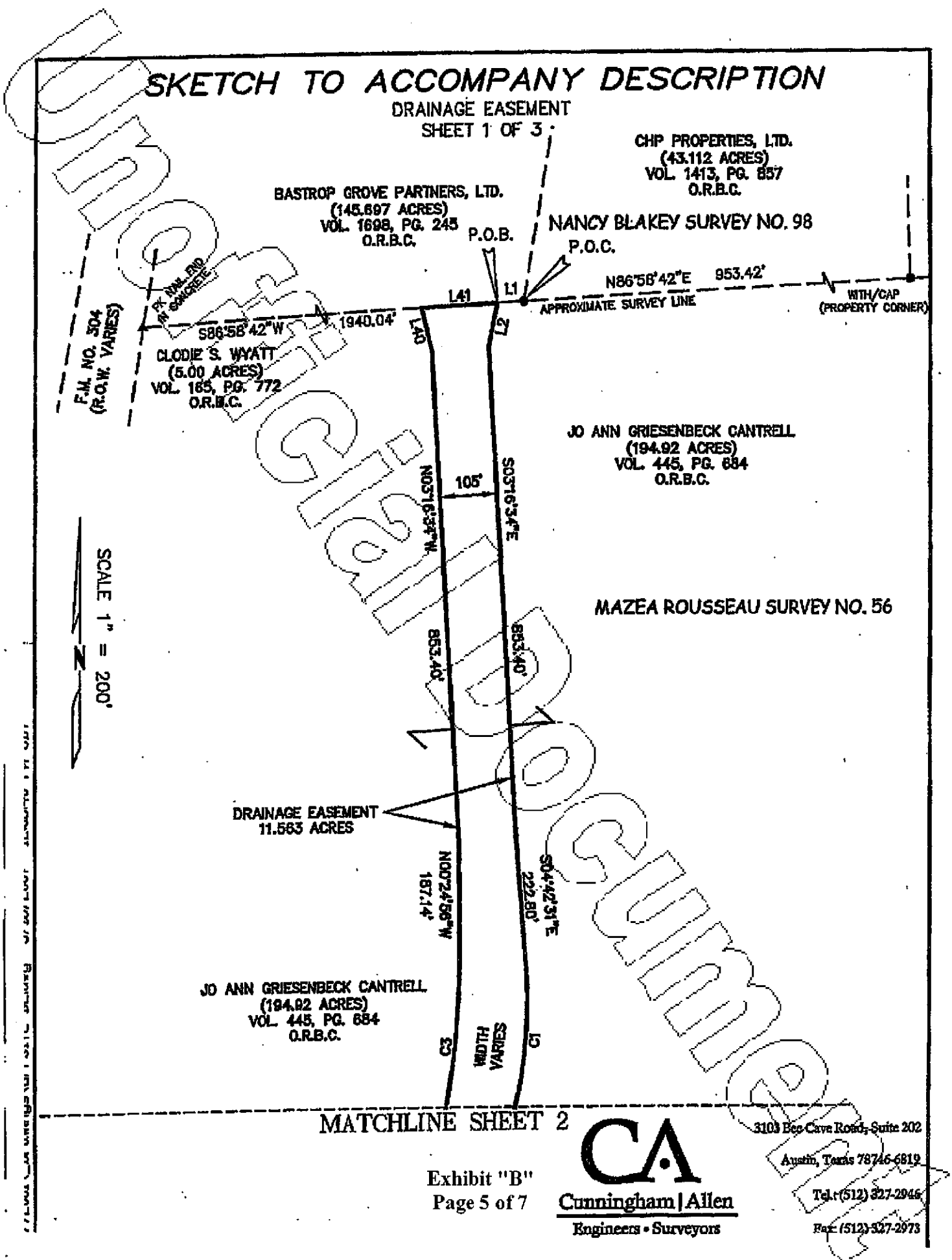
JO ANN GRIESENBECK CANTRELL  
(194.92 ACRES)  
VOL. 445, PG. 684  
O.R.B.C.

MATCHLINE SHEET 2

Exhibit "B"  
Page 5 of 7

**CA**  
**Cunningham | Allen**  
Engineers • Surveyors

3103 Eco-Cave Road, Suite 202  
Austin, Texas 78746-6819  
Tel: (512) 327-2946  
Fax: (512) 327-2973



# SKETCH TO ACCOMPANY DESCRIPTION

DRAINAGE EASEMENT  
SHEET 2 OF 3

MATCHLINE SHEET 2

SCALE 1" = 200'

JO ANN GRIESENBECK CANTRELL  
(194.92 ACRES)  
VOL. 445, PG. 684  
O.R.B.C.

MAZEA ROUSSEAU SURVEY NO. 56

DRAINAGE EASEMENT  
11.563 ACRES

JO ANN GRIESENBECK CANTRELL  
(194.92 ACRES)  
VOL. 445, PG. 684  
O.R.B.C.

JACK A. GRIESENBECK  
(10.090 ACRES)  
VOL. 184, PG. 231  
O.R.B.C.

JACK A. GRIESENBECK  
(3.994 ACRES)  
VOL. 184, PG. 231  
O.R.B.C.

EDGE OF WATER  
COLORADO RIVER

**CA**  
Cunningham | Allen  
Engineers • Surveyors

3103 Bee Cave Road, Suite 202

Austin, Texas 78746-6819

Tel.: (512) 327-2946

Fax: (512) 327-2973



# SKETCH TO ACCOMPANY DESCRIPTION

DRAINAGE EASEMENT  
SHEET 3 OF 3

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S88°58'42"W	48.19'
L2	S11°42'54"W	77.13'
L3	S00°37'50"W	100.41'
L4	S40°08'24"E	27.70'
L5	S1°59'14"W	112.49'
L6	S29°36'57"W	147.88'
L7	S03°28'22"W	108.28'
L8	S16°57'19"W	67.03'
L9	S00°30'59"W	70.47'
L10	S32°30'41"E	106.80'
L11	S05°47'43"W	61.84'
L12	S79°48'16"W	26.72'
L13	S41°49'29"W	82.67'
L14	S33°08'04"W	62.47'
L15	S15°58'58"E	18.81'
L16	N53°57'26"E	30.87'
L17	S39°34'27"E	76.96'
L18	S50°25'33"W	114.99'
L19	S47°42'18"W	64.37'
L20	S50°50'56"W	46.53'
L21	N58°46'12"E	39.85'
L22	N63°48'18"E	64.50'
L23	N14°02'29"W	9.70'
L24	N73°33'52"W	34.96'
L25	N26°00'20"W	129.24'
L26	N56°14'37"W	67.28'
L27	N15°37'06"E	19.22'
L28	N88°07'33"E	87.95'
L29	N28°58'56"E	152.26'
L30	N06°19'30"E	107.74'
L31	N19°18'13"E	42.37'
L32	N02°58'19"W	46.42'
L33	N87°25'44"E	102.32'
L34	N43°57'41"E	133.93'
L35	N19°43'55"W	85.62'
L36	N17°20'35"E	64.34'
L37	N00°45'36"W	150.96'
L38	N02°02'28"E	103.11'
L39	N05°05'47"E	150.36'
L40	N14°32'22"W	76.60'
L41	N86°58'42"E	139.91'
L42	N32°38'15"W	28.13'

BEARING BASIS: GRID NORTH, TEXAS STATE PLANE COORDINATE SYSTEM NAD83 (CORS) CENTRAL ZONE.

REFERENCE IS HEREIN MADE TO THE METES AND BOUND DESCRIPTION TO ACCOMPANY THIS SKETCH.

