TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 27, 2012

Mr. J.L. Guerra Jr.
Cross Canyon Ranch, Ltd.
P.O. Box 65101
San Antonio, TX 78216

Re: Edwards Aquifer, Comal County

Name of Project: Hills at Cross Canyon Ranch; Located two miles north of the intersection of Mystic Canyon and FM 306 at the end of Canyon Heights, Comal County, 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 San Antonio File No. 2503.01; Investigation No. 1002129; Regulated Entity No. RN104921648

Dear Mr. Guerra:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the CZP application for the above-referenced project submitted to the San Antonio Regional Office by Kavanaugh Consulting, LLC on behalf of Cross Canyon Ranch, Ltd. on April 16, 2012. Final review of the CZP was completed after additional material was received on June 22, 2012 and July 24, 2012. 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 Edwards Aquifer Protection 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 percent of the construction has commenced on the project or an extension of time has been requested.*

Background

The original Cross Canyon Ranch CZP (SA #2503.00) was approved on June 19, 2006 for an 817.4 acre site with 47 single family residential lots. The CZP approved 31.9 acres of impervious cover (3.9 percent) and other permanent BMPs were not required.

Project Description

This CZP modification will add additional acreage adjacent to the 817.4 acre site. The proposed residential project will have an area of approximately 90.1 acres and will include 11 single family residential lots and roadways. The impervious cover will be 3.42 acres (3.8 percent). According to a letter dated, May 1, 2012, signed by Thomas Hornseth, P.E., with Comal County, the site in the development is acceptable for the use of on-site sewage facilities.

Permanent Pollution Abatement Measures

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, the site will have less than 20 percent impervious cover and other permanent BMPs are not required. Temporary BMPs will be used during construction to prevent the discharge of sediment.

Special Conditions

1. 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 format (Deed Recordation Affidavit, TCEQ-0625A) that you may use to deed record the approved CZP is enclosed.

2. Since this project will not have more than 20 percent impervious cover, an exemption from additional permanent BMPs is approved. If the percent impervious cover ever increases above 20 percent or the land use changes, the exemption for the whole site as described in the property boundaries required by §213.4(g), may no longer apply and the property owner must notify the appropriate regional office of these changes.

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.
2. The holder of the approved Edwards Aquifer protection plan must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the approved plan. Additional and separate approvals, permits, registrations and/or authorizations from other TCEQ Programs (i.e., Stormwater, Water Rights, UIC) can be required depending on the specifics of the plan.
3. In addition to the rules of the Commission, the applicant may also be required to comply with state and local ordinances and regulations providing for the protection of water quality.

Prior to Commencement of Construction:

4. 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 location until all regulated activities are completed.
5. 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.

6. The applicant must provide written notification of intent to commence construction, replacement, or rehabilitation 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.

7. 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:

8. 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.

9. 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).

10. Intentional discharges of sediment laden storm water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.

11. 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.

12. 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.

13. This approval does not authorize the installation of temporary aboveground storage tanks on this project. If the contractor desires to install a temporary aboveground storage tank for use during construction, an application to modify this approval must be submitted and approved prior to installation. The application must include information related to tank location and spill containment. Refer to Standard Condition No. 5, above.

After Completion of Construction:

14. 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 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.

15. 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.

16. 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.

17. A Contributing Zone Plan approval or extension will expire and no extension will be granted if more than 50 percent 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.

18. 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.

This action is taken under authority delegated by the Executive Director of the Texas Commission on Environmental Quality. If you have any questions or require additional information, please contact Charly Fritz of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4065.

Sincerely,

Lynn Bumguardner, Water Section Manager
San Antonio Region Office
Texas Commission on Environmental Quality

LMB/CF/eg

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625A

cc: Mr. David Parkerson, P.E., Kavanaugh Consulting, LLC
Mr. Thomas Hornseth, P.E., Office of Comal County Engineer
Mr. Roland Ruiz, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC212

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 27, 2012

Mr. J.L. Guerra Jr.
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Sincerely,

Lynn Bumguardner, Water Section Manager
San Antonio Region Office
Texas Commission on Environmental Quality

LMB/CF/eg

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625A

cc: Mr. David Parkerson, P.E., Kavanaugh Consulting, LLC
Mr. Thomas Hornseth, P.E., Office of Comal County Engineer
Mr. Roland Ruiz, Edwards Aquifer Authority
TCEQ Central Records, Building F, MC212

Comal County

OFFICE OF COMAL COUNTY ENGINEER

May 1, 2012

Mr. Todd Jones
Water Section Work Leader
TCEQ Region 13
14250 Judson Rd
San Antonio, TX 78233-4480

Re: Edwards Aquifer, Comal County
PROJECT NAME: The Hills at Cross Canyon Ranch, located approximately 2 miles n of Mystic Canyon and the FM 306 intersection, Comal County, Texas
PLAN TYPE: Application for Contributing Zone Water Pollution Abatement Plan (WPAP) 30 Texas Administration Code (TAC) Chapter 213; Edwards Aquifer Protection Program
EAPP File No.: 3016.00

Dear Mr. Jones,

In response to your request for comments on the above referenced project, we submit to you, the following:

The Suitability Letter from Comal County that was submitted by the applicant was for a previous development in 2006, and does not apply to the proposed subdivision.

Sincerely,

Thomas H. Hornseth, P.E.
Comal County Engineer

195 David Jonas Drive • New Braunfels, Texas 78130 • (830) 608-2090 FAX (830) 608-2009

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 16, 2012

Mr. Thomas H. Hornseth, P.E.
Comal County Engineer
195 David Jonas Drive
New Braunfels TX 78132-3710

Re: Edwards Aquifer, Comal County
PROJECT NAME: The Hills at Cross Canyon Ranch, located approximately 2 miles n of Mystic Canyon and the FM 306 intersection, Comal County, Texas
PLAN TYPE: Application for Contributing Zone Water Pollution Abatement Plan (WPAP) 30 Texas Administration Code (TAC) Chapter 213; Edwards Aquifer Protection Program
EAPP File No.: 3016.00

Dear Mr. Hornseth:

The referenced application is being forwarded to you pursuant to the Edwards Aquifer Rules. The Texas Commission on Environmental Quality (TCEQ) is required by 30 TAC Chapter 213 to provide copies of all applications to affected incorporated cities and underground water conservation districts for their comments prior to TCEQ approval.

Please forward your comments to this office by May 15, 2012.

The Texas Commission on Environmental Quality appreciates your assistance in this matter and your compliance efforts to ensure protection of the State's environment. If you or members of your staff have any questions regarding these matters, please feel free to contact the San Antonio Region Office at (210) 490-3096.

Sincerely

Todd Jones
Water Section Work Leader
San Antonio Regional Office

TJ/eg

Storm Water Pollution Prevention Plan

Cross Canyon Ranch, Ltd.
11202 Disco Drive
San Antonio, Texas 78216

merit
professional

Hills of Cross Canyon Ranch
Spring Branch, Texas

Preparation Date:

April 8, 2012

PO Box 271712 – Flower Mound, Texas 75027 – (214) 998-9455 – (214) 998-9454 – Fax (866) 926-0983

Stormwater Pollution Prevention Plan

For:

Hills of Cross Canyon Ranch
2 miles North of intersection of Mystic Canyon Drive and FM 306
Spring Branch, Texas 78070
210-495-8777

Operator(s):

Cross Canyon Ranch, Ltd.
J.L. Guerra Jr.
11202 Disco Drive
San Antonio, Texas 78216
210.495.8777
Fax: 210.499.4217

SWPPP Contact(s):

Cross Canyon Ranch, Ltd.
J.L. Guerra Jr.
11202 Disco Drive
San Antonio, Texas 78216
210.495.8777
Fax: 210.499.4217

SWPPP Preparation Date:

April 8, 2012

Merit Professional
P.O. Box 271712
Flower Mound, Texas 75027

Contents

LIST OF TABLES

DELINEATION OF RESPONSIBILITIES
SITE / LOCATION MAP
EROSION CONTROL PLAN
ENDANGERED SPECIES/HISTORICAL PRESERVATION

APPENDICES

OPERATOR CERTIFICATION

Storm Water Pollution Prevention Plan
For Storm Water Discharges Associated with Construction Activity

Project:	Hills of Cross Canyon Ranch
Name of Operator:	Cross Canyon Ranch, Ltd.
Address:	11202 Disco Drive
	San Antonio, Texas 78216
Telephone No.:	210.495.8777
Facsimile:	210.499.4217

Certification Statement:

> "I certify under penalty of law that I understand the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

This certification is hereby signed in reference to construction at the above-referenced project.

By: _____
Signature

J.L. Guerra Jr.
Name

Manager
Title

4/18/2012
Date

STORM WATER POLLUTION PREVENTION PLAN

Hills of Cross Canyon Ranch
2 miles North of intersection of Mystic Canyon Drive and FM 306
Spring Branch, Texas 78070

April 8, 2012

Prepared by _____ 4/10/12
Melissa Singer, Merit Professional Services, LLC Date

Reviewed by _____ 4/11/12
Chrissy Holden, Merit Professional Services, LLC Date

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Certified by _____ 4/12/2012
Date

Name: J.L. Guerra Jr.
Position/Title: Manager
Company: Cross Canyon Ranch, Ltd.

OPERATOR CERTIFICATION

Storm Water Pollution Prevention Plan
For Storm Water Discharges Associated with Construction Activity

Project: Hills of Cross Canyon Ranch
Name of Operator:
Address:

Telephone No.:
Facsimile:

Certification Statement:

> "I certify under penalty of law that I understand the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

This certification is hereby signed in reference to construction at the above-referenced project.

By:

_____
Signature

_____
Name

_____
Title

_____
Date

OPERATOR CERTIFICATION

Storm Water Pollution Prevention Plan
For Storm Water Discharges Associated with Construction Activity

Each operator engaged in activities under this SWPPP that disturb surface soil must be identified and must sign the following certification statement.

Project: Hills of Cross Canyon Ranch
Name of Operator:
Address:

Telephone No.:
Facsimile:

Type of Construction Service to be provided: _____

Certification Statement:

> "I certify under penalty of law that I understand the terms and conditions of the Texas Pollutant Discharge Elimination System (TPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

This certification is hereby signed in reference to construction at the above-referenced project.

By:

_____
Signature

_____
Name

_____
Title

_____
Date

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This certification is hereby signed in reference to construction at the above-referenced project.

By:

_____
Signature

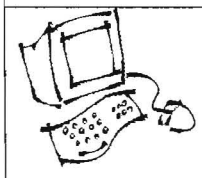
_____
Name

_____
Title

_____
Date

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

TCEQ Office Use Only
Permit No.: TXR15
RN:
CN:
Ref No:



Sign up now for ePermits NOI at https://www6.tceq.state.tx.us/steers/
Get Instant Permit Coverage and only pay a $225 application fee.

If filing a paper NOI you can pay the application fee on line? Go to https://www6.tceq.texas.gov/epay/

IMPORTANT:
- Use the **INSTRUCTIONS** to fill out each question in this form.
- Use the attached **CUSTOMER CHECKLIST** to make certain all you filled out all required information.
- Incomplete applications **WILL** delay approval or result in **automatic Denial**.

Renewal of General Permit
Is this NOI to renew an ACTIVE permit?
Yes - What is your permit number? **Permit No. TXR15** _____
(No) - a permit number will be issued.

Application Fee if mailing a paper NOI:
You must pay the $325 Application Fee to TCEQ for the application to be considered complete.
Payment and NOI must be mailed to separate addresses. See instructions for correct mailing addresses.

Provide your payment information below, for us to verify payment of the application fee:

Mailed:	Check/Money Order No.: 1484	Company Name on checking account: CROSS CANYON RANCH LTD
EPAY:	Voucher No.:	Is the Payment Voucher copy attached? (Yes)

A. OPERATOR (applicant)

1. If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity?
CN 603004656 (Search Central Registry)

2. What is the Legal Name of the entity (applicant) applying for this permit?
CROSS CANYON RANCH, LTD
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

3. What is the name and title of the person signing the application?
(The person must be an official meeting signatory requirements in TAC 305.43(a).)

Name: JOEY GUERRA	Title: MGR

4. What is the Operator's (applicant) mailing address as recognized by the US Postal Service? (verify at USPS.com)

Address: P.O. BOX 65101	Suite No./Bldg. No./Mail Code:	
City: SAN ANTONIO	State: TX	ZIP Code: 78216
Country Mailing Information (if outside USA).	Country Code:	Postal Code:

5. Phone No.: (210) 495 8777	Extension:
6. Fax No.: (210) 499 4217	E-mail Address: JOEY@INTEGRATEDREALTYGROUP.COM

7. Indicate the type of Customer:

☐ Individual	☐ Sole Proprietorship-D.B.A.	☒ Limited Partnership
☐ Corporation	☐ Federal Government	☐ General Partnership
☐ State Government	☐ County Government	☐ City Government
☐ Other Government	☐ Other (describe):	

8. Independent Operator: [X] Yes [ ] No (If governmental entity, subsidiary, or part of a larger corporation, check "No".)

9. Number of Employees: [X] 0-20; [ ] 21-100; [ ] 101-250; [ ] 251-500; or [ ] 501 or higher

10. Customer Business Tax and Filing Numbers *(This item is not applicable to Individuals, Government, GP or Sole Proprietor.)*
REQUIRED for Corporations and Limited Partnerships (Verify the entity's status and filing no. with TX SOS at 512/463-5555)

State Franchise Tax ID Number: 32035384281	Federal Tax ID: 20-3019546
TX SOS Charter (filing) Number: 800507545	DUNS Number (if known):

B. APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

1. Name: MARTIN KELLER	Title: PROJECT MANAGER	Company: BAKER SURVEYING
2. Phone No.: (830) 833 2250	Extension:	
3. Fax No.: 830 833 2257	E-mail Address: MARTIN@ABAKERSURVEY.COM	

C. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

1. TCEQ Issued RE Reference Number (RN): RN 104921648
(Search Central Registry)

2. Name of Project or Site (the name as known by the community where this facility/project is located):
THE HILLS AT CANYON LAKE
(example: phase and name of subdivision or name of project that's unique to the site)

3. Does the site have a physical address? NO
If Yes, complete **Section A** for a physical address.
If No, complete **Section B** for site location information.

Section A: Enter the physical address for the site. (verify it with USPS.com or other delivery source)

Street Number:	Street Name:
City:	ZIP Code:

Section B: Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site:
(Ex.: phase I of Woodland subdivision located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)
HILLS AT CANYON LAKE LOCATED 2 MILES NORTH OF INT OF MYSTIC CANYON AND FM 306

City where the site is located or nearest city to site:	ZIP Code where site is located:
~~CANYON LAKE~~ SPRING BRANCH	78070

4. Identify the county where the site is located: COMAL

5. Latitude: 29°58'26.535" N	Longitude: 98° 20' 48.524" W

6. What is the primary business of this entity? In your own words, briefly describe the primary business of the Regulated Entity:
(Do not repeat the SIC and NAICS code)
DEVELOPER

7. What is the mailing address for the regulated entity?

Is the RE mailing address the same as the Operator? [X] Yes, address is the same as Operator [ ] No, provide the address

Street Number:	Street Name:	
City:	State:	ZIP Code:

D. GENERAL CHARACTERISTICS

1. Is the site located on Indian Country Lands? [X] No [ ] Yes – If Yes, do not submit this NOI. Contact EPA, Region VI
If the site is on Indian country lands, you must obtain authorization through EPA, Region VI.

2. What is the Standard Industrial Classification (SIC) code (see instructions for common codes): (Search Osha.gov)

Primary: 152 Secondary: 1521

3(a) What is the total number of acres disturbed? 12.47 AC

3(b) Is the project site part of a larger common plan of development or sale? ☐ Yes ☒ No

If **Yes**, the total number of acres disturbed can be less than 5 acres.

If **No**, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

4. Discharge Information (all information MUST be provided or the permit will be denied)

4(a) What is the name of the water body(s) to receive the storm water runoff or potential runoff from the site?

DEVIL'S HOLLOW → GUADALUPE RIVER → CANYON LAKE

4(b) What is the segment number(s) of the classified water body(s) that the discharge or potential discharge will eventually reach? 1805

4(c) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) list of impaired waters?

☐ Yes ☒ No

If Yes, provide the name of the impaired water body(s). _____

4(d) Is the discharge into an MS4? ☐ Yes ☒ No

If Yes, what is the name of the MS4 Operator? _____

Note: The general permit requires you to send a copy of the NOI to the MS4 Operator.

4(e) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer?

☐ Yes ☒ No

If the answer is Yes, please note that a copy of the agency approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) must be included or referenced in the Storm Water Pollution Prevention Plan.

E. CERT IFICATION

Check "Yes" to the certifications below. **Failure to certify to all items will result in denial.**

☒ Yes	I certify that I have obtained a copy and understand the terms and conditions of the general permit (TXR150000).
☒ Yes	I certify that the full legal name of the entity (Operator) applying for this permit has been provided and is legally authorized to do business in Texas.
☒ Yes	I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed.
☒ Yes	I certify that a storm water pollution prevention plan has been developed and will be implemented prior to construction, and that is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000.

Operator Certification:

I. JOEY GUERRA — Typed or printed name *(Required & must be legible)*

MGR. — Title *(Required & legible)*

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: _____ (Use blue ink) Date: 1/13/2012

April 2012

Executive Director
Texas Commission on Environmental Quality
Storm Water Processing Center; MC-228
P.O. Box 13087
Austin, TX 78711-3087

Dear Executive Director:

This letter serves to designate either a person or specifically described position as an authorized person for signing reports, documents, certification or other information as required to implement the Storm Water Pollution Prevention Plan. The following person or position is hereby authorized to sign reports, documents or certifications other than an NOI application.

A Qualified Storm Water Inspector employed by Merit Professional Services

This letter is in reference to:

Hills of Cross Canyon Ranch

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in the Texas Administrative Code Title 30 Part 1 Chapter 305 Subchapter C Rule 305.44 and Title 30 Part 1 Chapter 305 Subchapter F rule 305.128.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Project or Site:	Hills of Cross Canyon Ranch
Owner Name:	Cross Canyon Ranch, Ltd.
Printed Name:	J.L. Guerra Jr.
Title:	Manager
Signature:	
Date:	4/10/2012

LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

"PRIMARY OPERATOR" NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.E.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	TXR15
Operator Name:	Cross Canyon Ranch, Ltd.
Contact Name and Phone Number:	J.L. Guerra Jr. 210.495.8777
Project Description: *Physical address or description of the site's location, and* *Estimated start date and projected end date, or date that disturbed soils will be stabilized.*	Hills of Cross Canyon Ranch 2 miles North of intersection of Mystic Canyon Drive and FM 306 Spring Branch, Texas 78216 Development Start: April 2012 Stop: April 2014
Location of Storm Water Pollution Prevention Plan (SWP3):	On Site Construction Trailer 2 miles North of intersection of Mystic Canyon Drive and FM 306 Spring Branch, Texas 78216

SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Project/Site Name: Hills of Cross Canyon Ranch (herein referred to as the "site")
Project Street/Location: 2 miles North of intersection of Mystic Canyon Drive and FM 306
City: Spring Branch
State: TX
ZIP Code: 78070
County or Similar Subdivision: Comal

Latitude/Longitude

Latitude:	Longitude:
29.965977	-98.352571

Method for determining latitude/longitude:
☐ USGS topographic map (specify scale: _____)
☐ EPA Web site
☐ GPS
☒ Other (please specify): Arc GIS

Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer? ☒ Yes ☐ No

Location of site with regards to the Edwards Aquifer:
☐ Outside the Aquifer ☐ Recharge Zone
☒ Contributing Zone (CZ) ☐ CZ w/in Transition Zone

Is the project located in Indian country? ☐ Yes ☒ No
If yes, name of Reservation, or if not part of a Reservation, indicate "not applicable."
Not Applicable

Is this project considered a federal facility? ☐ Yes ☒ No
TPDES project or permit tracking number*:_____
**(This is the unique identifying number assigned to your project by your permitting authority after you have applied for coverage under the appropriate National Pollutant Discharge Elimination System (NPDES) construction general permit.)*

1.2 Contact Information/Responsible Parties

Operator(s):

1. **Operator with Control Over Construction Plans and Specifications:**

   Cross Canyon Ranch, Ltd.
   J.L. Guerra Jr.
   11202 Disco Drive
   San Antonio, Texas 78216
   210.495.8777
   Fax: 210.499.4217

2. **Operator with Day-to-Day Operational Control:**

   Cross Canyon Ranch, Ltd.
   J.L. Guerra Jr.
   11202 Disco Drive
   San Antonio, Texas 78216
   210.495.8777
   Fax: 210.499.4217

Project Manager(s) or Site Supervisor(s):
Cross Canyon Ranch, Ltd.
J.L. Guerra Jr.
11202 Disco Drive
San Antonio, Texas 78216
210.495.8777
Fax: 210.499.4217
joey@integratedrealtygroup.com

SWPPP Contact(s):
Cross Canyon Ranch, Ltd.
J.L. Guerra Jr.
11202 Disco Drive
San Antonio, Texas 78216
210.495.8777
Fax: 210.499.4217
joey@integratedrealtygroup.com

This SWPPP was Prepared by:
Merit Professional Services, LLC.
PO Box 271712
Flower Mound, Texas 75027
214-998-9454
Fax: 866-926-0983

MS4 Operator(s):

Comal County
Attn: Comal County Building/Planning/Public Works
100 Main Plaza
New Braunfels, Texas 78130

Emergency 24-Hour Contact:
Cross Canyon Ranch, Ltd.
J.L. Guerra Jr.
210.495.8777

If additional operators are involved with this project, Secondary operators (Subcontractors) must complete, sign and post a Construction Site Notice and send a copy of the Construction Site Notice to the MS4. If there are Secondary Operators, the following section will be completed by the Developer:

Subcontractor(s):
Name: _____
Address: _____
Telephone Number: _____
Fax/Email: _____

Repeat as necessary

1.3 Nature and Sequence of Construction Activity

Cross Canyon Ranch, Ltd. plans construction of a development project in Spring Branch, Comal County, Texas. Cross Canyon Ranch, Ltd. is responsible for overall site development. Soil disturbing activities will include clearing and grubbing; installing stabilized construction exits; installing erosion and sediment controls; grading; excavation and installation of utilities; grading and preparing streets; and installation of post-construction controls. There are a total of 204 acres in this development and the portion of the development, Hills of Cross Canyon Ranch Phase 2, this SWPPP will apply to 12 disturbed acres.

The general construction sequence will be:

1. Install Structural Controls;
   - Install silt fencing around the perimeter.
   - Install stone overflow structures.
   - Install curb and area inlet protection devices, where appropriate.
   - Install erosion control matting, where appropriate.
2. Site Preparation, Clearing, Grading
3. Excavation of storm sewer, water and wastewater utility, gas, utility, cable, electric excavation,
4. Grade and Prepare Streets.
5. Grade and Prepare Lots.
6. Stabilize the site
   - Landscape
   - Remove temporary BMPs not required for construction
7. Add and Maintain Permanent Storm Water Controls if applicable.
   - Add and maintain existing vegetation and seeded areas where needed

These are the major activities that will disturb soils onsite. General construction plans are to develop the land for future construction of new homes on site. Surface runoff will drain to storm water culverts and roadside ditches. Appropriate control measures or best management practices (BMPs) for these activities are described in Sections 2 (Erosion and Sediment Control BMPs), 3.0 (Good Housekeeping BMPs) and 4.0 (Post-Construction BMPs) of this SWPPP.

What is the function of the construction activity?
☒ Development ☐ Residential ☐ Industrial ☐ Road Construction ☐ Linear Utility
☐ Other (please specify):

Estimated Project Start Date: April 2012
Estimated Project Completion Date: April 2014

1.4 Soils, Slopes, Vegetation, and Current Drainage Patterns

Soil type (s):

The soil designations within the site are described by U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey January 2, 2007. The three soil classifications onsite are:

Type of Soil	K Factor	Erosion Rating	Percent
Bolar clay loam, 1 to 3 percent slopes	.32	slight	6.9%
Brackett Rock, outcrop, Comfort complex, 1 to 8 percent slopes	.20	slight	38.9%
Brackett Rock, outcrop, Real complex, 8 to 30 percent slopes	No rating	moderate	54.2%

Slopes:

All of the lots on which construction will occur slope toward the interior streets of the development (Erosion Control Plan). On-site slopes will consist of a slope from 1 to 30%.

Drainage Patterns:

The site will be graded to have all individual lots drain to onsite streets. Culverts and roadside ditches will convey stormwater.

Vegetation:

The site will be graded and cleared for construction of single family homes and currently does not support vegetation. Following construction of the new homes, the areas surrounding homes and roads and other open areas will be landscaped with grass, shrubs, and trees.

1.5 Construction Site Estimates

The following are estimates of the construction site (EPA 1992):

Total project area:	204 acres
Construction area to be disturbed:	12 acres
Percentage impervious area before construction:	25%
Runoff coefficient before construction:	0.20-0.30
Percentage impervious area after construction:	85%
Runoff coefficient after construction:	0.40-0.50

1.6 Receiving Waters

Description of receiving waters:

The site discharges into Comal County municipal separate storm sewer system (MS4) and into Devil's Hollow Tributary 5 to Canyon Lake Segment 1805.

This project discharges to Devil's Hollow Tributary 5 to Canyon Lake Segment 1805. The river basin does have 303(d) impaired waters with mercury in edible tissue listed as the pollutant(s) of concern. This SWPPP is designed to accommodate the TMDL requirements established by the EPA/State. If inspections reveal that additional BMPs are needed, they will be added during the construction phase. Any water bodies will be shown on the site map.

This project does not discharge to TMDL streams listed by the EPA/State. If inspections reveal that additional BMPs are needed, they will be added during the construction phase. Any water bodies will be shown on the site map. If EPA/State-established TMDLs are later identified, the SWPPP will be modified.

Description of storm sewer systems:

Stormwater will flow from the lots, down the onsite streets, and into culverts and roadside ditches. These culverts and roadside ditches are part of the MS4 that will be installed throughout the development. The stormwater will be conveyed offsite via the MS4.

1.7 Site Features and Sensitive Areas to be Protected

This site is located in the Edwards Aquifer Contributing Zone. This SWPPP will incorporate requirements of the Edwards Aquifer Rule to reduce impacts to the Edwards Aquifer.

1.8 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff:

- Clearing and grubbing operations
- Grading and excavation of building(s)
- Vehicle tracking
- Landscape operations

Potential sources of pollution that could potentially be released into the environment may include:

Stormwater Pollutants	Onsite	Notes
Concrete Curing Compound	Yes	Curing compound will be used as needed and concrete contractor will remove remaining compound from the site.
Concrete Wash Water	Yes	Wash water resulting from concrete trucks will be washed out at a designated site. See Section 3.3.
Excavation Pump Out Water	Yes	Pump on vegetated area or through filter bag to contain sediment.
Fertilizer	Yes	Fertilizer is seldom used during final site preparation when vegetated areas are sodded or seeded. Fertilizer will not be applied just before a storm event, and will not be stored on the site for any length of time.
Fuels	Yes	Used by vehicles performing dirt work and construction activities. Secondary containment will be provided for tanks to contain leaks and spills.
Glue/Adhesives	No	Used in flooring and other similar functions. Empty containers will be disposed of properly.
Joint Compound	No	Joint compound will be used to adhere wallboard joints. Empty containers will be disposed of properly.
Oils/Grease	Yes	Used by vehicles performing dirt work and construction activities. Drip pans will be used when changing oil.
Painting and Brick Wash Waters	No	Contained on the site in designated areas where possible.
Paving	Yes	Paving operations will not be performed immediately before an anticipated major storm event. Excess chemical from paving will be removed.
Pesticides	No	Pesticides may be used as a preparation before the foundation is poured and for pest control during construction to control fire ants, etc. Pesticides will be used according to the manufacturer's labeled instructions, and will not be applied just before a storm event. Excess pesticides will be removed from the site once application is complete.

Stormwater Pollutants (cont.)	Onsite	Notes
Refrigerants	Yes	Refrigerants will be used in the AC units. Any AC servicing will be performed by HVAC trained technicians.
Roofing Tar	No	Roofing tar will be used to seal flashing during the construction. Waste tar will be disposed of in covered container and the roofing contractor will remove excess tar from the site.
Sanitary/Septic Waste Management	Yes	Portable toilets will be contained on the site in designated areas. Licensed sanitary services will ensure facilities are in working order at all times.
Sediment	Yes	Erosion from area where soil is disturbed due to construction has a high potential of sediment. Sediment and erosion control measures are included in this SWPPP.
Soil Stabilization Material	Yes	Contained on the site and not applied just before a storm event.
Solvents	No	Used by utility and painting contractors and will be removed from the site by contractors.
Stains, Paints	No	Used by painting contractor. Paints and stains may be stored inside the structure and the contractor will remove waste paints and stains from the site.
Trash	Yes	Trash will be properly contained on the site and removed frequently for off-site disposal.
Water Injection	No	Water injection is used to stabilize expansive clay soil. After injection, the area is capped with select fill.
Wood Preservatives	No	Used by painting contractor. Wood preservatives may be stored inside the structure and contractor will remove waste wood preservatives from the site.

1.9 Endangered Species

Are endangered or threatened species and critical habitats on or near the project area?
☐ Yes ☒ No

This SWPPP provides a list of Endangered and Threatened Species in the area of construction (see attached list). As additional assessment reports and documents applicable to this requirement become available, those reports and documents should be attached with the SWPPP as required by Part 1.3.C.6 and Part 3.7 of the NPDES General Permit. A review of the site found no evidence that this project will have an adverse impact on any endangered or threatened species and critical habitats listed.

1.10 Historic Preservation

Are there any historic sites on or near the construction site?
☐ Yes ☒ No

This SWPPP provides a listing of sites on the National Register of Historic Places in the area of construction (see attached list). As additional assessment reports and documents applicable to this requirement become available, those reports and documents should be attached with the SWPPP for reference. In accordance with Part 1.3.C.7 of the EPA NPDES General Permit the Owner/Operator is reminded to comply with applicable state, tribal and local laws concerning the protection of historic properties and places. A review of the site found no evidence that this project will have an adverse impact on any historic site listed on the National Register of Historic Sites.

1.11 Applicable Federal, Tribal, State or Local Programs

This Storm Water Pollution Prevention Plan (SWPPP) is prepared in compliance with the requirements of the Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES) General Permit for Storm Water Discharges from Construction Activities. This SWPPP is consistent with applicable state and local environmental regulations and codes. The SWPPP will be updated as necessary to remain consistent with any changes to site plans and permits approved by state and local officials. Permit requirements for this SWPPP are provided in Appendix H.

The General Permit cannot be authorized for a site regulated under 30 Texas Administrative Code (TAC) Chapter 213 (relating to the Edwards Aquifer program) until the appropriate Edwards Aquifer Protection Plan has been approved by the TCEQ's Edwards Aquifer Protection Program. For sites located in the Edwards Aquifer Recharge Zone a Water Pollution Abatement Plan (WPAP) must be developed. For Sites located in the Edwards Aquifer Contributing Zone a Contributing Zone Plan (CZP) must be developed. The permittee shall maintain a copy of the approval letter for the plan in its SWPPP. A copy of the separate plan will be made available upon request.

1.12 Maps

The following site maps and plans are provided as figures in this SWPPP:

Erosion Control Map
Site Location Map

SECTION 2: EROSION AND SEDIMENT CONTROL BMPS

Implementation of all control measures (BMPs) will be the responsibility of Cross Canyon Ranch, Ltd. The following subsections apply to erosion and sediment controls for the major construction activities onsite. The schedule of inspections for these measures is discussed as appropriate in Section 5.

The following goals and criteria will be accomplished with regard to erosion and sediment control:

1. All control measures have been designed to retain sediment on the property and prevent sediment from entering the municipal storm sewer system and surface waters (Devil's Hollow Tributary 5 to Canyon Lake Segment 1805) to the maximum extent possible.

2. All control measures will be selected, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the Operator will replace or modify the control for site situations.

3. If sediment escapes the property, offsite accumulations of sediment will be removed at a frequency sufficient to minimize offsite impacts.

4. Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges.

5. If offsite material storage areas to be used solely by this project are added to the project plan, they will be considered a part of the project and will be added to the SWPPP.

Construction specifications and details for debris and trash management, chemical management, and sanitary facilities are provided in Appendix F.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

The site is part of a development that will be disturbed by excavation, grading, or other activities including off-site borrow and fill areas. Fill areas located onsite will have temporary vegetation established if the fill pile would be left for over 21 days without being disturbed. Measures taken to minimize disturbed areas and protect natural features are best described in the following subsection.

2.2 Phase Construction Activity

Construction activity is planned to occur between April 2012 and April 2014.

Sequence of Construction Activity			
Construction Activity	**Schedule Consideration**	**Start**	**Finish**
Construction access, entrance to site, construction routes, areas designated for equipment parking	As soon as construction begins, stabilize any bare areas with gravel and temporary vegetation.		
Installation of erosion and sediment controls and site preparation	After the construction site is accessed, install erosion and sediment controls before land grading.		
Land clearing and grading	Implement major clearing and grading after installing principal sediment and key runoff-control measures, and install additional control measures as grading continues. Clear borrow and disposal areas as needed, and mark trees and buffer areas for preservation.		
Paving	Grading and paving of streets. Paving operations will not be performed immediately before an anticipated major storm event. Excess chemical from paving will be removed.		
Backfill excavation	Apply temporary or permanent stabilizing measures immediately to any disturbed areas where work has been either completed or delayed.		
Landscaping and Final Stabilization	Stabilize all open areas, including borrow and spoil areas, and remove and stabilize all temporary control measures.		

The following management practices will be employed to sequence construction activities so as to minimize the overall amount of disturbed soil that will be subject to potential erosion at one time:

1. Prevent the disturbance of an area until ready to proceed with field work;
2. Anticipate the site conditions that will exist as the construction progresses toward the final product;
3. Have the materials on-hand to complete the work without delay;
4. Stabilize disturbed areas as soon as applicable and apply temporary stabilization immediately after grading;
5. Consider the time of year and be prepared for sudden thunderstorms;
6. Install erosion and sediment controls prior to site disturbance;
7. Physically mark off limits of disturbance on the site with tape, signs or other methods, so that workers can see areas to be protected;
8. Maintain storm water control devices until stabilized disturbed areas have achieved final stabilization;
9. Carry out a regular maintenance schedule for BMPs; and
10. Designate one individual responsible for implementing BMPs. Make sure that all workers understand the provisions of the BMPs. Establish reporting procedures for problems identified by workers.

If construction ceases for longer than 14 days, temporary stabilization practices, which may include temporary seeding, hay, geotextiles, mulches, and other techniques, will be employed for all graded and other disturbed portions of the site.

A Grading and Stabilization Record will be maintained by the Operator and will be kept in the SWPPP. The Record will include the dates when construction activities temporarily or permanently cease on a portion of the site and the dates when any stabilization measures are initiated. The Grading and Stabilization Record is provided in Appendix A. Construction specifications and details for vegetation and dust control are provided in Appendix F.

2.3 Control Stormwater Flowing onto and through the Project

Silt fencing will be installed along perimeter of the site before construction begins. Silt fencing will be installed perpendicular to and cross gradient to the direction of flow. This structural feature will prevent sediment from entering storm sewers and receiving waters and will reduce the speed of runoff flow. A description and typical details of the silt fencing is provided in Appendix F.

2.4 Stabilize Soils

During construction, erosion control matting will be applied to bare soil as needed to stabilize soils on active construction sites. Permanent stabilization will be done immediately following the final construction but no later than 14 days after construction ceases. Native species of plants will be used to establish vegetative cover on exposed soils. Permanent stabilization will be completed in accordance with the final stabilization procedures described in Section 7.

If dust is visibly leaving the site due to construction activities, dust suppression techniques such as wetting the soil will be employed. All trucks carrying erodible materials (i.e. soil, concrete dust, sand) off site onto any public road must be covered with a tarp. After construction, the site will be stabilized to reduce dust. Water used to control dust and for other construction purposes will originate from a public water supply or private well approved by the State or local health department.

2.5 Protect Slopes

During construction erosion control matting will be applied to bare soil as needed to protect slopes.

2.6 Protect Culverts

Culverts within the project area will be protected by installing rock berms. Construction specifications and details for rock berms (check dam) are provided in Appendix H.

2.7 Establish Perimeter Controls and Sediment Barriers

Silt fencing will be used to establish perimeter controls and sediment barriers. See Section 2.3 for details pertaining to this BMP.

2.8 Retain Sediment On-Site

Silt fencing and erosion control matting will be utilized to retain sediment on site. See Section 2.3 for details pertaining to these BMPs.

This project disturbs 10 or more acres and does have a sediment/detention basin. Sediment basin capacity calculations are included with the site erosion plans.

2.9 Establish Stabilized Construction Exits

Install and maintain rock entrance pad until streets are installed. Entrances into the equipment staging area will need a crushed rock entry to prevent off-site tracking of sediment. Off-site tracking of sediments will be controlled using the site entrance pads as called for on the site map. All construction equipment and vehicles will use the designated stabilized construction entrance when exiting the construction project.

2.10 Additional BMPs

Rock berms will be installed at the culverts. If an additional BMP not listed is used, the SWPPP will be updated to reflect the changes.

SECTION 3: GOOD HOUSEKEEPING BMPS

3.1 Material Handling and Waste Management

The following measures will be taken to prevent the discharge of solid materials to receiving waters, except as authorized by a permit issued under section 404 of the Clean Water Act.

1. Solid waste will be gathered daily and deposited in a container for disposal at a permitted solid waste disposal facility.

2. During periods of continuous site activity, portable toilets may be used, and if so, will be provided and maintained by a licensed sanitary waste contractor.

Construction specifications and details for debris and trash management and sanitary facilities are provided in Appendix F.

3.2 Establish Proper Building Material Staging Areas

Construction equipment, non-hazardous building materials such as packing material (wood, plastic, and glass), construction scrap material (brick, wood, steel, metal scraps, and pipe cuttings), and maintenance materials will be stored at a combined staging area and material storage area.

All hazardous waste materials such as oil filters, petroleum products, paint, and equipment maintenance fluids will be stored in structurally sound and sealed containers under cover within a separate hazardous material storage area.

Large items, such as framing materials and stockpiled lumber, will be stored in the open in the storage area. Such material will be elevated on wood blocks to minimize contact with runoff.

3.3 Designated Washout Areas

A designated concrete washout area will be established onsite. Details for the concrete washout area and further measures that will be implemented to eliminate the potential for discharges from washout areas for concrete mixers, paint, stucco, and like building materials are illustrated in Appendix F.

3.4 Establish Proper Equipment/Vehicle Fueling and Maintenance Practices

The following measures will be taken to minimize the exposure of vehicular fluids to stormwater:

1. All vehicles will be parked in areas away from surface water bodies and drainage courses near surface water bodies. Vehicles will be inspected routinely for fluid leaks.

2. Change-out of vehicle fluids (oil, antifreeze, etc) will not be performed onsite if at all possible. Equipment that is inoperable and/or cannot be moved offsite for repair will be the only exception and will be maintained on site. Vehicle repair will be performed only in a controlled location and runoff from that location will be controlled so as to not reach any surface water.

3. Drip pans will be available for vehicle leaks in the appropriate location on site to be determined by the Operator.

3.5 Control Equipment/Vehicle Washing

Vehicle wash-down will be performed only in a controlled location and runoff from that location will be controlled so as to not reach any surface water.

3.6 Spill Prevention and Control Plan

The following spill prevention and control measures will be taken to minimize exposure of the materials to stormwater:

1. Paints, solvents, fuel (small containers), and any other stored chemical substance (small containers) will be kept covered or within an enclosure to protect the containers and the floor of the enclosure from wind, precipitation, and runoff. Runoff containing such materials will be collected, removed from the site and disposed of in accordance with the federal, state, and local regulations.

2. All chemicals will be used as described by manufacturers' instructions. Excess chemicals will be removed from the site and disposed of properly, recycled, or used elsewhere.

3. In the event of a spill of hazardous, toxic, or radiological waste (HTRW), the operator will cease work, contain the spill, and notify the designated personnel.

4. Spill response materials will be located in the spill response kit in an appropriate location on site to be determined by the Operator.

5. Spill response materials will be located on the earth-moving equipment on site.

Spills of toxic or hazardous material will be reported to the State of Texas Spill-Reporting Hotline and the State Emergency Response Commission (SERC) at 1-800-832-8224. In the event of a release of a chemical in an amount that exceeds the Reportable Quantity (RQ), the National Response Center will also be contacted immediately at (800) 424-8802. A list of RQs is included as Appendix B.

3.7 Any Additional BMPs

The following measures will be taken to manage chemicals onsite:

1. Cross Canyon Ranch, Ltd. will compile the Material Safety Data Sheets (MSDS) for each chemical used at the site and will be kept in an appropriate location on site to be determined by the Operator.

2. All chemicals will be used as described by manufacturers' instructions. Excess chemicals will be removed from the site and disposed of properly, recycled, or used elsewhere.

Details for chemical management are provided in Appendix F.

3.8 Allowable Non-Stormwater Discharge Management

The following non-stormwater discharges are allowable under the general stormwater permit which authorizes this project:

- Discharges from fire fighting activities;
- Fire hydrant flushings;
- Vehicle, external building, and pavement wash water so long as detergents and soaps are not used and spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed; and if local, state, or federal regulations are applicable, the materials are removed according to those regulations), and if the purpose of the washings is to remove mud, dirt, and dust;
- water used to control dust;
- potable water sources including waterline flushings;
- air conditioning condensate; and
- uncontaminated groundwater or spring water, including foundations or footing drains where flows are not contaminated with industrial materials such as solvents.
- lawn watering and similar irrigation drainage.

If any of the above listed allowable non-stormwater discharges become contaminated, these discharges will be contained so as to not enter the MS4 and will be disposed of properly. A routine inspection of potential non-permitted non-storm water discharges will be conducted at the site during the regularly scheduled inspections. Any discharge would be recorded in the inspection report.

SECTION 4: POST-CONSTRUCTION BMPs

Permanent Stormwater Controls

The following measures will be installed and designed during construction to control runoff after construction is complete:

1. Portions of the site will be landscaped with trees and shrubs to provide soil stabilization. Seeding, sodding or hydromulch will be installed after final grading phase where soil has been disturbed to control erosion.

2. Landscaped areas within all unpaved disturbed areas will continue to provide soil stabilization.

3. A storm drain system may be completed at the completion of the project, as noted in Civil Plans, to collect storm runoff.

4. Vegetated swales, diversion dikes or natural depressions may be established at the completion of the project, per the Civil Plans, to divert run-off from the site.

SECTION 5: INSPECTIONS

5.1 Inspections

Inspection Personnel:

Cross Canyon Ranch, Ltd. will be responsible for implementing, maintaining, revising and amending, and managing the practices of the SWPPP. Cross Canyon Ranch, Ltd. will assign each subcontractor the responsibility to implement and maintain best management practices, structural controls, and other controls during their onsite activities. Cross Canyon Ranch, Ltd. is designated accountable for inspection activities at the site (Table 1). They will either conduct inspections themselves, or authorize another qualified individual to complete the inspections. A form delineating responsibilities for the designated inspector is included in the Delineation Tab. The inspector's qualifications are provided in Appendix C.

Inspection Schedule and Procedures:

Inspections will occur on a schedule of once every seven (7) calendar days and on a specifically defined day, regardless of whether or not there has been a rainfall event since the previous inspection. The inspections will include disturbed areas of the construction site owned or under operational control of Cross Canyon Ranch, Ltd. that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or potential for, pollutants entering the drainage system.

Where areas have been finally or temporarily stabilized or where runoff is unlikely due to winter conditions (e.g. site is covered with snow, ice, or frozen ground exists), inspections will be conducted at least once every month.

All erosion and sediment control measures and other protective measures identified in this SWPPP will be maintained in effective operating condition. If through inspections the permittee identifies that BMPs are not operating effectively, maintenance will be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance will be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed, or otherwise rendered ineffective must be replaced or corrected immediately upon discovery

Based on the results of the inspection, the SWPPP will be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP will be completed within seven (7) calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation of these changes will be completed before the next anticipated storm event. If implementation before the next anticipated storm event is impracticable, an implementation schedule will be established and implemented as soon as possible.

A site specific Inspection Report (Appendix D) will be completed during inspections. All deficiencies will be recorded on the inspection reports and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Inspection observations will include, at a minimum:

- The locations of discharges of sediment or other pollutants from the site.
- Locations of all BMPs, especially those that failed to operate as designed or proved inadequate for a particular location.
- Locations where additional BMPs are needed that did not exist at the time of inspection.
- Incidence of non-compliance with the SWPPP.

A Corrective Action Log will be generated with the inspection report. Where no incidents of non-compliance are found, a certification will be signed by the Operator that the facility is in compliance with the SWPPP and the General Permit.

5.2 Delegation of Authority

Duly Authorized Representative(s) or Position(s):

See Tab – Delegation Letter at the front of the SWPPP

See Tab - Delineation of Responsibilities after the SWPPP

SECTION 6: RECORDKEEPING AND TRAINING

6.1 Recordkeeping

The Operator will retain copies of this SWPPP, all reports required by the General Permit, and records of all data used for coverage under this General Permit for a period of at least three years from the date that the site has achieved final stabilization. The Operator will retain a copy of the SWPPP at the construction site from the date of project initiation to the date of final stabilization, except for periods when no continuous site presence (construction office or personnel) is maintained. Modifications or updates to the SWPPP will be made directly to the affected page(s).

This SWPPP was developed and implemented before submitting an NOI for coverage under the General Permit. The NOI was submitted to TCEQ at least two days before commencing construction activities. If the Operator changes, or an additional Operator is added after the initial NOI is submitted, the new Operator will submit an NOI at least two days before assuming operational control of the site. The Operator will post a copy of the NOI near the main entrance of the construction site prior to commencing construction activities, and maintain the notice in that location until completion of the construction activity. A copy of the signed NOI will be provided to the Operator of any MS4 receiving the discharge (Comal County), at least two days prior to commencing construction activities. The NOI is included before the SWPPP at the NOI tab. The construction activities are located on the Edwards Aquifer Contributing Zone, a copy of the signed NOI will be submitted to the appropriate TCEQ Regional Office.

A Construction Site Notice (CSN) was developed for the site. The Operator will post a copy of the CSN near the main entrance of the construction site prior to commencing construction activities and maintain the notice in that location until completion of the construction activity. The CSN is included before the SWPPP at the Construction Site Notice tab.

A Notice of Change (NOC) will be submitted if any relevant facts were omitted from or incorrect information was submitted in the NOI. The NOC will provide the correct information to the executive director within 14 days after discovery. If relevant information provided in the NOI changes, the NOC will be submitted within 14 days of the change. A copy of the NOC will be submitted to the Operator of any MS4 receiving the discharge (Comal County).

An NOT will be submitted to TCEQ, and to the Operator of any MS4 receiving the discharge (Comal County), and to the TCEQ Regional Office within 30 days after:

- Final stabilization has been achieved on all portions of the site (when 70% density of the native ground cover is established) that is the responsibility of the permittee (Operator); or
- Another permitted Operator has assumed control over all areas of the site that have not been finally stabilized; and

- All silt fences and other temporary erosion controls have been removed, scheduled for removal as defined in the SWPPP, or transferred to a new Operator if the new Operator has sought permit coverage. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.

Authorization to discharge under the General Permit terminates at midnight on the day the NOT is postmarked for delivery to TCEQ. The NOT is included in Appendix E.

A responsible corporate officer of the Operator will sign all reports required by the General Permit, including this SWPPP, unless the Operator duly authorizes a representative that is not a corporate officer. The authorized representative may be either a named individual or any individual occupying a named position. A Delegation Letter is provided before the SWPPP at the Delegation Letter tab.

The date(s) when construction activities temporarily or permanently cease on a portion of the site will be recorded in the Grading and Stabilization Record (Appendix A). The date when an area is either temporarily or permanently stabilized will also be recorded in the Grading and Stabilization Record (Appendix A).

6.2 Training

Individual(s) Responsible for Training:

J.L Guerra Jr.'s responsibility is to establish that all the subcontractors/vendors are aware of their storm water responsibilities.

Describe Training Conducted:

- General Stormwater and BMP awareness training for staff and subcontractors.
- Detailed training for staff and subcontractors with specific stormwater responsibilities.

SECTION 7: FINAL STABILIZATION

Unpaved portions of the site will be landscaped with trees, shrubs, and grass to control erosion once construction has ceased. See landscaping plan in the civil engineering documents for specifics on final stabilization.

Unless otherwise noted in the Engineer Plans:
The site is in Final Stabilization when:

(a) All soil disturbing activities at the site have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(b) For individual lots in a residential construction site by either:
   (1) the homebuilder completing final stabilization as specified in condition (a) above; or
   (2) the homebuilder establishing temporary stabilization for an individual lot prior to the time of transfer of the ownership of the home to the buyer and after informing the homeowner of the need for, and benefits of, final stabilization. If temporary stabilization is not feasible, then the homebuilder may fulfill this requirement by retaining perimeter controls or other best management practices, and informing the homeowner of the need for removal of temporary controls and the establishment of final stabilization.

(c) For construction activities on land used for agricultural purposes (e.g. pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to surface water and areas that are not being returned to their preconstruction agricultural use must meet the final stabilization conditions of condition (a) above.

(d) In arid, semi-arid, and drought-stricken areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
   (1) Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the operator, and
   (2) The temporary erosion control measures are selected, designed, and installed to achieve 70 percent vegetative coverage within three years.

References

EPA, 1992. Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices. EPA 832-R-92-005.

TCEQ, 2008. Texas Pollutant Discharge Elimination System Multi-Sector General Permit TXR150000 (Renewed March 2008).

Texas Historical Commission (THC) 2008. Texas Historic Sites Atlas website: http://www.atlas.thc.state.tx.us, accessed April 2012

TPWD, 2008. Annotated County List of Rare Species, Comal County. http://gis2.tpwd.state.tx.us/ReportServer$gis_epasde_sql?%2fReport+Project2%2fReport5&rs:Command=Render&county=<Comal>
Accessed April 2012

U.S. Department of Agriculture, Natural Resources Conservation Service. Soil Survey Jan. 3, 2007.

TABLES

Table 1. Pollution Prevention Personnel for Hills of Cross Canyon Ranch Phase 2.

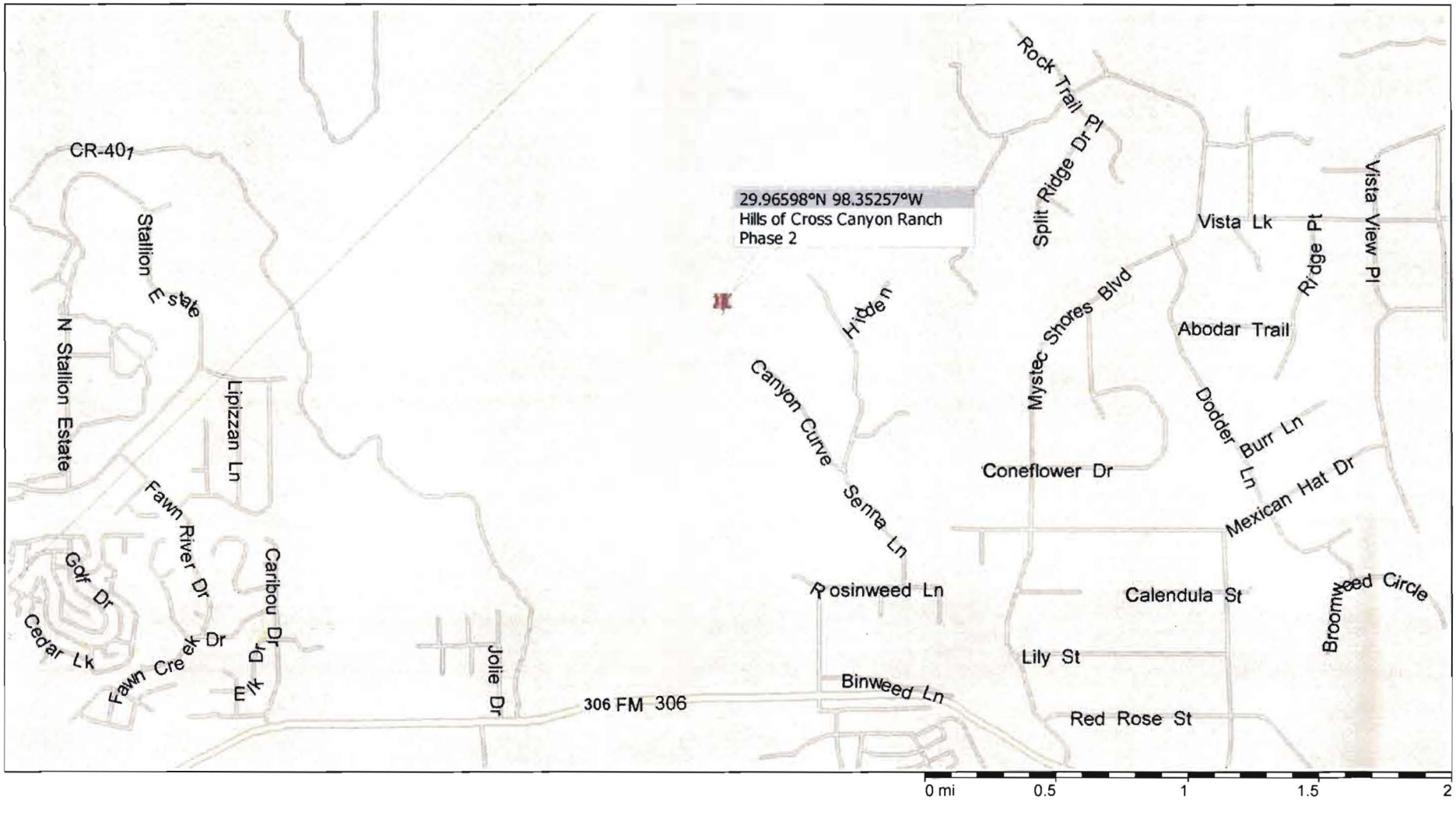
POLLUTION PREVENTION PERSONNEL	Completed by: Merit Professional Services, LLC. Date: April 8, 2012
Members: J.L. Guerra Jr.	Title: J.L. Guerra Jr. Office Phone: 210.495.8777Mobile Phone:
Responsibilities: Responsible for implementation of the plan. Responsible for delegating to subcontractors the duties of conducting implementing, maintaining, and managing the practices of the SWPPP.	
Name Merit Professional Services	Title: Site Inspector Office Phone: 214-998-9454 Mobile Phone:_____
Responsibilities: Responsible for inspection practices for the SWPPP	
Name:_____	Title: _____ Office Phone: _____ Mobile Phone: _____
Responsibilities: _____	
Name:_____	Title: _____ Office Phone: _____ Mobile Phone: _____
Responsibilities: _____	
Name:_____	Title: _____ Office Phone: _____ Mobile Phone: _____
Responsibilities: _____	

DELINEATION OF RESPONSIBILITES FOR POLLUTION PREVENTION PERSONNEL

Hills of Cross Canyon Ranch at 2 miles north of intersection of Mystic Canyon Drive and FM 306Spring Branch, Texas 78216

Responsibility	Name
Operator with Control Over Construction Plans and Specifications	Cross Canyon Ranch, Ltd.
Operator with Day-to-Day Operational Control (maintaining, revising, amending, managing practices and implementation of the SWPPP:	Cross Canyon Ranch, Ltd.
Delegate authority to appropriate individuals/companies/subcontractors	Cross Canyon Ranch, Ltd.
File Notice of Intent (NOI)	Cross Canyon Ranch, Ltd.
Ensure all Operators are included in SWPPP	Cross Canyon Ranch, Ltd.
Install and Maintain Structural Best Management Practices (BMPs)	Cross Canyon Ranch, Ltd.
Perform Procedural BMPs	Cross Canyon Ranch, Ltd.
Responsible for Inspection Practices for the SWPPP	Merit Professional
Responsible for Rain Event Inspection Practices for the SWPPP (if needed)	N/A
Update SWPPP as necessary	Merit Professional And Cross Canyon Ranch, Ltd.
Install Stabilization Practices	Cross Canyon Ranch, Ltd.
Removal of temporary BMPs once complete	Cross Canyon Ranch, Ltd.
File Notice of Termination (NOT)	Cross Canyon Ranch, Ltd.

