

Kathleen Hartnett White, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
Larry R. Soward, *Commissioner*  
Glenn Shankle, *Executive Director*

246000

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

June 14, 2006

Mr. Allen Strickland  
McKenna Health Facilities  
600 N. Union Ave.  
New Braunfels, TX 78130

Re: Edwards Aquifer, Comal County  
NAME OF PROJECT: McKenna Health Care M.O.B.; Located at the northeast corner of FM 311 and FM 3159; New Braunfels, Texas  
TYPE OF PLAN: Request for Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer  
Edwards Aquifer Protection Program File No. 2460.00  
Regulated Entity No. RN104860382  
Investigation No. 454089

Dear Mr. Strickland:

The Contributing Zone Plan application for the referenced project was submitted to the San Antonio Regional Office by Lockwood, Andrews & Newnam, Inc. on behalf of McKenna Health Facilities on January 23, 2006. Final review of the CZP submittal was completed after additional material was received on May 17, 2006 and June 12, 2006. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed, and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration of the executive director's final action on this Contributing Zone Plan. A motion for reconsideration must be filed no later than 23 days after the date of this approval letter. *This approval expires two (2) years from the date of this letter unless, prior to the expiration date, more than 10% of the construction has commenced on the project or an extension of time has been requested.*

### PROJECT DESCRIPTION

The proposed commercial project will be located on 8.20 acres and will consist of a 14,400 square foot medical office and pharmacy, parking facilities, and drainage control structures. The proposed impervious cover for the development is approximately 1.66 acres (20.22 % of the total area of the site).

### PERMANENT POLLUTION ABATEMENT MEASURES

To prevent pollution of stormwater runoff originating on-site or up-gradient of the site and potentially flowing across and off the site after construction, a partial sedimentation/filtration basin designed using the TCEQ technical guidance document, *Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (BMPs)* (July 2005) will be constructed. The basin is designed to provide

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Mr. Allen Strickland  
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treatment for 1790.62 pounds (lbs) of Total Suspended Solids (TSS) from 8.20 acres with a capture volume 26,771 cubic feet and a sand filter area of 2,856 square feet. The approved measures have been presented to meet the required 80 percent removal of the increased load in TSS caused by the project.

#### SPECIAL CONDITIONS

1. The sedimentation/filtration basin shall be operational prior to occupancy of the commercial development.
2. All sediment and/or media removed from the sedimentation/filtration basins during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335 as applicable.
3. Intentional discharges of sediment laden stormwater are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetative filter strips, sediment traps, rock berms, silt fence rings, filters, etc.
4. Any use of this property, other than the use described in this letter shall require notification to the TCEQ San Antonio Regional Office and may require submittal and approval of a WPAP or a modification.
5. The applicant shall provide all contractors with a copy of pages 1-35 through 1-60 of the TCEQ's TGM RG-348 (2005) as a guide for soil stabilization practices, and assure that any soil stabilization is performed in accordance with these practices and the approved plan.
6. The application presents that the emergency shut off valve from the sand filter basin will be used to basin outflow to allow for a minimum drawdown time of 24 hours. Since no procedure was provided, submit a method for setting the valve for the minimum drawdown time. The procedure must be certified by a Texas licensed professional engineer, and must be submitted with the basin certification required in Standard Condition #10 below.
7. Within 60 days of receiving written approval of an Edwards Aquifer protection plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TNRCC-0625) that you may use to deed record the approved WPAP is enclosed.

#### STANDARD CONDITIONS

1. Pursuant to Chapter 7 Subchapter C of the Texas Water Code, any violations of the requirements in 30 TAC Chapter 213 may result in administrative penalties.

#### Prior to Commencement of Construction:

2. All contractors conducting regulated activities at the referenced project location shall be provided a copy of this notice of approval. At least one complete copy of the approved Contributing Zone Plan and this notice of approval shall be maintained at the project until all regulated activities are completed.

Mr. Allen Strickland  
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3. Any modification to the activities described in the referenced CZP application following the date of approval may require the submittal of a plan to modify this approval, including the payment of appropriate fees and all information necessary for its review and approval prior to initiating construction of the modifications.
4. The applicant must provide written notification of intent to commence construction of the referenced project. Notification must be submitted to the San Antonio Regional Office no later than 48 hours prior to commencement of the regulated activity. Written notification must include the name of the approved plan and file number for the regulated activity, the date on which the regulated activity will commence, and the name of the prime contractor with the name and telephone number of the contact person.
5. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved Storm Water Pollution Prevention Plan (SWPPP) must be installed prior to construction and maintained during construction. Temporary E&S controls may be removed when vegetation is established and the construction area is stabilized. If a water quality pond is proposed, it shall be used as a sedimentation basin during construction. The TCEQ may monitor stormwater discharges from the site to evaluate the adequacy of temporary E&S control measures. Additional controls may be necessary if excessive solids are being discharged from the site.

During Construction:

6. During the course of regulated activities related to this project, the applicant or his agent shall comply with all applicable provisions of 30 TAC Chapter 213, Edwards Aquifer. The applicant shall remain responsible for the provisions and conditions of this approval until such responsibility is legally transferred to another person or entity.
7. If sediment escapes the construction site, the sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain). Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been significantly reduced. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).
8. The following records shall be maintained and made available to the executive director upon request: the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
9. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

10. Owners of permanent BMPs and measures must insure that the BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in

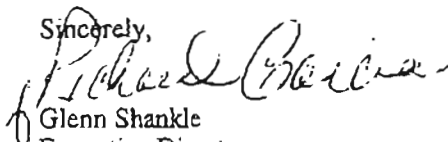
Mr. Allen Strickland  
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writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the San Antonio Regional Office within 30 days of site completion.

11. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
12. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Contributing Zone Plan. If the new owner intends to commence any new regulated activity on the site, a new Contributing Zone Plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
13. A Contributing Zone Plan approval or extension will expire and no extension will be granted if more than 50% of the total construction has not been completed within ten years from the initial approval of a plan. A new Contributing Zone Plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
14. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact Agnieszka Hobson of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4075.

Sincerely,



Glenn Shankle  
Executive Director  
Texas Commission on Environmental Quality

GS/AMH/eg

Enclosure(s): Deed Recordation Affidavit, TNRCC-0625  
Change in Responsibility for Maintenance on Permanent BMPs-Form TCEQ-10263

fc: Mr. Andrew Dodson, P.E., Lockwood, Andrews & Newnam, Inc.  
cc: Mr. Tom Hornseth, Comal County  
Mr. Robert J. Potts, Edwards Aquifer Authority  
TCEQ Central Records, Building F, MC 212

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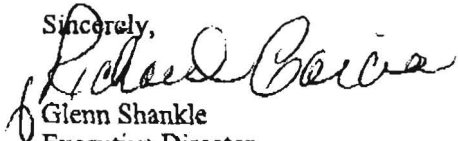
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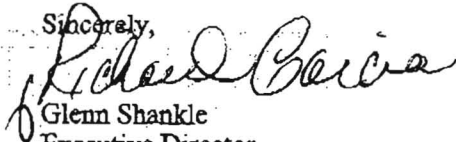
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11. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred. A copy of the transfer of responsibility must be filed with the executive director through the San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
12. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Contributing Zone Plan. If the new owner intends to commence any new regulated activity on the site, a new Contributing Zone Plan that specifically addresses the new activity must be submitted to the executive director. Approval of the plan for the new regulated activity by the executive director is required prior to commencement of the new regulated activity.
13. A Contributing Zone Plan approval or extension will expire and no extension will be granted if more than 50% of the total construction has not been completed within ten years from the initial approval of a plan. A new Contributing Zone Plan must be submitted to the San Antonio Regional Office with the appropriate fees for review and approval by the executive director prior to commencing any additional regulated activities.
14. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact Agnieszka Hobson of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4075.

Sincerely,



Glenn Shankle  
Executive Director  
Texas Commission on Environmental Quality

GS/AMH/eg

Enclosure(s): Deed Recordation Affidavit, TNRCC-0625  
Change in Responsibility for Maintenance on Permanent BMPs-Form TCEQ-10263

fc: Mr. Andrew Dodson, P.E., Lockwood, Andrews & Newnam, Inc.  
cc: Mr. Tom Hornseth, Comal County  
Mr. Robert J. Potts, Edwards Aquifer Authority  
TCEQ Central Records, Building F, MC 212



**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

RECEIVED

JUN 19 2006

COUNTY ENGINEER

June 12, 2006

TCEQ  
Region 13/ San Antonio

RE: McKenna Health Care MOB, TCEQ file # 2460.00

Ms Hobson,

The following items are offered in response to your comments for the above mentioned plan:

1. Detailed answers are provided for each question..
2. The pond has a design volume of 26,771 cubic feet which is in access of the required volume of 8,681 cubic feet per TCEQ spreadsheet. The pond will treat 1790.62 lbs of TSS per year. The sand filter area is 2,856 square feet in area. All these items are shown on sheet 7 of the plan set.
3. Sheet 5 shows flow path and areas that drain to pond and splitter box. All flows are overland to the splitter except the west side which is conveyed in storm pipe as shown..
4. The following items are shown on sheet 7 of the plan set.
  - a. Flow line information is shown for underdrain piping at 1%.
  - b. Call out for maximum separation of 10' center to center is shown on sheet 7.
  - c. Call out for screw on caps is labeled.
  - d. No basin liner is required this is a CZP plan not WPAP.
  - e. No basin liner is required this is a CZP plan not WPAP.
  - f. Control access fence and gate are shown.
  - g. Access ramps to sedimentation and filtration basins are shown.
  - h. Staging area is shown.
  - i. Depth of water is 4' as indicated in spread sheet on sheet 7. WQ Elevation is 1274' and bottom of sedimentation pond is 1270'.
5. Procedure for setting gate valve are shown on general notes page number 2.

If you have any further questions please contact me to discuss.

Sincerely,

Andrew Dodson, PE  
Project Engineer.

2006 JUN 12 PM 2:57

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SAN ANTONIO  
REGION

RECEIVED

JUN 07 2006

COUNTY ENGINEER

## EWDARD'S AQUIFER CONTRIBUTING ZONE PLAN MCKENNA HEALTH CARE CONSTRUCTION PLANS

---

**Prepared for:**

McKenna Health Care Systems  
Karl Hittle, President

**Prepared by:**

Lockwood, Andrews & Newnam, Inc.  
Contact: Andy Dodson, PE  
Phone: 338-4212 ext. 60  
awdodson@lan-inc.com

LAN Job No. 160-10157-000.400

**TCEQ-R13**

**MAY 17 2006**

**SAN ANTONIO**



**Lockwood, Andrews  
& Newnam, Inc.**

A SUBSIDIARY OF LEO A DALY



**Lockwood, Andrews  
& Newnam, Inc.**

A LEO A DALY COMPANY

May 12, 2006

Texas Commission on Environmental Quality TCEQ  
San Antonio Regional Office  
14250 Judson RD  
San Antonio, TX 78233-4480

Phone 210-490-3096  
Fax 210-545-4329

RE: Contributing Zone Application for the McKenna Health Care M.O.B., Comal County, TX

General:

McKenna Health Care Systems is planning to construct a medical office building complex at the intersection of FM 311 and FM 3159 in Comal County. The initial construction will consist of a 14,400 square foot medical office and pharmacy, parking facilities, and drainage control structures. Increases in pollutant loads will be controlled utilizing a sedimentation/ filtration pond system capturing 100% of the runoff from the site.

Methodology:


TCEQ standards for design of BMP's were used in developing this plan. The use of sedimentation/ filtration ponds was the best choice in treating the runoff. Flows from the site will be directed to a splitter box which will capture the first flush to treat the pollutant loads as required by TCEQ rules. All flows associated with the new development will be captured. Offsite flows are directed around the site to the discharge point. ASTM C33 sand is to be utilized in the filtration chamber. 6" SCH 40 PVC under drain pipes with a flat bottom chamber are to be used to convey treated runoff to the discharge point.

Maintenance: Standard maintenance procedures will be followed to maintain the BMP's. A schedule of regular maintenance is included in this application for the owner to have on hand.

Construction: After construction is complete, the project engineer will inspect the pond system and certify in writing that everything was built according to the drawings and specifications. This letter will be sent to TCEQ for record keeping.

We have included all the necessary items in the attachments to assist in the review of this application. If you have any questions please do not hesitate to contact our office for clarification.

Sincerely,

  
Andrew Dodson, PE



**Lockwood, Andrews  
& Newnam, Inc.**

A LEO A DALY COMPANY

Attachments:

1. Attachment A: Roadway vicinity map
2. Attachment B: USGS map
3. Attachment C: Project overview
4. Attachment D: Factor affecting surface water quality
5. Attachment E: Volume and character of Stormwater
6. Attachment F: Onsite suitability letter
7. Attachment G-I: Not applicable
8. Attachment J: BMPs for upgradient
9. Attachment K: BMPs for onsite stormwater
10. Attachment L: BMPs for Surface streams
11. Attachment M: construction plans
12. Attachment N: Inspection, maintenance, repair and retrofit
13. Attachment O: N/A
14. Attachment P: Measures for Minimizing Surface Stream Contamination







**Attachment A  
Vicinity Map**

YAHOO!







# Letter Of Transmittal

Return Address  10801-I N Mopac Expwy, Suite 120, Austin, TX 78759

Send Via  Delivery  Regular Mail  
 Pick-Up  Over Night

To TCEQ Region 13/ San Antonio		Date		
<b>14250 Judson Rd</b>		5/16/06		
<b>San Antonio, TX 78233-4480</b>		Project Number		
<b>210/490-3096</b>		160-10157-000		
Attn: Agnieszka Hobson		Data Code		
Re: EAPP file # 2460.00 McKenna Health Care MOB CZP		1.8		
<table border="0"> <tr> <td style="vertical-align: top;"> <b>We Are Sending You:</b>  <input type="checkbox"/> Shop Drawings  <input type="checkbox"/> Original Drawings  <input checked="" type="checkbox"/> Prints  <input type="checkbox"/> Specifications  <input checked="" type="checkbox"/> Reports  <input type="checkbox"/> As Noted         </td> <td style="vertical-align: top;"> <b>These Are Transmitted:</b>  <input type="checkbox"/> As Requested  <input type="checkbox"/> For Your Use  <input checked="" type="checkbox"/> For Review and Comment         </td> </tr> </table>		<b>We Are Sending You:</b> <input type="checkbox"/> Shop Drawings <input type="checkbox"/> Original Drawings <input checked="" type="checkbox"/> Prints <input type="checkbox"/> Specifications <input checked="" type="checkbox"/> Reports <input type="checkbox"/> As Noted	<b>These Are Transmitted:</b> <input type="checkbox"/> As Requested <input type="checkbox"/> For Your Use <input checked="" type="checkbox"/> For Review and Comment	Routing:
<b>We Are Sending You:</b> <input type="checkbox"/> Shop Drawings <input type="checkbox"/> Original Drawings <input checked="" type="checkbox"/> Prints <input type="checkbox"/> Specifications <input checked="" type="checkbox"/> Reports <input type="checkbox"/> As Noted	<b>These Are Transmitted:</b> <input type="checkbox"/> As Requested <input type="checkbox"/> For Your Use <input checked="" type="checkbox"/> For Review and Comment			

Quantity	Item	Description
4	CZP report	Contributing Zone Plan reports
4	Plan sets	CZP Plans for McKenna health care
1	Letter	Response letter to comments

Remarks

Ms. Hobson,  
Enclosed you will find the revised reports and plans addressing your comments. If you have any further questions please contact me to discuss.

Sincerely,  
Andy Dodson, PE

Distribution	Prepared By



**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

May 12, 2006

TCEQ  
Region 13/ San Antonio

RE: McKenna Health Care MOB, TCEQ file # 2460.00


Ms Hobson,

The following items are offered in response to your comments for the above mentioned plan:

1. All impervious cover data has been revised to match the impervious cover data for Phase I only.
2. The sizing calculations were based on the old methodology. I have provided revised calculations using TCEQ spreadsheets provided by the Austin office.
3. Pre and post developed runoff coefficients have been provided in Attachment E.
4. All offsite drainage is diverted around the site and does not enter the pond.
5. Site boundaries are shown on E&S sheet showing the Limits of Construction.
6. Legend added to sheet 4.
7. Requested items have been added to the plan set.
8. Check list items are all incorporated into the plan set.
9. Those items are covered in sheets 26 and 27 of the TXR15000 permit.
10. Procedure for adjusting draw down has been added to the plans.

If you have any further questions please contact me to discuss.

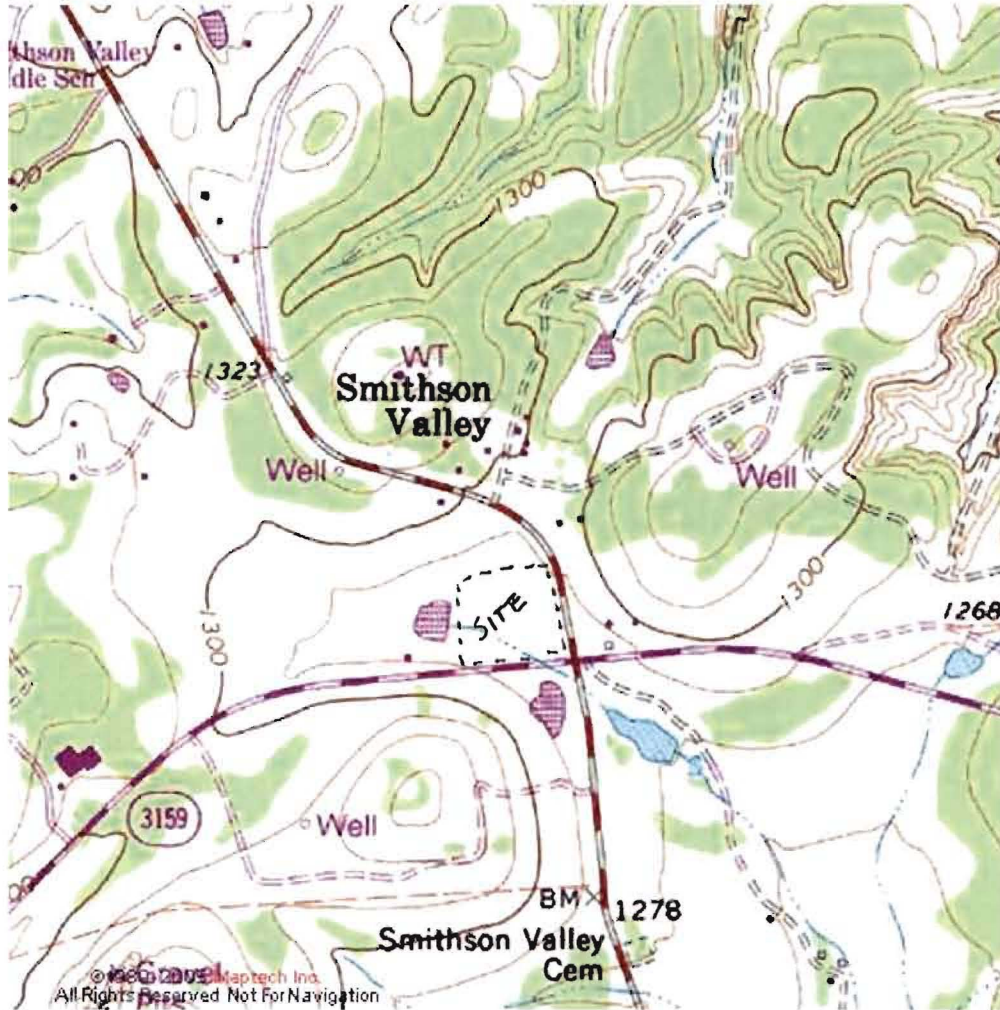
Sincerely,

  
Andrew Dodson, PE  
Project Engineer.

**TCEQ-R13**  
**MAY 17 2006**  
**SAN ANTONIO**



**Attachment B  
USGS Map**



**Scale 1;24000  
Smithson Valley Quad**





**Lockwood, Andrews  
& Newnam, Inc.**

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## **Attachment C Project Overview**

McKenna Health Care Systems is planning to construct a medical office building complex at the intersection of FM 311 and FM 3159 in Comal County. The initial construction will consist of a 14,400 square foot medical office and pharmacy, parking facilities, and drainage control structures. Increases in pollutant loads will be controlled utilizing a sedimentation/ filtration pond system capturing 100% of the runoff from the site.

### **Project Data:**

**Overall area: 8.199 acres**

**Existing development: 0 acres**

**Proposed development: 8.199 acres (40% impervious cover)**

### **BMP selection:**

**Sedimentation/ Filtration**

**Calculations as follows**



**TSS Removal Calculations**

Project: **McKenna Health Care**  
 Date Prepared: 5/12/2006  
 Phase I

1. Required Load Reduction:

$$L_m = 27.2(A_n \times P)$$

where:

L<sub>m</sub> = Required TSS removal  
 A<sub>n</sub> = Net increase in impervious area for site  
 P = Average annual precipitation, inches

Site Data: Drainage area A

County = **comal**  
 Total site area = **8.20** acres  
 Predevelopment impervious area = **0.00** acres  
 Post-development impervious area = **1.66** acres  
 Postdevelopment impervious fraction = **0.20**  
 P = **33** inches

$$L_m = 1490.016 \text{ lbs.}$$

2. Select BMP

Proposed BMP = **sf** abbreviation  
 Removal efficiency = **89** percent

AC Aqualogic Cartridge Filter  
 BR Bioretention  
 CW Constructed Wetland  
 RI Retention / Irrigation  
 SF Sand Filter  
 WB Wet Basin

3. Calculate TSS Load Removed by BMPs

$$LR = (\text{BMP efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$$

where:

LR = TSS Load removed by BMP  
 A<sub>i</sub> = Impervious area of BMP catchment  
 A<sub>p</sub> = Pervious area of BMP catchment

A<sub>i</sub> = **1.66** acres  
 A<sub>p</sub> = **6.54** acres  
 L<sub>r</sub> = **1790.62** lbs

4. Calculate Fraction of Annual to Treat

$$F = 0.83$$

5. Calculate Capture Volume

Rainfall Depth = **1.20** inches  
 Post Development Runoff Coefficient = **0.20**  
 Runoff Volume = **7234** cubic feet  
 Storage for Sediment = **1447**

Total Capture Volume **8681** cubic feet





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& Newnam, Inc.**  
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## **Attachment D Factors Affecting Water Quality**

**General:** The most common factors affecting water quality are Total Suspended Solids (TSS). TSS includes sediment, oil, grease, and BOD contaminants. Sediment occurs naturally as erosion during rainfall events, along with BOD in decaying plant material that may get washed into rivers and streams, this also occurs during construction activities when faulty erosion controls are used to minimize the impact of runoff into streams and rivers. Oil, grease, and other nutrients are introduced into the mix by development. Oil and grease can come from roadways and parking lots. Nutrients from fertilizers placed on yards and landscaped areas.

**Specific:** This project is anticipated to generate the same contaminants, including nutrient loadings associated with fertilizers. The nature of this project will generate mostly oil and grease when completed. During construction we would anticipate the standard contaminants to be encountered, sediment from construction activities. Significant care will be required with this project, due to the existing drainage crossing existing in the low point of the roadway. It will be imperative to maintain controls in this area to prevent sediment and other contaminants from entering the stream.





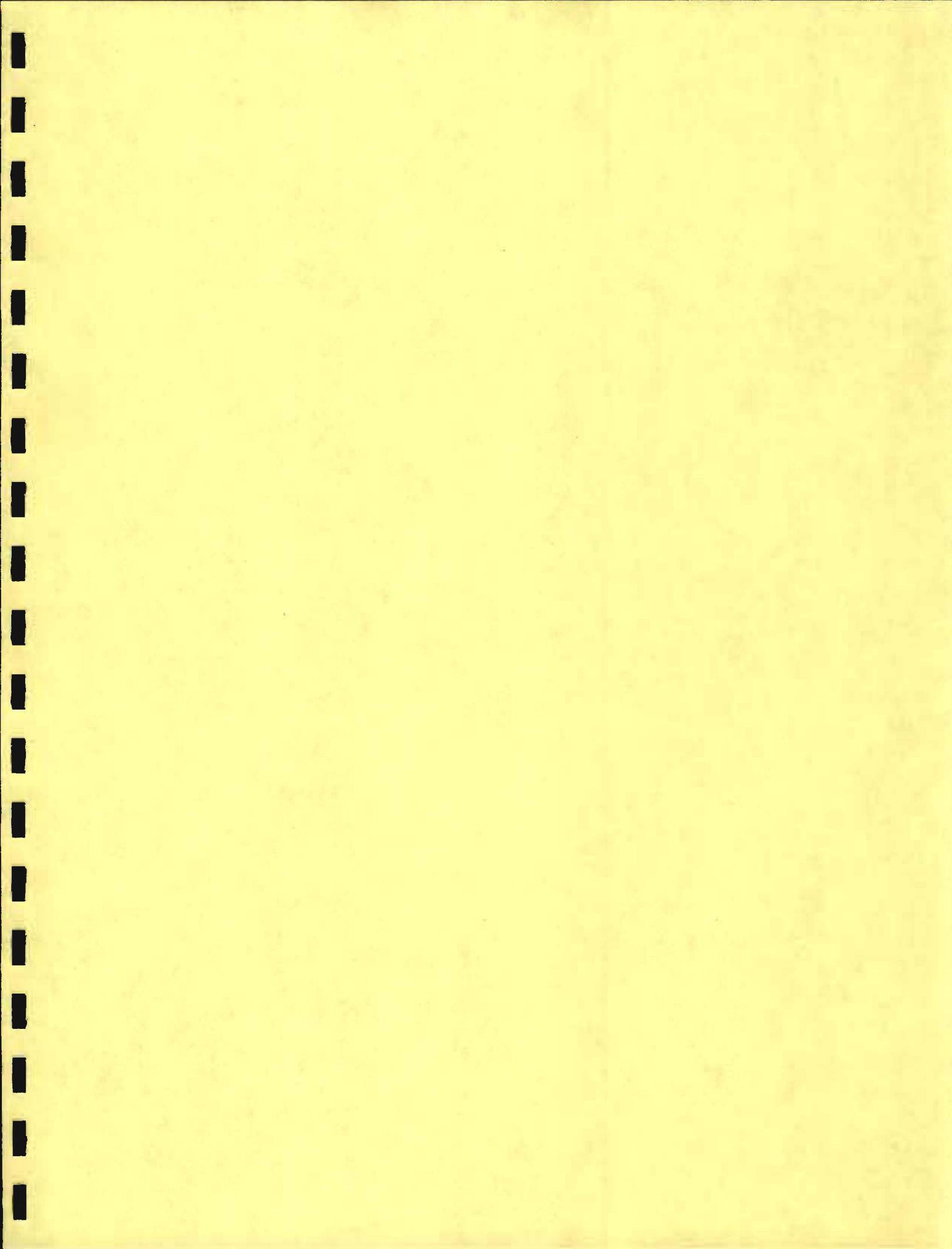
**Lockwood, Andrews  
& Newnam, Inc.**  
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## **Attachment E Volume and Character of Stormwater**

**Summary:** The overall project area is divided into 4 drainage systems. 3 of the systems are offsite. Storm inlets and storm sewer will be used to capture the runoff associated with the project and convey all of the runoff to the treatment areas. All of this runoff will bypass the controls set up to treat the new construction.

This project is generating 15.24 cfs of runoff in the 25 year event and 38.35 cfs of runoff in the 100 year event. There is one area of discharge. The annual pollutant load for the overall project is 43.90 lbs/yr, the existing pollutant load prior to development is 4.52 lbs/yr. The entire development is being treated to provide the required treatment level of the entire project of 31.50 lbs/yr. The runoff is discharged into the proposed splitter box to divert the first flush into the water quality pond for treatment.

Predeveloped runoff coefficient	CN= 79 (SCS TR-55)
Developed runoff coefficient	CN= 83 (SCS TR-55)





**Attachment F**  
**Suitability Letter for OSSF**

This site will utilize OSSF for treatment of the wastewater from this site. Application for approval by the authorized agent will be made and approved prior to construction of any wastewater facilities. Suitability letter from Comal County is provided with this application.



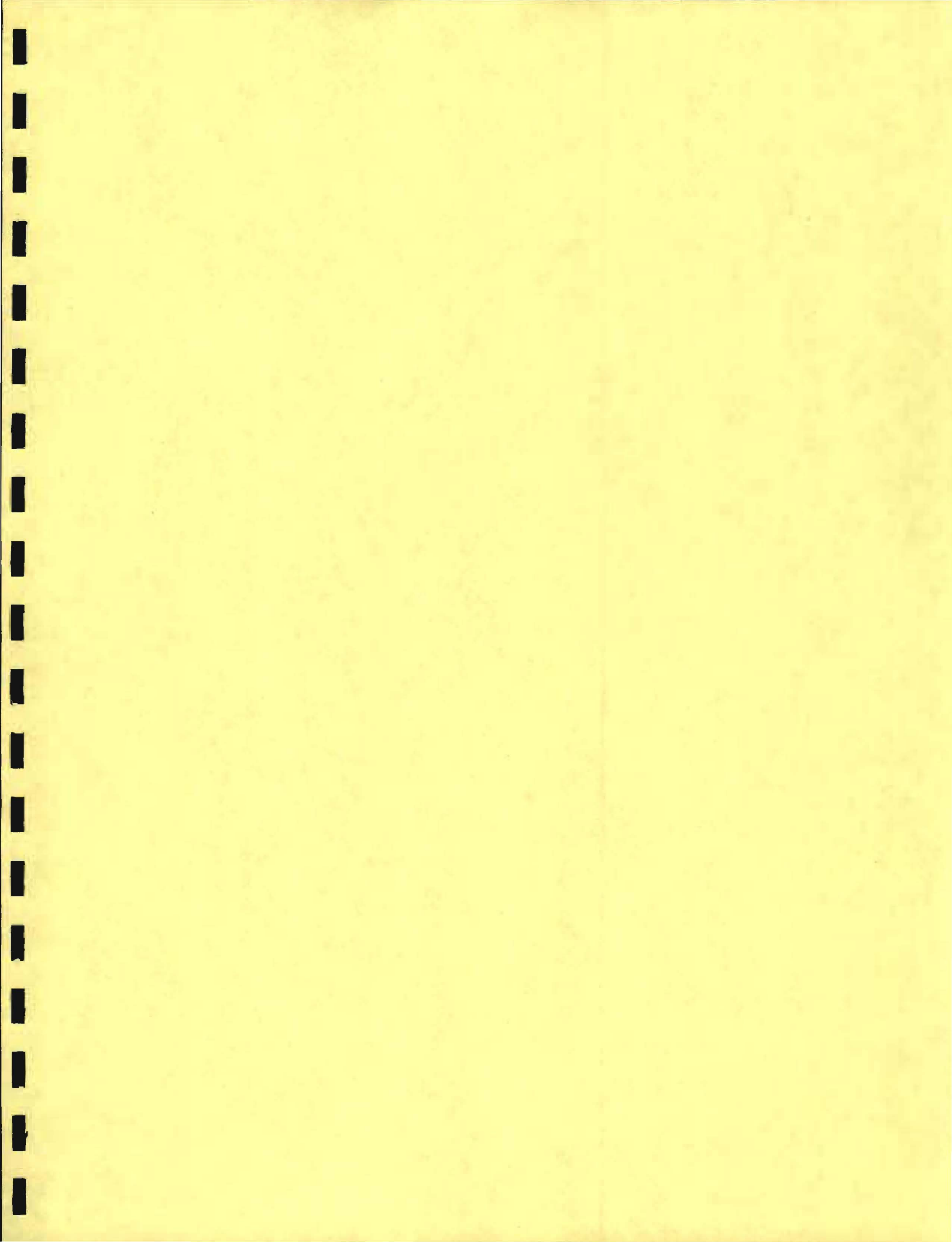




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& Newnam, Inc.**

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**Attachments G, H, And I  
Not applicable to this project.  
No AST's onsite**



**Attachment J  
BMPs for Upgradient Stormwater**

The runoff associated with upstream areas that pass through this site will not receive permanent treatment at this time. The upstream areas are all undeveloped and are not contributing any load at this time. During construction temporary controls will be installed to prevent sediment from entering the stream bed. The use of rock berms and silt fence will control the runoff associated with this upstream area during construction. Measures taken to insure control of offsite flows through this site are obtained by use of open channels. These open channels will intercept the offsite flows and direct them to the point of discharge. Utilizing channel geometry and slope velocities of the offsite flows are held at non erosive rates to insure no downstream degradation of surface waters. These vegetated channels also provide some small measure of biologic treatment of the TSS in the offsite waters.