CURVE TABLE					
CURVE	RADIUS	LENGTH	DELTA	CHORD BRG.	CHORD
C1	800.00'	261.06'	18°41'51"	S04°38'23"W	259.91
C2	1350.00'	363.56'	15°25'51"	S06°16'23"W	362.48
C3	1500.00'	350.12'	13°22'25"	N06°16'17"E	348.33

**LEGEND**

- 1/2" IRON ROD FOUND (UNLESS STATED)
- ▲ PK NAIL FOUND IN CONCRETE
- O.R.B.C. OFFICIAL RECORDS OF BASTROP COUNTY
- P.O.B. POINT OF BEGINNING
- P.O.C. POINT OF COMMENCEMENT

SURVEYED BY:

*David A. McDow*  
 DAVID A. MCDOW  
 REG. PROF. LAND SURVEYOR  
 NO. 5908  
 DATE: 05/18/07



3103 Bee Cave Road, Suite 202

Austin, Texas 78746-6819

Tel.: (512) 327-2946

Fax: (512) 327-2973

Exhibit "B"

Page 7 of 7

**Cunningham | Allen**

Engineers • Surveyors

10/11/07 11:00 AM 10/11/07 11:00 AM 10/11/07 11:00 AM 10/11/07 11:00 AM 10/11/07 11:00 AM

**EXHIBIT "C"****Exceptions, Easements, Restrictive Covenants, Conditions and Encumbrances**Applicable to the Land Described in Exhibit "A":

1. Electric transmission line easement granted to the Lower Colorado River Authority by instrument dated September 19, 1941, recorded in Volume C, Page 417 of the Minutes of County Court of Bastrop County, Texas;
2. Electric transmission and/or distribution lines and systems easement granted to Lower Colorado River Authority by instrument dated September 13, 1961, recorded in Volume 155, Page 209 of the Deed Records of Bastrop County, Texas.
3. Wastewater easement granted to the City of Bastrop by instrument dated July 17, 1993, recorded in Volume 684, Page 718 of the Official Records of Bastrop County, Texas. The aforesaid Water and Wastewater Easement is recorded at Volume 684, Pages 744-750 of the Official Public Records of Bastrop County, Texas as Exhibit "D" of that one certain Agreement between the City of Bastrop and Hal Berdoll and Lisa Berdoll recorded at Volume 684, Pages 737-752 of the Official Records of Bastrop County, Texas, as Exhibit "F" of that one certain Petition Requesting Annexation recorded at Volume 684, Pages 718-752 of the Official Records of Bastrop County, Texas;
4. An undivided 1/16<sup>th</sup> non-participating royalty interest in all oil, gas and other minerals reserved by The Federal Land Bank of Houston in instrument recorded in Volume 102, Page 162 of the Deed Records of Bastrop County, Texas;
5. One-half (1/2) interest (without executive rights) in all water, oil, gas, sand, gravel, coal, lignite and any other minerals reserved by Hal Berdoll and wife, Lisa Berdoll, in instrument recorded in Volume 842, Page 103 of the Official Records of Bastrop County, Texas;
6. Release and Relinquishment of Access Rights to Highway Facility dated January 13, 2005, executed by Brundage Bastrop, Ltd. to State of Texas, recorded in Volume 1544, Page 774 of the Official Records of Bastrop County, Texas;
7. Electric distribution line or system telecommunications systems and equipment or other services and systems easement granted to Bluebonnet Electric Cooperative, Inc., recorded in Volume 1790, Page 606 of the Official Records of Bastrop County, Texas;
8. Terms, Conditions and Stipulations of the Drainage Easement Agreement dated March 13, 2008 by and between Jo Ann Griesenbeck Cantrell and William Cantrell as Grantors, and

Bastrop Grove Partners, Ltd., as Grantee, recorded in Volume 1819, Page 840 of the Official Records of Bastrop County, Texas;

9. Terms, Conditions and Stipulations of the Temporary Construction Easement and Permanent Public Utility Easement dated December 8, 2009, by and between Tom Brundage, Bastrop Grove Partners, Ltd., as Grantors, and the City of Bastrop as Grantee, recorded in Volume 1961, Page 649 of the Official Records of Bastrop County, Texas;
10. 16 foot electric distribution line or system telecommunications systems and equipment or other services and systems easement granted to Bluebonnet Electric Cooperative, Inc., recorded in Volume 1790, Page 612 of the Official Records of Bastrop County, Texas;

Applicable to the Cantrell Easement Tract Described in Exhibit "B":

11. Terms, Conditions and Stipulations of the Drainage Easement Agreement dated March 13, 2008 by and between Jo Ann Griesenbeck Cantrell and William Cantrell as Grantors, and Bastrop Grove Partners, Ltd., as Grantee, recorded in Volume 1819, Page 840 of the Official Records of Bastrop County, Texas;
12. Underground electric facilities and overhead electric facilities easement traversing north property line(s), by and between Jo Ann Cantrell as Grantor, and Bluebonnet Electric Cooperative, Inc., as Grantee, recorded in Volume 1790, Page 632 of the Official Records of Bastrop County, Texas;
13. All interest in oil, gas and other minerals reserved by J.P. Fitzwilliams in instrument recorded in Volume 121, Page 433 of the Deed Records of Bastrop County, Texas.

11-GF# 201101334 BKH  
RETURN TO: HERITAGE TITLE  
401 CONGRESS, SUITE 1500  
AUSTIN, TEXAS 78701



# Owner's Agent Authorization

### Property Owner's Information

Owner's Name(s): MC BASTROP 71, LP  
 Property Address(s): PARCEL #R78736  
 Owner's Email Address: DM@MORANCAP.COM  
 Owner's Phone Number: (      ) (214) 622-6525

The individuals listed below are hereby authorized to apply for, sign for, and conduct business for permits, plan, and/or other legal documents with the City of Bastrop Planning and Development Department on behalf of the above identified property owner(s).

The City of Bastrop Planning and Development Department may retain a copy of this form for our records and maintain a file as a courtesy. The form with the most recent date shall supersede all previous authorizations on file and **remain in effect for one (1) year, or until a new form is filed by the property owners, whichever is shorter.**

All signatories understand that it is the property owner's responsibility to provide a copy of this form every time they would like to add or remove authorized agents, and that this form expires one (1) year after it is signed. The property owner's signature designates the agent as the official contact person for projects and the single point of contact. All correspondence and communication will be conducted with the agent.

### Print full name(s) and title(s) of authorized agent(s):

1. ANY EMPLOYEE OF
2. CARLSON, BRIGANCE & DOERING, INC.

x [Signature]  
 Signature(s) of Property Owner(s)

x 1-7-19  
 Date

Signature(s) of Property Owner(s)  
[Signature]  
 Signature(s) of Agent(s)

Date  
1/3/19  
 Date

Signature(s) of Agent(s)

Date



# Exception Application

## 5. Authorization from Property Owner

I, Douglas MacMahon, swear and affirm that I am the owner of property at Parcel #R78736, as shown in the records of Bastrop County, Texas, which is the subject of this application.

I, Douglas MacMahon, the owner of the property subject to this Grandfathered Project Exception Application, authorize to submit the application and serve as my representative for this request.