Texas, United States, North America



COMAL COUNTY

AMPHIBIANS

		Federal Status	State Status
Cascade Caverns salamander	*Eurycea latitans complex*		T

endemic; subaquatic; springs and caves in Medina River, Guadalupe River, and Cibolo Creek watersheds within Edwards Aquifer area

Comal blind salamander	*Eurycea tridentifera*		T

endemic; semi-troglobitic; found in springs and waters of caves

Comal Springs salamander	*Eurycea sp 8*		

endemic; Comal Springs

Edwards Plateau spring salamanders	*Eurycea sp 7*		

endemic; springs and waters of some caves of this region

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Black-capped Vireo	*Vireo atricapilla*	LE	E

oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Golden-cheeked Warbler	*Dendroica chrysoparia*	LE	E

juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer

COMAL COUNTY

BIRDS

		Federal Status	State Status
Mountain Plover	*Charadrius montanus*	PT	

breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Western Burrowing Owl *Athene cunicularia hypugaea*

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Whooping Crane	*Grus americana*	LE	E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

Zone-tailed Hawk	*Buteo albonotatus*		T

arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions

CRUSTACEANS

		Federal Status	State Status
Ezell's cave amphipod	*Stygobromus flagellatus*		

known only from artesian wells

Long-legged cave amphipod *Stygobromus longipes*

subaquatic crustacean; subterranean obligate; found in subterranean streams

Peck's cave amphipod	*Stygobromus pecki*	LE	E

small, aquatic crustacean; lives underground in the Edwards Aquifer; collected at Comal Springs and Hueco Springs

FISHES

		Federal Status	State Status
Fountain darter	*Etheostoma fonticola*	LE	E

known only from the San Marcos and Comal rivers; springs and spring-fed streams in dense beds of aquatic plants growing close to bottom, which is normally mucky; feeding mostly diurnal; spawns year-round with August and late winter to early spring peaks

Guadalupe bass *Micropterus treculii*

COMAL COUNTY

FISHES

Federal Status State Status

endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system

Guadalupe darter *Percina sciera apristis*

Guadalupe River basin; most common over gravel or gravel and sand raceways of large streams and rivers

INSECTS

Federal Status State Status

A mayfly *Pseudocentroptiloides morihari*

mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

Comal Springs diving beetle *Comaldessus stygius*

known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column

Comal Springs dryopid beetle *Stygoparnus comalensis* LE

dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood

Comal Springs riffle beetle *Heterelmis comalensis* LE

Comal and San Marcos Springs

Edwards Aquifer diving beetle *Haideoporus texanus*

habitat poorly known; known from an artesian well in Hays County

Rawson's metalmark *Calephelis rawsoni*

moist areas in shaded limestone outcrops in central Texas, desert scrub or oak woodland in foothills, or along rivers elsehwere; larval hosts are Eupatorium havanense, E. greggii.

MAMMALS

Federal Status State Status

Black bear *Ursus americanus* T/SA;NL T

bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened

Cave myotis bat *Myotis velifer*

colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore

Jaguarundi *Herpailurus yaguarondi* LE E

thick brushlands, near water favored; 60 to 75 day gestation, young born sometimes twice per year in March and August, elsewhere the beginning of the rainy season and end of the dry season

Plains spotted skunk *Spilogale putorius interrupta*

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

COMAL COUNTY

MAMMALS

		Federal Status	State Status
Red wolf	*Canis rufus*	LE	E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

MOLLUSKS

		Federal Status	State Status
Creeper (squawfoot)	*Strophitus undulatus*		

small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins

False spike mussel	*Quadrula mitchelli*		T

possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins

Golden orb	*Quadrula aurea*		T

sand and gravel in some locations and mud at others; intolerant of impoundment in most instances; Guadalupe, San Antonio, and Nueces River basins

Horseshoe liptooth snail	*Daedalochila hippocrepis*		

terrestrial snail known only from the steep, wooded hillsides of Landa Park in New Braunfels

Texas fatmucket	*Lampsilis bracteata*		T

streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins

REPTILES

		Federal Status	State Status
Cagle's map turtle	*Graptemys caglei*		T

endemic; Guadalupe River System; short stretches of shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nest on gently sloping sand banks within ca. 30 feet of water's edge

Spot-tailed earless lizard	*Holbrookia lacerata*		

central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground

Texas garter snake	*Thamnophis sirtalis annectens*		

wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August

Texas horned lizard	*Phrynosoma cornutum*		T

COMAL COUNTY

REPTILES

Federal Status State Status

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

PLANTS

Federal Status State Status

Bracted twistflower *Streptanthus bracteatus*

Texas endemic; shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer

Canyon mock-orange *Philadelphus ernestii*

Texas endemic; usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October

Comal snakewood *Colubrina stricta*

in El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; the historic Comal County record does not describe the habitat; in Mexico ,found in shrublands on calcareous, gravelly, clay soils with woody associates; flowering late spring or early summer

Hill Country wild-mercury *Argythamnia aphoroides*

Texas endemic; mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; flowering April-May with fruit persisting until midsummer

Texas mock-orange *Philadelphus texensis*

limestone outcrops on cliffs and rocky slopes, on boulders in mesic canyon bottoms, usually in shade of mixed evergreen-deciduous slope woodland forest; flowering April-May, but readily recognizable throughout the growing season

Nationally Registered Historic Sites- Comal County, Texas

For detailed information, visit the website at http://www.nps.gov/history/nr/research/nris.htm

COUNTY	RESOURCE NAME	ADDRESS	CITY	LISTED	MULTIPLE
Comal	Breustedt, Andreas, House	1370 Church Hill Dr.	New Braunfels	1982-07-22	
Comal	Comal County Courthouse	N. Sequin Ave.	New Braunfels	1976-12-12	
Comal	Comal Hotel and Klein-Kuse House	295 E. San Antonio and 165 Market St.	New Braunfels	1986-06-26	
Comal	Comal Power Plant	Jct. of Landa Rd. and Landa Park Dr.	New Braunfels	2004-08-20	
Comal	First Protestant Church	296 S. Sequin St.	New Braunfels	1971-07-14	
Comal	Groos, Carl W.A., House	228 S. Seguin St.	New Braunfels	2000-08-17	
Comal	Gruene Historic District	Both sides of Sequin, New Braunfels, and Austin Sts.	Gruene	1975-04-21	
Comal	Guadalupe Hotel	471 Main Plaza	New Braunfels	1975-03-13	
Comal	Holz--Forshage--Krueger Building	472 W. San Antonio St.	New Braunfels	1997-04-17	
Comal	Hotel Faust	240 S. Sequin St.	New Braunfels	1985-05-02	
Comal	Klein, Stephen, House	131 S. Seguin St.	New Braunfels	1970-08-25	
Comal	Lindheimer House	489 Comal Ave.	New Braunfels	1970-08-25	
Comal	Natural Bridge Caverns Sinkhole Site	Address Restricted	Natural Bridge Caverns	2004-10-29	

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APPENDICES

APPENDIX A

GRADING AND STABILIZATION RECORD

Hills of Cross Canyon Ranch Phase 2, Spring Branch, Texas

GRADING AND STABILIZATION RECORD							
Area[1]	Date Major Grading/ Excavation Began in Area	Date Grading/ Excavation Temporarily Ceased[2]	Date Grading/ Excavation Permanently Ceased	Date Stabilization Activities Initiated	Comments	Signature[3]	Date

[1] Area defined in Comments column. [2] "Temporarily Ceased" means inactive for less than 21 consecutive days. [3] Signature of Permittee

Hills of Cross Canyon Ranch Phase 2, Spring Branch, Texas

GRADING AND STABILIZATION RECORD							
Area[1]	Date Major Grading/ Excavation Began in Area	Date Grading/ Excavation Temporarily Ceased[2]	Date Grading/ Excavation Permanently Ceased	Date Stabilization Activities Initiated	Comments	Signature[3]	Date

[1] Area defined in Comments column. [2] "Temporarily Ceased" means inactive for less than 21 consecutive days. [3] Signature of Permittee

APPENDIX B

LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES

Table 117.3 Reportable Quantities of Hazardous Substances Designated Pursuant to Section 311 of the Clean Water Act

Material	Category	RQ in pounds (kilograms)
Acetaldehyde	C	1,000 (454)
Acetic acid	D	5,000 (2,270)
Acetic anhydride	D	5,000 (2,270)
Acetone cyanohydrin	A	10 (4.54)
Acetyl bromide	D	5,000 (2,270)
Acetyl chloride	D	5,000 (2,270)
Acrolein	X	1 (0.454)
Acrylonitrile	B	100 (45.4)
Adipic acid	D	5,000 (2,270)
Aldrin	X	1 (0.454)
Allyl alcohol	B	100 (45.4)
Allyl chloride	C	1,000 (454)
Aluminum sulfate	D	5,000 (2,270)
Ammonia	B	100 (45.4)
Ammonium acetate	D	5,000 (2,270)
Ammonium benzoate	D	5,000 (2,270)
Ammonium bicarbonate	D	5,000 (2,270)
Ammonium bichromate	A	10 (4.54)
Ammonium bifluoride	B	100 (45.4)
Ammonium bisulfite	D	5,000 (2,270)
Ammonium carbamate	D	5,000 (2,270)
Ammonium carbonate	D	5,000 (2,270)
Ammonium chloride	D	5,000 (2,270)
Ammonium chromate	A	10 (4.54)
Ammonium citrate dibasic	D	5,000 (2,270)
Ammonium fluoborate	D	5,000 (2,270)
Ammonium fluoride	B	100 (45.4)
Ammonium hydroxide	C	1,000 (454)
Ammonium oxalate	D	5,000 (2,270)
Ammonium silicofluoride	C	1,000 (454)
Ammonium sulfamate	D	5,000 (2,270)
Ammonium sulfide	B	100 (45.4)
Ammonium sulfite	D	5,000 (2,270)
Ammonium tartrate	D	5,000 (2,270)
Ammonium thiocyanate	D	5,000 (2,270)
Amyl acetate	D	5,000 (2,270)
Aniline	D	5,000 (2,270)
Antimony pentachloride	C	1,000 (454)
Antimony potassium tartrate	B	100 (45.4)
Antimony tribromide	C	1,000 (454)
Antimony trichloride	C	1,000 (454)
Antimony trifluoride	C	1,000 (454)
Antimony trioxide	C	1,000 (454)
Arsenic disulfide	X	1 (0.454)
Arsenic pentoxide	X	1 (0.454)
Arsenic trichloride	X	1 (0.454)
Arsenic trioxide	X	1 (0.454)
Arsenic trisulfide	X	1 (0.454)
Barium cyanide	A	10 (4.54)

Benzene	A	10 (4.54)
Benzoic acid	D	5,000 (2,270)
Benzonitrile	D	5,000 (2,270)
Benzoyl chloride	C	1,000 (454)
Benzyl chloride	B	100 (45.4)
Beryllium chloride	X	1 (0.454)
Beryllium fluoride	X	1 (0.454)
Beryllium nitrate	X	1 (0.454)
Butyl acetate	D	5,000 (2,270)
Butylamine	C	1,000 (454)
n-Butyl phthalate	A	10 (4.54)
Butyric acid	D	5,000 (2,270)
Cadmium acetate	A	10 (4.54)
Cadmium bromide	A	10 (4.54)
Cadmium chloride	A	10 (4.54)
Calcium arsenate	X	1 (0.454)
Calcium arsenite	X	1 (0.454)
Calcium carbide	A	10 (4.54)
Calcium chromate	A	10 (4.54)
Calcium cyanide	A	10 (4.54)
Calcium dodecylbenzenesulfonate	C	1,000 (454)
Calcium hypochlorite	A	10 (4.54)
Captan	A	10 (4.54)
Carbaryl	B	100 (45.4)
Carbofuran	A	10 (4.54)
Carbon disulfide	B	100 (45.4)
Carbon tetrachloride	A	10 (4.54)
Chlordane	X	1 (0.454)
Chlorine	A	10 (4.54)
Chlorobenzene	B	100 (45.4)
Chloroform	A	10 (4.54)
Chlorosulfonic acid	C	1,000 (454)
Chlorpyrifos	X	1 (0.454)
Chromic acetate	C	1,000 (454)
Chromic acid	A	10 (4.54)
Chromic sulfate	C	1,000 (454)
Chromous chloride	C	1,000 (454)
Cobaltous bromide	C	1,000 (454)
Cobaltous formate	C	1,000 (454)
Cobaltous sulfamate	C	1,000 (454)
Coumaphos	A	10 (4.54)
Cresol	B	100 (45.4)
Crotonaldehyde	B	100 (45.4)
Cupric acetate	B	100 (45.4)
Cupric acetoarsenite	X	1 (0.454)
Cupric chloride	A	10 (4.54)
Cupric nitrate	B	100 (45.4)
Cupric oxalate	B	100 (45.4)
Cupric sulfate	A	10 (4.54)
Cupric sulfate, ammoniated	B	100 (45.4)
Cupric tartrate	B	100 (45.4)
Cyanogen chloride	A	10 (4.54)
Cyclohexane	C	1,000 (454)
2,4-D Acid	B	100 (45.4)
2,4-D Esters	B	100 (45.4)
DDT	X	1 (0.454)
Diazinon	X	1 (0.454)

Dicamba	C	1,000 (454)
Dichlobenil	B	100 (45.4)
Dichlone	X	1 (0.454)
Dichlorobenzene	B	100 (45.4)
Dichloropropane	C	1,000 (454)
Dichloropropene	B	100 (45.4)
Dichloropropene-Dichloropropane (mixture).	B	100 (45.4)
2,2-Dichloropropionic acid	D	5,000 (2,270)
Dichlorvos	A	10 (4.54)
Dicofol	A	10 (4.54)
Dieldrin	X	1 (0.454)
Diethylamine	B	100 (45.4)
Dimethylamine	C	1,000 (454)
Dinitrobenzene (mixed)	B	100 (45.4)
Dinitrophenol	A	10 (45.4)
Dinitrotoluene	A	10 (4.54)
Diquat	C	1,000 (454)
Disulfoton	X	1 (0.454)
Diuron	B	100 (45.4)
Dodecylbenzenesulfonic acid	C	1,000 (454)
Endosulfan	X	1 (0.454)
Endrin	X	1 (0.454)
Epichlorohydrin	B	100 (45.4)
Ethion	A	10 (4.54)
Ethylbenzene	C	1,000 (454)
Ethylenediamine	D	5,000 (2,270)
Ethylenediamine-tetraacetic acid (EDTA).	D	5,000 (2,270)
Ethylene dibromide	X	1 (0.454)
Ethylene dichloride	B	100 (45.4)
Ferric ammonium citrate	C	1,000 (454)
Ferric ammonium oxalate	C	1,000 (454)
Ferric chloride	C	1,000 (454)
Ferric fluoride	B	100 (45.4)
Ferric nitrate	C	1,000 (454)
Ferric sulfate	C	1,000 (454)
Ferrous ammonium sulfate	C	1,000 (454)
Ferrous chloride	B	100 (45.4)
Ferrous sulfate	C	1,000 (454)
Formaldehyde	B	100 (45.4)
Formic acid	D	5,000 (2,270)
Fumaric acid	D	5,000 (2,270)
Furfural	D	5,000 (2,270)
Guthion	X	1 (0.454)
Heptachlor	X	1 (0.454)
Hexachlorocyclopentadiene	A	10 (4.54)
Hydrochloric acid	D	5,000 (2,270)
Hydrofluoric acid	B	100 (45.4)
Hydrogen cyanide	A	10 (4.54)
Hydrogen sulfide	B	100 (45.4)
Isoprene	B	100 (45.4)
Isopropanolamine dodecylbenzenesulfonate.	C	1,000 (454)
Kepone	X	1 (0.454)
Lead acetate	A	10 (4.54)
Lead arsenate	X	1 (0.454)

Lead chloride	A	10 (4.54)
Lead fluoborate	A	10 (4.54)
Lead fluoride	A	10 (4.54)
Lead iodide	A	10 (4.54)
Lead nitrate	A	10 (4.54)
Lead stearate	A	10 (4.54)
Lead sulfate	A	10 (4.54)
Lead sulfide	A	10 (4.54)
Lead thiocyanate	A	10 (4.54)
Lindane	X	1 (0.454)
Lithium chromate	A	10 (4.54)
Malathion	B	100 (45.4)
Maleic acid	D	5,000 (2,270)
Maleic anhydride	D	5,000 (2,270)
Mercaptodimethur	A	10 (4.54)
Mercuric cyanide	X	1 (0.454)
Mercuric nitrate	A	10 (4.54)
Mercuric sulfate	A	10 (4.54)
Mercuric thiocyanate	A	10 (4.54)
Mercurous nitrate	A	10 (4.54)
Methoxychlor	X	1 (0.454)
Methyl mercaptan	B	100 (45.4)
Methyl methacrylate	C	1,000 (454)
Methyl parathion	B	100 (45.4)
Mevinphos	A	10 (4.54)
Mexacarbate	C	1,000 (454)
Monoethylamine	B	100 (45.4)
Monomethylamine	B	100 (45.4)
Naled	A	10 (4.54)
Naphthalene	B	100 (45.4)
Naphthenic acid	B	100 (45.4)
Nickel ammonium sulfate	B	100 (45.4)
Nickel chloride	B	100 (45.4)
Nickel hydroxide	A	10 (4.54)
Nickel nitrate	B	100 (45.4)
Nickel sulfate	B	100 (45.4)
Nitric acid	C	1,000 (454)
Nitrobenzene	C	1,000 (454)
Nitrogen dioxide	A	10 (4.54)
Nitrophenol (mixed)	B	100 (45.4)
Nitrotoluene	C	1,000 (454)
Paraformaldehyde	C	1,000 (454)
Parathion	A	10 (4.54)
Pentachlorophenol	A	10 (4.54)
Phenol	C	1,000 (454)
Phosgene	A	10 (4.54)
Phosphoric acid	D	5,000 (2,270)
Phosphorus	X	1 (0.454)
Phosphorus oxychloride	C	1,000 (454)
Phosphorus pentasulfide	B	100 (45.4)
Phosphorus trichloride	C	1,000 (454)
Polychlorinated biphenyls	X	1 (0.454)
Potassium arsenate	X	1 (0.454)
Potassium arsenite	X	1 (0.454)
Potassium bichromate	A	10 (4.54)
Potassium chromate	A	10 (4.54)
Potassium cyanide	A	10 (4.54)

Potassium hydroxide	C	1,000 (454)
Potassium permanganate	B	100 (45.4)
Propargite	A	10 (4.54)
Propionic acid	D	5,000 (2,270)
Propionic anhydride	D	5,000 (2,270)
Propylene oxide	B	100 (45.4)
Pyrethrine	X	1 (0.454)
Quinoline	D	5,000 (2,270)
Resorcinol	D	5,000 (2,270)
Selenium oxide	A	10 (4.54)
Silver nitrate	X	1 (0.454)
Sodium	A	10 (4.54)
Sodium arsenate	X	1 (0.454)
Sodium arsenite	X	1 (0.454)
Sodium bichromate	A	10 (4.54)
Sodium bifluoride	B	100 (45.4)
Sodium bisulfite	D	5,000 (2,270)
Sodium chromate	A	10 (4.54)
Sodium cyanide	A	10 (4.54)
Sodium dodecylbenzenesulfonate	C	1,000 (454)
Sodium fluoride	C	1,000 (454)
Sodium hydrosulfide	D	5,000 (2,270)
Sodium hydroxide	C	1,000 (454)
Sodium hypochlorite	B	100 (45.4)
Sodium methylate	C	1,000 (454)
Sodium nitrite	B	100 (45.4)
Sodium phosphate, dibasic	D	5,000 (2,270)
Sodium phosphate, tribasic	D	5,000 (2,270)
Sodium selenite	B	100 (45.4)
Strontium chromate	A	10 (4.54)
Strychnine	A	10 (4.54)
Styrene	C	1,000 (454)
Sulfuric acid	C	1,000 (454)
Sulfur monochloride	C	1,000 (454)
2,4,5-T acid	C	1,000 (454)
2,4,5-T amines	D	5,000 (2,270)
2,4,5-T esters	C	1,000 (454)
2,4,5-T salts	C	1,000 (454)
TDE	X	1 (0.454)
2,4,5-TP acid	B	100 (45.4)
2,4,5-TP acid esters	B	100 (45.4)
Tetraethyl lead	A	10 (4.54)
Tetraethyl pyrophosphate	A	10 (4.54)
Thallium sulfate	B	100 (45.4)
Toluene	C	1,000 (454)
Toxaphene	X	1 (0.454)
Trichlorfon	B	100 (45.4)
Trichloroethylene	B	100 (45.4)
Trichlorophenol	A	10 (4.54)
Triethanolamine dodecylbenzenesulfonate	C	1,000 (454)
Triethylamine	D	5,000 (2,270)
Trimethylamine	B	100 (45.4)
Uranyl acetate	B	100 (45.4)
Uranyl nitrate	B	100 (45.4)
Vanadium pentoxide	C	1,000 (454)
Vanadyl sulfate	C	1,000 (454)

Vinyl acetate	D	5,000 (2,270)
Vinylidene chloride	B	100 (45.4)
Xylene (mixed)	B	100 (45.4)
Xylenol	C	1,000 (454)
Zinc acetate	C	1,000 (454)
Zinc ammonium chloride	C	1,000 (454)
Zinc borate	C	1,000 (454)
Zinc bromide	C	1,000 (454)
Zinc carbonate	C	1,000 (454)
Zinc chloride	C	1,000 (454)
Zinc cyanide	A	10 (4.54)
Zinc fluoride	C	1,000 (454)
Zinc formate	C	1,000 (454)
Zinc hydrosulfite	C	1,000 (454)
Zinc nitrate	C	1,000 (454)
Zinc phenolsulfonate	D	5,000 (2,270)
Zinc phosphide	B	100 (45.4)
Zinc silicofluoride	D	5,000 (2,270)
Zinc sulfate	C	1,000 (454)
Zirconium nitrate	D	5,000 (2,270)
Zirconium potassium fluoride	C	1,000 (454)
Zirconium sulfate	D	5,000 (2,270)
Zirconium tetrachloride	D	5,000 (2,270)

APPENDIX C

INSPECTOR QUALIFICATIONS

Storm Water Inspector Qualifications

Inspector's Name	Angela Opela
Training Received	5-Hour Construction Storm Water Inspector Training Class on October of 2003.
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation and maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning October 2003
Storm Water Inspection Experience	Storm Water Inspector since October of 2003.

Storm Water Inspector Qualifications

Inspector's Name	Chrissy Holden
Training Received	Chrissy Holden CESSWI #0752 since December 10, 2009 CPESC-IT #5521 since October 28, 2009
Training Covered	Best Management Practices (BMPs) function, proper installation and maintenance, the Texas Pollutant Discharge Elimination System (TPDES) requirements for construction activity, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning July 2006
Storm Water Inspection Experience	Completed Storm Water Construction Inspections for the following consulting firms: Compliance Resources Inc., 7/06 - 8/08 Ensource Business Solutions, 8/08 - 6/09 Merit Professional Services, 7/09 - Present

Storm Water Inspector Qualifications

Inspector's Name	Clint Vinson
Training Received	5-Hour Construction Storm Water Inspector Training Class on May 5, 2001. CESSWI certified as of January 14, 2008
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation And maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning May 2001
Storm Water Inspection Experience	Storm Water Inspector for Merit Professional and b that, an inspector at another engineering firm beginning May of 2001

Storm Water Inspector Qualifications

Inspector's Name	James McKinney
Training Received	5-Hour Construction Storm Water Inspector Training Class on May 2007.
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation And maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning May 1999
Storm Water Inspection Experience	Storm Water Inspector for Merit Professional and b that, an inspector at another engineering firm beginning May of 2007

Storm Water Inspector Qualifications

Inspector's Name	Josh Phillips
Training Received	5-Hour Construction Storm Water Inspector Training Class on March of 2004. CESSWI certified as of January 14, 2008.
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation and maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning March 2004
Storm Water Inspection Experience	Storm Water Inspector for Merit Professional and b that, an inspector at another engineering firm beginning March of 2004

Storm Water Inspector Qualifications

Inspector's Name	Ken McGaugh
Training Received	5-Hour Construction Storm Water Inspector Training Class on July of 2002.CPESC – IT certified as of May of 2007.
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation And maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning July 2002
Storm Water Inspection Experience	Storm Water Inspector for Merit Professional and b that, an inspector at another engineering firm beginning July of 2002

Storm Water Inspector Qualifications

Inspector's Name	Lacy Hall, Qualified Storm Water Inspector Merit Professional Services
Training Received	80 hours of classroom and field TPDES Specific
Training Covered	Attended 30 hours of formal classroom training covering NPDES, TPDES, MS4 Ordinances and Clean Water ACT
Construction Experience	6 months
Storm Water Inspection Experience	Field Inspections conducted with the training staff Of Merit Professional

merit
professional

Storm Water Inspector Qualifications

Inspector's Name	Tani Vinson
Training Received	5-Hour Construction Storm Water Inspector Training Class on November of 2006.
Training Covered	The training covered the EPA, TCEQ permits and local ordinance guidelines for Storm Water Pollution Prevention Plans (SWPPPs), Best Management Practices (BMPs) proper installation and maintenance, Endangered Species and Historic Preservation Acts.
Construction Experience	Beginning of January 1998
Storm Water Inspection Experience	Storm Water Inspector since October of 2006.

1207 Indian Lake Trail – Corinth, Texas 76210 – (214) 998-9455 – (214) 998-9454 – Fax (940) 326-9072

APPENDIX D

INSPECTION REPORTS

Note: The Completed Inspection Reports are stored in a separate binder that accompanies this SWPPP

CONSTRUCTION INSPECTION CHECKLIST

Hills of Cross Canyon Ranch Phase 2
Spring Branch, Texas

The Construction Storm Water General Permit requires inspections of disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, and structural controls for evidence of, or potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP must be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site must be inspected for offsite sediment tracking. Inspections will be conducted at least once every seven (7) calendar days and will occur on a specifically defined day, regardless of whether or not there has been a rainfall event since the previous inspection.

General Information					
Project Name, Location, Permit No.					
Date of Inspection		**Time**		**SWP3 Location**	
Inspector's Name, Title					
Inspector's Qualifications					
Nature of Construction	☐ Home Building ☐ Land Development ☐ Commercial Other:				
Type of Inspection:	☐ Routine Weekly ☐ Routine Biweekly ☐ Routine Monthly ☐ Post- Significant Storm Event ☐ Other:				

Weather Information			
Has there been a significant storm event since the last inspection? ☐ Yes ☐ No (If yes, provide storm information)			
Date of Storm Event:		Approximate Amount of Precipitation (in):	
Weather at time of this inspection? ☐ Clear ☐ Cloudy ☐ Partly Cloudy ☐ Raining ☐ Recent Rain/Wet ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds			
Are there any discharges at the time of inspection? ☐ Yes ☐ No **If yes, describe:**			

Site Inspection					
	Erosion Control Measures	**N/A**	**Acceptable**	**Action Item**	**Notes**
1	Protection of Disturbed Areas	☐	☐	☐	
2	Slope Protection	☐	☐	☐	
3	Grass Mesh/Fiber Mats	☐	☐	☐	
4	Vegetation/Re-vegetation/Sod	☐	☐	☐	
5	Velocity Reduction Devices (Outlets)	☐	☐	☐	
	Sediment Control Measures	**N/A**	**Acceptable**	**Action Item**	**Notes**
6	Silt Fence	☐	☐	☐	
7	Check Dam/ Rock Berm	☐	☐	☐	
8	Straw Wattles /Rock Rolls /Tri-Dikes	☐	☐	☐	
9	Sediment Traps/Cut Back Curb	☐	☐	☐	
10	Storm Water Inlet Protection	☐	☐	☐	
11	Stockpile Management	☐	☐	☐	
12	Detention Basins	☐	☐	☐	
13	Stabilized Construction Exits	☐	☐	☐	
	Good Housekeeping/Material Management	**N/A**	**Acceptable**	**Action Item**	**Notes**
14	Concrete and Chemical Washout(s)	☐	☐	☐	
15	Waste/Trash Management	☐	☐	☐	
16	Sanitary Stations/Portable Toilets	☐	☐	☐	

17	Spill and Leak Prevention	☐	☐	☐	
18	Material Use and Storage	☐	☐	☐	
19	Equipment Storage and Maintenance	☐	☐	☐	
20	Dust Control	☐	☐	☐	
21	Street Sweeping	☐	☐	☐	
	Natural Resource Protection	**N/A**	**Acceptable**	**Action Item**	**Notes**
22	Wetlands/Drainage Areas	☐	☐	☐	
23	Critical Features/Caves	☐	☐	☐	
24	Tree Protection	☐	☐	☐	
25	Endangered/Threatened Species	☐	☐	☐	
	Miscellaneous	**N/A**	**Acceptable**	**Action Item**	**Notes**
26	Non-Storm Water	☐	☐	☐	
27	Site's Weathering of Storm Events	☐	☐	☐	
28	Discharge Locations/Outfalls	☐	☐	☐	
29	Other:	☐	☐	☐	
30	Other:	☐	☐	☐	
	Documentation	**N/A**	**Acceptable**	**Action Item**	**Notes**
31	Construction Site Notice and Posted NOI	☐	☐	☐	
32	Documents/Certifications/Permits/Reports	☐	☐	☐	
33	BMP Map Updates/SWP3 Updates	☐	☐	☐	

Corrective Action Log

#	Location and Recommended Action	Date Noted	Date Resolved	Initials

☐ "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

☐ "I certify that there were no issues of non-compliance at the time of inspection"

Inspector Name: Title:

Signature: Date: Click here to enter a date.

Hills of Cross Canyon Ranch Phase 2, Spring Branch, Texas

CORRECTIVE ACTIONS

Date of Corrective Action	Location of Corrective Action	Description of Corrective Action	Reason for Corrective Action	Permittee Signature	Date

APPENDIX E

NOTICE OF TERMINATION

NOT INSTRUCTIONS:

When the Site is Complete:

Sign and date the NOT; make three copies. Place one copy in SWPPP.

1. **Mail the original signed copy to the TCEQ certified mail.**

   TCEQ - Storm Water & General
   Permits Team: MC-228
   P. O. Box 13087
   Austin, TX 78711-3087

2. **Mail signed copy to your MS4**

   Comal County
   Attn: Comal County Building/Planning/Public Works
   100 Main Plaza
   New Braunfels, Texas 78130

3. **Mail signed copy to your TCEQ Regional Office**

   San Antonio Regional Office
   14250 Judson Road
   San Antonio, Texas 78233

APPENDIX F

STRUCTURAL CONTROL SPECIFICATIONS/DETAILS AND MECHANICAL PRACTICES (BMPS)

1 Temporary Best Management Practices

1.1 Introduction

The two most basic categories of temporary control methods for construction-generated pollution are erosion and sediment controls. Erosion controls are used to prevent soil on the construction site from being mobilized and transported by stormwater runoff. Vegetative stabilization, slope coverings, and diversion of runoff away from exposed areas can effectively prevent erosion. Sediment controls may be considered as the second line of defense and include sedimentation ponds, silt fences, berms and other temporary barriers that temporarily detain the runoff. Runoff velocities are reduced in these controls allowing sediment in the runoff to settle out.

This chapter gives instructions for installation of the most commonly used erosion and sediment control practices. Each practice is presented with a list of guidelines for proper installation and a compilation of common trouble points. Additional information on these and other practices can be found in other manuals.

Contractors are encouraged to install and maintain practices carefully, in a professional manner. Minor adjustments should be anticipated to assure proper performance. Intensive maintenance and extensive use of vegetation, mulch, and other ground covers may be required to achieve optimum performance. We recommend very strongly, therefore, that such erosion and sediment control efforts be specified clearly in the general construction contract and that any unexpected expenses be approved before they are incurred. When these controls are removed after final stabilization of the site, it is important to also remove or stabilize any accumulated sediment.

Periodic inspection and maintenance is vital to the performance of erosion and sedimentation control measures. It is recommended that all temporary erosion controls be inspected weekly and after every rainfall; however, daily inspections may be warranted when environmentally sensitive features are located on or immediately adjacent to the site. If not properly maintained, some practices may cause more damage than they prevent.

Always evaluate the consequences of a measure failing when considering which control measure to use, since failure of a practice may be hazardous or damaging to both people and property. For example, a large sediment basin failure can have disastrous results; low points in dikes can cause major gullies to form on a fill slope. It is essential to inspect all practices to determine that they are working properly and to ensure that problems are corrected as soon as they develop. Assign an individual responsibility for routine checks of operating erosion and sedimentation control practices.

1.2 General Guidelines

The following planning and construction practices were described by the U.S. Environmental Protection Agency (EPA, 1993) and North Carolina (North Carolina, 1993) to illustrate the types of measures that can be applied successfully to achieve a reduction in the amount of erosion occurring on active construction sites. These practices are used to reduce the amount of sediment that is detached during construction and to prevent sediment from entering runoff. Erosion control is based on two main concepts: (1) disturb the smallest area of land possible for the shortest period of time, and (2) stabilize disturbed soils to prevent erosion from occurring.

Development Siting

Review and consider all existing conditions in the initial site selection for the project. Select a site that is suitable rather than force the terrain to conform to development needs (Figure 1-1). Ensure that development features follow natural contours. Steep slopes, areas subject to flooding, and highly erodible soils severely limit a site's use, while level, well-drained areas offer few restrictions. Any modification of a site's drainage features or topography requires protection from erosion and sedimentation.

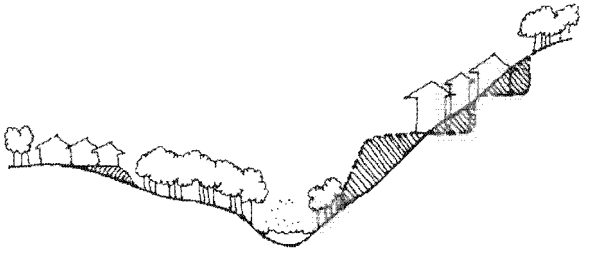


Figure 1-1 Examples of Proper and Improper Siting (North Carolina, 1993)

Project Scheduling

Often a project can be scheduled during the time of year that the erosion potential of the site is relatively low. In many parts of the country, there is a certain period of the year when erosion potential is relatively low and construction scheduling could be very

effective. In central Texas, rainfall amounts are generally lower during July and August and the hot temperatures quickly dry out exposed soils. During the wetter months (spring and fall), construction vehicles can easily turn the soft, wet ground into mud, which is more easily washed offsite.

Scheduling can be a very effective means of reducing the hazards of erosion. Schedule construction activities to minimize the exposed area and the duration of exposure. In scheduling, take into account the season and the weather forecast. Stabilize disturbed areas as quickly as possible.

Avoid area wide clearance of construction sites. Plan and stage land disturbance activities so that only the area currently under construction is exposed. As soon as the grading and construction in an area are complete, the area should be stabilized.

Material Management

Locate potential nonpoint pollutant sources away from steep slopes, streams, and critical areas. Material stockpiles, borrow areas, access roads, and other land-disturbing activities can often be located away from critical areas such as steep slopes, highly erodible soils, and areas that drain directly into geologically sensitive features. The exposure of litter, construction debris, and chemicals to stormwater should be minimized to prevent them from becoming a pollutant source. Daily litter removal and screening outfalls and storm drain inlets may help retain these materials onsite.

Stockpile topsoil and reapply to revegetate site. Because of the high organic content of topsoil, it cannot be used as fill material or under pavement. Topsoil is typically removed when a site is cleared. Since topsoil is essential to establish new vegetation, it should be stockpiled and then reapplied to the site for revegetation, if appropriate. Although topsoil salvaged from the existing site can often be used, it must meet certain standards and topsoil may need to be imported onto the site if the existing topsoil is not adequate for establishing new vegetation.

Cover or stabilize topsoil stockpiles. Unprotected stockpiles are very prone to erosion and therefore stockpiles must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles should be stabilized with erosion blankets, seeding, and/or mulching. In addition, spoils should not be stored within the 100-year floodplain where they can be disturbed during high flow conditions.

Vegetation Protection

By clearing only those areas immediately essential for completing site construction, buffer zones are preserved and soil remains undisturbed until construction begins (Figure 1-2). Physical markers, such as tape, signs, or barriers, indicating the limits of land disturbance, can ensure that equipment operators know the proposed limits of clearing.

The area of the watershed that is exposed to construction is important in determining the net amount of erosion. Reducing the extent of the disturbed area will ultimately reduce sediment loads to surface waters. Existing or newly planted vegetation that has been planted to stabilize disturbed areas should be protected by routing construction traffic around the areas and protecting natural vegetation with fencing, tree armoring, retaining walls, or tree wells. Avoid disturbing vegetation on steep slopes or other critical areas.

Where possible, construction traffic should travel over areas that must be disturbed for other construction activity. This practice will reduce the area that is cleared and susceptible to erosion.

Tree armoring protects tree trunks from being damaged by construction equipment. Fencing can also protect tree trunks, but should be placed at the tree's drip line so that construction equipment is kept away from the tree. The tree drip line is the minimum area around a tree in which the tree's root system should not be disturbed by cut, fill, or soil compaction caused by heavy equipment. When cutting or filling must be done near a tree, a retaining wall or tree well should be used to minimize the cutting of the tree's roots or the quantity of fill placed over the roots.

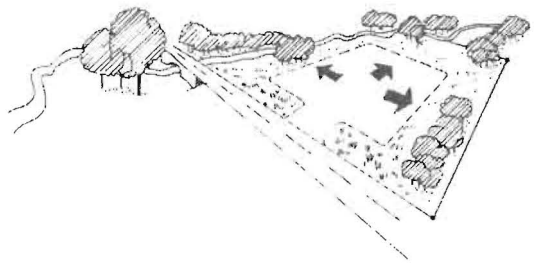


Figure 1-2 Example of Conservative Site Clearing (North Carolina, 1993)

Use wind erosion controls.

Although not required by the rules, wind erosion controls can reduce the impact of construction on adjacent tracts. These controls limit the movement of dust from disturbed soil surfaces and include many different practices. Wind barriers block air currents and are effective in controlling soil blowing. Many different materials can be used as wind barriers, including solid board fences, snow fences, and bales of hay. Sprinkling moistens the soil surface with water and must be repeated as needed to be effective for preventing wind erosion; however, applications must be monitored to prevent excessive runoff and erosion.

Protect Area from Upgradient runoff

Protect areas to be disturbed from stormwater runoff. Use dikes, diversions, and waterways to interrupt runoff and divert it away from cut-and-fill slopes or other disturbed areas. To reduce on-site erosion, install these measures before clearing and grading.

Earth dikes, perimeter dikes or swales, or diversions can be used to intercept and convey runoff above disturbed areas (Figure 1-3). An earth dike is a temporary berm or ridge of compacted soil that channels water around or away from disturbed areas. A perimeter dike/swale or diversion is a swale with a supporting ridge on the lower side that is constructed from the soil excavated from the adjoining swale. These practices should be used to intercept flow from denuded areas or newly seeded areas to keep the disturbed areas from being eroded from the uphill runoff. The structures should be stabilized within 14 days of installation or as soon as practicable with vegetation, slope coverings or other appropriate erosion prevention measures. A pipe slope drain, also known as a pipe drop structure, is a temporary pipe placed from the top of a slope to the bottom of the slope to convey concentrated runoff down the slope without causing erosion.

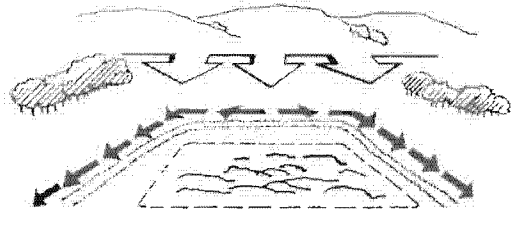


Figure 1-3 Diversion of Runoff away from Construction Area (North Carolina, 1993)

Reduce Runoff Velocities

Keep runoff velocities low. Clearing existing vegetation reduces the surface roughness and infiltration rate and thereby increases runoff velocities and volumes. Use measures that break the slopes (Figure 1-4) to reduce the problems associated with concentrated flow volumes and runoff velocities. Practical ways to reduce velocities include conveying stormwater runoff away from steep slopes to stabilized outlets, preserving natural vegetation where possible, and mulching and vegetating exposed areas immediately after construction.

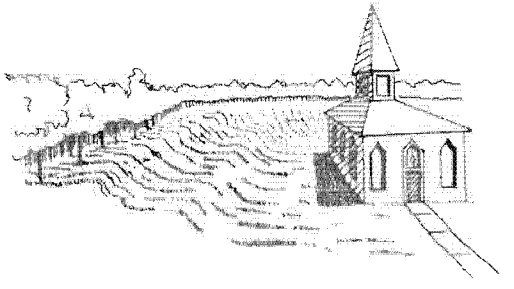


Figure 1-4 Slow Runoff by Breaking Slopes (North Carolina, 1993)

Benches, terraces, or ditches break up a slope by providing areas of low slope in the reverse direction. This keeps water from proceeding down the slope at increasing volume and velocity. Instead, the flow is directed to a suitable outlet, such as a sediment basin or trap. The frequency of benches, terraces, or ditches will depend on the erodibility of the soils, steepness and length of the slope, and rock outcrops. This practice should be used if there is a potential for erosion along the slope.

Use retaining walls. Often retaining walls can be used to decrease the steepness of a slope. If the steepness of a slope is reduced, the runoff velocity is decreased and therefore, the erosion potential is decreased. Retaining walls also may actually encourage water to infiltrate rather than runoff, thereby helping maintain the natural hydrologic characteristics of a site.

Provide linings for urban runoff conveyance channels. Construction often increases the velocity and volume of runoff, which causes erosion in newly constructed or existing urban runoff conveyance channels. If the runoff during or after construction will cause erosion in a channel, the channel should be lined or flow control BMPs installed. The first choice of lining should be grass or sod since this reduces runoff velocities and provides water quality benefits through filtration and infiltration. If the velocity in the channel would erode the grass or sod, then riprap, concrete, or gabions can be used.

Use check dams. Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce the erosion in a swale or channel. Check dams should be used when a swale or channel will be used for a short time and therefore it is not feasible or practical to line the channel or implement flow control BMPs.

Site Stabilization

Removing the vegetative cover and altering the soil structure by clearing, grading, and compacting the surface increases an area's susceptibility to erosion. Apply stabilizing measures as soon as possible after the land is disturbed (Figure 1-5). Plan and implement temporary or permanent vegetation, mulches, or other protective practices to correspond with construction activities. Protect channels from erosive forces by using protective linings and the appropriate channel design. Consider possible future repairs and maintenance of these practices in the design.

Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once a vegetative cover of about 80% has been established. However, often seeding and fertilizing do not produce as thick a vegetative cover as do seed and mulch or netting. Newly established vegetation does not have as extensive a root system as existing vegetation and therefore is more prone to erosion, especially on steep slopes. Care should be taken when fertilizing to avoid untimely or excessive application. Since the practice of seeding and fertilizing does not provide any protection during the time of vegetative establishment, it should be used only on favorable soils in very flat areas and not in sensitive areas.

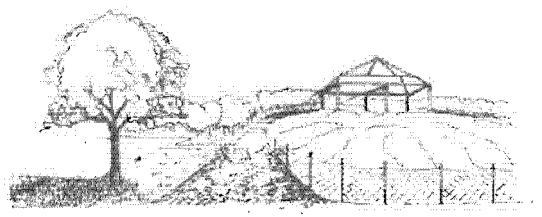


Figure 1-5 Stabilization of Disturbed Areas (North Carolina, 1993)

The management of land by using ground cover reduces erosion by reducing the flow rate of runoff and the raindrop impact. Bare soils should be seeded or otherwise stabilized within 14 calendar days after final grading or where construction activity has temporarily ceased for more than 21 days. In very flat, non-sensitive areas with favorable soils, stabilization may involve simply seeding and fertilizing. Mulch and/or sod may be necessary on steeper slopes, for erodible soils, and near sensitive areas. Sediment that has escaped the site due to the failure of sediment and erosion controls should be removed as soon as possible to minimize offsite impacts. Permission should be obtained from adjacent landowners prior to offsite sediment removal.

Mulching/mats can be used to protect the disturbed area while vegetation becomes established. Mulching involves applying plant residues or other suitable materials on disturbed soil surfaces. Mulches/mats used include tacked straw, wood chips, and jute netting and are often covered by blankets or netting. Mulching alone should be used only for temporary protection of the soil surface or when permanent seeding is not feasible. The useful life of mulch varies with the material used and the amount of precipitation, but is approximately 2 to 6 months.

During times of year when vegetation cannot be established, soil mulching should be applied to moderate slopes and soils that are not highly erodible. On steep slopes or highly erodible soils, multiple mulching treatments should be used. Interlocking ceramic materials, filter fabric, and netting are available for this purpose. Before stabilizing an area, it is important to have installed all sediment controls and diverted runoff away from the area to be planted. Runoff may be diverted away from denuded areas or newly planted areas using dikes, swales, or pipe slope drains to intercept runoff and convey it to a permanent channel or storm drain. Reserved topsoil may be used to revegetate a site if the stockpile has been covered and stabilized.

Consideration should be given to maintenance when designing mulching and matting schemes. Plastic nets are often used to cover the mulch or mats; however, they can foul lawn mower blades if the area requires mowing.

Sod can be used to permanently stabilize an area. Sodding provides immediate stabilization of an area and should be used in critical areas or where establishment of permanent vegetation by seeding and mulching would be difficult. Sodding is also a preferred option when there is high erosion potential during the period of vegetative establishment from seeding.

Because of the hardy drought-resistant nature of wildflowers, they may be more beneficial as an erosion control practice than turf grass. While not as dense as turfgrass, wildflower thatches and associated grasses are expected to be as effective in erosion control and contaminant absorption. Because thatches of wildflowers do not need fertilizers, pesticides, or herbicides, and the need for watering is minimal, implementation of this practice may result in cost savings. In 1987, Howard County, Maryland, spent $690.00 per acre to maintain turfgrass areas, compared to only $31.00 per acre for wildflower meadows. A wildflower stand requires several years to become established; however, maintenance requirements are minimal once the area is established.

Plan for Temporary Structural Controls

Retain Sediment on the Site. Even with careful planning, some erosion is unavoidable. The resulting sediment must be trapped on the site. Plan the location where sediment deposition will occur and maintain access for cleanout. Protect low points below disturbed areas by building barriers to reduce sediment loss. Whenever possible, plan and construct sediment traps and basins before other land-disturbing activities (Figure 1-6).

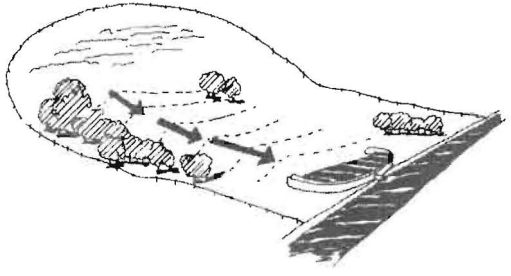


Figure 1-6 Retention of Eroded Sediment on Site

1.3 Temporary Erosion Control BMPs

Temporary erosion controls should be considered the first line of defense for prevention of water pollution during construction activities. It is much simpler to maintain the soil cover than to trap the sediment once it has been mobilized. In addition effective erosion prevention can result in cost savings, since repair of erosion damage can be minimized.

The primary goal of erosion control is to divert runoff away from unstable areas or to provide a stable surface that will resist the effects of rain and runoff. The principle measures for diverting runoff include perimeter swales and dikes, and slope drains. These measures can direct flow around the active construction area or transport stormwater runoff across unstable areas.

The flow in swales, dikes, and storm drain systems should be discharged in such a way that erosion is minimized. Therefore, outlet stabilization and level spreaders should be implemented to reduce the effects of concentrated flow.

Existing trees and vegetation should be protected to help maintain a stable ground surface and prevent loss of valuable topsoil. Where temporary vegetation is used to prevent erosion, blankets, matting and mulches can stabilize the area until the vegetation is established.

The following sections describe some of the common erosion controls. The types and application of the controls are summarized in Table 1-1.

Table 1-1 Summary of Temporary Erosion Control Practices

Practice	Area	Application	Notes
Interceptor Swale	< 5 ac	Used as a perimeter control or to shorten slope	Maximum flow velocity 6 ft/s unless stabilized
Diversion Dike	<10 ac	Used to route runoff away from disturbed areas	
Pipe Slope Drain	<5 ac	Transport runoff down steep, erodible slopes	
Polyacrylamide (PAM)	NA	Erosion control	
Outlet Stabilization	NA	Prevent erosion at outlet of channel or conduit	
Level Spreader	Based on flow	Outlet device for dikes and diversions	Slope <10% and stable, flowrate <20 cfs
Subsurface Drain	NA	Prevent soils from becoming saturated and prevent seeps	
Temporary Vegetation	NA	Temporary stabilization of disturbed areas	One of the most effective measures, highly recommended
Blankets/Matting	NA	Used in channels and on steep slopes	Slope <15%
Hydraulic Mulch	NA	Stabilization of newly seeded areas	Slope <15%
Sod	NA	Immediate stabilization in channels, around inlets, or for aesthetics	
Dust Control	NA	In areas subject to surface and air movement of dust where on- or off-site damage may occur	

1.3.1 Interceptor Swale

Interceptor swales are used to shorten the length of exposed slope by intercepting runoff and can also serve as perimeter swales preventing off-site runoff from entering the disturbed area or prevent sediment-laden runoff from leaving the construction site or disturbed area. They may have a vshape or be trapezoidal with a flat bottom and side slopes of 3:1 or flatter. The outflow from a swale should be directed to a stabilized outlet or sediment-trapping device. The swales should remain in place until the disturbed area is permanently stabilized. A schematic of an interceptor swale is shown in Figure 1-7.

Materials:

(1) Stone stabilization should be used when grades exceed 2% or velocities exceed 6 feet per second and should consist of a layer of crushed stone three inches thick, riprap or high velocity erosion control mats.

(2) Stabilization should extend across the bottom of the swale and up both sides of the channel to a minimum height of three inches above the design water surface elevation based on a 2-year, 24-hour storm.

Installation:

(3) An interceptor swale should be installed across exposed slopes during construction and should intercept no more than 5 acres of runoff.

(4) All earth removed and not needed in construction should be disposed of in an approved spoils site so that it will not interfere with the functioning of the swale or contribute to siltation in other areas of the site.

(5) All trees, brush, stumps, obstructions and other material should be removed and disposed of so as not to interfere with the proper functioning of the swale.

(6) Swales should have a maximum depth of 1.5 feet with side slopes of 2:1 or flatter. Swales should have positive drainage for its entire length to an outlet.

(7) When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Stabilization should be crushed stone placed in a layer of at least 3 inches thick or may be high velocity erosion control matting. Check dams are also recommended to reduce velocities in the swales possibly reducing the amount of stabilization necessary.

(8) Minimum compaction for the swale should be 90% standard proctor density.

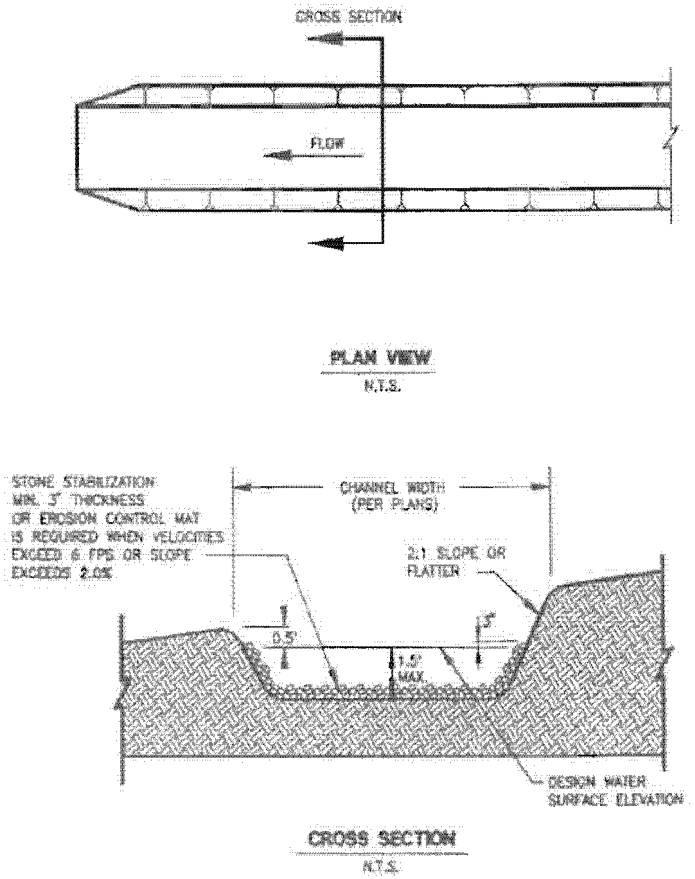


Figure 1-7 Schematic Diagram of an Interceptor Swale

Inspection and Maintenance Guidelines:

(1) Interceptor swales should be inspected weekly and after each rain event to locate and repair any damage to the channel or clear debris or other obstructions so as not to diminish flow capacity.

(2) Damage from storms or normal construction activities such as tire ruts or disturbance of swale stabilization should be repaired as soon as practical.

1.3.2 Diversion Dikes

A temporary diversion dike is a barrier created by the placement of an earthen embankment to reroute the flow of runoff to an erosion control device or away from an open, easily erodible area. A diversion dike intercepts runoff from small upland areas and diverts it away from exposed slopes to a stabilized outlet, such as a rock berm, sandbag berm, or stone outlet structure. These controls can be used on the perimeter of the site to prevent runoff from entering the construction area. Dikes are generally used for the duration of construction to intercept and reroute runoff from disturbed areas to prevent excessive erosion until permanent drainage features are installed and/or slopes are stabilized. A schematic of a diversion dike is shown in Figure 1-8.

Materials:

(1) Stone stabilization (required for velocities in excess of 6 fps) should consist of riprap placed in a layer at least 3 inches thick and should extend a minimum height of 3 inches above the design water surface up the existing slope and the upstream face of the dike. Stabilization riprap should conform to the following specifications

Channel Grade	Riprap Stabilization
0.5 – 1%	4 inch rock
1.1 – 2%	6 inch rock
2.1 – 4 %	8 inch rock
4.1 – 5%	8 – 12 inch riprap

(2) Geotextile fabric should be a non-woven polypropylene fabric designed specifically for use as a soil filtration media with an approximate weight of 6 oz./yd^2, a Mullen burst rating of 140 psi, and having an equivalent opening size (EOS) greater than a #50 sieve.

Installation:

(1) Diversion dikes should be installed prior to and maintained for the duration of construction and should intercept no more than 10 acres of runoff.

(2) Dikes should have a minimum top width of 2 feet and a minimum height of compacted fill of 18 inches measured form the top of the existing ground at the upslope toe to top of the dike and having side slopes of 2:1 or flatter.

(3) The soil for the dike should be placed in lifts of 8 inches or less and be compacted to 95 % standard proctor density.

(4) The channel, which is formed by the dike, must have positive drainage for its entire length to an outlet.

(5) When the slope exceeds 2 percent, or velocities exceed 6 feet per second (regardless of slope), stabilization is required. Situations in which velocities do not exceed 6 feet per second, vegetation may be used to control erosion.

Inspection and Maintenance Guidelines:

(1) Swales should be inspected weekly and after each rain event to determine if silt is building up behind the dike or if erosion is occurring on the face of the dike. Locate and repair any damage to the channel or clear debris or other obstructions so as not to diminish flow capacity.

(2) Silt should be removed in a timely manner to prevent remobilization and to maintain the effectiveness of the control.

(3) If erosion is occurring on the face of the dike, the slopes of the face should either be stabilized through mulch or seeding or the slopes of the face should be reduced.

(4) Damage from storms or normal construction activities such as tire ruts or disturbance of swale stabilization should be repaired as soon as practical

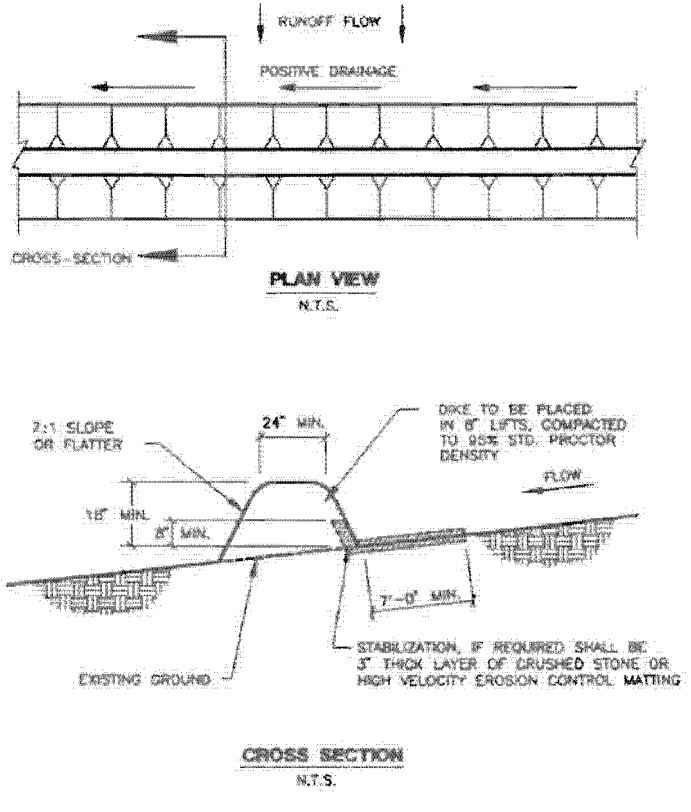


Figure 1-8 Schematic of a Diversion Dike (NCTCOG, 1993b)

1.3.3 Pipe Slope Drain

A temporary pipe slope drain is an erosion control device that combines an earthen embankment and a pipe to carry runoff over an exposed slope to a stabilized outlet apron. The maximum area contributing to any one drain should be 5 acres or less and the pipe should be sized to convey the 10-yr, 3-hr storm. A diagram of a slope drain is shown in Figure 1-9.

Materials:

(1) The drain pipe may be made of any material, rigid or flexible, which is capable of conveying runoff. The drainpipe should be completely watertight so that no water leaks on to the slope to be protected.

(2) Riprap to be used in the outlet apron should consist of either crushed stone or broken Portland cement concrete. All stones used should weigh between 50 and 150 pounds each and should be as nearly uniform as is practical.

Installation:

(1) A diversion dike should be constructed at the top of the slope that is to be protected. This dike should be sized so that no runoff may overtop the dike. The soil around and under the entrance section of the drainpipe should be hand-tamped in 8-inch lifts to prevent piping failure around the inlet.