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**Attachment K  
BMPs for Onsite Stormwater**

Onsite controls for stormwater runoff associated with this site include sedimentation/ filtration and detention ponds. These controls are being installed on a permanent basis. The water quality pond system is designed to treat all of the developed. These controls will treat the surface runoff and help maintain the overall water quality of the existing tributary. With these controls in place and functioning as intended then the required reduction of 80% will be obtained.





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& Newnam, Inc.**  
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**Attachment "L"  
BMP's for Surface Streams**

Best management practices utilized on this project to protect surface streams are as follows, onsite flows are routed through the water quality and detention pond system to attenuate increased runoff from the proposed development. Offsite flows are controlled via open channels that minimize velocity using channel geometry and slope to maintain non erosive flows. This site has a specific discharge point via the roadway culvert under FM 3159. All flows onsite and offsite are directed through this point and released at rates equivalent to existing conditions, thereby minimizing the impact to downstream waters.







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& Newnam, Inc.**  
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**Attachment M  
Construction Plans**

**Submitted as separate attachment**



**Attachment N**  
**Inspection, Maintenance, Repair, and Retrofit Plan**

The following pages shall be used as guidelines for the regular maintenance of the constructed BMPs and a maintenance log along with corrective measures and changes to the system.

These guidelines have also been provided to the person responsible with the maintenance of these controls. A signed copy of this separate document is included in the attachment




**Lockwood, Andrews  
& Newnam, Inc.**  
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**Maintenance Guidelines for Water Quality Controls  
Associated with the McKenna Health Care MOB**

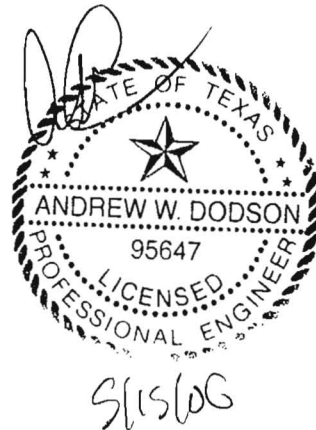
**Prepared for:  
McKenna Health Care Systems**

**Prepared By:  
Lockwood, Andrews & Newnam, Inc.  
10801-1 N Mopac Expressway, Suite 120  
Austin, TX 78759  
512-338-4212  
Andrew W Dodson, PE  
#95647**

  
Andrew W Dodson, PE

**Signed by:**

\_\_\_\_\_  
**For McKenna Health Care Systems**



## Maintenance Procedures for Water Quality Pond at the “McKenna Health Care MOB”

### Routine Maintenance for Water Quality Systems

Water quality ponds of all types have similar routine maintenance requirements, although most ponds have some unique maintenance needs, as detailed in this section. The following general maintenance requirements apply:

- a. Facilities must be inspected at least twice a month (once during or immediately following wet weather) to evaluate facility operation.
- b. During each inspection, erosion areas inside and downstream of the PONDS must be identified and repaired or revegetated immediately;
- c. Grass areas in and around ponds must be mowed biweekly to limit vegetation height to 6 inches. When mowing of grass is performed, a mulching mower must be used, or grass clippings must be caught and removed, as with all water quality ponds.
- d. Debris and litter accumulated in the facility must be removed during each inspection: Note this is very important for this facility to maintain proper functioning of the water quality basins.
- e. Excessive sediment must be removed and properly disposed of.
- f. Design drawdown times must not be exceeded by more than 24 hours. If drawdown times are excessive, repairs should occur immediately; Drawdown is the amount of time it takes water to completely drain from the pond system.
- g. With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) must be identified and repaired immediately.
- h. Inlet and outlet structures will eventually deteriorate and must be replaced, though it may be 25-50 years before this is necessary.

### Additional Maintenance Requirements for Water Quality Ponds

#### Sand Filtration Ponds

- a. Remove sediment crust from surface of sand and restore sand to original condition when buildup depth reaches 1 inch or when the allowable drawdown time for the facility is exceeded. Allowable drawn down time is 24-48 hrs after rainfall.
- b. Remove sediment from the inlet structure and sedimentation chamber when sediment buildup reaches 3 inches or when the proper functioning of inlet and outlet structures is impaired. Sediment must be cleared from the inlet structure at least every 3 months, and from the sedimentation basin at least every 6 months.
- c. Clean underdrain piping network to remove any sediment buildup every 2 years, or as needed to achieve design drawdown time.



**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

General inspections are to include the following items:

1. Inspect sedimentation pond for windblown paper, plastic items, etc. weekly.
2. Gravel bed at inlet to sand filtration to be pressure washed to remove sediment build up every 6-8 weeks.
3. Vegetation to be controlled around sand filtration bed. Any grass that is spreading into sand area to be removed. Inspect every 4 weeks.
4. Trash rack to be inspected after every rain event to remove debris and prevent blockage of headwall.
5. Vegetation around every headwall is to be removed as necessary to maintain proper operation of the water quality system.
6. Draw down time should be monitored to insure that minimum 24 hours passes before sand filter drains. If draw down time is less than 24 hours, 6" gate valve should be moved to 50% open condition and time interval remeasured. Continue to adjust gate valve until draw down time is greater than 24 hours.









**Lockwood, Andrews  
& Newnam, Inc.**  
A LEO A DALY COMPANY

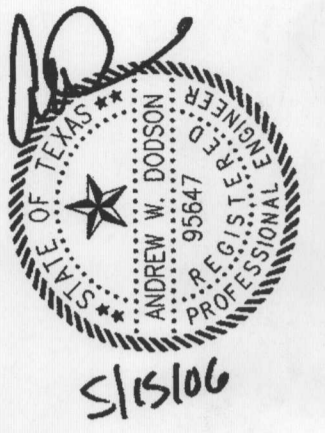
**Attachment P  
Measures for Minimizing Surface Stream Contamination**

After construction is complete the affects of the development should not affect the conditions of the adjacent stream bed. Measures have been taken to return flows back to original flow patterns using rock rubble and other flow spreading techniques. Proper vegetation is to be established in all disturbed areas and the use of the irrigation water should maintain a healthy stand of grass. If any erosion is noticed during the routine inspections proper measures should be taken to repair these areas and return them back to original conditions. Comal County standards are proposed along with City of Austin standards in using silt fence, rock berms and stabilized construction entrances to minimize surface stream contamination during construction. An SWPPP has been prepared and will be onsite for the contractor to follow during construction. After construction is complete the water quality, detention pond, and vegetated channels will control all runoff through and around the site to minimize impact to downstream wates.

# MCKENNA HEALTH CARE Contributing Zone Plan Phase 1 NEW BRAUNFELS, TEXAS, M.O.B.

TCEQ-R13  
MAY 7 2006  
SAN ANTONIO

**lan**  
Lockwood, Andrews  
& Newnam, Inc.  
A LEO A DALY COMPANY  
10801 NORTH MOPAC EXPY., BLDG. 1, STE. 120, AUSTIN, TX 78759



**GENERAL INFORMATION:**

SUBMITTAL DATE: OCTOBER 26, 2005  
PROJECT ADDRESS: FM 311 @ FM 3159  
PROPERTY OWNER: MCKENNA HEALTH CARE

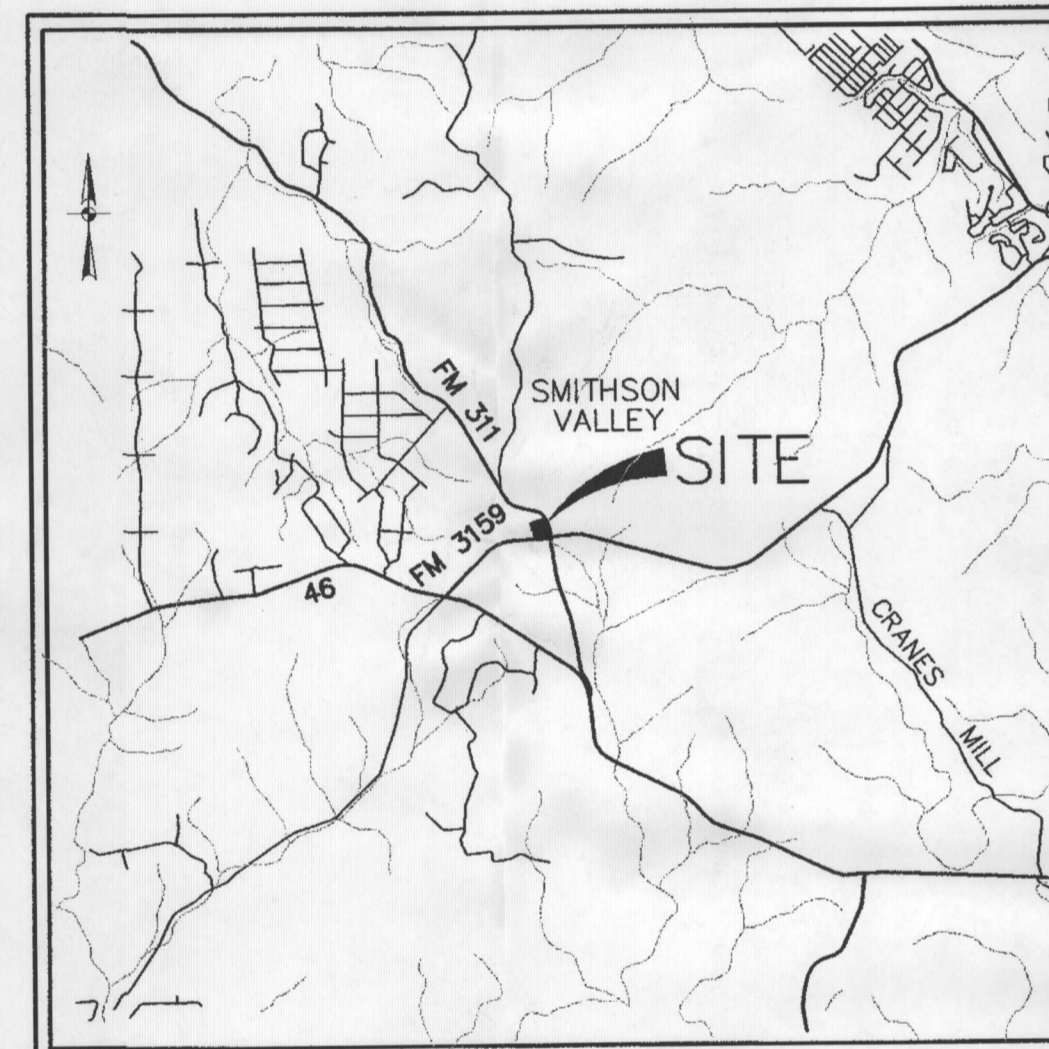
**LEGAL DESCRIPTION:**

A 8.199 ACRE, OR 357,132 SQUARE FEET, MORE OR LESS, TRACT OF LAND, BEING ALL OF THE CALLED 8.207 ACRE TRACT CONVEYED TO MONTSERRAT GONZALEZ GARDUNO IN WARRANTY DEED WITH VENDOR'S LIEN RECORDED IN DOCUMENT 9906029986 OF THE OFFICIAL RECORDS OF COMAL COUNTY, TEXAS, AND BEING OUT OF THE T.P. KUYKENDAHL SURVEY NO. 461, ABSTRACT 332, OF COMAL COUNTY, TEXAS, SAID 8.199 ACRE TRACT BEING MORE FULLY DESCRIBED AS FOLLOWS, WITH THE BASIS OF BEARINGS BEING THE TEXAS COORDINATE SYSTEM SOUTH CENTRAL ZONE FROM THE NORTH AMERICAN DATUM OF 1983 (CORS 1996):

**DESIGN PROFESSIONALS:**

**CIVIL ENGINEER:** LOCKWOOD, ANDREWS & NEWNAM, INC.  
10801 NORTH MOPAC EXPY., BLDG. 1, STE. 120  
AUSTIN, TX 78759  
CONTACT: MR. ANDREW DODSON P.E.  
(512) 338-4212 FAX: (512) 338-4942

**SURVEYOR:** PAPE-DAWSON ENGINEERS  
555 EAST RAMSEY  
SAN ANTONIO TEXAS 78216  
PHONE: (210)375-9000  
FAX: (210)375-9010



LOCATION MAP  
N.T.S.

**SHEET INDEX**

1. COVER SHEET
2. GENERAL NOTES
3. OVERALL DRAINAGE AREA MAP
4. SITE PLAN - PHASE I
5. GRADING PLAN - PHASE I
6. EROSION & SEDIMENTATION PLAN - PHASE I
7. WATER QUALITY POND PLAN & DETAILS
8. DETAILS

MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.

COVER SHEET

L:\20221\160-10157-000\Plan\100 Construction Plans\01 Submittal Drawings\01-CVR czp.dwg May 15, 2006 - 3:07 pm awdodson

RECEIVED  
JUN 07 2006  
COUNTY ENGINEER

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHEN  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400

Sheet Number  
1

SHT 1 OF 8



L:\2022\160-10157-000\Prod\000\Construction Plans\01 Submittal Drawings\03-DRNG-OVERALL.dwg May 15, 2006 - 2:54pm awd/son



**TCEQ-R13**  
MAY 17 2006  
SAN ANTONIO

GRAPHIC SCALE  
100 0 50 100 200 400  
( IN FEET )  
1 in. = 200 ft.

**PLAN LEGEND**

- PROPERTY LINE
- LOT LINE
- - - EASEMENT
- BUILDING LINE
- CURB AND GUTTER
- SIDEWALK
- PROPOSED CONTOUR
- EXISTING MAJOR CONTOUR
- PHASE LINE
- AREA INLET
- CURB INLET
- WATER VALVE
- FIRE HYDRANT
- MANHOLE
- DRAINAGE FLOW DIRECTION
- A1 1.00 Ac DRAINAGE AREA

**McKenna Health Care**  
Time of Concentration

DRAINAGE AREA D.A.	OVERLAND FLOW				SHALLOW CONCENTRATED GRASS SURFACE			SHALLOW CONCENTRATED PAVED SURFACE			CONCENTRATED S.S. OR CHANNEL			CONCENTRATED FLOW MAIN CHANNEL			TOTAL Tc (.6 * Tc)	T lag		
	P-2yr24hr	4.2 IN	L	S	L	V (FPS)	Tt(hr)	L	V (FPS)	Tt(hr)	L	V (FPS)	Tt(hr)	L	V	Tt(hr)				
<b>Predeveloped</b>																				
A1	0.13	150	0.01	0.232	2050	1.8	0.316	0	2	0.000	0	7	0.000	810	4	0.056	dev	0.60	0.36	
A2	0.13	150	0.02	0.176	1350	1.5	0.250	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.43	0.26	
A3	0.13	150	0.02	0.176	1050	1.25	0.233	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.41	0.25	
A4	0.13	300	0.02	0.306	500	1.25	0.111	0	2	0.000	0	7	0.000	0	4	0.000	predev	0.42	0.25	
<b>Ultimate Developed Conditions</b>																				
A1	0.13	150	0.01	0.232	2050	1.8	0.316	0	1.25	0.000	0	8	0.000	810	2	0.113	dev	0.66	0.40	uncontrolled
A2	0.13	150	0.02	0.176	1350	1.5	0.250	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.43	0.26	uncontrolled
A3	0.13	150	0.02	0.176	1050	1.25	0.233	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.41	0.25	uncontrolled
A4	0.13	150	0.01	0.232	150	1.1	0.038	300	1.85	0.045	0	7	0.000	0	4	0.000	dev	0.31	0.19	controlled

**lan**  
**Lockwood, Andrews & Newnam, Inc.**  
A LEO A DALY COMPANY  
10001 MAC PACE DRIVE, BLDG. 1, STE. 100, AUSTIN, TX 78798

**Professional Seal:** Andrew W. Dodson, P.E., No. 95647, State of Texas

**MCKENNA HEALTH CARE**  
**NEW BRAUNFELS, TEXAS, M.O.B.**  
**OVERALL DRAINAGE AREA MAP**

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHON  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400

Sheet Number  
**3**  
SHT 3 OF 8

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T.P. KUYKENDALL SURVEY NO. 461  
ABSTRACT NO. 332

9.738 ACRE TRACT  
(VOL. 657, PGS. 800-801 R.P.R.)

**BENCHMARK**

BM 2  
BENT 600 IN POWER POLE AT NW CORNER OF 8.207 AC. SITE  
LOCATED AT THE NW CORNER OF FM 311-FM 3159 ±30' FROM WELL  
ELEVATION = 1288.08

6.479 ACRE TRACT  
(VOL. 360, PGS. 183-186 R.P.R.)

**BENCHMARK**

BM 1  
BENT 600 IN POWER POLE ±500' FROM INTERSECTION  
OF FM 311-FM 3159 70' N. OF FM 3159  
ELEVATION = 1278.41

**8,199 ACRES**  
(357,132 SQ. FT. MORE OR LESS)

14,530 SF  
FFE=1280.0

33,000 SF  
FFE=1280.0

15,200 SF  
FFE=1280.0

1 STORY METAL BUILDING  
AND WOOD FRAME

CONCRETE PAD  
WITH TRANSFORMER

8,199 ACRES  
(357,132 SQ. FT. MORE OR LESS)

F.M. 3159  
(VARIABLE WIDTH RIGHT-OF-WAY)

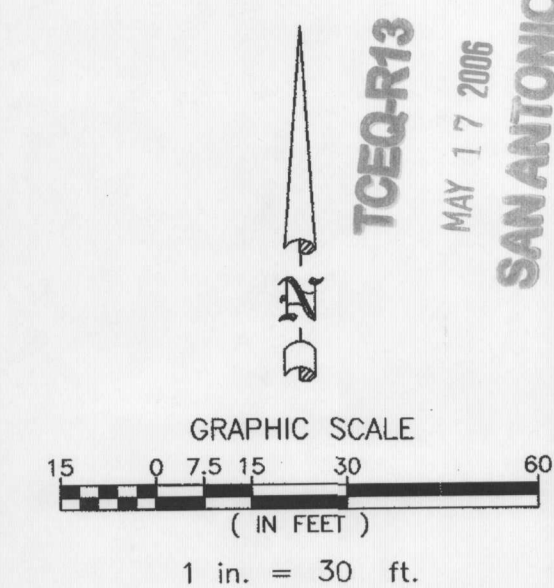
CHANNEL EASEMENT  
(VOLUME 102, PAGES 625-626 D.R.)

P.O.B.

CHANNEL EASEMENT  
(VOLUME 102, PAGES 625-626 D.R.)

ENTIRE SITE TO BE  
GRADED TO BALANCE  
ONSITE MATERIALS

ALL PREVIOUS AREAS  
TO BE REVEGETATED  
WITH APPROVED SEEDING  
MIXES AFTER FINAL  
GRADES HAVE BEEN  
ESTABLISHED



**PLAN LEGEND**

- PROPERTY LINE
- LOT LINE
- - - EASEMENT
- BUILDING LINE
- CURB AND GUTTER
- SIDEWALK
- PROPOSED CONTOUR
- EXISTING MAJOR CONTOUR
- PHASE LINE
- AREA INLET
- CURB INLET
- WATER VALVE
- FIRE HYDRANT
- MANHOLE
- (5) NUMBER OF SPACES
- FIRE LANE

**SITE SUMMARY**

TOTAL SITE AREA 357,132 SF 8.199 AC.

**PHASE I**

BUILDING 14,530 SF 4.1% OF TOTAL SITE  
PARKING/DRIVES 55,720 SF 15.6% OF TOTAL SITE  
SIDEWALKS 1,975 SF 0.5% OF TOTAL SITE

TOTAL IMPERVIOUS COVER PHASE I 72,225 SF 20.2% OF TOTAL SITE

**PHASE I PARKING**

TOTAL BUILDING 14,530 SF (GROSS)  
PARKING DESIRED 1 SPACE/200 S.F. = 72 SPACES  
PARKING PROVIDED  
STANDARD 9'X20' 99 SPACES  
HC VAN ACCESSIBLE 4 SPACES  
HC STANDARD 0 SPACES  
PARKING PROVIDED 1 SPACE/133 S.F. = 103 SPACES

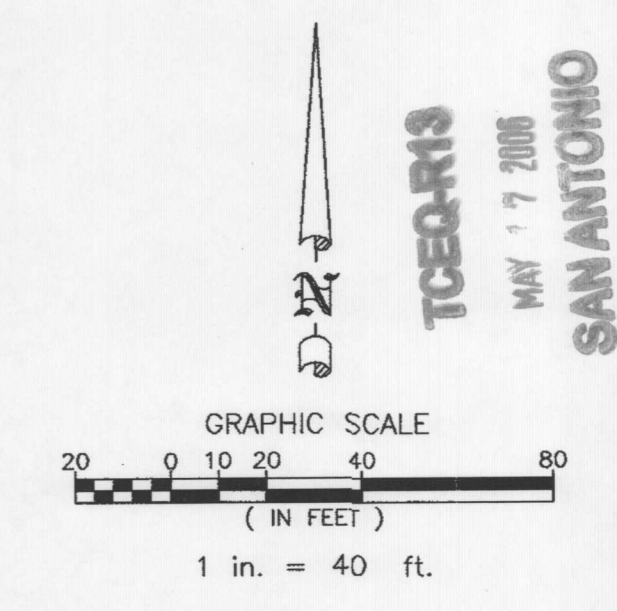
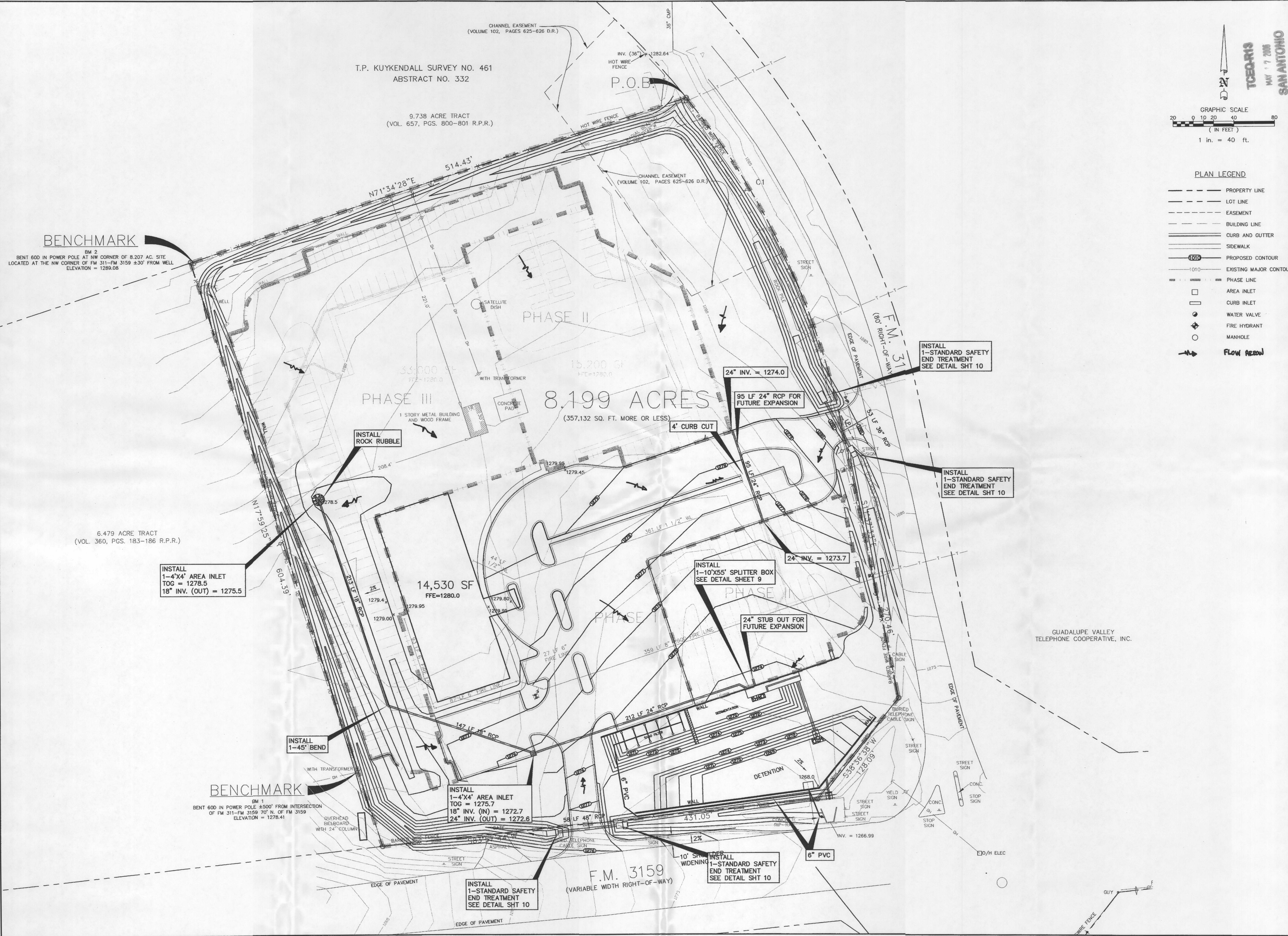
MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
SITE PLAN - PHASE I

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHON  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400  
Sheet Number  
SHT 4 OF 8



**lan**  
Lockwood, Andrews  
& Newnam, Inc.  
A LEAD A DAILY COMPANY  
1901 MID PAC DRIVE, ELDT, STE. 200, AUSTIN, TX 78799

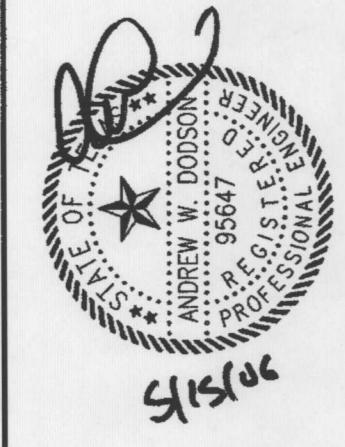
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**PLAN LEGEND**

---	PROPERTY LINE
- - - -	LOT LINE
- . - . -	EASEMENT
---	BUILDING LINE
---	CURB AND GUTTER
---	SIDEWALK
---	PROPOSED CONTOUR
---	EXISTING MAJOR CONTOUR
---	PHASE LINE
□	AREA INLET
□	CURB INLET
○	WATER VALVE
○	FIRE HYDRANT
○	MANHOLE
→	Flow Arrow

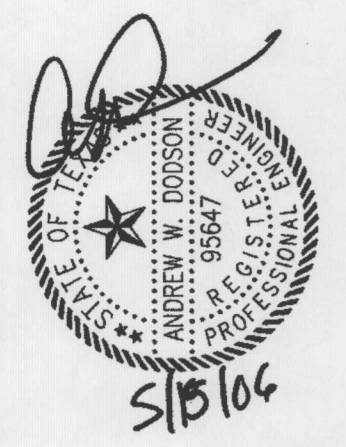
**Lockwood, Andrews & Newnam, Inc.**  
A LEED & DALY COMPANY  
1500 MID PAC DRIVE, BLDG. 1, STE. 100, AUSTIN, TX 78799



**MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
GRADING PLAN - PHASE I**

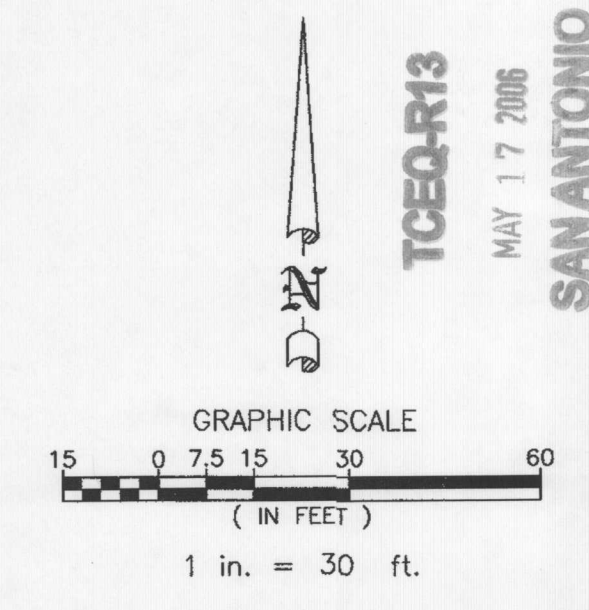
SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHON  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400

Sheet Number  
**5**  
SHT 5 OF 8



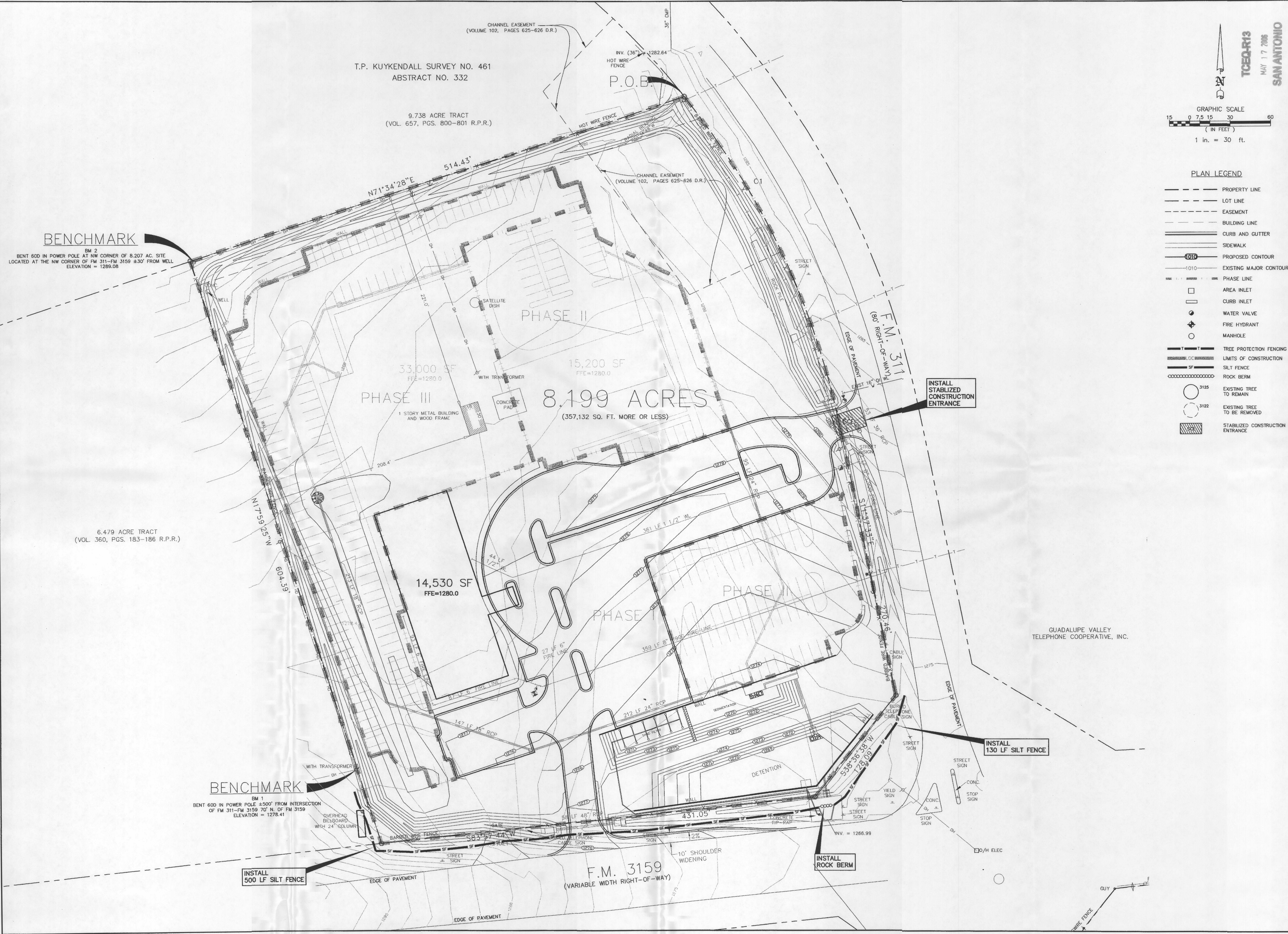
**MCKENNA HEALTH CARE  
 NEW BRAUNFELS, TEXAS, M.O.B.  
 EROSION & SEDIMENTATION PLAN - PHASE I**