[Signature]  
Property owner's signature

X 1-7-19  
Date

## 6. Sworn statement:

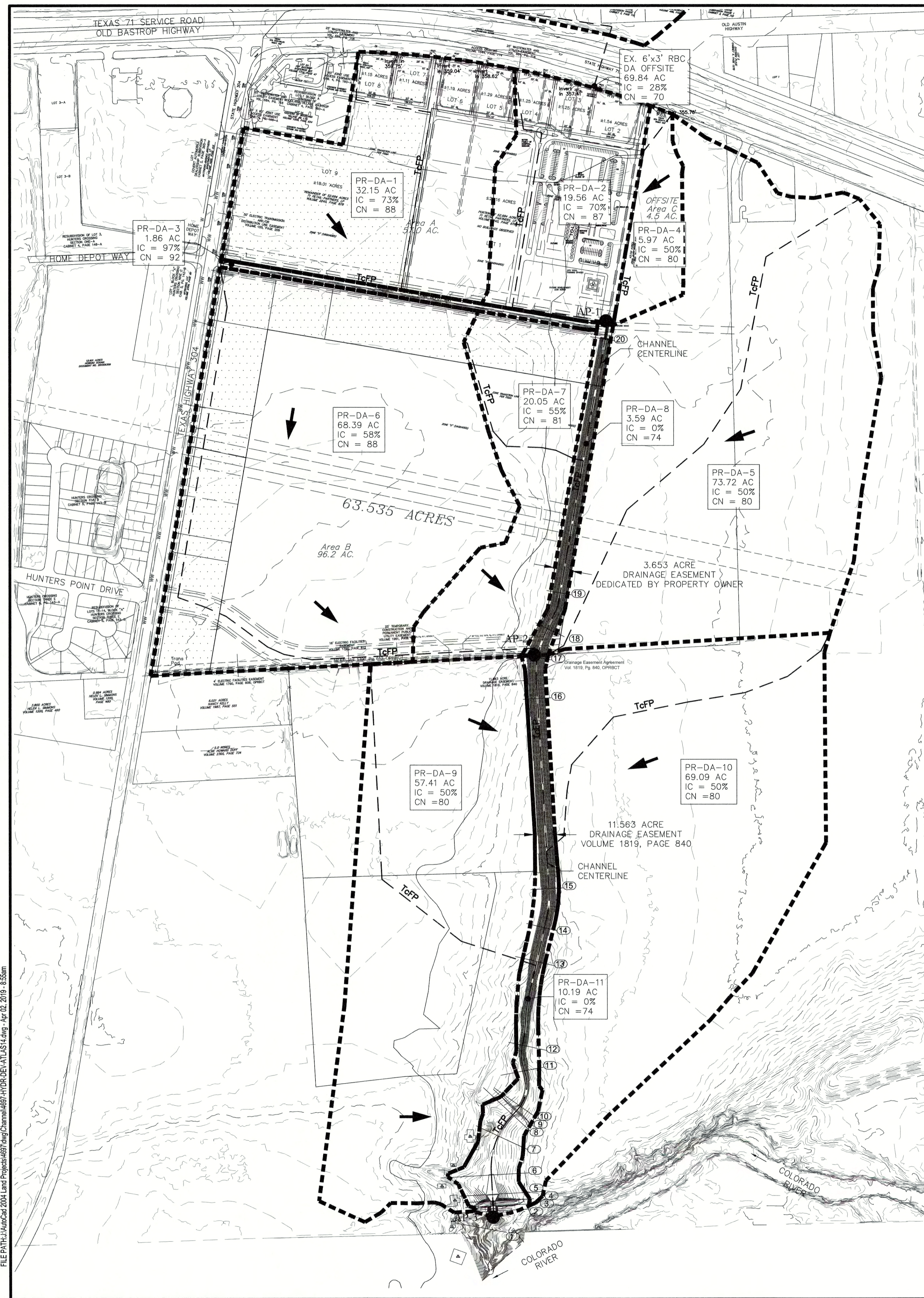
I, the undersigned, hereby certify that all information contained herein and the attached documents are true and correct and that it is my belief that the property owner is entitled to the requested rights for this Project and, during the pending time of this determination, I understand my continuing obligation to notify the Development Services Director in writing of the inaccuracy of any statement or representation which was incorrect when made or which becomes incorrect by virtue of changed circumstances.

Christine M. Methvin [Signature] 1/3/19  
Applicant's Name Applicant's signature Date

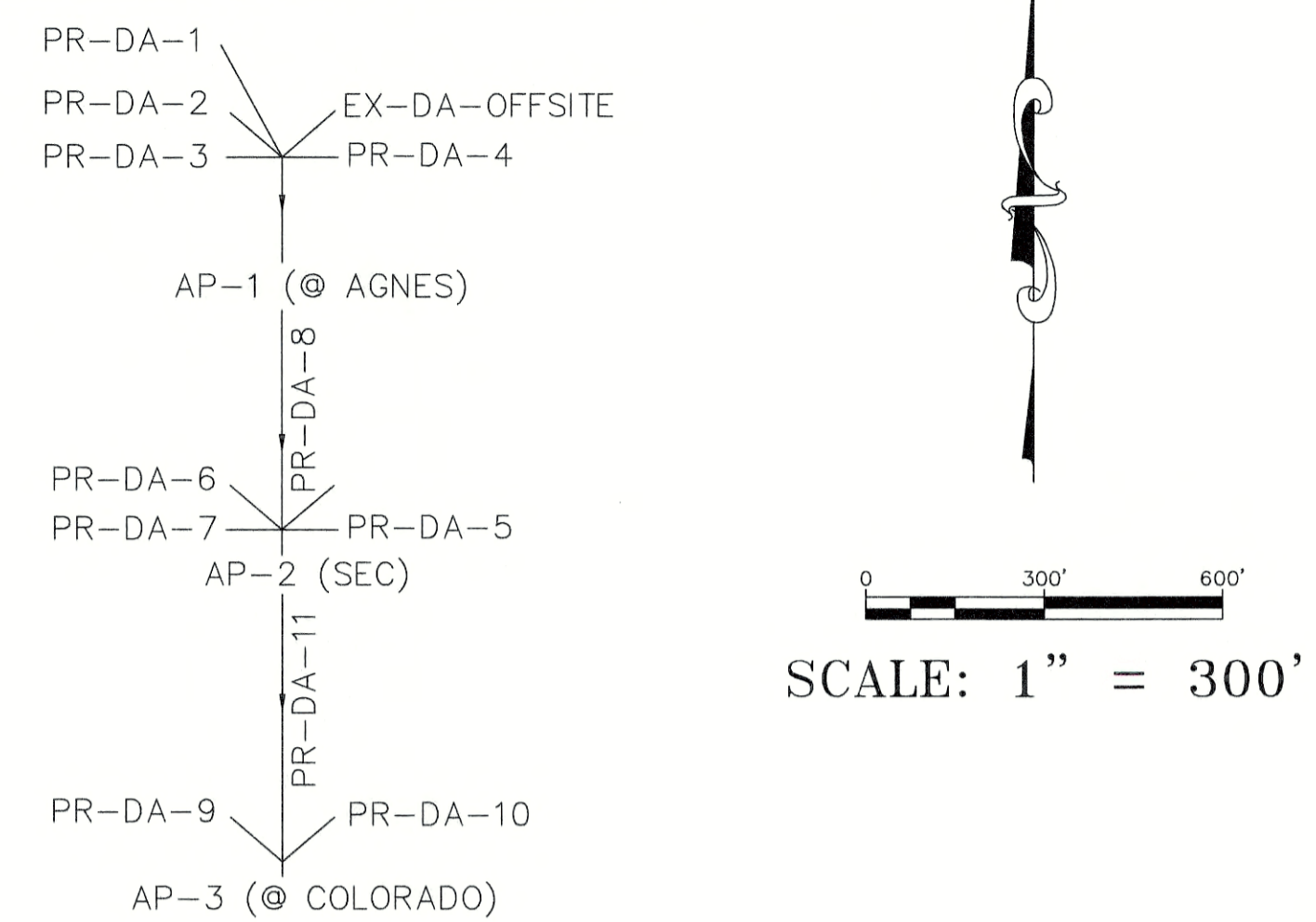
Sworn to and subscribed before me by SUSAN O. MARTIN on this 3rd day of January in the year 2019, to certify which witness my hand and seal of office.

[Signature]  
Notary Public, State of Texas





**HYDROLOGY FLOW CHART**



**LEGEND**

- DRAINAGE EASEMENT BOUNDARY
- ==== DRAINAGE BOUNDARY LINE
- A1 DRAINAGE AREA LABEL
- ANALYSIS POINT (AP)
- - - 940 - - - EXISTING CONTOUR MAJOR
- - - EXISTING CONTOUR MINOR
- ➔ FLOW ARROW
- - - TcFP - - - TIME OF CONCENTRATION FLOW PATH
- ▨ COMMERCIAL LOTS AT 75% IMPERVIOUS COVER

**TIME OF CONCENTRATION CALCULATIONS - SCS METHOD**

Drainage Area	Sheet Flow				Shallow Concentrated Flow				Channel Flow				Time of Concentration		Lag Time
	n	L	Slope	Tc (min)	Paved/Unpaved	L	Slope	V (fps)	Tc (min)	n	L	Slope	V (fps)	Tc (min)	
PR-DA-1	0.011	100	0.50%	1.85	P	200	0.50%	1.437	2.32	0.013	1.750	0.50%	6.0	4.93	23.83