(2) The height of the diversion dike at the centerline of the inlet should be equal to the diameter of the pipe plus 12 inches.

(3) A rigid section of pipe should be installed through the dike. A standard flared-end section with an integral toe plate extending a minimum of 6 inches from the bottom of the end section should be attached to the inlet end of the pipe using watertight fittings.

(4) A riprap-lined apron should be excavated to accept the runoff from the pipe and dissipate the energy of the flow. The width of the bottom of the apron should be 3 times the pipe diameter and the length should be a minimum of 6 times the pipe diameter. The apron should be a minimum of 12-inches deep and lined with riprap with a thickness of at least 12 inches. The apron should be designed so that the released flow has a velocity less than 3 feet per second.

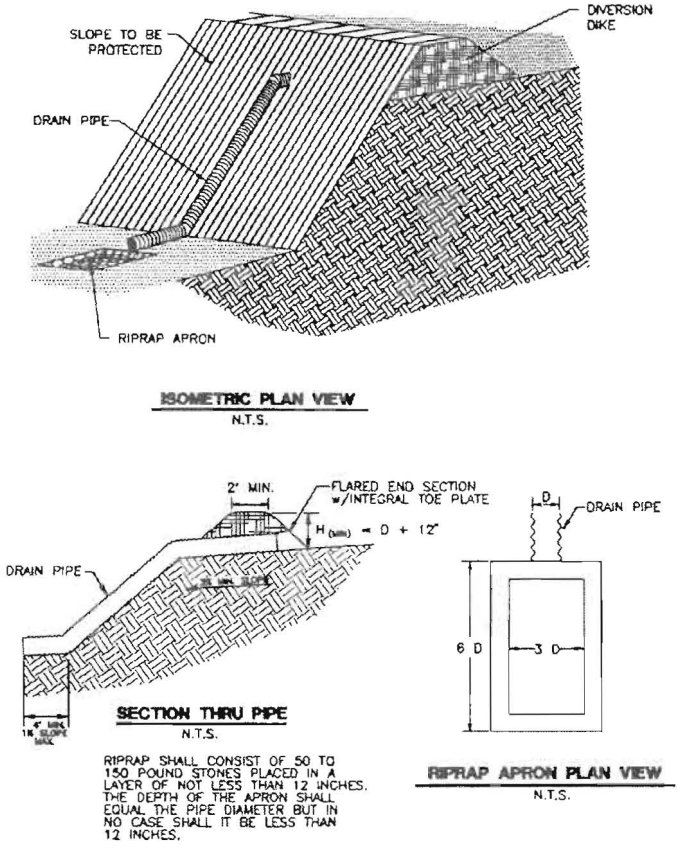


Figure 1-9 Schematic Diagram of a Slope Drain (NCTCOG, 1993)

Inspection and Maintenance Guidelines:

(1) Pipe slope drains should be inspected weekly and after each rain event to locate and repair any damage to joints or clogging of the pipe.

(2) In cases where the diversion dike has deteriorated around the entrance of the pipe, it may be necessary to reinforce the dike with sandbags or to install a concrete collar to prevent failure.

(3) Signs of erosion around the pipe drain should be addressed in a timely manner by stabilizing the area with erosion control mats, crushed stone, concrete or other appropriate method.

1.3.4 Polyacrylamide

Polyacrylamide (PAM) is a chemical that can be applied to disturbed soils at construction sites to reduce erosion and improve settling of suspended sediment. PAM increases the soil's available pore volume, thus increasing infiltration and reducing the quantity of stormwater runoff that can cause erosion. Suspended sediments from PAM treated soils exhibit increased flocculation over untreated soils. The increased flocculation aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

Pam shall be used in conjunction with other BMPs and not in place of other erosion and sediment control BMPs. Stormwater runoff from PAM treated soils should pass through a sediment control BMP prior to discharging to surface waters. Do not add PAM to water discharging from site.

On PAM treated sites, the use of silt fence and fiber rolls shall be maximized to limit the discharges of sediment to sediment traps and sediment basins. All areas not being actively worked should be covered and protected from rainfall. PAM should not be the only cover BMP used.

Materials:

(1) Some PAMs are more toxic and carcinogenic than others. Only the most environmentally safe PAM products should be used.

(2) The specific PAM copolymer formulation must be anionic. **Cationic PAM shall not be used in any application because of known aquatic toxicity problems.** Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, will be used for soil applications. Formulations that meet this standard are available at: http://www.nsf.org/Certified/PwsChemicals/Listings.asp?CompanyName=&TradeName=&ChemicalName=Polyacrylamide&ProductFunction=&PlantState=&PlantCountry=

(3) PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked"

(4) Recent high interest in PAM has resulted in some entrepreneurial exploitation of the term "polymer". All PAMs are polymer, but not all polymers are PAM, and not all PAM products comply with ANSI/NSF Standard 60.

(5) The PAM anionic charge density may vary from 2-30%; a value of 18% is typical. Studies conducted by the United States Department of Agriculture (USDA)/Agricultural Research Service (ARS) demonstrated that soil stabilization was optimized by using very high molecular weight (12-15 mg/mole), highly anionic (>20% charge density) PAM.

Installation:

(1) PAM can be applied to wet soil, but dry soil is preferred due to less sediment loss

(2) Keep the granular PAM supply out of the sun. Granular PAM loses its effectiveness in three months after exposure to sunlight and air.

(3) Proper application and re-application plans are necessary to ensure total effectiveness of PAM usage.

(4) PAM, combined with water, is very slippery and can be a safety hazard. Care must be taken to prevent spills of PAM powder onto paved surfaces. During an application of PAM, prevent over spray from reaching pavement, as pavement will become slippery. If PAM powder gets on skin or clothing, wipe it off with a rough towel rather than washing with water this only makes cleanup messier and longer.

(5) PAM tackifiers are available and being used in place of guar and alpha plantago. Typically, PAM tackifiers should be used at a rate of no more than 0.5-1 lb per 1,000 gallons of water in a hydro mulch machine. Some tackifier product instructions say to use at a rate of 3-5 lbs per acre, which can be too much. In addition, pump problems can occur at higher rates due to increased viscosity.

(6) The preferred application method for PAM is dissolved in water. Other options include application in dry, granular, or powered form

(7) PAM is to be applied at a maximum rate of ½ pound PAM per 1000 gallons water per 1 acre of bare soil. Table 1-2 can be used to determine the PAM and water application rate for a disturbed soil area. Higher concentrations of PAM **do not** provide any additional effectiveness. Pre-measure the area where PAM is to be applied and calculate the amount of product and water necessary to provide coverage at the specified application rate.

(8) PAM has infinite solubility in water, but dissolves very slowly. Dissolve pre-measured dry granular PAM with a known quantity of clean water in a bucket several hours or overnight. Mechanical mixing will help dissolve the PAM. Always add PAM to water – not water to PAM

(9) Pre-fill the water truck about 1/8 full with water. The water does not have to be potable, but it must have relatively low turbidity – in the range of 20 NTU or less.

(10) Add the dissolved PAM and water mixture to the truck.

(11) Fill the water truck to specified volume for the amount of PAM to be applied.

(12) Spray the PAM/water mixture onto dry soil until the soil surface is uniformly and completely wetted.

Table 1-2 Application Rates for PAM

Disturbed Area (ac)	PAM (lbs)	Water (gallons)
0.50	0.25	500
1.00	0.50	1000
1.50	0.75	1,500
2.00	1.00	2,000
2.50	1.25	2,500
3.00	1.50	3,000
3.50	1.75	3,500
4.00	2.00	4,000
4.50	2.25	4,500
5.00	2.50	5,000

Alternate Installation:

PAM may also be applied as a powder at the rate of 5 lbs per acre. This must be applied on a day that is dry. For areas less than 5-10 acres, a hand held "organ grinder" fertilizer spreader set to the smallest setting will work. Tractor mounted spreaders will work for larger areas.

Inspection and Maintenance Guidelines:

(1) PAM must be reapplied on actively worked areas after a 48-hour period if PAM is to remain effective.

(2) Reapplication is not required unless PAM treated soil is disturbed or unless turbidity levels show the need for an additional application.

(3) If PAM treated soil is left undisturbed a reapplication may be necessary after two months.

(4) More PAM applications may be required for steep slopes, silty and clayey soils (USDA Classification Type "C" and "D" soils), and long grades.

(5) When PAM is applied first to bare soil and then covered with straw, a reapplication may not be necessary for several months

1.3.5 Outlet Stabilization

The goal of outlet stabilization is to prevent erosion at the outlet of a channel or conduit by reducing the velocity of flow and dissipating the energy. This practice applies where the discharge velocity of a pipe, box culvert, diversion, open channel, or other water conveyance structure exceeds the permissible velocity of the receiving channel or disposal area.

The outlets of channels, conduits, and other structures are points of high erosion potential, because they frequently carry flows at velocities that exceed the allowable limit for the area downstream. To prevent scour and undermining, an outlet stabilization structure is needed to absorb the impact of the flow and reduce the velocity to non-erosive levels. A riprap-lined apron is the most commonly used practice for this purpose because of its relatively low cost and ease of installation. The riprap apron should be extended downstream until stable conditions are reached even though this may exceed the length calculated for design velocity control.

Riprap-stilling basins or plunge pools reduce flow velocity rapidly. They should be considered in lieu of aprons where overfalls exit at the ends of pipes or where high flows would require excessive apron length. Consider other energy dissipaters such as concrete impact basins or paved outlet structures (see Figure 1-10) where site conditions warrant.

Materials:

(1) Materials—Ensure that riprap consists of a well-graded mixture of stone. Larger stone should predominate, with sufficient smaller sizes to fill the voids between the stones. The maximum stone diameter should be no greater than 1.5 times the d_{50} size.

(2) Thickness—Make the minimum thickness of riprap 1.5 times the maximum stone diameter.

(3) Stone quality—Select stone for riprap from field stone or quarry stone. The stone should be hard, angular, and highly weather-resistant. The specific gravity of the individual stones should be at least 2.5.

(4) Geotextile Fabric—Install appropriate barrier to prevent soil movement through the openings in the riprap. The barrier should consist of a graded gravel layer or a synthetic filter cloth.

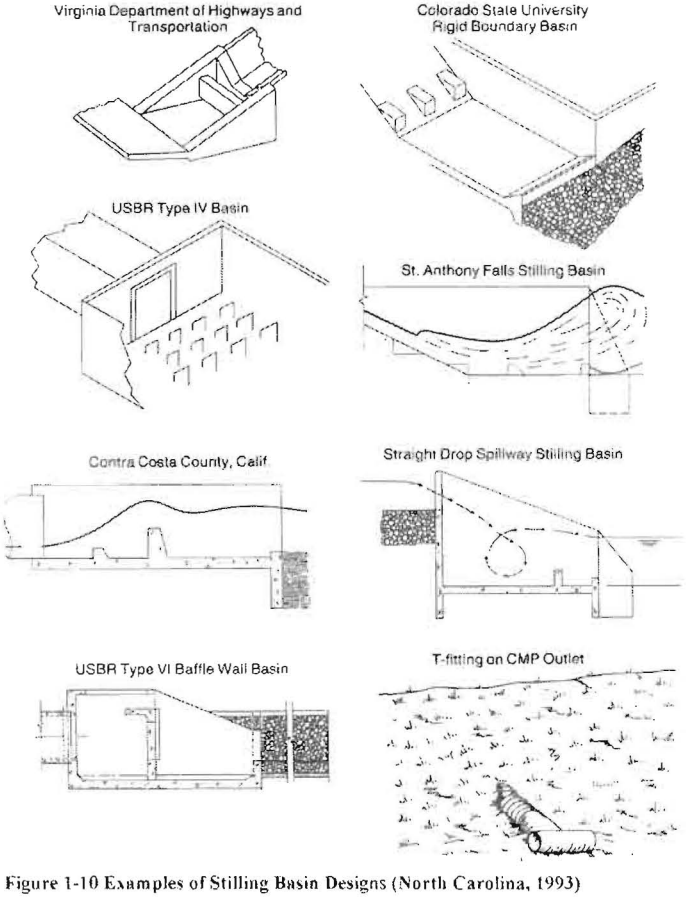


Figure 1-10 Examples of Stilling Basin Designs (North Carolina, 1993)

Design Guidelines:

(1) Capacity—10-yr, 3-hour peak runoff or the design discharge of the water conveyance structure, whichever is greater.

(2) Apron size—If the water conveyance structure discharges directly into a well-defined channel, extend the apron across the channel bottom and up the channel banks to an elevation of 0.5 ft above the maximum tailwater depth or to the top of the bank, whichever is less (see Figure 1-11). Determine the maximum allowable velocity for the receiving stream, and design the riprap apron to reduce flow to this velocity before flow leaves the apron. Calculate the apron length for velocity control or use the length required to meet stable conditions downstream, whichever is greater.

(3) Grade—Ensure that the apron has zero grade. There should be no overfall at the end of the apron; that is, the elevation of the top of the riprap at the downstream end should be the same as the elevation of the bottom of the receiving channel or the adjacent ground if there is no channel.

(4) Alignment—The apron should be straight throughout its entire length, but if a curve is necessary to align the apron with the receiving stream, locate the curve in the upstream section of riprap.

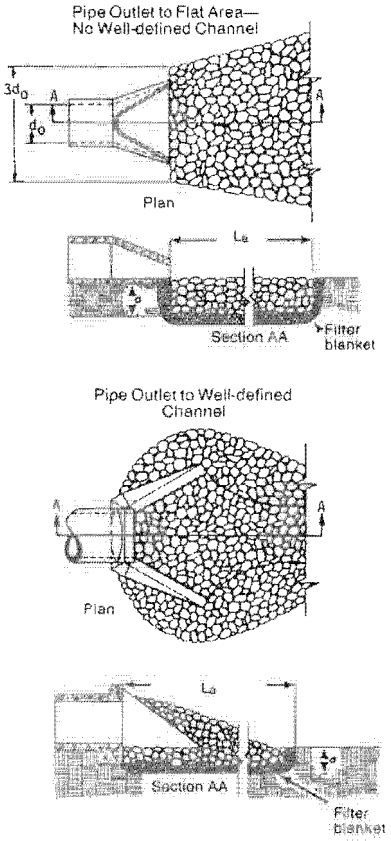
Installation:

(1) Ensure that the subgrade for the fabric and riprap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.

(2) The riprap and fabric must conform to the specified grading limits shown on the plans.

(3) Filter cloth must be properly protected from punching or tearing during installation. Repair any damage by removing the riprap and placing another piece of filter cloth over the damaged area. All connecting joints should overlap a minimum of 1 ft. If the damage is extensive, replace the entire filter cloth.

(4) Riprap may be placed by equipment, but take care to avoid damaging the fabric.



Notes

1. L_a is the length of the riprap apron.
2. $d = 1.5$ times the maximum stone diameter but not less than 6".
3. In a well-defined channel extend the apron up the channel banks to an elevation of 6" above the maximum tailwater depth or to the top of the bank, whichever is less.
4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

Figure 1-11 Riprap Outlet Design (North Carolina, 1993)

(5) The minimum thickness of the riprap should be 1.5 times the maximum stone diameter

(6) Riprap may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant and well graded.

(7) Construct the apron on zero grade with no overfall at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.

(8) Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.

(9) Immediately after construction, stabilize all disturbed areas with vegetation

Inspection and Maintenance Guidelines:

(1) Inspect riprap outlet structures after heavy rains to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

1.3.6 Level Spreaders

A level spreader is used as an outlet device for dikes and diversions and consists of an excavated depression constructed at zero grade across a slope. The purpose is to convert concentrated runoff to sheet flow and release it uniformly onto areas stabilized by existing vegetation.

Level spreaders should be used where there is a need to divert stormwater away from disturbed areas to avoid overstressing erosion control measures or where sediment free storm runoff can be released in sheet flow down a stabilized slope without causing erosion. A perspective view of a level spreader is shown in Figure 1-12.

This practice applies only in those situations where the spreader can be constructed on undisturbed soil and the area below the level lip is uniform with a slope of 10% or less and is stabilized by natural vegetation. The runoff water should not be allowed to re-concentrate after release unless it occurs during interception by another measure (such as a permanent pond or detention basin) located below the level spreader

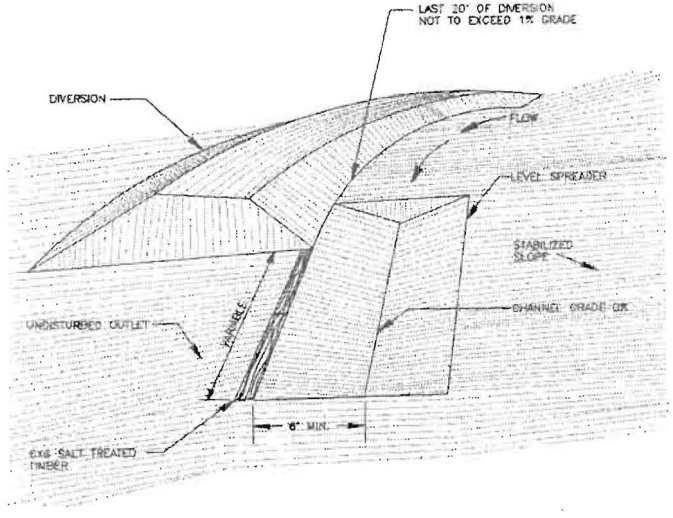


Figure 1-12 Perspective View of a Level Spreader (VA Dept of Conservation, 1992)

Particular care should be taken to construct the outlet lip completely level in a stable, undisturbed soil. Any depressions in the lip will concentrate the flow, resulting in erosion. Under higher design flow conditions, a rigid outlet lip design should be used to create the desired sheet flow conditions. Runoff water containing high sediment loads must be treated in a sediment-trapping device before being released to a level spreader.

Installation:

(1) Level spreaders should be constructed on undisturbed soil (not fill material).

(2) The entrance to the spreader should be shaped in such a manner as to insure that runoff enters directly onto the 0% grade channel.

(3) Construct a 20-ft. transition section from the diversion channel to blend smoothly to the width and depth of the spreader

(4) The level lip should be constructed at 0% grade to insure uniform spreading of stormwater runoff

(5) The level lip may be stabilized by vegetation if the flow from the 2-year, 24-hour storm is expected to be less than 4 cfs, otherwise a rigid non-erodible material should be used.

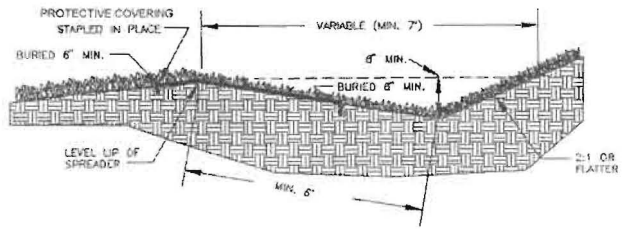
(6) Protective covering for vegetated lip should be a minimum of 4 feet wide extending 6 inches over the lip and buried 6 inches deep in a vertical trench on the lower edge. The upper edge should butt against smoothly cut sod and be securely held in place with closely spaced heavy-duty wire staples (see Figure 1-13).

(7) Rigid level lip should be entrenched at least 2 inches below existing ground and securely anchored to prevent displacement. An apron of coarse aggregate should be placed to top of level lip and extended down slope at least 3 feet. Place filter fabric under stone and use galvanized wire mesh to hold stone securely in place (see Figure 1-13).

(8) The released runoff must outlet onto undisturbed stabilized areas with slope not exceeding 10%. Slope must be sufficiently smooth to preserve sheet flow and prevent flow from concentrating.

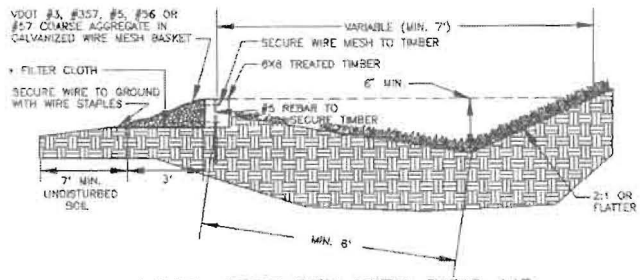
(9) Immediately after its construction, appropriately seed and mulch the entire disturbed area of the spreader.

CROSS SECTION



LEVEL SPREADER WITH VEGETATED LIP

CROSS SECTION



LEVEL SPREADER WITH RIGID LIP

Figure 1-13 Cross-Section of a Level Spreader (VA Dept of Conservation, 1992)

Inspection and Maintenance Guidelines:

(1) The measure should be inspected after every rainfall and repairs made, if required.

(2) Level spreader lip should remain at 0% slope to allow proper function of measure.

(3) The contractor should avoid the placement of any material on and prevent construction traffic across the structure. If the measure is damaged by construction traffic, it should be repaired immediately.

1.3.7 Subsurface Drains

A subsurface drain is a perforated conduit such as pipe, tubing or tile installed beneath the ground to intercept and convey ground water. The main purposes are to prevent sloping soils from becoming excessively wet and subject to sloughing, improve the quality of the growth medium in excessively wet areas by lowering the water table (see Figure 1-14), or drain stormwater detention areas or structures.

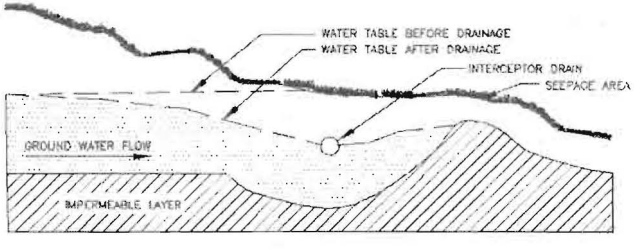


Figure 1-14 Effect of Subsurface Drain (VA Dept. of Conservation, 1992)

This measure is appropriate wherever excess water must be removed from the soil. This is generally not a problem on the recharge zone of the Edwards, but may be encountered in the contributing zone. The soil must be deep and permeable enough to allow an effective system to be installed. Either a gravity outlet must be available or pumping must be provided. These standards do not apply to foundation drains.

Subsurface drainage systems are of two types, relief drains and interceptor drains. Relief drains are used either to lower the water table in order to improve the growth of vegetation, or to remove surface water. They are installed along a slope and drain in the direction of the slope. They can be installed in a gridiron pattern, a herringbone pattern, or a random pattern (see Figure 1-15).

Interceptor drains are used to remove water as it seeps down a slope to prevent the soil from becoming saturated and subject to slippage. They are installed across a slope and drain to the side of the slope. They usually consist of a single pipe or series of single pipes instead of a patterned layout.

Materials:

Acceptable materials for subsurface drains include perforated, continuous closed-joint conduits of corrugated plastic, concrete, corrugated metal, asbestos cement, and bituminous fiber. The strength and durability of the pipe should meet the requirements of the site in accordance with the manufacturer's specifications.

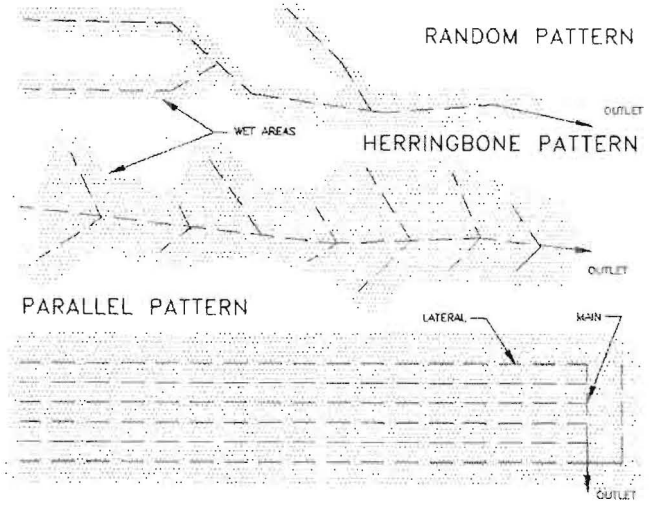


Figure 1-15 Subsurface Drainage Patterns (VA Dept. of Conservation, 1992)

General Installation Requirements:

(1) The trench should be constructed on a continuous grade with no reverse grades or low spots

(2) Soft or yielding soils under the drain should be stabilized with gravel or other suitable material.

(3) Deformed, warped, or otherwise unsuitable pipe should not be used. The minimum diameter for a subsurface drain should be 4 inches.

(4) Envelopes or filter material should be placed as specified with at least 3 inches of material on all sides of the pipe.

(5) The trench should be backfilled immediately after placement of the pipe. No sections of pipe should remain uncovered overnight or during a rainstorm. Backfill material should be placed in the trench in such a manner that the drain pipe is not displaced or damaged.

Relief Drain Installation:

(1) Relief drains should be located through the center of wet areas. They should drain in the same direction as the slope.

(2) Relief drains installed in a uniform pattern should remove a minimum of 1 inch of groundwater in 24 hours (0.042 cfs/acre). Relief drains installed in a random pattern should remove a minimum of 1.5 cfs/1000 feet of length. The design capacity should be increased accordingly to accommodate any surface water which enters directly into the system (see Figure 1-16).

(3) Relief drains installed in a uniform pattern should have equal spacing between drains and the drains should be at the same depth. Maximum depth is limited by the allowable load on the pipe, depth to impermeable layers in the soil, and outlet requirements. The minimum depth is 24 inches under normal conditions. Twelve inches is acceptable where the drain will not be subject to equipment loading. Spacing between drains is dependent on soil permeability and the depth of the drain. In general, however, a depth of 3 feet and a spacing of 50 feet will be adequate

(4) The minimum velocity required to prevent silting is 1.4 ft/sec. The line should be graded to achieve at least this velocity. Steep grades should be avoided, however

(5) Envelopes should be used around all drains for proper bedding and improved flow of groundwater into the drain. The envelope should consist of 3 inches of aggregate placed completely around the drain. The stone should be encompassed by a filter cloth separator to prevent the migration of surrounding soil particles

into the drain (see Figure 1-17). Filter cloth must be designed specifically for soil filtration

(6) The outlet of the subsurface drain should empty into a channel or some other watercourse that will remove the water from the outlet. It should be above the mean water level in the receiving channel. It should be protected from erosion, undermining, damage from periods of submergence, and the entry of small animals into the drain

Interceptor Drain Installation:

(1) Interceptor drains should remove a minimum of 1.5 cfs/1000 feet of length. This value should be increased for sloping land. In addition, if a flowing spring or surface water enters directly into the system, this flow must be accommodated and the design capacity should be increased accordingly to take care of this flow.

(2) The depth of installation of an interceptor drain is influenced mainly by the depth to which the water table is to be lowered. The maximum depth is limited by the allowable load on the pipe and the depth to an impermeable layer. Minimum depth should be the same as for relief drains.

(3) One interceptor drain is usually sufficient, however, if multiple drains are to be used, determining the required spacing can be difficult. The best approach is to install the first drain - then if seepage or high water table problems occur down slope, install an additional drain a suitable distance down slope.

Inspection and Maintenance Guidelines:

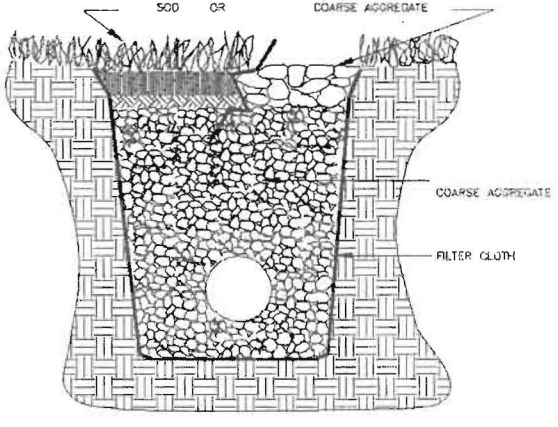
(1) Subsurface drains should be checked weekly and after rainfall events to ensure that they are free flowing and not clogged with sediment.

(2) The outlet should be kept clean and free of debris.

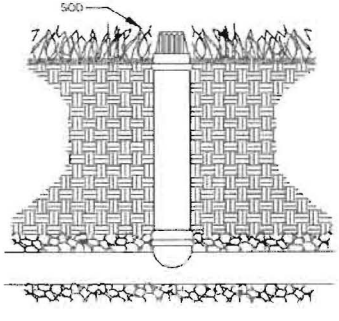
(3) Surface inlets should be kept open and free of sediment and other debris.

(4) Trees located too close to a subsurface drain often clog the system with their roots. If a drain becomes clogged, relocate the drain.

(5) Where heavy vehicles cross drains, the line should be checked to ensure that it is not crushed.



NATURAL INLET



GRATED INLET

Figure 1-16 Surface Inlets for Subsurface Drains (VA Dept. of Conservation, 1992)

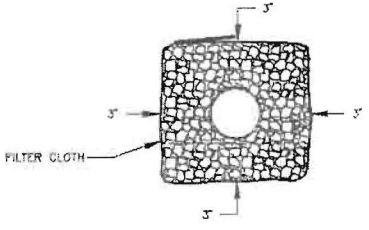


Figure 1-17 Subsurface Drain Envelope (VA Dept. of Conservation, 1992)

1.3.8 Temporary Vegetation

Vegetation is used as a temporary or permanent stabilization technique for areas disturbed by construction, but not covered by pavement, buildings, or other structures. As a temporary control, vegetation can be used to stabilize stockpiles and barren areas that are inactive for long periods of time.

Vegetative techniques can and should apply to every construction project with few exceptions. Vegetation effectively reduces erosion in swales, stockpiles, berms, mild to medium slopes, and along roadways.

Other techniques may be required to assist in the establishment of vegetation. These other techniques include erosion control matting, mulches, surface roughening, swales and dikes to direct runoff around newly seeded areas, and proper grading to limit runoff velocities during construction. (NCTCOG, 1993b)

Materials:

The type of temporary vegetation used on a site is a function of the season and the availability of water for irrigation. For areas that are not irrigated, the year can be divided into two temporary planting seasons and one season for planting of permanent warm weather groundcovers. These periods are shown in Figure 1-18 for Hays, Travis, and Williamson Counties. Planting times for Bexar, Comal, Kinney, Medina, and Uvalde Counties are shown in Figure 1-19. Appropriate temporary vegetation for these two areas are shown in Table 1-3 and Table 1-4.

Other vegetation may perform as well as the recommended varieties, especially where irrigation is available. County agricultural extension agents are a good source for suggestions for other types of temporary vegetation. All seed should be high quality, U.S. Dept. of Agriculture certified seed.

Installation:

(1) Interim or final grading must be completed prior to seeding, minimizing all steep slopes. In addition, all necessary erosion structures such as dikes, swales, diversions, should also be installed.

(2) Seedbed should be well pulverized, loose, and uniform.

(3) Fertilizer should be applied at the rate of 40 pounds of nitrogen and 40 pounds of phosphorus per acre, which is equivalent to about 1.0 pounds of nitrogen and phosphorus per 1000 square feet. Compost can be used instead of fertilizer and applied at the same time as the seed.

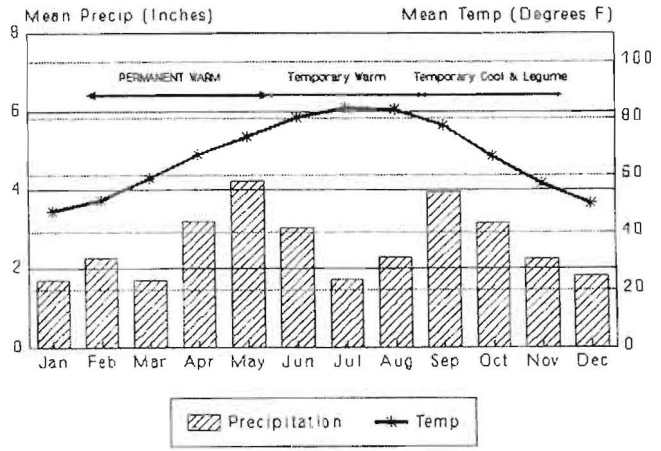


Figure 1-18 Planting Dates for Hays, Travis, and Williamson Counties (Northcutt, 1993)

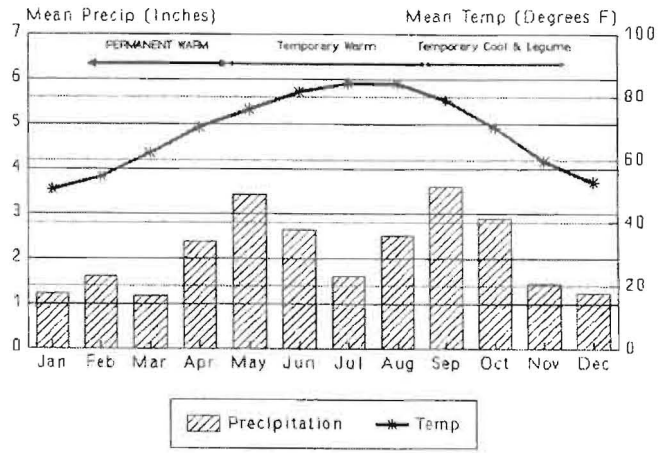


Figure 1-19 Planting Dates for Bexar, Comal, Kinney, Medina, and Uvalde Counties (Northcutt, 1993)

Table 1-3 Temporary Seeding for Hays, Travis, and Williamson Counties (Northcutt, 1993)

Dates	Climate	Species (lb/ac)	
Sept 1 to Nov 30	Temporary Cool Season	Tall Fescue	4.0
		Oats	21.0
		Wheat (Red, Winter)	30.0
		Total	**55.0**
Sept 1 to Nov 30	Cool Season Legume	Hairy Vetch	8.0
May 15 to Aug 31	Temporary Warm Season	Foxtail Millet	30.0

Table 1-4 Temporary Seeding for Bexar, Comal, Kinney, Medina, and Uvalde Counties (Northcutt, 1993)

Dates	Climate	Species (lb/ac)	
Sept 1 to Nov 30	Temporary Cool Season	Tall Fescue	4.0
		Oats	21.0
		Wheat (Red, Winter)	30.0
		Total	**55.0**
Sept 1 to Nov 30	Cool Season Legume	Hairy Vetch	8.0
May 1 to Aug 31	Temporary Warm Season	Foxtail Millet	30.0

(4) Seeding rates should be as shown in Table 1-3 and Table 1-4 or as recommended by the county agricultural extension agent.

(5) The seed should be applied uniformly with a cyclone seeder, drill, cultipacker seeder or hydroseeder (slurry includes seed, fertilizer and binder).

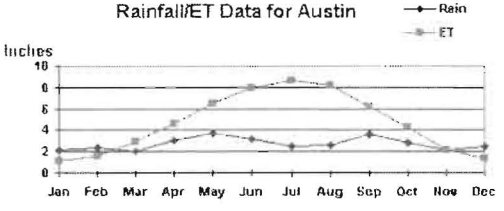
(6) Slopes that are steeper than 3:1 should be covered with appropriate soil stabilization matting as described in the following section to prevent loss of soil and seed.

Irrigation

Temporary irrigation should be provided according to the schedule described below, or to replace moisture loss to evapotranspiration (ET), whichever is greater. Significant rainfall (on-site rainfall of ½" or greater) may allow watering to be postponed until the next scheduled irrigation.

Time Period	Irrigation Amount and Frequency
Within 2 hours of installation	Irrigate entire root depth, or to germinate seed
During the next 10 business days	Irrigate entire root depth every Monday, Wednesday, and Friday
During the next 30 business days or until Substantial Completion	Irrigate entire root depth a minimum of once per week, or as necessary to ensure vigorous growth
During the next 4 months or until Final Acceptance of the Project	Irrigate entire root depth once every two weeks, or as necessary to ensure vigorous growth

Refer to Figure 1, below, for average rainfall/ET data for the Edwards aquifer area. This data shall serve as a guide to the overall watering regime; however, actual frequency and amount of irrigation water used shall be weather-dependent.



If cool weather induces plant dormancy, water only as necessary to maintain plant health. Irrigate in a manner that will not erode the topsoil but will sufficiently soak the entire depth of roots.

Inspection and Maintenance Guidelines:

(1) Temporary vegetation should be inspected weekly and after each rain event to locate and repair any erosion

(2) Erosion from storms or other damage should be repaired as soon as practical by regrading the area and applying new seed.

(3) If the vegetated cover is less than 80%, the area should be reseeded.

1.3.9 Blankets and Matting

Blankets and matting material can be used as an aid to control erosion on critical sites during establishment period of protective vegetation. The most common uses are: in channels where designed flow exceeds 3.5 feet per second; on interceptor swales and diversion dikes when design flow exceeds 6 feet per second; on short, steep slopes where erosion hazard is high and planting is likely to be slow to establish adequate protective cover; and on stream banks where moving water is likely to wash out new vegetative plantings

Blankets and matting can also be used to create erosion stops on steep, highly erodible watercourses. Erosion stops should be placed approximately 3 feet down channel from point of entry of a concentrated flow such as from culverts, tributary channels or diversions or at points where a change in gradient or course of channel occurs. Spacing of erosion stops on long slopes will vary, depending on the erodibility of the soil and velocity and volume of flow. Erosion stops are placed beneath blankets and matting.

Biodegradable rolled erosion control products (RECPs) are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable.

Jute is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. It is designed to be used in conjunction with vegetation and has longevity of approximately one year. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Excelsior (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life.

Straw blanket should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket

Wood fiber blanket is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation.

The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Coconut fiber blanket should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket.

Coconut fiber mesh is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Straw coconut fiber blanket should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well.

Plastic netting is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Plastic mesh is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Synthetic fiber with netting is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots,

and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Bonded synthetic fibers consist of a three dimensional geomatrix nylon (or other synthetic) matting. Typically it has more than 90 percent open area, which facilitates root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Combination synthetic and biodegradable RECPs consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Materials:

New types of blankets and matting materials are continuously being developed. The Texas Department of Transportation (TxDOT) has defined the critical performance factors for these types of products, and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT's construction or maintenance activities. The products that have been approved by TxDOT are also appropriate for general construction site stabilization. TxDOT maintains a web site at:

http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm

which is continually updated as new products are evaluated. The following tables list applications and products approved by TxDOT as of February 2001.

CLASS 1 "SLOPE PROTECTION"

Type A - Slopes 1:3 or Flatter - Clay Soils:

Airtrol
Anti-wash/Geojute
BioD-Mesh 60
Carthage Mills Veg Net
C-Jute
Contech Standard
Contech Standard Plus
Contech Straw/Coconut Fiber Mat w/Kraft Net
Contech C-35
Conwed 3000
Curlex I
Curlex™-LT
Earth Bound
EcoAegis™
Econo-Jute
ECS Excelsior Blanket Standard
ECS High Velocity Straw Mat
ECS Standard Straw
EnviroGuard Plus
Formula 480 Liquid Clay
Futerra®
Grass Mat
Greenfix WSO72
GeoTech TechMat™ SCKN
Green Triangle Regular
Green Triangle Superior
Greenstreak Pec-Mat
Landlok BonTerra EcoNet™ ENS2
Landlok BonTerra EcoNet™ ENCS2
Landlok BonTerra S1
Landlok BonTerra S2
Landlok BonTerra CS2
Landlok BonTerra SFB12
Landlok 407GT
Landlok FRS 3112
Landlok TRM 435
Miramat TM8
North American Green S150
North American Green S75
North American Green® S75 BN
North American Green SC150
North American Green® S150 BN
Maccaferri MX287
Pennzsuppress®
Poplar Erosion Blanket
Soil Guard
Soil Saver
SuperGro
Terra-Control®
TerraJute
verdyol Fro-Mat
verdyol Excelsior High Velocity
verdyol Excelsior Standard
Webtec Terraguard 44P
Xcel Regular
Xcel Superior

Type B - 1:3 or Flatter - Sandy Soils:

C-Jute
Carthage Mills Veg Net
Contech Standard
Contech Standard Plus
Contech Straw/Coconut Fiber Mat w/Kraft Net
Contech C-35
Curlex LT
Earth Bound
ECS Standard Straw
ECS Excelsior Blanket Standard
ECS High Velocity Straw Mat
EcoAegis™
EnviroGuard Plus
Futerra®
Greenfix WSO72
Geojute Plus I
GeoTech TechMat™ SCKN
Green Triangle Regular
Green Triangle Superior
Landlok® BonTerra S1
Landlok® BonTerra S2
Landlok® BonTerra CS2
Landlok®
BonTerra®EcoNet™ENCS2™
Landlok® BonTerra®EcoNet™ ENS2
Landlok FRS 3112
Landlok 407GT
Landlok TRM 435
Maccaferri MX287
Miramat 1000
Miramat TM8
North American Green S75
North American Green® S75 BN
North American Green S150
North American Green SC150
North American Green® S150 BN
Poplar Erosion Blanket
Soil Guard
Terra-Control®
TerraJute
verdyol Ero-Mat
verdyol Excelsior Standard
Webtec Terraguard 44P
Xcel Regular
Xcel Superior

Type C - Slopes Steeper than 1:3 - Clay Soils:

Airtrol
Anti-Wash/Geojute
Carthage Mills Veg Net
C-Jute
Contech Standard Plus
Contech Straw/Coconut Fiber Mat w/Kraft Net
Contech C-35
Conwed 3000
Curlex I
Earth Bound
Econo Jute
ECS High Velocity Straw Mat
ECS Standard Straw
EnviroGuard Plus
Formula 480 Liquid Clay
Futerra®
Greenfix WSO72
Green Triangle Superior
GeoTech TechMat™ SCKN
Greensneak Pec-Mat
Landlok® BonTerra® EcoNet™ ENCS2
Landlok® BonTerra S2
Landlok BonTerra CS2
Landlok® BonTerra SFB12
Landlok 407GT
Landlok FRS 3112
Landlok TRM 435
Maccaferri MX287
Miramat TM8
North American Green S150
North American Green S75
North American Green SC150
North American Green® S150 BN
Pennzsuppress®
Poplar Erosion Blanket
Soil Guard
Soil Saver
SuperGro
TerraJute
verdyol Excelsior High Velocity
Webtec Terraguard 44P
Xcel Superior

Type D - Slopes Steeper than 1:3 - Sandy Soils:

C-Jute
Carghage Mills Veg Net
Contech Standard Plus
Contech Straw/Coconut Fiber Mat w/Kraft Net
Contech C-35
Curlex I
ECS High Velocity Straw Mat
ECS Standard Straw
EnviroGuard Plus
Futerra®
Greenfix WSO72
Geojute Plus 1
GeoTech TechMat™ SCKN
Green Triangle Superior
Landlok® BonTerra S2
Landlok® BonTerra CS2
Landlok®
BonTerra®EcoNet™ENCS2™
Landlok 407GT
Landlok FRS 3112
Landlok TRM 435
Maccaferri MX287
Miramat 1000
Miramat TM8
North American Green S150
North American Green SC150
North American Green® S150 BN
Soil Guard
TerraJute
Webtec Terraguard 44P
Xcel Superior

CLASS 2 - "FLEXIBLE CHANNEL LINER"

Type E - Shear Stress Range 0 - 96 Pascal (0 - 2 Pounds Per Square Foot):

Contech TRM C-45
Contech C-35
Contech C50
Contech Coconut/Poly Fiber Mat
Contech Coconut Mat w/Kraft Net
Curlex® II Stitched
Curlex® III Stitched
Curlex® Channel Enforcer I
Curlex® Channel Enforcer II
Earth-Lock
Earth-Lock II
ECS High Impact Excelsior
ECS Standard Excelsior
ECS High Velocity Straw Mat
Enkamat 7018
Enkamat 7020
Enkamat Composite 30
Enkamat Composite NPK**
Enviromat
Geotech TechMat™ CP 3-D
Geotech TechMat™ CKN
Greenfix CFO 72RP **
Greenfix CFO 72RR
Greenstreak Pec-Mat
Koinmat™ 700
Landlok® BonTerra® C2
Landlok® BonTerra® CP2
Landlok® BonTerra® EcoNet™ ENC2
Landlok® BonTerra® SFB™
Landlok® BonTerra SFB12
Landlok TRM 435
Landlok TRM 450
Landlok TRM 1050
Landlok TRM 1060
Maccaferri MX287
Miramat TM8
Multimat 100
North American Green C125 BN
North American Green C350 Three Phase
North American Green SC150 BN
North American Green S350
North American Green® P350
North American Green S150
Pyramat®
Webtec Terraguard 44P
Webtec Terraguard 45P
Xcel PP-5

Type F - Shear Stress Range 0 - 192 Pascal (0 - 4 Pounds Per Square Foot):

Curlex® II Stitched
Curlex® III Stitched
Curlex® Channel Enforcer I
Curlex® Channel Enforcer II
Contech C50
Contech TRM C-45
Contech C-35
Contech Coconut/Poly Fiber Mat
Contech Coconut Mat w/Kraft Net
Earth-Lock
Earth-Lock II
ECS High Impact Excelsior
ECS High Velocity Straw Mat
ECS Standard Excelsior
Enkamat 7018
Enkamat Composite 30
Enkamat Composite NPK **
Enkamat Composite P/T**
Enviromat
Geotech TechMat™ CP 3-D
Geotech TechMat™ CKN
Greenfix CFO 72RP **
Greenfix CFO 72RR
Greenstreak Pec-Mat
Koirmat™ 700
Landlok® BonTerra® C2
Landlok® BonTerra® CP2
Landlok® BonTerra® EcoNet™ ENC2
Landlok BonTerra® SFB™
Landlok BonTerra SFB12
Landlok TRM 435
Landlok TRM 450
Landlok TRM 1050
Landlok TRM 1060
Maccaferri MX287
Miramat TM8
Multimat 100
North American Green C125 BN
North American Green C350 Three Phase
North American Green SC150 BN
North American Green S350
North American Green® P350
North American Green S150
Pyramat®
Webtec Terraguard 44P
Webtec Terraguard 45P
Xcel PP-5

Type G - Shear Stress Range 0 - 287 Pascal (0 - 6 Pounds Per Square Foot):

Contech TRM C-45
Contech C-35
Contech C50
Contech Coconut/Poly Fiber Mat
Curlex® III Stitched
Curlex® Channel Enforcer II
Earth-Lock
Earth-Lock II
Enkamat 7018
Enkamat Composite 30
Geotech TechMat™ CP 3-D
Greenstreak Pec-Mat
Koirmat™ 700
Landlok® BonTerra® CP2
Landlok® BonTerra® SFB™
Landlok® BonTerra SFB12
Landlok TRM 1050
Landlok TRM 1060
Landlok TRM 435
Landlok TRM 450
North American Green C350 Three Phase
North American Green S350
North American Green® P350
Pyramat®
Webtec Terraguard 44P
Webtec Terraguard 45P

Type H - Shear Stress Range 0 - 383 Pascal (0 - 8 Pounds Per Square Foot):

Contech TRM C-45
Contech C-35
Contech C50
Contech Coconut/Poly Fiber Mat
Curlex® III Stitched
Geotech TechMat™ CP 3-D
Landlok® BonTerra SFB12
Landlok TRM 435
Landlok TRM 450
Landlok TRM 1050
Landlok TRM 1060
North American Green C350 Three Phase
North American Green S350
North American Green® P350
Pyramat®
Webtec Terraguard 44P
Webtec Terraguard 45P

"SEEDING FOR EROSION CONTROL"

Cellulose Fiber Mulches

Clay or Tight Soils:

Agri-Fiber
American Fiber Mulch
American Fiber Mulch (with Hydro-Stick)
Conwed Hydro Mulch
Enviro-Gro
Evercycle™ Hydro-Mulch
Excel Fibermulch II (with Exact-Tac)
Lay-Low Mulch
Oasis Fiber Mulch
Pennzsuppress®
Pro Mat
Pro Mat (with RMBplus)
Pro Mat XL
Second Nature Regenerated Paper Fiber Mulch
Silva Fiber Plus

Sandy or Loose Soils:

American Fiber Mulch
American Fiber Mulch (with Hydro-Stick)
American Fiber Mulch with Stick Plus
Conwed Hydro Mulch
Enviro-Gro
Evercycle™ Hydro-Mulch
Excel Fibermulch II (with Exact-Tac)
Lay-Low Mulch
Oasis Fiber Mulch
Pennzsuppress®
Pro Mat
Pro Mat (with RMBplus)
Pro Mat XL
Second Nature Regenerated Paper Fiber Mulch

Installation:

Proper installation of blankets and matting is necessary for these materials to function as intended. They should always be installed in accordance with the manufacturer's recommendations. Proper anchoring of the material and preparation of the soil are two of the most important aspects of installation. Typical anchoring methods are shown in Figure 1-20 and Figure 1-21.

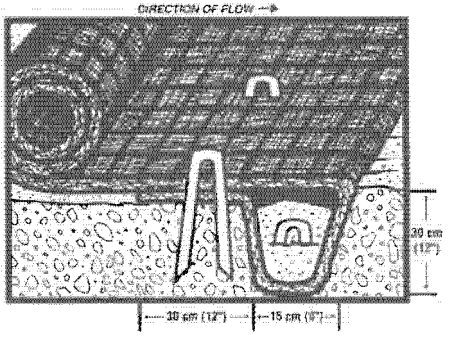


Figure 1-20 Initial Anchor Trench for Blankets and Mats

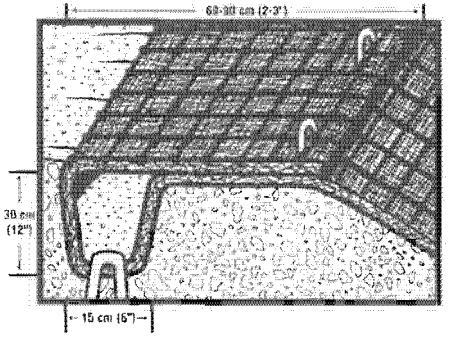


Figure 1-21 Terminal Anchor Trench for Blankets and Mats

Soil Preparation

(1) After site has been shaped and graded to approved design, prepare a friable seed bed relatively free from clods and rocks more than 1.5 inches in diameter and any foreign material that will prevent contact of the protective mat with the soil surface

(2) Fertilize and seed in accordance with seeding or other type of planting plan.

(3) The protective matting can be laid over sprigged areas where small grass plants have been planted. Where ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Erosion Stops

(1) Erosion stops should extend beyond the channel liner to full design cross-section of the channel to check any rills that might form outside the channel lining.

(2) The trench may be dug with a spade or a mechanical trencher, making sure that the down slope face of the trench is flat; it should be uniform and perpendicular to line of flow to permit proper placement and stapling of the matting.

(3) The erosion stop should be deep enough to penetrate solid material or below level of rilling in sandy soils. In general, erosion stops will vary from 6 to 12 inches in depth.

(4) The erosion stop mat should be wide enough to allow a minimum of 2 inch turnover at bottom of trench for stapling, while maintaining the top edge flush with channel surface.

(5) Tamp backfill firmly and to a uniform gradient of channel

Final Check:

- Make sure matting is uniformly in contact with the soil
- All lap joints are secure.
- All staples are flush with the ground.
- All disturbed areas seeded.

Inspection and Maintenance Guidelines:

(1) Blankets and matting should be inspected weekly and after each rain event to locate and repair any damage. Apply new material if necessary to restore function

1 3 10 Hydraulic Mulch

Hydraulic mulch consists of applying a mixture of shredded wood fiber or a hydraulic matrix, and a stabilizing emulsion or tackifier with hydro-mulching equipment, which temporarily protects exposed soil from erosion by raindrop impact or wind. Hydraulic mulch is suitable for soil disturbed areas requiring temporary protection until permanent stabilization is established, and disturbed areas that will be re-disturbed following an extended period of inactivity. It is not appropriate for slopes of 3:1 or steeper or for use in channels.

Wood fiber hydraulic mulches are generally short lived and need 24 hours to dry before rainfall occurs to be effective. May require a second application in order to remain effective for an entire rainy season.

Materials:

Hydraulic Mulches: Wood fiber mulch can be applied alone or as a component of hydraulic matrices. Wood fiber applied alone is typically applied at the rate of 2,000 to 4,000 lb/acre. Wood fiber mulch is manufactured from wood or wood waste from lumber mills or from urban sources.

Hydraulic Matrices: Hydraulic matrices include a mixture of wood fiber and acrylic polymer or other tackifier as binder. Apply as a liquid slurry using a hydraulic application machine (i.e., hydro seeder) at the following minimum rates, or as specified by the manufacturer to achieve complete coverage of the target area: 2,000 to 4,000 lb/acre wood fiber mulch, and 5 to 10% (by weight) of tackifier (acrylic copolymer, guar, psyllium, etc.)

Bonded Fiber Matrix: Bonded fiber matrix (BFM) is a hydraulically applied system of fibers and adhesives that upon drying forms an erosion resistant blanket that promotes vegetation, and prevents soil erosion. BFMs are typically applied at rates from 3,000 lb/acre to 4,000 lb/acre based on the manufacturer's recommendation. A biodegradable BFM is composed of materials that are 100% biodegradable. The binder in the BFM should also be biodegradable and should not dissolve or disperse upon re-wetting. Typically, biodegradable BFMs should not be applied immediately before, during or immediately after rainfall if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Installation:

(1) Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where other methods are impractical

(2) To be effective, hydraulic matrices require 24 hours to dry before rainfall occurs

(3) Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

Inspection and Maintenance Guidelines:

(1) Mulched areas should be inspected weekly and after each rain event to locate and repair any damage.

(2) Areas damaged by storms or normal construction activities should be regraded and hydraulic mulch reapplied as soon as practical

1.3.11 Sod

Sod is appropriate for disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment. Locations particularly suited to stabilization with sod are waterways carrying intermittent flow, areas around drop inlets or in grassed swales, and residential or commercial lawns where quick use or aesthetics are factors

The advantages of properly installed sod include:

- Immediate erosion control.
- An instant green surface with no dust or mud.
- Nearly year-round establishment capability.
- Less chance of failure than seed.
- Freedom from weeds.
- Quick use of the sodded surface.
- The option of buying a quality-controlled product with predictable results.

It is initially more costly to install sod than to seed. However, this cost is justified in places where sod can perform better than seed in controlling erosion. In swales and waterways where concentrated flow will occur, properly pegged sod is preferable to seed because there is no lag time between installation and the time when the channel is protected by vegetation. Drop inlets, which will be placed in grassed areas, can be kept

free of sediment, and the grade immediately around the inlet can be maintained, by framing the inlet with sod strips.

Sod can be laid during times of the year when seeded grass may fail, so long as there is adequate water available for irrigation in the early weeks. Ground preparation and proper maintenance are as important with sod as with seed. Sod is composed of living plants and those plants must receive adequate care in order to provide vegetative stabilization on a disturbed area.

Materials:

(1) Sod should be machine cut at a uniform soil thickness of ¾ inch (± ¼ inch) at the time of cutting. This thickness should exclude shoot growth and thatch

(2) Pieces of sod should be cut to the supplier's standard width and length, with a maximum allowable deviation in any dimension of 5%. Torn or uneven pads should not be acceptable.

(3) Standard size sections of sod should be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp on one end of the section

(4) Sod should be harvested, delivered, and installed within a period of 36 hours.

Site Preparation:

(1) Prior to soil preparation, areas to be sodded should be brought to final grade in accordance with the approved plan.

(2) The surface should be cleared of all trash, debris and of all roots, brush, wire, grade stakes and other objects that would interfere with planting, fertilizing or maintenance operations.

(3) Fertilize according to soil tests. Fertilizer needs can be determined by a soil testing laboratory or regional recommendations can be made by county agricultural extension agents. Fertilizer should be worked into the soil to a depth of 3 inches with a disc, springtooth harrow or other suitable equipment. On sloping land, the final harrowing or discing operation should be on the contour.

General Installation (VA Dept of Conservation, 1992):

(1) Sod should not be cut or laid in excessively wet or dry weather. Sod also should not be laid on soil surfaces that are frozen.

(2) During periods of high temperature, the soil should be lightly irrigated immediately prior to laying the sod, to cool the soil and reduce root burning and dieback

(3) The first row of sod should be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other. Lateral joints should be staggered to promote more uniform growth and strength. Care should be exercised to ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause drying of the roots (see Figure 1-22).

(4) On slopes 3:1 or greater, or wherever erosion may be a problem, sod should be laid with staggered joints and secured by stapling or other approved methods Sod should be installed with the length perpendicular to the slope (on the contour).

(5) As sodding of clearly defined areas is completed, sod should be rolled or tamped to provide firm contact between roots and soil.

(6) After rolling, sod should be irrigated to a depth sufficient that the underside of the sod pad and the soil 4 inches below the sod is thoroughly wet

(7) Until such time a good root system becomes developed, in the absence of adequate rainfall, watering should be performed as often as necessary to maintain moist soil to a depth of at least 4 inches.

(8) The first mowing should not be attempted until the sod is firmly rooted, usually 2-3 weeks Not more than one third of the grass leaf should be removed at any one cutting.