SCALE: AS SHOWN DATE: 02-03-06  
 DESIGNED BY: A. DODSON  
 DRAWN BY: J. MCMAHEN  
 CHECKED BY: A. DODSON  
 APPROVED BY: A. DODSON  
 PROJECT NO.: 120221-160-10157-400

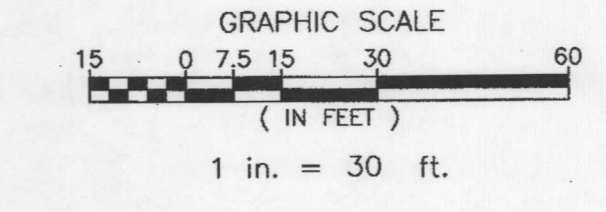
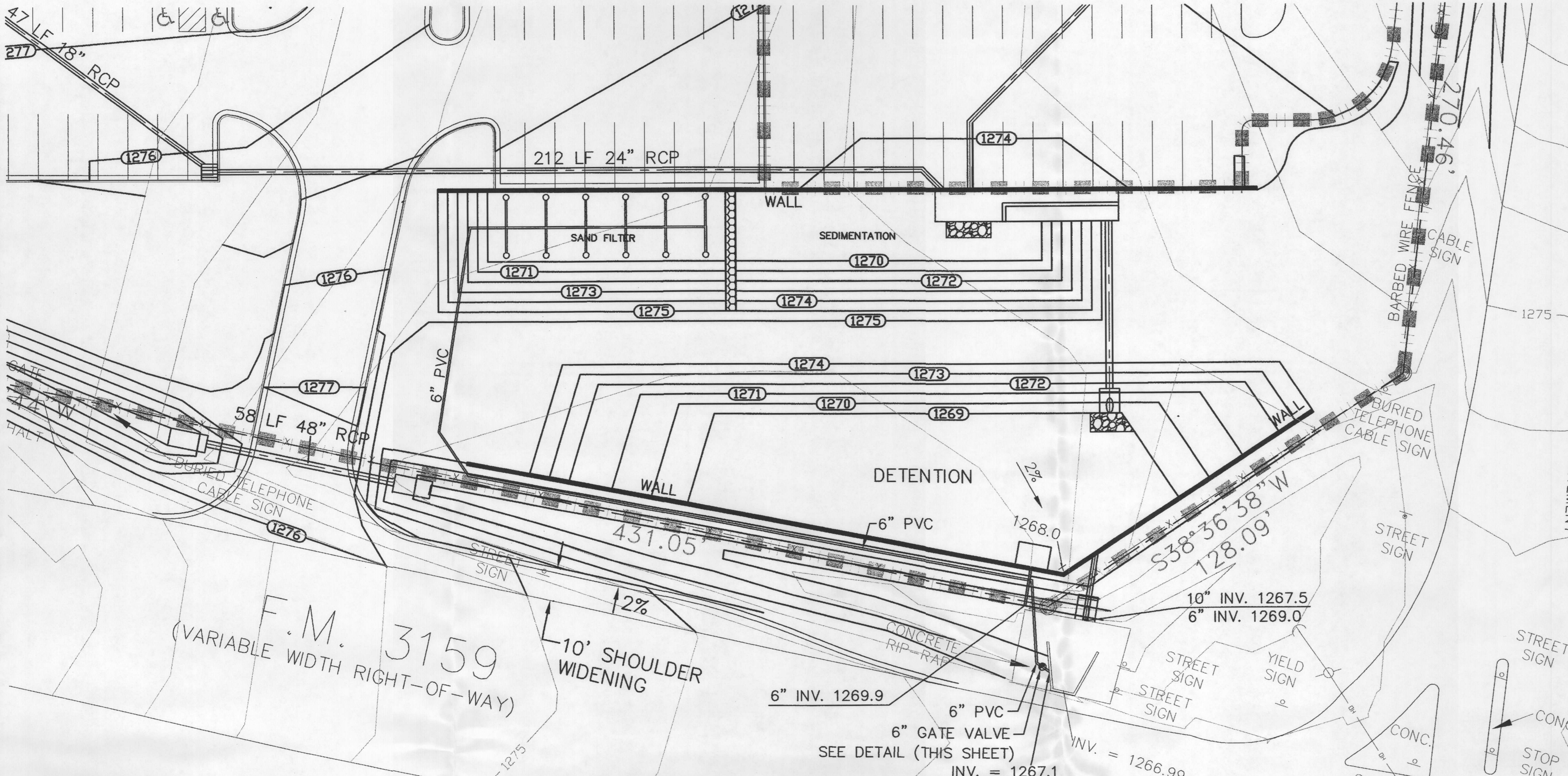


**PLAN LEGEND**

	PROPERTY LINE
	LOT LINE
	EASEMENT
	BUILDING LINE
	CURB AND GUTTER
	SIDEWALK
	PROPOSED CONTOUR
	EXISTING MAJOR CONTOUR
	PHASE LINE
	AREA INLET
	CURB INLET
	WATER VALVE
	FIRE HYDRANT
	MANHOLE
	TREE PROTECTION FENCING
	LIMITS OF CONSTRUCTION
	SILT FENCE
	ROCK BERM
	EXISTING TREE TO REMAIN
	EXISTING TREE TO BE REMOVED
	STABILIZED CONSTRUCTION ENTRANCE



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- PLAN LEGEND**
- PROPERTY LINE
  - LOT LINE
  - EASEMENT
  - BUILDING LINE
  - CURB AND GUTTER
  - SIDEWALK
  - PROPOSED CONTOUR
  - EXISTING MAJOR CONTOUR
  - PHASE LINE
  - AREA INLET
  - CURB INLET
  - WATER VALVE
  - FIRE HYDRANT
  - MANHOLE

**McKenna Health Care Phase I WQ Pond  
"PARTIAL" SEDIMENTATION / FILTRATION POND CALCULATIONS**

**DRAINAGE AREA DATA**

Drainage Area to Control	8.2 ac.
Drainage Area Impervious Cover (IC)	20 %
Capture Depth (0.5'*(IC-20)/100) (CD)	0.5 in.

**WATER QUALITY CONTROL CALCULATIONS**

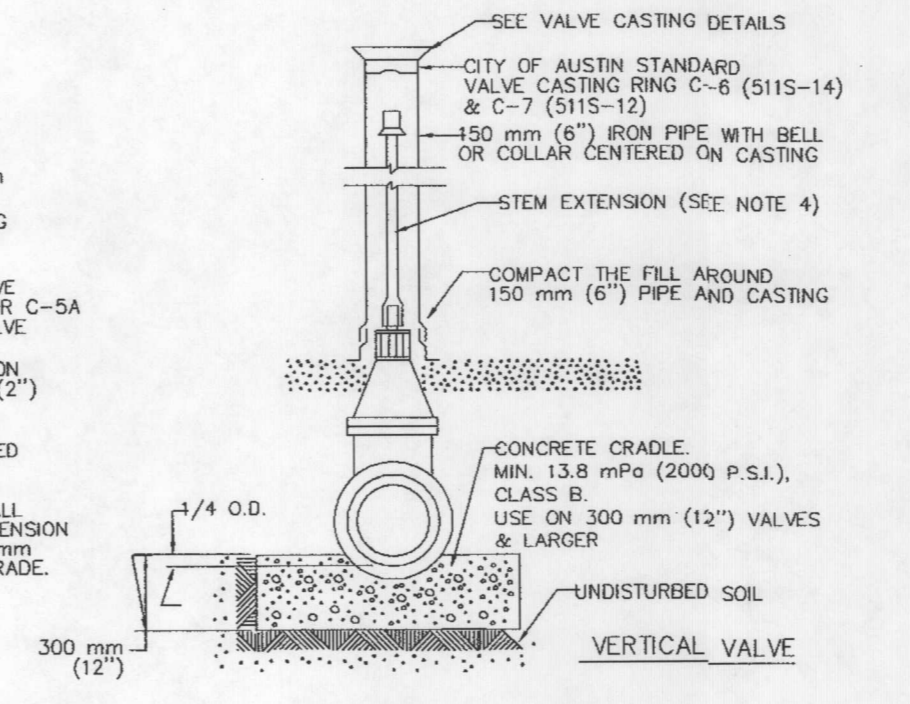
Pond #	Required	Provided	+20% req'd
Site Area Draining to Pond	8.2 ac.	8.2 ac.	
Total Area Draining to Pond	8.2 ac.	8.2 ac.	
Design Peak Flow Rate	40 cfs	40 cfs	
Water Quality Volume (WQV=CD*Area)	14,883 cf.	26,771 cf.	17859.6 req'd
Sedimentation Pond Vol. (min.20% WQV)	2,977 cf.	11,986 cf.	
Filtration Pond Area (min.=WQV/10)	n/a cf.	2,978 sf.	
Filtration Pond Volume	n/a cf.	14,785 cf.	

Water Quality Elevation	1274.00
Elev. of Splitter Weir(-WQelev)	1274.00
Height of Gabion Wall (WQelev-0.5')	1273.50

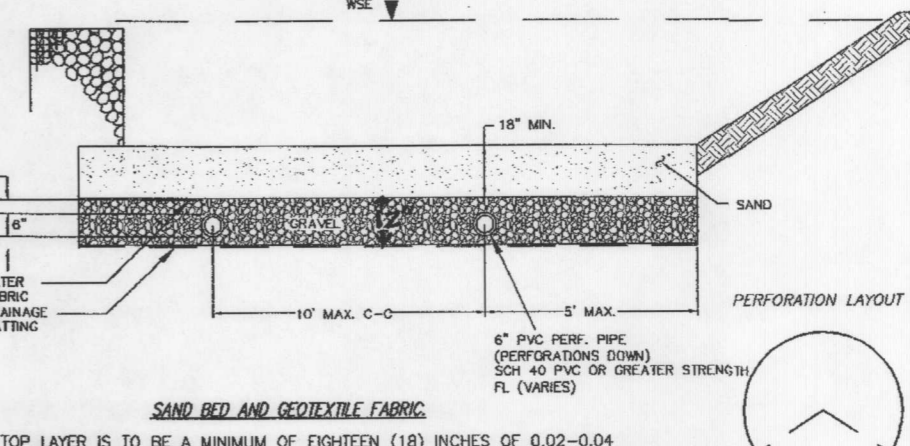
Length of Splitter Weir	40 ft.	C=3.0
Required Head to Pass Design Flow	0.48 ft.	
Top of Wall or Berm	1275.00	
Water Quality Pond Freeboard Provided	0.52 ft.	

Sedimentation Pond Stage(ft.)	Area(sf)	Storage(cf)	Filtration Pond	
			Stage(ft.)	Area(sf) Storage(cf)
1270.00	2,000	0	1270.00	3,219 3,036
1271.00	2,500	2,245	1271.00	3,731 3,472
1272.00	3,000	4,992	1272.00	4,136 3,932
1273.00	3,500	8,238	1273.00	4,559 4,346
1274.00	4,000	11,988		

- NOTES:**
- WELD SOCKET 64 mm X 51 mm (2 1/2" X 2") DEEP TO 25 mm (1") SCH. 40 ROUND STEEL EXTENSION, FITTED ON OPERATING NUT. SCH. 40 FOR LENGTHS OVER 3 m (10').
  - CITY OF AUSTIN STANDARD VALVE CASTING RING C-6 & LID C-7 OR C-5A LID IN UNPAVED AREAS. SEE VALVE CASTING DETAIL.
  - NUT AT TOP OF VALVE EXTENSION. NUT SHALL BE SQUARE 51 mm (2") LONG WELDED TO TOP OF ROD.
  - VALVE EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 0.9 m (3') DEEP FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 450 AND 600 mm (18 AND 24") FROM FINISHED GRADE.



TYPICAL GATE VALVE



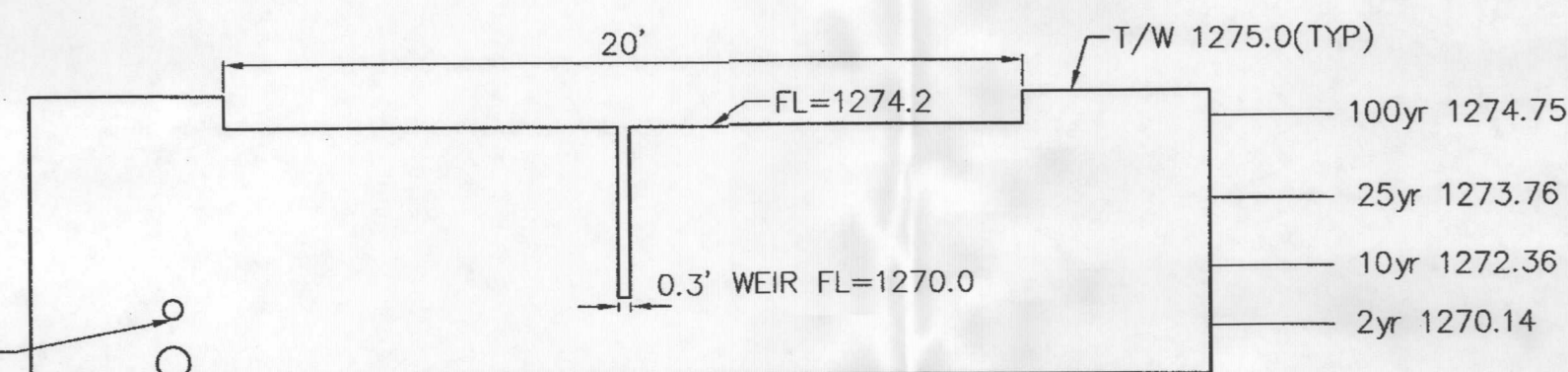
THE TOP LAYER IS TO BE A MINIMUM OF EIGHTEEN (18) INCHES OF 0.075-0.04 INCH DIAMETER SAND WHICH CORRESPONDS WITH ASTM C-33 CONCRETE SAND. SMALLER SAND SIZE IS NOT ACCEPTABLE. UNDER THE SAND SHALL BE A LAYER OF ONE-HALF (0.5) TO ONE AND ONE-HALF (1.5) INCH DIAMETER WASHED, ROUND, HEAVY GRAVEL WHICH PROVIDES A MINIMUM OF THREE (3) INCHES OF COVER OVER THE TOP OF THE UNDERLAYER. THE SAND AND GRAVEL MUST BE SEPARATED BY A LAYER OF GEOTEXTILE FABRIC MEETING THE SPECIFICATIONS LISTED IN SECTION 1.6.2(C).

**TABLE 1-9 ELEM**

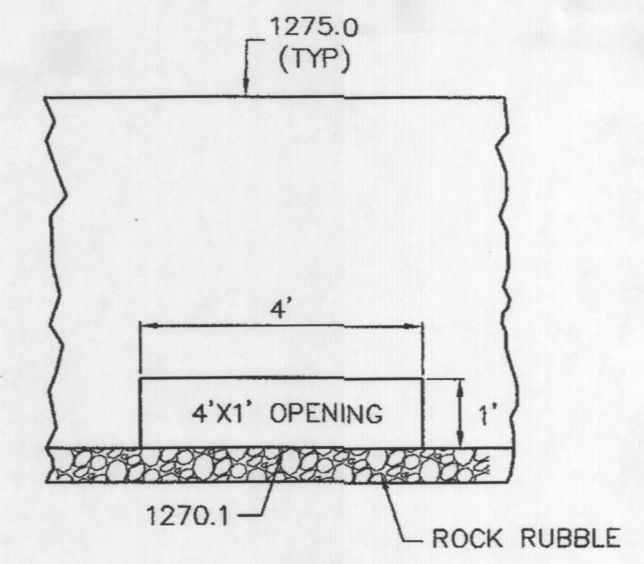
PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MINIMUM SAND	ASTM D-2952	%	85 (MIN)
FINISHING SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)

**TABLE 1-7 ELEM**

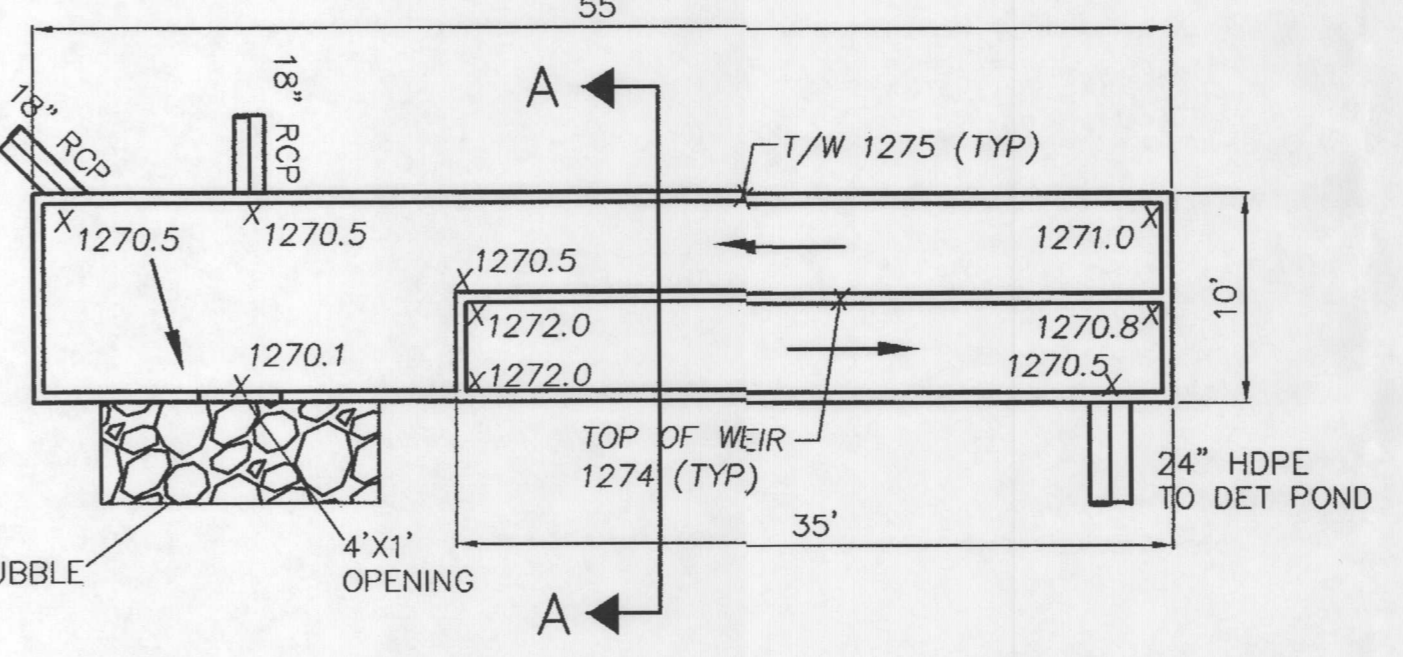
PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MINIMUM SAND	ASTM D-2952	%	85 (MIN)
FINISHING SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)
PERCENTAGE SAND	ASTM D-2952	%	100 (MIN)



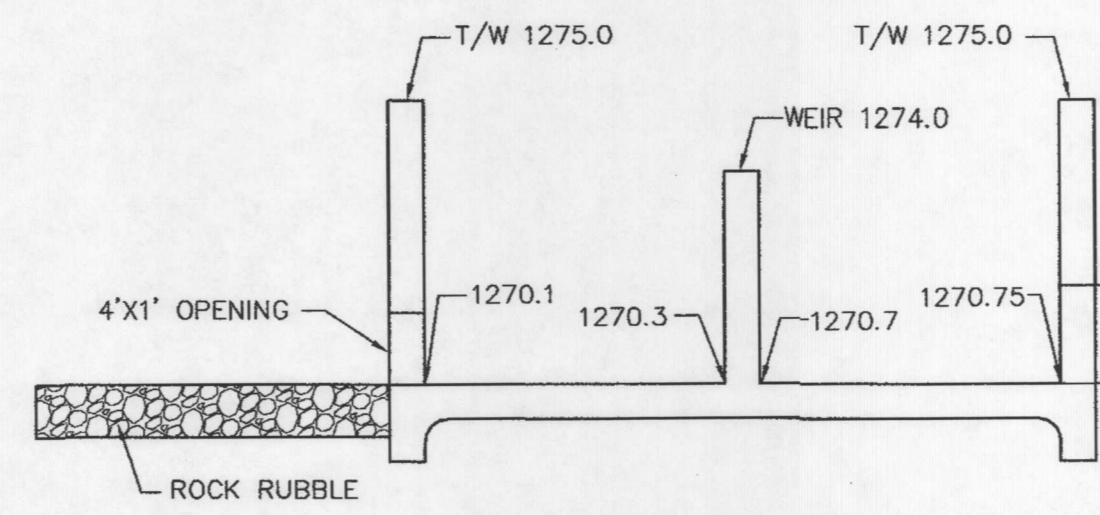
OUTLET STRUCTURE NTS



FRONT VIEW NTS

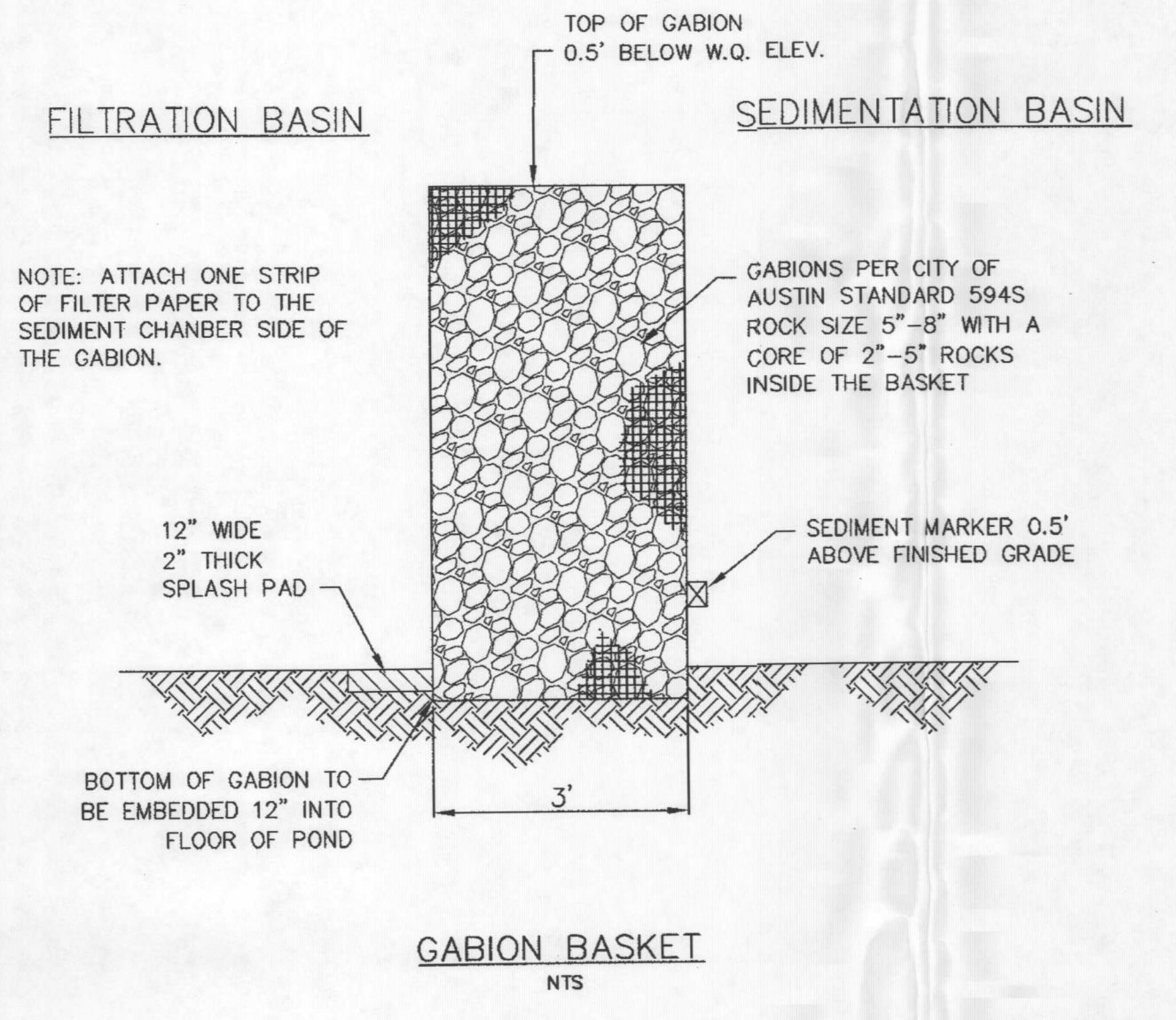


PLAN VIEW NTS



SECTION A-A NTS

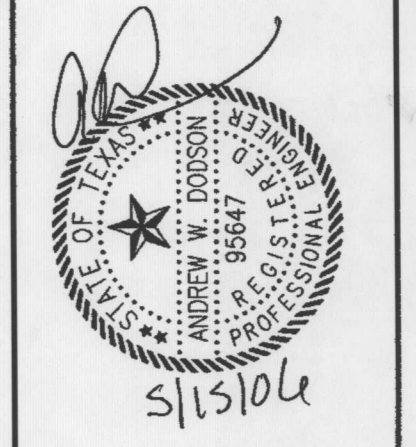
SPLITTER BOX DETAIL



GABION BASKET NTS

L:\2022\160-10157-000-Prod\400 Construction Plans\01 Submittal Drawings\09-WQ-WQ-DET-1.dwg May 15, 2025 - 2:21pm amsdson