**RESULTS TABLE - PROPOSED CONDITIONS**

HYDROLOGIC ELEMENT	AREA (AC.)	%IC	CN	Tc (min)	Q10 (CFS)	Q25 (CFS)	Q100 (CFS)
DA-OFFSITE	69.84	28	71	39.71	149.39	221.84	362.99
PR-DA-1	32.15	73	92	9.18	178.20	234.33	339.79

**MAXIMUM POTENTIAL OUTFALL CONDITIONS FOR 100-YR AND 25-YR STORM EVENTS**

FLOWLINE STATION	RIVER STATION	PROFILE	MAX POTENTIAL TW WITH COINCIDING PEAKS				ANTICIPATED TW WITH NON-COINCIDING PEAKS				TW WITH GRAVITY OUTFALL					
			WSE (ft)	df (ft)	V (fps)	Sf	WSE (ft)	df (ft)	V (fps)	Sf	WSE (ft)	df (ft)	V (fps)	Sf		
50+49.7	19	25-YR	538.92	0.026	356.74	3.74	3.6	0.000856	356.74	3.74	3.6	0.000856	356.74	3.74	3.6	0.000856

**NOTES:**

- SCS METHODOLOGY WAS USED FOR DRAINAGE ANALYSIS
- 24-HOUR RAINFALL DEPTH DATA FOR DESIGN STORMS WERE SELECTED FROM THE NOAA ATLAS 14 PRECIPITATION FREQUENCY DATA SERVER FOR BASTROP, TX
- 2-YR = 4.17 IN
- 5-YR = 5.52 IN
- 10-YR = 6.81 IN
- 25-YR = 8.81 IN
- 100-YR = 12.6 IN
- EXISTING CURVE NUMBERS REFLECT HYDROLOGIC SOIL GROUP DATA FOR TYPE A & B SOILS AS PER THE USDA WEB SOIL SURVEY
- DEVELOPED ONS REFLECT HSGs FOR TYPE B & C SOILS, ASSUMING FILL CONDITIONS RESEMBLE HSG C SOILS
- TOC CALCULATIONS ASSUME FUTURE DEVELOPMENT & USE TR-55 METHODOLOGY
- MANNING'S N VALUES FROM TR-55:
- PIPE/CHANNEL FLOW
- PIPES - REINFORCED CONCRETE = 0.013
- NATURAL CHANNELS - EARTH, STRAIGHT, SOME GRASS = 0.026
- OVERLAND FLOW
- SMOOTH SURFACE (CONCRETE, ASPHALT, BARE SOIL) = 0.011
- SHORT GRASS = 0.15
- OFFSITE IMPERVIOUS COVERS ARE APPROXIMATE BASED ON AERIAL IMAGERY
- ONSITE IMPERVIOUS COVERS REFLECT ASSUMED FUTURE DEVELOPMENT AS FOLLOWS:
  - SINGLE-USE RESIDENTIAL = 50%
  - COMMERCIAL = 70-75%
  - ROW = 97%

**TAILWATER ASSUMING GRAVITY OUTFALL:**

- CALCULATIONS UTILIZE A TAILWATER OF 0' FOR BOTH THE 100-YR AND 25-YR STORM EVENTS.
- GRAVITY OUTFALL CALCULATIONS DEPICT MAXIMUM VELOCITIES WHICH ARE USED FOR DESIGN OF OUTFALL PROTECTION.
- FLOW CHARACTERISTICS ARE THE SAME AS THOSE WITH THE ANTICIPATED TAILWATER ASSUMING NON-COINCIDING PEAKS AT EVERY STATION EXCEPT STATION 1.

**ANTICIPATED TAILWATER ASSUMING NON-COINCIDING PEAKS:**

- CALCULATIONS UTILIZE TAILWATERS OF 338.59' AND 331.96' FOR THE 100-YR AND 25-YR STORM EVENTS, RESPECTIVELY.
- SINCE THE COLORADO RIVER AND PROPOSED CHANNEL PEAKS ARE NON-COINCIDING, AN ESTIMATED REDUCTION OF 10.41' IS EXPECTED TO BE REALIZED IN ACTUAL WSE AT 12:06 HOURS. THE 100-YR WSE IS ESTIMATED AT 338.59'. THIS REDUCED WSE IS BASED ON GRAPHICAL INTERPOLATIONS OF THE MEMORANDUM'S COLORADO RIVER 1% ANNUAL CHANCE HYDROGRAPH AND HYDRAULIC RATING CURVE.
- THE ACTUAL 25-YR WSE OF THE COLORADO RIVER REALIZED AT 12:06 HOURS AT THE PROPOSED CHANNEL'S OUTFALL IS ESTIMATED AT 331.96'. THIS REDUCED WSE WAS CALCULATED USING A PROPORTIONAL REDUCTION EQUIVALENT TO THE CHANGE IN 100-YR WSE'S REALIZED AT A TIME TO PEAK OF 31:45 HOURS AS COMPARED TO 12:06 HOURS.

**MAXIMUM POTENTIAL TAILWATER ASSUMING COINCIDING PEAKS:**

- CALCULATIONS UTILIZE TAILWATERS OF 349.00' AND 342.17' FOR THE 100-YR AND 25-YR STORM EVENTS, RESPECTIVELY.
- ACCORDING TO FEMA MAP 48021C0355E, THE EXISTING 100-YR BFE AT THE SITE IS 349' MSL.
- THE COLORADO RIVER'S PEAK 25-YR WSE AT THE SITE IS ESTIMATED AT 342.17'. THIS WSE WAS EXTRAPOLATED FROM A LOGARITHMIC TREND OF BFE'S FOR VARIOUS ANNUAL CHANCE FLOODS USING DATA FROM THE FEMA FLOOD INSURANCE STUDY 48021C0008 AT STATION 'AW'.
- ACCORDING TO THE MEMORANDUM, TIME TO PEAK OF THE COLORADO RIVER IS APPROXIMATED AT 31:45 HOURS FOR THE 100-YR EVENT, WHEREAS THE PROPOSED CHANNEL'S TIME TO PEAK IS MODELED AT APPROXIMATELY 12:06 HOURS. THESE PEAKS ARE NON-COINCIDING AND THEREFORE THESE WSE'S OVERESTIMATE EXPECTED FLOODING FOR THE 100-YR AND 25-YR EVENTS.
- MAXIMUM POTENTIAL WSE USED TO DESIGN EXTENTS OF EROSION CONTROL MEASURES.

**GIVEN MAXIMUM TAILWATERS, THE PROPOSED DRAINAGE CHANNEL PROVIDES AT LEAST ONE FOOT OF FREEBOARD AT DESIGN FLOWS AND THE PROPOSED CULVERT HAS CAPACITY TO CONVEY 100-YR STORM RUNOFF WITHOUT EXCEEDING THE MINIMUM ROAD SURFACE ELEVATION OF AGNES ROAD AT 359.50', AS PER DESIGN REQUIREMENTS BY BASTROP COUNTY'S CODE OF ORDINANCES (101.40 & 10.5.90).**

**FLOW RATE, TIME TO PEAK, AND WATER SURFACE DATA FOR THE COLORADO RIVER ARE BASED ON FEMA MAP 48021C0355E AND THE DRAINAGE TECHNICAL MEMORANDUM FOR THE PECAN PARK DEVELOPMENT DATED FEBRUARY 22, 2010, BY ESPEY CONSULTANTS, INC., WHICH UTILIZED THE USGS GAGE 08159200 LOCATED AT STATE HIGHWAY 71 APPROXIMATELY 2 MILES UPSTREAM OF THE PROPOSED CHANNEL'S OUTFALL. JUSTIFICATION FOR TAILWATER ASSUMPTIONS ARE PROVIDED BELOW:**

FILE PATH: \\uau\cadd\2004 Land Projects\48071\48071.dwg Channel\48071-HYDR DEV\ATLAS.dwg - Apr 02, 2019 - 8:55am

**STATE OF TEXAS**  
BRENDAN P. MCENTEE  
LICENSED PROFESSIONAL ENGINEER  
96200  
Carlson, Brigrance & Doering, Inc.  
17391  
Redem  
04-02-2019

DESIGNED BY: BM  
DRAWN BY: IW

DATE: [ ] [ ] [ ]  
REVISION: [ ] [ ] [ ]