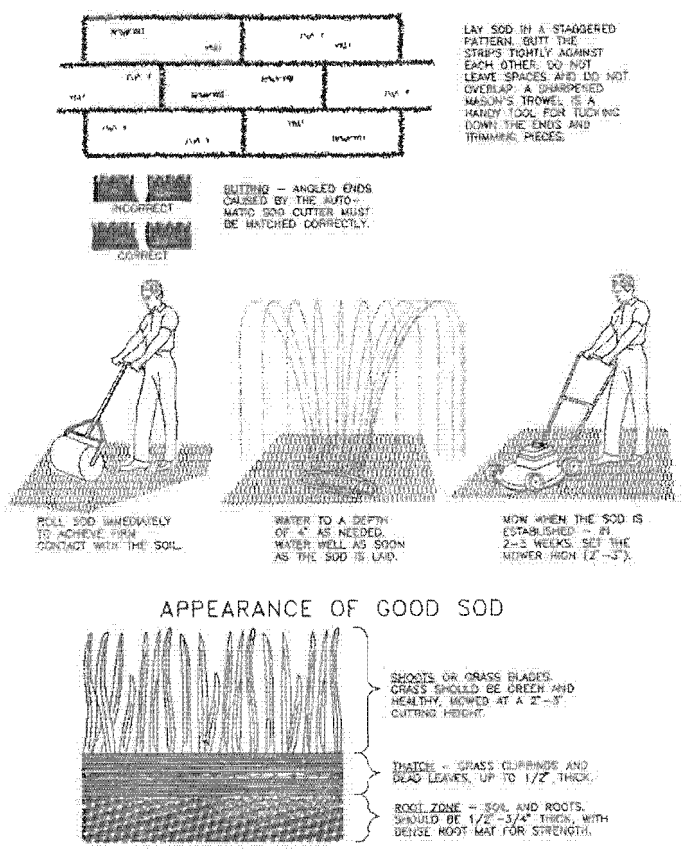


Figure 1-22 Proper Sod Installation Techniques (VA Dept. of Conservation, 1992)

Installation in Channels:

(1) Sod strips in waterways should be laid perpendicular to the direction of flow. Care should be taken to butt ends of strips tightly (see Figure 1-23).

(2) After rolling or tamping, sod should be pegged or stapled to resist washout during the establishment period. Mesh or other netting may be pegged over the sod for extra protection in critical areas.

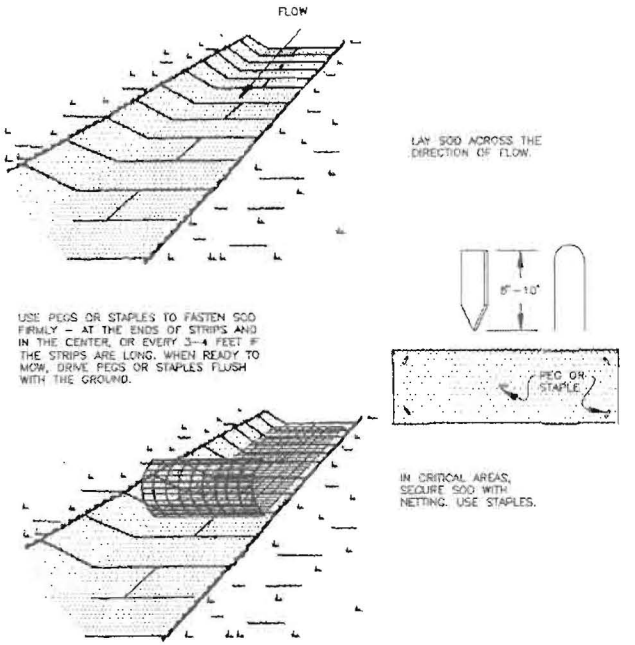


Figure 1-23 Installation of Sod in a Channel (VA Dept. of Conservation, 1992)

Inspection and Maintenance Guidelines:

(3) Sod should be inspected weekly and after each rain event to locate and repair any damage.

(4) Damage from storms or normal construction activities such as tire ruts or disturbance of swale stabilization should be repaired as soon as practical

1.3.12 Dust Control

The purpose of dust control is to prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards and improve traffic safety. This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Construction activities inevitably result in the exposure and disturbance of soil. Fugitive dust is emitted both during the activities (i.e., excavation demolition, vehicle traffic, human activity) and as a result of wind erosion over the exposed earth surfaces. Large quantities of dust are typically generated in 'heavy' construction activities, such as road and street construction and subdivision, commercial or industrial development, which involve disturbance of significant areas of the soil surface. Research on construction sites has established an average dust emission rate of 1.2 tons/acre/month for active construction (VA. Dept of Conservation, 1992). Earth moving activities comprise the major source of construction dust emissions, but traffic and general disturbance of the soil also generate significant dust emissions.

Temporary Methods:

(1) Vegetative Cover – See Section 1.3.8.

(2) Mulches – See Section 1.3.10 – Chemical mulch binders may be used to bind mulch material. Commercial binders should be used according to manufacturer's recommendations.

(3) Commercially available dust suppressors if applied in accordance with the manufacturers' directions.

(4) Tillage – to roughen surface and bring clods to the surface. This is an emergency measure that should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12 inches apart, spring-toothed harrows and similar plows are examples of equipment that may produce the desired effect.

(5) Irrigation – Site is sprinkled with water until the surface is moist. Repeat as needed. Irrigation can be particularly effective for controlling dust during trenching operations. A dedicated water truck placed next to the trencher and using a "pulse" fog pattern applied to the discharge belt can effectively control dust. This method is more effective than spraying the ground ahead of the trencher or the trench itself as it is being dug.

(6) Barriers – Solid board fences, snow fences, burlap fences, crate walls, bales of hay and similar materials can be used to control air currents and soil blowing.

Barriers placed at right angles to prevailing currents at intervals of about 15 times their height are effective in controlling soil blowing.

Permanent Methods:

(1) Permanent Vegetation -- trees or large shrubs may afford valuable protection if left in place.

(2) Topsoil – Covering with less erosive soil material.

(3) Stone – Cover surface with crushed stone or coarse gravel.

Inspection and Maintenance Guidelines:

(1) When dust is evident during dry weather, reapply dust control BMPs.

1.4 Temporary Sediment Control BMPs

1.4.1 General Guidelines

Construction activities normally result in disturbance on the site due to grading operations, clearing and other activities. Erosion will occur in the disturbed areas and BMPs should be used to contain the sediment transported by stormwater runoff. Although the names of many controls suggest that filtration is an important component of sediment removal, almost all reduction in sediment load is the result of particle settling under relatively quiescent conditions. Consequently, sediment barriers, such as silt fences and rock berms, should be designed and installed as temporary (although leaky) dams.

When viewed as temporary dams, it is easier to see the importance of installing these devices along the contour or with a constant top elevation to prevent concentrating the runoff at the lowest spot in the barrier. Concentrating the runoff in this fashion can result in more erosion than if no barrier was installed at all. Therefore, great care should be taken in the placement and installation of these types of controls.

For larger areas or where effective installation of sediment barriers is not an option, sediment traps and sediment basins should be used to control sediment in runoff. These devices are essentially larger, more permanent dams that temporarily detain stormwater runoff.

All of the sediment control BMPs are potentially very effective for removing sediment from stormwater runoff when properly maintained and installed. However, this potential is often squandered. Casual observation of many active construction sites reveals silt fences that are torn or damaged by equipment, evidence of stormwater bypass, or controls installed in inappropriate locations (i.e., silt fences used in channels). In these cases, significant funds are expended for little in the way of water quality protection. Consequently, proper installation and maintenance should form a key component of any temporary sediment control plan.

A list of the temporary sediment controls and their appropriate siting criteria are contained in Table 1-5. More detailed guidance on siting and maintenance are contained in the subsequent sections. Note that hay bales are no longer considered an effective sediment control measure. Compost amended soils can be used to promote vegetation growth, but they are not considered a sediment control technology. Compost berms for sediment control are considered to be an experimental technology and should not be used in the areas covered by the Edwards Rules.

Table 1-5 Guidelines for Selection of Sediment Control BMPs

Control Type	Applications	Drainage Area	Slope
Construction Exit	Should be used at all designated access points.	NA	NA
Silt Fence (interior)	Areas of minor sheet flow.	< ¼ acre/100 ft of fence	< 20%
Silt Fence (exterior)	Down slope borders of site; up slope border is necessary to divert offsite drainage. For larger areas use diversion swale or berm.	< ¼ acre/100 ft of fence	< 20%
Triangular Filter Dike	Areas within site requiring frequent access	< 1 acre	< 10%
Rock Berm	Drainage swales and ditches with and below site.	< 5 acres	< 30%
High Service Rock Berm	Around sensitive features, high flow areas within and below site.	< 5 acres	< 30%
Brush Berm	Small areas of sheet flow	< 2 acres	< 20%
Sand Bag Berm	For construction activities in streambeds.	5-10 acres	<15%
Vegetative Buffer Strips	On floodplains, next to wetlands, along stream banks, and on steep slopes.	NA	NA
Inlet Protection	Prevent sediment from entering storm drain system.	< 1 acre	NA
Sediment Trap	Used where flows concentrated in a swale or channel	1-5 acres	NA
Sediment Basin	Appropriate for large disturbed areas	5 – 100 acres	NA
Filter Rolls	On slopes to interrupt slope	< 1 acre	<30%
Dewatering Operations	Used to remove groundwater or accumulated stormwater from excavations	NA	NA
Spill Prevention	Used on all sites to reduce spills	NA	NA
Utility Line Crossings	Crossings of drainage ways and creeks	>40 acres	NA
Concrete Washout	Use on all concrete pouring operations	NA	NA

1.4.2 Temporary Construction Entrance/Exit

The purpose of a temporary gravel construction entrance is to provide a stable entrance/exit condition from the construction site and keep mud and sediment off public roads. A stabilized construction entrance is a stabilized pad of crushed stone located at any point traffic will be entering or leaving the construction site from a public right-of-way, street, alley, sidewalk or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking or flowing of sediment onto public rights-of-way. This practice should be used at all points of construction ingress and egress. Schematic diagrams of a construction entrance/exit are shown in Figure 1-24 and Figure 1-25.

Excessive amounts of mud can also present a safety hazard to roadway users. To minimize the amount of sediment loss to nearby roads, access to the construction site should be limited to as few points as possible and vegetation around the perimeter should be protected were access is not necessary. A rock stabilized construction entrance should be used at all designated access points.

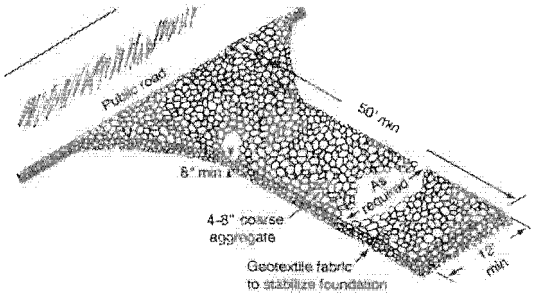


Figure 1-24 Schematic of Temporary Construction Entrance/Exit (after NC, 1993)

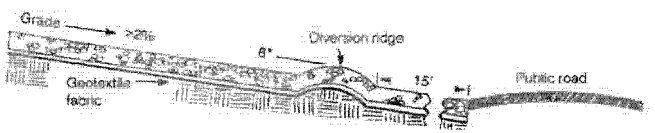


Figure 1-25 Cross-section of a Construction Entrance/Exit (NC, 1993)

Materials:

(1) The aggregate should consist of 4 to 8 inch washed stone over a stable foundation as specified in the plan.

(2) The aggregate should be placed with a minimum thickness of 8 inches.

(3) The geotextile fabric should be designed specifically for use as a soil filtration media with an approximate weight of 6 oz/yd^2, a mullen burst rating of 140 lb/in^2, and an equivalent opening size greater than a number 50 sieve.

(4) If a washing facility is required, a level area with a minimum of 4 inch diameter washed stone or commercial rack should be included in the plans. Divert wastewater to a sediment trap or basin.

Installation: (North Carolina, 1993)

(1) Avoid curves on public roads and steep slopes. Remove vegetation and other objectionable material from the foundation area. Grade crown foundation for positive drainage.

(2) The minimum width of the entrance/exit should be 12 feet or the full width of exit roadway, whichever is greater.

(3) The construction entrance should be at least 50 feet long.

(4) If the slope toward the road exceeds 2%, construct a ridge, 6 to 8 inches high with 3:1 (H:V) side slopes, across the foundation approximately 15 feet from the entrance to divert runoff away from the public road.

(5) Place geotextile fabric and grade foundation to improve stability, especially where wet conditions are anticipated.

(6) Place stone to dimensions and grade shown on plans. Leave surface smooth and slope for drainage.

(7) Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

(8) Install pipe under pad as needed to maintain proper public road drainage.

Common trouble points

(1) Inadequate runoff control – sediment washes onto public road.

(2) Stone too small or geotextile fabric absent, results in muddy condition as stone is pressed into soil.

(3) Pad too short for heavy construction traffic – extend pad beyond the minimum 50 foot length as necessary.

(4) Pad not flared sufficiently at road surface, results in mud being tracked on to road and possible damage to road edge.

(5) Unstable foundation – use geotextile fabric under pad and/or improve foundation drainage.

Inspection and Maintenance Guidelines:

(1) The entrance should 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.

(2) All sediment spilled, dropped, washed or tracked onto public rights-of-way should be removed immediately by contractor.

(3) When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way.

(4) When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.

(5) All sediment should be prevented from entering any storm drain, ditch or water course by using approved methods.

1.4.3 Silt Fence

A silt fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. When properly used, silt fences can be highly effective at controlling sediment from disturbed areas. They cause runoff to pond, allowing heavier solids to settle out. If not properly installed, silt fences are not likely to be effective. A schematic illustration of a silt fence is shown in Figure 1-26.

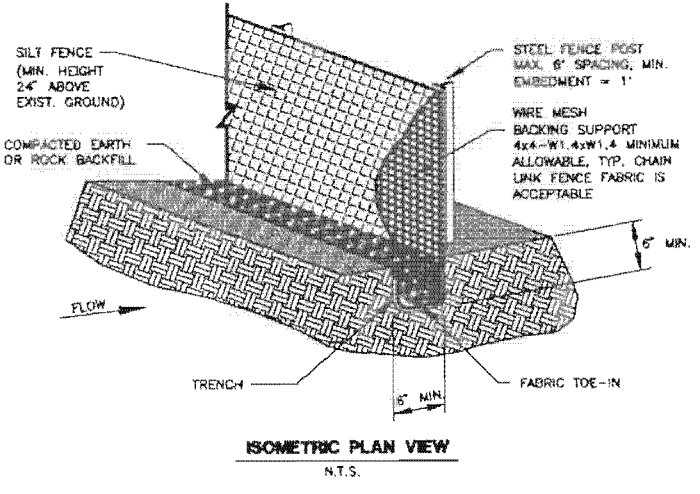


Figure 1-26 Schematic of a Silt Fence Installation (NCTCOG, 1993b)

The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas of a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence should remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way. If concentrated flow occurs after installation, corrective action must be taken such as placing a rock berm in the areas of concentrated flow.

Silt fencing within the site may be temporarily moved during the day to allow construction activity provided it is replaced and properly anchored to the ground at the end of the day. Silt fences on the perimeter of the site or around drainage ways should not be moved at any time.

Materials:

(1) Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in^2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

(2) Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft^2, and Brindell hardness exceeding 140.

(3) Woven wire backing to support the fabric should be galvanized 2" x 4" welded wire, 12 gauge minimum.

Installation:

(1) Steel posts, which support the silt fence, should be installed on a slight angle toward the anticipated runoff source. Post must be embedded a minimum of 1-foot deep and spaced not more than 8 feet on center. Where water concentrates, the maximum spacing should be 6 feet.

(2) Lay out fencing down-slope of disturbed area, following the contour as closely as possible. The fence should be sited so that the maximum drainage area is ¼ acre/100 feet of fence.

(3) The toe of the silt fence should be trenched in with a spade or mechanical trencher, so that the down-slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.

(4) The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.

(5) Silt fence should be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.

(6) Silt fence should be removed when the site is completely stabilized so as not to block or impede storm flow or drainage.

Common Trouble Points:

(1) Fence not installed along the contour causing water to concentrate and flow over the fence.

(2) Fabric not seated securely to ground (runoff passing under fence)

(3) Fence not installed perpendicular to flow line (runoff escaping around sides)

(4) Fence treating too large an area, or excessive channel flow (runoff overtops or collapses fence)

Inspection and Maintenance Guidelines:

(1) Inspect all fencing weekly, and after any rainfall

(2) Remove sediment when buildup reaches 6 inches.

(3) Replace any torn fabric or install a second line of fencing parallel to the torn section.

(4) Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points.

(5) When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of the silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.

1.4.4 Triangular Sediment Filter Dikes

The purpose of a triangular sediment filter dike (Figure 1-27) is to intercept and detain water-borne sediment from unprotected areas of limited extent. The triangular sediment filter dike is used where there is no concentration of water in a channel or other drainage way above the barrier and the contributing drainage area is less than one acre. If the uphill slope above the dike exceeds 10%, the length of the slope above the dike should be less than 50 feet. If concentrated flow occurs after installation, corrective action should be taken such as placing rock berm in the areas of concentrated flow

This measure is effective on paved areas where installation of silt fence is not possible or where vehicle access must be maintained. The advantage of these controls is the ease with which they can be moved to allow vehicle traffic, then reinstalled to maintain sediment control

Materials:

(1) Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in^2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

(2) The dike structure should be 6 gauge 6" x 6" wire mesh folded into triangular form being eighteen (18) inches on each side.

Installation:

(1) As shown in the diagram (Figure 1-27), the frame should be constructed of 6" x 6", 6 gauge welded wire mesh, 18 inches per side, and wrapped with geotextile fabric the same composition as that used for silt fences

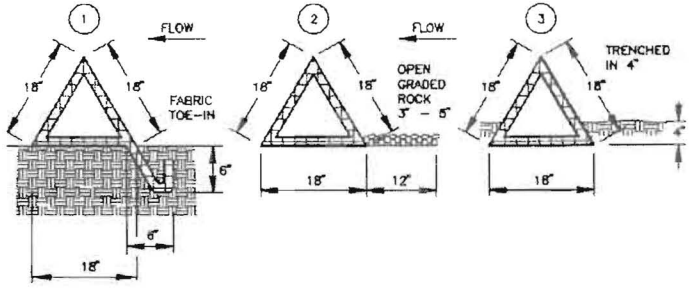
(2) Filter fabric should lap over ends six (6) inches to cover dike to dike junction; each junction should be secured by shoat rings.

(3) Position dike parallel to the contours, with the end of each section closely abutting the adjacent sections

(4) There are several options for fastening the filter dike to the ground as shown in Figure 1-27. The fabric skirt may be toed-in with 6 inches of compacted material, or 12 inches of the fabric skirt should extend uphill and be secured with a minimum of 3 inches of open graded rock, or with staples or nails. If these two options are not feasible the dike structure may be trenched in 4 inches.

(5) Triangular sediment filter dikes should be installed across exposed slopes during construction with ends of the dike tied into existing grades to prevent failure and should intercept no more than one acre of runoff

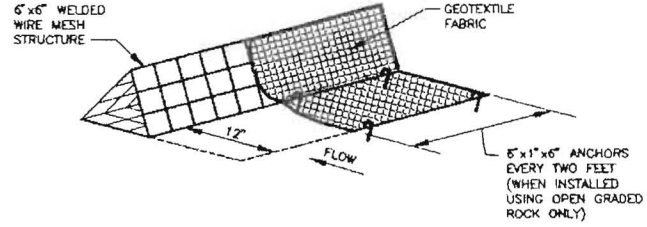
(6) When moved to allow vehicular access, the dikes should be reinstalled as soon as possible, but always at the end of the workday.



CROSS SECTION OF INSTALLATION OPTIONS

N.T.S.

1. TOE-IN 6" MIN
2. WEIGHTED W/ 3" - 5" OPEN GRADED ROCK
3. TRENCHED IN 4"



ISOMETRIC PLAN VIEW

N.T.S.

Figure 1-27 Schematic of a Triangular Filter Dike (NCTCOG, 1993)

Common Trouble Points:

(1) Fabric skirt missing, too short, or not securely anchored (flows passing under dike)

(2) Gap between adjacent dikes (runoff passing between dikes)

(3) Dike not placed parallel to contour (runoff flowing around dike)

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly or after each rainfall event and repair or replacement should be made promptly as needed by the contractor.

(2) Inspect and realign dikes as needed to prevent gaps between sections.

(3) Accumulated silt should be removed after each rainfall, and disposed of in a manner which will not cause additional siltation.

(4) After the site is completely stabilized, the dikes and any remaining silt should be removed. Silt should be disposed of in a manner that will not contribute to additional siltation

1.4.5 Rock Berms

The purpose of a rock berm is to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow. The rock berm should be used when the contributing drainage area is less than 5 acres. Rock berms are used in areas where the volume of runoff is too great for a silt fence to contain. They are less effective for sediment removal than silt fences, particularly for fine particles, but are able to withstand higher flows than a silt fence. As such, rock berms are often used in areas of channel flows (ditches, gullies, etc.) Rock berms are most effective at reducing bed load in channels and should not be substituted for other erosion and sediment control measures farther up the watershed

Materials:

(1) The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

(2) Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used

Installation:

(1) Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1 inch openings

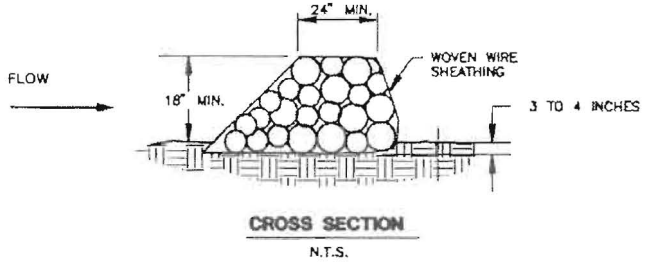
(2) Berm should have a top width of 2 feet minimum with side slopes being 2:1 (H:V) or flatter

(3) Place the rock along the sheathing as shown in the diagram (Figure 1-28), to a height not less than 18".

(4) Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon

(5) Berm should be built along the contour at zero percent grade or as near as possible.

(6) The ends of the berm should be tied into existing upslope grade and the berm should be buried in a trench approximately 3 to 4 inches deep to prevent failure of the control.



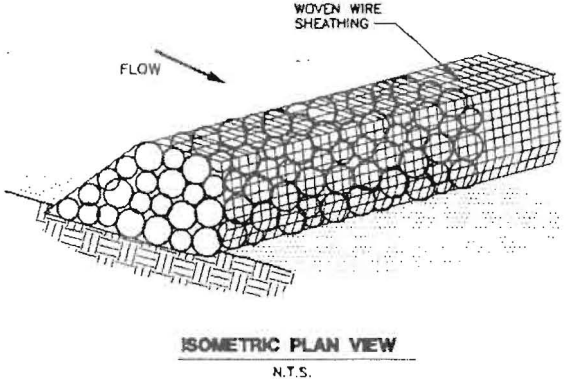


Figure 1-28 Schematic Diagram of a Rock Berm (NCTCOG, 1993)

Common Trouble Points:

(1) Insufficient berm height or length (runoff quickly escapes over the top or around the sides of berm)

(2) Berm not installed perpendicular to flow line (runoff escaping around one side)

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly and after each rainfall by the responsible party. For installations in streambeds, additional daily inspections should be made.

(2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt in an approved manner that will not cause any additional siltation.

(3) Repair any loose wire sheathing.

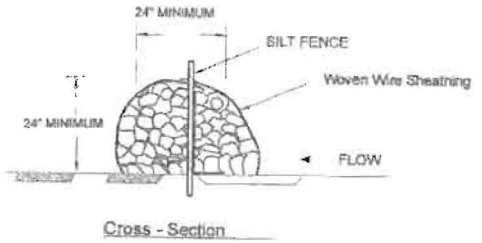
(4) The berm should be reshaped as needed during inspection.

(5) The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.

(6) The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

1.4.6 High Service Rock Berms

A high service rock berm should be designated in areas of important environmental significance such as in steep canyons or above permanent springs, pools, recharge features, or other environmentally sensitive areas that may require a higher level of protection. This type of sediment barrier combines the characteristics of a silt fence and a rock berm to provide a substantial level of sediment reduction and a sturdy enough barrier to withstand higher flows. The drainage area to this device should not exceed 5 acres and the slope should be less than 30%.



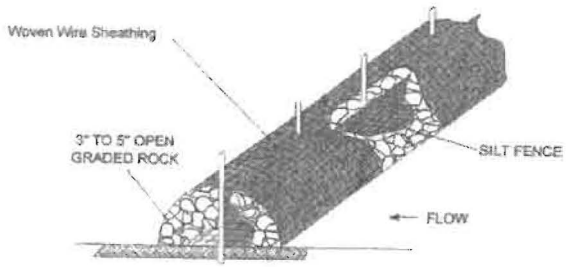


Figure 1-29 Schematic Diagram of High Service Rock Berm (LCRA, 1998)

Materials:

(1) Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width should be 36 inches, with a minimum unit weight of 4.5 oz/yd, mullen burst strength exceeding 190 lb/in^2, ultraviolet stability exceeding 70%, and minimum apparent opening size of U.S. Sieve No. 30.

(2) Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Y-bar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft^2, and Brindell hardness exceeding 140. Rebar (either #5 or #6) may also be used to anchor the berm.

(3) Woven wire backing to support the fabric should be galvanized 2" x 4" welded wire, 12 gauge minimum.

(4) The berm structure should be secured with a woven wire sheathing having maximum opening of 1 inch and a minimum wire diameter of 20 gauge galvanized and should be secured with shoat rings.

(5) Clean, open graded 3- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rocks may be used.

Installation

(1) Lay out the woven wire sheathing perpendicular to the flow line. The sheathing should be 20 gauge woven wire mesh with 1-inch openings.

(2) Install the silt fence along the center of the proposed berm placement, as with a normal silt fence described in Section 2.4.3.

(3) Place the rock along the sheathing on both sides of the silt fence as shown in the diagram (Figure 1-29), to a height not less than 24 inches. Clean, open graded 3-5" diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- to 8-inch diameter rock may be used.

(4) Wrap the wire sheathing around the rock and secure with tie wire so that the ends of the sheathing overlap at least 2 inches, and the berm retains its shape when walked upon.

(5) The high service rock berm should be removed when the site is revegetated or otherwise stabilized or it may remain in place as a permanent BMP if drainage is adequate.

Common Trouble Points:

(1) Insufficient berm height or length (runoff quickly escapes over top or around sides of berm).

(2) Berm not installed perpendicular to flow line (runoff escaping around one side).

(3) Internal silt fence not anchored securely to ground (high flows displacing berm).

(4) When installed in streambeds, they often result in diversion scour, so their use in this setting is not recommended.

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly and after each rainfall by the responsible party. For installations in streambeds, additional daily inspections should be made on rock berm.

(2) Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt of in an approved manner.

(3) Repair any loose wire sheathing.

(4) The berm should be reshaped as needed during inspection.

(5) The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.

(6) The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

1.4.7 Brush Berms

Organic litter and spoil material from site clearing operations is usually burned or hauled away to be dumped elsewhere. Much of this material can be used effectively on the construction site itself. In areas where dense juniper (know locally as "cedar") thickets must be cleared, construction of brush berms from the cut juniper branches can be an effective alternative to installation of silt fences. The key to constructing an efficient brush berm is in the method used to obtain and place the brush. It will not be acceptable to simply take a bulldozer and push whole trees into a pile. This method does not assure continuous ground contact with the berm and will allow uncontrolled flows under the berm.

Brush berms may be used where there is little or no concentration of water in a channel or other drainage way above the berm. The size of the drainage area should be no greater than one-fourth of an acre per 100 feet of barrier length; the maximum slope length behind the barrier should not exceed 100 feet; and the maximum slope gradient behind the barrier should be less than 50 percent (2:1). Figure 1-50 illustrates a brush berm.

Materials:

(1) The brush should consist of woody brush and branches, preferably juniper less than 2 inches in diameter.

(2) The filter fabric should conform to the specifications for filter fence fabric.

(3) The rope should be ¼ inch polypropylene or nylon rope.

(4) The anchors should be 3/8-inch diameter rebar stakes that are 18-inches long.

Guidelines for installation:

(1) Lay out the brush berm following the contour as closely as possible.

(2) The juniper limbs should be cut and hand placed with the vegetated part of the limb in close contact with the ground. Each subsequent branch should overlap the previous branch providing a shingle effect.

(3) The brush berm should be constructed in lifts with each layer extending the entire length of the berm before the next layer is started.

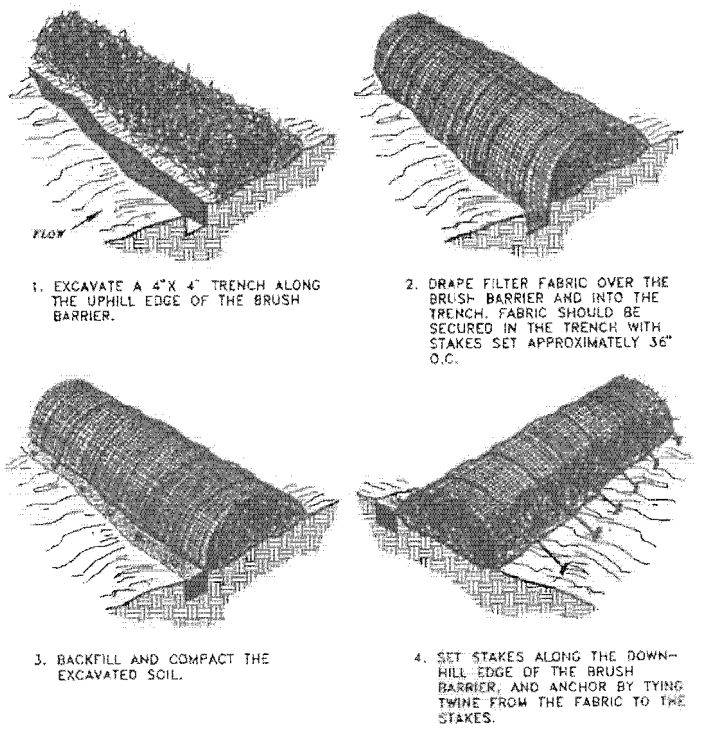


Figure 1-30 Schematic Diagram of a Brush Berm (VA Dept. of Conservation, 1992)

(4) A trench should be excavated 6-inches wide and 4-inches deep along the length of the barrier and immediately uphill from the barrier

(5) The filter fabric should be cut into lengths sufficient to lay across the barrier from its up-slope base to just beyond its peak. The lengths of filter fabric should be draped across the width of the barrier with the uphill edge placed in the trench and the edges of adjacent pieces overlapping each other. Where joints are necessary, the fabric should be spliced together with a minimum 6-inch overlap and securely sealed.

(6) The trench should be backfilled and the soil compacted over the filter fabric.

(7) Set stakes into the ground along the downhill edge of the brush barrier, and anchor the fabric by tying rope from the fabric to the stakes. Drive the rope anchors into the ground at approximately a 45-degree angle to the ground on 6-foot centers.

(8) Fasten the rope to the anchors and tighten berm securely to the ground with a minimum tension of 50 pounds.

(9) The height of the brush berm should be a minimum of 24 inches after the securing ropes have been tightened.

Common Trouble Points:

(1) Gaps between berm and ground due to uneven ground surface, inadequately compacted berm, or inadequately secured berm (runoff passing directly under berm).

(2) Berm receiving excessive volumes or velocities of flow (runoff overtopping or displacing berm).

Inspection and Maintenance Guidelines:

(1) The area upstream from the brush berm should be maintained in a condition that will allow accumulated silt to be removed following the runoff of a rainfall event.

(2) The berm should be inspected weekly or after each rainfall event.

(3) When the silt reaches a depth of 6 inches is should be removed and disposed of appropriately and in a manner that will not contribute to additional siltation.

(4) Periodic tightening of the anchoring ropes may be required due to shrinkage of the brush berm as it deteriorates over time.

(5) Brush berms should be replaced after 3 months or be repaired or reconstructed when loss of foliage occurs or, in the opinion of the TCEQ, they no longer function as intended.

1.4.8 Check Dams

Check dams are small barriers consisting of rock or earthen berms placed across a drainage swale or ditch. They reduce the velocity of small concentrated flows, provide a limited barrier for sediment and help disperse concentrated flows, reducing potential erosion.

They are used primarily in long drainage swales or ditches in which permanent vegetation may not be established and erosive velocities are present. They are typically used in conjunction with other techniques such as inlet protection, riprap or other sediment reduction techniques. Check dams provide limited treatment. They are more useful in reducing flow to acceptable levels for other techniques (NCTCOG, 1993b).

Although check dams are effective in reducing flow velocity and thereby the potential for channel erosion, it is usually better to establish a protective vegetative lining before flow is confined or to install a structural channel lining. However, under circumstances where this is not feasible, check dams are useful.

Materials:

Although many different types of material can be used to create check dams, aggregate and riprap produce a more stable structure.

(1) If the drainage area is less than 2 acres, coarse aggregate alone can be used for the dam.

(2) For drainage areas between 2 and 10 acres, a combination of coarse aggregate and riprap as shown in Figure 1-31 should be used.

Guidelines for installation:

(1) The dam height should be between 18 and 36 inches.

(2) The center of the check dam should be at least 6 inches lower than the outer edges. Field experience has shown that many dams are not constructed to promote this "weir" effect. Stormwater flows are then forced to the stone-soil interface, thereby promoting scour at that point and subsequent failure of the structure to perform its intended function.

(3) The dam should be designed so that the 2-year, 24-hour storm can pass the dam without causing excessive upstream flooding.

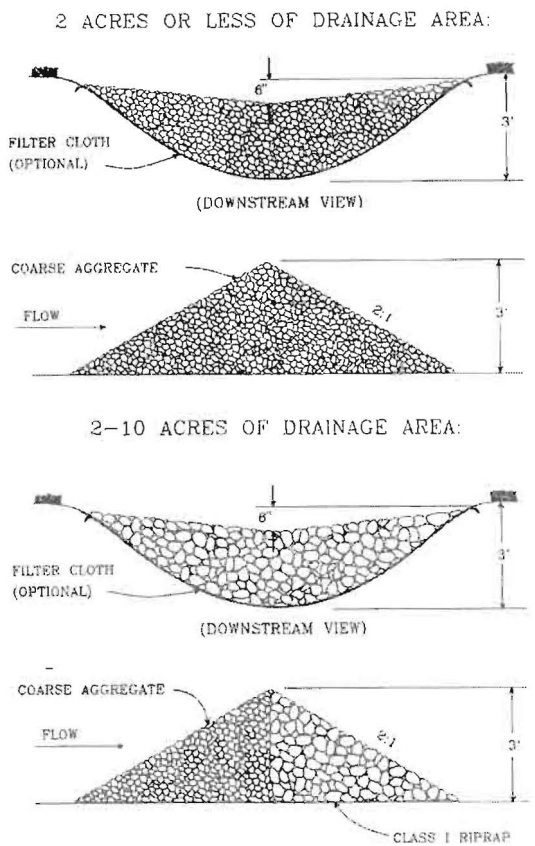


Figure 1-31 Diagram of a Rock Check Dam (VA Dept. of Conservation, 1992)

(4) For added stability, the base of the check dam can be keyed into the soil approximately 6 inches.

(5) The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

(6) Stone should be placed according to the configuration in Figure 1-31. Hand or mechanical placement will be necessary to achieve complete coverage of the ditch or swale and to insure that the center of the dam is lower than the edges.

(7) Filter cloth may be used under the stone to provide a stable foundation and to facilitate the removal of the stone.

Common Trouble Points:

(1) Check dams installed in grass-lined channels may kill the vegetative lining if submergence after rains is too long and/or silting is excessive.

(2) If check dams are used in grass-lined channels that will be mowed, care should be taken to remove all the stone when the dam is removed. Stones often wash downstream and can damage mowing equipment and present a safety hazard.

Inspection and Maintenance Guidelines:

(1) Check dams should be inspected and checked for sediment accumulation after each runoff-producing storm event.

(2) Sediment should be removed when it reaches one half of the original height of the measure.

(3) Regular inspections should be made to insure that the center of the dam is lower than the edges. Erosion caused by high flows around the edges of the dam should be corrected immediately.

1.4.9 Sand Bag Berm

The purpose of a sandbag berm (Figure 1-32) is to intercept sediment-laden water from disturbed areas such as construction in streambeds, create a retention pond, detain sediment and release water in sheet flow. Sand bag berms are used only during construction activities in streambeds when the contributing drainage area is between 5 and 10 acres and the slope is less than 15%, i.e., utility construction in channels, temporary channel crossing for construction equipment, etc.

An additional option for use in streambeds is a rock berm, appropriately sized for the channel. Plastic facing should be installed on the upstream side and the berm anchored to be streambed by drilling into the rock and driving in "T" posts or rebar (#5 or #6) spaced appropriately.

Materials:

(1) The sand bag material should be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4 oz/yd², mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent.

(2) The bag length should be 24 to 30 inches, width should be 16 to 18 inches and thickness should be 6 to 8 inches.

(3) Sandbags should be filled with coarse grade sand, free from deleterious material. All sand should pass through a No. 10 sieve. The filled bag should have an approximate weight of 40 pounds.

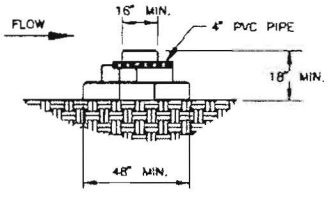
(4) Outlet pipe should be schedule 40 or stronger polyvinyl chloride (PVC) having a nominal internal diameter of 4 inches.

Guidelines for installation:

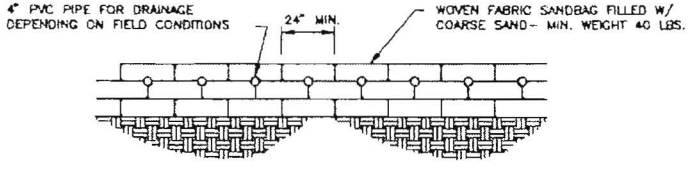
(1) The berm should be a minimum height of 18 inches, measured from the top of the existing ground at the upslope toe to the top of the berm.

(2) The berm should be sized as shown in the plans but should have a minimum width of 48 inches measured at the bottom of the berm and 16 inches measured at the top of the berm.

(3) Runoff water should flow over the tops of the sandbags or through 4-inch diameter PVC pipes embedded below the top layer of bags as shown in Figure 1-32.



CROSS SECTION
N.T.S.



PROFILE VIEW
N.T.S.

Figure 1-32 Schematic of a Sand Bag Berm (NCTCOG, 1993)

(4) When a sandbag is filled with material, the open end of the sandbag should be stapled or tied with nylon or poly cord.

(5) Sandbags should be stacked in at least three rows abutting each other, and in staggered arrangement.

(6) The base of the berm should have at least 3 sandbags. These can be reduced to 2 and 1 bag in the second and third rows respectively.

(7) For each additional 6 inches of height, an additional sandbag must be added to each row width.

(8) A bypass pump-around system, or similar alternative, should be used in conjunction with the berm for effective dewatering of the work area.

Common Trouble Points:

(1) Ponding will occur directly upstream from the berm creating the possibility of flooding, which should be considered prior to its placement.

(2) Berms are often damaged during periods of high flow, which increases the maintenance requirements.

Inspection and Maintenance Guidelines:

(1) The sand bag berm should be inspected weekly and after each rain.

(2) The sandbags should be reshaped or replaced as needed during inspection

(3) When the silt reaches 6 inches, the accumulated silt should be removed and disposed of at an approved site in a manner that will not contribute to additional siltation.

(4) The sandbag berm should be left in place until all upstream areas are stabilized and accumulated silt removed; removal should be done by hand.

1.4.10 Vegetative Buffers

Buffer zones are undisturbed strips of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities. Natural buffer zones are used along streams and other bodies of water that need protection from erosion and sedimentation. Vegetative buffers can be used to protect natural swales and be incorporated into natural landscaping of an area. They can provide critical habitat adjacent to streams and wetlands, as well as assisting in controlling erosion, especially on unstable steep slopes

The buffer zone can be an area of vegetation that is left undisturbed during construction, or it can be newly planted. If buffer zones are preserved, existing vegetation, good planning, and site management are needed to prevent disturbances such as grade changes, excavation, damage from equipment, and other activities. The creation of new buffer strips requires the establishment of a good dense turf (at least 80% coverage), trees, and shrubs.

Guidelines for installation:

(1) Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.

(2) All unstable steep slopes should be left in natural vegetation.

(3) Fence or flag clearing limits and keep all equipment and construction debris out of the natural areas.

(4) Keep all excavations outside the dripline of trees and shrubs.

(5) Debris or extra soil should not be pushed into the buffer zone area because it will cause damage from burying and smothering.

(6) The minimum width of a vegetative buffer used for sediment control should be 50 feet.

Inspection and Maintenance Guidelines:

Inspection and careful maintenance are important to ensure healthy vegetation. The need for routine maintenance such as mowing, fertilizing, irrigating, and weed and pest control will depend on the species of plants and trees, soil types, location and climatic conditions County agricultural extension agencies are a good source of this type of information.

1.4.11 Inlet Protection

Storm sewers that are made operational prior to stabilization of the associated drainage areas can convey large amounts of sediment to natural drainage ways. In case of extreme sediment loading, the storm sewer itself may clog and lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets. The following guidelines for inlet protection are based primarily on recommendations by the Virginia Dept. of Conservation and Recreation (1992) and the North Central Texas Council of Governments (NCTCOG, 1993b).

In developments for which drainage is to be conveyed by underground storm sewers (i.e., streets with curbs and gutters), all inlets that may receive storm runoff from disturbed areas should be protected. Temporary inlet protection is a series of different measures that provide protection against silt transport or accumulation in storm sewer systems. This clogging can greatly reduce or completely stop the flow in the pipes. The different measures are used for different site conditions and inlet types.

Care should be taken when choosing a specific type of inlet protection. Field experience has shown that inlet protection that causes excessive ponding in an area of high construction activity may become so inconvenient that it is removed or bypassed, thus transmitting sediment-laden flows unchecked. In such situations, a structure with an adequate overflow mechanism should be utilized.

It should also be noted that inlet protection devices are designed to be installed on construction sites and not on streets and roads open to the public. When used on public streets these devices will cause ponding of runoff, which can cause minor flooding and can present a traffic hazard. An example of appropriate siting would be a new subdivision where the storm drain system is installed before the area is stabilized and the streets open to the general public. When construction occurs adjacent to active streets, the sediment should be controlled on site and not on public thoroughfares. Occasionally, roadwork or utility installation will occur on public roads. In these cases, inlet protection is an appropriate temporary BMP.

The following inlet protection devices are for drainage areas of one acre or less. Runoff from larger disturbed areas should be routed to a temporary sediment trap or basin.

Filter barrier protection using silt fence is appropriate when the drainage area is less than one acre and the basin slope is less than five percent. This type of protection is not applicable in paved areas.

Block and gravel protection is used when flows exceed 0.5 cubic feet per second and it is necessary to allow for overtopping to prevent flooding. This form of protection is also useful for curb type inlets as it works well in paved areas.

Wire mesh and gravel protection is used when flows exceed 0.5 cubic feet per second and construction traffic may occur over the inlet. This form of protection may be used with both curb and drop inlets.

Excavated impoundment protection around a drop inlet may be used for protection against sediment entering a storm drain inlet. With this method, it is necessary to install weep holes to allow the impoundment to drain completely. If this measure is implemented, the impoundment should be sized such that the volume of excavation is 3,600 cubic feet per acre (equivalent to 1 inch of runoff) of disturbed area entering the inlet.

Materials:

(1) Filter fabric should be a nylon reinforced polypropylene fabric which meets the following minimum criteria: Tensile Strength, 90 lbs.; Puncture Rating, 60 lbs.; Mullen Burst Rating, 280 psi; Apparent Opening Size, U.S. Sieve No. 70.

(2) Posts for fabric should be 2" x 4" pressure treated wood stakes or galvanized steel, tubular in cross-section or they may be standard fence "T" posts.

(3) Concrete blocks should be standard 8" x 8" x 16" concrete masonry units.

(4) Wire mesh should be standard hardware cloth or comparable wire mesh with an opening size not to exceed 1/2 inch.

Guidelines for installation:

Silt Fence Drop Inlet Protection

(1) Silt fence should conform to the specifications listed above and should be cut from a continuous roll to avoid joints.

(2) For stakes, use 2 x 4-inch wood or equivalent metal with a minimum length of 3 feet.

(3) Space stakes evenly around the perimeter of the inlet a maximum of 3 feet apart, and securely drive them into the ground, approximately 18 inches deep (Figure 1-33).

(4) To provide needed stability to the installation, a frame with 2 x 4-inch wood strips around the crest of the overflow area at a maximum of 1½ feet above the drop inlet crest should be provided.

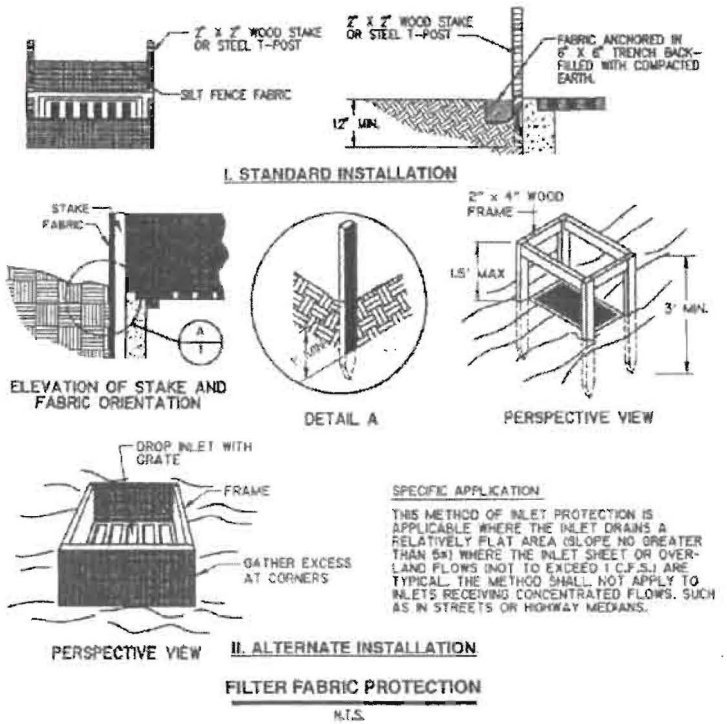


Figure 1-33 Filter Fabric Inlet Protection (NCTCOG, 1993)

(5) Place the bottom 12 inches of the fabric in a trench and backfill the trench with 12 inches of compacted soil.

(6) Fasten fabric securely by staples or wire to the stakes and frame. Joints must be overlapped to the next stake

(7) It may be necessary to build a temporary dike on the down slope side of the structure to prevent bypass flow.

If the drop inlet is above the finished grade, the grate may be completely covered with filter fabric. The fabric should be securely attached to the entire perimeter of the inlet using 1"x 2" wood strips and appropriate fasteners.

Gravel and Wire Mesh Drop Inlet Sediment Filter

(1) Wire mesh should be laid over the drop inlet so that the wire extends a minimum of 1 foot beyond each side of the inlet structure. Wire mesh with 1/2-inch openings should be used. If more than one strip of mesh is necessary, the strips should be overlapped (see Figure 1-34).

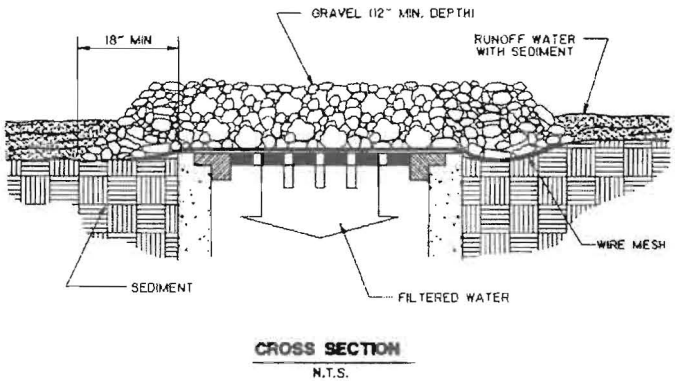


Figure 1-34 Wire Mesh and Gravel Inlet Protection (NCTCOG, 1993)

(2) Coarse aggregate should be placed over the wire mesh as indicated in Figure 1-34. The depth of stone should be at least 12 inches over the entire inlet opening. The stone should extend beyond the inlet opening at least 18 inches on all sides.

(3) If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and/or replaced

Note: This filtering device has no overflow mechanism; therefore, ponding is likely especially if sediment is not removed regularly. This type of device should never be used where overflow may endanger an exposed fill slope. Consideration should also be given to the possible effects of ponding on traffic movement, nearby structures, working areas, adjacent property, etc.

Block and Gravel Drop Inlet Sediment Filter

(1) Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, with the ends of adjacent blocks abutting. The height of the barrier can be varied, depending on design needs, by stacking combinations of 4-inch, 8-inch and 12-inch wide blocks. The barrier of blocks should be between 12 and 24 inches high.

(2) Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Wire mesh with 1/2-inch openings should be used.

(3) Stone should be piled against the wire to the top of the block barrier, as shown in Figure 1-35.

(4) If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the blocks, cleaned and replaced.

Block and Gravel Curb Inlet Sediment Filter

(1) Two concrete blocks should be placed on their sides abutting the curb at either side of the inlet opening.

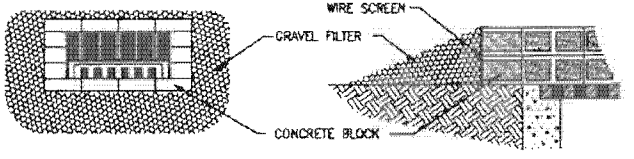
(2) A 2-inch x 4-inch stud should be cut and placed through the outer holes of each spacer block to help keep the front blocks in place.

(3) Concrete blocks should be placed on their sides across the front of the inlet and abutting the spacer blocks as depicted in Figure 1-35.

(4) Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Wire mesh with 1/2-inch openings should be used.

(5) Coarse aggregate should be piled against the wire to the top of the barrier as shown in Figure 1-35.

(6) If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the blocks, cleaned and/or replaced.



DROP INLET PROTECTION
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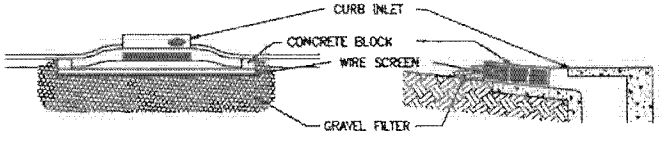

CURB INLET PROTECTION
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Figure 1-35 Block and Gravel Inlet Protection (NCTCOG, 1993)

Excavated Drop Inlet Sediment Trap

(1) The excavated trap should be sized to provide a minimum storage capacity calculated at 3,600 cubic feet per acre of drainage area. A trap should be no less than 1-foot nor more than 2 feet deep measured from the top of the inlet structure. Side slopes should not be steeper than 2:1 (see Figure 1-36).

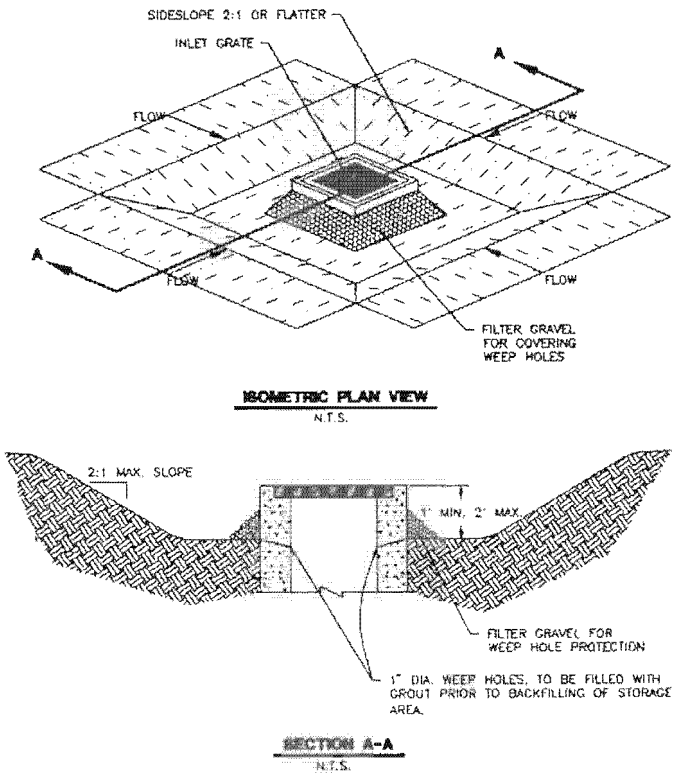


Figure 1-36 Excavated Inlet Protection (NCTCOG, 1993)

(2) The slope of the basin may vary to fit the drainage area and terrain. Observations must be made to check trap efficiency and modifications should be made as necessary to ensure satisfactory trapping of sediment. Where an inlet is located so as to receive concentrated flows, such as in a highway median, it is recommended that the basin have a rectangular shape in a 2:1 (length/width) ratio, with the length oriented in the direction of the flow.

(3) Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Removed sediment should be deposited in a suitable area and in a manner such that it will not erode.

Curb Inlet Protection with 2-inch x 4-inch Wooden Weir

(1) Attach a continuous piece of wire mesh (30-inch minimum width x inlet throat length plus 4 feet) to the 2-inch x 4-inch wooden weir (with a total length of throat length plus 2 feet) as shown in Figure 1-37. Wood should be "construction grade" lumber.

(2) Place a piece of approved filter cloth of the same dimensions as the wire mesh over the wire mesh and securely attach to the 2-inch x 4-inch weir.

(3) Securely nail the 2-inch x 4-inch weir to the 9-inch long vertical spacers which are to be located between the weir and inlet face at a maximum 6-foot spacing.

(4) Place the assembly against the inlet throat and nail 2-foot (minimum) lengths of 2-inch x 4-inch board to the top of the weir at spacer locations. These 2-inch x 4-inch anchors should extend across the inlet tops and be held in place by sandbags or alternate weight.

(5) The assembly should be placed so that the end spacers are a minimum 1 foot beyond both ends of the throat opening.

(6) Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place coarse aggregate over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or around the filter cloth.

(7) This type of protection should be inspected frequently and the filter cloth and stone replaced when clogged with sediment.

(8) Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.

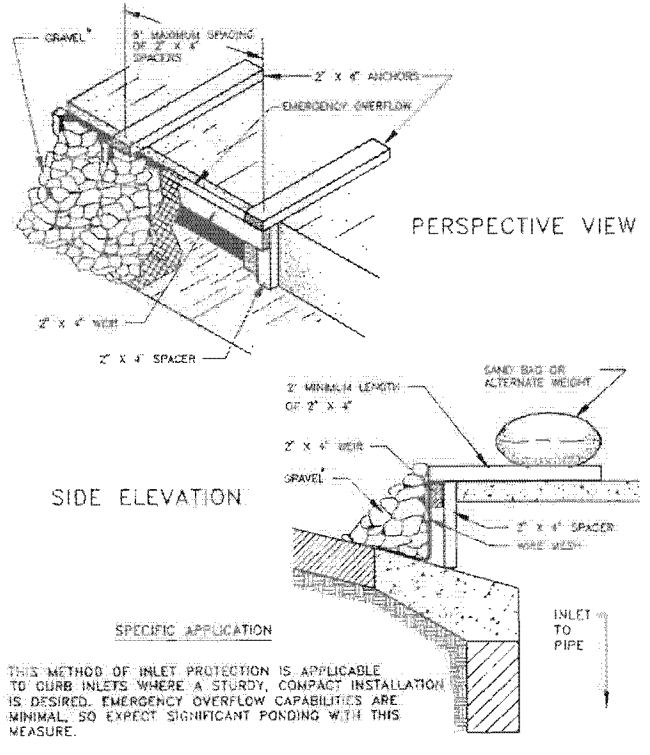


Figure 1-37 Wooden Weir Curb Inlet Protection (VA Dept of Conservation, 1992)

Common Trouble Points:

(1) Gaps between the inlet protection and the curb (flows bypass around side of filter).

(2) Filter fabric skirt not anchored to pavement (flows pass under filter)

Bagged Gravel Inlet Filter

Sandbags filled with pea gravel can also be used to construct a sediment barrier around curb and drain inlets. The sandbags should be filled with washed pea gravel and stacked to form a continuous barrier about 1 foot high around the inlets. The bags should be tightly abutted against each other to prevent runoff from flowing between the bags. This measure should be installed as shown in Figure 1-38.

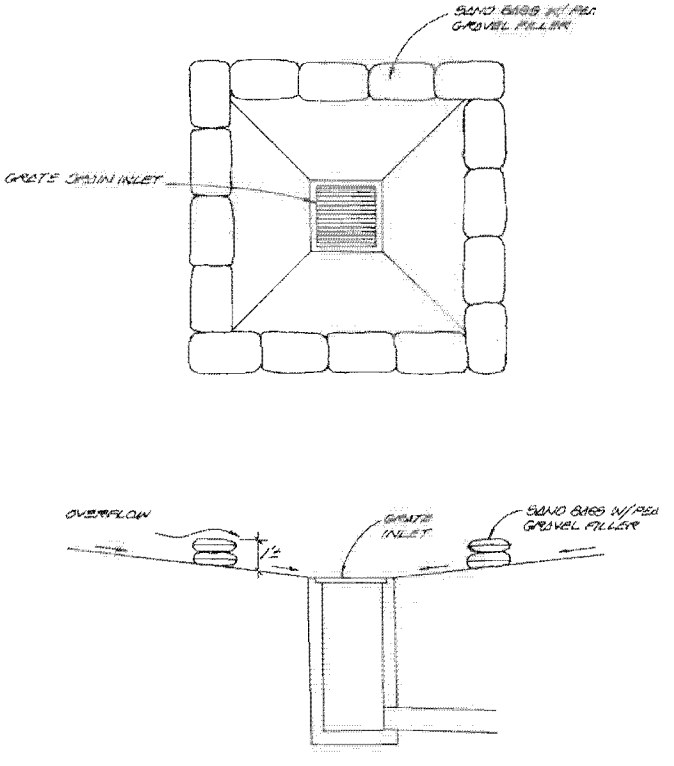
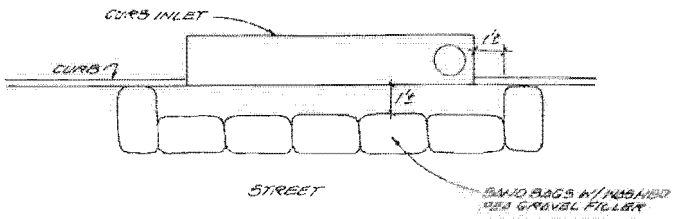


Figure 1-38 Diagram of Bagged Gravel Grate Inlet Protection (Pape-Dawson)



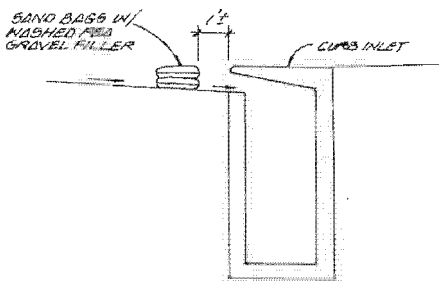


Figure 1-39 Diagram of Bagged Gravel Curb Inlet Protection (Pape-Dawson).