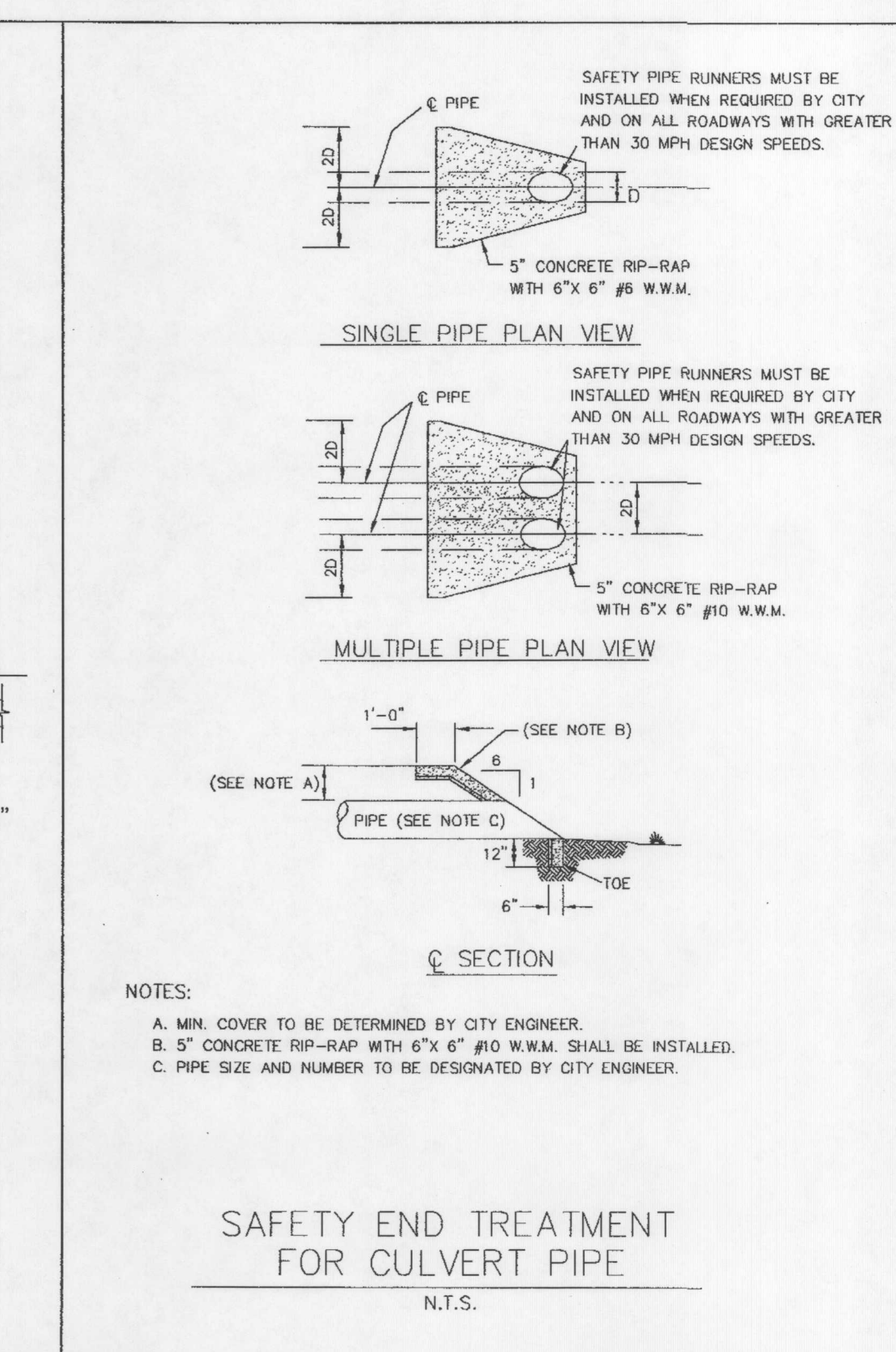
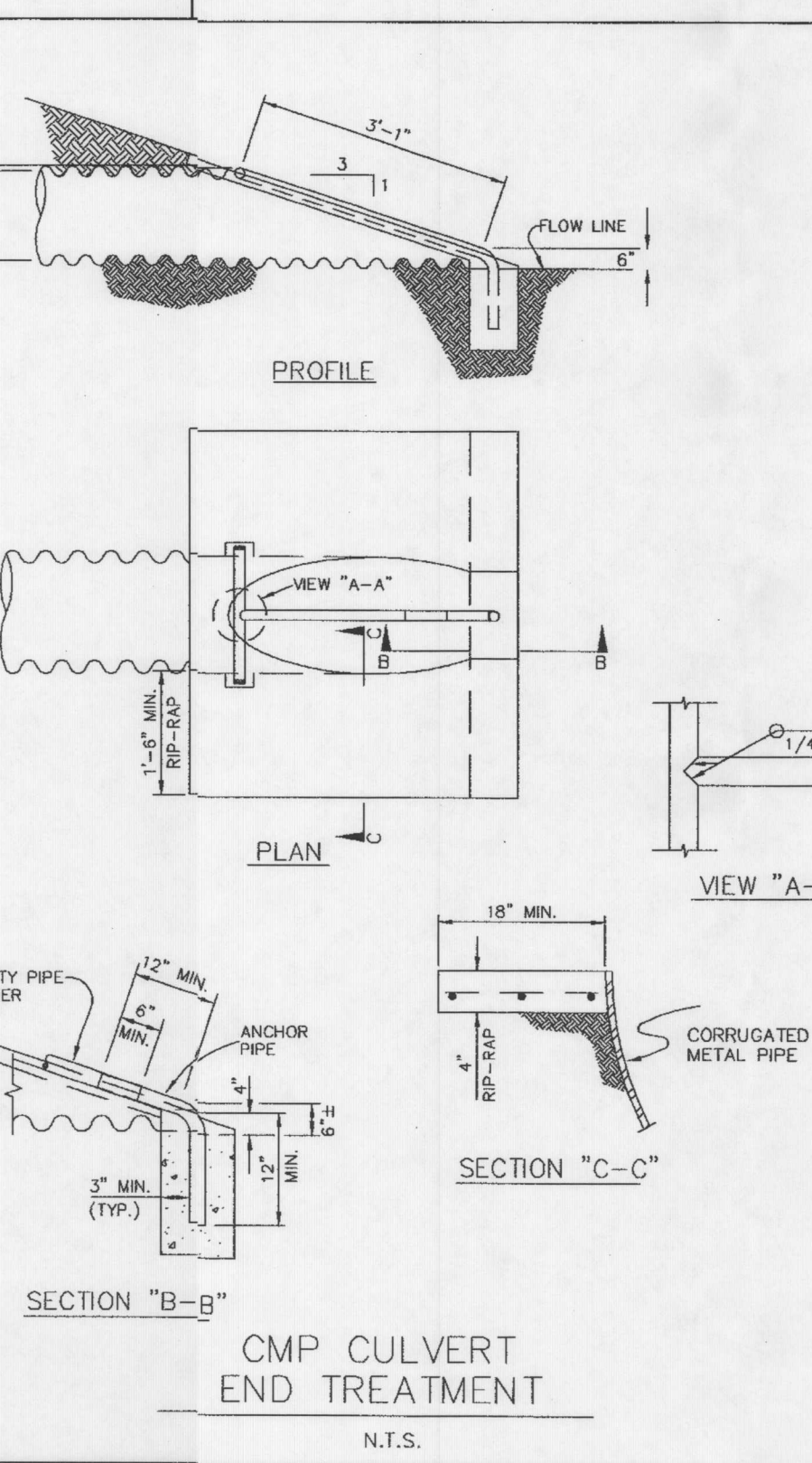
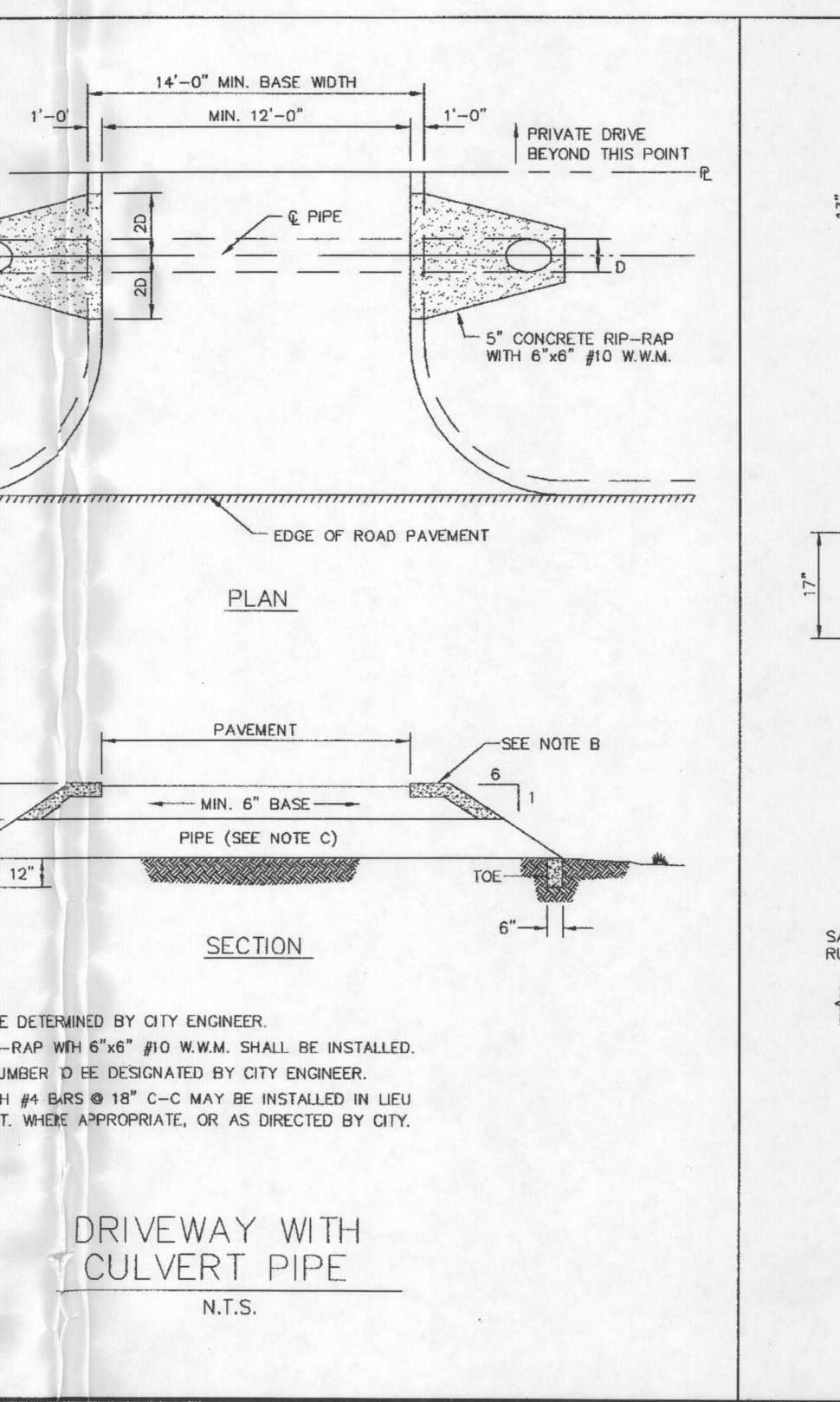
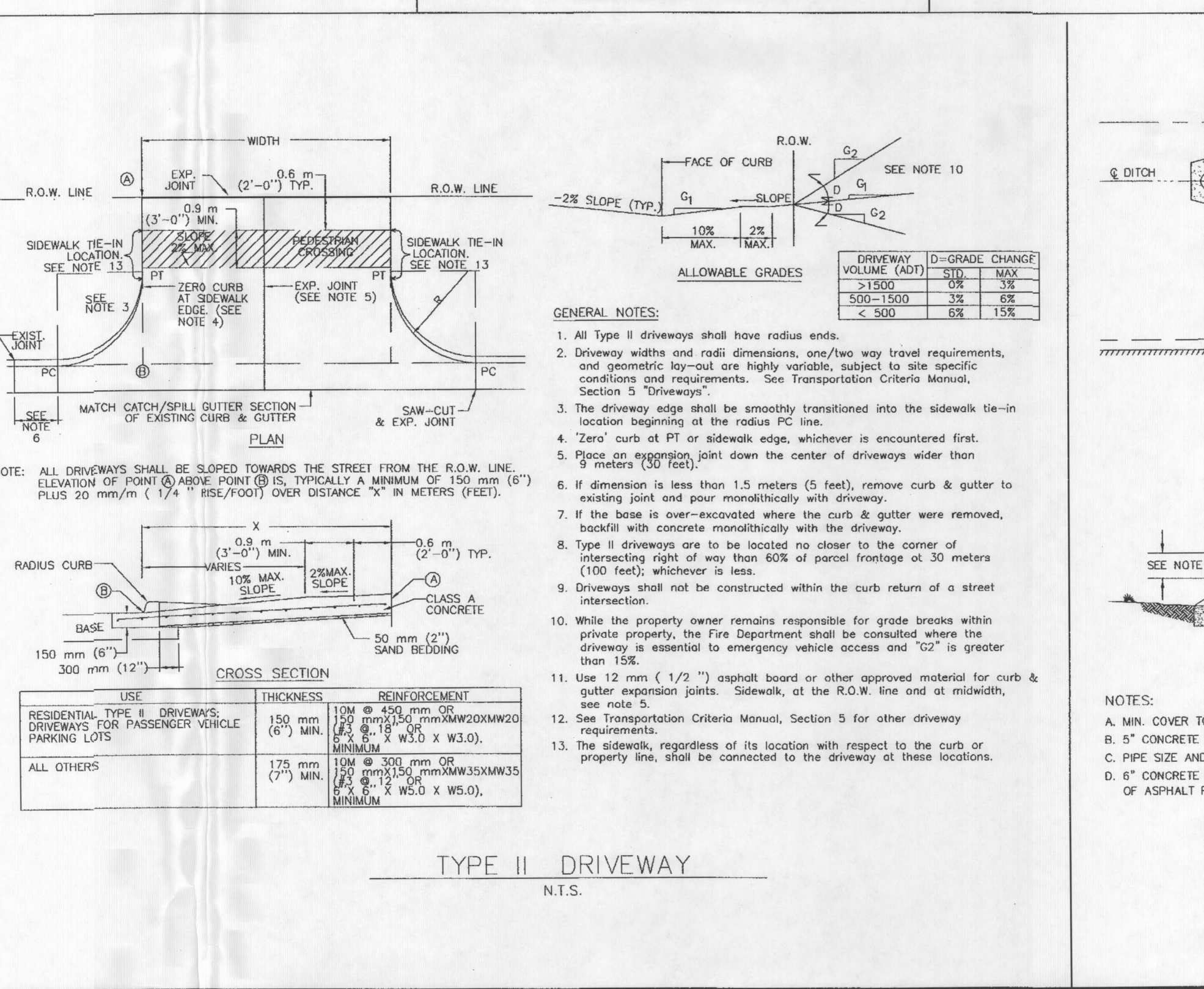
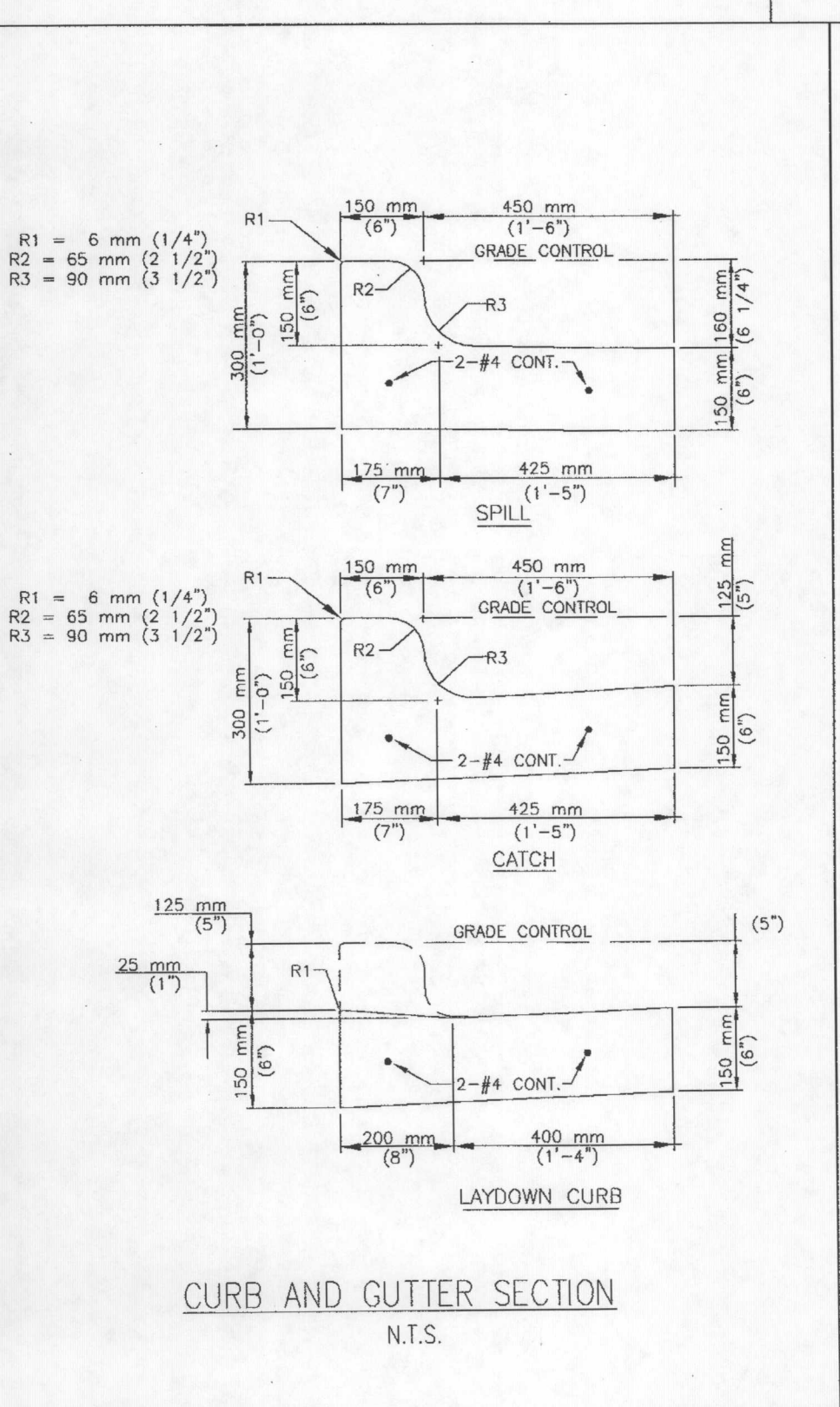
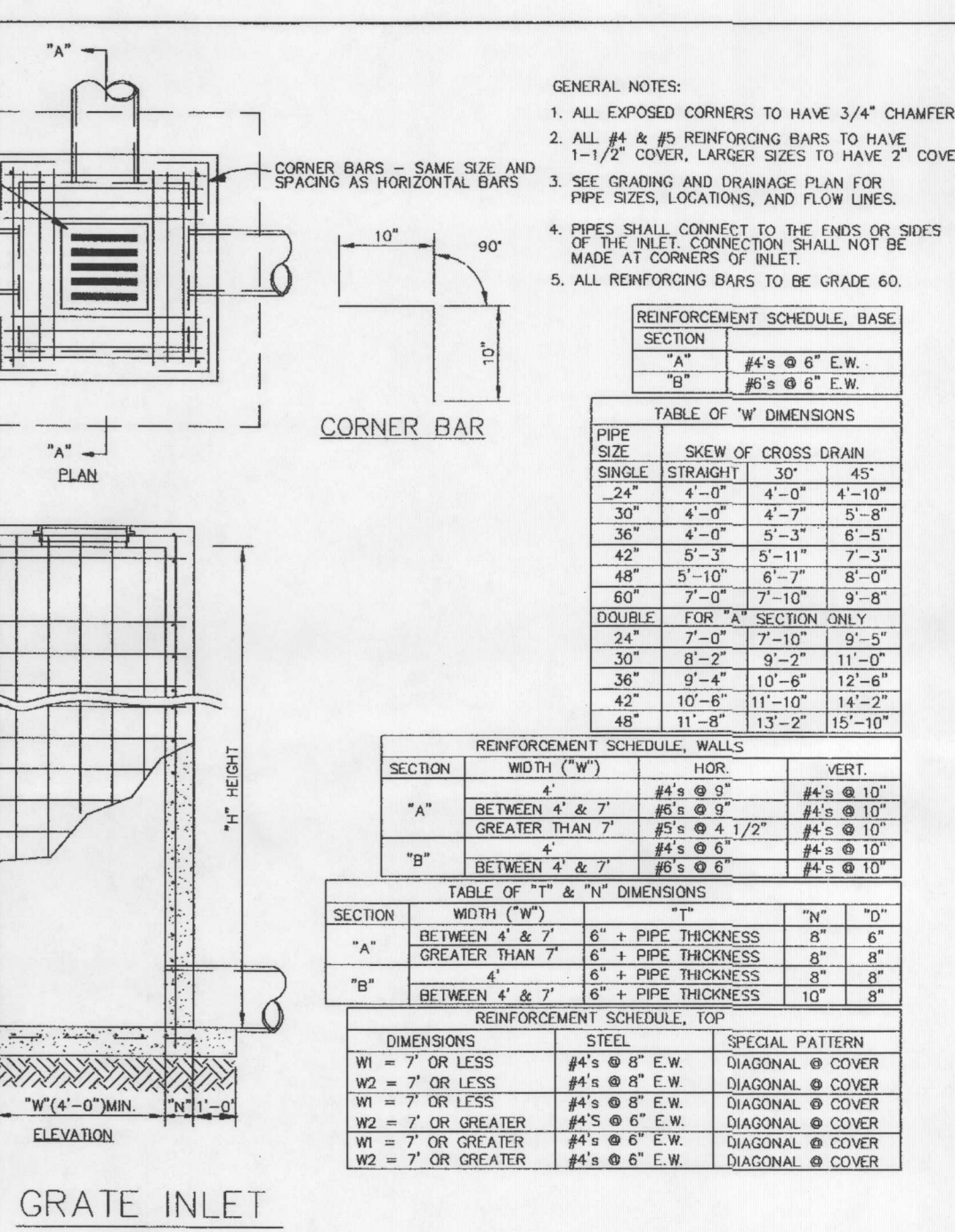
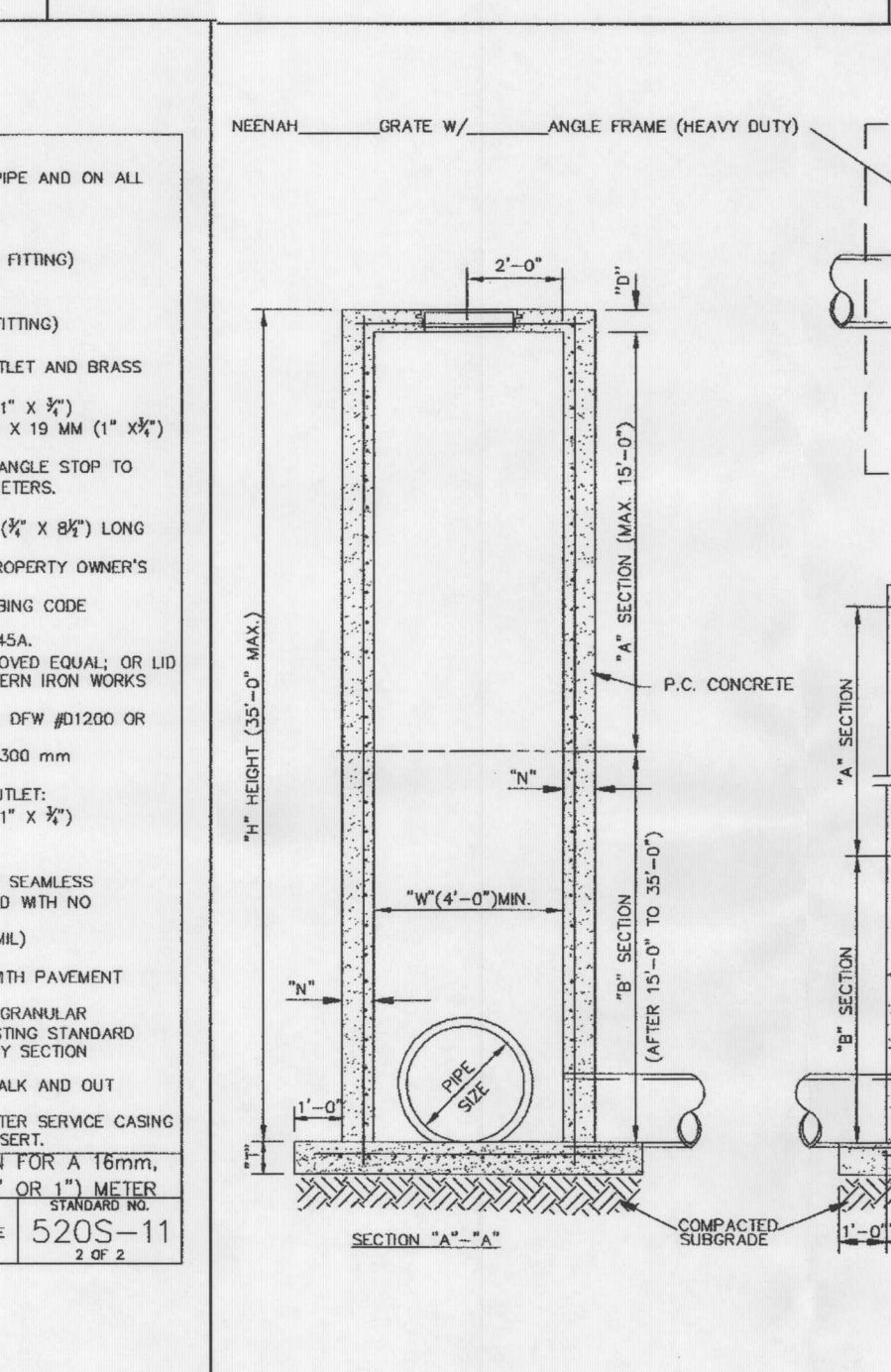
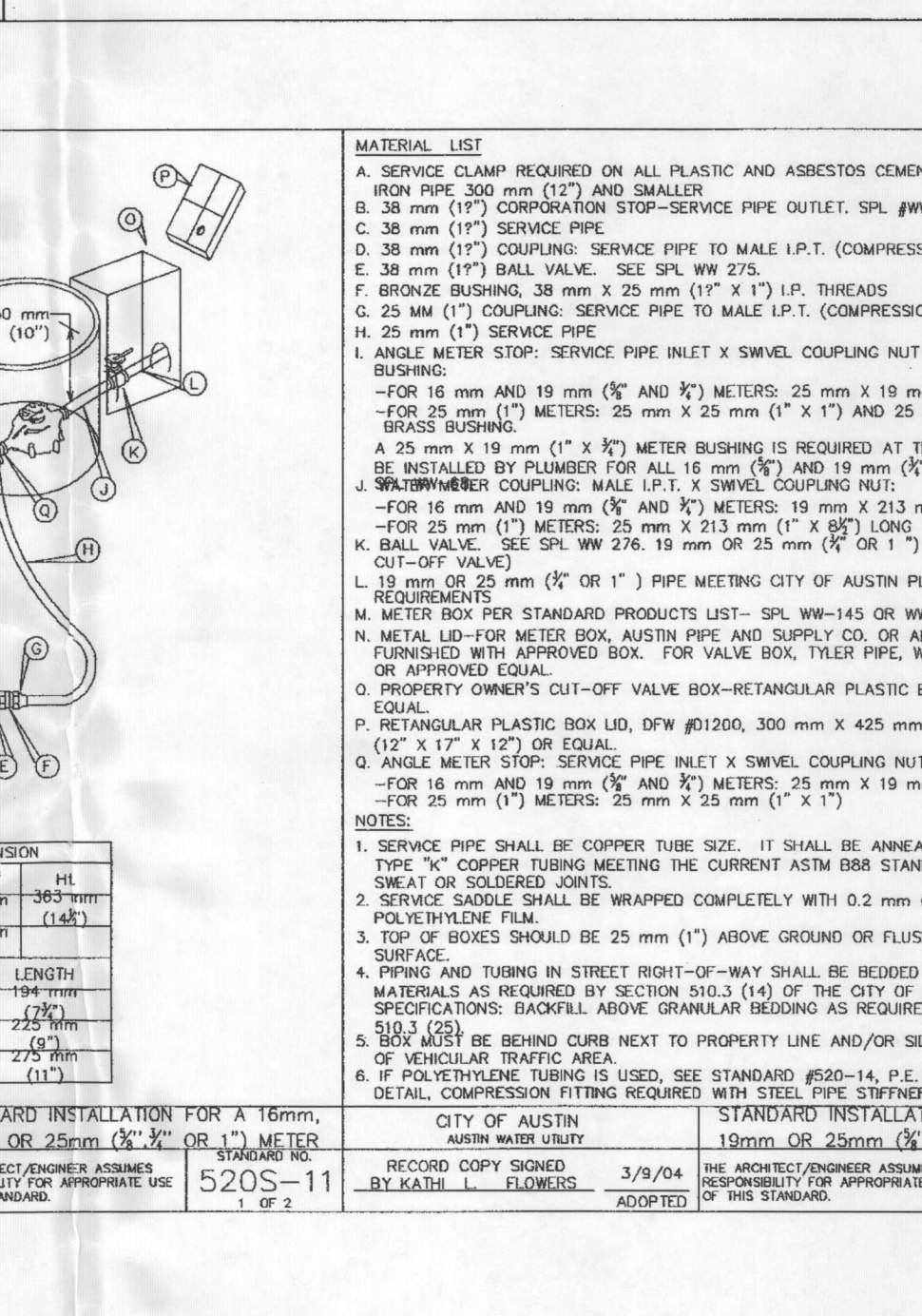
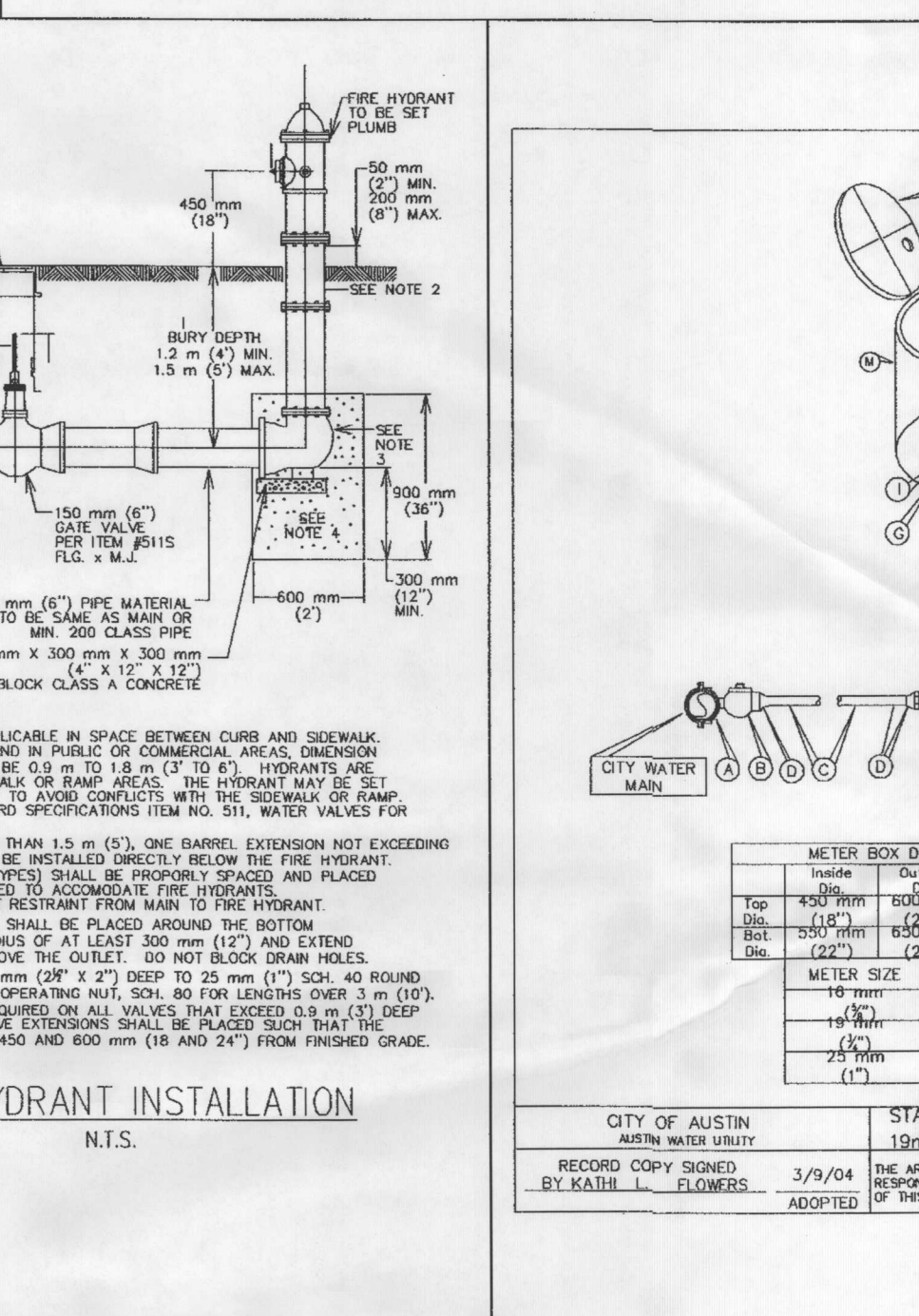
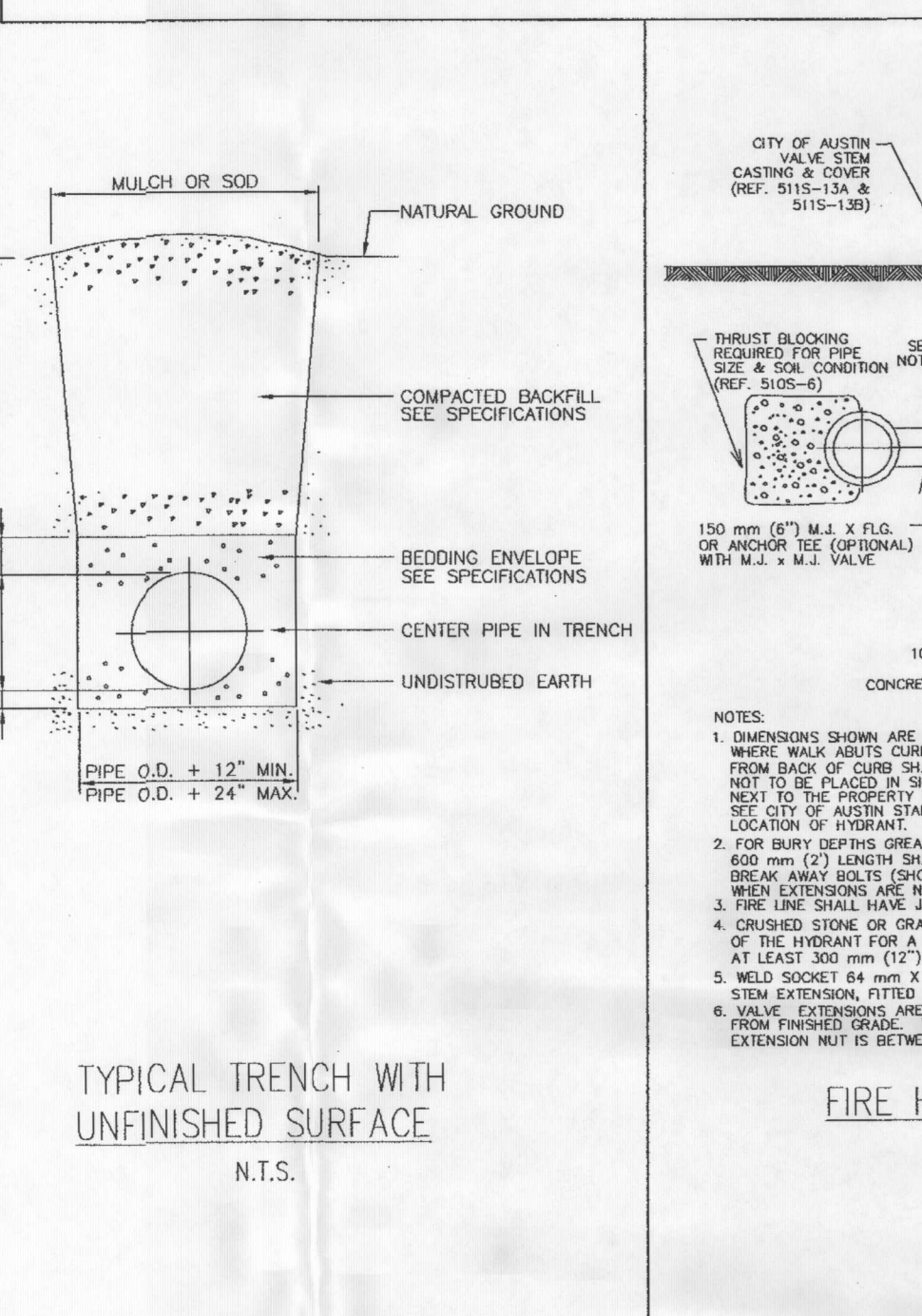
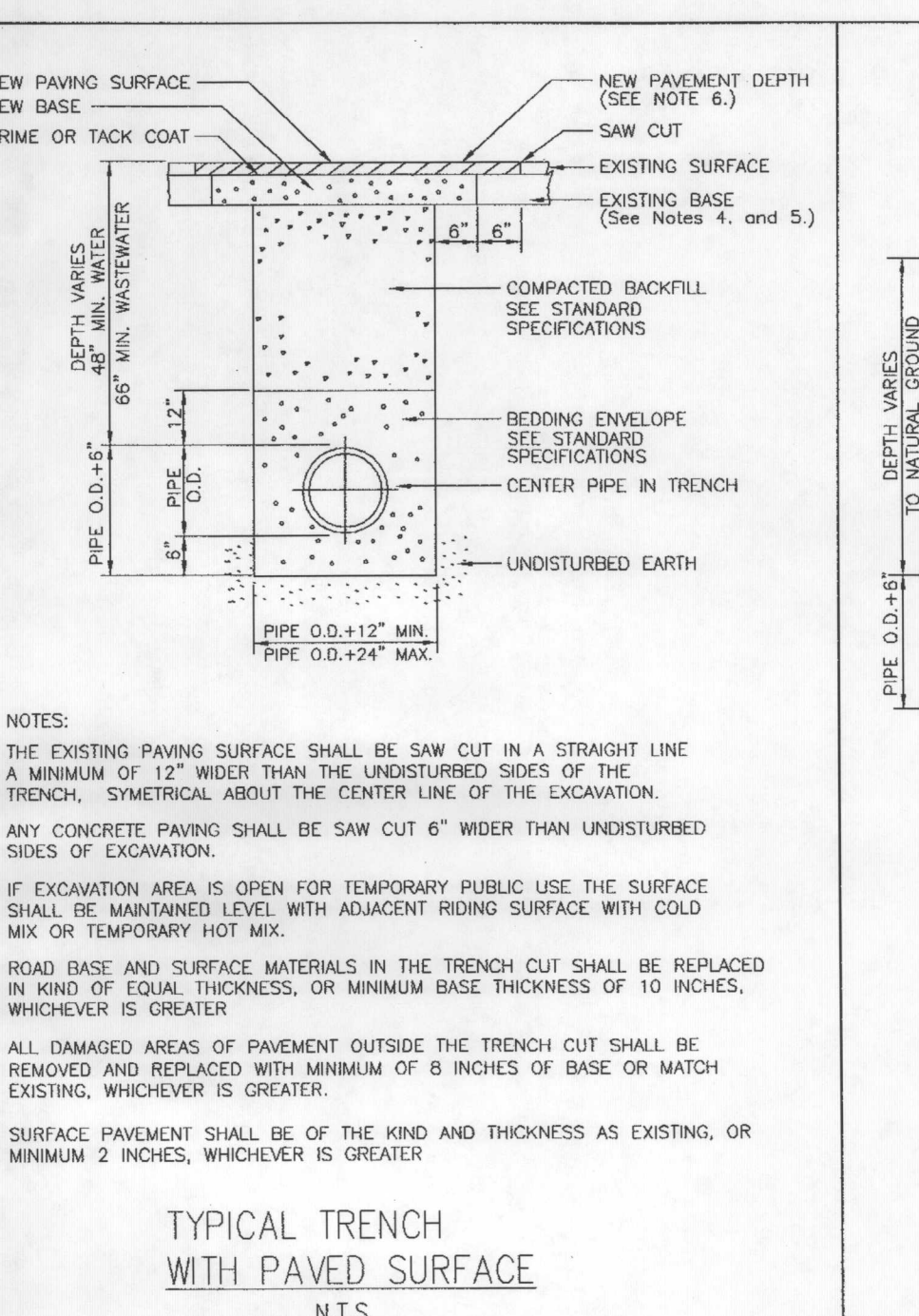
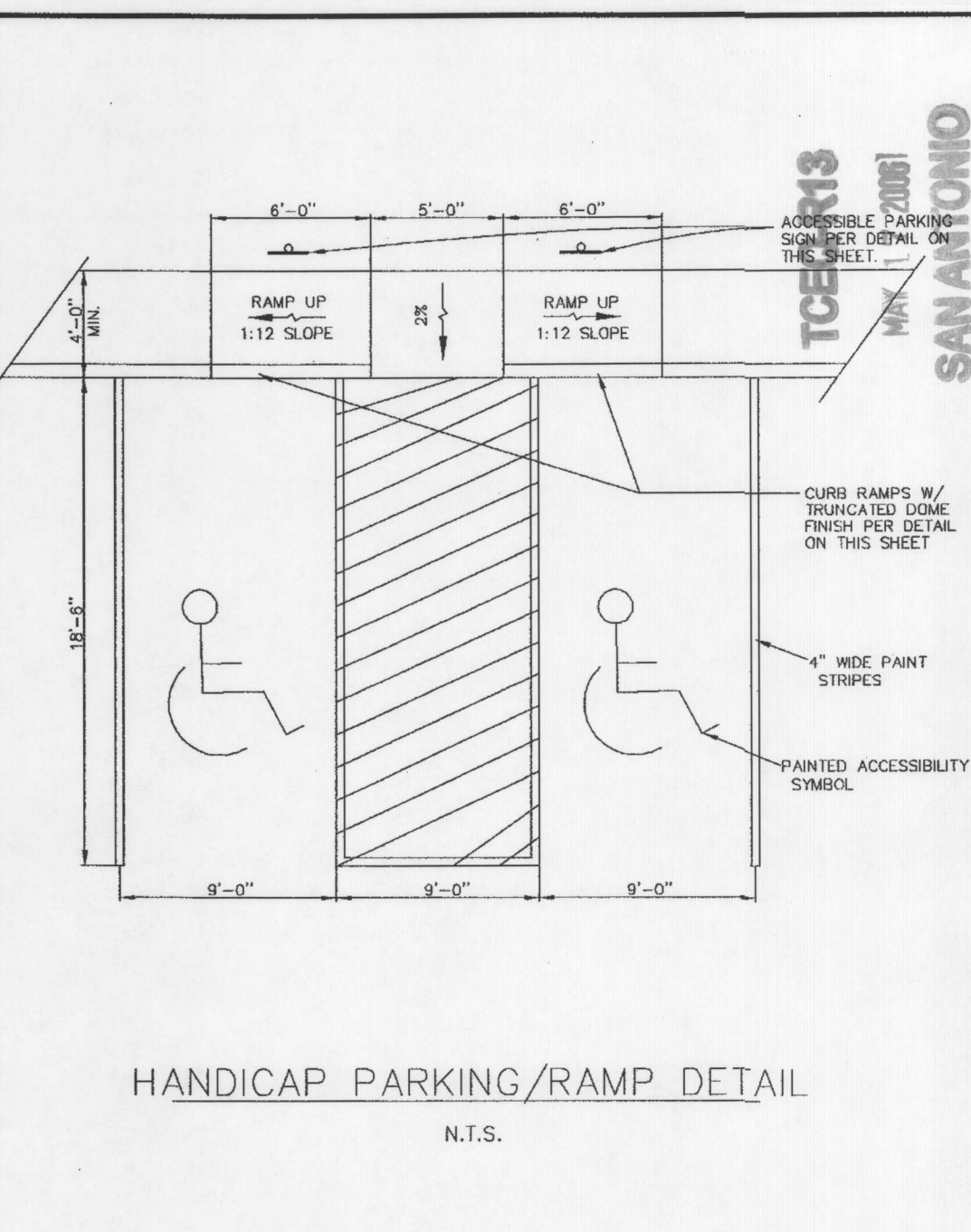
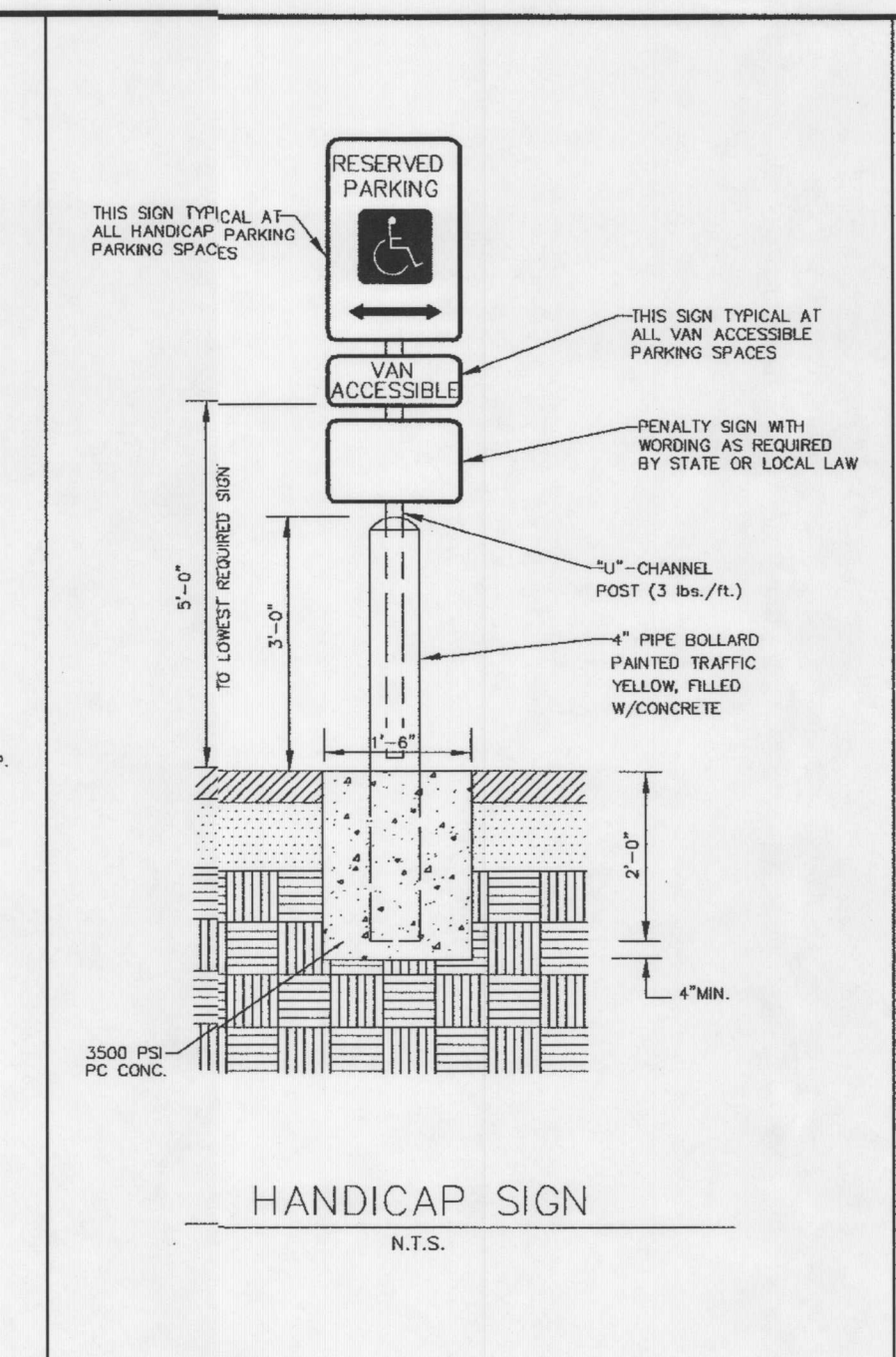
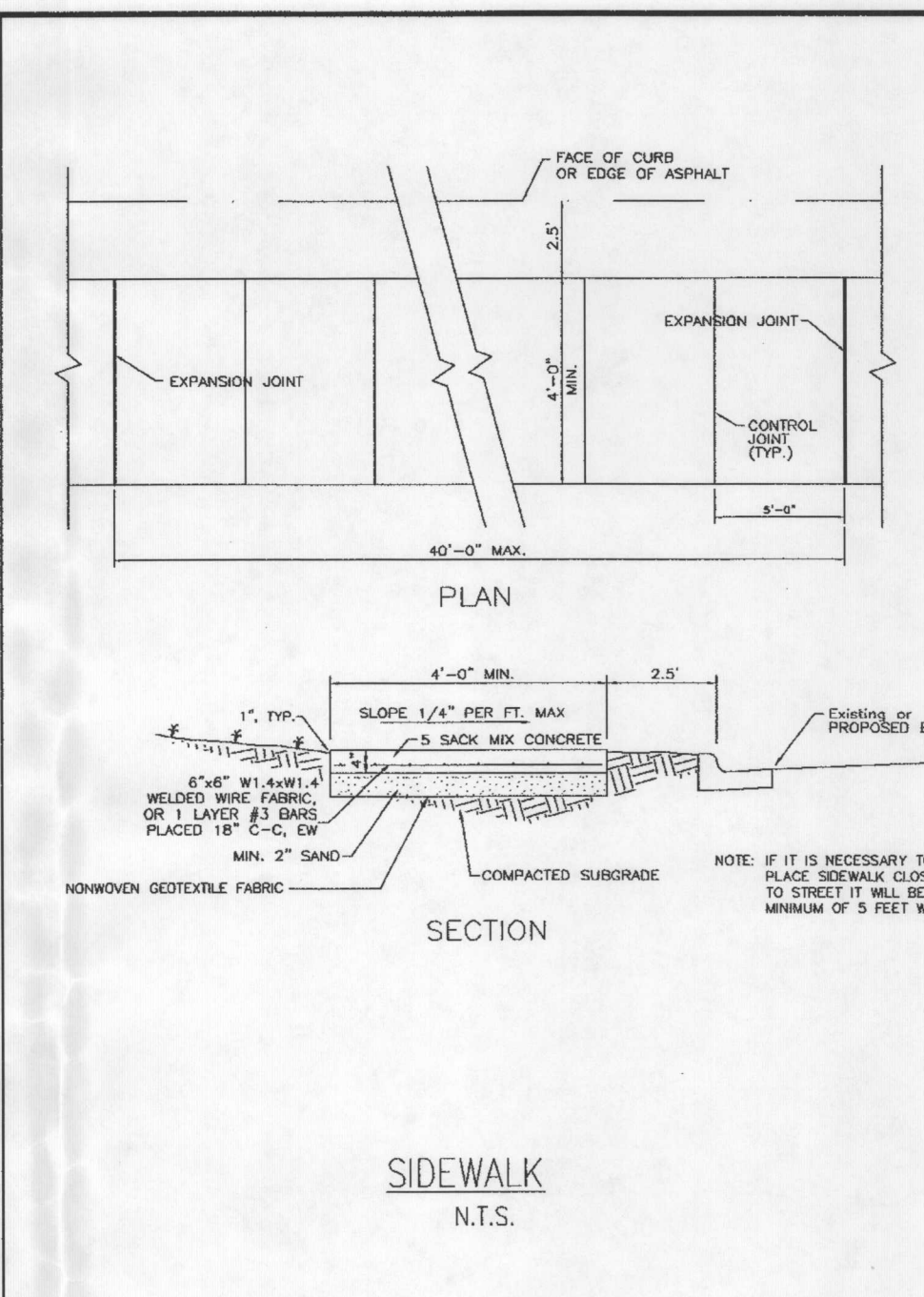
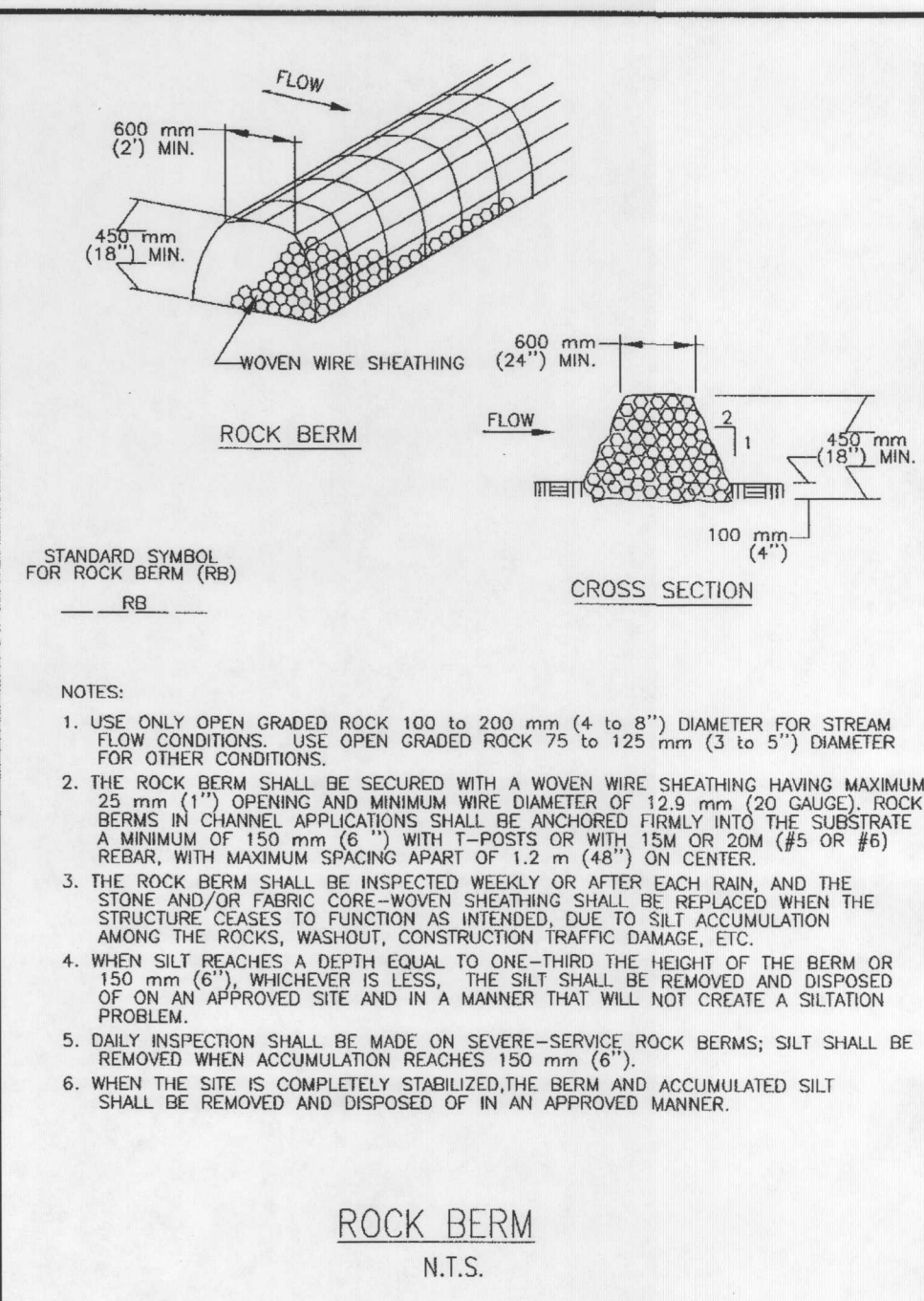
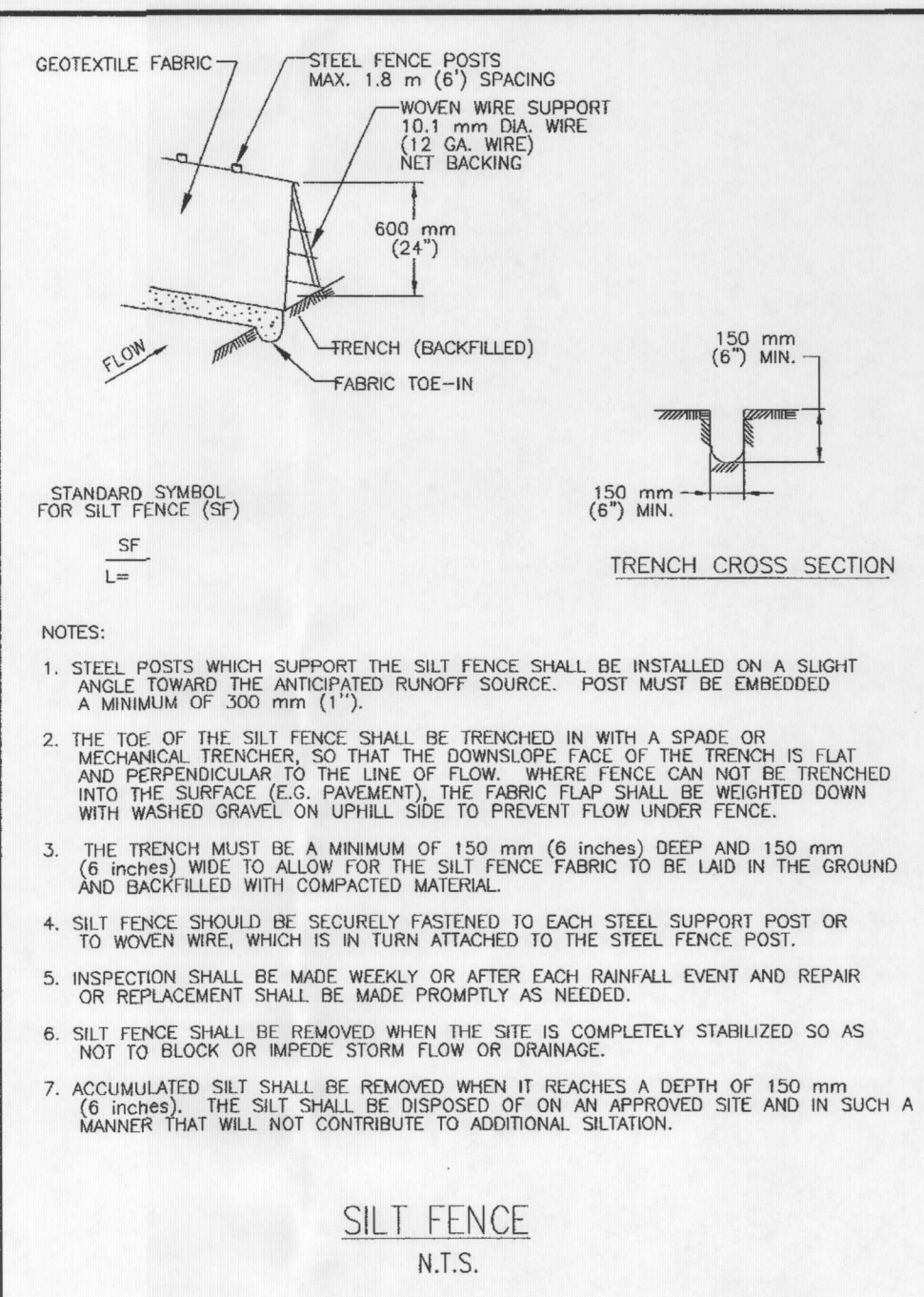
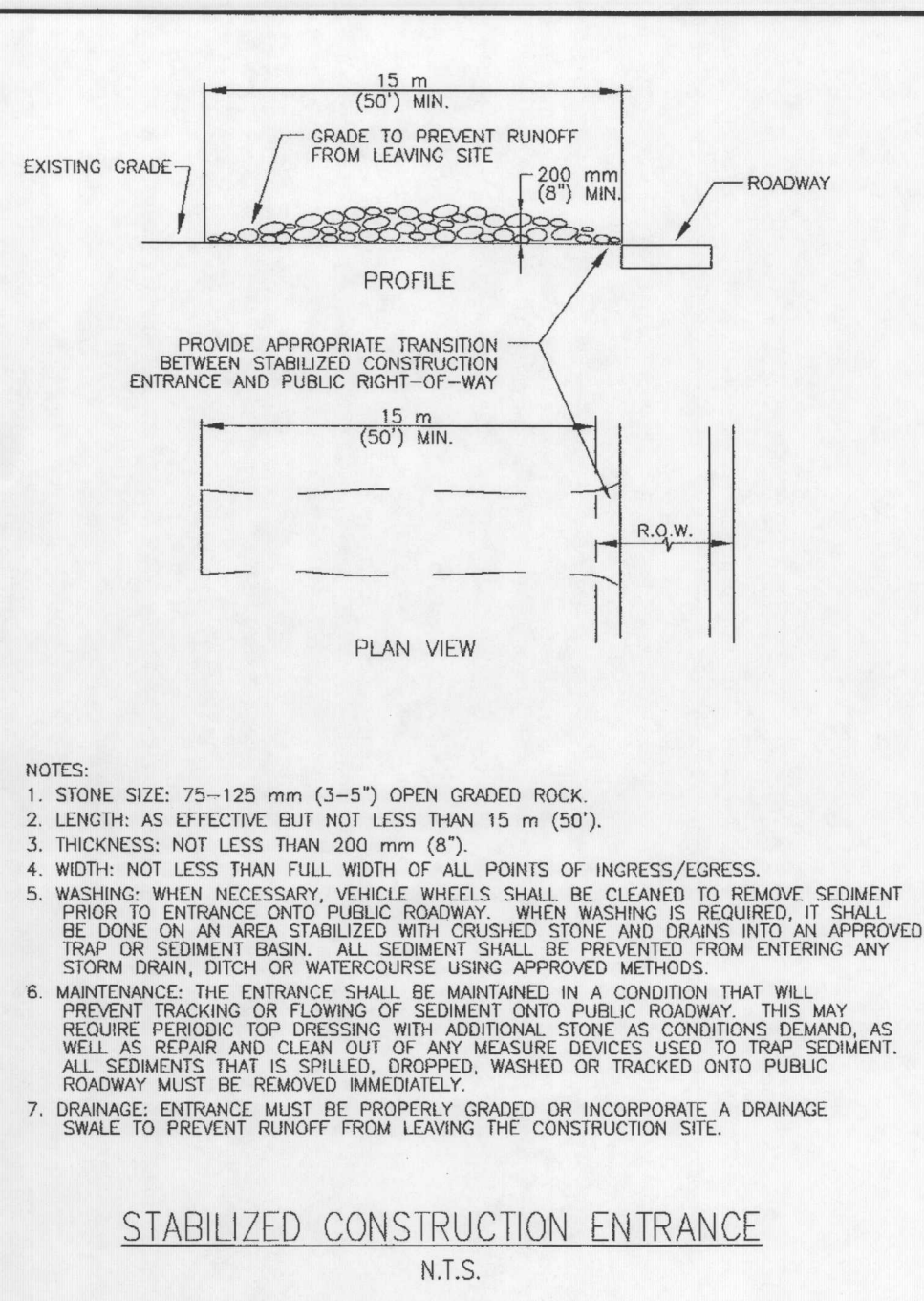
**Lockwood, Andrews & Newnam, Inc.**  
A LEAD COMPANY  
1986 MCNEEBOULEVARD, STE. 100, AUSTIN, TX 78769



**MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
WATER QUALITY POND PLAN & DETAILS**

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHON  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400





**Lockwood, Andrews & Newnam, Inc.**  
A LEAD A DAILY COMPANY  
1800 MC PACE BOULEVARD, SUITE 100, AUSTIN, TX 78799

**MCKENNA HEALTH CARE**  
**NEW BRAUNFELS, TEXAS, M.O.B.**  
**STANDARD DETAILS**

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHEN  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-180-10157-400

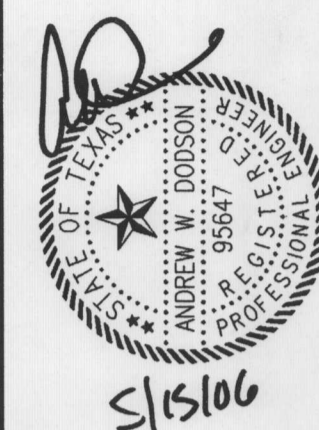
Sheet Number **8** OF **8**

# MCKENNA HEALTH CARE Contributing Zone Plan Phase 1 NEW BRAUNFELS, TEXAS, M.O.B.

TCEQ-R13  
JUN 12 2006  
SAN ANTONIO

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JUN 19 2006  
COUNTY ENGINEER

**lan**  
Lockwood, Andrews  
& Newnam, Inc.  
A LEED A DALY COMPANY  
10801 NORTH MOPAC, BLDG. 1, STE. 120, AUSTIN, TX 78759

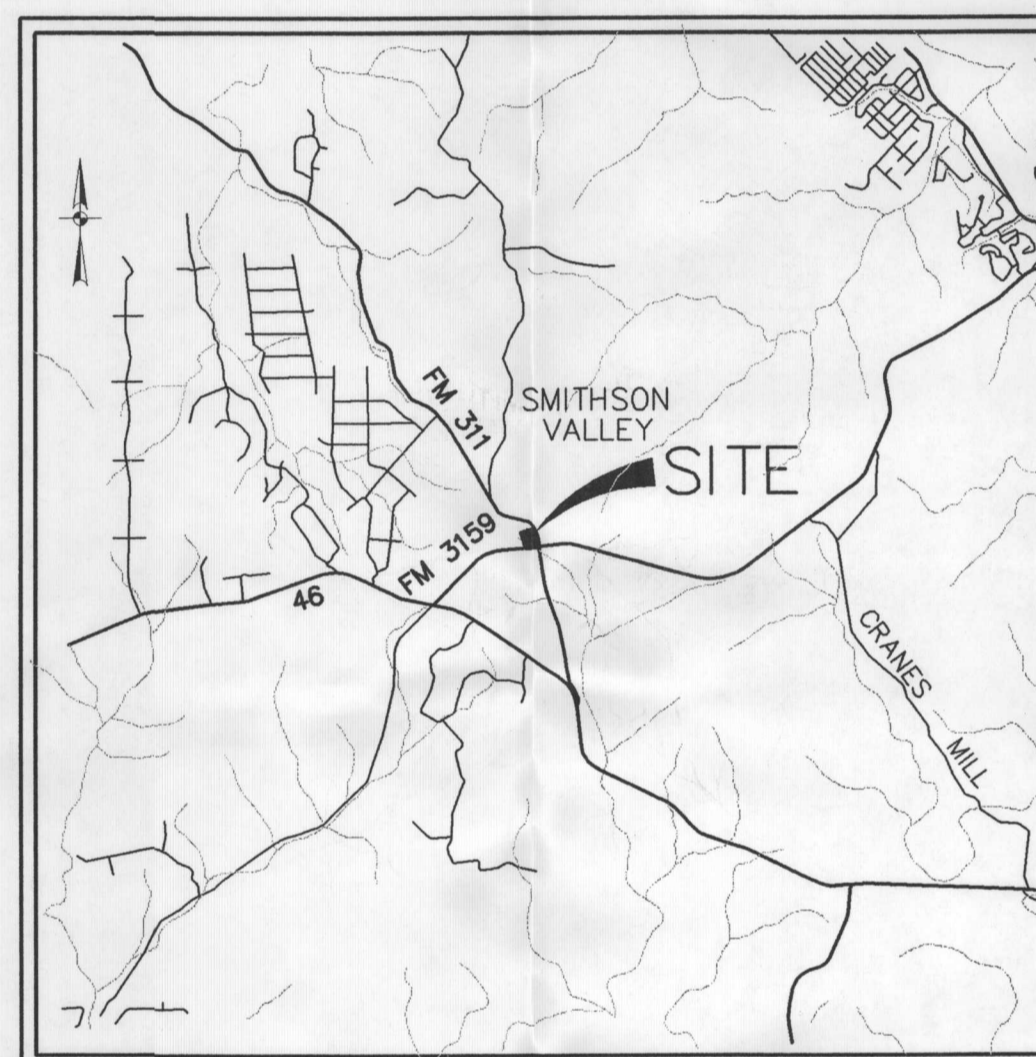


**GENERAL INFORMATION:**

SUBMITTAL DATE: OCTOBER 26, 2005  
PROJECT ADDRESS: FM 311 @ FM 3159  
PROPERTY OWNER: MCKENNA HEALTH CARE

**LEGAL DESCRIPTION:**

A 8.199 ACRE, OR 357,132 SQUARE FEET, MORE OR LESS, TRACT OF LAND, BEING ALL OF THE CALLED 8.207 ACRE TRACT CONVEYED TO MONTSERRAT GONZALEZ GARDUNO IN WARRANTY DEED WITH VENDOR'S LIEN RECORDED IN DOCUMENT 9906029986 OF THE OFFICIAL RECORDS OF COMAL COUNTY, TEXAS, AND BEING OUT OF THE T.P. KUYKENDAHL SURVEY NO. 461, ABSTRACT 332, OF COMAL COUNTY, TEXAS, SAID 8.199 ACRE TRACT BEING MORE FULLY DESCRIBED AS FOLLOWS, WITH THE BASIS OF BEARINGS BEING THE TEXAS COORDINATE SYSTEM SOUTH CENTRAL ZONE FROM THE NORTH AMERICAN DATUM OF 1983 (CORS 1996):



LOCATION MAP  
N.T.S.

**SHEET INDEX**

1. COVER SHEET
2. GENERAL NOTES
3. OVERALL DRAINAGE AREA MAP
4. SITE PLAN - PHASE I
5. GRADING PLAN - PHASE I
6. EROSION & SEDIMENTATION PLAN - PHASE I
7. WATER QUALITY POND PLAN & DETAILS
8. DETAILS

**DESIGN PROFESSIONALS:**

CIVIL ENGINEER: LOCKWOOD, ANDREWS & NEWNAM, INC.  
10801 NORTH MOPAC EXPY., BLDG. 1, STE. 120  
AUSTIN, TX 78759  
CONTACT: MR. ANDREW DODSON P.E.  
(512) 338-4212 FAX: (512) 338-4942

SURVEYOR: PAPE-DAWSON ENGINEERS  
555 EAST RAMSEY  
SAN ANTONIO TEXAS 78216  
PHONE: (210)375-9000  
FAX: (210)375-9010

MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.