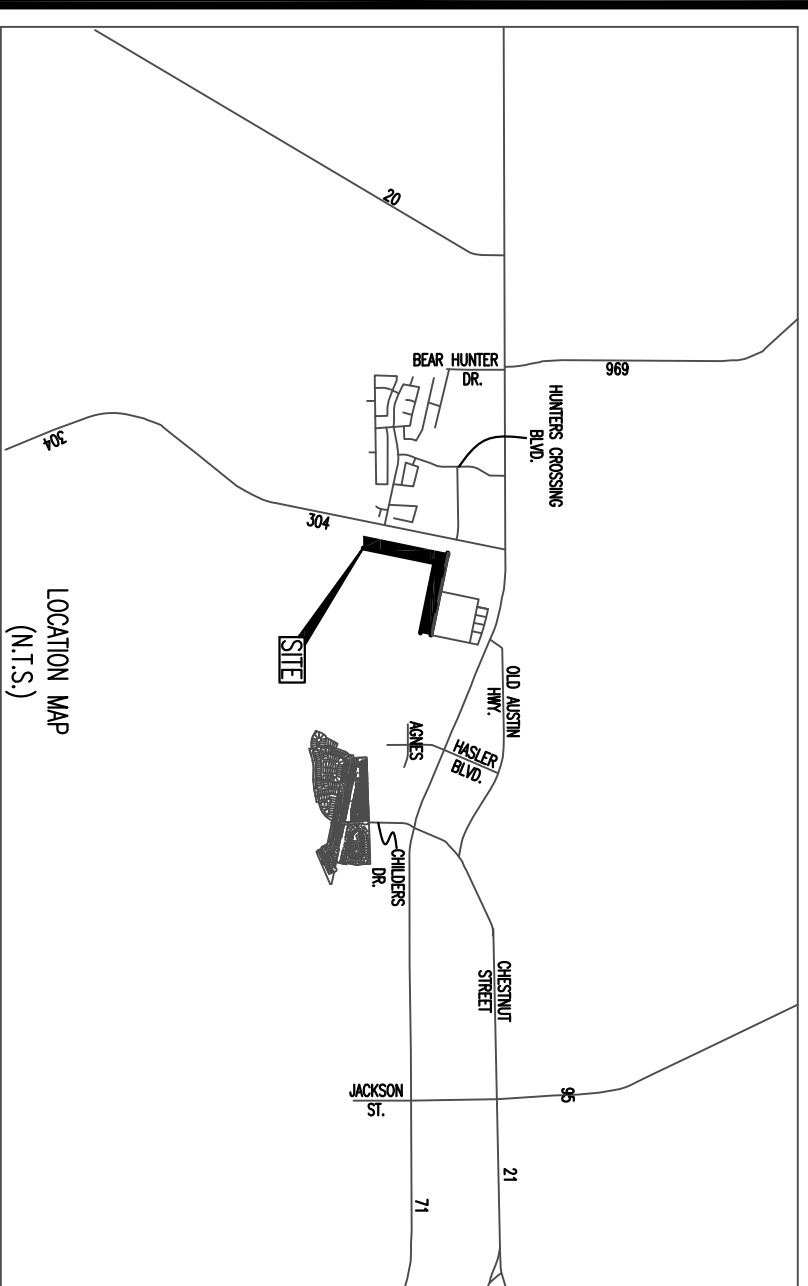
Carlson, Brigrance & Doering, Inc.  
Firm ID #13791  
Civil Engineering  
5501 West Willow Canyon Dr. • Austin, Texas 78749  
Phone No. (512) 280-5168 • Fax No. (512) 280-5165

**DEVELOPED HYDROLOGY REVISION MAP**  
BASTROP GROVE  
DRAINAGE IMPROVEMENTS

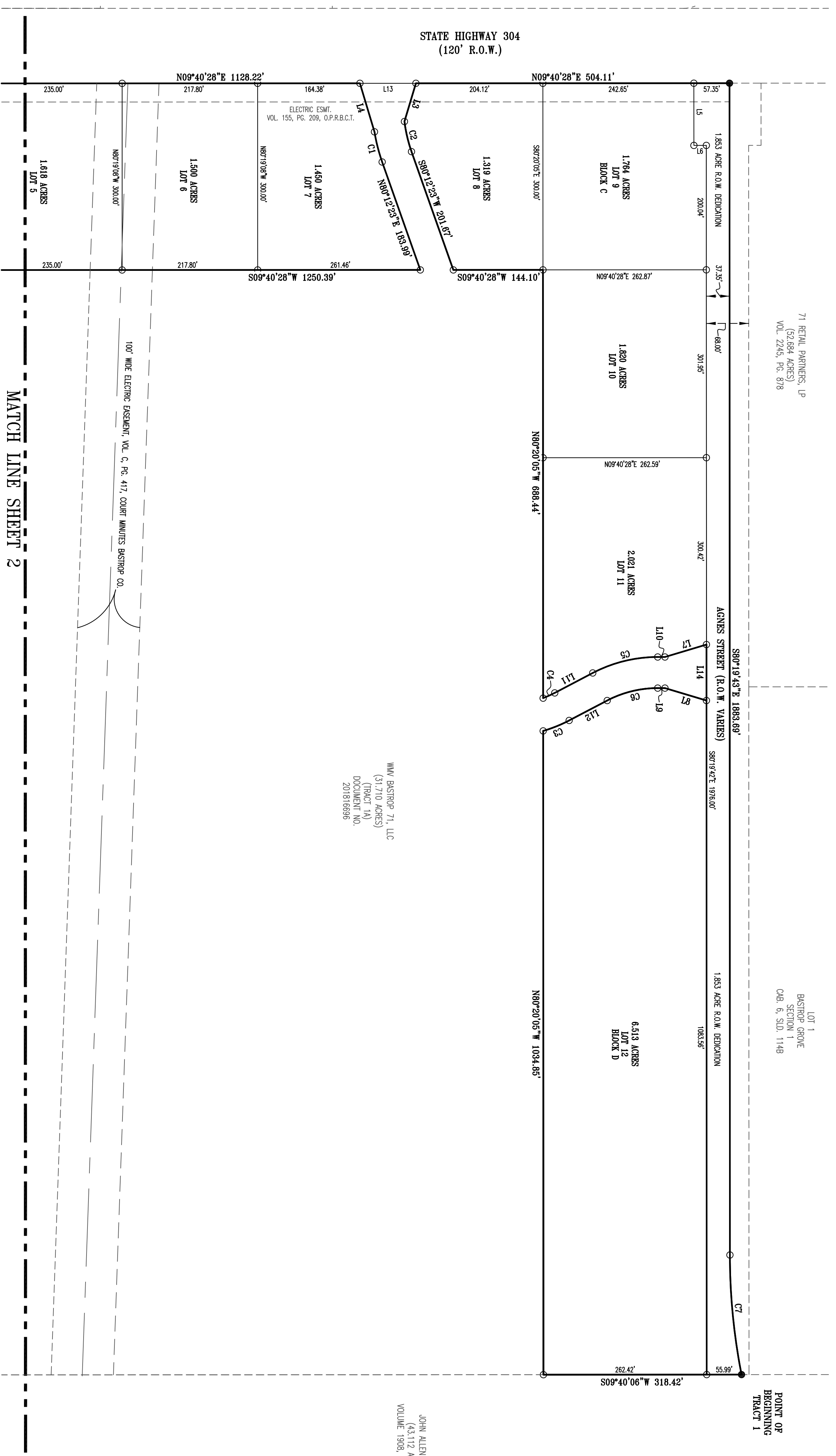
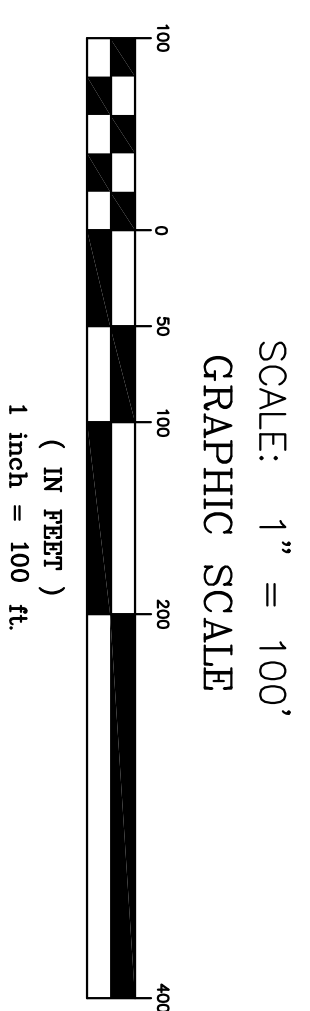
SHEET NAME:  
JOB NAME:  
PROJECT:

DATE: **FEBRUARY 2019**  
JOB NUMBER: 4697  
SHEET OF 14  
SHEET NO.