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor.

(2) Remove sediment when buildup reaches a depth of 3 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode.

(3) Check placement of device to prevent gaps between device and curb.

(4) Inspect filter fabric and patch or replace if torn or missing.

(5) Structures should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.

1.4.12 Stone Outlet Sediment Trap

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than 5 acres. Larger areas should be treated using a sediment basin. A sediment trap differs from a sediment basin mainly in the type of discharge structure. A schematic of a sediment trap is shown in Figure 1-40.

The trap should be located to obtain the maximum storage benefit from the terrain, for ease of cleanout and disposal of the trapped sediment and to minimize interference with construction activities. The volume of the trap should be at least 3600 cubic feet per acre of drainage area.

Materials:

(1) All aggregate should be at least 3 inches in diameter and should not exceed a volume of 0.5 cubic foot.

(2) The geotextile fabric specification should be woven polypropylene, polyethylene or polyamide geotextile, minimum unit weight of 4.5 oz/yd^2, mullen burst strength at least 250 lb/in^2, ultraviolet stability exceeding 70%, and equivalent opening size exceeding 40

Installation:

(1) Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. The minimum width of the embankment should be 3 feet.

(2) A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.

(3) Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet should be placed across the opening of the earth embankment and should be covered by geotextile fabric

which should extend a minimum distance of 2 feet in either direction from the base of the filter stone core.

(4) Filter Stone Embankment: Filter stone should be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete. The crest of the outlet should be at least 1 foot below the top of the embankment.

Common Trouble Points:

(1) Can cause minor flooding upstream of dam, impacting construction operations.

(2) The cost of construction, availability of materials, and the amount of land required limit the application of this measure.

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly and after each rainfall. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Repair should be made promptly as needed by the contractor.

(2) Trash and other debris should be removed after each rainfall to prevent clogging of the outlet structure.

(3) Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to half of the design depth of the trap.

(4) Sediment removed from the trap should be deposited in an approved spoils area and in such a manner that it will not cause additional siltation.

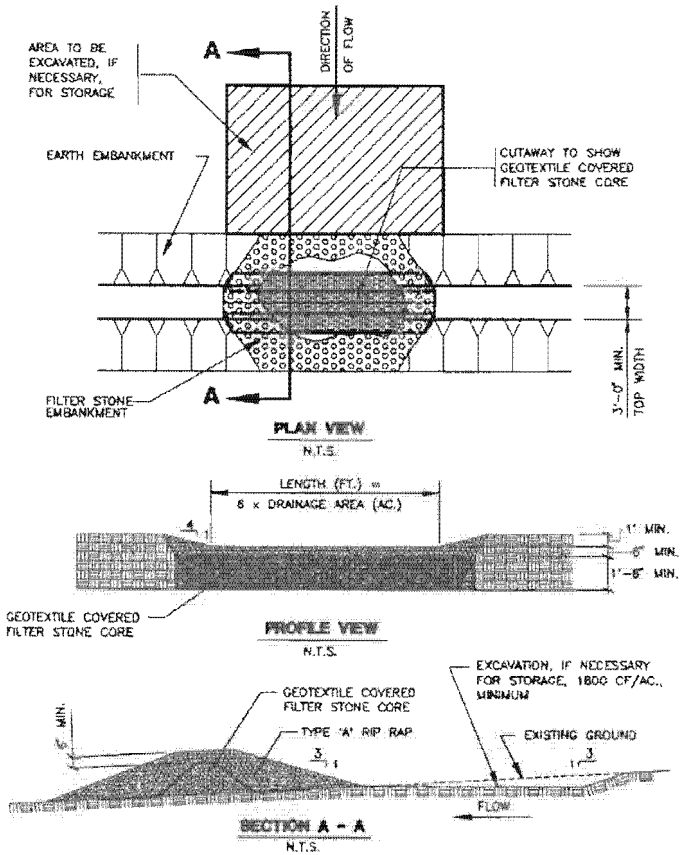


Figure 1-40 Schematic Diagram of a Sediment Trap (NCTCOG, 1993)

1.4.13 Sediment Basins

The purpose of a sediment basin is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment basin from sedimentation. A sediment basin is usually installed at points of discharge from disturbed areas. The drainage area for a sediment basin is recommended to be less than 100 acres.

Sediment basins are effective for capturing and slowly releasing the runoff from larger disturbed areas thereby allowing sedimentation to take place. A sediment basin can be created where a permanent pond BMP is being constructed. Guidelines for construction of the permanent BMP should be followed, but revegetation, placement of underdrain piping, and installation of sand or other filter media should not be carried out until the site construction phase is complete. A schematic of a sediment basin is shown in Figure 1-41.

Materials:

(1) Riser should be corrugated metal or reinforced concrete pipe or box and should have watertight fittings or end to end connections of sections.

(2) An outlet pipe of corrugated metal or reinforced concrete should be attached to the riser and should have positive flow to a stabilized outlet on the downstream side of the embankment.

(3) An anti-vortex device and rubbish screen should be attached to the top of the riser and should be made of polyvinyl chloride or corrugated metal

Basin Design and Construction:

(1) For common drainage locations that serve an area with ten or more acres disturbed at one time, a sediment basin should provide storage for a volume of runoff from a two-year, 24-hour storm from each disturbed acre drained. The rainfall depths for the design storm are shown for each county in Table 1-6.

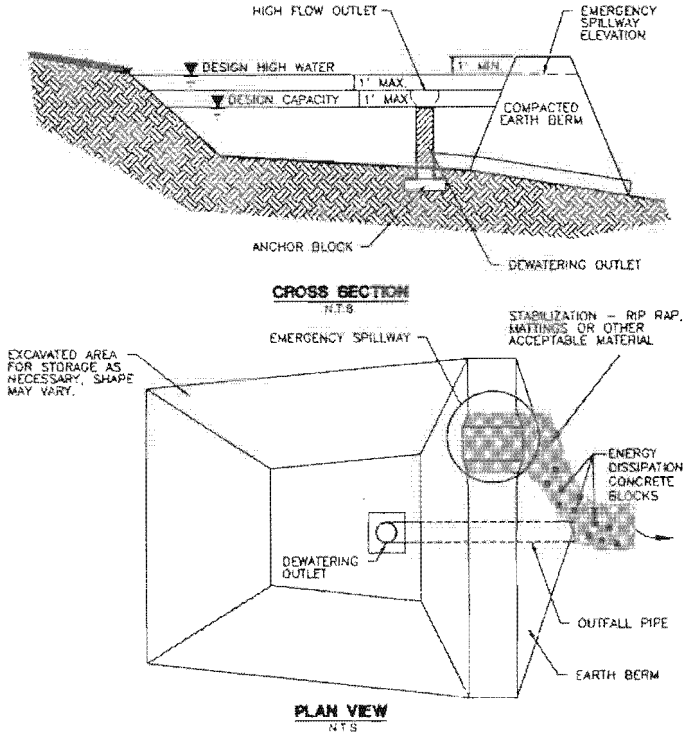


Figure I-41 Schematic of a Sediment Basin (NCTCOG, 1993)

Table I-6 Design Storm Depth by County (Asquith and Roussel, 2004)

County	2-year, 24-hour Storm Depth (in)
Bexar	3.8
Comal	3.7
Hays	3.5
Kinney	3.2
Medina	3.4
Travis	3.4
Uvalde	3.3
Williamson	3.4

(2) The basin length to width ratio should be at least 2:1 to improve trapping efficiency. The shape may be attained by excavation or the use of baffles. The lengths should be measured at the elevation of the riser de-watering hole.

(3) Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment should be 3:1 (H:V).

(4) An emergency spillway should be installed adjacent to the embankment on undisturbed soil and should be sized to carry the full amount of flow generated by a 10-year, 3-hour storm with 1 foot of freeboard less the amount which can be carried by the principal outlet control device.

(5) The emergency spillway should be lined with riprap as should the swale leading from the spillway to the normal watercourse at the base of the embankment.

(6) The principal outlet control device should consist of a rigid vertically oriented pipe or box of corrugated metal or reinforced concrete. Attached to this structure should be a horizontal pipe, which should extend through the embankment to the toe of fill to provide a de-watering outlet for the basin.

(7) An anti-vortex device should be attached to the inlet portion of the principal outlet control device to serve as a rubbish screen.

(8) A concrete base should be used to anchor the principal outlet control device and should be sized to provide a safety factor of 1.5 (downward forces = 1.5 buoyant forces).

(9) The basin should include a permanent stake to indicate the sediment level in the pool and marked to indicate when the sediment occupies 50% of the basin volume (not the top of the stake).

(10) The top of the riser pipe should remain open and be guarded with a trash rack and anti-vortex device. The top of the riser should be 12 inches below the elevation of the emergency spillway. The riser should be sized to convey the runoff from the 2-year, 3-hour storm when the water surface is at the emergency spillway elevation. For basins with no spillway the riser must be sized to convey the runoff from the 10-yr, 3-hour storm.

(11) Anti-seep collars should be included when soil conditions or length of service make piping through the backfill a possibility.

(12) The 48-hour drawdown time will be achieved by using a riser pipe perforated at the point measured from the bottom of the riser pipe equal to ½ the volume of the basin. This is the maximum sediment storage elevation. The size of the perforation may be calculated as follows.

$$A_o = \frac{A_s \times \sqrt{2h}}{C_d \times 80{,}000}$$

Where

A_o = Area of the de-watering hole, ft^2
A_s = Surface area of the basin, ft^2
C_d = Coefficient of contraction, approximately 0.6
h = head of water above the hole, ft

Perforating the riser with multiple holes with a combined surface area equal to A_o is acceptable.

Common Trouble Points:

(1) Storm events that exceed the design storm event can cause damage to the spillway structure of the basin and may cause adverse impacts downstream.

(2) Piping (flow occurring in the fill material) around outlet pipe can cause failure of the embankment.

Inspection and Maintenance Guidelines:

(1) Inspection should be made weekly and after each rainfall. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Repair should be made promptly as needed by the contractor.

(2) Trash and other debris should be removed after each rainfall to prevent clogging of the outlet structure.

(3) Accumulated silt should be removed and the basin should be re-graded to its original dimensions at such point that the capacity of the impoundment has been reduced to 75% of its original storage capacity.

(4) The removed sediment should be stockpiled or redistributed in areas that are protected from erosion.

1.4 14 Fiber Rolls

A fiber roll consists of straw, coconut fibers, or other similar materials bound into a tight tubular roll. When fiber rolls are placed at the toe and on the face of slopes, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff. By interrupting the length of a slope, fiber rolls can also reduce erosion.

Fiber rolls may be suitable

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
- At the end of a downward slope where it transitions to a steeper slope
- Along the perimeter of a project
- As check dams in unlined ditches
- Down-slope of exposed soil areas
- Around temporary stockpiles

Limitations:

- Fiber rolls are not effective unless trenched
- Fiber rolls at the toe of slopes greater than 5.1 (H:V) should be a minimum of 20 in. diameter or installations achieving the same protection (i.e. stacked smaller diameter fiber rolls, etc.).
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.

Material:

(1) Core material. Core material should be biodegradable or recyclable. Material may be compost, mulch, aspen wood fibers, chipped site vegetation, agricultural rice or wheat straw, coconut fiber, 100% recyclable fibers, or similar materials.

(2) Containment Mesh. Containment mesh should be 100% biodegradable, photodegradable or recyclable such as burlap, twine, UV photodegradable plastic, polyester, or similar material. When the fiber role will remain in place as part of a vegetative system use biodegradable or photodegradable mesh. For temporary installation recyclable mesh is recommended

Implementation.

(1) Locate fiber rolls on level contours spaced as follows:

Slope inclination of 4.1 (H:V) or flatter. Fiber rolls should be placed at a maximum interval of 20 ft.

Slope inclination between 4:1 and 2 1 (H:V) Fiber Rolls should be placed at a maximum interval of 15 ft (a closer spacing is more effective).

Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).

(2) Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.

(3) Stake fiber rolls into a 2 to 4 in. deep trench with a width equal to the diameter of the fiber roll.

(4) Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center

(5) Use wood stakes with a nominal classificanon of 0.75 by 0.75 in. and minimum length of 24 in.

(6) If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

Inspection and Maintenance Guidelines:

(1) Inspect prior to forecast rain, daily during extended rain events, after rain events, and weekly.

(2) Repair of replace split, torn, unraveling, or slumping fiber rolls.

(3) If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates behind the role must be periodically removed tin order to maintain its effecuveness. Sediment should be removed when the accumulation reaches one-half the designated sediment storage depth, usually one-half the distance between the top of the fiber roll and the adjacent ground surface. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.

1.4.15 Dewatering Operations

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation or groundwater must be removed from a work location so that construction work may be accomplished.

The controls detailed in this BMP only allow for minimal settling time for sediment particles and should only be used when site conditions restrict the use of the other control methods. When possible avoid dewatering discharges by using the water for dust control, by infiltration, allowing to evaporate, etc.

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. When pumping water out or through any of these devices, a floatation device should be attached to the pump inlet.

Sediment controls are low to high cost measures depending on the dewatering system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months). Mobilization and demobilization costs vary considerably

Inspection and Maintenance

(1) Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly to verify continued BMP implementation.

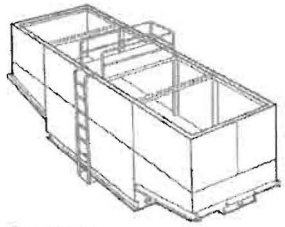
(2) Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

(3) Unit-specific maintenance requirements are included with the description of each technology.

(4) Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site.

(5) Sediment that is commingled with other pollutants must be disposed of in accordance with all applicable laws and regulations.

Weir Tanks



Description:

A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.

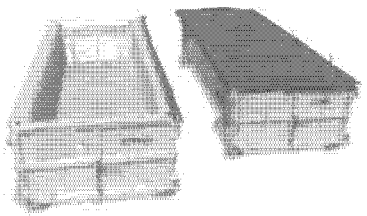
Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

Periodic cleaning is required based on visual inspection or reduced flow.

Oil and grease disposal must be by licensed waste disposal company.

Dewatering Tanks



Description:
A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:
The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

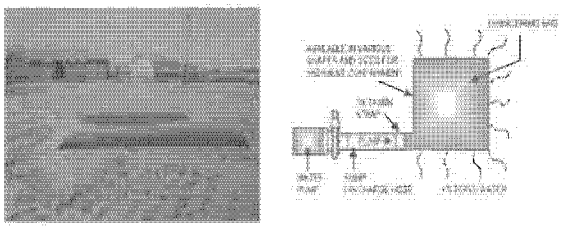
Implementation:
Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.

Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to determine appropriate size of tank.

Maintenance:
Periodic cleaning is required based on visual inspection or reduced flow.

Oil and grease disposal must be by licensed waste disposal company.

Gravity Bag Filter



Description:
A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects sand, silt, and fines.

Appropriate Applications:

Effective for the removal of sediments (gravel, sand, and silt). Some metals are removed with the sediment.

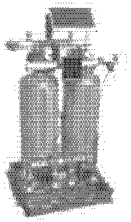
Implementation:
Water is pumped into one side of the bag and seeps through the bottom and sides of the bag.

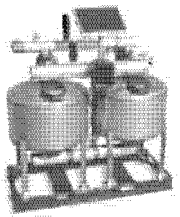
A secondary barrier, such as a rock filter bed or straw bale barrier, is placed beneath and beyond the edges of the bag to capture sediments that escape the bag.

Maintenance:
Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier is required.

Replace the bag when it no longer filters sediment or passes water at a reasonable rate. The bag is disposed of offsite.

Sand Media Particulate Filter





Description:
Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:
Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.

Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.

Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

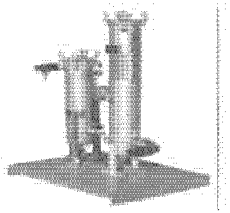
Implementation:
The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

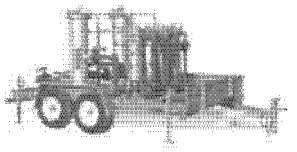
Maintenance:
The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.

Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.

If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter





Description:
A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:
Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.

Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:
The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:
The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter

Description:
Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:
Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.

Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:
The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:
The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

1.4.16 Spill Prevention and Control

The objective of this section is to describe measures to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

(1) Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills. Employees should also be aware of when spill must be reported to the TCEQ. Information available in 30 TAC 327.4 and 40 CFR 302.4.

(2) Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.

(3) Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).

(4) Establish a continuing education program to indoctrinate new employees.

(5) Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

(1) To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.

(2) Store hazardous materials and wastes in covered containers and protect from vandalism.

(3) Place a stockpile of spill cleanup materials where it will be readily accessible.

(4) Train employees in spill prevention and cleanup.

(5) Designate responsible individuals to oversee and enforce control measures.

(6) Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.

(7) Do not bury or wash spills with water.

(8) Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.

(9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.

(10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.

(11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.

(12) Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

(1) Clean up leaks and spills immediately.

(2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.

(3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

(1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.

(2) Use absorbent materials on small spills rather than hosing down or burying the spill.

(3) Absorbent materials should be promptly removed and disposed of properly.

(4) Follow the practice below for a minor spill.

(5) Contain the spread of the spill.

(6) Recover spilled materials.

(7) Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately.

(1) Contain spread of the spill.

(2) Notify the project foreman immediately.

(3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.

(4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.

(5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

(1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.

(2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

(3) Notification should first be made by telephone and followed up with a written report.

(4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.

(5) Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at: http://www.tnrcc.state.tx.us/enforcement/emergency_response.html

Vehicle and Equipment Maintenance

(1) If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.

(2) Regularly inspect onsite vehicles and equipment for leaks and repair immediately

(3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.

(4) Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids

(5) Place drip pans or absorbent materials under paving equipment when not in use

(6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly

(7) Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.

(8) Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters

(9) Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

(1) If fueling must occur on site, use designated areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills

(2) Discourage "topping off" of fuel tanks.

(3) Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks

1.4.17 Utility Line Creek Crossings

Creek crossings represent particularly important areas to employ effective erosion and sedimentation control. Underground utility construction across creeks requires special measures, as detailed below.

(1) Unless prior approval is received from TCEQ, utility line creek crossings should be made perpendicular to the creek flowline.

(2) If baseflow is present, TCEQ personnel should be consulted, as it may be necessary to divert or pump water around the construction area.

(3) Every effort should be made to keep the zone of immediate construction free of surface water. For construction in the creek channel, a pipe of adequate size to divert normal stream flow should be provided around the construction area. Diversion may be by pumping or gravity flow using temporary dams

(4) Where water must be pumped from the construction zone, discharges should be in a manner that will not cause scouring or erosion. All discharges shall be on the upstream or upslope side of emplaced erosion control structures. If discharges are necessary in easily erodible areas, a stabilized, energy-dissipating discharge apron shall be constructed of riprap with minimum stone diameter of 6 inches and minimum depth of 12 inches. Size of the apron in linear dimensions shall be approximately 10 times the diameter of the discharge pipe.

(5) Before any trenching, install two high service rock berms at 100-ft spacing across the channel (perpendicular to the flowline) downstream of the proposed trench. These berms should be located between 100 and 300 feet downstream of the proposed trench. Lay pipe or other utility line and bury as soon as possible after trenching

(6) After installation is complete (or at the end of work day, if installation cannot be completed by end of day), install silt fencing along trench line on either side of creek at 25-ft intervals, as shown in Figure 1-42

(7) Material excavated from the trench in the creek channel should not be deposited on the channel banks. Excavation should be hauled out of the channel or used in backfill of open trench. No loose excavated material should be left in the channel at the end of a work day

(8) A concrete cap should be placed over buried pipe within the creek, and the streambed should be restored to proper grade.

(9) Revegetate the disturbed area using appropriate native or adapted grass species applied either with hydromulch at twice the normal application rate or incorporated with erosion protection matting.

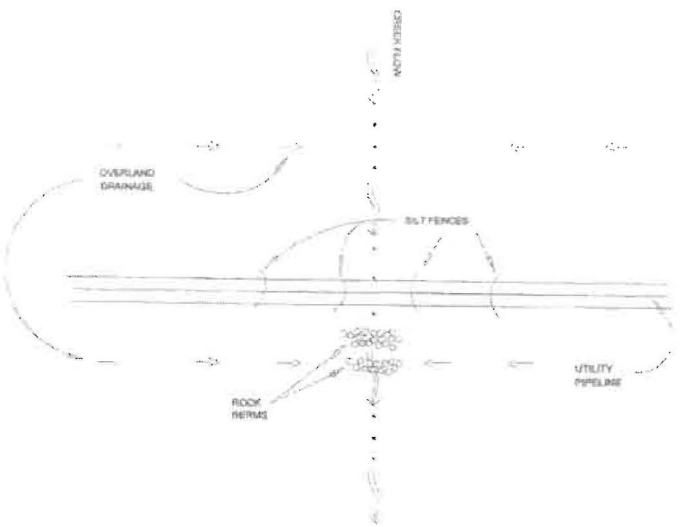


Figure 1-42 Utility Line Creek Crossing (LCRA, 1998)

1.4.18 Concrete Washout Areas

The purpose of concrete washout areas is to prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, performing onsite washout in a designated area, and training employees and subcontractors.

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Avoid mixing excess amounts of fresh concrete.
- Perform washout of concrete trucks in designated areas only.
- Do not wash out concrete trucks into storm drains, open ditches, streets, or streams.
- Do not allow excess concrete to be dumped onsite, except in designated areas.

For onsite washout:

- Locate washout area at least 50 feet from sensitive features, storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
- Wash out wastes into the temporary pit where the concrete can set, be broken up, and then disposed properly.

Below grade concrete washout facilities are typical. These consist of a lined excavation sufficiently large to hold expected volume of washout material. Above grade facilities are used if excavation is not practical. Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this section, with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and disposed of. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and disposed of. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired

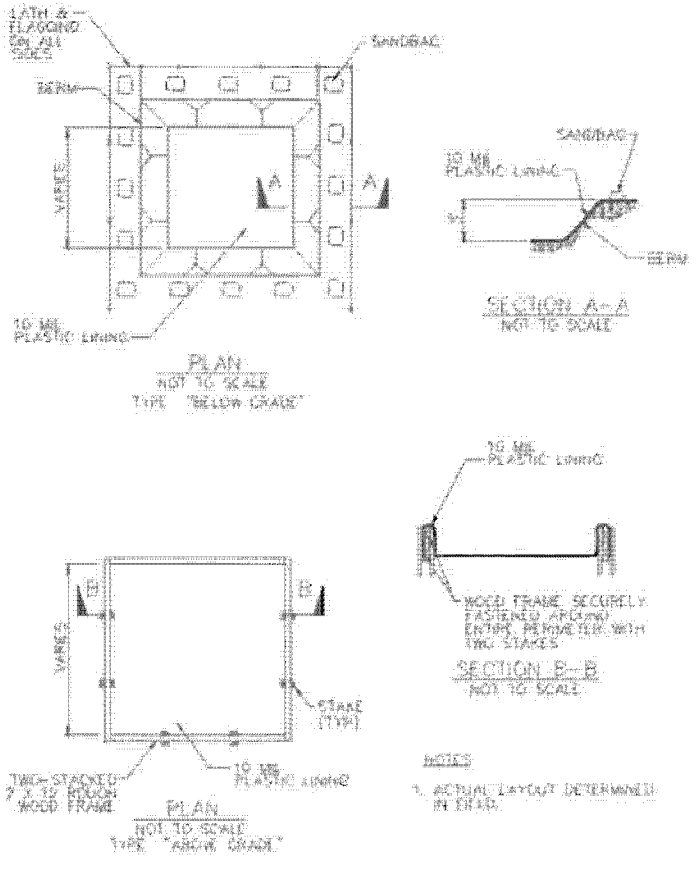


Figure 1-43 Schematics of Concrete Washout Areas

APPENDIX G

SPILL RESPONSE

Spill Response Plan

Project Name: Hills of Cross Canyon Ranch

Important phone numbers to call in case of a spill:

For spills of any quantity -

- 911 (if immediate danger to life or health)
- Site Superintendent / Emergency Coordinator: J.L. Guerra Jr. - 210.495.3233
- Qualified Emergency Response Contractor

Eagle Construction and Environmental Services, L.P. (800) 336-0909 (24 Hrs. /Emergency)
TAS Environmental Services (888) 654-0111 (all areas - 24 Hrs. /Emergency)

For spills that exceed the reportable quantity (per federal and state regulations), also contact:

- Texas Commission on Environmental Quality (TCEQ) 800-832-8224
- National Response Center 800-424-8802

Reportable Quantities		
Material	**Quantity**	**Location**
Diesel fuel, oil, brake fluid	25 gallons	Land
Diesel fuel, oil, brake fluid	Visible Sheen	Water
Concrete mix	Ten 40-lb bags	Land
Paint	Three 5-gallon buckets	Land
Antifreeze, battery acid	100 lbs (13 gal.)	Land
Refrigerant	1 lb	Air

APPENDIX H

TCEQ GENERAL PERMIT NUMBER TXR150000 RELATING TO DISCHARGES FROM CONSTRUCTION ACTIVITIES

TCEQ Docket No. 2007-1588-WQ
TPDES General Permit No. TXR150000

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. BOX 13087
Austin, TX 78711-3087

This is a renewal of TPDES General Permit No. TXR150000, issued March 5, 2003.

GENERAL PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

Construction sites that discharge storm water associated with construction activity

located in the state of Texas

may discharge to surface water in the state

only according to effluent limitations, monitoring requirements and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this general permit does not grant to the permittee the right to use private or public property for conveyance of storm water and certain non-storm water discharges along the discharge route. This includes property belonging to but not limited to any individual, partnership, corporation or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit and the authorization contained herein shall expire at midnight on March 5, 2013.

EFFECTIVE DATE: March 5, 2008

ISSUED DATE: FEB 15 2008

Buddy Garcia
For the Commission

TPDES GENERAL PERMIT NUMBER TXR150000 RELATING TO STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES

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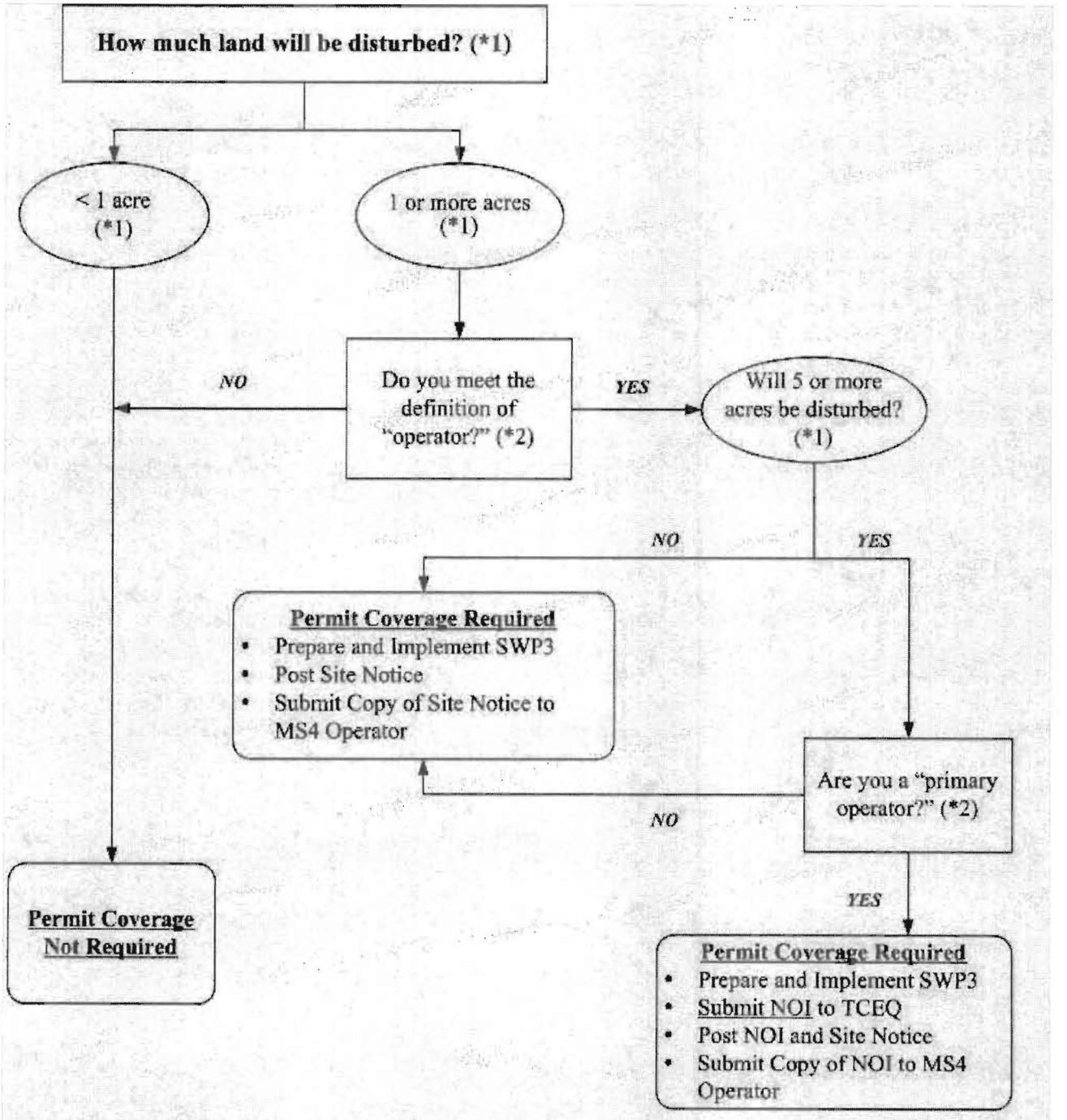
Part I. Flow Chart and Definitions

Section A. Flow Chart to Determine Whether Coverage is Required



(*1) ***To determine the size of the construction project, use the size of the entire area to be disturbed, and include the size of the larger common plan of development or sale, if the project is part of a larger project (refer to Part I.B., "Definitions," for an explanation of "larger common plan of development or sale").***

(*2) ***Refer to the definitions for "operator," "primary operator," and "secondary operator" in Part I., Section B. of this permit.***

Section B. Definitions

Arid Areas - Areas with an average annual rainfall of 0 to 10 inches.

Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, structural controls, local ordinances, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control construction site runoff, spills or leaks, waste disposal, or drainage from raw material storage areas.

Commencement of Construction - The initial disturbance of soils associated with clearing, grading, or excavation activities, as well as other construction-related activities (e.g., stockpiling of fill material, demolition)

Common Plan of Development - A construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. A common plan of development (also known as a "common plan of development or sale") is identified by the documentation for the construction project that identifies the scope of the project, and may include plats, blueprints, marketing plans, contracts, building permits, a public notice or hearing, zoning requests, or other similar documentation and activities. A common plan of development does not necessarily include all construction projects within the jurisdiction of a public entity (e.g., a city or university). Construction of roads or buildings in different parts of the jurisdiction would be considered separate "common plans," with only the interconnected parts of a project being considered part of a "common plan" (e.g., a building and its associated parking lot and driveways, airport runway and associated taxiways, a building complex, etc.). Where discrete construction projects occur within a larger common plan of development or sale but are located ¼ mile or more apart, and the area between the projects is not being disturbed, each individual project can be treated as a separate plan of development or sale, provided that any interconnecting road, pipeline or utility project that is part of the same "common plan" is not included in the area to be disturbed.

Discharge – For the purposes of this permit, the drainage, release, or disposal of pollutants in storm water and certain non-storm water from areas where soil disturbing activities (e.g., clearing, grading, excavation, stockpiling of fill material, and demolition), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

Edwards Aquifer - As defined under Texas Administrative Code § 213.3 of this title (relating to the Edwards Aquifer), that portion of an arcuate belt of porous, water-bearing, predominantly carbonate rocks known as the Edwards and Associated Limestones in the Balcones Fault Zone trending from west to east to northeast in Kinney, Uvalde, Medina, Bexar, Comal, Hays, Travis, and Williamson Counties; and composed of the Salmon Peak Limestone, McKnight Formation, West Nueces Formation, Devil's River Limestone, Person Formation, Kainer Formation, Edwards Formation, and Georgetown Formation. The permeable aquifer units generally overlie the less-permeable Glen Rose Formation to the south, overlie the less-permeable Comanche Peak and Walnut Formations north of the Colorado River, and underlie the less-permeable Del Rio Clay regionally.

Edwards Aquifer Recharge Zone - Generally, that area where the stratigraphic units constituting the Edwards Aquifer crop out, including the outcrops of other geologic formations in proximity to the Edwards Aquifer, where caves, sinkholes, faults, fractures, or other permeable features would create a potential for recharge of surface waters into the Edwards Aquifer. The recharge zone is identified as that area designated

as such on official maps located in the offices of the Texas Commission on Environmental Quality and the appropriate regional office. The Edwards Aquifer Map Viewer, located at http://www.tceq.state.tx.us/compliance/field_ops/eapp/mapdisclaimer.html, can be used to determine where the recharge zone is located.

Edwards Aquifer Contributing Zone - The area or watershed where runoff from precipitation flows downgradient to the recharge zone of the Edwards Aquifer. The contributing zone is located upstream (upgradient) and generally north and northwest of the recharge zone for the following counties: all areas within Kinney County, except the area within the watershed draining to Segment 2304 of the Rio Grande Basin; all areas within Uvalde, Medina, Bexar, and Comal Counties; all areas within Hays and Travis Counties, except the area within the watersheds draining to the Colorado River above a point 1.3 miles upstream from Tom Miller Dam, Lake Austin at the confluence of Barrow Brook Cove, Segment 1403 of the Colorado River Basin; and all areas within Williamson County, except the area within the watersheds draining to the Lampasas River above the dam at Stillhouse Hollow reservoir, Segment 1216 of the Brazos River Basin. The contributing zone is illustrated on the Edwards Aquifer map viewer at http://www.tceq.state.tx.us/compliance/field_ops/eapp/mapdisclaimer.html.

Facility or Activity – For the purpose of this permit, a construction site or construction support activity that is regulated under this general permit, including all contiguous land and fixtures (e.g., ponds and materials stockpiles), structures, or appurtances used at a construction site or industrial site described by this general permit.

Final Stabilization - A construction site status where any of the following conditions are met:

(a) All soil disturbing activities at the site have been completed and a uniform (i.e., evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(b) For individual lots in a residential construction site by either:

(1) the homebuilder completing final stabilization as specified in condition (a) above; or

(2) the homebuilder establishing temporary stabilization for an individual lot prior to the time of transfer of the ownership of the home to the buyer and after informing the homeowner of the need for, and benefits of, final stabilization. If temporary stabilization is not feasible, then the homebuilder may fulfill this requirement by retaining perimeter controls or other best management practices, and informing the homeowner of the need for removal of temporary controls and the establishment of final stabilization.

(c) For construction activities on land used for agricultural purposes (e.g. pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to surface water and areas

that are not being returned to their preconstruction agricultural use must meet the final stabilization conditions of condition (a) above.

(d) In arid, semi-arid, and drought-stricken areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:

(1) Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the operator, and

(2) The temporary erosion control measures are selected, designed, and installed to achieve 70 percent vegetative coverage within three years.

Hyperchlorination of Waterlines – Treatment of potable water lines or tanks with chlorine for disinfection purposes, typically following repair or partial replacement of the waterline or tank, and subsequently flushing the contents.

Indian Country Land – (from 40 CFR 122.2) (1) all land within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation; (2) all dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and (3) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

Indian Tribe - (from 40 CFR 122.2) any Indian Tribe, band, group, or community recognized by the Secretary of the Interior and exercising governmental authority over a Federal Indian Reservation.

Large Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than five (5) acres of land. Large construction activity also includes the disturbance of less than five (5) acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than five (5) acres of land. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (e.g., the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

Municipal Separate Storm Sewer System (MS4) - A separate storm sewer system owned or operated by the United States, a state, city, town, county, district, association, or other public body (created by or pursuant to state law) having jurisdiction over the disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, that discharges to surface water in the state.

Notice of Change (NOC) – Written notification to the executive director from a discharger authorized under this permit, providing changes to information that was previously provided to the agency in a notice of intent form.

Notice of Intent (NOI) - A written submission to the executive director from an applicant requesting coverage under this general permit.

Notice of Termination (NOT) - A written submission to the executive director from a discharger authorized under a general permit requesting termination of coverage.

Operator - The person or persons associated with a large or small construction activity that is either a primary or secondary operator as defined below:

Primary Operator – the person or persons associated with a large or small construction activity that meets either of the following two criteria:

(a) the person or persons have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

(b) the person or persons have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a storm water pollution prevention plan (SWP3) for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

Secondary Operator – The person whose operational control is limited to the employment of other operators or to the ability to approve or disapprove changes to plans and specifications. A secondary operator is also defined as a primary operator and must comply with the permit requirements for primary operators if there are no other operators at the construction site.

Outfall - For the purpose of this permit, a point source at the point where storm water runoff associated with construction activity discharges to surface water in the state and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other water of the U.S. and are used to convey waters of the U.S.

Permittee - An operator authorized under this general permit. The authorization may be gained through submission of a notice of intent, by waiver, or by meeting the requirements for automatic coverage to discharge storm water runoff and certain non-storm water discharges.

Point Source – (from 40 CFR §122.2) Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are, or may be, discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, filter backwash, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into any surface water in the state. The term "pollutant" does not include tail water or runoff water from irrigation or rainwater runoff from cultivated or uncultivated rangeland, pastureland, and farmland. For the purpose of this permit, the term "pollutant" includes sediment.

Pollution - (from Texas Water Code §26.001(14)) The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any surface water in the state that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property or to public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.

Rainfall Erosivity Factor (R factor) - the total annual erosive potential that is due to climatic effects, and is part of the Revised Universal Soil Loss Equation (RUSLE).

Semiarid Areas - areas with an average annual rainfall of 10 to 20 inches

Separate Storm Sewer System - A conveyance or system of conveyances (including roads with drainage systems, streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains), designed or used for collecting or conveying storm water; that is not a combined sewer, and that is not part of a publicly owned treatment works (POTW).

Small Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres of land. Small construction activity also includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one (1) and less than five (5) acres of land. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site (e.g., the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.)

Storm Water (or Storm Water Runoff) - Rainfall runoff, snow melt runoff, and surface runoff and drainage.

Storm Water Associated with Construction Activity - Storm water runoff from a construction activity where soil disturbing activities (including clearing, grading, excavating) result in the disturbance of one (1) or more acres of total land area, or are part of a larger common plan of development or sale that will result in disturbance of one (1) or more acres of total land area.

Structural Control (or Practice) - A pollution prevention practice that requires the construction of a device, or the use of a device, to capture or prevent pollution in storm water runoff. Structural controls and practices may include but are not limited to: silt fences, earthen dikes, drainage swales, sediment traps, check dams, subsurface drains, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins.

Surface Water in the State - Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, wetlands, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state (from the mean high water mark (MHWM) out 10.36 miles into the Gulf), and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or nonnavigable, and including the beds and banks of all water-courses and bodies of surface water, that are wholly or partially inside or bordering the state or subject to the jurisdiction of the state; except that waters in treatment systems which are authorized by state or federal law, regulation, or permit, and which are created for the purpose of waste treatment are not considered to be water in the state.

Temporary Stabilization - A condition where exposed soils or disturbed areas are provided a protective cover or other structural control to prevent the migration of pollutants. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either permanent stabilization can be achieved or until further construction activities take place.

Waters of the United States - (from 40 CFR, Part122, Section 2) Waters of the United States or waters of the U.S. means:

(a) all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) all interstate waters, including interstate wetlands;

(c) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds that the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) which are used or could be used for industrial purposes by industries in interstate commerce;

(d) all impoundments of waters otherwise defined as waters of the United States under this definition;

(e) tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) the territorial sea; and

(g) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR '423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area=s status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Part II. Permit Applicability and Coverage

Section A. Discharges Eligible for Authorization

1. Storm Water Associated with Construction Activity

Discharges of storm water runoff from small and large construction activities may be authorized under this general permit.

2. Discharges of Storm Water Associated with Construction Support Activities

Examples of construction support activities include, but are not limited to, concrete batch plants, rock crushers, asphalt batch plants, equipment staging areas, material storage yards, material borrow areas, and excavated material disposal areas. Discharges of storm water runoff from construction support activities may be authorized under this general permit, provided that the following conditions are met:

(a) the activities are located within one (1)-mile from the boundary of the permitted construction site and directly support the construction activity;

(b) a storm water pollution prevention plan is developed according to the provisions of this general permit and includes appropriate controls and measures to reduce erosion and discharge of pollutants in storm water runoff from the construction support activities; and

(c) the construction support activities either do not operate beyond the completion date of the construction activity or are authorized under separate TPDES authorization. Separate TPDES authorization may include the TPDES Multi Sector General Permit, TXR050000 (related to storm water discharges associated with industrial activity), separate authorization under this general permit if applicable, coverage under an alternative general permit if available, or authorization under an individual water quality permit.

3. Non-Storm Water Discharges

The following non-storm water discharges from sites authorized under this general permit are also eligible for authorization under this general permit:

(a) discharges from fire fighting activities (fire fighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, and similar activities);

(b) uncontaminated fire hydrant flushings (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life), which include flushings from systems that utilize potable water, surface water, or groundwater that does not contain additional

pollutants (uncontaminated fire hydrant flushings do not include systems utilizing reclaimed wastewater as a source water);

(c) water from the routine external washing of vehicles, the external portion of buildings or structures, and pavement, where detergents and soaps are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless spilled materials have been removed; and if local state, or federal regulations are applicable, the materials are removed according to those regulations), and where the purpose is to remove mud, dirt, or dust;

(d) uncontaminated water used to control dust;

(e) potable water sources including waterline flushings (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life);

(f) uncontaminated air conditioning condensate;

(g) uncontaminated ground water or spring water, including foundation or footing drains where flows are not contaminated with industrial materials such as solvents; and

(h) lawn watering and similar irrigation drainage.

4. Other Permitted Discharges

Any discharge authorized under a separate NPDES, TPDES, or TCEQ permit may be combined with discharges authorized by this general permit, provided those discharges comply with the associated permit.

Section B. Concrete Truck Wash Out

The washout of concrete trucks associated with off-site production facilities may be conducted at regulated construction sites in accordance with the requirements of Part V of this general permit.

Section C. Limitations on Permit Coverage

1. Post Construction Discharges.

Discharges that occur after construction activities have been completed, and after the construction site and any supporting activity site have undergone final stabilization, are not eligible for coverage under this general permit. Discharges originating from the sites are not authorized under this general permit following the submission of the notice of termination (NOT) for the construction activity.

2. Prohibition of Non-Storm Water Discharges

Except as otherwise provided in Part II.A. of this general permit, only discharges that are composed entirely of storm water associated with construction activity may be authorized under this general permit.

3. Compliance With Water Quality Standards

Discharges to surface water in the state that would cause or contribute to a violation of water quality standards or that would fail to protect and maintain existing designated uses are not eligible for coverage under this general permit. The executive director may require an application for an individual permit or alternative general permit (see Parts II.H.2. and 3.) to authorize discharges to surface water in the state from any activity that is determined to cause a violation of water quality standards or is found to cause, or contribute to, the loss of a designated use. The executive director may also require an application for an individual permit considering factors described in Part II.H.2. of this general permit.

4. Discharges to Water Quality-Impaired Receiving Waters.

New sources or new discharges of the constituents of concern to impaired waters are not authorized by this permit unless otherwise allowable under 30 TAC Chapter 305 and applicable state law. Impaired waters are those that do not meet applicable water quality standards and are listed on the EPA approved Clean Water Act Section 303(d) list. Constituents of concern are those for which the water body is listed as impaired.

Discharges of the constituents of concern to impaired water bodies for which there is a total maximum daily load (TMDL) are not eligible for this permit unless they are consistent with the approved TMDL. Permittees must incorporate the limitations, conditions, and requirements applicable to their discharges, including monitoring frequency and reporting required by TCEQ rules, into their storm water pollution prevention plan in order to be eligible for coverage under this general permit.

5. Discharges to the Edwards Aquifer Recharge Zone

Discharges cannot be authorized by this general permit where prohibited by 30 Texas Administrative Code (TAC) Chapter 213 (relating to Edwards Aquifer). **In addition, commencement of construction (i.e., the initial disturbance of soils associated with clearing, grading, or excavating activities, as well as other construction-related activities such as stockpiling of fill material and demolition) at a site regulated under 30 TAC Chapter 213, may not begin until the appropriate Edwards Aquifer Protection Plan has been approved by the TCEQ's Edwards Aquifer Protection Program.**

(a) For new discharges located within the Edwards Aquifer Recharge Zone, or within that area upstream from the recharge zone and defined as the Contributing Zone, operators must meet all applicable requirements of, and operate according to, 30 TAC Chapter 213 (Edwards Aquifer Rule) in addition to the provisions and requirements of this general permit.

(b) For existing discharges located within the Edwards Aquifer Recharge Zone, the requirements of the agency-approved Water Pollution Abatement Plan under the Edwards Aquifer Rules are in addition to the requirements of this general permit. BMPs and maintenance schedules for structural storm water controls, for example, may be required as a provision of the rule. All applicable requirements of the Edwards Aquifer Rule for reductions of suspended solids in storm water runoff are in addition to the requirements in this general permit for this pollutant.

For discharges from large construction activities located on the Edwards Aquifer recharge zone or the Edwards Aquifer contributing zone, applicants must submit a copy of the NOI to the appropriate TCEQ regional office. For discharges from small construction activities located on the Edwards Aquifer recharge zone or the Edwards Aquifer contributing zone, and for discharges from large construction activities by operators not required to submit an NOI under this general permit, applicants must submit a copy of the construction site notice to the appropriate TCEQ regional office where required by the Edwards Aquifer Rules at 30 TAC Chapter 213:

Counties:	Contact:
Comal, Bexar, Medina, Uvalde, and Kinney	TCEQ Water Program Manager San Antonio Regional Office 14250 Judson Rd. San Antonio, Texas (210) 490-3096
Williamson, Travis, and Hays	TCEQ Water Program Manager Austin Regional Office 2800 South IH 35, Suite 100 Austin, Texas 78704-5712 (512) 339-2929

6. Discharges to Specific Watersheds and Water Quality Areas

Discharges otherwise eligible for coverage cannot be authorized by this general permit where prohibited by 30 TAC Chapter 311 (relating to Watershed Protection) for water quality areas and watersheds.

7. Protection of Streams and Watersheds by Other Governmental Entities

This general permit does not limit the authority or ability of federal, other state, or local governmental entities from placing additional or more stringent requirements on construction activities or discharges from construction activities. For example, this permit does not limit the authority of a home-rule municipality provided by Texas Local Government Code §401.002.

8. Indian Country Lands

Storm water runoff from construction activities occurring on Indian Country lands are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of storm water require authorization under federal National Pollutant Discharge Elimination System (NPDES) regulations, authority for these discharges must be obtained from the U.S. Environmental Protection Agency (EPA).

9. Oil and Gas Production

Storm water runoff from construction activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline, are not under the authority of the TCEQ and are not eligible for coverage under this general permit. If discharges of storm water require authorization under federal NPDES regulations, authority for these discharges must be obtained from the EPA.

10. Storm Water Discharges from Agricultural Activities

Storm water discharges from agricultural activities that are not point source discharges of storm water are not subject to TPDES permit requirements. These activities may include clearing and cultivating ground for crops, construction of fences to contain livestock, construction of stock ponds, and other similar agricultural activities. Discharges of storm water runoff associated with the construction of facilities that are subject to TPDES regulations, such as the construction of confined animal feeding operations, would be point sources regulated under this general permit.

11. Other

Nothing in Part II of the general permit is intended to negate any person's ability to assert the force majeure (act of God, war, strike, riot, or other catastrophe) defenses found in 30 TAC ' 70.7.

Section D. Deadlines for Obtaining Authorization to Discharge

1. Large Construction Activities

(a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.

(b) Ongoing Construction - Operators of large construction activities continuing to operate after the effective date of this permit, and authorized under TPDES general permit TXR150000 (issued March 5, 2003), must submit an NOI to renew authorization under this general permit within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit,

the operator must continue to meet the conditions and requirements of the previous TPDES permit.

2. Small Construction Activities

(a) New Construction - Discharges from sites where the commencement of construction occurs on or after the effective date of this general permit must be authorized, either under this general permit or a separate TPDES permit, prior to the commencement of those construction activities.

(b) Ongoing Construction - Discharges from ongoing small construction activities that commenced prior to the effective date of this general permit, and that would not meet the conditions to qualify for termination of this permit as described in Part II.E. of this general permit, must meet the requirements to be authorized, either under this general permit or a separate TPDES permit, within 90 days of the effective date of this general permit. During this interim period, as a requirement of this TPDES permit, the operator must continue to meet the conditions and requirements of the previous TPDES permit.

Section E. Obtaining Authorization to Discharge

1. Automatic Authorization for Small Construction Activities With Low Potential for Erosion:

If all of the following conditions are met, then a small construction activity is determined to occur during periods of low potential for erosion, and a site operator may be automatically authorized under this general permit without being required to develop a storm water pollution prevention plan or submit a notice of intent (NOI):

(a) the construction activity occurs in a county listed in Appendix A;

(b) the construction activity is initiated and completed, including either final or temporary stabilization of all disturbed areas, within the time frame identified in Appendix A for the location of the construction site;

(c) all temporary stabilization is adequately maintained to effectively reduce or prohibit erosion, permanent stabilization activities have been initiated, and a condition of final stabilization is completed no later than 30 days following the end date of the time frame identified in Appendix A for the location of the construction site;

(d) the permittee signs a completed construction site notice (Attachment 1 of this general permit), including the certification statement;

(e) a signed copy of the construction site notice is posted at the construction site in a location where it is readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction activities, and maintained in that location until completion of the construction activity;

(f) a copy of the signed and certified construction site notice is provided to the operator of any municipal separate storm sewer system (MS4) receiving the discharge at least two days prior to commencement of construction activities;

(g) any supporting concrete batch plant or asphalt batch plant is separately authorized for discharges of storm water runoff or other non-storm water discharges under an individual TPDES permit, another TPDES general permit, or under an individual TCEQ permit where storm water and non-storm water is disposed of by evaporation or irrigation (discharges are adjacent to water in the state); and

(h) any non-storm water discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

Part II.G. of this general permit describes how an operator may apply for and obtain a waiver from permitting, for certain small construction activities that occur during a period with a low potential for erosion, where automatic authorization under this section is not available.

2. Automatic Authorization For All Other Small Construction Activities:

Operators of small construction activities not described in Part II.E.1. above may be automatically authorized under this general permit, and operators of these sites shall not be required to submit an NOI, provided that they meet all of the following conditions:

(a) develop a SWP3 according to the provisions of this general permit, that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;

(b) sign and certify a completed construction site notice (Attachment 2 of this general permit), post the notice at the construction site in a location where it is safely and readily available for viewing by the general public, local, state, and federal authorities, prior to commencing construction, and maintain the notice in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities); and

(c) provide a copy of the signed and certified construction site notice to the operator of any municipal separate storm sewer system receiving the discharge at least two days prior to commencement of construction activities.

Operators of small construction activities as defined in Part I of this general permit shall not submit an NOI for coverage unless otherwise required by the executive director.

As described in Part I (Definitions) of this general permit, large construction activities include those that will disturb less than five (5) acres of land, but that are part of a larger

common plan of development or sale that will ultimately disturb five (5) or more acres of land, and must meet the requirements of Part II.E.3. below.

3. Authorization for Large Construction Activities:

Operators of large construction activities that qualify for coverage under this general permit must meet all of the following conditions:

(a) develop a SWP3 according to the provisions of this general permit that covers either the entire site or all portions of the site for which the applicant is the operator, and implement that plan prior to commencing construction activities;

(b) primary operators must submit a Notice of Intent (NOI), using a form provided by the executive director, at least seven (7) days prior to commencing construction activities, or if utilizing electronic submittal, prior to commencing construction activities. If an additional primary operator is added after the initial NOI is submitted, the new primary operator must submit an NOI at least seven (7) days before assuming operational control, or if utilizing electronic NOI submittal, prior to assuming operational control. If the primary operator changes after the initial NOI is submitted, the new primary operator must submit a paper NOI or an electronic NOI at least ten (10) days before assuming operational control;

(c) all primary operators must also post a copy of the signed NOI at the construction site in a location where it is readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction activities, and must maintain the NOI in that location until completion of the construction activity;

(d) all operators of large construction activities must post a site notice in accordance with Part III.D.2. of this permit. The site notice must be located where it is safely and readily available for viewing by the general public, local, state, and federal authorities prior to commencing construction, and must be maintained in that location until completion of the construction activity (for linear construction activities, e.g. pipeline or highway, the site notice must be placed in a publicly accessible location near where construction is actively underway; notice for these linear sites may be relocated, as necessary, along the length of the project, and the notice must be safely and readily available for viewing by the general public; local, state, and federal authorities); and

(e) all primary operators must provide a copy of the signed NOI to the operator of any municipal separate storm sewer system (MS4) receiving the discharge and to any secondary operator, at least seven (7) days prior to commencing construction activities, and must list in the SWP3 the names and addresses of all MS4 operators receiving a copy.

(f) All persons meeting the definition of "secondary operator" in Part I of this permit are hereby notified that they are regulated under this general permit, but are not required to submit an NOI, provided that another operator(s) at the site has submitted an NOI, or is required to submit an NOI and the secondary operator has provided notification

to the operator(s) of the need to obtain coverage (with records of notification available upon request). Any secondary operator notified under this provision may alternatively submit an NOI under this general permit, may seek coverage under an alternative TPDES individual permit, or may seek coverage under an alternative TPDES general permit if available.

4. Waivers for Small Construction Activities:

Part II.G. describes how operators of certain small construction activities may obtain a waiver from coverage.

5. Effective Date of Coverage

(a) Operators of small construction activities as described in either Part II.E.1. or II.E.2. above are authorized immediately following compliance with the applicable conditions of Part II.E.1. or II.E.2. Secondary operators of large construction activities as described in Part II.E.3. above are authorized immediately following compliance with the applicable conditions in Part II.E.3. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator's responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.

(b) Primary operators of large construction activities as described in Part II.E.3. above are provisionally authorized seven (7) days from the date that a completed NOI is postmarked for delivery to the TCEQ, unless otherwise notified by the executive director. If electronic submission of the NOI is provided, and unless otherwise notified by the executive director, primary operators are authorized immediately following confirmation of receipt of the NOI by the TCEQ. Authorization is non-provisional when the executive director finds the NOI is administratively complete and an authorization number is issued for the activity. For activities located in areas regulated by 30 TAC Chapter 213, related to the Edwards Aquifer, this authorization to discharge is separate from the requirements of the operator's responsibilities under that rule. Construction may not commence for sites regulated under 30 TAC Chapter 213 until all applicable requirements of that rule are met.

(c) Operators are not prohibited from submitting late NOIs or posting late notices to obtain authorization under this general permit. The TCEQ reserves the right to take appropriate enforcement actions for any unpermitted activities that may have occurred between the time construction commenced and authorization was obtained.

6. Notice of Change (NOC)

If relevant information provided in the NOI changes, an NOC must be submitted at least 14 days before the change occurs, if possible. Where 14-day advance notice is not possible, the operator must submit an NOC within 14 days of discovery of the change. If the operator becomes aware that it failed to submit any relevant facts or submitted incorrect information in an NOI, the correct information must be provided to the executive director in an NOC within 14 days after discovery. The NOC shall be submitted on a form provided by the executive director, or by letter if an NOC form is not available. A copy of the NOC must also be provided to the operator of any MS4 receiving the discharge, and a list must be included in the SWP3 that includes the names and addresses of all MS4 operators receiving a copy.

Information that may be included on an NOC includes, but is not limited to, the following: the description of the construction project, an increase in the number of acres disturbed (for increases of one or more acres), or the operator name. A transfer of operational control from one operator to another, including a transfer of the ownership of a company, may not be included in an NOC. A transfer of ownership of a company includes changes to the structure of a company, such as changing from a partnership to a corporation or changing corporation types, so that the filing number (or charter number) that is on record with the Texas Secretary of State must be changed.

An NOC is not required for notifying TCEQ of a decrease in the number of acres disturbed. This information must be included in the storm water pollution prevention plan (SWP3) and retained on site.

7. Signatory Requirement for NOI Forms, Notice of Termination (NOT) Forms, NOC Letters, and Construction Site Notices

NOI forms, NOT forms, NOC letters, and Construction Site Notices that require a signature must be signed according to 30 TAC ' 305.44 (relating to Signatories for Applications).