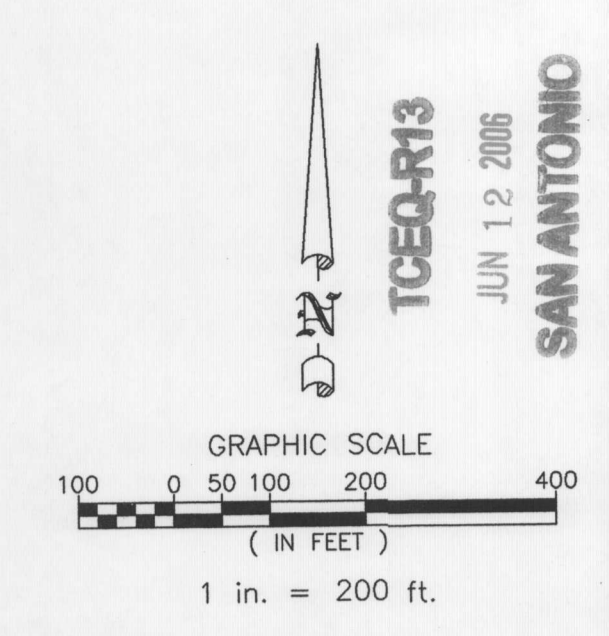
COVER SHEET

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHEN  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO: 120221-160-10157-400

Sheet Number  
1  
SHT 1 OF 8

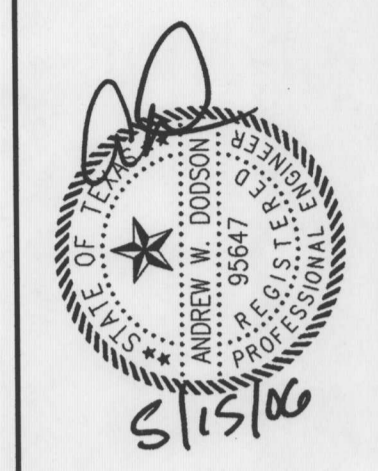


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- PLAN LEGEND**
- PROPERTY LINE
  - LOT LINE
  - - - EASEMENT
  - BUILDING LINE
  - CURB AND GUTTER
  - SIDEWALK
  - PROPOSED CONTOUR
  - - - EXISTING MAJOR CONTOUR
  - - - PHASE LINE
  - AREA INLET
  - CURB INLET
  - WATER VALVE
  - FIRE HYDRANT
  - MANHOLE
  - DRAINAGE FLOW DIRECTION
  - DRAINAGE AREA

**Lockwood, Andrews & Newnam, Inc.**  
A LEO A DALY COMPANY  
1800 MIDLAND EXPRESS, SUITE 100, AUSTIN, TX 78759



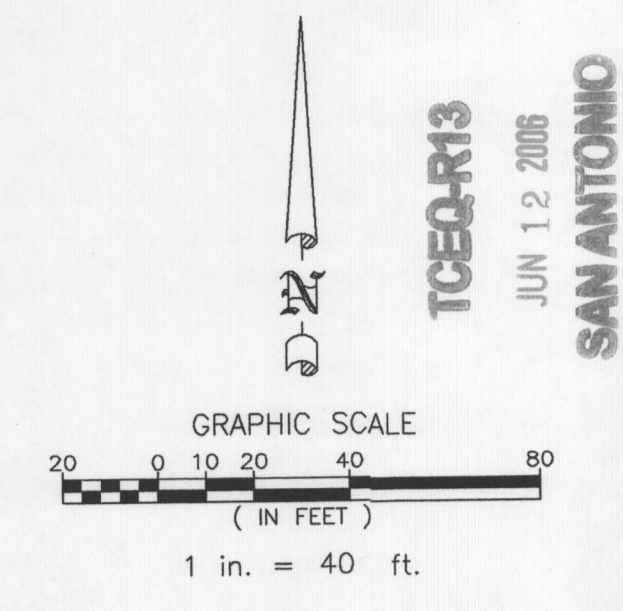
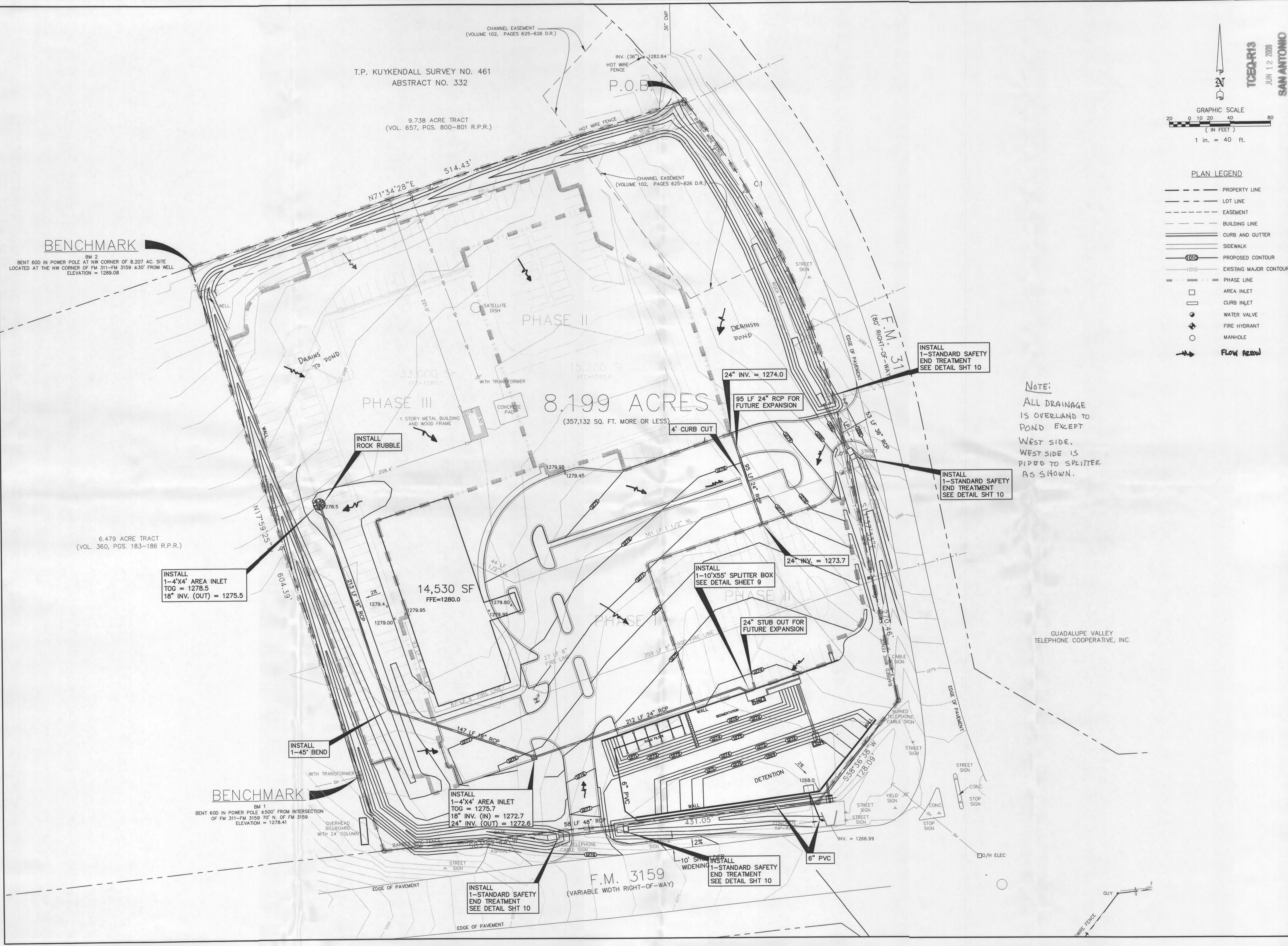
**MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
OVERALL DRAINAGE AREA MAP**

McKenna Health Care  
Time of Concentration

DRAINAGE AREA	SCS TIME OF CONCENTRATION				FROM TR 55			SHALLOW CONCENTRATED PAVED SURFACE			CONCENTRATED S.S. OR CHANNEL			CONCENTRATED FLOW MAIN CHANNEL			TOTAL Tc (.6 * Tc)			
	N	P-2yr/24hr L	4.2 IN S	Tt(hr)	L	V (FPS)	Tt(hr)	L	V (FPS)	Tt(hr)	L	V (FPS)	Tt(hr)	L	V	Tt(hr)	dev	T log		
<b>Predeveloped</b>																				
A1	0.13	150	0.01	0.232	2050	1.8	0.316	0	2	0.000	0	7	0.000	810	4	0.056	dev	0.60	0.36	
A2	0.13	150	0.02	0.176	1350	1.5	0.250	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.43	0.26	
A3	0.13	150	0.02	0.176	1050	1.25	0.233	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.41	0.25	
A4	0.13	300	0.02	0.306	500	1.25	0.111	0	2	0.000	0	7	0.000	0	4	0.000	predev	0.42	0.25	
<b>Ultimate Developed Conditions</b>																				
A1	0.13	150	0.01	0.232	2050	1.8	0.316	0	1.25	0.000	0	8	0.000	810	2	0.113	dev	0.66	0.40	uncontrolled
A2	0.13	150	0.02	0.176	1350	1.5	0.250	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.43	0.26	uncontrolled
A3	0.13	150	0.02	0.176	1050	1.25	0.233	0	2	0.000	0	7	0.000	0	4	0.000	dev	0.41	0.25	uncontrolled
A4	0.13	150	0.01	0.232	150	1.1	0.038	300	1.85	0.045	0	7	0.000	0	4	0.000	dev	0.31	0.19	controlled

SCALE: AS SHOWN DATE: 02-03-06  
 DESIGNED BY: A. DODSON  
 DRAWN BY: J. MCMAHEN  
 CHECKED BY: A. DODSON  
 APPROVED BY: A. DODSON  
 PROJECT NO: 120221-160-10157-400  
 Sheet Number  
**3**  
 SHT 3 OF 8

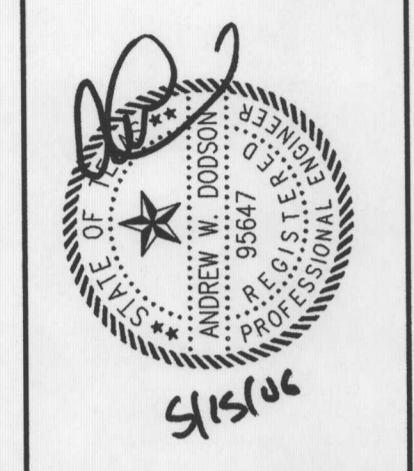
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PLAN LEGEND

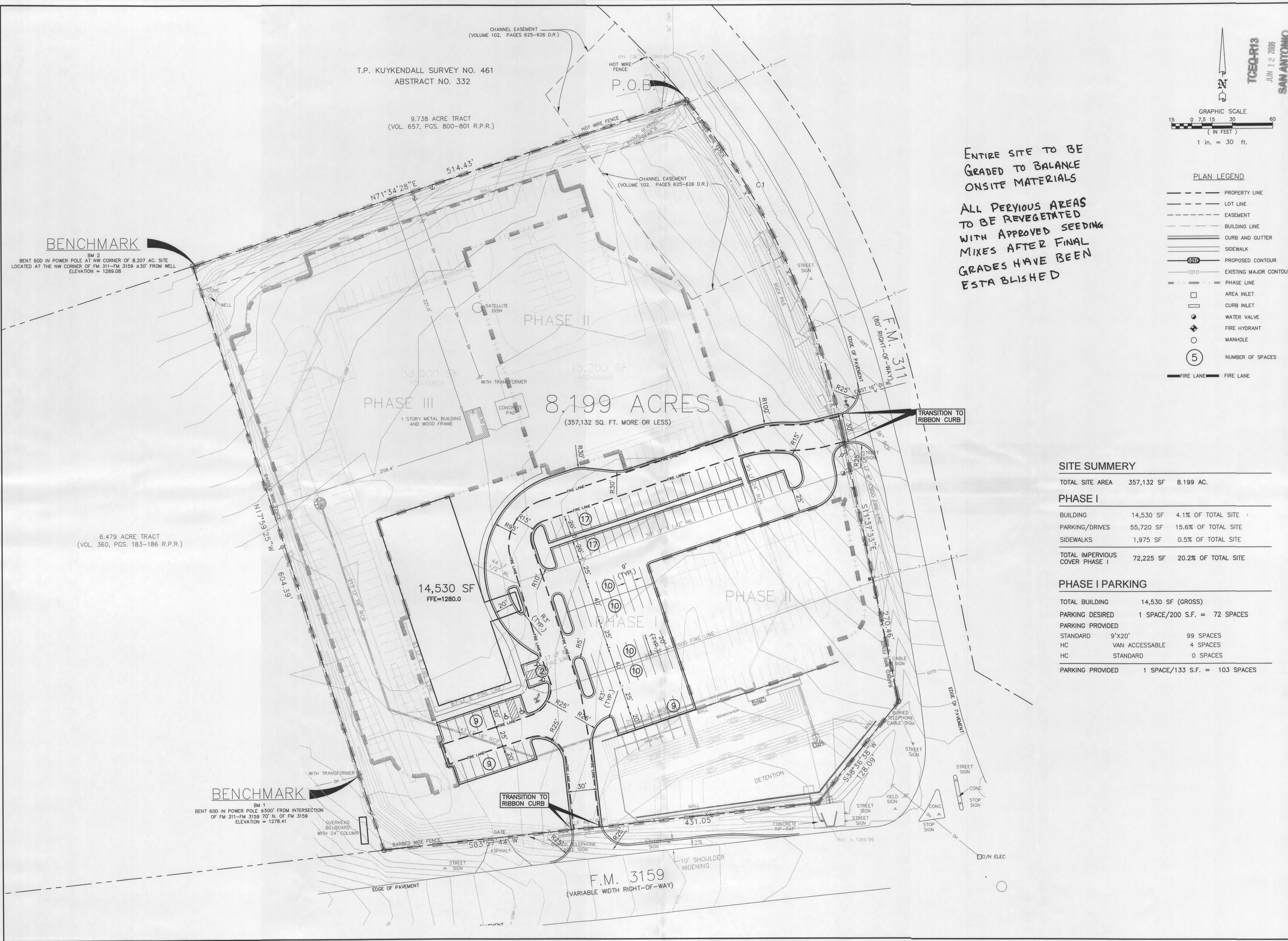
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- - -	LOT LINE
- . - . -	EASEMENT
---	BUILDING LINE
---	CURB AND GUTTER
---	SIDEWALK
---	PROPOSED CONTOUR
---	EXISTING MAJOR CONTOUR
---	PHASE LINE
□	AREA INLET
□	CURB INLET
○	WATER VALVE
○	FIRE HYDRANT
○	MANHOLE
→	FLOW ARROW

NOTE:  
ALL DRAINAGE IS OVERLAND TO POND EXCEPT WEST SIDE. WEST SIDE IS PIPED TO SPLITTER AS SHOWN.



MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
GRADING PLAN - PHASE I

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ENTIRE SITE TO BE GRADED TO BALANCE ONSITE MATERIALS  
 ALL PREVIOUS AREAS TO BE REVEGETATED WITH APPROVED SEEDING MIXES AFTER FINAL GRADES HAVE BEEN ESTABLISHED

TCEQ-R13  
 JUN 12 2006  
 SAN ANTONIO

GRAPHIC SCALE  
 15 0 7.5 15 30 60  
 (IN FEET)  
 1 in. = 30 ft.

PLAN LEGEND

- PROPERTY LINE
- LOT LINE
- EASEMENT
- BUILDING LINE
- CURB AND GUTTER
- SIDEWALK
- PROPOSED CONTOUR
- EXISTING MAJOR CONTOUR
- PHASE LINE
- AREA INLET
- CURB INLET
- WATER VALVE
- FIRE HYDRANT
- MANHOLE
- ⑤ NUMBER OF SPACES
- FIRE LANE
- FIRE LANE

**SITE SUMMARY**

TOTAL SITE AREA	357,132 SF	8.199 AC.
-----------------	------------	-----------

**PHASE I**

BUILDING	14,530 SF	4.1% OF TOTAL SITE
PARKING/DRIVES	55,720 SF	15.6% OF TOTAL SITE
SIDEWALKS	1,975 SF	0.5% OF TOTAL SITE
TOTAL IMPERVIOUS COVER PHASE I	72,225 SF	20.2% OF TOTAL SITE

**PHASE I PARKING**

TOTAL BUILDING	14,530 SF (GROSS)
PARKING DESIRED	1 SPACE/200 S.F. = 72 SPACES
PARKING PROVIDED	
STANDARD	9'x20' 99 SPACES
HC	VAN ACCESSIBLE 4 SPACES
HC	STANDARD 0 SPACES
PARKING PROVIDED	1 SPACE/133 S.F. = 103 SPACES

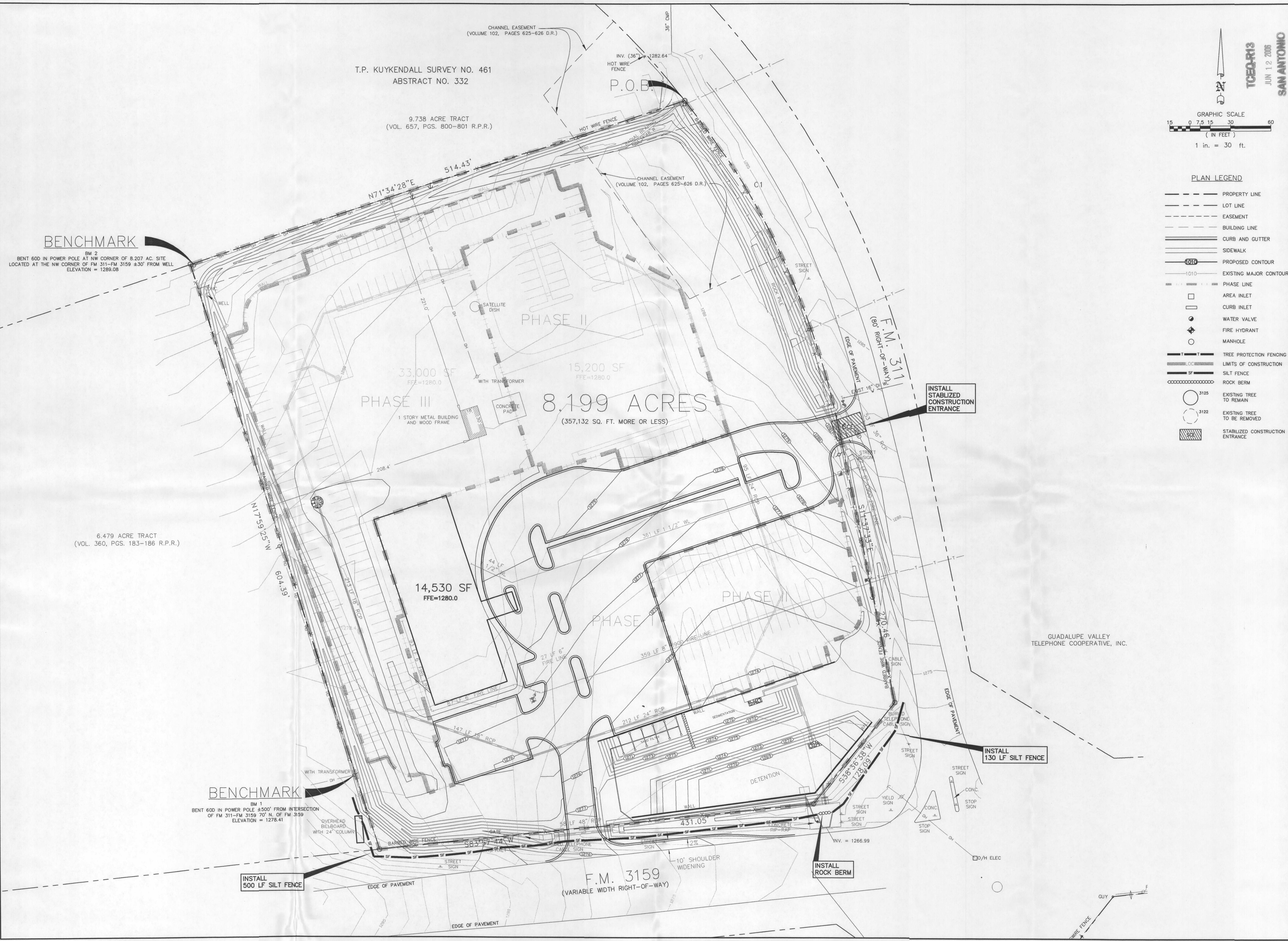
MCKENNA HEALTH CARE  
 NEW BRAUNFELS, TEXAS, M.O.B.  
 SITE PLAN - PHASE I

SCALE: AS SHOWN DATE: 02-03-06  
 DESIGNED BY: A. DODSON  
 DRAWN BY: J. MCMAHEN  
 CHECKED BY: A. DODSON  
 APPROVED BY: A. DODSON  
 PROJECT NO: 120221-160-10157-400

Sheet Number  
 4  
 SHT 4 OF 8

Lockwood, Andrews & Newnam, Inc.  
 A LEAD DAILY COMPANY  
 1000 MARINE DRIVE, SUITE 100, AUSTIN, TX 78799

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**BENCHMARK**  
BM 2  
BENT 600 IN POWER POLE AT NW CORNER OF 8.207 AC. SITE  
LOCATED AT THE NW CORNER OF FM 311-FM 3159 ±30' FROM WELL  
ELEVATION = 1289.08

**BENCHMARK**  
BM 1  
BENT 600 IN POWER POLE ±500' FROM INTERSECTION  
OF FM 311-FM 3159 70' N. OF FM 3159  
ELEVATION = 1278.41

T.P. KUYKENDALL SURVEY NO. 461  
ABSTRACT NO. 332

9.738 ACRE TRACT  
(VOL. 657, PGS. 800-801 R.P.R.)

6.479 ACRE TRACT  
(VOL. 360, PGS. 183-186 R.P.R.)

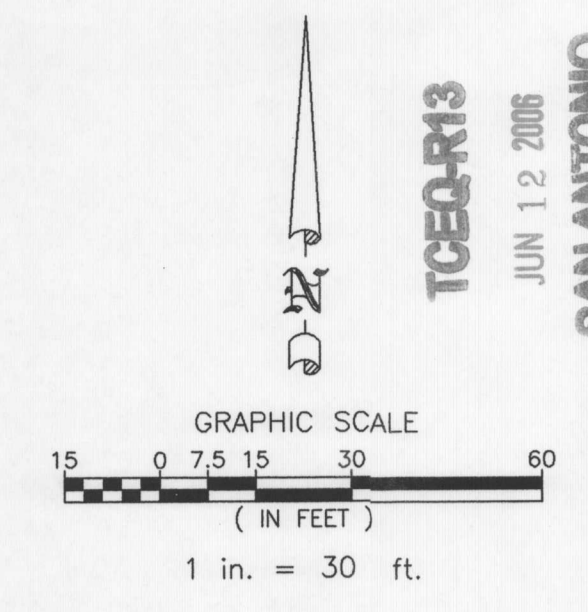
**8.199 ACRES**  
(357,132 SQ. FT. MORE OR LESS)

INSTALL  
500 LF SILT FENCE

INSTALL  
STABILIZED  
CONSTRUCTION  
ENTRANCE

INSTALL  
130 LF SILT FENCE

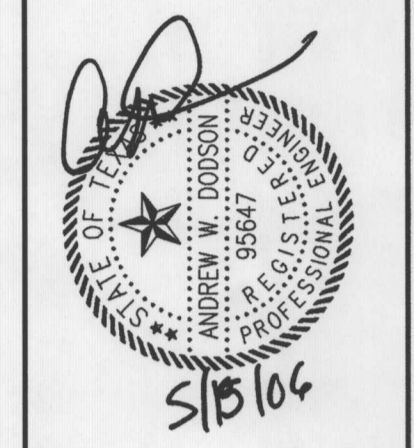
INSTALL  
ROCK BERM



**PLAN LEGEND**

- PROPERTY LINE
- - - LOT LINE
- - - EASEMENT
- - - BUILDING LINE
- ==== CURB AND GUTTER
- ==== SIDEWALK
- PROPOSED CONTOUR
- EXISTING MAJOR CONTOUR
- - - PHASE LINE
- AREA INLET
- CURB INLET
- WATER VALVE
- FIRE HYDRANT
- MANHOLE
- TREE PROTECTION FENCING
- LIMITS OF CONSTRUCTION
- SILT FENCE
- ROCK BERM
- 3125 EXISTING TREE TO REMAIN
- 3122 EXISTING TREE TO BE REMOVED
- STABILIZED CONSTRUCTION ENTRANCE

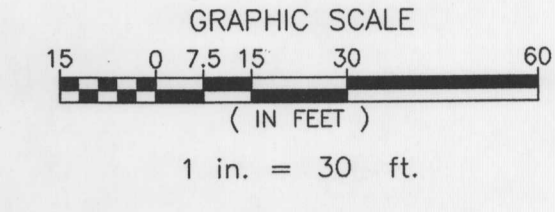
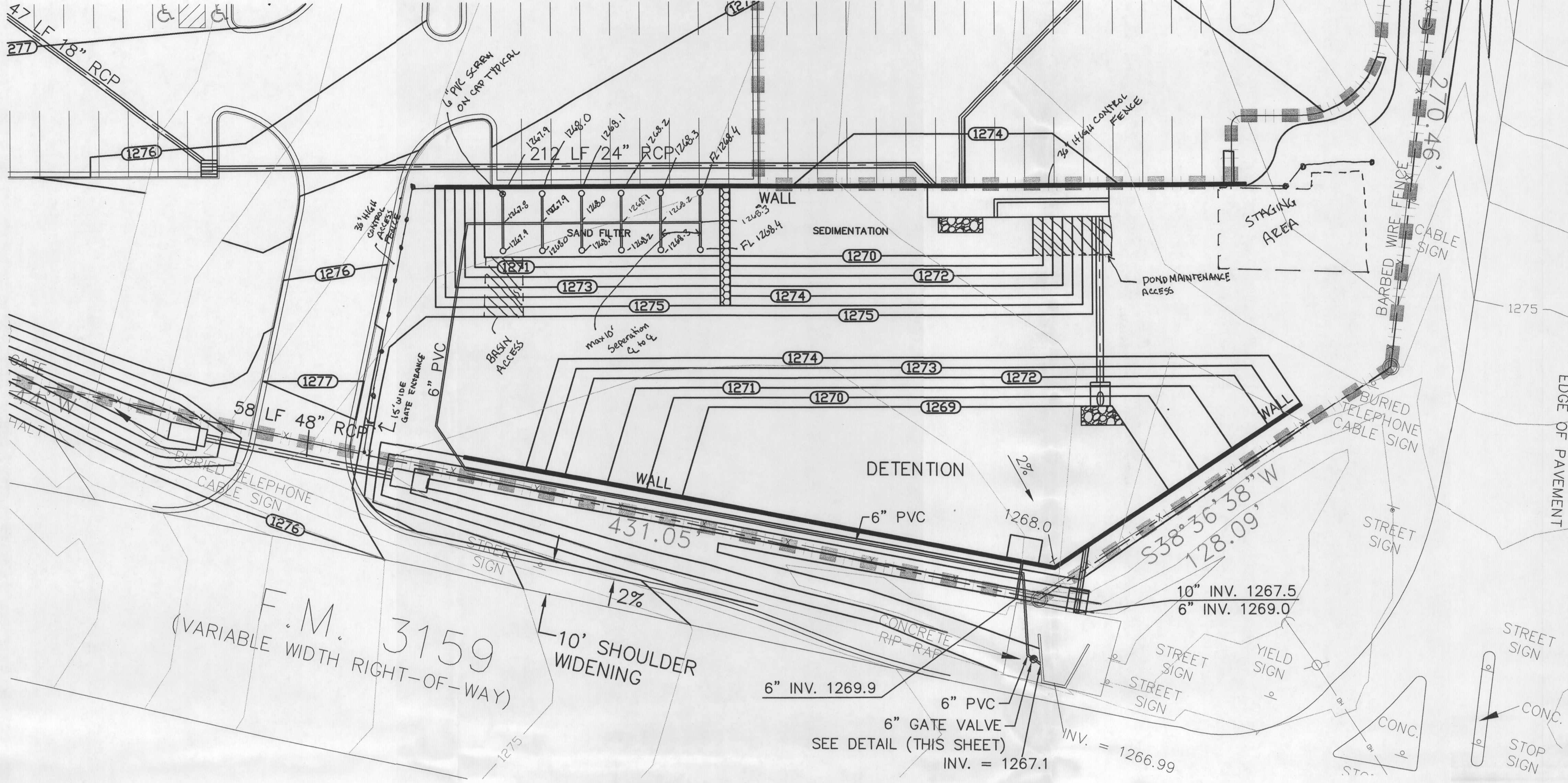
**Lockwood, Andrews & Newnam, Inc.**  
A LEO A DALY COMPANY  
1000 MC PACE DRIVE, BLDG. 1, STE. 100, AUSTIN, TX 78799



**MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
EROSION & SEDIMENTATION PLAN - PHASE I**

SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHEN  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO. 120221-160-10157-400

Sheet Number  
**6**  
SHT 6 OF 8



**PLAN LEGEND**

- PROPERTY LINE
- LOT LINE
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- CURB AND GUTTER
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- EXISTING MAJOR CONTOUR
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- CURB INLET
- WATER VALVE
- FIRE HYDRANT
- MANHOLE

**McKenna Health Care Phase I WQ Pond  
"PARTIAL" SEDIMENTATION / FILTRATION POND CALCULATIONS**

**DRAINAGE AREA DATA**

Drainage Area to Control	8.2 ac.
Drainage Area Impervious Cover (IC)	20 %
Capture Depth (0.5'+(IC-20)/100) (CD)	0.5 in.

**WATER QUALITY CONTROL CALCULATIONS**

Pond #	
Site Area Draining to Pond	8.2 ac.
Total Area Draining to Pond	8.2 ac.
Design Peak Flow Rate	40 cfs

Water Quality Volume (WQV = CD * Area)	14,883 cf.	Required	26,771 cf.	+20%	17859.6 req'd
Sedimentation Pond Vol. (min. 20% WQV)	2,977 cf.	Provided Volume	11,986 cf.		
Filtration Pond Area (min. = WQV/10)	1,488 sf.		2,856 sf.		
Filtration Pond Volume	n/a cf.		14,785 cf.		