# PRELIMINARY PLAT BASTROP GROVE, SECTION 2



- LEGEND**
- 1/2" IRON ROD FOUND
  - 1/2" CHIPPED IRON ROD SET
  - ▲ MAG NAIL FOUND



71 RETAIL PARTNERS, LP  
(52,684 ACRES)  
VOL. 2745, PG. 878

LOT 1  
BASTROP GROVE  
SECTION 1  
O&B 6, SLD. 1148

M/W/ BASTROP 71, LLC  
(31,310 ACRES)  
TRACT 1A  
DOCUMENT NO.  
201816686

JOHN ALLEN HOOK  
(43,112 ACRES)  
VOLUME 1906, PAGE 825

Curve Table

Curve #	Length	Radius	Chord Direction	Chord Length	Tangent	DELTA
C1	50.15	275.00	N82°52'49"E	50.08	26.14	107°26'52"
C2	49.78	226.00	S86°32'41"W	49.88	24.99	127°40'36"
C3	45.11	226.00	N127°29'21"W	45.04	22.63	117°29'17"
C4	20.42	175.00	S147°30'21"E	20.41	10.22	84°11'07"
C5	108.55	226.00	S04°08'23"E	107.50	55.35	27°28'31"
C6	84.43	175.00	N04°08'23"W	83.61	43.05	27°28'30"
C7	193.84	1000.00	S85°51'51"E	193.16	97.03	117°03'04"

Line Table

Line #	Length	Direction
L1	89.82	N82°50'07"E
L2	67.53	S83°10'11"W
L3	64.18	N63°38'06"W
L4	81.42	N82°57'59"E
L5	99.95	S07°19'42"E
L6	20.00	S09°40'18"W
L7	88.64	S07°01'08"E
L8	88.68	N62°22'49"E
L9	11.70	N06°40'53"E
L10	11.70	S09°40'53"W
L11	68.01	S17°57'29"E
L12	68.01	N17°57'29"W
L13	90.02	N09°40'28"E
L14	90.03	N09°19'42"W
L15	105.16	N09°40'28"E

TOTAL ACREAGE: 25,882 ACRES  
SURVEY: NANCY BLANKS SURVEY, ABSTRACT NO. 98  
COMMERCIAL LOTS  
R.O.W. DEDICATION  
NO. OF BLOCKS  
NO. OF LOTS

DATE: JANUARY 22, 2019  
OWNER:  
MC BASTROP 71, LP  
2828 ROUTE STREET, SUITE 500  
DALLAS, TEXAS 75201

ENGINEER & SURVEYOR:  
CARLSON, BRIGANCE & DOERING, INC.  
5501 WEST WILLIAM CANNON  
AUSTIN, TX 78749  
(512) 280-5148  
(512) 280-5103 fax

FEMA MAP NO. 48021 C 0355E  
BASTROP COUNTY, TEXAS DATED: JANUARY 19, 2006

**Carlson, Brigrance & Doering, Inc.**  
FIRM ID #17391 REG. # 1002990  
Geomatics Engineering  
5501 West William Cannon  
Austin, Texas 78749  
Phone No. (512) 280-5100 Fax No. (512) 280-5105

PATH-J-AC2004LP\4697\SURVEY\PRELIMINARY PLAT - BASTROP GROVE.DWG











# Grandfathering Review Committee

Date of Decision – May 4, 2021

**Applicant:** Carlson, Brigance, and Doering, Inc.  
71 Retail Partners LP

**Project:** #21-000090 – Bastrop Grove Section 2 Grandfathering Request

**Members:** Director of Planning & Development  
City Engineer  
Director of Public Works

## DETERMINATION

The Grandfathering Review Committee has evaluated the above referenced project and this project is not Grandfathered due to expiration of the last submitted document from 4/04/2019.

## BASIS OF DETERMINATION AND CLAIMS RECOGNIZED / REJECTED

The original lot layout and dimensions for Section 2 can be found in the Bastrop Grove Drainage Improvement. However, it appears a deed division of property inconsistent with State Law took place sometime between 10-01-2018 and 01-22-2019 as shown on the Proposed Preliminary Plat from 1-22-2019. In addition to the lot layout on the Propose Preliminary Plat an additional Exemption Application was submitted to the City of Bastrop on 04-04-2019 during a drainage moratorium. Unfortunately, all the applications were submitted over two years ago and have exceeded the time that allows for an exemption under the Local Government Code Chapter 245, Sec. 245.004.

**SIGNED:**

Trey Job, Assistant City Manager for Community Development

MC BASTROP 71, L.P.  
8214 Westchester Drive, Ste 550  
Dallas, TX 75225

May 25, 2021

Trey Job, Assistant City Manager  
City of Bastrop, TX  
Planning and Development Department  
1311 Chestnut Street  
Bastrop, TX 78602

**Request for Reconsideration**

Dear Trey,

MC BASTROP 71, L.P. ("MC 71") filed a Grandfathering Development Status Application on April 19, 2021 under City Code Art. 1.20 (the "Ordinance"). The Grandfathering Review Committee (the "GRC") issued a determination (the "GRC Determination") on May 4, 2021. MC 71 hereby requests reconsideration of the GRC Determination pursuant to the Ordinance.

The GRC Determination is required by the City for the City to make its own determination of its position on the application of Texas Local Government Code ("LGC") Chapter 245 ("LGC 245"), which provides protections from changes in local regulation as to an ongoing development project (such protections being commonly known as "vested rights"). Only LGC 245 determines the applicable vested rights, and to the extent the Ordinance seeks to limit vested rights or give the City control over the interpretation process (such as, but not limited to, establishing standards and burdens), we protest, and submit this application under protest. The GRC Determination is for the benefit of the City only and is not binding on MC 71 as to the nature or extent of vested rights. MC 71 reserves all its rights under LGC 245.

Vested Rights defined (emphasis added):

- "If a series of permits is required for a project, the orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements *in effect at the time the original application for the first permit in that series is filed shall be the sole basis for consideration of all subsequent permits required for the completion of the project*. All permits required for the project are considered to be a single series of permits. Preliminary plans and related subdivision plats, site plans, and all other development permits for land covered by the preliminary plans or subdivision plats

are considered collectively to be one series of permits for a project.” LGC 245.002(b)

- “Rights to which a permit applicant is entitled under this chapter *accrue on the filing of an original application or plan for development or plat application* that gives the regulatory agency fair notice of the project and the nature of the permit sought.” LGC 245.002(a-1)

The Ordinance requires the following:

1. Filing with the Director of Planning and Development in writing within fifteen (15) business days of the date of the Grandfathering Review Committee's previous determination or the date of automatic denial;
2. State the reasons why the previous determination should be reversed or modified;
3. Present information that has not previously been presented for consideration by the Grandfathering Review Committee;
4. Provide an explanation of the legal and factual grounds of the request; and
5. Be accompanied by payment of the reconsideration fee established by the City Council, as codified in the city's fee schedule.

The GRC Determination states:

“The Grandfathering Review Committee has evaluated the above referenced project and this project is not Grandfathered due to expiration of the last submitted document from 4/4/2019... Unfortunately, all the applications were submitted over two years ago and have exceeded the time that allows for an exemption under the Local Government Code Chapter 245, Sec 245.004.”

This statement leaves MC 71 confused as to the specific basis for denial.