8. Contents of the NOI

The NOI form shall require, at a minimum, the following information:

(a) the TPDES CGP authorization number for existing authorizations under this general permit, where the operator submits an NOI to renew coverage within 90 days of the effective date of this general permit;

(b) the name, address, and telephone number of the operator filing the NOI for permit coverage;

(c) the name (or other identifier), address, county, and latitude/longitude of the construction project or site;

(d) the number of acres that will be disturbed by the applicant;

(e) confirmation that the project or site will not be located on Indian Country lands;

(f) confirmation that a SWP3 has been developed, that it will be implemented prior to construction, and that it is compliant with any applicable local sediment and erosion control plans;

(g) name of the receiving water(s);

(h) the classified segment number for each classified segment that receives discharges from the regulated construction activity (if the discharge is not directly to a classified segment, then the classified segment number of the first classified segment that those discharges reach); and

(i) the name of all surface waters receiving discharges from the regulated construction activity that are on the latest EPA-approved CWA § 303(d) list of impaired waters.

Section F. Terminating Coverage

1. Notice of Termination (NOT) Required

Each operator that has submitted an NOI for authorization under this general permit must apply to terminate that authorization following the conditions described in this section of the general permit. Authorization must be terminated by submitting a Notice of Termination (NOT) on a form supplied by the executive director. Authorization to discharge under this general permit terminates at midnight on the day the NOT is postmarked for delivery to the TCEQ. If electronic submission of the NOT is provided, authorization to discharge under this permit terminates immediately following confirmation of receipt of the NOT by the TCEQ. Compliance with the conditions and requirements of this permit is required until an NOT is submitted.

The NOT must be submitted to TCEQ, and a copy of the NOT provided to the operator of any MS4 receiving the discharge (with a list in the SWP3 of the names and addresses of all MS4 operators receiving a copy), within 30 days after any of the following conditions are met:

(a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;

(b) a transfer of operational control has occurred (See Section II.F.4. below); or

(c) the operator has obtained alternative authorization under an individual TPDES permit or alternative TPDES general permit.

2. Minimum Contents of the NOT

The NOT form shall require, at a minimum, the following information:

(a) if authorization was granted following submission of an NOI, the permittee's site-specific TPDES authorization number for the construction site;

(b) an indication of whether the construction activity is completed or if the permittee is simply no longer an operator at the site;

(c) the name, address, and telephone number of the permittee submitting the NOT;

(d) the name (or other identifier), address, county, and latitude/longitude of the construction project or site; and

(e) a signed certification that either all storm water discharges requiring authorization under this general permit will no longer occur, or that the applicant to terminate coverage is no longer the operator of the facility or construction site, and that all temporary structural erosion controls have either been removed, will be removed on a schedule defined in the SWP3, or have been transferred to a new operator if the new operator has applied for permit coverage. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.

3. Termination of Coverage for Small Construction Sites and for Secondary Operators at Large Construction Sites

Each operator that has obtained automatic authorization and has not been required to submit an NOI must remove the site notice upon meeting any of the conditions listed below, complete the applicable portion of the site notice related to removal of the site notice, and submit a copy of the completed site notice to the operator of any MS4 receiving the discharge (or provide alternative notification as allowed by the MS4 operator, with documentation of such notification included in the SWP3), within 30 days of meeting any of the following conditions:

(a) final stabilization has been achieved on all portions of the site that are the responsibility of the permittee;

(b) a transfer of operational control has occurred (See Section II.F.4. below); or

(c) the operator has obtained alternative authorization under an individual or general TPDES permit.

Authorization to discharge under this general permit terminates immediately upon removal of the applicable site notice. Compliance with the conditions and requirements of this permit is required until the site notice is removed.

4. Transfer of Operational Control

Coverage under this general permit is not transferable. A transfer of operational control includes changes to the structure of a company, such as changing from a partnership to a

corporation, or changing to a different corporation type such that a different filing (or charter) number is established with the Texas Secretary of State.

When the primary operator of a large construction activity changes or operational control is transferred, the original operator must submit a Notice of Termination (NOT) within ten (10) days prior to the date that responsibility for operations terminates, and the new operator must submit an NOI at least ten (10) days prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the NOT must be provided to the operator of any MS4 receiving the discharge in accordance with Section II.F.1. above.

Operators of regulated construction activities who are not required to submit an NOI must remove the original site notice, and the new operator must post the required site notice prior to the transfer of operational control, in accordance with condition (a) or (b) below. A copy of the completed site notice must be provided to the operator of any MS4 receiving the discharge, in accordance with Section II.F.3. above.

A transfer of operational control occurs when either of the following criteria is met:

(a) Another operator has assumed control over all areas of the site that have not been finally stabilized; and all silt fences and other temporary erosion controls have either been removed, scheduled for removal as defined in the SWP3, or transferred to a new operator, provided that the permitted operator has attempted to notify the new operator in writing of the requirement to obtain permit coverage. Record of this notification (or attempt at notification) shall be retained by the operator in accordance with Part VI of this permit. Erosion controls that are designed to remain in place for an indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal.

(b) A homebuilder has purchased one or more lots from an operator who obtained coverage under this general permit for a common plan of development or sale. The homebuilder is considered a new operator and shall comply with the requirements listed above, including the development of a SWP3 if necessary. Under these circumstances, the homebuilder is only responsible for compliance with the general permit requirements as they apply to lot(s) it has operational control over, and the original operator remains responsible for common controls or discharges, and must amend its SWP3 to remove the lot(s) transferred to the homebuilder.

Section G. Waivers from Coverage

The executive director may waive the otherwise applicable requirements of this general permit for storm water discharges from small construction activities under the terms and conditions described in this section.

1. Waiver Applicability and Coverage

Operators of small construction activities may apply for and receive a waiver from the requirements to obtain authorization under this general permit, where all of the following conditions are met. This waiver from coverage does not apply to non-storm water discharges. The operator must insure that any non-storm water discharges are either authorized under a separate permit or authorization, or are not considered to be a wastewater.

(a) the calculated rainfall erosivity (R) factor for the entire period of the construction project is less than five (5);

(b) the operator submits to the TCEQ a signed waiver certification form, supplied by the executive director, certifying that the construction activity will commence and be completed within a period when the value of the calculated rainfall erosivity R factor is less than five (5); and

(c) the waiver certification form is postmarked for delivery to the TCEQ at least two (2) days before construction activity begins.

2. Steps to Obtaining a Waiver

The construction site operator may calculate the R factor to request a waiver using the following steps:

(a) Estimate the construction start date and the construction end date. The construction end date is the date that final stabilization will be achieved.

(b) Find the appropriate Erosivity Index (EI) zone in Appendix B of this permit.

(c) Find the EI percentage for the project period by adding the results for each period of the project using the table provided in Appendix D of this permit. in EPA Fact Sheet 2.1, or in USDA Handbook 703, by subtracting the start value from the end value to find the percent EI for the site.

(d) Refer to the Isoerodent Map (Appendix C of this permit) and interpolate the annual isoerodent value for the proposed construction location.

(e) Multiply the percent value obtained in Step (c) above by the annual isoerodent value obtained in Step (d). This is the R factor for the proposed project. If the value is less than 5, then a waiver may be obtained. If the value is five (5) or more, then a waiver may not be obtained, and the operator must obtain coverage under Part II.E.2. of this permit.

Alternatively, the operator may calculate a site-specific R factor utilizing the following online calculator: http://ei.tamu.edu/index.html, or using another available resource.

The waiver certification form is not required to be posted at the small construction site.

3. Effective Date of Waiver

Operators of small construction activities are provisionally waived from the otherwise applicable requirements of this general permit two (2) days from the date that a completed waiver certification form is postmarked for delivery to TCEQ.

4. Activities Extending Beyond the Waiver Period

If a construction activity extends beyond the approved waiver period due to circumstances beyond the control of the operator, the operator must either:

(a) recalculate the rainfall erosivity (R) factor using the original start date and a new projected ending date, and if the R factor is still under five (5), submit a new waiver certification form at least two (2) days before the end of the original waiver period; or

(b) obtain authorization under this general permit according to the requirements delineated in either Part II.E.2. or Part II.E.3. at least two (2) days before the end of the approved waiver period.

Section H. Alternative TPDES Permit Coverage

1. Individual Permit Alternative

Any discharge eligible for coverage under this general permit may alternatively be authorized under an individual TPDES permit according to 30 TAC Chapter 305 (relating to Consolidated Permits). Applications for individual permit coverage should be submitted at least three hundred and thirty (330) days prior to commencement of construction activities to ensure timely issuance.

2. Individual Permit Required

The executive director may suspend an authorization or deny an NOI in accordance with the procedures set forth in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges), including the requirement that the executive director provide written notice to the permittee. The executive director may require an operator of a construction site, otherwise eligible for authorization under this general permit, to apply for an individual TPDES permit in the following circumstances:

(a) the conditions of an approved total maximum daily load (TMDL) limitation or TMDL implementation plan on the receiving stream;

(b) the activity being determined to cause a violation of water quality standards or being found to cause, or contribute to, the loss of a designated use of surface water in the state: and

(c) any other consideration defined in 30 TAC Chapter 205 (relating to General Permits for Waste Discharges) including 30 TAC '205.4(c)(3)(D), which allows the

commission to deny authorization under the general permit and require an individual permit if a discharger Ahas been determined by the executive director to have been out of compliance with any rule, order, or permit of the commission, including non-payment of fees assessed by the executive director.

Additionally, the executive director may cancel, revoke, or suspend authorization to discharge under this general permit based on a finding of historical and significant noncompliance with the provisions of this general permit, relating to 30 TAC §60.3 (Use of Compliance History). Denial of authorization to discharge under this general permit or suspension of a permittee's authorization under this general permit shall be done according to commission rules in 30 TAC, Chapter 205 (relating to General Permits for Waste Discharges).

3. Any discharge eligible for authorization under this general permit may alternatively be authorized under a separate general permit according to 30 TAC Chapter 205 (relating to General Permits for Waste Discharges), if applicable.

Section I. Permit Expiration

1. This general permit is issued for a term not to exceed five (5) years. All active discharge authorizations expire on the date provided on page one (1) of this permit. Following public notice and comment, as provided by 30 TAC '205.3 (relating to Public Notice, Public Meetings, and Public Comment), the commission may amend, revoke, cancel, or renew this general permit.

2. If the executive director publishes a notice of the intent to renew or amend this general permit before the expiration date, the permit will remain in effect for existing, authorized discharges until the commission takes final action on the permit. Upon issuance of a renewed or amended permit, permittees may be required to submit an NOI within 90 days following the effective date of the renewed or amended permit, unless that permit provides for an alternative method for obtaining authorization.

3. If the commission does not propose to reissue this general permit within 90 days before the expiration date, permittees shall apply for authorization under an individual permit or an alternative general permit. If the application for an individual permit is submitted before the expiration date, authorization under this expiring general permit remains in effect until the issuance or denial of an individual permit. No new NOIs will be accepted nor new authorizations honored under the general permit after the expiration date.

Part III. Storm Water Pollution Prevention Plans (SWP3)

Storm water pollution prevention plans must be prepared to address discharges authorized under Parts II.E.2. and II.E.3. that will reach Waters of the United States, including discharges to MS4s and privately owned separate storm sewer systems that drain to Waters of the United States, to identify and address potential sources of pollution that are reasonably expected to affect the quality of discharges from the construction site, including off-site material storage areas, overburden and stockpiles of dirt, borrow areas, equipment staging areas, vehicle repair areas, fueling areas, etc., used solely by the permitted project. The SWP3 must describe the implementation of practices that will be used to minimize to the extent practicable the discharge

of pollutants in storm water associated with construction activity and non-storm water discharges described in Part II.A.3., in compliance with the terms and conditions of this permit.

Individual operators at a site may develop separate SWP3s that cover only their portion of the project, provided reference is made to the other operators at the site. Where there is more than one SWP3 for a site, permittees must coordinate to ensure that BMPs and controls are consistent and do not negate or impair the effectiveness of each other. Regardless of whether a single comprehensive SWP3 is developed or separate SWP3s are developed for each operator, it is the responsibility of each operator to ensure compliance with the terms and conditions of this general permit in the areas of the construction site where that operator has control over construction plans and specifications or day-to-day operations.

Section A. Shared SWP3 Development

For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site is encouraged. Operators must independently obtain authorization, but may work together to prepare and implement a single, comprehensive SWP3 for the entire construction site.

1. The SWP3 must clearly list the name and, for large construction activities, the general permit authorization numbers, for each operator that participates in the shared SWP3. Until the TCEQ responds to receipt of the NOI with a general permit authorization number, the SWP3 must specify the date that the NOI was submitted to TCEQ by each operator. Each operator participating in the shared plan must also sign the SWP3.

2. The SWP3 must clearly indicate which operator is responsible for satisfying each shared requirement of the SWP3. If the responsibility for satisfying a requirement is not described in the plan, then each permittee is entirely responsible for meeting the requirement within the boundaries of the construction site where they perform construction activities. The SWP3 must clearly describe responsibilities for meeting each requirement in shared or common areas.

Section B. Responsibilities of Operators

1. Secondary Operators and Primary Operators with Control Over Construction Plans and Specifications

   All secondary operators and primary operators with control over construction plans and specifications must:

   (a) ensure the project specifications allow or provide that adequate BMPs are developed to meet the requirements of Part III of this general permit;

   (b) ensure that the SWP3 indicates the areas of the project where they have control over project specifications, including the ability to make modifications in specifications;

   (c) ensure all other operators affected by modifications in project specifications are notified in a timely manner so that those operators may modify their best

management practices as necessary to remain compliant with the conditions of this general permit; and

(d) ensure that the SWP3 for portions of the project where they are operators indicates the name and site-specific TPDES authorization numbers for permittees with the day-to-day operational control over those activities necessary to ensure compliance with the SWP3 and other permit conditions. If the party with day-to-day operational control has not been authorized or has abandoned the site, the person with control over project specifications is considered to be the responsible party until the authority is transferred to another party and the SWP3 is updated.

2. Primary Operators with Day-to-Day Operational Control

Primary Operators with day-to-day operational control of those activities at a project that are necessary to ensure compliance with an SWP3 and other permit conditions must ensure that the SWP3 accomplishes the following requirements:

(a) meets the requirements of this general permit for those portions of the project where they are operators;

(b) identifies the parties responsible for implementation of best management practices (BMPs) described in the SWP3;

(c) indicates areas of the project where they have operational control over day-to-day activities; and

(d) includes, for areas where they have operational control over day-to-day activities, the name and site-specific TPDES authorization number of the parties with control over project specifications, including the ability to make modifications in specifications.

Section C. Deadlines for SWP3 Preparation, Implementation, and Compliance

The SWP3 must be prepared prior to obtaining authorization under this general permit, and implemented prior to commencing construction activities that result in soil disturbance. The SWP3 must be prepared so that it provides for compliance with the terms and conditions of this general permit.

Section D. Plan Review and Making Plans Available

1. The SWP3 must be retained on-site at the construction site or, if the site is inactive or does not have an on-site location to store the plan, a notice must be posted describing the location of the SWP3. The SWP3 must be made readily available at the time of an on-site inspection to: the executive director; a federal, state, or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; and the operator of a municipal separate storm sewer receiving discharges from the site.

2. In addition to the requirement to post the NOI, a primary operator of a large construction activity must post the site notice provided in Attachment 4 of this permit near the main

entrance of the construction site. An operator of a small construction activity seeking authorization under this general permit and a secondary operator of a large construction activity must post the site notice required in Part II.E.1., 2., or 3. of this permit in order to obtain authorization (see Attachments 1, 2, and 3). If the construction project is a linear construction project (e.g. pipeline or highway), the notices must be placed in a publicly accessible location near where construction is actively underway. Notices for these linear sites may be relocated, as necessary, along the length of the project. The notices must be readily available for viewing by the general public; local, state, and federal authorities; and contain the following information:

(a) the site-specific TPDES authorization number for the project if assigned;

(b) the operator name, contact name, and contact phone number;

(c) a brief description of the project; and

(d) the location of the SWP3.

3. This permit does not provide the general public with any right to trespass on a construction site for any reason, including inspection of a site; nor does this permit require that permittees allow members of the general public access to a construction site.

Section E. Revisions and Updates to SWP3s

The permittee must revise or update the SWP3 whenever the following occurs:

1. a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants and that has not been previously addressed in the SWP3;

2. changing site conditions based on updated plans and specifications, new operators, new areas of responsibility, and changes in BMPs; or

3. results of inspections or investigations by site operators, operators of a municipal separate storm sewer system receiving the discharge, authorized TCEQ personnel, or a federal, state or local agency approving sediment and erosion plans indicate the SWP3 is proving ineffective in eliminating or significantly minimizing pollutants in discharges authorized under this general permit.

Section F. Contents of SWP3

The SWP3 must include, at a minimum, the information described in this section.

1. A site or project description, which includes the following information:

(a) a description of the nature of the construction activity;

(b) a list of potential pollutants and their sources;

(c) a description of the intended schedule or sequence of activities that will disturb soils for major portions of the site;

(d) the total number of acres of the entire property and the total number of acres where construction activities will occur, including off-site material storage areas, overburden and stockpiles of dirt, and borrow areas that are authorized under the permittee's NOI;

(e) data describing the soil or the quality of any discharge from the site;

(f) a map showing the general location of the site (e.g. a portion of a city or county map);

(g) a detailed site map (or maps) indicating the following:

(i) drainage patterns and approximate slopes anticipated after major grading activities;

(ii) areas where soil disturbance will occur;

(iii) locations of all major structural controls either planned or in place;

(iv) locations where temporary or permanent stabilization practices are expected to be used;

(v) locations of construction support activities, including off-site activities, that are authorized under the permittee's NOI, including material, waste, borrow, fill, or equipment storage areas;

(vi) surface waters (including wetlands) either at, adjacent, or in close proximity to the site;

(vii) locations where storm water discharges from the site directly to a surface water body or a municipal separate storm sewer system; and

(viii) vehicle wash areas.

Where the amount of information required to be included on the map would result in a single map being difficult to read and interpret, the operator shall develop a series of maps that collectively include the required information.

(h) the location and description of support activities authorized under the permittee's NOI, including asphalt plants, concrete plants, and other activities providing support to the construction site that is authorized under this general permit;

(i) the name of receiving waters at or near the site that may be disturbed or that may receive discharges from disturbed areas of the project;

(j) a copy of this TPDES general permit, and

(k) the notice of intent (NOI) and acknowledgement certificate for primary operators of large construction sites, and the site notice for small construction sites and for secondary operators of large construction sites.

2. A description of the best management practices (BMPs) that will be used to minimize pollution in runoff.

The description must identify the general timing or sequence for implementation. At a minimum, the description must include the following components:

(a) General Requirements

(i) Erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type, and rainfall.

(ii) Control measures must be properly selected, installed, and maintained according to the manufacturer=s or designer=s specifications.

(iii) Controls must be developed to minimize the offsite transport of litter, construction debris, and construction materials.

(b) Erosion Control and Stabilization Practices

The SWP3 must include a description of temporary and permanent erosion control and stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where it is possible.

(i) Erosion control and stabilization practices may include but are not limited to: establishment of temporary or permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of existing trees and vegetation, slope texturing, temporary velocity dissipation devices, flow diversion mechanisms, and other similar measures.

(ii) The following records must be maintained and either attached to or referenced in the SWP3, and made readily available upon request to the parties listed in Part III.D.1 of this general permit:

(A) the dates when major grading activities occur;

(B) the dates when construction activities temporarily or permanently cease on a portion of the site; and

(C) the dates when stabilization measures are initiated.

(iii) Erosion control and stabilization measures must be initiated as soon as practicable in portions of the site where construction activities have temporarily ceased. Stabilization measures that provide a protective cover must be initiated as soon as practicable in portions of the site where construction activities have permanently ceased. Except as provided in (A) through (D) below, these measures must be initiated no more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased:

(A) Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable.

(B) Where construction activity on a portion of the site has temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary erosion control and stabilization measures are not required on that portion of site.

(C) In arid areas, semiarid areas, and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased or is precluded by arid conditions, erosion control and stabilization measures must be initiated as soon as practicable. Where vegetative controls are not feasible due to arid conditions, the operator shall install non-vegetative erosion controls. If non-vegetative controls are not feasible, the operator shall install temporary sediment controls as required in Paragraph (D) below.

(D) In areas where temporary stabilization measures are infeasible, the operator may alternatively utilize temporary perimeter controls. The operator must document in the SWP3 the reason why stabilization measures are not feasible, and must demonstrate that the perimeter controls will retain sediment on site to the extent practicable. The operator must continue to inspect the BMPs at the frequency established in Section III.F.7.(a) for unstabilized sites.

(iv) Final stabilization must be achieved prior to termination of permit coverage.

(c) Sediment Control Practices

The SWP3 must include a description of any sediment control practices used to remove eroded soils from storm water runoff, including the general timing or sequence for implementation of controls.

(i) Sites With Drainage Areas of Ten or More Acres

(A) Sedimentation Basin(s)

(1) A sedimentation basin is required, where feasible, for a common drainage location that serves an area with ten (10) or more acres disturbed at one time. A sedimentation basin may be temporary or permanent, and must provide sufficient storage to contain a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained. When calculating the volume of runoff from a 2-year, 24-hour storm event, it is not required to include the flows from offsite areas and flow from onsite areas that are either undisturbed or have already undergone permanent stabilization, if these flows are diverted around both the disturbed areas of the site and the sediment basin. Capacity calculations shall be included in the SWP3.

(2) Where rainfall data is not available or a calculation cannot be performed, the sedimentation basin must provide at least 3,600 cubic feet of storage per acre drained until final stabilization of the site.

(3) If a sedimentation basin is not feasible, then the permittee shall provide equivalent control measures until final stabilization of the site. In determining whether installing a sediment basin is feasible, the permittee may consider factors such as site soils, slope, available area, public safety, precipitation patterns, site geometry, site vegetation, infiltration capacity, geotechnical factors, depth to groundwater, and other similar considerations. The permittee shall document the reason that the sediment basins are not feasible, and shall utilize equivalent control measures, which may include a series of smaller sediment basins.

(B) Perimeter Controls: At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area, and for those side slope boundaries deemed appropriate as dictated by individual site conditions.

(ii) Controls for Sites With Drainage Areas Less than Ten Acres:

(A) Sediment traps and sediment basins may be used to control solids in storm water runoff for drainage locations serving less than ten (10) acres. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope

boundaries of the construction area, and for those side slope boundaries deemed appropriate as dictated by individual site conditions.

(B) Alternatively, a sediment basin that provides storage for a calculated volume of runoff from a 2-year, 24-hour storm from each disturbed acre drained may be utilized. Where rainfall data is not available or a calculation cannot be performed, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained may be provided. If a calculation is performed, then the calculation shall be included in the SWP3.

3. A Description of Permanent Storm Water Controls

A description of any measures that will be installed during the construction process to control pollutants in storm water discharges that may occur after construction operations have been completed must be included in the SWP3. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site or prior to submission of an NOT.

4. Other Required Controls and BMPs

(a) Permittees shall minimize, to the extent practicable, the off-site vehicle tracking of sediments and the generation of dust. The SWP3 shall include a description of controls utilized to accomplish this requirement.

(b) The SWP3 must include a description of construction and waste materials expected to be stored on-site and a description of controls to minimize pollutants from these materials.

(c) The SWP3 must include a description of potential pollutant sources from areas other than construction (such as storm water discharges from dedicated asphalt plants and dedicated concrete batch plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

(d) Permittees shall place velocity dissipation devices at discharge locations and along the length of any outfall channel (i.e., runoff conveyance) to provide a non-erosive flow velocity from the structure to a water course, so that the natural physical and biological characteristics and functions are maintained and protected.

(e) Permittees shall design and utilize appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water from the site.

5. Documentation of Compliance with Approved State and Local Plans

(a) Permittees must ensure that the SWP3 is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by federal, state, or local officials.

(b) SWP3s must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or storm water management site plans or site permits approved by state or local official for which the permittee receives written notice.

(c) If the permittee is required to prepare a separate management plan, including but not limited to a Water Pollution Abatement Plan or Contributing Zone Plan in accordance with 30 TAC Chapter 213 (related to the Edwards Aquifer), then a copy of that plan must be either included in the SWP3 or made readily available upon request to authorized personnel of the TCEQ. The permittee shall maintain a copy of the approval letter for the plan in its SWP3.

6. Maintenance Requirements

(a) All protective measures identified in the SWP3 must be maintained in effective operating condition. If, through inspections or other means, the permittee determines that BMPs are not operating effectively, then the permittee shall perform maintenance as necessary to maintain the continued effectiveness of storm water controls, and prior to the next rain event if feasible. If maintenance prior to the next anticipated storm event is impracticable, the reason shall be documented in the SWP3 and maintenance must be scheduled and accomplished as soon as practicable. Erosion and sediment controls that have been intentionally disabled, run-over, removed, or otherwise rendered ineffective must be replaced or corrected immediately upon discovery.

(b) If periodic inspections or other information indicates a control has been used incorrectly, is performing inadequately, or is damaged, then the operator must replace or modify the control as soon as practicable after making the discovery.

(c) Sediment must be removed from sediment traps and sedimentation ponds no later than the time that design capacity has been reduced by 50%. For perimeter controls such as silt fences, berms, etc., the trapped sediment must be removed before it reaches 50% of the above-ground height.

(d) If sediment escapes the site, accumulations must be removed at a frequency that minimizes off-site impacts, and prior to the next rain event, if feasible. If the permittee does not own or operate the off-site conveyance, then the permittee must to work with the owner or operator of the property to remove the sediment.

7. Inspections of Controls

(a) Personnel provided by the permittee must inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, discharge locations, and structural controls for evidence of, or the potential for, pollutants entering the drainage system. Personnel conducting these inspections must be knowledgeable of this general permit, familiar with the construction site, and knowledgeable of the SWP3 for the site. Sediment and erosion control measures identified in the SWP3 must be inspected to ensure that they are operating correctly. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking. Inspections must be conducted at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized or where runoff is unlikely due to winter conditions (e.g. site is covered with snow, ice, or frozen ground exists), inspections must be conducted at least once every month. In arid or semi-arid areas, inspections must be conducted at least once every month and within 24 hours after the end of a storm event of 0.5 inches or greater.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, then the inspection must occur on a specifically defined day, regardless of whether or not there has been a rainfall event since the previous inspection. The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of "dry" season and beginning of "wet" season).

(b) Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may provide inspection personnel with limited access to the areas described in Part III.F.8.(a) above. Inspection of these areas could require that vehicles compromise temporarily or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described in Part III.F.8.(a) above. The conditions of the controls along each inspected 0.25 mile portion may be considered as representative of the condition of controls along that

reach extending from the end of the 0.25 mile portion to either the end of the next 0.25 mile inspected portion, or to the end of the project, whichever occurs first.

As an alternative to the above-described inspection schedule of once every 14 calendar days and within 24 hours of a storm event of 0.5 inches or greater, the SWP3 may be developed to require that these inspections will occur at least once every seven (7) calendar days. If this alternative schedule is developed, the inspection must occur on a specifically defined day, regardless of whether or not there has been a rainfall event since the previous inspection. The inspections may occur on either schedule provided that the SWP3 reflects the current schedule and that any changes to the schedule are conducted in accordance with the following provisions: the schedule may be changed a maximum of one time each month, the schedule change must be implemented at the beginning of a calendar month, and the reason for the schedule change must be documented in the SWP3 (e.g., end of "dry" season and beginning of "wet" season).

(c) In the event of flooding or other uncontrollable situations which prohibit access to the inspection sites, inspections must be conducted as soon as access is practicable.

(d) The SWP3 must be modified based on the results of inspections, as necessary, to better control pollutants in runoff. Revisions to the SWP3 must be completed within seven (7) calendar days following the inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SWP3 and wherever possible those changes implemented before the next storm event. If implementation before the next anticipated storm event is impracticable, these changes must be implemented as soon as practicable.

(e) A report summarizing the scope of the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWP3 must be made and retained as part of the SWP3. Major observations should include: The locations of discharges of sediment or other pollutants from the site; locations of BMPs that need to be maintained; locations of BMPs that failed to operate as designed or proved inadequate for a particular location; and locations where additional BMPs are needed.

Actions taken as a result of inspections must be described within, and retained as a part of, the SWP3. Reports must identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the facility or site is in compliance with the SWP3 and this permit. The report must be signed by the person and in the manner required by 30 TAC ' 305.128 (relating to Signatories to Reports).

The names and qualifications of personnel making the inspections for the permittee may be documented once in the SWP3 rather than being included in each report.

8. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for all eligible non-storm water components of the discharge, as listed in Part II.A.3. of this permit.

9. The SWP3 must include the information required in Part III.B. of this general permit.

Part IV. Storm Water Runoff from Concrete Batch Plants

Discharges of storm water runoff from concrete batch plants at regulated construction sites may be authorized under the provisions of this general permit provided that the following requirements are met for concrete batch plant(s) authorized under this permit. If discharges of storm water runoff from concrete batch plants are not covered under this general permit, then discharges must be authorized under an alternative general permit or individual permit. This permit does not authorize the discharge or land disposal of any wastewater from concrete batch plants at regulated construction sites. Authorization for these wastes must be obtained under an individual permit or an alternative general permit.

Section A. Benchmark Sampling Requirements

1. Operators of concrete batch plants authorized under this general permit must sample the storm water runoff from the concrete batch plants according to the requirements of this section of this general permit, and must conduct evaluations on the effectiveness of the SWP3 based on the following benchmark monitoring values:

Benchmark Parameter	Benchmark Value	Sampling Frequency	Sample Type
Oil and Grease	15 mg/L	1/quarter (*1)(*2)	Grab (*3)
Total Suspended Solids	100 mg/L	1/quarter (*1)(*2)	Grab (*3)
pH	6.0 - 9.0 Standard Units	1/quarter (*1)(*2)	Grab (*3)
Total Iron	1.3 mg/L	1/quarter(*1)(*2)	Grab (*3)

(*1) When discharge occurs. Sampling is required within the first 30 minutes of discharge. If it is not practicable to take the sample, or to complete the sampling, within the first 30 minutes, sampling must be completed within the first hour of discharge. If sampling is not completed within the first 30 minutes of discharge, the reason must be documented and attached to all required reports and records of the sampling activity.

(*2) Sampling must be conducted at least once during each of the following periods. The first sample must be collected during the first full quarter that a storm water discharge occurs from a concrete batch plant authorized under this general permit.

January through March
April through June
July through September
October through December

For projects lasting less than one full quarter, a minimum of one sample shall be collected, provided that a storm water discharge occurred at least once following

submission of the NOI or following the date that automatic authorization was obtained under Section II.E.2., and prior to terminating coverage.

(*3) A grab sample shall be collected from the storm water discharge resulting from a storm event that is at least 0.1 inches of measured precipitation that occurs at least 72 hours from the previously measurable storm event. The sample shall be collected downstream of the concrete batch plant, and where the discharge exits any BMPs utilized to handle the runoff from the batch plant, prior to commingling with any other water authorized under this general permit.

2. The permittee must compare the results of sample analyses to the benchmark values above, and must include this comparison in the overall assessment of the SWP3's effectiveness. Analytical results that exceed a benchmark value are not a violation of this permit, as these values are not numeric effluent limitations. Results of analyses are indicators that modifications of the SWP3 should be assessed and may be necessary to protect water quality. The operator must investigate the cause for each exceedance and must document the results of this investigation in the SWP3 by the end of the quarter following the sampling event.

The operator's investigation must identify the following:

(a) any additional potential sources of pollution, such as spills that might have occurred,

(b) necessary revisions to good housekeeping measures that are part of the SWP3,

(c) additional BMPs, including a schedule to install or implement the BMPs, and

(d) other parts of the SWP3 that may require revisions in order to meet the goal of the benchmark values.

Background concentrations of specific pollutants may also be considered during the investigation. If the operator is able to relate the cause of the exceedance to background concentrations, then subsequent exceedances of benchmark values for that pollutant may be resolved by referencing earlier findings in the SWP3. Background concentrations may be identified by laboratory analyses of samples of storm water runon to the permitted facility, by laboratory analyses of samples of storm water run-off from adjacent non-industrial areas, or by identifying the pollutant is a naturally occurring material in soils at the site.

Section B. Best Management Practices (BMPs) and SWP3 Requirements

Minimum Storm Water Pollution Prevention Plan (SWP3) Requirements – The following are required in addition to other SWP3 requirements listed in this general permit (including, but not limited to Part III.F.7. of this permit):

1. Description of Potential Pollutant Sources - The SWP3 must provide a description of potential sources (activities and materials) that may reasonably be expected to affect the quality of storm water discharges associated with concrete batch plants authorized under this permit. The SWP3 must describe practices that that will be used to reduce the pollutants in

these discharges to assure compliance with this general permit, including the protection of water quality, and must ensure the implementation of these practices.

The following must be developed, at a minimum, in support of developing this description:

(a) Drainage – The site map must include the following information:

(1) the location of all outfalls for storm water discharges associated with concrete batch plants that are authorized under this permit;

(2) a depiction of the drainage area and the direction of flow to the outfall(s);

(3) structural controls used within the drainage area(s);

(4) the locations of the following areas associated with concrete batch plants that are exposed to precipitation: vehicle and equipment maintenance activities (including fueling, repair, and storage areas for vehicles and equipment scheduled for maintenance); areas used for the treatment, storage, or disposal of wastes; liquid storage tanks; material processing and storage areas; and loading and unloading areas; and

(5) the locations of the following: any bag house or other dust control device(s); recycle/sedimentation pond, clarifier or other device used for the treatment of facility wastewater (including the areas that drain to the treatment device); areas with significant materials; and areas where major spills or leaks have occurred.

(b) Inventory of Exposed Materials – A list of materials handled at the concrete batch plant that may be exposed to storm water and that have a potential to affect the quality of storm water discharges associated with concrete batch plants that are authorized under this general permit.

(c) Spills and Leaks - A list of significant spills and leaks of toxic or hazardous pollutants that occurred in areas exposed to storm water and that drain to storm water outfalls associated with concrete batch plants authorized under this general permit must be developed, maintained, and updated.

(d) Sampling Data - A summary of existing storm water discharge sampling data must be maintained, if available.

2. Measures and Controls - The SWP3 must include a description of management controls to regulate pollutants identified in the SWP3's "Description of Potential Pollutant Sources" from Part IV.B.1.(a) of this permit, and a schedule for implementation of the measures and controls. This must include, at a minimum:

(a) Good Housekeeping - Good housekeeping measures must be developed and implemented in the area(s) associated with concrete batch plants.

(1) Operators must prevent or minimize the discharge of spilled cement, aggregate (including sand or gravel), settled dust, or other significant materials from paved portions of the site that are exposed to storm water. Measures used to minimize the presence of these materials may include regular sweeping or other equivalent practices. These practices must be conducted at a frequency that is determined based on consideration of the amount of industrial activity occurring in the area and frequency of precipitation, and shall occur at least once per week when cement or aggregate is being handled or otherwise processed in the area.

(2) Operators must prevent the exposure of fine granular solids, such as cement, to storm water. Where practicable, these materials must be stored in enclosed silos, hoppers or buildings, in covered areas, or under covering.

(b) Spill Prevention and Response Procedures - Areas where potential spills that can contribute pollutants to storm water runoff, and the drainage areas from these locations, must be identified in the SWP3. Where appropriate, the SWP3 must specify material handling procedures, storage requirements, and use of equipment. Procedures for cleaning up spills must be identified in the SWP3 and made available to the appropriate personnel.

(c) Inspections - Qualified facility personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP3 related to the concrete batch plant(s) for the site) must be identified to inspect designated equipment and areas of the facility specified in the SWP3. The inspection frequency must be specified in the SWP3 based upon a consideration of the level of concrete production at the facility, but must be a minimum of once per month while the facility is in operation. The inspection must take place while the facility is in operation and must, at a minimum, include all areas that are exposed to storm water at the site, including material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, truck wash down and equipment cleaning areas. Follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections must be maintained and be made readily available for inspection upon request.

(d) Employee Training - An employee training program must be developed to educate personnel responsible for implementing any component of the SWP3, or personnel otherwise responsible for storm water pollution prevention, with the provisions of the SWP3. The frequency of training must be documented in the SWP3, and at a minimum, must consist of one training prior to the initiation of operation of the concrete batch plant.

(e) Record Keeping and Internal Reporting Procedures - A description of spills and similar incidents, plus additional information that is obtained regarding the quality and quantity of storm water discharges, must be included in the SWP3. Inspection and maintenance activities must be documented and records of those inspection and maintenance activities must be incorporated in the SWP3.

(f) Management of Runoff - The SWP3 shall contain a narrative consideration for reducing the volume of runoff from concrete batch plants by diverting runoff or otherwise managing runoff, including use of infiltration, detention ponds, retention ponds, or reusing of runoff.

3. Comprehensive Compliance Evaluation – At least once per year, one or more qualified personnel (i.e., a person or persons with knowledge of this general permit, the concrete batch plant, and the SWP3 related to the concrete batch plant(s) for the site) shall conduct a compliance evaluation of the plant. The evaluation must include the following.

(a) Visual examination of all areas draining storm water associated with regulated concrete batch plants for evidence of, or the potential for, pollutants entering the drainage system. These include but are not limited to: cleaning areas, material handling areas, above ground storage tanks, hoppers or silos, dust collection/containment systems, and truck wash down and equipment cleaning areas. Measures implemented to reduce pollutants in runoff (including structural controls and implementation of management practices) must be evaluated to determine if they are effective and if they are implemented in accordance with the terms of this permit and with the permittee's SWP3. The operator shall conduct a visual inspection of equipment needed to implement the SWP3, such as spill response equipment.

(b) Based on the results of the evaluation, the following must be revised as appropriate within two weeks of the evaluation: the description of potential pollutant sources identified in the SWP3 (as required in Part IV.B.1., "Description of Potential Pollutant Sources"); and pollution prevention measures and controls identified in the SWP3 (as required in Part IV.B.2., "Measures and Controls"). The revisions may include a schedule for implementing the necessary changes.

(c) The permittee shall prepare and include in the SWP3 a report summarizing the scope of the evaluation, the personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the SWP3, and actions taken in response to the findings of the evaluation. The report must identify any incidents of noncompliance. Where the report does not identify incidences of noncompliance, the report must contain a statement that the evaluation did not identify any incidence(s), and the report must be signed according to 30 TAC Section 305.128, relating to Signatories to Reports.

(d) The Comprehensive Compliance Evaluation may substitute for one of the required inspections delineated in Part IV.B.2.(c) of this general permit.

Section C. Prohibition of Wastewater Discharges

Wastewater discharges associated with concrete production including wastewater disposal by land application are not authorized under this general permit. These wastewater discharges must be authorized under an alternative TCEQ water quality permit or otherwise disposed of in an authorized manner. Discharges of concrete truck washout at construction sites may be authorized if conducted in accordance with the requirements of Part V of this general permit.

Part V. Concrete Truck Wash Out Requirements

This general permit authorizes the wash out of concrete trucks at construction sites regulated under Sections II.E.1., 2., and 3. of this general permit, provided the following requirements are met. Authorization is limited to the land disposal of wash out water from concrete trucks that are associated with off-site production facilities. Wash out water associated with on-site concrete production facilities must be authorized under a separate TCEQ general permit or individual permit.

1. Direct discharge of concrete truck wash out water to surface water in the state, including discharge to storm sewers, is prohibited by this general permit.

2. Concrete truck wash out water shall be discharged to areas at the construction site where structural controls have been established to prevent direct discharge to surface waters, or to areas that have a minimal slope that allow infiltration and filtering of wash out water to prevent direct discharge to surface waters. Structural controls may consist of temporary berms, temporary shallow pits, temporary storage tanks with slow rate release, or other reasonable measures to prevent runoff from the construction site.

3. Wash out of concrete trucks during rainfall events shall be minimized. The direct discharge of concrete truck wash out water is prohibited at all times, and the operator shall insure that its BMPs are sufficient to prevent the discharge of concrete truck washout as the result of rain.

4. The discharge of wash out water shall not cause or contribute to groundwater contamination.

5. If a SWP3 is required to be implemented, the SWP3 shall include concrete wash out areas on the associated map.

Part VI. Retention of Records

The permittee must retain the following records for a minimum period of three (3) years from the date that a NOT is submitted as required by Part II.E.3. For activities in which an NOT is not required, records shall be retained for a minimum period of three (3) years from the date that the operator terminates coverage under Section II.F.3. of this permit. Records include:

1. A copy of the SWP3;

2. All reports and actions required by this permit, including a copy of the construction site notice;

3. All data used to complete the NOI, if an NOI is required for coverage under this general permit; and

4. All records of submittal of forms submitted to the operator of any MS4 receiving the discharge and to the secondary operator of a large construction site, if applicable.

Part VII. Standard Permit Conditions

1. The permittee has a duty to comply with all permit conditions. Failure to comply with any permit condition is a violation of the permit and statutes under which it was issued, and is grounds for enforcement action, for terminating coverage under this general permit, or for requiring a discharger to apply for and obtain an individual TPDES permit.

2. Authorization under this general permit may be suspended or revoked for cause. Filing a notice of planned changes or anticipated non-compliance by the permittee does not stay any permit condition. The permittee must furnish to the executive director, upon request and within a reasonable time, any information necessary for the executive director to determine whether cause exists for revoking, suspending, or terminating authorization under this permit. Additionally, the permittee must provide to the executive director, upon request, copies of all records that the permittee is required to maintain as a condition of this general permit.

3. It is not a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the permit conditions.

4. Inspection and entry shall be allowed under Texas Water Code Chapters 26-28, Texas Health and Safety Code "361.032-361.033 and 361.037, and 40 Code of Federal Regulations (CFR) '122.41(i). The statement in Texas Water Code '26.014 that commission entry of a facility shall occur according to an establishment's rules and regulations concerning safety, internal security, and fire protection is not grounds for denial or restriction of entry to any part of the facility or site, but merely describes the commission's duty to observe appropriate rules and regulations during an inspection.

5. The discharger is subject to administrative, civil, and criminal penalties, as applicable, under Texas Water Code "26.136, 26.212, and 26.213 for violations including but not limited to the following:

   a. negligently or knowingly violating the federal Clean Water Act (CWA), "301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under CWA, '402, or any requirement imposed in a pretreatment program approved under CWA, "402(a)(3) or 402(b)(8);

   b. knowingly making any false statement, representation, or certification in any record or other document submitted or required to be maintained under a permit, including monitoring reports or reports of compliance or noncompliance.

6. All reports and other information requested by the executive director must be signed by the person and in the manner required by 30 TAC '305.128 (relating to Signatories to Reports).

7. Authorization under this general permit does not convey property or water rights of any sort and does not grant any exclusive privilege.

Part VIII. Fees

1. A fee of must be submitted along with the NOI:

   a. $325 if submitting a paper NOI, or
   b. $225 if submitting a NOI electronically.

2. Fees are due upon submission of the NOI. An NOI will not be declared administratively complete unless the associated fee has been paid in full.

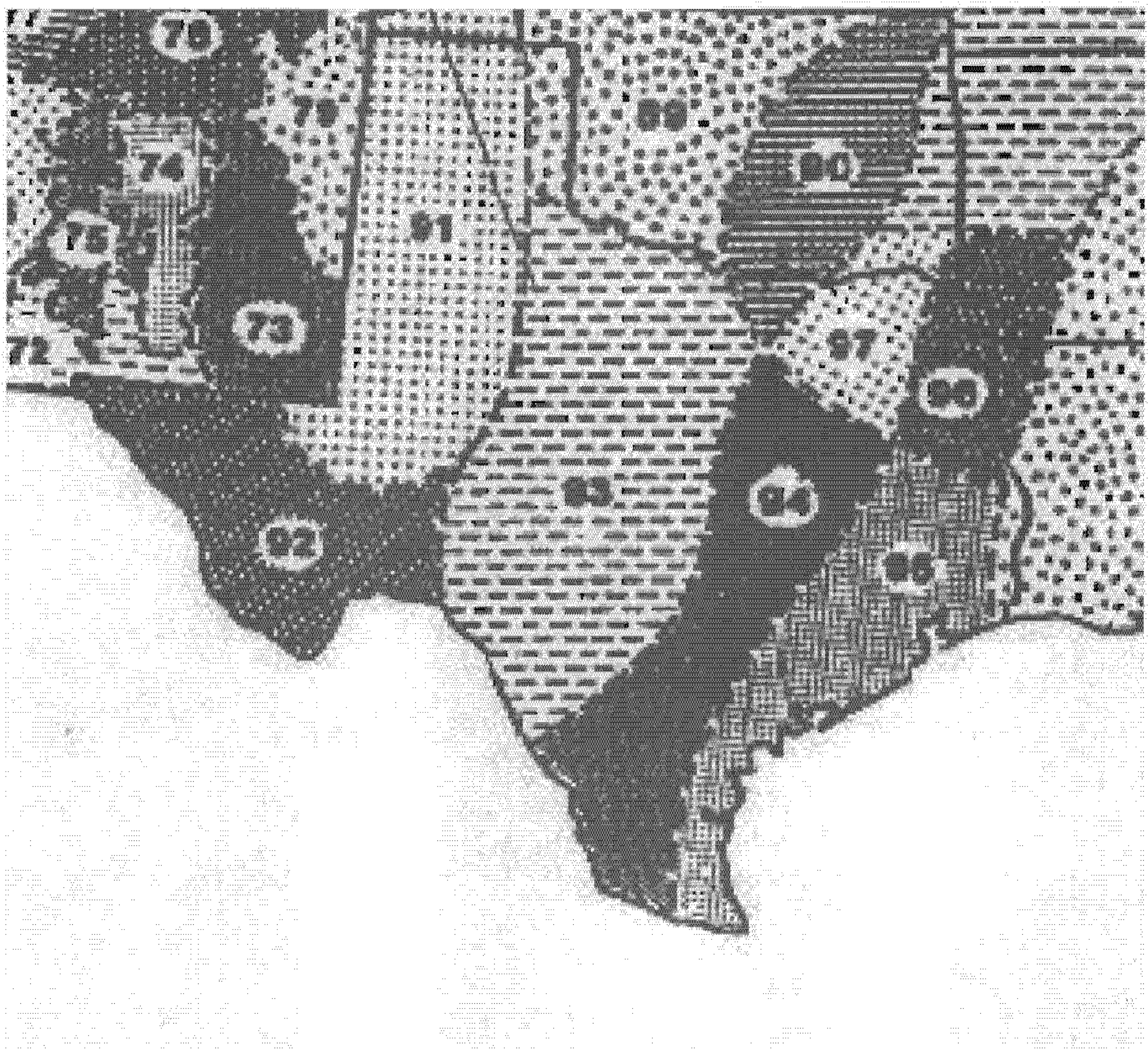
3. No separate annual fees will be assessed. The Water Quality Annual fee has been incorporated into the NOI fees as described above.

Appendix A: Automatic Authorization

Periods of Low Erosion Potential by County – Eligible Date Ranges

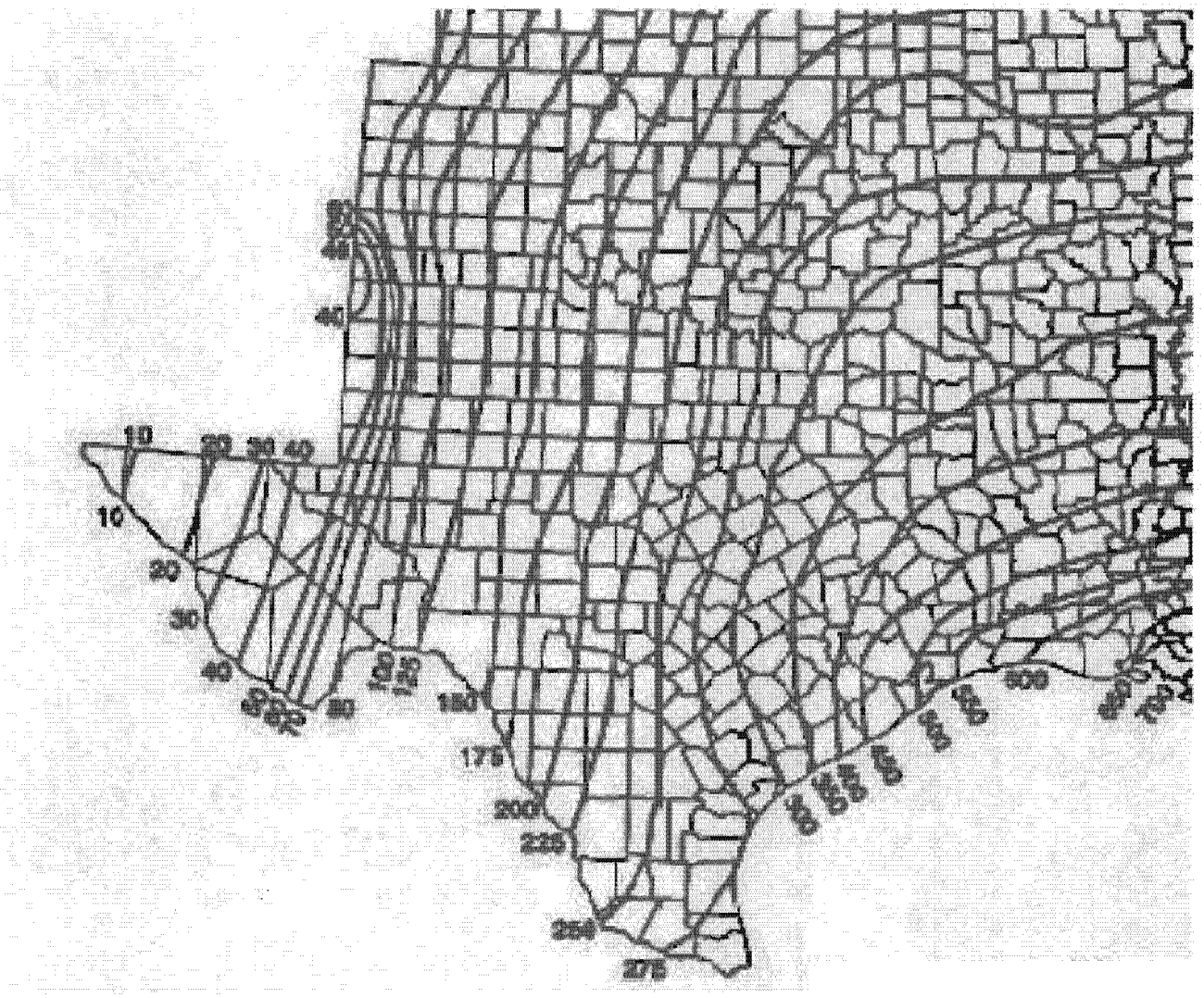
Andrews: Nov. 15 - Apr. 30
Archer: Dec. 15 - Feb. 14
Armstrong: Nov. 15 - Apr. 30
Bailey: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Baylor: Dec. 15 - Feb. 14
Borden: Nov. 15 - Apr. 30
Brewster: Nov. 15 - Apr. 30
Briscoe: Nov. 15 - Apr. 30
Brown: Dec. 15 - Feb. 14
Callahan: Dec. 15 - Feb. 14
Carson: Nov. 15 - Apr. 30
Castro: Nov. 15 - Apr. 30
Childress: Dec. 15 - Feb. 14
Cochran: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Coke: Dec. 15 - Feb. 14
Coleman: Dec. 15 - Feb. 14
Collingsworth: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28
Concho: Dec. 15 - Feb. 14
Cottle: Dec. 15 - Feb. 14
Crane: Nov. 15 - Apr. 30
Crockett: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Crosby: Nov. 15 - Apr. 30
Culberson: Nov. 1 - May 14
Dallam: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Dawson: Nov. 15 - Apr. 30
Deaf Smith: Nov. 15 - Apr. 30
Dickens: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Dimmit: Dec. 15 - Feb. 14
Donley: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28
Eastland: Dec. 15 - Feb. 14
Ector: Nov. 15 - Apr. 30
Edwards: Dec. 15 - Feb. 14
El Paso: Jan. 1 - Jul. 14, or May 15 - Jul. 31, or Jun. 1 - Aug. 14, or Jun. 15 - Sept. 14, or Jul. 1 - Oct. 14, or Jul. 15 - Oct. 31, or Aug. 1 - Apr. 30, or Aug. 15 - May 14, or Sept. 1 - May 30, or Oct. 1 - Jun. 14, or Nov. 1 - Jun. 30, or Nov. 15 - Jul. 14
Fisher: Dec. 15 - Feb. 14
Floyd: Nov. 15 - Apr. 30
Foard: Dec. 15 - Feb. 14
Gaines: Nov. 15 - Apr. 30
Garza: Nov. 15 - Apr. 30
Glasscock: Nov. 15 - Apr. 30
Hale: Nov. 15 - Apr. 30
Hall: Feb. 1 - Mar. 30
Hansford: Nov. 15 - Apr. 30
Hardeman: Dec. 15 - Feb. 14
Hartley: Nov. 15 - Apr. 30
Haskell: Dec. 15 - Feb. 14
Hockley: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Howard: Nov. 15 - Apr. 30
Hudspeth: Nov. 1 - May 14
Hutchinson: Nov. 15 - Apr. 30
Irion: Dec. 15 - Feb. 14
Jeff Davis: Nov. 1 - Apr. 30 or Nov. 15 - May 14
Jones: Dec. 15 - Feb. 14
Kent: Nov. 15 - Jan. 14 or Feb. 1 - Mar. 30
Kerr: Dec. 15 - Feb. 14
Kimble: Dec. 15 - Feb. 14
King: Dec. 15 - Feb. 14
Kinney: Dec. 15 - Feb. 14
Knox: Dec. 15 - Feb. 14
Lamb: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Loving: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Lubbock: Nov. 15 - Apr. 30
Lynn: Nov. 15 - Apr. 30
Martin: Nov. 15 - Apr. 30
Mason: Dec. 15 - Feb. 14
Maverick: Dec. 15 - Feb. 14
McCulloch: Dec. 15 - Feb. 14
Menard: Dec. 15 - Feb. 14
Midland: Nov. 15 - Apr. 30
Mitchell: Nov. 15 - Apr. 30
Moore: Nov. 15 - Apr. 30
Motley: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Nolan: Dec. 15 - Feb. 14
Oldham: Nov. 15 - Apr. 30
Parmer: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Pecos: Nov. 15 - Apr. 30
Potter: Nov. 15 - Apr. 30
Presidio: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Randall: Nov. 15 - Apr. 30
Reagan: Nov. 15 - Apr. 30
Real: Dec. 15 - Feb. 14
Reeves: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Runnels: Dec. 15 - Feb. 14
Schleicher: Dec. 15 - Feb. 14
Scurry: Nov. 15 - Apr. 30
Shackelford: Dec. 15 - Feb. 14
Sherman: Nov. 15 - Apr. 30
Stephens: Dec. 15 - Feb. 14
Sterling: Nov. 15 - Apr. 30
Stonewall: Dec. 15 - Feb. 14
Sutton: Dec. 15 - Feb. 14
Swisher: Nov. 15 - Apr. 30
Taylor: Dec. 15 - Feb. 14
Terrell: Nov. 15 - Apr. 30
Terry: Nov. 15 - Apr. 30
Throckmorton: Dec. 15 - Feb. 14
Tom Green: Dec. 15 - Feb. 14
Upton: Nov. 15 - Apr. 30
Uvalde: Dec. 15 - Feb. 14
Val Verde: Nov. 15 - Jan. 14, or Feb. 1 - Mar. 30
Ward: Nov. 1 - Apr. 14, or Nov. 15 - Apr. 30
Wichita: Dec. 15 - Feb. 14
Wilbarger: Dec. 15 - Feb. 14
Winkler: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Yoakum: Nov. 1 - Apr. 30, or Nov. 15 - May 14
Young: Dec. 15 - Feb. 14
Wheeler: Jan. 1 - Mar. 30, or Dec. 1 - Feb. 28
Zavala: Dec. 15 - Feb. 14

Appendix B:
Erosivity Index (EI) Zones in Texas



Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Appendix C: Isoerodent Map



Adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Appendix D: Erosivity Indices for EI Zones in Texas

Periods:

EI#:	1/1	1/15	2/1	2/15	3/1	3/15	4/1	4/15	5/1	5/15	6/1	6/15	7/1	7/15	8/1	8/15	9/1	9/15	10/1	10/15	11/1	11/15	12/1	12/15
89	0	0	1	1	2	3	4	7	12	18	27	38	48	55	62	69	76	83	90	94	97	98	99	100
90	0	1	2	3	4	6	8	13	21	29	37	46	54	60	65	69	74	81	87	92	95	97	98	99
91	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100
92	0	0	0	0	1	1	1	2	6	16	29	39	46	53	60	67	74	81	88	95	99	99	100	100
93	0	1	1	2	3	4	6	8	13	25	40	49	56	62	67	72	76	80	85	91	97	98	99	99
94	0	1	2	4	6	8	10	15	21	29	38	47	53	57	61	65	70	76	83	88	91	94	96	98
95	0	1	3	5	7	9	11	14	18	27	35	41	46	51	57	62	68	73	79	84	89	93	96	98
96	0	2	4	6	9	12	17	23	30	37	43	49	54	58	62	66	70	74	78	82	86	90	94	97
97	0	1	3	5	7	10	14	20	28	37	48	56	61	64	68	72	77	81	86	89	92	95	98	99
106	0	3	6	9	13	17	21	27	33	38	44	49	55	61	67	71	75	78	81	84	86	90	94	97

- Each period begins on the date listed in the table above and lasts until the day before the following period. The final period begins on December 15 and ends on December 31.