**Water Quality Elevation**

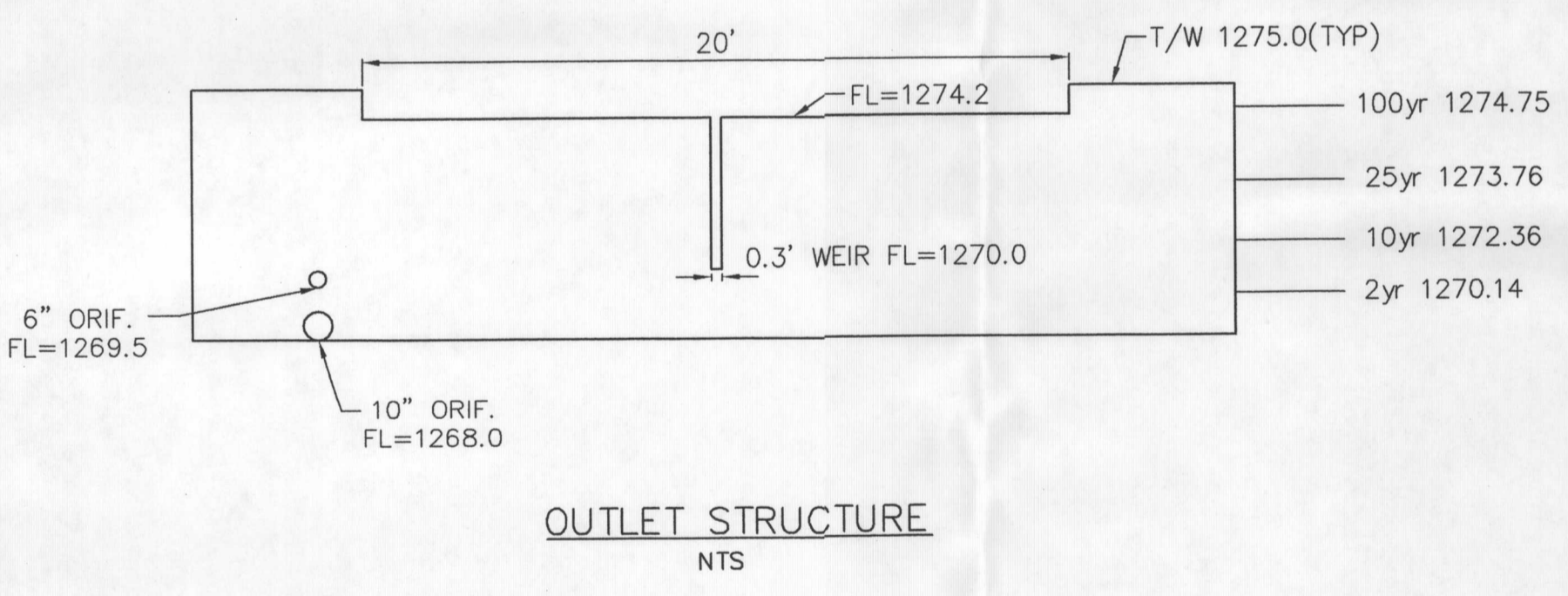
Elev. of Splitter Weir (WQelev)	1274.00
Height of Gabion Wall (WQelev-0.5')	1273.50

**Length of Splitter Weir**

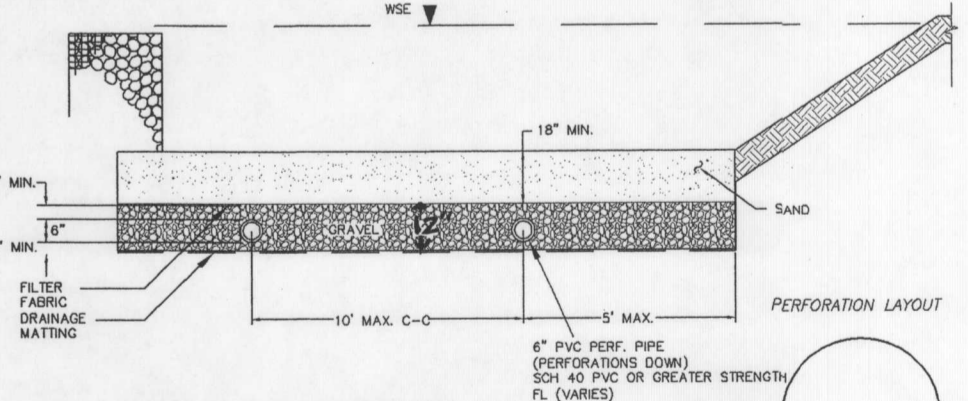
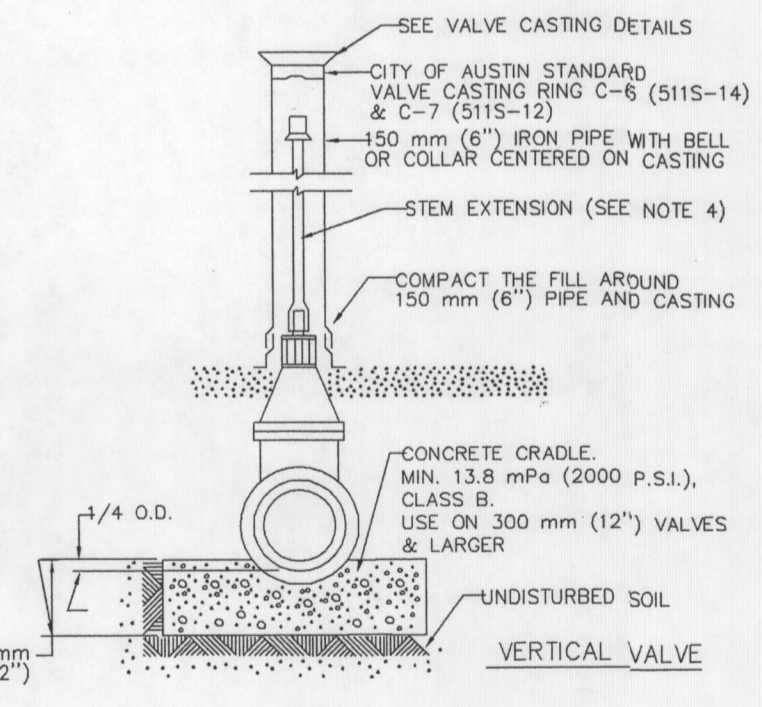
Required Head to Pass Design Flow	0.48 ft.
Top of Wall or Berm	1275.00
Water Quality Pond Freeboard Provided	0.52 ft.

**Treats TSS Load of 1791 lbs/yr**

Sedimentation Pond Stage(ft.)	Area(sf)	Storage(cf)	Filtration Pond		
			Stage(ft.)	Area(sf)	Storage(cf)
1270.00	2,000	0	1270.00	2,856	0
1271.00	2,245	2,245	1271.00	3,219	3,036
1272.00	3,000	4,992	1272.00	3,731	6,508
1273.00	3,500	8,238	1273.00	4,130	10,439
1274.00	4,000	11,986	1274.00	4,559	14,785



- NOTES:**
- WELD SOCKET 64 mm X 51 mm (2 1/2" X 2") DEEP TO 25 mm (1") SCH. 40 ROUND STEM EXTENSION, FITTED ON OPERATING NUT, SCH. 80 FOR LENGTHS OVER 3 m (10').
  - CITY OF AUSTIN STANDARD VALVE CASTING RING C-8 & LID C-7 OR C-5A LID IN UNPAVED AREAS. SEE VALVE CASTING DETAIL.
  - NUT AT TOP OF VALVE EXTENSION, ROD SHALL BE SQUARE 51 mm (2") LONG WELDED TO TOP OF ROD.
  - VALVE EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 0.9 m (3') DEEP FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 450 AND 600 mm (18 AND 24") FROM FINISHED GRADE.



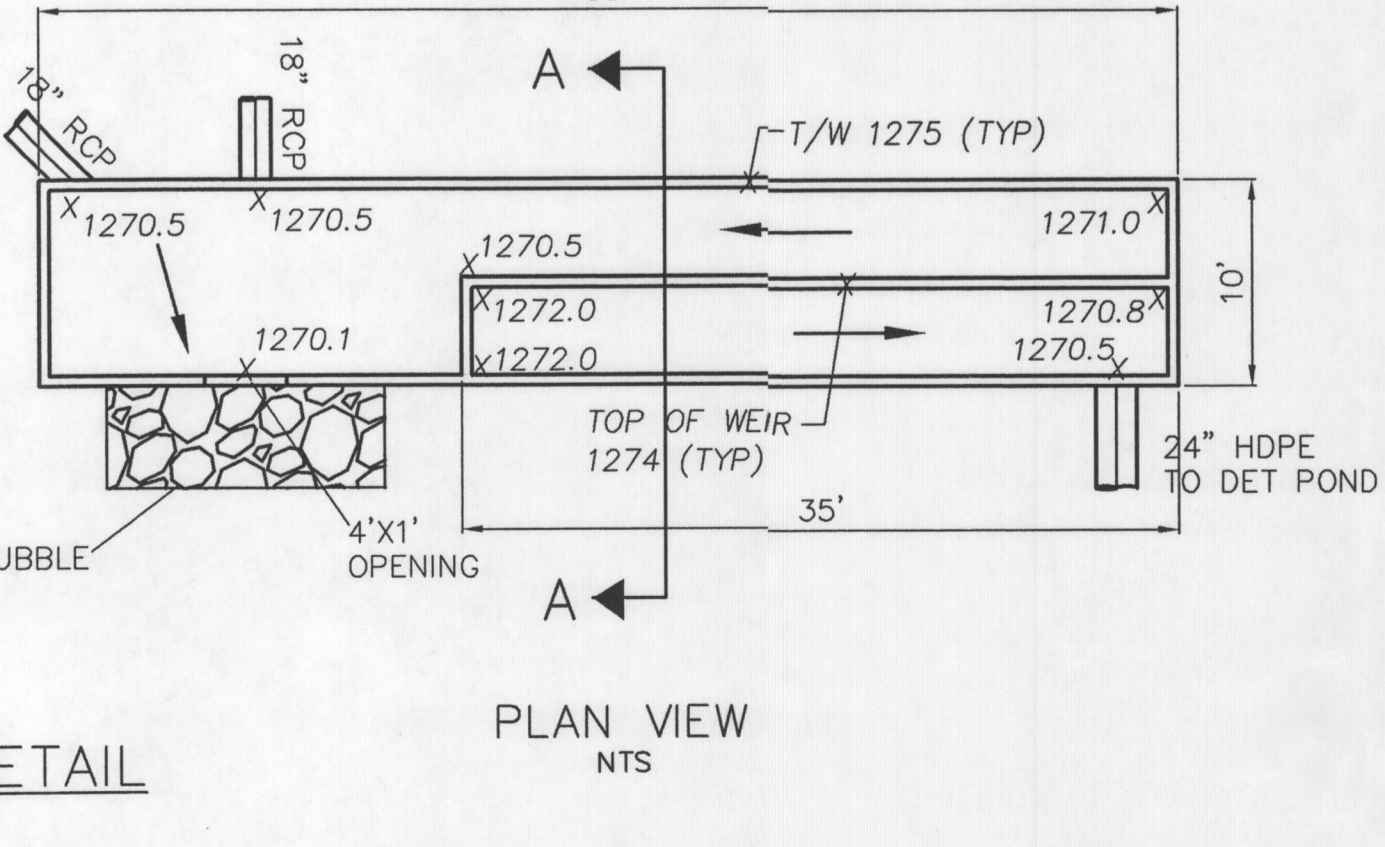
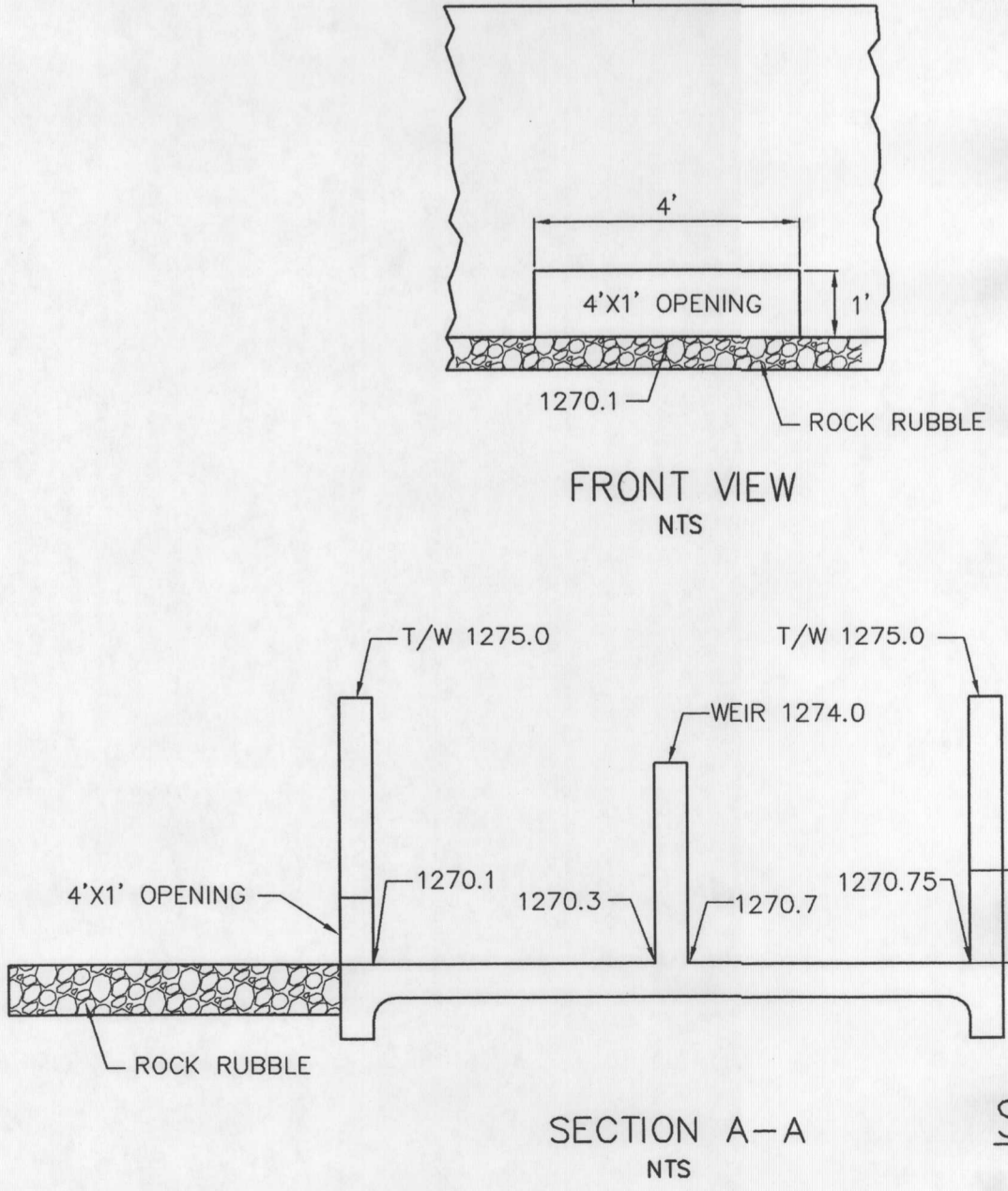
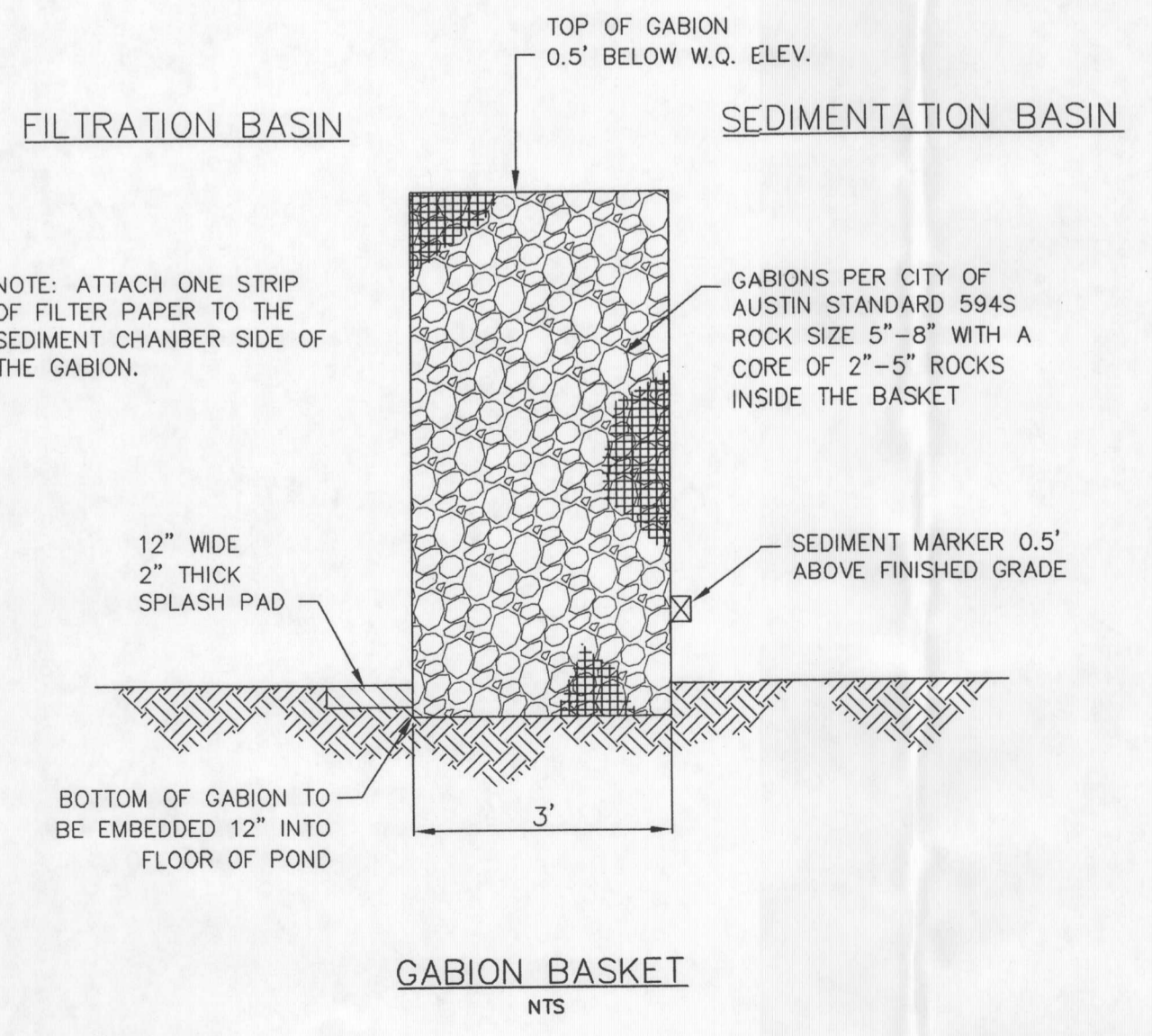
**SAND BED AND GEOTEXTILE FABRIC:**  
THE TOP LAYER IS TO BE A MINIMUM OF EIGHTEEN (18) INCHES OF 0.09-0.04 INCH DIAMETER SAND WHICH CORRESPONDS WITH ASTM C-33 CONCRETE SAND (SMALLER SAND SIZE IS NOT ACCEPTABLE). UNDER THE SAND SHALL BE A LAYER OF ONE-HALF (0.5) TO ONE AND ONE-HALF (1.5) INCH DIAMETER WASHED, ROUNDED, RIVER GRAVEL WHICH PROVIDES A MINIMUM OF THREE (3) INCHES OF COVER OVER THE TOP OF THE UNDERLAIN LATERAL PIPES TWO (2) INCHES OF GRAVEL IS REQUIRED OVER THE LATERAL PIPES. THE SAND AND GRAVEL MUST BE SEPARATED BY A LAYER OF GEOTEXTILE FABRIC MEETING THE SPECIFICATIONS LISTED IN SECTION 1.6.2(C).

**TABLE 1-9 EGM  
DRAINAGE MATING SPECIFICATIONS**

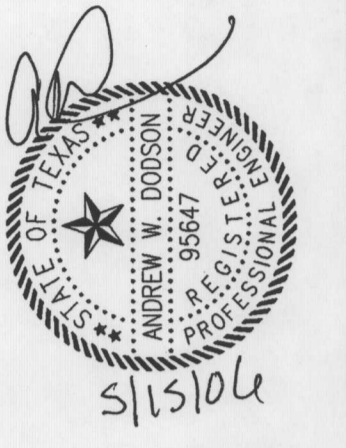
PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50

**TABLE 1-7 EGM  
GEOTEXTILE FABRIC SPECIFICATIONS**

PROPERTY	TEST METHOD	UNIT	SPECIFICATION
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50
MINIMUM PERCENTAGE	ASTM D-1585	%	50



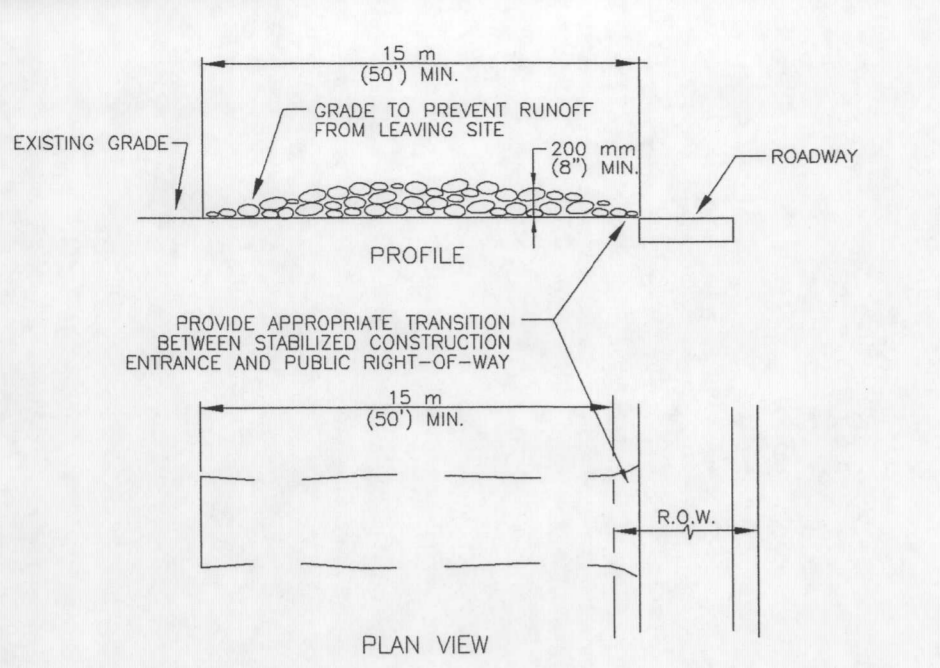
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**MCKENNA HEALTH CARE  
NEW BRAUNFELS, TEXAS, M.O.B.  
WATER QUALITY POND PLAN & DETAILS**

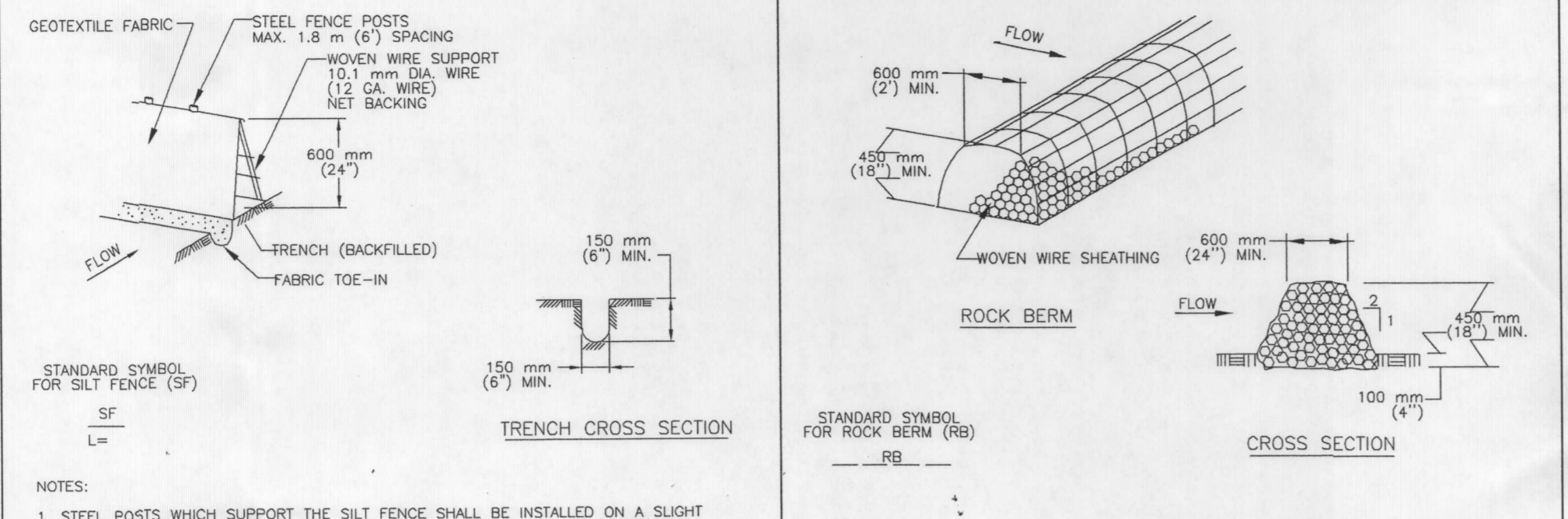
SCALE: AS SHOWN DATE: 02-03-06  
DESIGNED BY: A. DODSON  
DRAWN BY: J. MCMAHEN  
CHECKED BY: A. DODSON  
APPROVED BY: A. DODSON  
PROJECT NO. 120221-160-10157-400





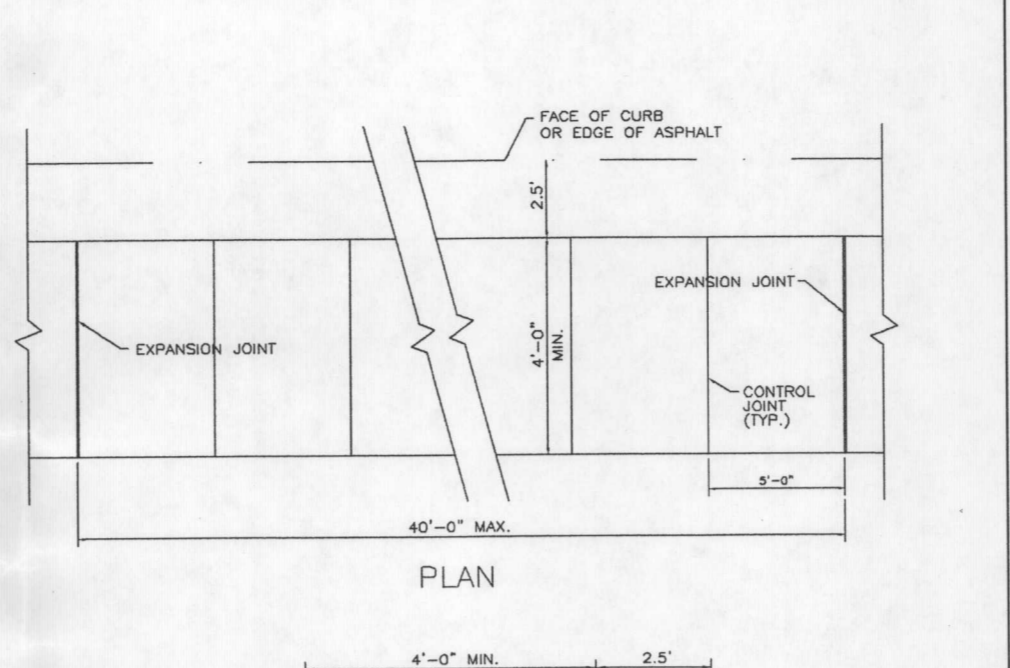
- NOTES:
- STONE SIZE: 75-125 mm (3-5") OPEN GRADED ROCK.
  - LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
  - THICKNESS: NOT LESS THAN 200 mm (8").
  - WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
  - WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND GRASS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
  - MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRAFFIC OR FLUING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT ANY MEASURING DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
  - DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

STABILIZED CONSTRUCTION ENTRANCE  
N.T.S.



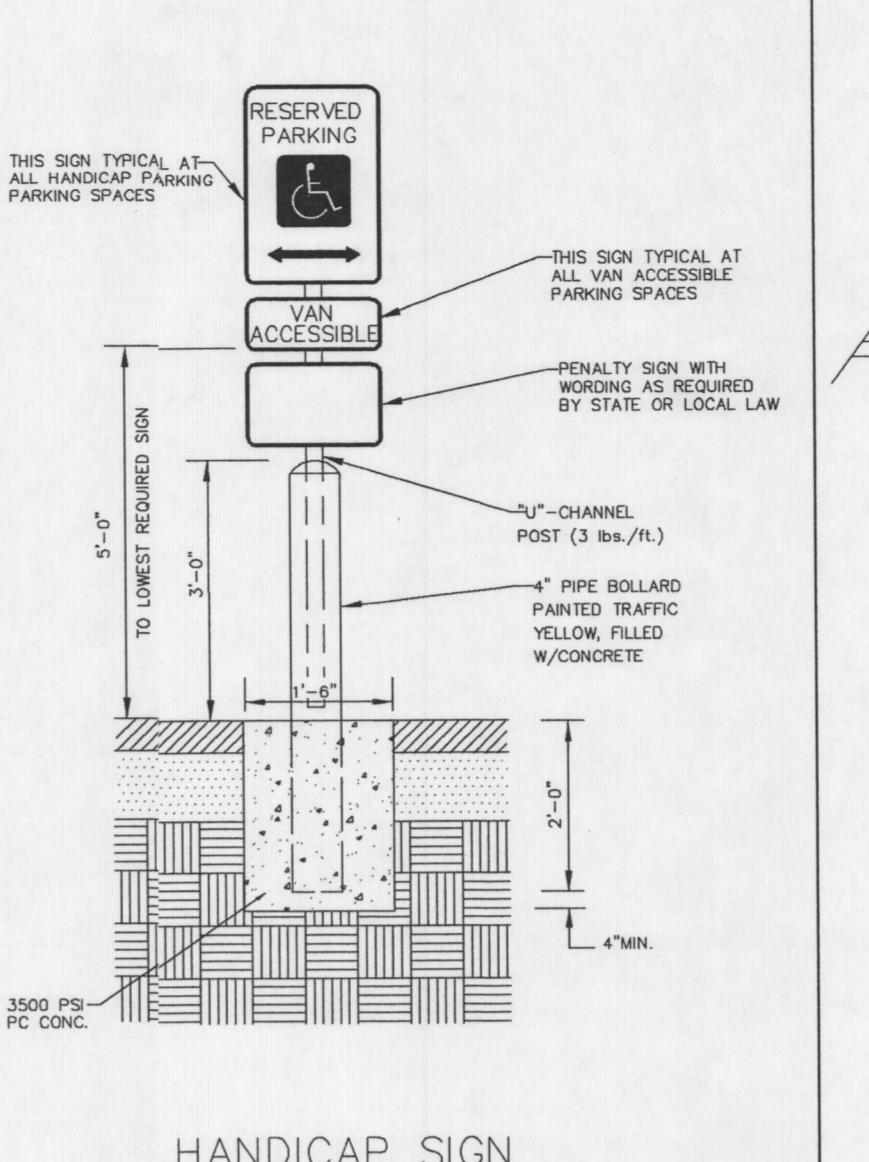
- NOTES:
- STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED BUFFER SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (1').
  - THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSTREAM FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CAN NOT BE TRENCHED INTO THE SURFACE (E.G. PAVEMENT), THE FABRIC FLAP SHALL BE WEIGHTED DOWN WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
  - THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
  - SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL SUPPORT POST.
  - INSPECTIONS SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
  - SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPED STORM FLOW OR DRAINAGE.
  - ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTING.

SILT FENCE  
N.T.S.