For purposes of this letter, the term “Project” shall refer to 25.882 acres owned by MC 71, shown in the Preliminary Plat Application dated 1-22-2019 (the “PP Application”), inclusive of the creation of the lots and related infrastructure and the construction of buildings thereon. Both the land development and the building development are entitled to vested rights. MC 71 has continuously pursued this Project since the filing of the PP Application. The scope and nature of the Project is well known to the City, as suburban retail/commercial pad site development for buildings consistent with surrounding developments such as the Medtail facility located on Highway 71 in the Bastrop Grove Project of 71 Retail Partners, L.P. The elements of the contemplated retail/commercial pad sites are relatively small buildings (usually 1 story), typically centered in each lot, with ample, surface parking surrounding the building, and cross access easements shared among the other pad sites. These lots are typically call “commercial reserves”.

MC 71 asserts the following reasons the previous determination should be reversed:

- Texas LGC 245.004 does not contain an applicable time limit for exemption for the applications submitted for the Project, but only for building permits (LGC 245.004(1)).
- MC 71 properly filed the PP Application consistent with the requirements of LGC 245 with the City on 1-22-2019. This is the proper vesting date for the Project. Since 2005, LGC 245 does not require the City to “accept” a filing. See, LGC 245.002(a), (a-1) and (b), none of which required an “accepted” or “complete” application, and mention only an “original application.” The Ordinance, particularly Sec. 1.20.010(g) is not consistent with LGC 245.
- While Texas LGC 245 does contain certain time limits under various provisions, none of those time limits are applicable for the Project. If the City’s position is that the application lapsed under its internal requirements, then that is an inequitable result since it was the City which was refusing to process the filed applications, thus impeding the progress of the Project.
- Following the submission of the PP Application, MC 71 representatives held a meeting with Allison Land and the City Planning staff to review and discuss the PP Application. MC 71 received a memo from Allison Land containing a summary of that meeting (attached hereto as Exhibit “A”). That memo inaccurately characterizes the meeting as a “Pre-Application Meeting”, but it was a meeting to discuss the application previously filed. But for the receipt of the PP Application, there would have been no meeting and as such the filing prompted the meeting. That memo directed MC 71 to submit an exemption application (the “Exemption Application”), which MC 71 properly did on 4-14-2019. The memo states that “After the submittal is deemed complete, Staff will take to the next available City Council meeting for approval to move forward with the Checklist option chosen and the development process”. As such, the Exemption Application is pending action by the City.
- MC 71 has not withdrawn the PP Application or Exemption Application. In fact, MC 71’s engineer routinely followed up with the City about the status of these items. In essence, the City seems to have stonewalled MC 71.

Because MC 71 properly filed applications for the Project consistent with the requirements of LGC 245 and those applications are still pending action by the City, and MC 71 is not aware of any legally enforceable limits on the relevant applications, the Project should be vested as of the filing of the PP Application under LGC 245.

MC 71 hereby presents new information that has not previously been presented for consideration by the Grandfathering Review Committee in this letter and attached hereto as "Exhibit A".

MC 71's request is based on the following legal and factual grounds:

- Texas LGC 245.002(a-1) states:
  - “Rights to which a permit applicant is entitled under this chapter accrue *on the filing of an original application or plan for development or plat application* that gives the regulatory agency fair notice of the project and the nature of the permit sought.” *emphasis added*
  - MC 71 did file the PP Application on 1-22-2019 properly and as required.
  - The PP Application was of sufficient detail to give fair notice of the Project and the nature of the permit sought.
- Texas LGC 245.002(2)(e) requires the City to provide notice within 45 days of filing if “the applicant fails to provide documents or other information necessary to comply with the agency’s technical requirements relating to the form and content of the permit application”. MC 71 did not receive any notice from the City regarding the PP Application or the Exemption Application of any deficiency in either application.
- Texas LGC 245.004(1) provides an exemption to LGC 245 for “a permit that is at least two years old, is issued for construction of a building or structure intended for human occupancy, or habitation, and is issued under laws, ordinances, procedures, rules, or regulations adopting only (A) uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization; or (B) local amendments to those codes enacted solely to address imminent threats of destruction of property or injury to persons;”
  - This section is not applicable to the Project because the PP Application and Exemption Applications are not building permits as contemplated by LGC 245.004(1).
- Texas LGC 245.005 addresses “Dormant Projects”. The Project is not a Dormant Project under Texas LGC 245.005 due to the following:
  - The PP Application and the Exemption Applications are not permits for the purpose of this section.
  - Even if they were, the time limits in Texas LGC 245.005 are not applicable because MC 71 has made progress towards completion of the Project in accordance with Texas LGC 245.005 (2) through MC 71’s (i) filing the PP Application, (ii) filing the Exemption Application, and (iii) good faith attempt

to file with a regulatory agency an application for a permit necessary to begin or continue towards completion of the Project.

- Even if no progress towards completion of the Project had been made by MC 71, LGC 245.005 (b) states “Notwithstanding any other provision of this chapter, any ordinance, rule, or regulation enacted pursuant to this section shall place an expiration date on a project of no earlier than the fifth anniversary of the date the first permit application was filed for the project if no progress has been made towards completion of the project.” The expiration of the PP Application and Exemption Application could be no earlier than 4-14-2024.

The City’s decision did not reach all issues relating to vested rights for the Project. If the City reverses its determination and finds that a vesting event occurred, then MC 71 requests the opportunity to review that decision and have a separate opportunity for reconsideration on the merits of that decision.

The Ordinance requests legal grounds and seems to want a legal brief on this matter, when MC 71 is simply trying to comply with a City requirement to help it determine its own conclusion on vested rights, and the City has no authority to adjudicate vested rights that are binding on MC 71. Nonetheless, we attach an addendum with reference to LGC 245 and relevant case law. Our primary reliance is on the text of LGC 245, as cited herein and available online to the City.

MC Bastrop 71, L.P. and its representatives look forward to your reconsideration. Should any further information or clarification be required, please do not hesitate to contact us.

Sincerely,



Douglas M. MacMahon  
Manager of the General Partner of MC Bastrop 71, L.P.



## **Addendum**

### Relevant Vested Rights Caselaw Supporting this Reconsideration Request

*Hatchett v. West Travis County Public Utility Agency*, 598 S.W.3d 744, (Tex. App.—Austin, 2020, pet denied)- Summary of the current state of vested rights under LGC 245.

*FLCT, Ltd. v. City of Frisco*, 49 S.W.3d 238 (Tex. App.—Fort Worth 2016, pet. den.)- The exceptions to the “municipal zoning regulations” except to vested rights under LGC 245.004 is determined on an “as applied” basis to any regulations which “have an effect” on the listed exception issues. The exception for “property classification” means the permissible uses under the regulator scheme when vesting occurs. A project is entitled to all uses permitted when vesting occurs. “Fair notice” of a project incorporates all the city actual knows about the project, not just what the applicante documents. The definition of a “project” is broad.

*City of San Antonio v. Greater San Antonio Builders Ass'n*, 419 S.W.3d 597 (Tex. App.—San Antonio 2013, pet. den.)- A city may not add local limits to vested rights, only LGC 245 determines vested rights.

*Harper Park Two, LP v. City of Austin*, 359 S.W.3d 247 (Tex. App.—Austin 2011, pet. den.)- The entirety of a development project is considered in a “project”, not components or phases. The definition of “permit” is very broad. The vesting is considered in the context of the regulatory scheme at the time to determine the scope of the project.

*Hartsell v. Town of Talty*, 130 S.W.3d 325, 326 (Tex. App.—Dallas 2004, pet. denied)- Vested rights extend to the entire development project, land and buildings.

Exhibit "A"



## MEMO

**To:** Brendan McEntee  
**From:** Allison Land  
**cc:** Staff  
**Date:** February 13, 2019  
**Re:** Pre-Application Meeting – Grove Commercial

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City staff has generated notes from the meeting on February 5, 2019. The information discussed and comments made by staff during this meeting are not intended to constitute a formal review of your project. This meeting *does not substitute* for the formal review that will take place in the event you file a development application with the City. Information provided and comments made by staff during the meeting are based solely on the information provided by you prior to or during the meeting.

Upon submittal of the appropriate application(s), additional comments are to be expected that may or may not be discussed in this meeting. More detailed information provided by you concerning your project during staff's review of a formal application may alter comments made during the meeting depending on the situation.