Table adapted from Chapter 2 of USDA Agriculture Handbook 703: "Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)," U.S. Department of Agriculture, Agricultural Research Service

Attachment 1

SMALL CONSTRUCTION SITE NOTICE: LOW POTENTIAL FOR EROSION

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

The following information is posted in compliance with **Part II.E.1.** of the TCEQ General Permit Number TXR150000 for discharges of storm water runoff from small construction sites automatically authorized based on low rainfall erosivity. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/wq_construction.html

Operator Name:	
Contact Name and Phone Number:	
Project Description: (Physical address or description of the site=s location, estimated start date and projected end date, or date that disturbed soils will be stabilized)	

For Small Construction Sites Authorized Under Part II.E.1., the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an automatic authorization based on low rainfall erosivity under Part II.E.1. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. Construction activities at this site shall occur within a time period listed in Appendix A of the TPDES general permit for this county, that period beginning on and ending on _____. I understand that if construction activities continue past this period, all storm water runoff must be authorized under a separate provision of the general permit. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title _____ Date_____

_____ *Date Notice Removed*

_____ *MS4 operator notified per Part II.F.3.*

Attachment 2

SMALL CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

The following information is posted in compliance with **Part II.E.2.** of the TCEQ General Permit Number TXR150000 for discharges of storm water runoff from small construction sites. Additional information regarding the TCEQ storm water permit program may be found on the internet at:
http://www.tceq.state.tx.us/nav/permits/wq_construction.html

Operator Name:	
Contact Name and Phone Number:	
Project Description: *Physical address or description of the site=s location, estimated start date and projected end date, or date that disturbed soils will be stabilized*	
Location of Storm Water Pollution Prevention Plan:	

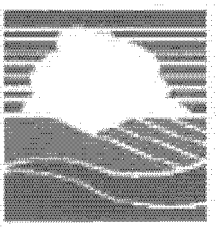
For Small Construction Activities Authorized Under Part II.E.2. (Obtaining Authorization to Discharge) the following certification must be completed:

I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.D.2. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A storm water pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title_____ Date _____

_____ *Date Notice Removed*
_____ *MS4 operator notified per Part II.F.3.*

Attachment 3



LARGE CONSTRUCTION SITE NOTICE

FOR THE

Texas Commission on Environmental Quality (TCEQ)

Storm Water Program

TPDES GENERAL PERMIT TXR150000

"SECONDARY OPERATOR" NOTICE

This notice applies to secondary operators of construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.E.2. of the general permit. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: *Physical address or description of the site=s location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.*	
Location of Storm Water Pollution Prevention Plan (SWP3):	

For Large Construction Activities Authorized Under Part II.E.3. (Obtaining Authorization to Discharge) the following certification must be completed:

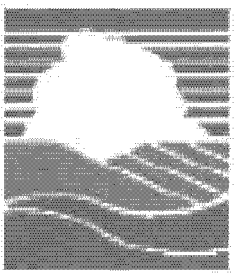
I _____ (Typed or Printed Name Person Completing This Certification) certify under penalty of law that I have read and understand the eligibility requirements for claiming an authorization under Part II.E.2. of TPDES General Permit TXR150000 and agree to comply with the terms of this permit. A storm water pollution prevention plan has been developed and will be implemented prior to construction, according to permit requirements. A copy of this signed notice is supplied to the operator of the MS4 if discharges enter an MS4. I am aware there are significant penalties for providing false information or for conducting unauthorized discharges, including the possibility of fine and imprisonment for knowing violations.

Signature and Title_____ Date _____

_____*Date Notice Removed*

____*MS4 operator notified per Part II.F.3.*

Attachment 4



LARGE CONSTRUCTION SITE NOTICE

FOR THE
Texas Commission on Environmental Quality (TCEQ)
Storm Water Program

TPDES GENERAL PERMIT TXR150000

"PRIMARY OPERATOR" NOTICE

This notice applies to construction sites operating under Part II.E.3. of the TPDES General Permit Number TXR150000 for discharges of storm water runoff from construction sites equal to or greater than five acres, including the larger common plan of development. The information on this notice is required in Part III.E.2. of the general permit. This notice shall be posted along with a copy of the signed Notice of Intent (NOI), as applicable. Additional information regarding the TCEQ storm water permit program may be found on the internet at: http://www.tceq.state.tx.us/nav/permits/sw_permits.html

Site-Specific TPDES Authorization Number:	
Operator Name:	
Contact Name and Phone Number:	
Project Description: *Physical address or description of the site=s location, and estimated start date and projected end date, or date that disturbed soils will be stabilized.*	
Location of Storm Water Pollution Prevention Plan:	

TCEQ
Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: **March 12, 2012** NUMBER OF PAGES *(including this cover sheet)*: **2**

TO: Name **Joey Guerra** mel@integratedrealtygroup.com
Organization **Cross Canyon Ranch, LTD**
FAX Number **(210) 499-4217**

TO: Name **Martin Keller**
Organization **Baker Surveying**
FAX Number **(830) 833-2257**

FROM: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Name **Yuliya Dunaway**
Division/Region **EAPP/San Antonio**
Telephone Number **210/490-3096**
FAX Number **210/545-4329**

NOTES:

Re: Edwards Aquifer, Comal County
NAME OF PROJECT: Cross Canyon Ranch; Located approximately 2 miles north of the intersection of Mystic Canyon and FM 306; Comal County, Texas

TYPE OF PLAN: Request for Approval of a Contributing Zone Plan (CZP); 30 Texas Administrative Code (TAC) Chapter 213 Subchapter B Edwards Aquifer;

Dear Mr. Guerra and Mr. Keller:

ADMINISTRATIVE DEFICIENCY NOTICE

The referenced application, received from you on March 9, 2012, has been determined to be administratively incomplete and is returned for your further action. **The application must be picked up from our office** and the changes below must be made before it can be resubmitted for another administrative review. Also, please recheck all other parts of your submittal with respect to their adequacy and completeness to avoid later possible delays in your application processing. Your check will be retained and applied toward resubmission or you may request a refund.

The most recent application and related correspondence has been reviewed and determined to

be administratively incomplete for the following reasons:

General Comments:

1. The proposed construction is a part of the Hills at Canyon Lake Development that was previously approved letter dated June 19, 2006 (EAPP File No. 2503.00). Therefore a modification of the previously approved plan is required. Provide a completed Modification Form (TCEQ-0590).

2. It appears that the proposed project consists of 204 acres owned by Cross Canyon Ranch and approved in previous CZP Application (EAPP 2503.00) and additional 115 acres owned by Ms. Patricia Mangan. Please provide two (2) Agent Authorization Forms from the property owners to Baker Surveying or provide documentation that Cross Canyon Ranch has the right to possess and control the additional 115 acres of the property.

3. Submit two (2) Core Data Forms for each property owner and provide second property owners information in TCEQ-10257, Item 2 or provide documentation that Cross Canyon Ranch has the right to possess and control the property.

4. The submitted review fee appears to be based on the project area. Review fees are based on a legal site boundary in which the project is to occur. If a modification is required, the fee should be based on the original legal site boundary. Revise the Fee Form as necessary and provide the appropriate fee. The submitted check for $4,000 will be applied for the review fee (unless requested otherwise). Please provide the remaining balance to supplement submitted check.

5. Item 6. Please provide a copy of the official 7 ½ minute USGS Quadrangle Map scale 1:2000 that shows project site boundaries.

6. Item 7. Attachment C. Project narrative should include site history, previous development, new acreage added to the previously approved site.

7. Item 22. Please provide Suitability Letters for the on-site sewage facilities for proposed project.

8. Item 34. Drainage slope % must be shown on the site plan and clearly outlined and labeled.

9. Item 42 through 44. This is a requirement that must be acknowledged. Please provide the appropriate marks.

10. Please provide Temporary Storm Water Section TCEQ-0602 or properly developed SWPPP. Please follow the link below for more information on Construction General Permits and SWPPP.
http://www.tceq.texas.gov/assistance/sblga/water/sw-construction.html

Please call me at the number listed above if you have any questions. You can call anyone in the Edwards Aquifer Protection Program at 210/490-3096 to make arrangements to pick up the application. **END**

Kavanaugh Consulting, LLC
108 River Oaks Drive
Wimberley, Texas 78676
kavanaughconsulting@gmail.com
(512) 587 - 7397

April 6, 2012

TCEQ
EAPP
14250 Judson Road
San Antonio, Texas 78233

Re: Comment Responses – Cross Canyon Ranch CZP Application

Please find the attached revision and resubmittal of an application that was originally submitted to the TCEQ on March 8, 2012.

Regarding your comments to this Revised CZP application offered on March 12, 2012, we offer the following responses in *Italics* (copy of the Original Comments are also shown herein);

General Comments:

1. The proposed construction is a part of the Hills at Canyon Lake Development that was previously approved by letter dated June 19, 2006 (EAPP File No. 2503.00). Therefore a modification of the previously approved plan is required. Provide a completed Modification Form (TCEQ-0590).

   The application has been revised to encompass only the portion of the project being developed that is not already under an approved (Recorded) CZP. Therefore no modification of the previous application is being requested. The existing 817 acre development is currently still under construction.

2. It appears that the proposed project consists of 204 acres owned by Cross Canyon Ranch and approved in previous CZP Application (EAPP 2503.00) and additional 115 acres owned by Ms. Patricia Mangan. Please provide two (2) Agent Authorization Forms from the property owners to Baker Surveying or provide documentation that Cross Canyon Ranch has the right to possess and control the additional 115 acres of the property.

   This application has been revised to reflect only the property owned by Ms. Patricia Mangan (115 Acres). Kavanaugh Consulting, LLC is the Engineer/Agent for the Owner instead of Baker Surveying as noted previously. Cross Canyon Ranch, Ltd. has the right to control the property as they are under Contract/Agreement for purchase of the property from Ms. Patricia Mangan. Attached herein are Originals of the Letters of Agent Authorization to the Engineer/Agent (Kavanaugh Consulting, LLC) and Developer/Applicant (Cross Canyon Ranch, Ltd.) from Ms. Patricia Mangan. Also, attached herein is an Original of the Letter of Agent Authorization to the Engineer/Agent

(Kavanaugh Consulting, LLC) from Cross Canyon Ranch, Ltd. Finally, an Original of the TCEQ- Agent Authorization Form signed by Cross Canyon Ranch, Ltd. is attached as well.

3. Submit two (2) Core Data Forms for each property owner and provide second property owners information in TCEQ-10257, Item 2 or provide documentation that Cross Canyon Ranch has the right to possess and control the property.

Core Data Forms for Cross Canyon Ranch, Ltd. have already been submitted for Cross Canyon Ranch, Ltd., but are attached again herein. Cross Canyon Ranch, Ltd. has the right to possess/control the property as per the attached approval of Ms. Patricia Mangan and via contract for purchase.

4. The submitted review fee appears to be based on the project area. Review fees are based on a legal site boundary in which the project is to occur. If a modification is required, the fee should be based on the original legal site boundary. Revise the Fee Form as necessary and provide the appropriate fee. The submitted check for $4,000 will be applied for the review fee (unless requested otherwise). Please provide the remaining balance to supplement submitted check.

Attached herein is an additional review fee of $2,500 to be added to the already submitted review fee of $4,000 which will be adequate as $6,500 for the 90.1 acres in this application.

5. Item 6. Please provide a copy of the official 7 ½ minute USGS Quadrangle Map scale 1:2000 that shows project site boundaries.

The Official USGS Quadrangle Map is attached.

6. Item 7. Attachment C. Project narrative should include site history, previous development, new acreage added to the previously approved site.

The Project Narrative has been updated accordingly.

7. Item 22. Please provide Suitability Letters for the on-site sewage facilities for proposed project.

A suitability letter from Comal County has been submitted for the overall Cross Canyon Ranch, Ltd. project.

8. Item 34. Drainage slope % must be shown on the site plan and clearly outlined and labeled.

There are no proposed modifications to the existing Drainage slope % in the Project site. Drainage Slope % of the existing ground is shown throughout the CZP site plan.

9. Item 42 through 44. This is a requirement that must be acknowledged. Please provide the appropriate marks.

Appropriate marks have been provided. Please note that there are no permanent BMP's proposed for this development as they will not be necessary due to the low density nature of this development and the 20% Impervious Cover Deed Restriction.

10. Please provide Temporary Storm Water Section TCEQ-0602 or properly developed SWPPP. Please follow the link below for more information on Construction General Permits and SWPPP. http://www.tceq.texas.gov/assistance/sblga/water/sw-construction.html

The properly developed SWPPP is included herein for your information. It has been prepared by Merit Professionals and they will continue to monitor the site on a regular basis accordingly on behalf of the owner.

Thanks for your assistance with this application.

Sincerely,

David Parkerson, P.E.
Kavanaugh Consulting, LLC, Its' Member

Attachments: Original Comments – TCEQ
Revised TCEQ CZP Application
Revised TCEQ CZP Application Fee Form
Check - $2,500
Letters of Agent Authorization
Notice of Intent (NOI)
SWPPP

CC: File

Contributing Zone Plan Application
for Regulated Activities
on the Contributing Zone to the Edwards Aquifer
and Relating to 30 TAC §213.24(1), Effective June 1, 1999

Regulated Entity Name: Cross Canyon Ranch, Ltd.
County: Comal Stream Basin: Guadalupe River (Devils Hollow)

1. ✓ Regulated activities on this site will disturb at least 5 acres.
   — Regulated activities on this site will disturb less than 5 acres and are part of a larger common plan of development or sale with the potential to disturb cumulatively five or more acres.

2. Customer (Applicant):

Contact Person: J.L. Guerra Jr. Mgr.
Entity: Cross Canyon Ranch, Ltd.
Mailing Address: P.O. Box 65101
City, State: San Antonio, TX Zip: 78216
Telephone: 210-495-8777 FAX: 210-499-4217

Agent/Representative (If any):

Contact Person: David Parkerson, P.E.
Entity: Kavanaugh Consulting, LLC
Mailing Address: 2250 US Hwy 281 N.
City, State: Blanco, TX Zip: 78606
Telephone: 512-587-7397 FAX: 830-833-2257

3. — This project is inside the city limits of _____.
   — This project is outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
   ✓ This project is not located within any city's limits or ETJ.

4. The location of the project site is described below. Sufficient detail and clarity has been provided so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.
2 miles North of Intersection of Mystic Canyon & FM 306 AT THE END OF Canyon Heights

5. ✓ **ATTACHMENT A - Road Map.** A road map showing directions to and the location of the project site is found as at the end of this form.

6. ✓ **ATTACHMENT B - USGS Quadrangle Map.** A copy of the USGS Quadrangle Map (Scale: 1" = 2000') is found at the end of this form. The map(s) clearly shows:
   ✓ Project site boundaries.
   ✓ USGS Quadrangle Name(s).

7. ✓ **ATTACHMENT C - Project Narrative.** A detailed narrative description of the proposed project is found at the end of this form.

8. Existing project site conditions are noted below:

- ___ Existing commercial site
- ___ Existing industrial site
- ___ Existing residential site
- ✓ Existing paved and/or unpaved roads
- ___ Undeveloped (Cleared)
- ✓ Undeveloped (Undisturbed/Uncleared)
- ___ Other: _____

PROJECT INFORMATION

9. The type of project is:

- ✓ Residential: # of Lots: 11
- ___ Residential: # of Living Unit Equivalents: _____
- ___ Commercial
- ___ Industrial
- ✓ Other: Private Drive

10. Total project area (size of site): 90.1 Acres
Total disturbed area: 8.0 Acres

11. Projected population: 33

12. The amount and type of impervious cover expected after construction is complete is shown below:

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	44,000	÷ 43,560 =	1.01
Parking	22,000	÷ 43,560 =	0.51
Other paved surfaces	83,000	÷ 43,560 =	1.91
Total Impervious Cover	149,000	÷ 43,560 =	3.42
Total Impervious Cover ÷ Total Acreage x 100 =			3.8 %

13. ✓ **ATTACHMENT D - Factors Affecting Surface Water Quality.** A description of factors that could affect surface water quality is found as at the end of this form. If applicable, this should included the location and description of any discharge associated with industrial activity other than construction.

14. ✓ Only inert materials as defined by 30 TAC 330.2 will be used as fill material.

FOR ROAD PROJECTS ONLY
Complete questions 15-20 if this application is exclusively for a road project.

15. Type of project:

- ___ TXDOT road project.
- ___ County road or roads built to county specifications.
- ___ City thoroughfare or roads to be dedicated to a municipality.

__ Street or road providing access to private driveways.

16. Type of pavement or road surface to be used:
__ Concrete
__ Asphaltic concrete pavement
__ Other: _____

17. Length of Right of Way (R.O.W.): _____ feet.
Width of R.O.W.: _____ feet.
L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.

18. Length of pavement area: _____ feet.
Width of pavement area: _____ feet.
L x W = _____ Ft^2 ÷ 43,560 Ft^2/Acre = _____ acres.
Pavement area _____ acres ÷ R.O.W. area _____ acres x 100 = _____% impervious cover.

19. __ A rest stop will be included in this project.
__ A rest stop will **not** be included in this project.

20. __ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

STORMWATER TO BE GENERATED BY THE PROPOSED PROJECT

21. ✓ **ATTACHMENT E - Volume and Character of Stormwater.** A description of the volume and character (quality) of the stormwater runoff which is expected to occur from the proposed project is found at the end of this form. The estimates of stormwater runoff quality and quantity are based on area and type of impervious cover. The runoff coefficient of the site for both pre-construction and post-construction conditions is included.

WASTEWATER TO BE GENERATED BY THE PROPOSED PROJECT

22. Wastewater will be disposed of by:

✓ On-Site Sewage Facility (OSSF/Septic Tank):
ATTACHMENT F - Suitability Letter from Authorized Agent. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's written approval is provided at the end of this form. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities, or it identifies those areas that are not suitable for the use of private sewage facilities. The system will be designed by a licensed professional engineer or a registered sanitarian and installed by a licensed installer in compliance with 30 TAC §285.

N/A Sewage Collection System (Sewer Lines):
Wastewater is to be disposed of by conveyance to the (name) treatment plant for treatment and disposal. The treatment facility is: _____
__ existing.
__ proposed.

N/A Wastewater is to be discharged in the contributing zone. Requirements under 30 TAC §213.6(c) relating to Wastewater Treatment and Disposal Systems have been satisfied.

FOR PERMANENT ABOVEGROUND STORAGE TANKS (ASTs) ≥ 500 GALLONS
Complete questions 23-29 if this project includes the installation of AST(s) with volume(s) greater than or equal to 500 gallons.

23. Tanks and substance stored:

AST Number	Size (Gallons)	Substance to be Stored	Tank Material
1	N/A		
2			
3			
4			
5			
Total		x 1.5 =	gallons

24. ___ The AST will be placed within a containment structure that is sized to capture one and one-half (1 1/2) times the storage capacity of the system. For facilities with more than one tank system, the containment structure is sized to capture one and one-half (1 1/2) times the cumulative storage capacity of all systems.

___ **ATTACHMENT G - Alternative Secondary Containment Methods.** Alternative methods for providing secondary containment are proposed. Specifications showing equivalent protection for the Edwards Aquifer are found at the end of this form.

25. Inside dimensions and capacity of containment structure(s):

Length (L) (Ft.)	Width (W) (Ft.)	Height (H) (Ft.)	L x W x H = (Ft^3)	Gallons
Total				

26. ___ All piping, hoses, and dispensers will be located inside the containment structure.
___ Some of the piping to dispensers or equipment will extend outside the containment structure.
___ The piping will be aboveground
___ The piping will be underground

27. ___ The containment area must be constructed of and in a material impervious to the substance(s) being stored. The proposed containment structure will be constructed of _____.

28. **ATTACHMENT H - AST Containment Structure Drawings.** A scaled drawing of the containment structure is found at the end of this form that shows the following:

___ Interior dimensions (length, width, depth and wall and floor thickness).
___ Internal drainage to a point convenient for the collection of any spillage.
___ Tanks clearly labeled
___ Piping clearly labeled
___ Dispenser clearly labeled

29. Any spills must be directed to a point convenient for collection and recovery. Spills from storage tank facilities must be removed from the controlled drainage area for disposal within 24 hours of the spill.

___ In the event of a spill, any spillage will be removed from the containment structure within 24 hours of the spill and disposed of properly.
___ In the event of a spill, any spillage will be drained from the containment structure through a drain and valve within 24 hours of the spill and disposed of properly. The drain and valve system are shown in detail on the scaled drawing.

SITE PLAN

Items 30 through 41 must be included on the Site Plan.

30. The Site Plan must have a minimum scale of 1" = 400'.
Site Plan Scale: 1" = 300'.

31. 100-year floodplain boundaries

___ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
✓ No part of the project site is located within the 100-year floodplain.

The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s):
FEMA FIRM MAP NO. 48091 C0080F dated September 2, 2009

32. ___ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.
✓ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot contour intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, etc. are shown on the site plan.

33. ✓ A drainage plan showing all paths of drainage from the site to surface streams.

34. ✓ The drainage patterns and approximate slopes anticipated after major grading activities.

35. ✓ Areas of soil disturbance and areas which will not be disturbed.

36. ✓ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.

37. ✓ Locations where soil stabilization practices are expected to occur.

38. N/A Surface waters (including wetlands).

39. — Locations where stormwater discharges to surface water.
✓ There will be no discharges to surface water.

40. — Temporary aboveground storage tank facilities.
✓ Temporary aboveground storage tank facilities will not be located on this site.

41. — Permanent aboveground storage tank facilities.
✓ Permanent aboveground storage tank facilities will not be located on this site.

Permanent best management practices (BMPs) and measures that will be used during and after construction is completed.

42. ✓ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.

43. ✓ These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.

✓ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

— A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is provided below.

_____

_____

44. ✓ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.

45. ✓ Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

✓ This site will be used for low density single-family residential development and has 20% or less impervious cover.

__ This site will be used for low density single-family residential development but has more than 20% impervious cover.

__ This site will not be used for low density single-family residential development.

46. ✓ The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.

__ **ATTACHMENT I - 20% or Less Impervious Cover Waiver.** This site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is found at the end of this form.

__ This site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.

✓ This site will not be used for multi-family residential developments, schools, or small business sites.

47. **ATTACHMENT J - BMPs for Upgradient Stormwater.**

__ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is provided as **ATTACHMENT J** at the end of this form.

✓ If no surface water, groundwater or stormwater originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT J** at the end of this form.

__ If permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT J** at the end of this form.

48. **ATTACHMENT K - BMPs for On-site Stormwater.**

✓ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is provided as **ATTACHMENT K** at the end of this form.

✓ If permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, an explanation is provided as **ATTACHMENT K** at the end of this form.

49. N/A **ATTACHMENT L - BMPs for Surface Streams.** A description of the BMPs and measures that prevent pollutants from entering surface streams is provided at the end of this form.

50. N/A **ATTACHMENT M - Construction Plans.** Construction plans and design calculations

for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information have been signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed permanent BMPs and measures are provided at the end of this form. Design Calculations, TCEQ Construction Notes, all proposed structural measures, and appropriate details must be shown on the construction plans.

51. N/A **ATTACHMENT N - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is provided at the end of this form. The plan has been prepared and certified by the engineer designing the permanent BMPs and measures. The plan has been signed by the owner or responsible party. The plan includes procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofits as well as a discussion of record keeping procedures.

52. N/A The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

__ Pilot-scale field testing (including water quality monitoring) may be required for BMPs that are not contained in technical guidance recognized by or prepared by the executive director.

__ **ATTACHMENT O - Pilot-Scale Field Testing Plan.** A plan for pilot-scale field testing is provided at the end of this form.

53. N/A **ATTACHMENT P - Measures for Minimizing Surface Stream Contamination.** A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is provided at the end of this form. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity which increases erosion that result in water quality degradation.

Responsibility for maintenance of permanent BMPs and measures after construction is complete.

54. N/A The applicant is 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.

55. N/A A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.

ADMINISTRATIVE INFORMATION

56. ✓ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and

county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

57. ✓ Any modification of this Contributing Zone Plan may require TCEQ review and Executive Director approval prior to construction, and may require submission of a revised application, with appropriate fees.

58. ✓ The site description, controls, maintenance, and inspection requirements for the storm water pollution prevention plan (SWPPP) developed under the EPA NPDES general permits for stormwater discharges have been submitted to fulfill paragraphs 30 TAC §213.24(1-5) of the technical report. All requirements of 30 TAC §213.24(1-5) have been met by the SWPPP document.

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **CONTRIBUTING ZONE PLAN APPLICATION** is hereby submitted for TCEQ review and Executive Director approval. The application was prepared by:

JOEY GUERRA, MBR
Print Name of Customer/Agent

Signature of Customer/Agent

1/3/2012
Date

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Application Fee Form

NAME OF PROPOSED REGULATED ENTITY: Cross Canyon Ranch, Ltd.
REGULATED ENTITY LOCATION: 2 mi. North of Int. of Mystic Canyon & FM 306
NAME OF CUSTOMER: Joey Guerra, Manager
CONTACT PERSON: David Parkerson PHONE: 512-587-7397
(Please Print)

Customer Reference Number (if issued): CN 603004656 (nine digits)
Regulated Entity Reference Number (if issued): RN 104921648 (nine digits)

Austin Regional Office (3373) ☐ Hays ☐ Travis ☐ Williamson
San Antonio Regional Office (3362) ☐ Bexar ☒ Comal ☐ Medina ☐ Kinney ☐ Uvalde

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment.** This payment is being submitted to (Check One):

☐ **Austin Regional Office**

☐ **Mailed to TCEQ:**
TCEQ – Cashier
Revenues Section
Mail Code 214
P.O. Box 13088
Austin, TX 78711-3088

☒ **San Antonio Regional Office**

☐ **Overnight Delivery to TCEQ:**
TCEQ - Cashier
12100 Park 35 Circle
Building A, 3rd Floor
Austin, TX 78753
512/239-1278

Site Location (Check All That Apply): ☐ Recharge Zone ☒ Contributing Zone ☐ Transition Zone

Type of Plan	Size		Fee Due
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling		Acres	$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	90.1	Acres	$ 6,500
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential		Acres	$
Sewage Collection System		L.F.	$
Lift Stations without sewer lines		Acres	$
Underground or Aboveground Storage Tank Facility		Tanks	$
Piping System(s)(only)		Each	$
Exception		Each	$
Extension of Time		Each	$

$4,000 paid 3/8/12
$2,500 Herein

Signature Mgr.

3/28/12
Date

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

Texas Commission on Environmental Quality
Edwards Aquifer Protection Program
Application Fee Schedule
30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications
Contributing Zone Plans and Modifications

PROJECT	PROJECT AREA IN ACRES	FEE
One Single Family Residential Dwelling	< 5	$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	$1,500 $3,000 $4,000 $6,500 $8,000 $10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100	$3,000 $4,000 $5,000 $6,500 $8,000 $10,000

Organized Sewage Collection Systems and Modifications

PROJECT	COST PER LINEAR FOOT	MINIMUM FEE MAXIMUM FEE
Sewage Collection Systems	$0.50	$650 - $6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

PROJECT	COST PER TANK OR PIPING SYSTEM	MINIMUM FEE MAXIMUM FEE
Underground and Aboveground Storage Tank Facility	$650	$650 - $6,500

Exception Requests

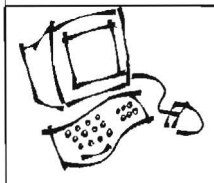
PROJECT	FEE
Exception Request	$500

Extension of Time Requests

PROJECT	FEE
Extension of Time Request	$150

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

TCEQ Office Use Only
Permit No.: TXR15
RN:
CN:
Ref No:



Sign up now for ePermits NOI at https://www6.tceq.state.tx.us/steers/
Get Instant Permit Coverage and only pay a $225 application fee.

If filing a paper NOI you can pay the application fee on line? Go to https://www6.tceq.texas.gov/epay/

IMPORTANT:
- Use the **INSTRUCTIONS** to fill out each question in this form.
- Use the attached **CUSTOMER CHECKLIST** to make certain all you filled out all required information.
- Incomplete applications **WILL** delay approval or result in **automatic Denial**.

Renewal of General Permit
Is this NOI to renew an ACTIVE permit?
Yes - What is your permit number? **Permit No. TXR15** _____
(No) - a permit number will be issued.

Application Fee if mailing a paper NOI:
You must pay the $325 Application Fee to TCEQ for the application to be considered complete.
Payment and NOI must be mailed to separate addresses. See instructions for correct mailing addresses.

Provide your payment information below, for us to verify payment of the application fee:

Mailed:	Check/Money Order No.: 1484	Company Name on checking account: CROSS CANYON RANCH LTD
EPAY:	Voucher No.:	Is the Payment Voucher copy attached? (Yes)

A. OPERATOR (applicant)

1. If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity?
CN 603004656 (Search Central Registry)

2. What is the Legal Name of the entity (applicant) applying for this permit?
CROSS CANYON RANCH, LTD
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

3. What is the name and title of the person signing the application?
(The person must be an official meeting signatory requirements in TAC 305.43(a).)

Name: JOEY GUERRA Title: MGR

4. What is the Operator's (applicant) mailing address as recognized by the **US Postal Service**? (verify at USPS.com)

Address: P.O. BOX 65101 Suite No./Bldg. No./Mail Code:
City: SAN ANTONIO State: TX ZIP Code: 78216
Country Mailing Information (if outside USA). Country Code: Postal Code:

5. Phone No.: (210) 495 8777 Extension:
6. Fax No.: (210) 499 4217 E-mail Address: JOEY@INTEGRATEDREALTYGROUP.COM

7. Indicate the type of Customer:

- [ ] Individual
- [ ] Corporation
- [ ] State Government
- [ ] Other Government
- [ ] Sole Proprietorship-D.B.A.
- [ ] Federal Government
- [ ] County Government
- [ ] Other (describe):
- [x] Limited Partnership
- [ ] General Partnership
- [ ] City Government

8. Independent Operator: [X] Yes [ ] No (If governmental entity, subsidiary, or part of a larger corporation, check "No".)

9. Number of Employees: [X] 0-20; [ ] 21-100; [ ] 101-250; [ ] 251-500; or [ ] 501 or higher

10. Customer Business Tax and Filing Numbers *(This item is not applicable to Individuals, Government, GP or Sole Proprietor.)*
REQUIRED for Corporations and Limited Partnerships **(Verify the entity's status and filing no. with TX SOS at 512/463-5555)**

State Franchise Tax ID Number: 32035384281	Federal Tax ID: 20-3019546
TX SOS Charter (filing) Number: 800507545	DUNS Number (if known):

B. APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

1. Name: MARTIN KELLER	Title: PROJECT MANAGER	Company: BAKER SURVEYING
2. Phone No.: (830) 833 2250	Extension:	
3. Fax No.: 830 833 2257	E-mail Address: MARTIN@ABAKERSURVEY.COM	

C. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

1. TCEQ Issued RE Reference Number (RN): **RN** 104921648
(Search Central Registry)

2. Name of Project or Site (the name as known by the community where this facility/project is located):
THE HILLS AT CANYON LAKE
(example: phase and name of subdivision or name of project that's unique to the site)

3. Does the site have a physical address? NO
If Yes, complete **Section A** for a physical address.
If No, complete **Section B** for site location information.

Section A: Enter the physical address for the site. **(verify it with USPS.com or other delivery source)**

Street Number:	Street Name:
City:	ZIP Code:

Section B: Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site:
(Ex.: phase 1 of Woodland subdivision located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)
HILLS AT CANYON LAKE LOCATED 2 MILES NORTH OF INT OF MYSTIC CANYON AND FM 306

City where the site is located or nearest city to site:	ZIP Code where site is located:
~~CANYON LAKE~~ SPRING BRANCH	78070

4. Identify the county where the site is located: COMAL

5. Latitude: 29° 58' 26.535" N	Longitude: 98° 20' 48.524" W

6. What is the primary business of this entity? In your own words, briefly describe the primary business of the Regulated Entity:
(Do not repeat the SIC and NAICS code)
DEVELOPER

7. What is the mailing address for the regulated entity?

Is the RE mailing address the same as the Operator? [X] Yes, address is the same as Operator [ ] No, provide the address

Street Number:	Street Name:	
City:	State:	ZIP Code:

D. GENERAL CHARACTERISTICS

1. Is the site located on Indian Country Lands? [X] No [ ] Yes – If Yes, do not submit this NOI. Contact EPA, Region VI
If the site is on Indian country lands, you must obtain authorization through EPA, Region VI.

2. What is the Standard Industrial Classification (SIC) code (see instructions for common codes): **(Search Osha.gov)**

Primary: 152 Secondary: 1521

3(a) What is the total number of acres disturbed? 12.47 AC

3(b) Is the project site part of a larger common plan of development or sale? ☐ Yes ☒ No

If **Yes**, the total number of acres disturbed can be less than 5 acres.

If **No**, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

4. Discharge Information **(all information MUST be provided or the permit will be denied)**

4(a) What is the name of the water body(s) to receive the storm water runoff or potential runoff from the site?

DEVIL'S HOLLOW → GUADALUPE RIVER → CANYON LAKE

4(b) What is the segment number(s) of the classified water body(s) that the discharge or potential discharge will eventually reach? 1805

4(c) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) list of impaired waters?

☐ Yes ☒ No

If Yes, provide the name of the impaired water body(s). _____

4(d) Is the discharge into an MS4? ☐ Yes ☒ No

If **Yes**, what is the name of the MS4 Operator? _____

Note: The general permit requires you to send a copy of the NOI to the MS4 Operator.

4(e) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer?

☐ Yes ☒ No

If the answer is Yes, please note that a copy of the agency approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) must be included or referenced in the Storm Water Pollution Prevention Plan.

E. CERT IFICATION

Check "Yes" to the certifications below. **Failure to certify to all items will result in denial.**

☒ Yes	I certify that I have obtained a copy and understand the terms and conditions of the general permit (TXR150000).
☒ Yes	I certify that the full legal name of the entity (Operator) applying for this permit has been provided and is legally authorized to do business in Texas.
☒ Yes	I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed.
☒ Yes	I certify that a storm water pollution prevention plan has been developed and will be implemented prior to construction, and that is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000.

Operator Certification:

I, JOEY GUERRA (Typed or printed name *(Required & must be legible)*) MGR. (Title *(Required & legible)*)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: _____ MGR. (Use blue ink) Date: 1/13/2012

TCEQ

CONTRIBUTING ZONE PLAN

FOR

The Hills at Cross Canyon Ranch

(aka Cross Canyon Ranch)

March 12, 2012

Kavanaugh Consulting, LLC

108 River Oaks Drive
Wimberley, Texas 78676
(512) 587 – 7397 (office)
(830) 833 – 2257 (fax)

Baker Surveying, Inc.

2250 US 281 N.
Blanco, Texas 78606
(830) 833 - 2250 (office)
(830) 833 – 2257 (fax)

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EXHIBIT A

Road Map

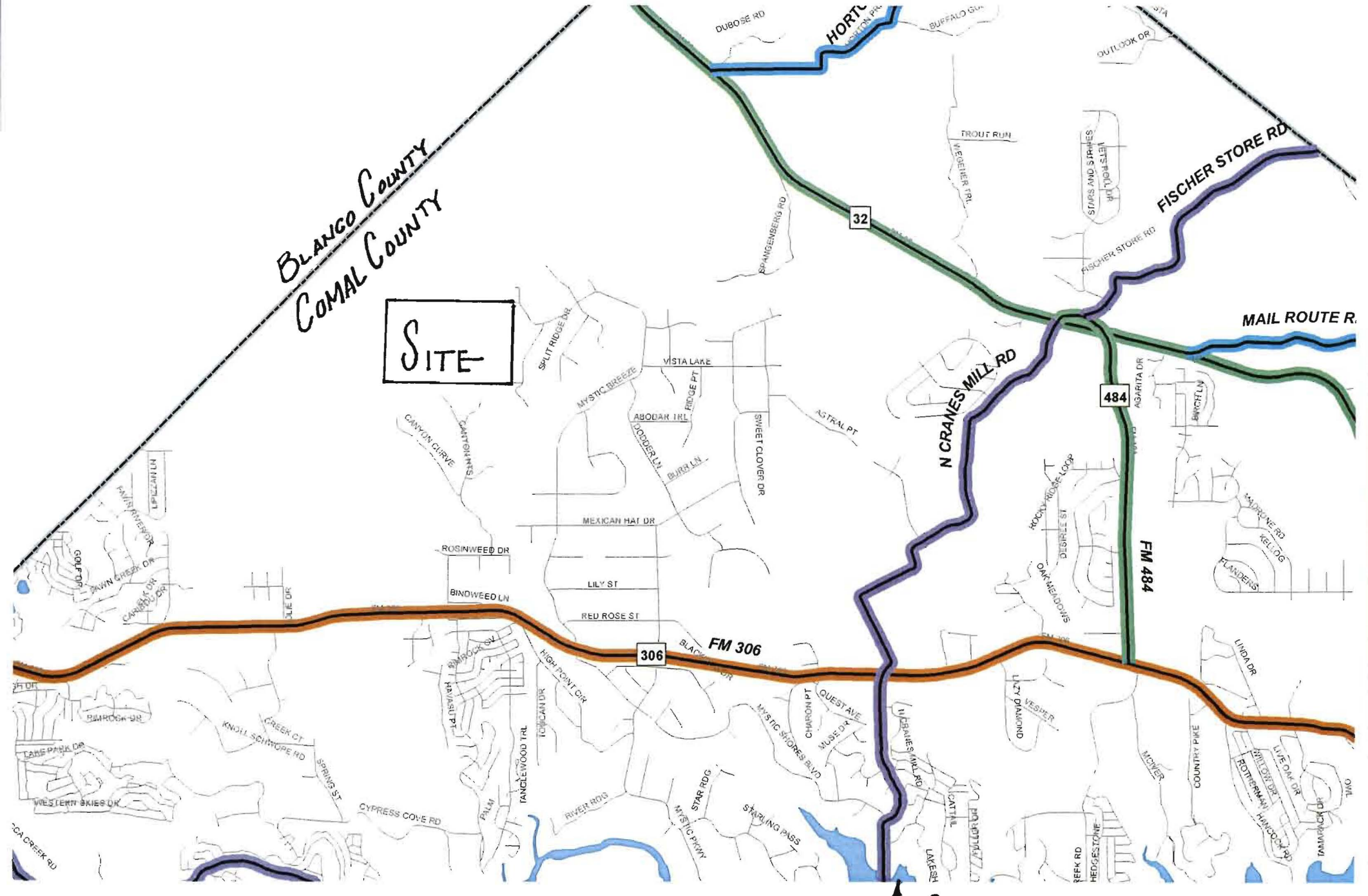

BLANCO COUNTY
COMAL COUNTY
SITE
DUBOSE RD
HORTON PR
BUFFALO GU
OUTLOOK DR
TROUT RUN
WEISENER TRL
SPRINGENBERG RD
32
STARS AND STRIPES
FISCHER STORE RD
FISCHER STORE RD
MAIL ROUTE R
N CRANES MILL RD
484
AGARITA DR
BIRCH LN
SPLIT RIDGE DR
VISTA LAKE
MYSTIC BREEZE
RIDGE PT
ABODAR TRL
DODDER LN
BURR LN
SWEET CLOVER DR
ASTRAL PT
CANYON CURVE
CANTIGNY
MEXICAN HAT DR
ROSINWEED DR
LILY ST
BINDWEED LN
RED ROSE ST
ROCKY RIDGE LOOP
DESIREE ST
OAK MEADOWS
MAJORCANE RD
KELLOG
FLANDERS
FM 484
FM 306
306
BLACK
LINDA DR
LAZY DIAMOND
VESPER
MCIVER
COUNTRY PIKE
LIVE OAK DR
HANCOCK RD
TAMARACK DR
OWL
LIPIZZAN LN
FAWN RIVER DR
GOLF RD
FAWN CREEK DR
CARIBOU DR
ELK DR
ELIE DR
PIMROCK DR
PIMROCK DR
LAKE PARK DR
WESTERN SKIES DR
KNOLL SCHROPE RD
CREEK CT
SPRING ST
CYPRESS COVE RD
HAVASU PT
HIGH POINT DR
TOWCAN DR
TANGLEWOOD TRL
PALM
RIVER RDG
STAR RDG
MYSTIC PKWY
STARLING PASS
MYSTIC SHORES BLVD
CHARON PT
QUEST AVE
MUSE DR
LAKESIDE
CATTAIL
FULLER DR
HEDGESTONE
CREEK RD
ROTTERMAN
CANYON LAKE

EXHIBIT B

USGS Quadrangle Map

SCALE
1" = 600'

0 100 200 400 600
GRAPHIC SCALE

MARCH 6, 2012

KAVANAUGH CONSULTING, LLC
BAKER SURVEYING, INC.

HILLS OF CROSS CANYON RANCH
COMAL COUNTY

USGS MAP

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	FEBRUARY 2012
Project No.	11-016

SHEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FISCHER QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)

SITE

Mapped, edited, and published by the Geological Survey
Revised in cooperation with the Texas Water Development Board

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1963. Revised from aerial photographs taken 1986. Field checked 1988. Map edited 1989

Projection and 10,000-foot grid ticks: Texas coordinate system, south central and central zones (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 14
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 19 meters south and 29 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1989 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

TEXAS
QUADRANGLE LOCATION

2998–434

FISCHER, TEX.
29098-H3-TF-024
1989
DMA 6343 IV NE-SERIES V882

TCEQ-R13
APR 16 2012
SAN ANTONIO

FISCHER
29098-H3-TF-024
19921

SCALE
1" = 600'

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	JAN 2012
Project No.	11-098

SHEET

AERIAL PHOTO

HILLS OF CROSS
CANYON RANCH
COMAL COUNTY

BAKER SURVEYING, INC.

KAVANAUGH CONSULTING, LLC
108 RIVER OAKS DR
WIMBERLEY, TEXAS 78676
PHONE (512) 857-7267
KAVANAUGHCONSULTING@GMAIL.COM
TBPE FIRM #8711

EXHIBIT C

Project Narrative

The Hills of Cross Canyon Ranch is the second phase of the existing Cross Canyon Ranch project. The first phase of the project consists of 817.4 acres with approximately 47 lots and 3.47 miles of roadway which will have a maximum impervious cover of 20%, which exempts phase one from the requirements for permanent BMP's. The first phase of the project is more than 50% complete and the remainder remains under construction. The Contributing Zone Plan for the first phase of the project was approved by the TCEQ on June 19, 2006 and recorded as Document #200606027270 in the Comal County Real Property Records.

This second phase is being planned as a "Large Lot" subdivision as well and is located in northwestern Comal County consisting of approximately 90.12-Acres. There are 3,500 linear feet of roadway with 11 single family lots of greater than 10-Acres each (the "Project"). It is located approximately 2 miles North of FM 306 and its' intersection with Mystic Canyon Road and is on the western boundary of the existing Mystic Shores Master Planned Community. This Project is located on Canyon Heights Drive at the back of the existing gated community.

Infrastructure proposed with this plat consists of Private Streets, culverts, roadside swales, and overhead electrical service from Pedernales Electric Cooperative (PEC). None of the proposed streets within the proposed subdivision plat are designed with slopes in excess of 10% in order to minimize erosion and to meet the general requirements of Comal County.

The Project is located within the Contributing Zone to the Edwards Aquifer Recharge Zone and further located within the stream basin of the Guadalupe River via Devils Hollow Tributaries. A Contributing Zone Plan (CZP) Application is being submitted to the TCEQ for approval with a maximum impervious cover of 20% due to the low density development proposed herein. The actual impervious cover proposed for the tract will be approximately 5%. Therefore, no permanent structural water quality controls are proposed herein.

The effective FEMA Firm Map (No. 48091C0080 F) dated September 2, 2009 indicates that the Project property is outside the boundaries of the FEMA 100-Year floodplain delineation. Onsite drainage for streets, culverts, and erosion control have been designed with the standards of the County of Comal, City of New Braunfels, AASHTO, and general engineering principles. The overall drainage analysis was performed for the developed condition with the estimated impervious cover at less

than 5% due to the large acreage lots proposed with details described herein. The information contained in this SMP displays how the proposed culverts, headwalls, and concrete slope protection will meet the needs of the proposed subdivision for proper drainage.

The existing Project site is undeveloped other than existing dirt ranch roads and is located generally at the highest elevation in the region so that drainage all slopes away from the Project. The site is hilly with various rock outcroppings throughout as is typical for the Texas hill country.

EXHIBIT D

Factors Affecting Surface Water Quality

The factors potentially affecting surface water quality in the development of this project will be the general activity of soil disturbance associated with the grading of the streets, driveways, and foundations for the houses.

The factors affecting surface water quality from the condition of the developed property will be any standard automobile contaminants such as oil, grease, and brake pads as well as any domestic activities on the single family lots such as pesticide use, rooftop runoff, and cleaning materials.

EXHIBIT E

Volume and Character of Stormwater

The drainage design enclosed herein is designed to Ultimate conditions for the Project based on lots in excess of 10-Acres and the onsite Culverts are designed to carry the drainage from the 10-Year storm event as required by Comal County without overtopping roadways. In general, the quantity of stormwater runoff will be similar to that for the existing conditions due to the low percentage of impervious cover and site disturbance.

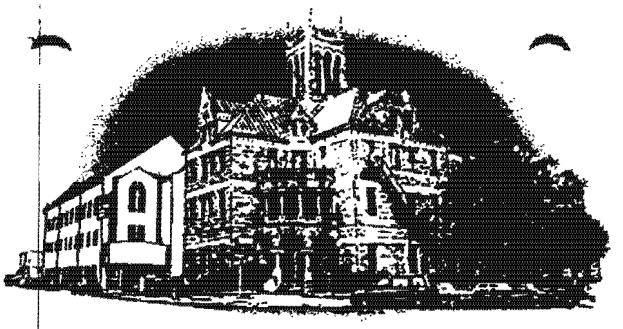
The proposed Private Streets in this Project are approximately 3,300-LF long with a Right-Of-Way (ROW) width of 60-Feet and a pavement section of 22-Feet of Pavement on 28-Feet of Road Bed with grades from 1% to 10%. The existing/proposed slopes for the lots remain natural and will be greater than 7% in general. Based on proposed ultimate impervious cover and the City of New Braunfels Drainage Criteria Tables, a C-Value of 0.42 was used. Many of the Times of Concentration for all of the drainage areas contributing to the infrastructure in this Project are near the minimum time of 5 minutes due to the slopes in the subdivision. The ultimate flows were calculated for the 2, 10, 25, and 100-year storms for use in design using the Rational Method and are shown on the Drainage Plan included herein. The Intensity Coefficients used are for Comal County.

The onsite storm sewer system is comprised of Roadside Drainage Ditch and Roadway Culverts consisting of Corrugated Metal Pipes (CMP) with reinforced concrete slope paving and/or Headwalls. Many of the crossings will utilize energy dissipators due to the slopes in the culverts. All of the culverts are Inlet Controlled due to the slope. Roadside Ditches will be a minimum depth of 1.5-foot as required by Comal County and most areas will be sloped at a minimum of 1% with a few limited locations with 0.5% slopes to avoid ponding.

Drainage easements are being provided throughout the development by a separate instrument recorded in the Comal County Property Records. The Easements are 20-feet wide along the Private Streets and 20-feet wide at all lot lines.

EXHIBIT F

Suitability Letter from Authorized Agent



Comal County

OFFICE OF COMAL COUNTY ENGINEER

March 9, 2006

Mr. Joey Guerra
11202 Disco
San Antonio, TX 78216

Re: Proposed subdivision of CROSS CANYON RANCH SUBDIVISION, within Comal County, Texas

Dear Property Owner:

We have completed the field inspection of the referenced for the recommendation for private sewage facilities and have found the property to be approved with the conditions that individual septic systems permits shall be required for the lots within this subdivision.

Please be advised that these individual permits will be required to meet 30 TAC 285, On-Site Sewage Facilities Rules of the Texas Natural Resource Conservation Commission.

Should you have any questions, please feel free to contact us.

Sincerely,

Thomas H. Hornseth, P.E.
Comal County Engineer

xc: Mr. Matt McCormick, P.E.
Matkin Hoover Engineering

195 David Jonas Drive • New Braunfels, Texas 78130 • (830) 608-2090 FAX (830) 608-2009

EXHIBITS J

BMPs for Upgradient Stormwater

The Project is location is at the top of a hill in general so there is no appreciable upgradient stormwater flowing into or across this site as can be seen on the USGS map enclosed herein.

EXHIBITS K

BMPs for On-site Stormwater

The BMPs for the On-site stormwater runoff from developed and disturbed areas of this project site will consist of those items as shown on the SWPPP enclosed herein. They consist of such items as Silt Fence along the low side of all proposed roadways and rock berms on the low side of all culvert crossings. There will also be some mulched material placed along the parkways in certain steeper slopes. All other areas of the project site will remain largely undisturbed except for the future house locations which will utilize silt fence at the time of their construction. It should also be noted that permanent BMP's are not required due to the 20% impervious cover maximum by deed restriction.

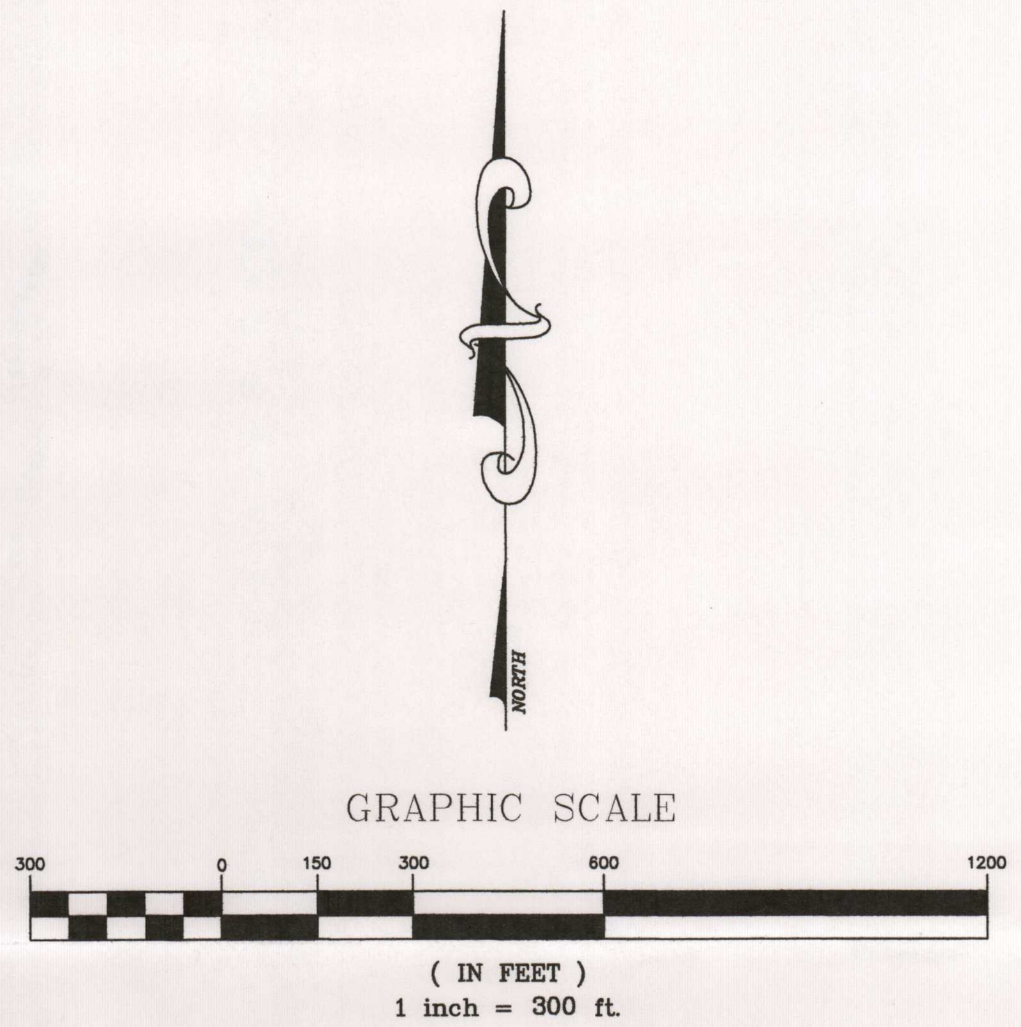
EXHIBITS L

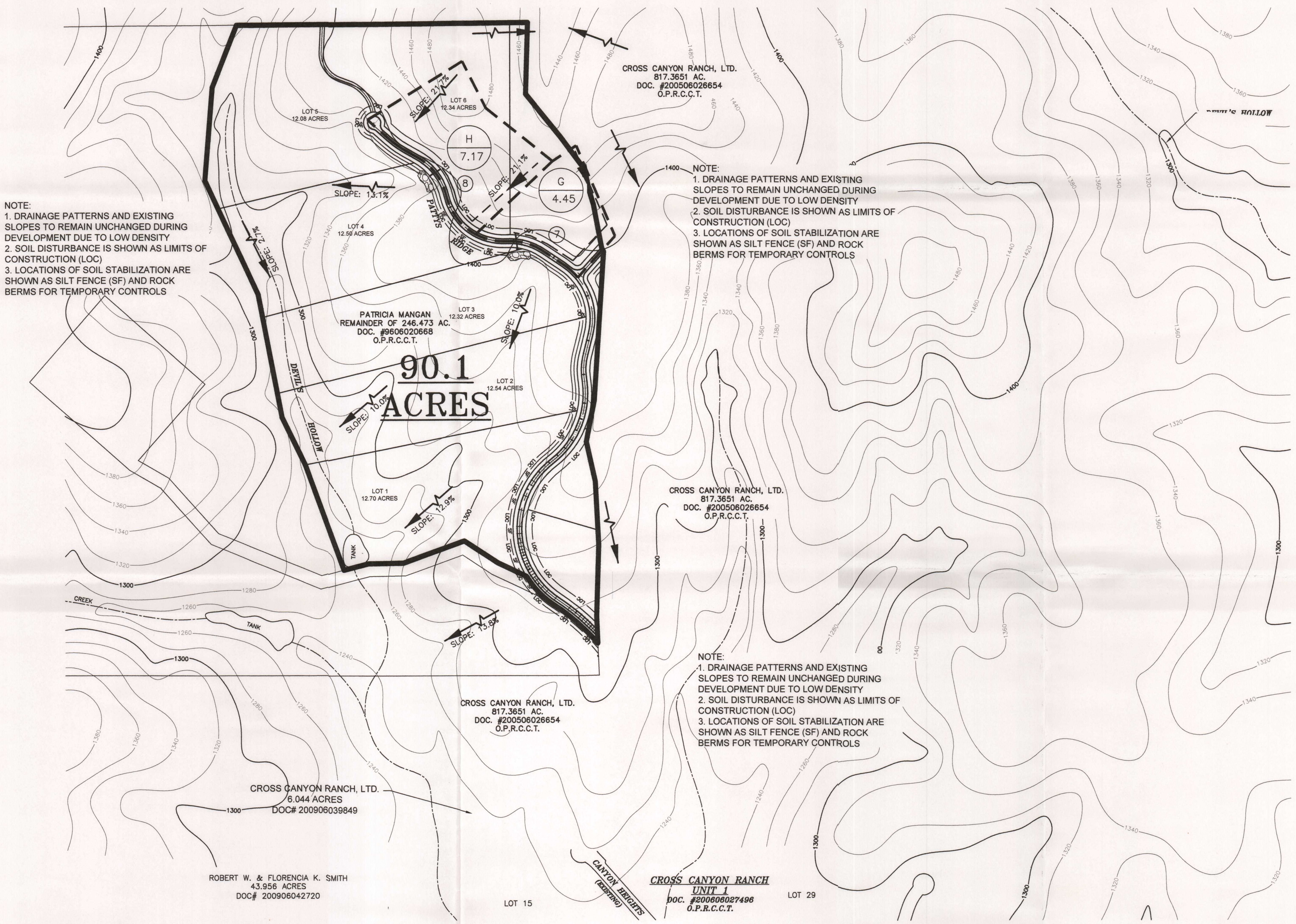
BMPs for Surface Streams

There are no surface streams on this site and any offsite surface streams should not be affected by stormwater runoff from this site due the proximity of the proposed site disturbed areas being located in such a way that stormwater drainage will travel across undisturbed portions of the property for at least 300 feet prior to exiting the property.

EXHIBIT M

Construction Plans





SITE PLAN

TCEQ-0592A (Rev. 3/15/07)

Texas Commission on Environmental Quality
Contributing Zone Plan
General Construction Notes

1. Written construction notification should be provided to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information should include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person.
2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.
3. No temporary aboveground hydrocarbon and hazardous substance storage tank system may be installed within 150 feet if a domestic, industrial, irrigation, or public water supply well.
4. Prior to commencing construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Controls specified in the SWPPP section of the approved Edwards Aquifer Contributing Zone Plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.
5. If sediment escapes the construction site, off-site accumulations of 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).
6. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake must be provided that can indicate when the sediment occupies 50% of the basin volume.
7. 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. All spoils (excavated material) generated from the project site and stored on-site must have proper E&S controls installed.
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.
10. The following records should be maintained and made available to the TCEQ 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.
11. The holder of any approved Contributing Zone plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:
   A. any physical or operational modification of any best management practices or structure(s), including but not limited to temporary or permanent ponds, dams, berms, silt fences, and diversionary structures;
   B. any change in the nature or character of the regulated activity from that which was originally approved;
   C. any change that would significantly impact the ability to prevent pollution of the Edwards Aquifer and hydrologically connected surface water; or
   D. any development of land previously identified in a contributing zone plan as undeveloped.