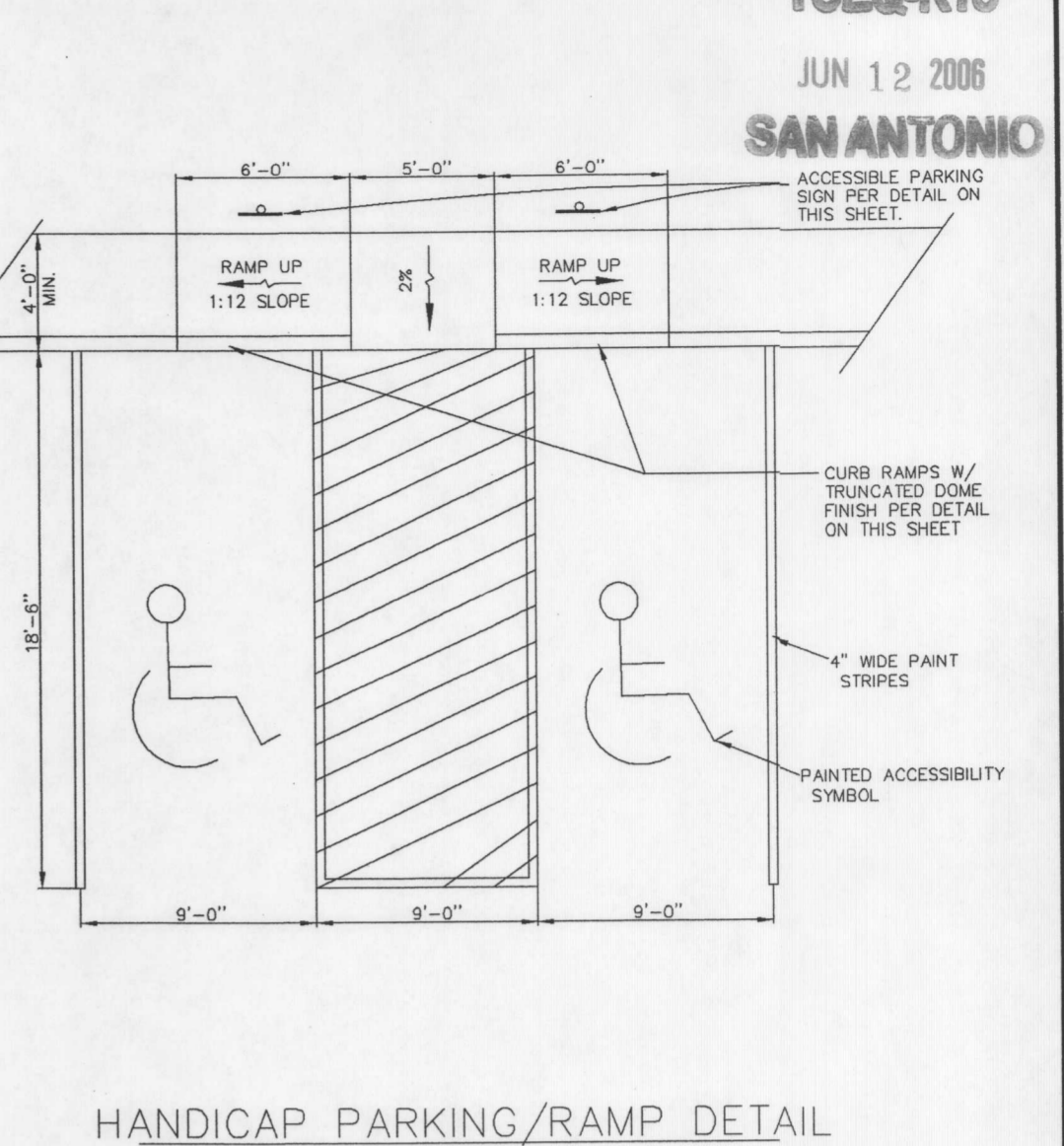


- NOTES:
- USE ONLY OPEN GRADED ROCK 100 to 200 mm (4 to 8") DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK 75 to 125 mm (3 to 5") DIAMETER FOR OTHER CONDITIONS.
  - THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 150 mm (6") OPENING AND MINIMUM WIRE DIAMETER OF 12.0 mm (1/2 GAUGE). ROCK BERMS IN CHANNEL APPLICATIONS SHALL BE ANCHORED FIRMLY INTO THE SUBSTRATE A MINIMUM OF 150 mm (6") WITH T-POSTS OR WITH 15M OR 20M (#5 OR #6) REBAR, WITH MAXIMUM SPACING APART OF 1.2 m (48") ON CENTER.
  - THE ROCK BERM SHALL BE INSPECTED WEEKLY 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 SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
  - WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR 150 mm (6 inches), THE SILT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SILTING PROBLEM.
  - DAILY INSPECTION SHALL BE MADE ON SEVERE-SERVICE ROCK BERMS; SILT SHALL BE REMOVED WHEN ACCUMULATION REACHES 150 mm (6").
  - WHEN THE SITE IS COMPLETELY STABILIZED THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

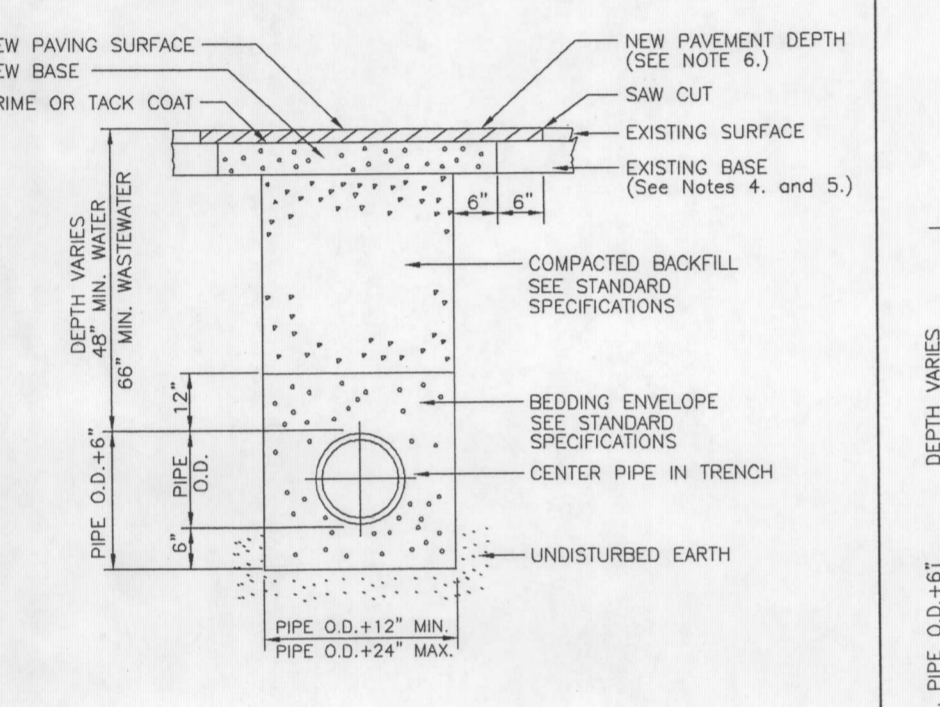
ROCK BERM  
N.T.S.



HANDICAP SIGN  
N.T.S.

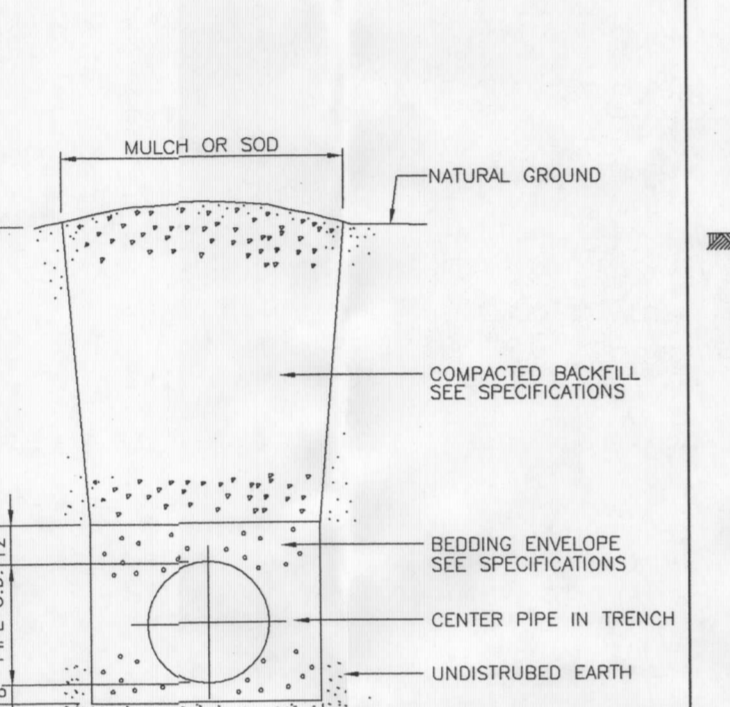


HANDICAP PARKING/RAMP DETAIL  
N.T.S.

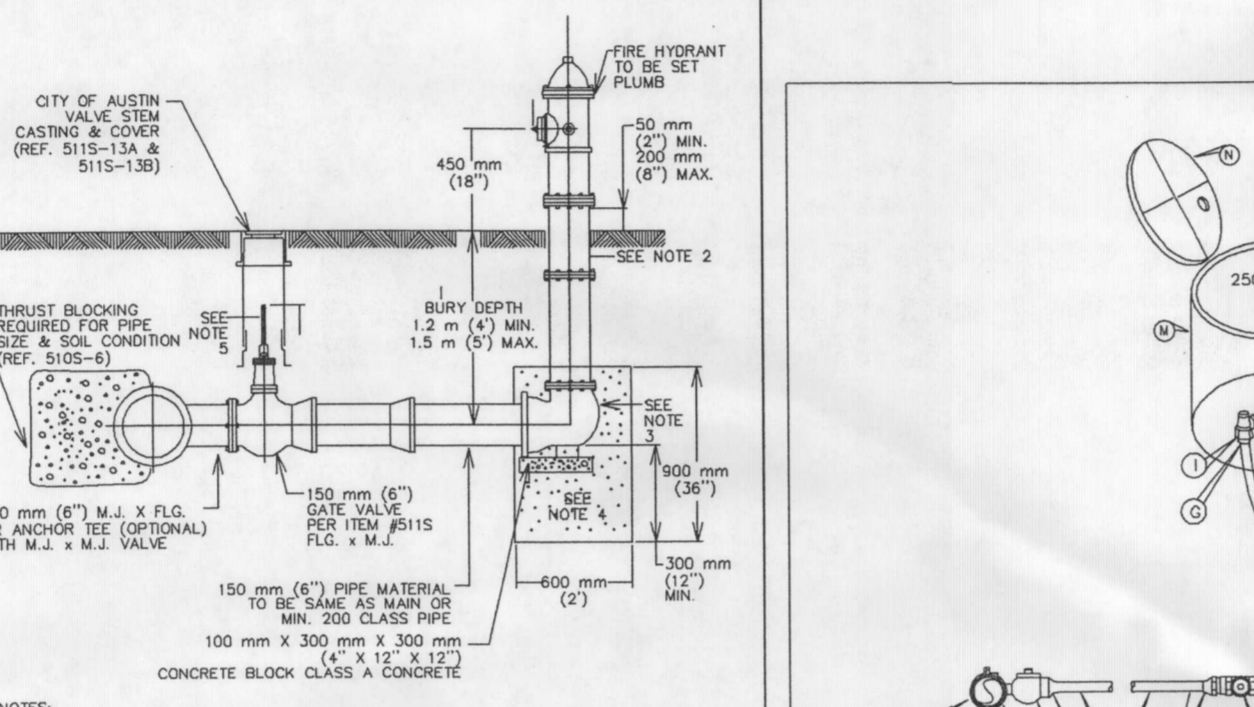


- NOTES:
- THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 12" WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
  - ANY CONCRETE PAVING SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
  - IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RISING SURFACE WITH SOILD MIX OR TEMPORARY HOT MIX.
  - ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND OF EQUAL THICKNESS, OR MINIMUM BASE THICKNESS OF 10 INCHES, WHICHEVER IS GREATER.
  - ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 8 INCHES OF BASE OR MATCH EXISTING, WHICHEVER IS GREATER.
  - SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 2 INCHES, WHICHEVER IS GREATER.

TYPICAL TRENCH WITH PAVED SURFACE  
N.T.S.

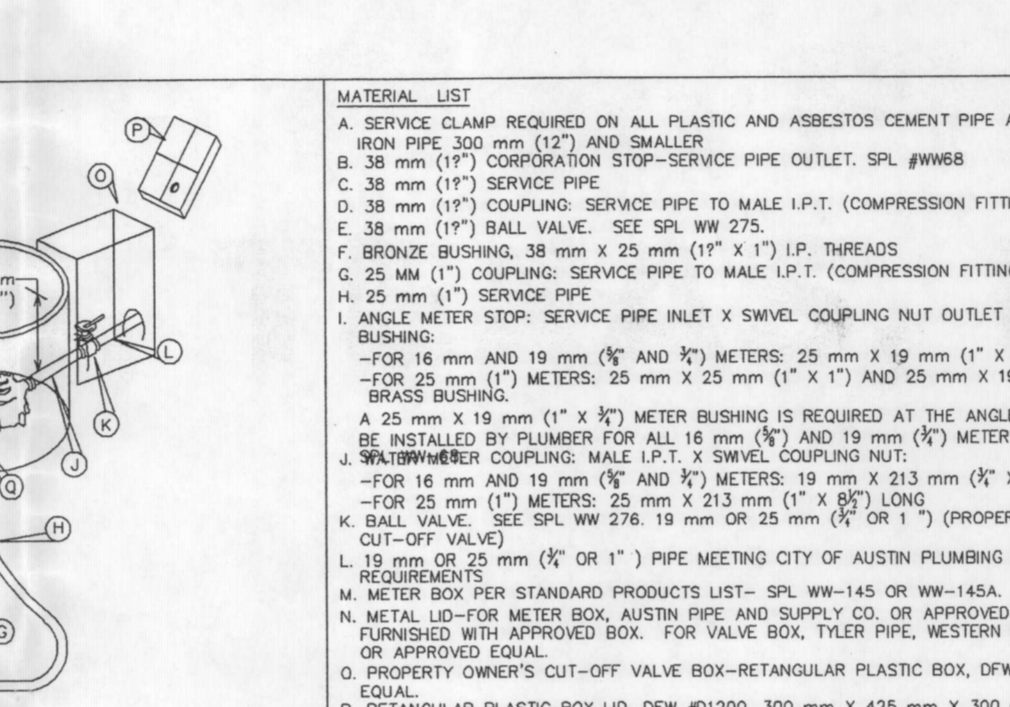


TYPICAL TRENCH WITH UNFINISHED SURFACE  
N.T.S.

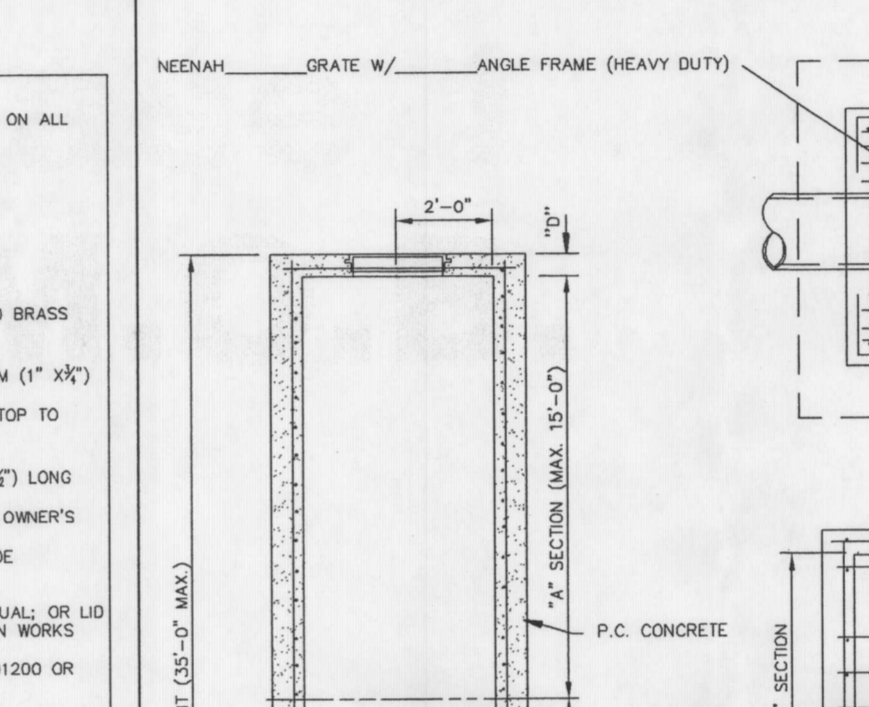


- NOTES:
- DIMENSIONS SHOWN ARE APPLICABLE IN SPACE BETWEEN CURB AND SIDEWALK. WHERE WALK ABUTS CURB AND IN PUBLIC OR COMMERCIAL AREAS, DIMENSION FROM BACK OF CURB SHALL BE 0.10 TO 1.81 (2) TO 1.81 (2) METERS. THE HYDRANT MAY BE NOT BE PLACED IN SIDEWALK OR RAMP AREAS. THE HYDRANT MAY BE SET NEAR THE PROPERTY LINE TO AVOID CONFLICT WITH THE SIDEWALK OR RAMP. THE LOCATION OF HYDRANT:
  - FOR BAYS GREATER THAN 1.81 m (6 ft), ONE BAY EXTENSION NOT EXCEEDING 0.91 m (3 ft) LENGTH SHALL BE INSTALLED DIRECTLY BELOW THE FIRE HYDRANT. OTHER BAY EXTENSIONS ARE REQUIRED TO ACCOMMODATE FIRE HYDRANTS.
  - FIRE LINE SHALL HAVE AN INSTANT FROM MAIN TO THE HYDRANT.
  - CRUSHED STONE OR GRAVEL SHALL BE PLACED AROUND THE BOTTOM OF THE HYDRANT FOR A MINIMUM OF 25 mm (1") AND EXTEND AT LEAST 300 mm (12") ABOVE THE OUTLET. DO NOT BLOCK DRAIN HOLES.
  - WELD SOCKET 64 mm x 51 mm (2 1/2" x 2") TO 25 mm (1") SIZE, 45 DEGREE STEEL EXTENSION, FITTED ON OPERATING NUT, SO, 80 FOR LENGTHS OVER 3 m (10').
  - VALVE EXTENSIONS ARE REQUIRED FOR VALVES THAT EXCEED 0.91 m (3 ft) FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 400 AND 600 mm (16 AND 24") FROM FINISHED GRADE.

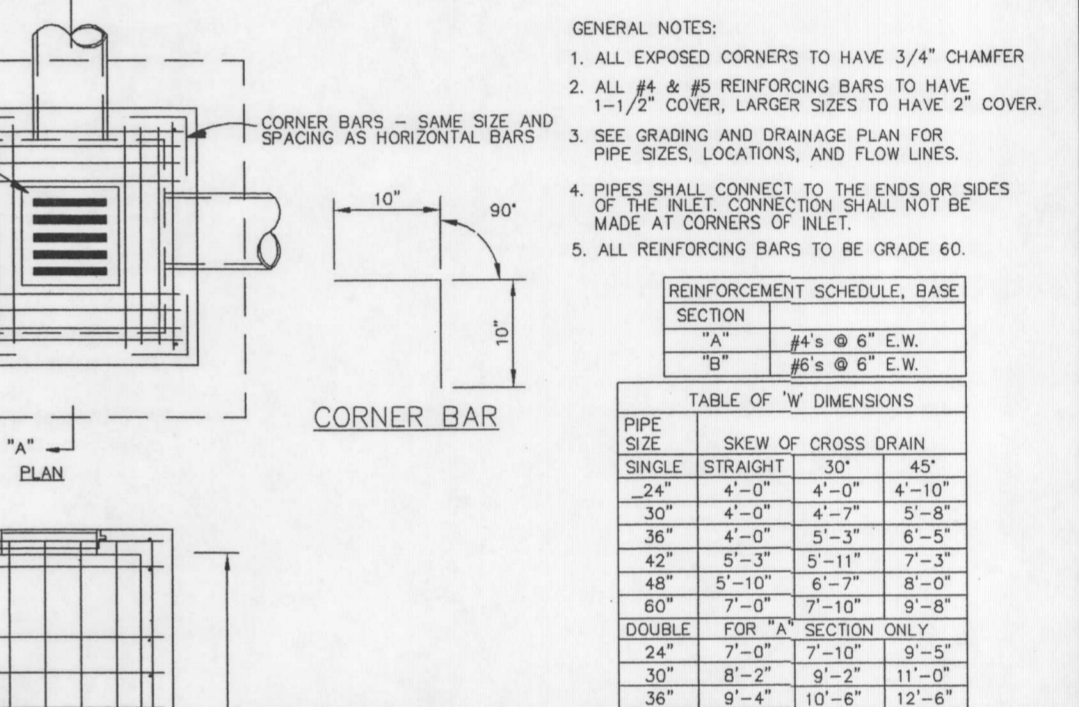
FIRE HYDRANT INSTALLATION  
N.T.S.



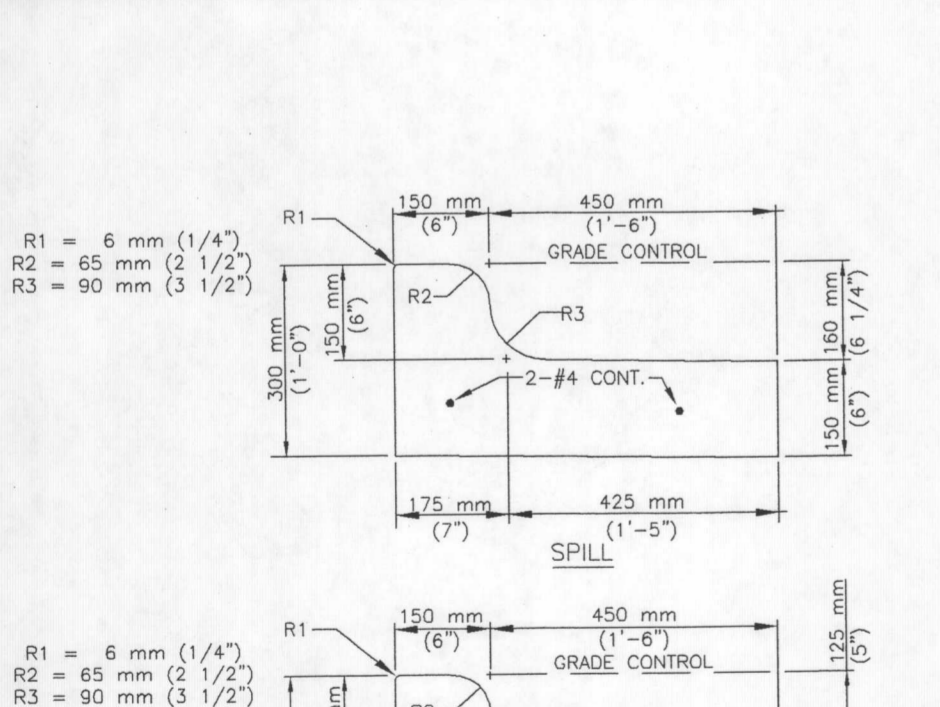
- GENERAL NOTES:
- ALL EXPOSED CORNERS TO HAVE 3/4" CHAMFER
  - ALL #4 & #5 REINFORCING BARS TO HAVE 1/2" COVER, LARGER SIZES TO HAVE 2" COVER
  - SEE GRADING AND DRAINAGE PLAN FOR PIPE SIZES, LOCATIONS, AND FLOW LINES
  - PIPES SHALL CONNECT TO THE ENDS OR SIDES OF THE INLET. CONNECTION SHALL NOT BE MADE AT CORNERS OF INLET.
  - ALL REINFORCING BARS TO BE GRADE 60.



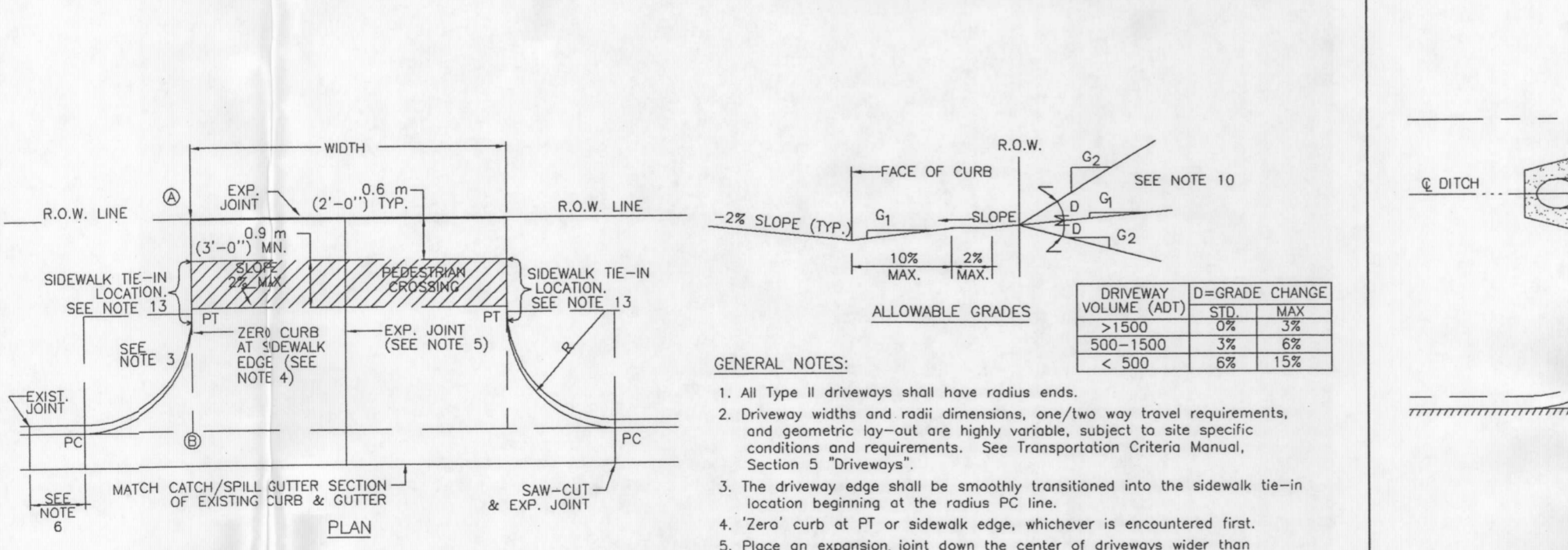
GRATE INLET  
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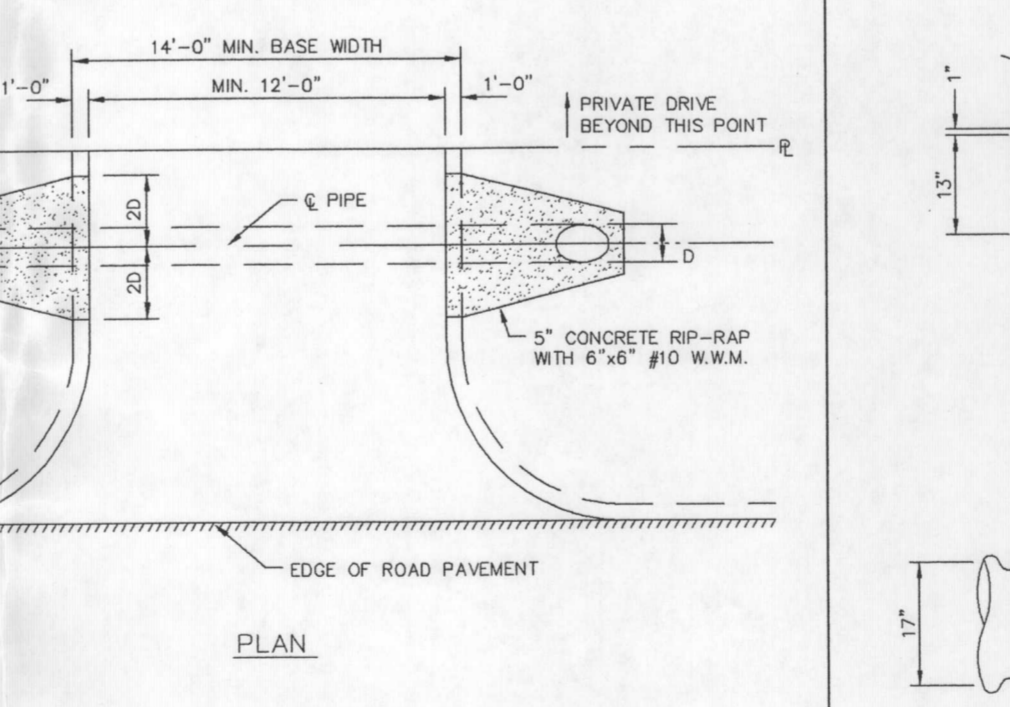
CORNER BAR  
N.T.S.



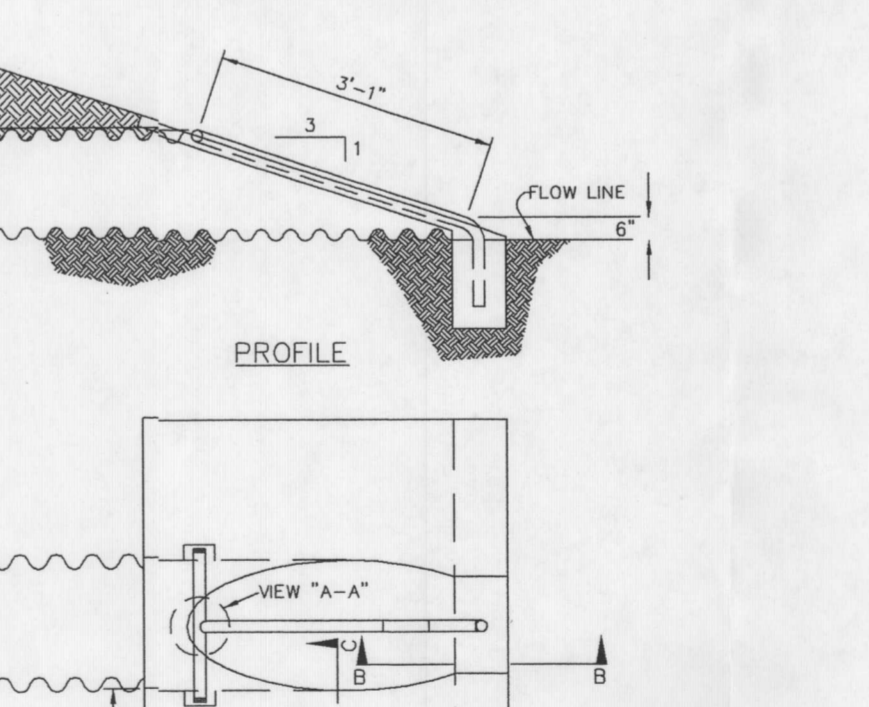
CURB AND GUTTER SECTION  
N.T.S.



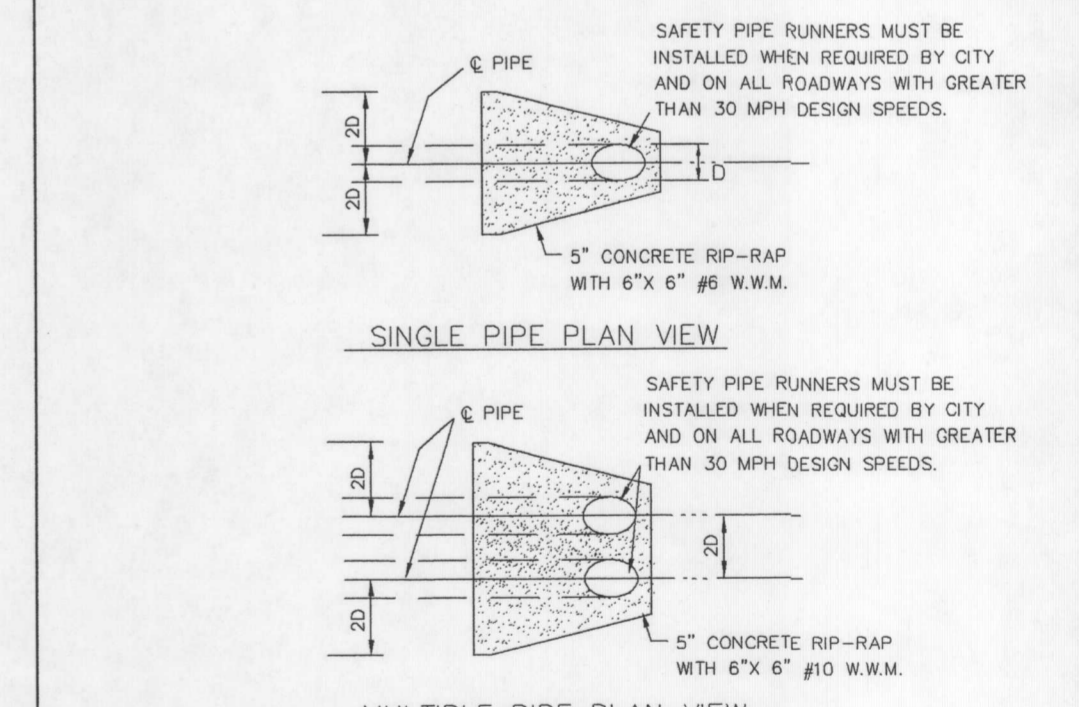
TYPE II DRIVEWAY  
N.T.S.



DRIVEWAY WITH CULVERT PIPE  
N.T.S.



SAFETY END TREATMENT FOR CULVERT PIPE  
N.T.S.



SAFETY END TREATMENT FOR CULVERT PIPE  
N.T.S.

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