### Property Information

Address:	TBD	In floodplain:	partial
R Number:		Water, Wastewater available:	Nearby
Jurisdiction:	City Limits	Electricity available:	Nearby
Platted:	No	Toad Habitat Area:	No
Current Zoning:	General Retail with restrictions		

### Meeting Goal

Discuss commercial development

## Items Discussed:

### Drainage channel

- Needs to establish good vegetation
- Anticipated 9 to 10 feet/second eventually

### Exemption:

- Requires pre-submission meeting (this one)
- Requires submittal of the Exemption Application and an associated Checklist: Planned Development District, Alternative Site Design, ETJ Agreement, or Waiver. A checklist and all items listed on the checklist must accompany the Application
- After the submittal is deemed complete, Staff will take to the next available City Council meeting for approval to move forward with the Checklist option chosen and the development process
- **Engineer Certification required. See Emergency Ordinance 2018-2-A Section 5b - [link](#)**
- Note: Documentation provided with the Exemption Application does NOT constitute a submittal for any required permits after the Exemption is granted
- This project could use either Planned Development or Alternative Design Standards
- Alternative Design Standards
  - Use new rainfall totals and Atlas 14 data
  - Add some water quality infrastructure
- Need to run the channel and anticipated development against Atlas 14 data to show that it works and that the new development tying in is accounted for
- If you can live with the setbacks, use Alternative Design Standards
- If not, use the Planned Development
  - Can keep high level, call out uses, driveway spacing
  - Need to show a concept plan
  - If you choose to address water quality, address the first 1.5 inches
  - Pervious pavers are allowed under this
  - Leave GR as the base zoning
  - Change setbacks (could be flexible, min/max), drainage standards, landscaping, etc. Get creative

### Zoning

- Two story development will have a 60-foot building setback from the residential lots
  - To change: need either a zoning variance (no financial hardship) or a planned development
  - Variances are hard to justify and hard to support

### Platting

- Lot of Record Verification or Platting is required before permits may be issued
- All lots must have public road frontage and utility access. Access easements and/or driveways across other lots does not provide public road frontage.
- Wants to do preliminary plat for all commercial parcels
- Channel sized for 50% cover of Nixon and 80% cover on the other side
- Preliminary plat:
  - Previously have submitted - Plat, grading, utility, engineering report discussing access, etc.
  - Checklist is the same now. Additional details are needed for the Exemption before the prelim can be submitted
- Note: still need to record Agnes St ROW by separate instrument

## Utilities

- Lift station: does it have capacity for the south side of Agnes?
  - Stantec for capacity

## Moving Forward

### Action Items

- City
  - Send copy of PD to Brendan
- Applicant

## Process Overview

What steps the project attendees need to follow to move forward in the project, in order of recommended completion.

- Exemption and Exception applications and checklists are available on the [Building Bastrop website](#).
  - [Building/Permitting](#) and [Planning](#) applications and checklists are available on the Planning & Development Department's [website](#) via the menu on the left.
1. Exemption [Application](#) with Planned Development [Checklist](#)
    - a. This will go to P&Z and Council like a normal PD
  2. Planning [Application](#) with Preliminary Plat [Checklist](#)
  - 3.

## City of Bastrop

*"Where Preservation of the Past Combined with Progress  
for the Future Encourages Opportunities to Grow"*

### Pre-Application Meeting Sign-in Sheet (Staff):

Project & Location: Grove Commercial

Date: February 5, 2019

	Name	Title/Organization	Phone	Email
<input type="checkbox"/>	Lynda Humble	City Manager	(512)-332-8800	<a href="mailto:lhumble@cityofbastrop.org">lhumble@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Jerry Palady, PE	Director of Engineering	(512) 332-8846	<a href="mailto:jpaldy@cityofbastrop.org">jpaldy@cityofbastrop.org</a>
<input type="checkbox"/>	James McCann, PE	Engineering Consultant		
<input type="checkbox"/>	Matt Jones, AICP	Director of Planning	(512) 332-8840	<a href="mailto:mjones@cityofbastrop.org">mjones@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Jennifer C. Bills, AICP, LEED AP	Assistant Planning Director	(512) 332-8845	<a href="mailto:jbills@cityofbastrop.org">jbills@cityofbastrop.org</a>
<input type="checkbox"/>	Matt Lewis, CNU	Planning Consultant		
<input checked="" type="checkbox"/>	Trey Job	Director of Water/Wastewater and Public Works	(512) 332-8932	<a href="mailto:tjob@cityofbastrop.org">tjob@cityofbastrop.org</a>
<input type="checkbox"/>	Curtis Hancock	Assistant Director of Water/Wastewater and Public Works	(512) 332-8964	<a href="mailto:chancock@cityofbastrop.org">chancock@cityofbastrop.org</a>
<input checked="" type="checkbox"/>	Allison Land	Planner/GIS Coordinator	(512) 332-8843	<a href="mailto:aland@cityofbastrop.org">aland@cityofbastrop.org</a>
<input type="checkbox"/>	Kimberly Hanly (Tap & Impact Fees)	Coordinator, Water & Wastewater Department	(512) 332-8960	<a href="mailto:khanly@cityofbastrop.org">khanly@cityofbastrop.org</a>
<input type="checkbox"/>	Tim Goetz	Electric Superintendent, Bastrop Power & Light	(512) 332-8900	<a href="mailto:tgoetz@cityofbastrop.org">tgoetz@cityofbastrop.org</a>
<input type="checkbox"/>	Cheryl Renfro	Project Coordinator Bastrop Power & Light	(512) 332-8901	<a href="mailto:crenfro@cityofbastrop.org">crenfro@cityofbastrop.org</a>
<input type="checkbox"/>	Andres Rosales	Fire Chief	(512) 332-8670	<a href="mailto:arosales@cityofbastrop.org">arosales@cityofbastrop.org</a>
<input type="checkbox"/>	Rod Stradling	Assistant Fire Chief	(512) 332-8670	<a href="mailto:rstradling@cityofbastrop.org">rstradling@cityofbastrop.org</a>
<input type="checkbox"/>	David Brasich	Building Official	(512) 332-8847	<a href="mailto:Dbrasich@cityofbastrop.org">Dbrasich@cityofbastrop.org</a>
<input type="checkbox"/>	Jean Riemenschneider	Bastrop Economic Development Corp.	(512) 332-8873	<a href="mailto:jean@bastropedc.org">jean@bastropedc.org</a>
<input type="checkbox"/>	Carolyn Dill, PE	County Engineer, Bastrop County	(512) 581-7180	<a href="mailto:carolyn.dill@co.bastrop.tx.us">carolyn.dill@co.bastrop.tx.us</a>
<input type="checkbox"/>	Cari Croft (contact for Houston toad)	Lost Pines HCP Administrator, Bastrop County	(512) 332-7284	<a href="mailto:Cari.croft@co.bastrop.tx.us">Cari.croft@co.bastrop.tx.us</a>

# City of Bastrop

*"Where Preservation of the Past Combined with Progress  
for the Future Encourages Opportunities to Grow"*

## Pre-Application Meeting Sign-in Sheet (Project Attendees):

Project & Location: Grove Commercial

Date: February 5, 2019

Name	Title/Organization	Phone	Email*
Brendan McEntee			

\*Email address will be used to send a copy of notes taken at this meeting, and as a further correspondence option as needed



June 15, 2021

71 Retail Partners LP  
C/O Douglas MacMahon  
8214 Westchester Drive, Suite 550  
Dallas, TX 75225

Dear Mr. MacMahon,

I have reviewed the documents that have been submitted and the previous determination the Grandfathering Committee issued.

The Committee does not agree with your interpretation of LGC 245 and has determined that the original application (permit) was not complete and did not continue to move forward. This puts the permits beyond the two-year time frame for applying for a grandfathered status, per Local Government Code Chapter 245, Section 245.004.

Sincerely,

A handwritten signature in blue ink that reads "Trey Job".

Trey Job  
Acting Director of Planning  
Assistant City Manager of Community Development

CC: Jennifer Bills, Assistant Planning Director