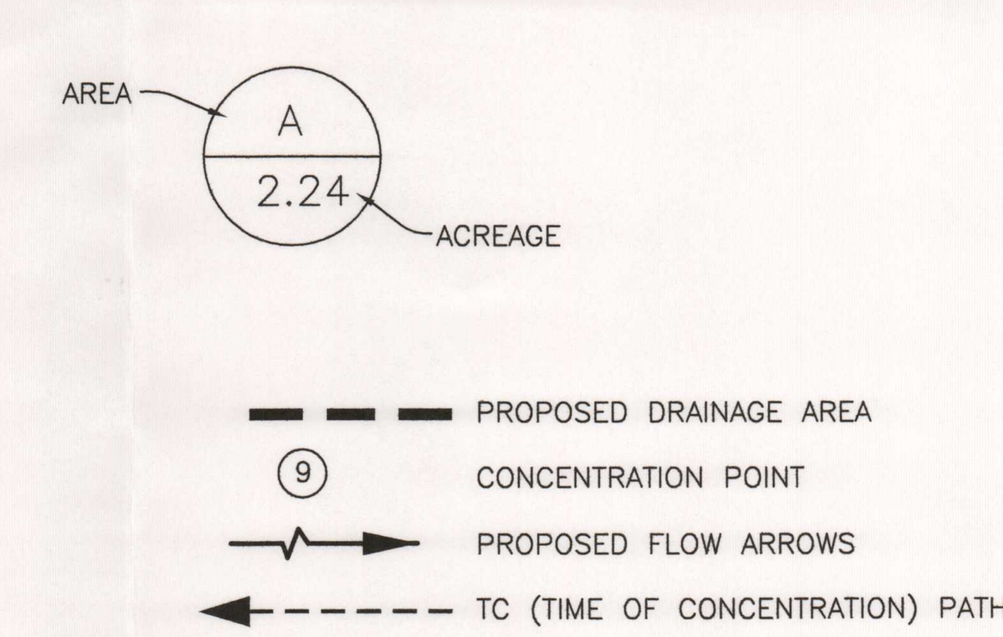
Austin Regional Office
2800 S. IH 35, Suite 100
Austin, Texas 78704-5712
Phone (512) 339-2929
Fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
Phone (210) 490-3096
Fax (210) 545-4329

THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

NOTE:
1. DRAINAGE PATTERNS AND EXISTING SLOPES TO REMAIN UNCHANGED DURING DEVELOPMENT DUE TO LOW DENSITY
2. SOIL DISTURBANCE IS SHOWN AS LIMITS OF CONSTRUCTION (LOC)
3. LOCATIONS OF SOIL STABILIZATION ARE SHOWN AS SILT FENCE (SF) AND ROCK BERMS FOR TEMPORARY CONTROLS

LEGEND



No.	Date	Revisions	App.

KAVANAUGH CONSULTING, LLC
108 RIVER OAKS DR
WIMBERLEY, TEXAS 78676
PHONE: (512) 587-7397
KAVANAUGHCONSULTING@GMAIL.COM
TBPE FIRM #6711

BAKER SURVEYING, INC.
PH. (830) 833-2250
FAX. (830) 833-2257
2250 US 281 N.
BLANCO TX. 78606

ENGINEER'S SEAL: STATE OF TEXAS — DAVID PARKERSON — 87016 — REGISTERED PROFESSIONAL ENGINEER

HILLS OF CROSS CANYON RANCH COMAL COUNTY

CONTRIBUTING ZONE PLAN

APRIL 5, 2012

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	APRIL 2012
Project No.	11-096

TCEQ-R13 APR 16 2012 SAN ANTONIO

SHEET 1 OF 1

NORTH

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

Texas Commission on Environmental Quality
Contributing Zone Plan
General Construction Notes

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2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.

3. No temporary aboveground hydrocarbon and hazardous substance storage tank system may be installed within 150 feet if a domestic, industrial, irrigation, or public water supply well.

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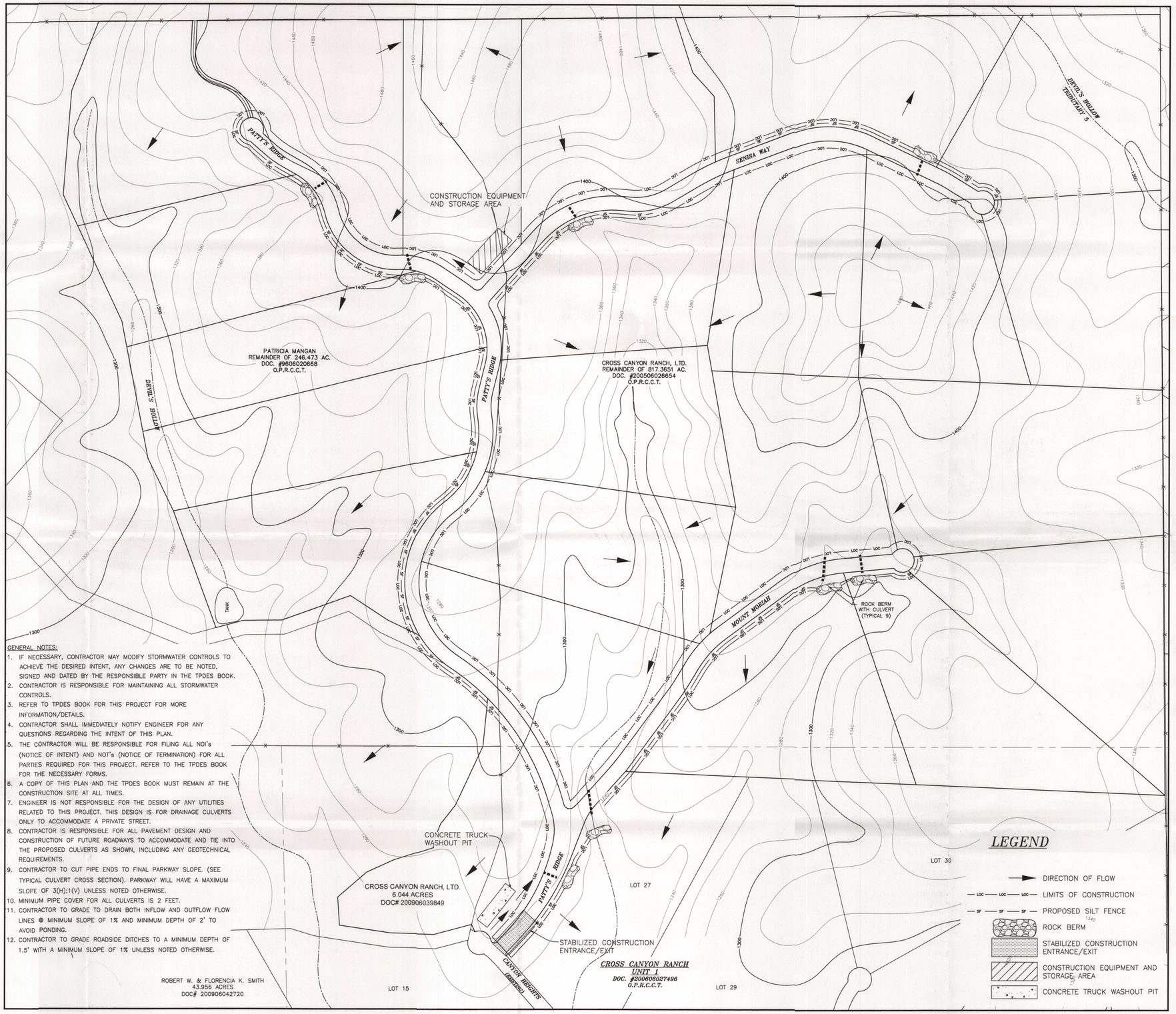

GENERAL NOTES:

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2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL STORMWATER CONTROLS.
3. REFER TO TPDES BOOK FOR THIS PROJECT FOR MORE INFORMATION/DETAILS.
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8. CONTRACTOR IS RESPONSIBLE FOR ALL PAVEMENT DESIGN AND CONSTRUCTION OF FUTURE ROADWAYS TO ACCOMMODATE AND TIE INTO THE PROPOSED CULVERTS AS SHOWN, INCLUDING ANY GEOTECHNICAL REQUIREMENTS.
9. CONTRACTOR TO CUT PIPE ENDS TO FINAL PARKWAY SLOPE. (SEE TYPICAL CULVERT CROSS SECTION). PARKWAY WILL HAVE A MAXIMUM SLOPE OF 3(H):1(V) UNLESS NOTED OTHERWISE.
10. MINIMUM PIPE COVER FOR ALL CULVERTS IS 2 FEET.
11. CONTRACTOR TO GRADE TO DRAIN BOTH INFLOW AND OUTFLOW FLOW LINES @ MINIMUM SLOPE OF 1% AND MINIMUM DEPTH OF 2' TO AVOID PONDING.
12. CONTRACTOR TO GRADE ROADSIDE DITCHES TO A MINIMUM DEPTH OF 1.5' WITH A MINIMUM SLOPE OF 1% UNLESS NOTED OTHERWISE.

LEGEND

- DIRECTION OF FLOW
- LOC LOC LOC — LIMITS OF CONSTRUCTION
- SF SF SF — PROPOSED SILT FENCE
- ROCK BERM
- STABILIZED CONSTRUCTION ENTRANCE/EXIT
- CONSTRUCTION EQUIPMENT AND STORAGE AREA
- CONCRETE TRUCK WASHOUT PIT

TCEQ-R13
APR 16 2012
CANYON LAKE

FOR REVIEW

PROPOSED STORM WATER POLLUTION PREVENTION PLAN

MARCH 8, 2012

No.	Date	Revisions	App.

BAKER SURVEYING, INC.

KAVANAUGH CONSULTING, LLC
108 RIVER OAKS DR
WIMBERLEY, TX 78676
PHONE: (512) 587-7397
KAVANAUGHCONSULTING@GMAIL.COM
TBPE FIRM #F711

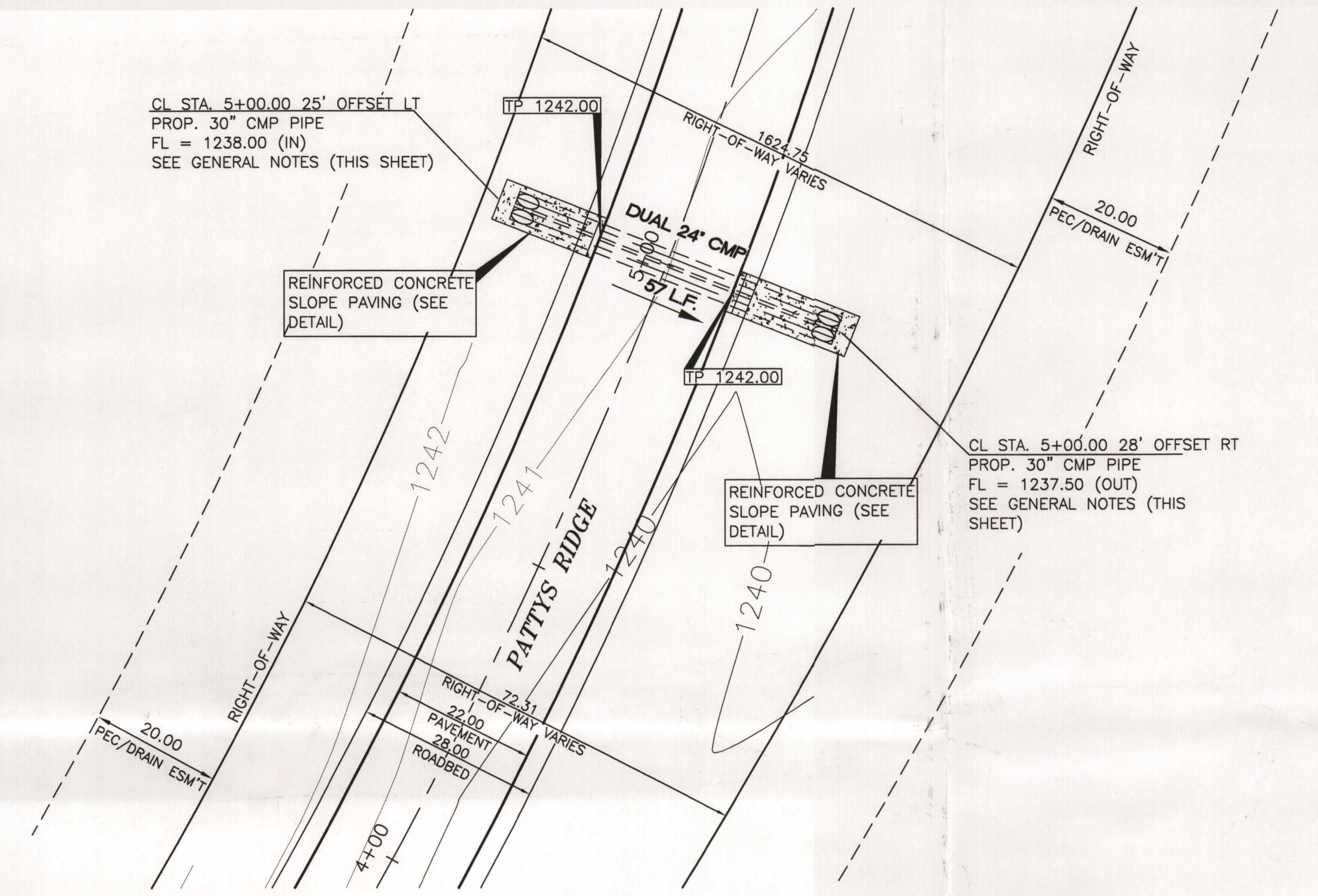
ENGINEER'S SEAL:
STATE OF TEXAS
DAVID PARKERSON
87016
REGISTERED
PROFESSIONAL ENGINEER

THE HILLS AT CANYON LAKE
COMAL COUNTY

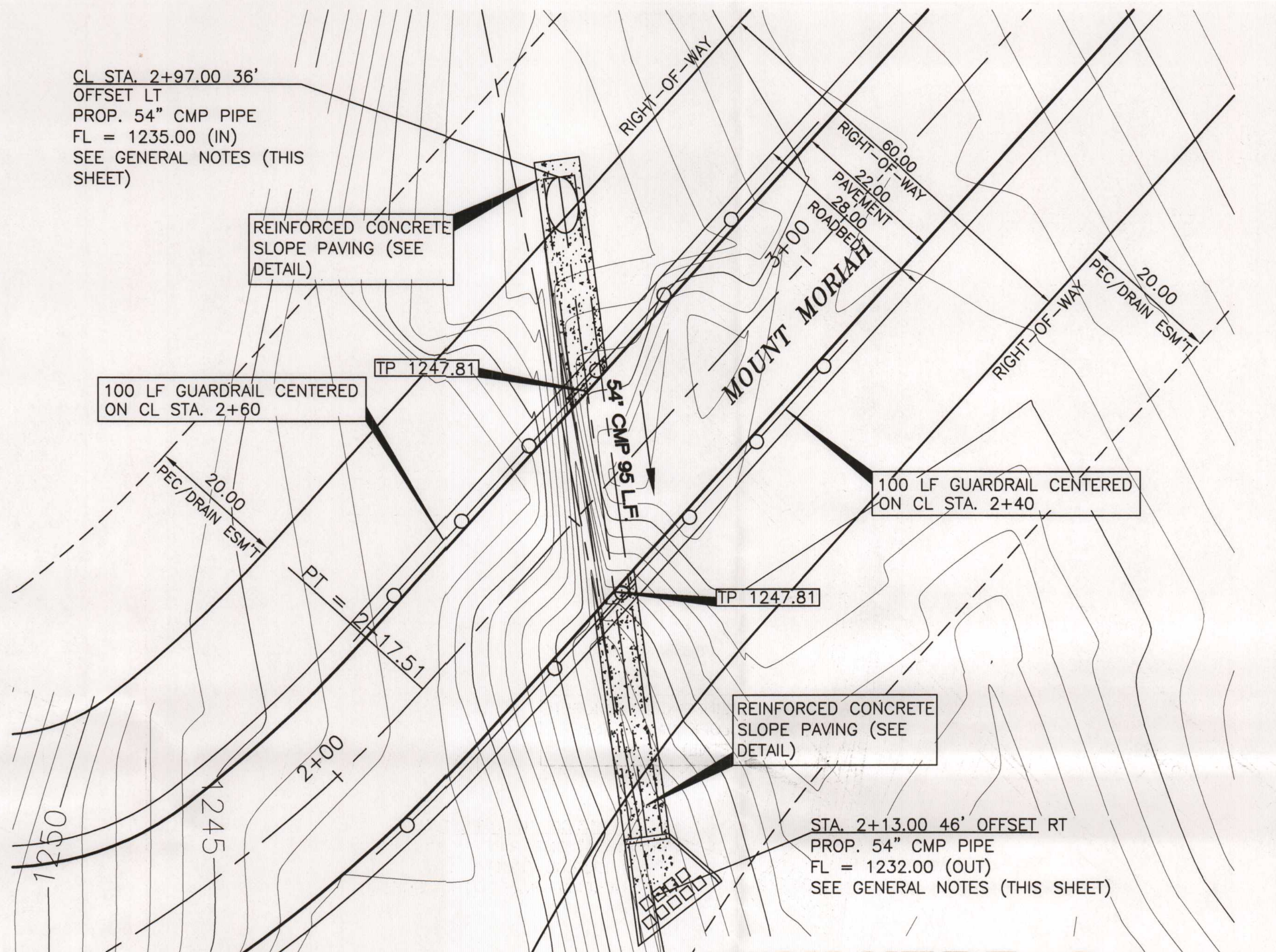
STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	FEBRUARY 2012
Project No.	11-096

SHEET 5 OF 16



CULVERT 1



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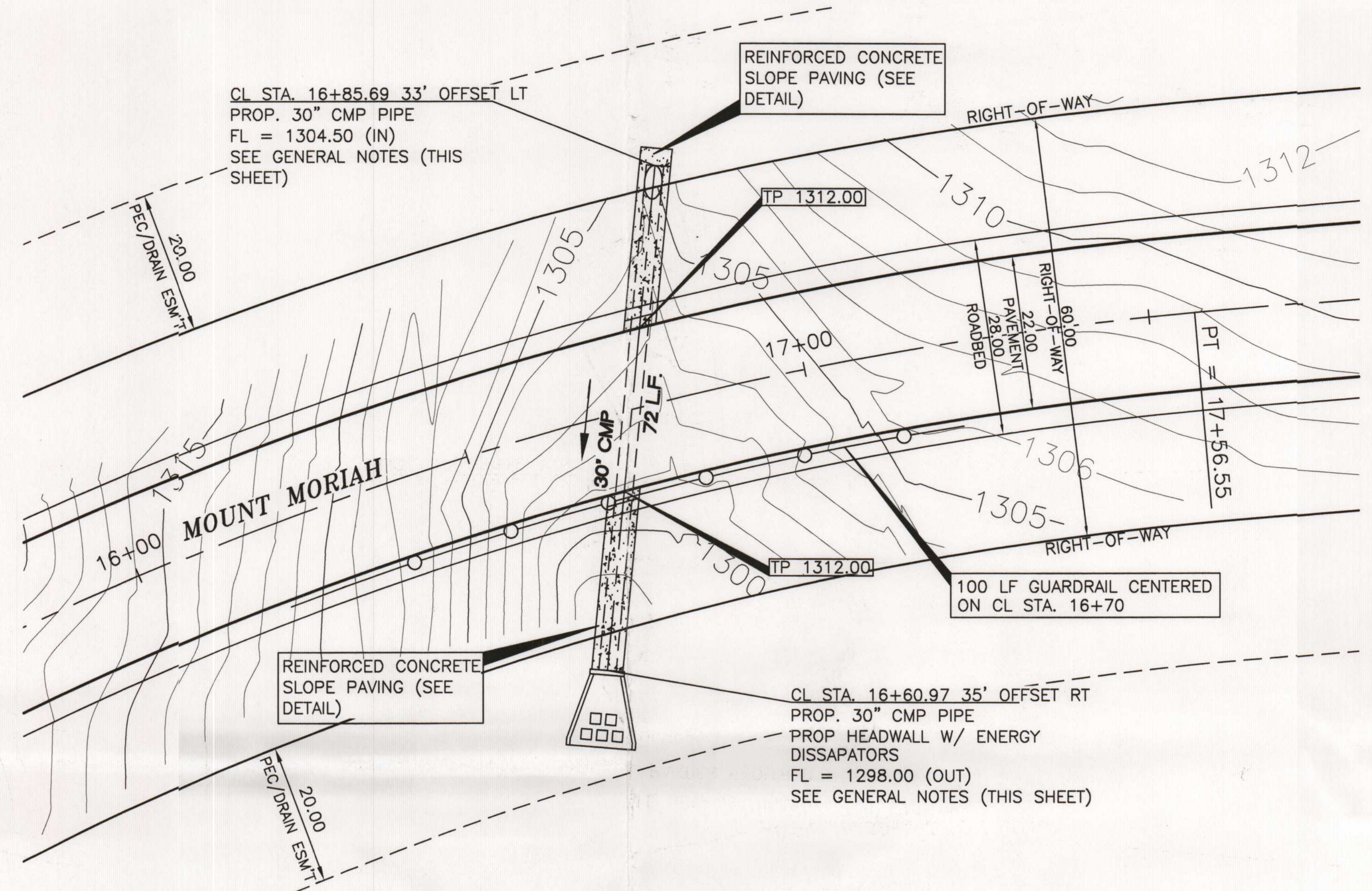
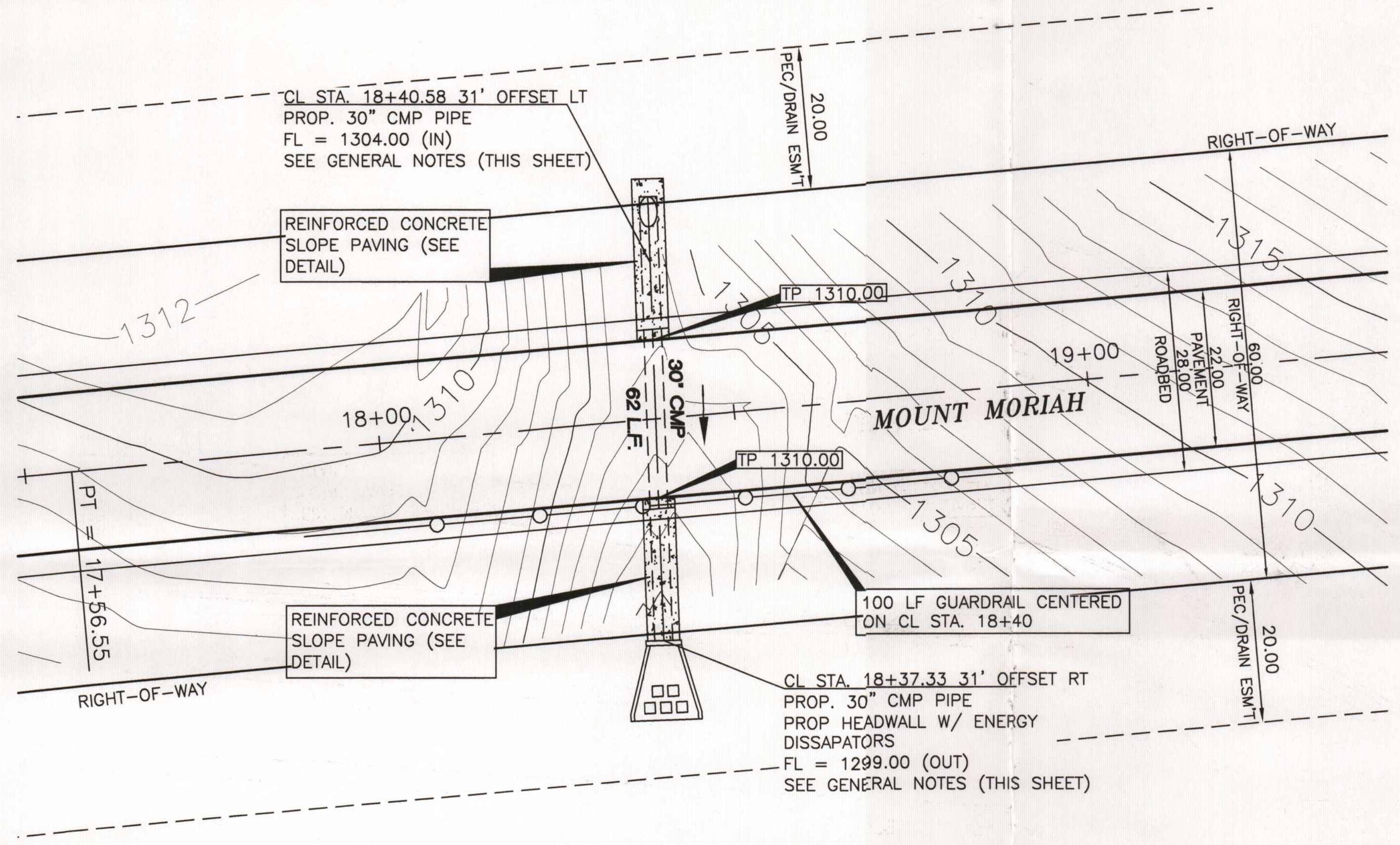
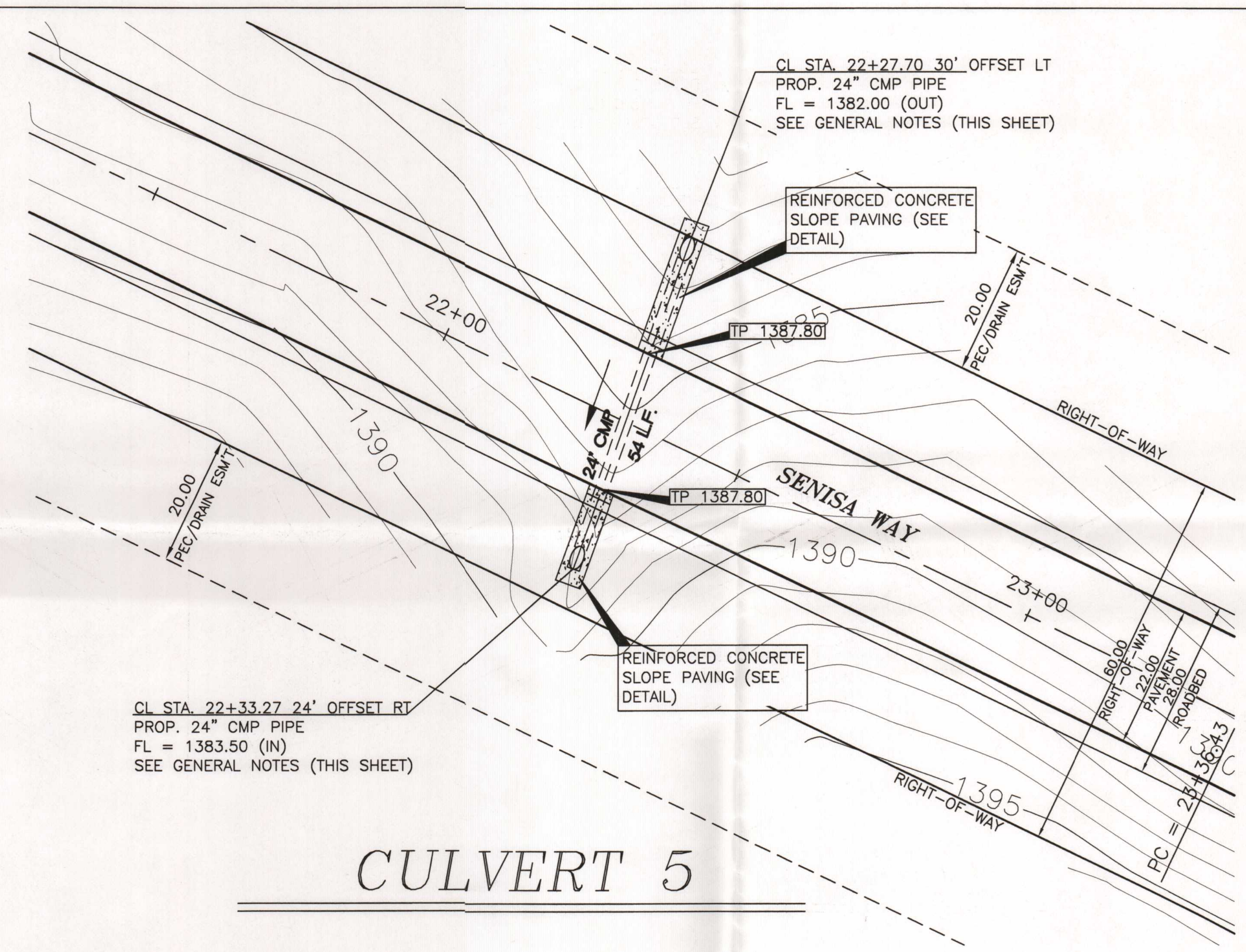


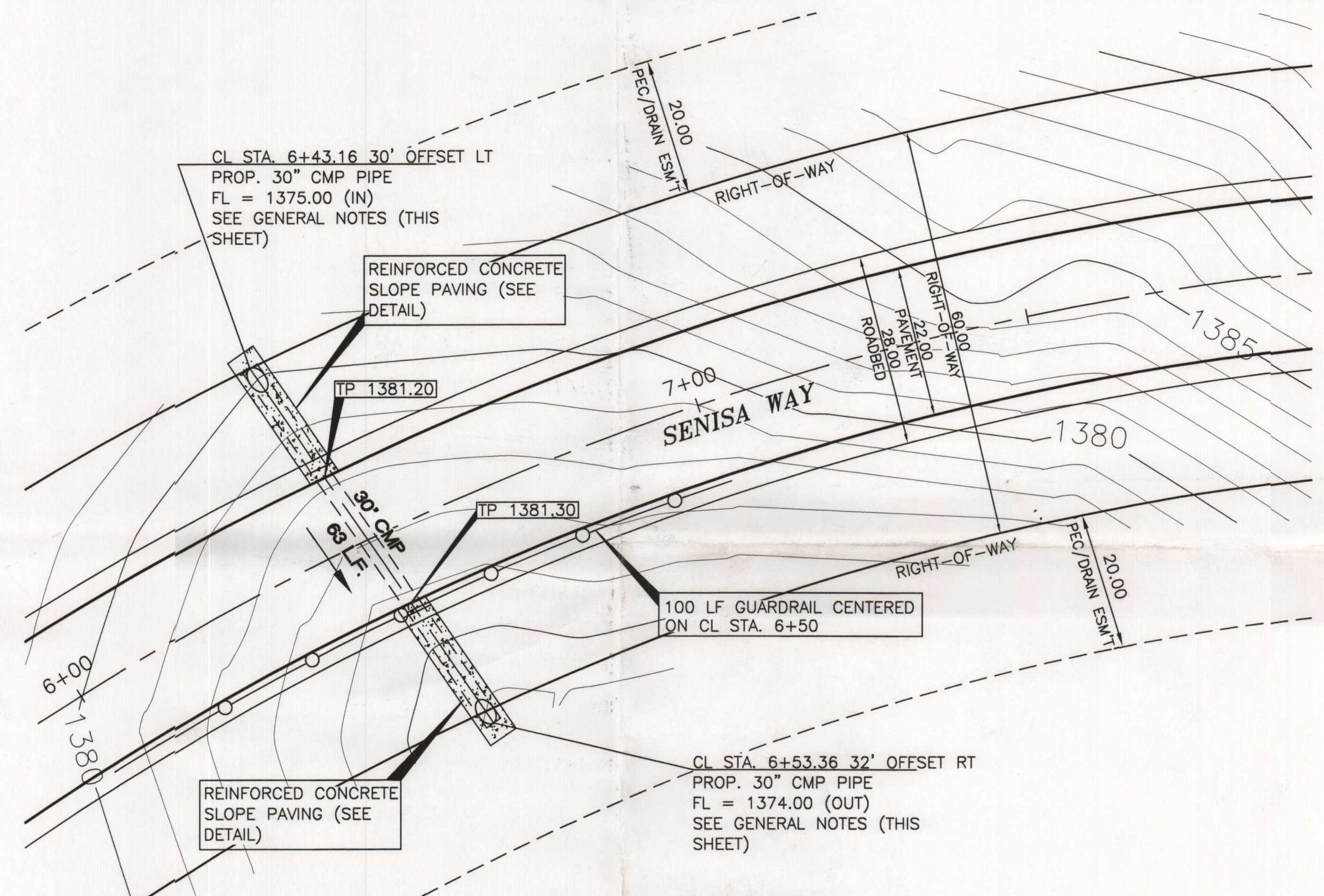
CULVERT 3



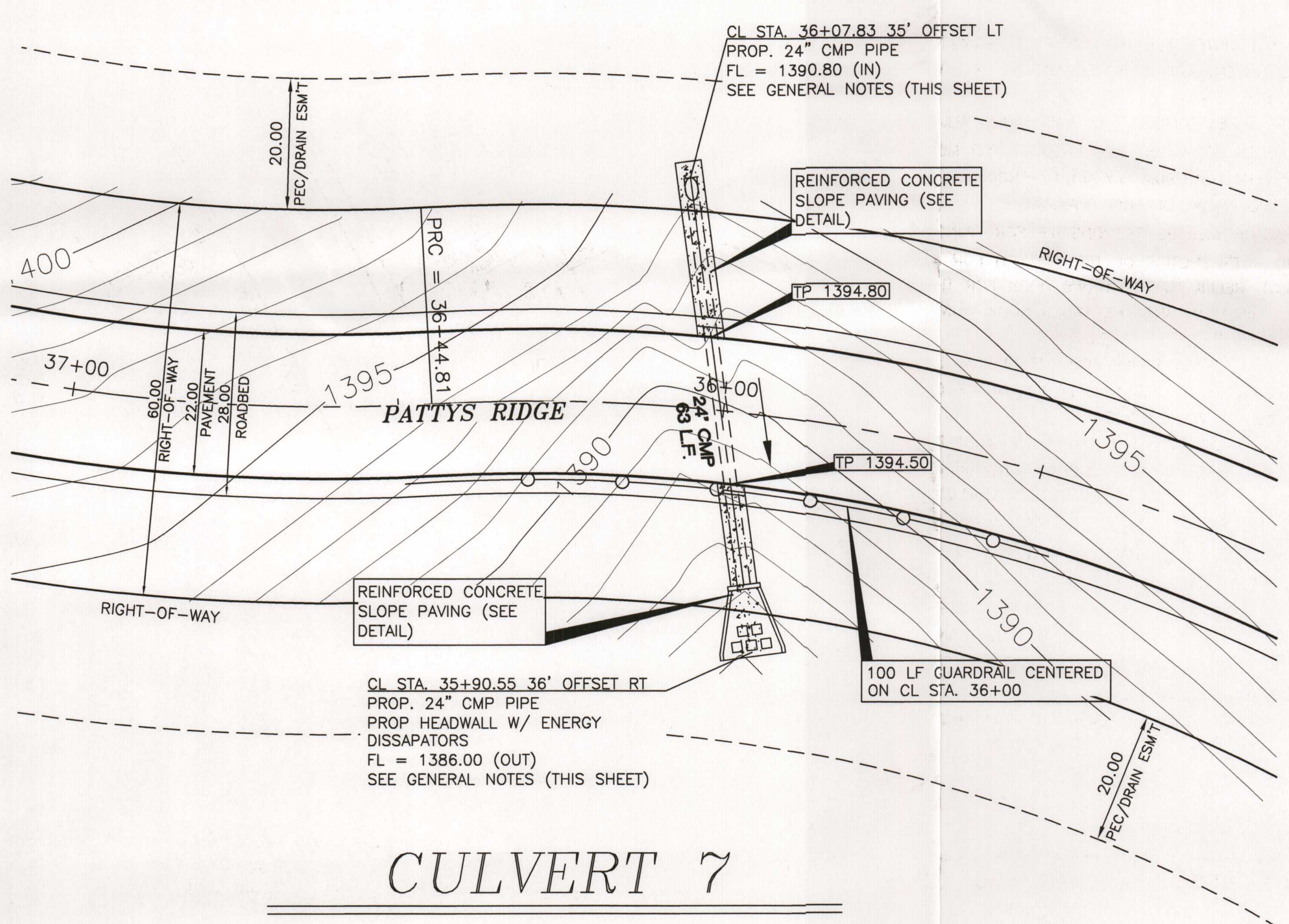
CULVERT 4



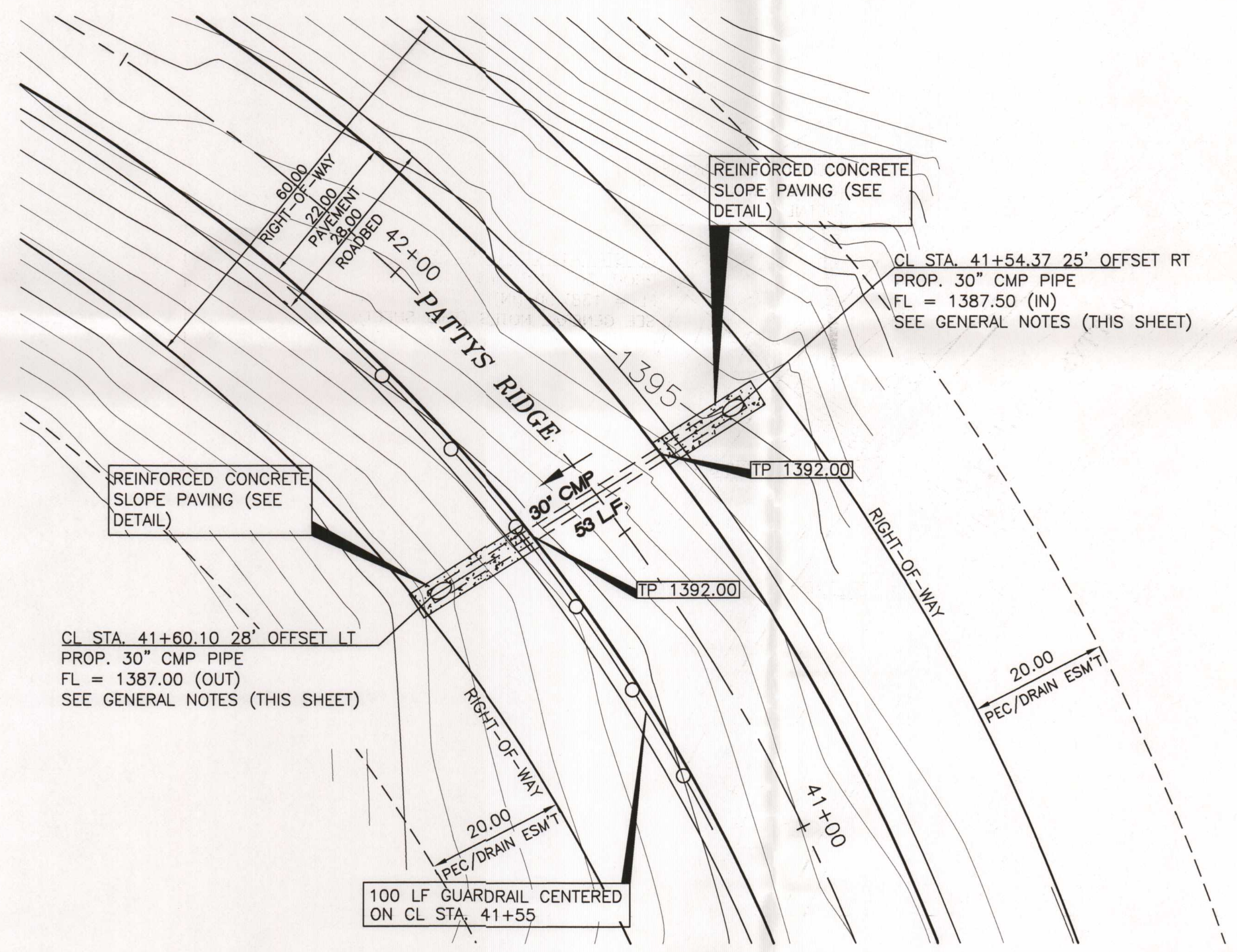
CULVERT 5



CULVERT 6



CULVERT 7



CULVERT 8

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12. CONTRACTOR TO GRADE ROADSIDE DITCHES TO A MINIMUM DEPTH OF 1.5' WITH A MINIMUM SLOPE OF 1% UNLESS NOTED OTHERWISE.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NORTH

FEBRUARY 9, 2012

FOR REVIEW

No.	Date	Revisions	App.

KAVANAUGH CONSULTING, LLC
108 RIVER OAKS DR
WIMBERLEY, TEXAS 78676
PHONE: (512) 587-7397
KAVANAUGHCONSULTING@GMAIL.COM
TBPE FIRM #6711

BAKER SURVEYING, INC.
PH. (830) 833-2250
FAX. (830) 833-2257
2250 US 281 N.
BLANCO TX. 78606

ENGINEER'S SEAL: STATE OF TEXAS — DAVID PARKERSON — 87016 — REGISTERED PROFESSIONAL ENGINEER

THE HILLS AT CANYON LAKE COMAL COUNTY

TCEQ-R13
APR 16 2012
SAN ANTONIO

PROPOSED ROAD CULVERT DETAILS

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	FEBRUARY 2012
Project No.	11-096

SHEET 4 OF 16

EXHIBIT N

Inspection, Maintenance, Repair and Retrofit Plan

Permanent Inspection, Maintenance, and Repair will not be needed as there are no permanent BMPs proposed with this CZP due to the low density nature of the development as very large lots with an approximate impervious cover of 5%. As shown on the SWPPP, silt fence, rock berm, and a stabilized construction entrance will be temporarily utilized during construction to minimize erosion and soil runoff from the site. Natural drainage ways will also remain in their native state for additional long term soil stabilization. During construction, however, we will have inspection, maintenance, and repair of the above mentioned Temporary BMPs based on the schedule below;

Silt Fence

Inspection: Inspection will occur on a monthly basis and after any heavy rain storms of at least 1-inch in depth.

Maintenance: Material will be removed when material is stacked up half of the vertical clearance from the ground to the top of the silt fence.

Repair: Repair of Silt Fence will occur upon observation of torn sections or unsheathed areas where filter fabric has separated from the wire mesh.

Rock Berm

Inspection: Inspection will occur on a monthly basis and after any heavy rain storms of at least 1-inch in depth.

Maintenance: Material will be removed when material is stacked up half of the vertical clearance from the ground to the top of the rock berm.

Repair: Repair of Rock Berm will occur upon observation of washed out sections.

Stabilized Construction Entrance

Inspection: Inspection will occur on a monthly basis and after any heavy rain storms of at least 1-inch in depth.

Maintenance: Material will be removed when material is packed between the aggregate in the drive surface at the development entrance such that additional material can no longer be deposited prior to exit of the development by vehicular traffic.

Repair: Repair of Stabilization Construction Entrance will occur upon observation of washed out sections.

EXHIBIT Q

FEMA Firm Map

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

0 0 300 600 METERS

JANUARY 18, 2012

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0080F

FIRM

FLOOD INSURANCE RATE MAP

COMAL COUNTY, TEXAS

AND INCORPORATED AREAS

PANEL 80 OF 505

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COMAL COUNTY	480469	0080	F

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
48091C0080F

EFFECTIVE DATE
SEPTEMBER 2, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

KAVANAUGH CONSULTING, LLC

BAKER ENGINEERING, INC.

HILLS OF CROSS CANYON RANCH
COMAL COUNTY

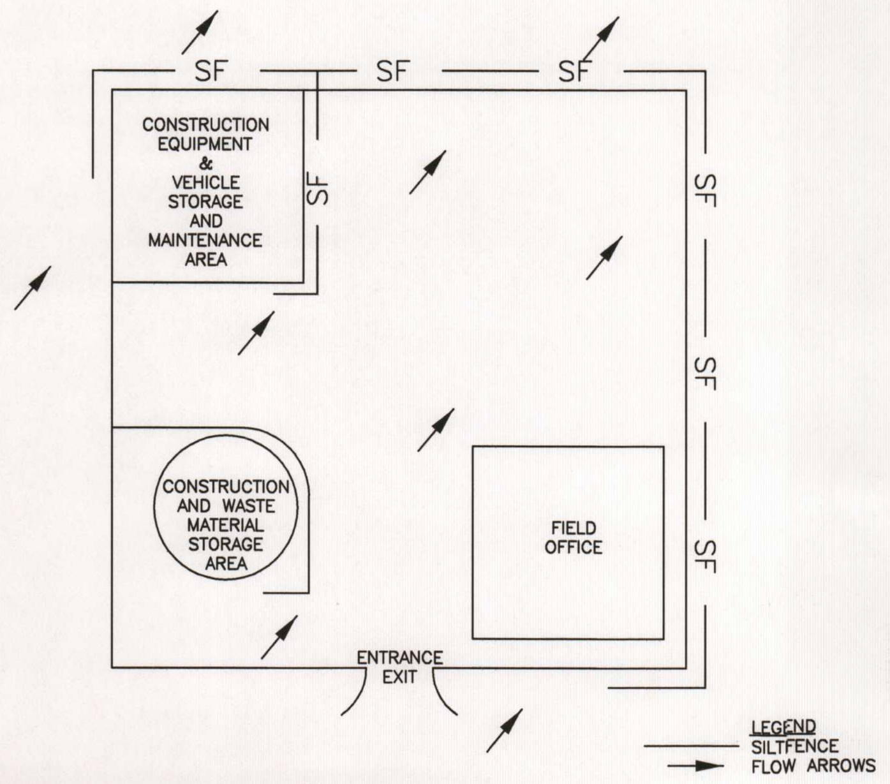
FEMA MAP

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	FEBRUARY 2012
Project No.	11-096

SHEET

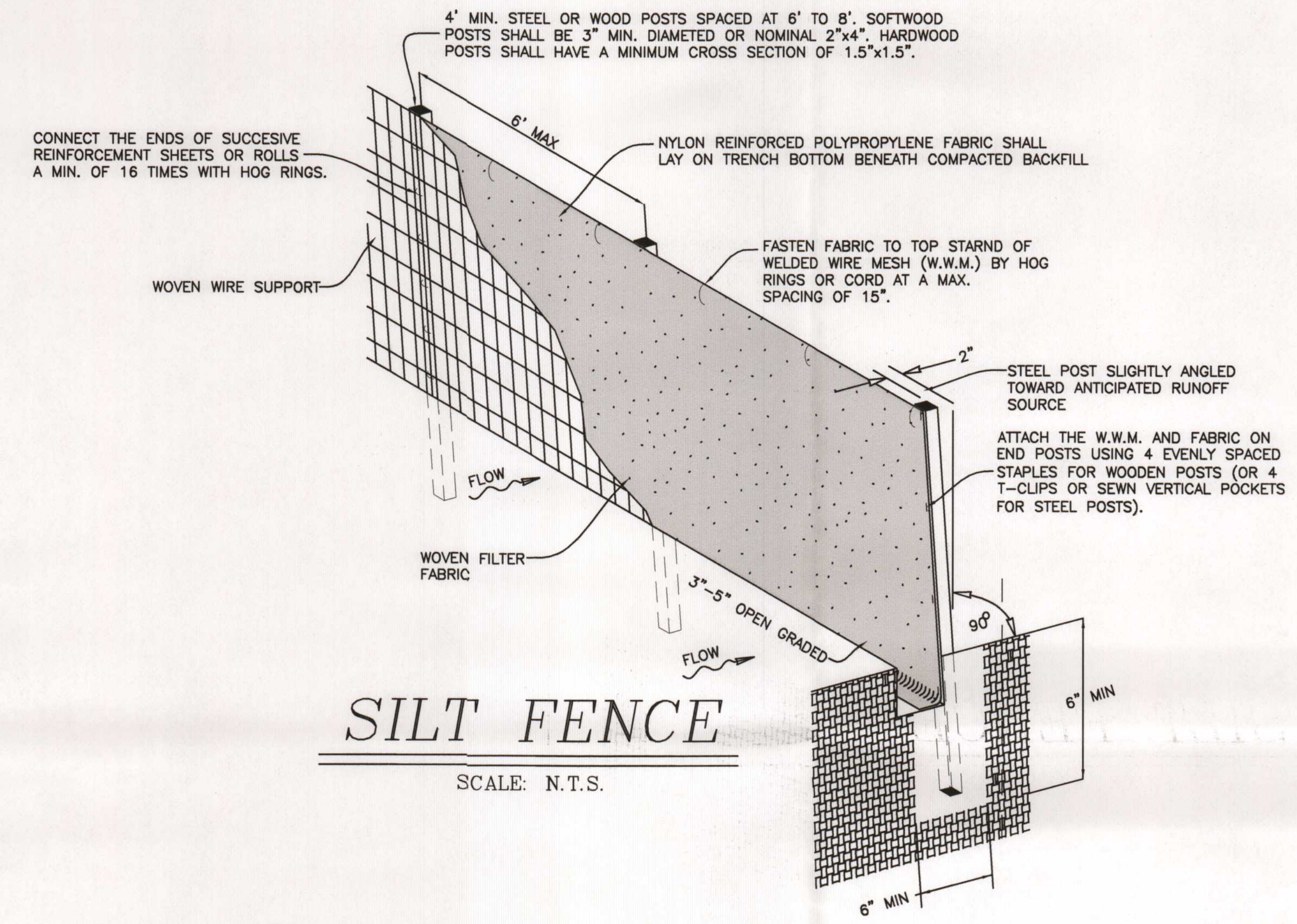
EXHIBIT R

Storm Water Pollution Prevention Plan (SWPPP)



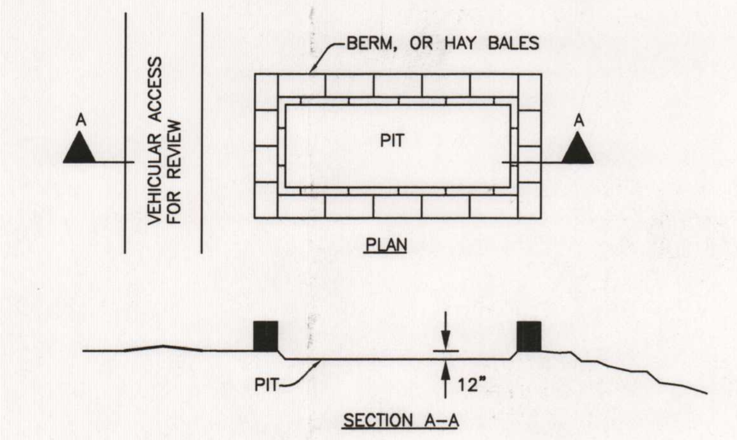
TYP. CONSTRUCTION STAGING AREA

SCALE: N.T.S.



SILT FENCE

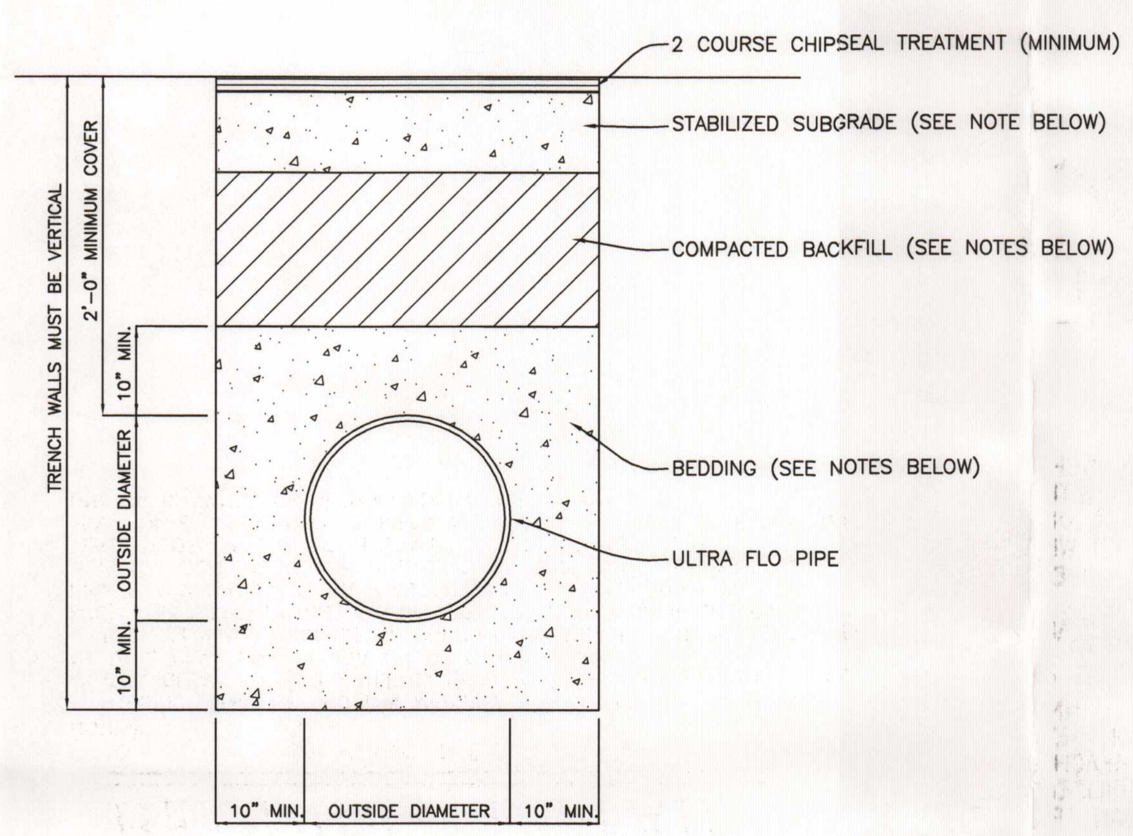
SCALE: N.T.S.



GENERAL NOTES:
DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.
IF HAY BALES ARE USED, THEY SHALL BE PLACED IN ACCORDANCE WITH DETAILS SHOWN ON EXHIBIT FOR HAY BALES.
WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.

CONCRETE TRUCK WASHOUT PIT

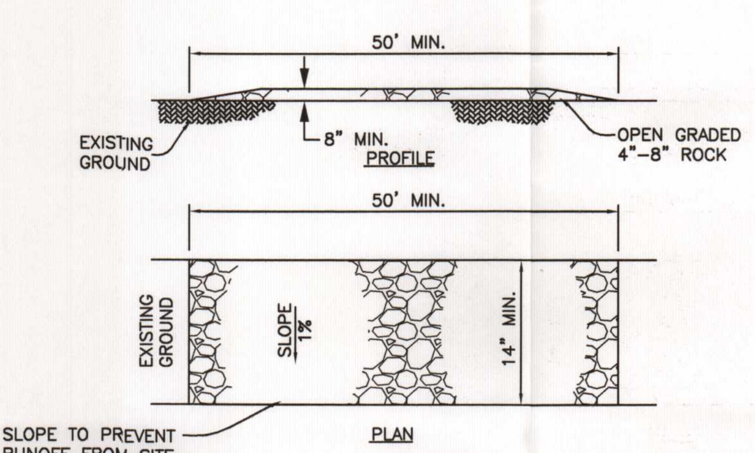
SCALE: N.T.S.



BEDDING DETAIL

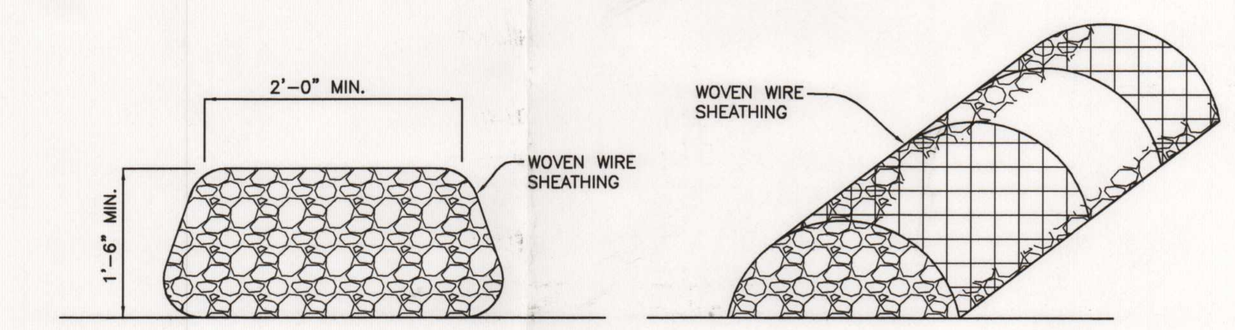
SCALE: N.T.S.

NOTES:
1. BEDDING SHALL BE ANGULAR MATERIAL (CRUSHED STONE OR GRAVEL) THAT IS CLEAN, WASHED MATERIAL, HARD AND INSOLUBLE IN WATER, FREE OF MUD, CLAY, SILT, VEGETATION OR OTHER DEBRIS.
2. BACKFILL SHALL CONSIST OF BORROW OR SUITABLE MATERIAL EXCAVATED FROM THE TRENCH. IT SHALL BE FREE OF STONES OR ROCKS OVER 8 INCHES AND SHALL HAVE A PLASTICITY INDEX OF LESS THAN 20. THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHALL BE WITHIN 2 PERCENT OF OPTIMUM AS DETERMINED BY TXDOT TEST METHOD TEX-114-E. SANDY LOAM BORROW WILL NOT BE ALLOWED UNLESS SHOWN ON THE DRAWINGS OR AUTHORIZED BY THE ENGINEER.



STABILIZED CONSTR. ENTRANCE

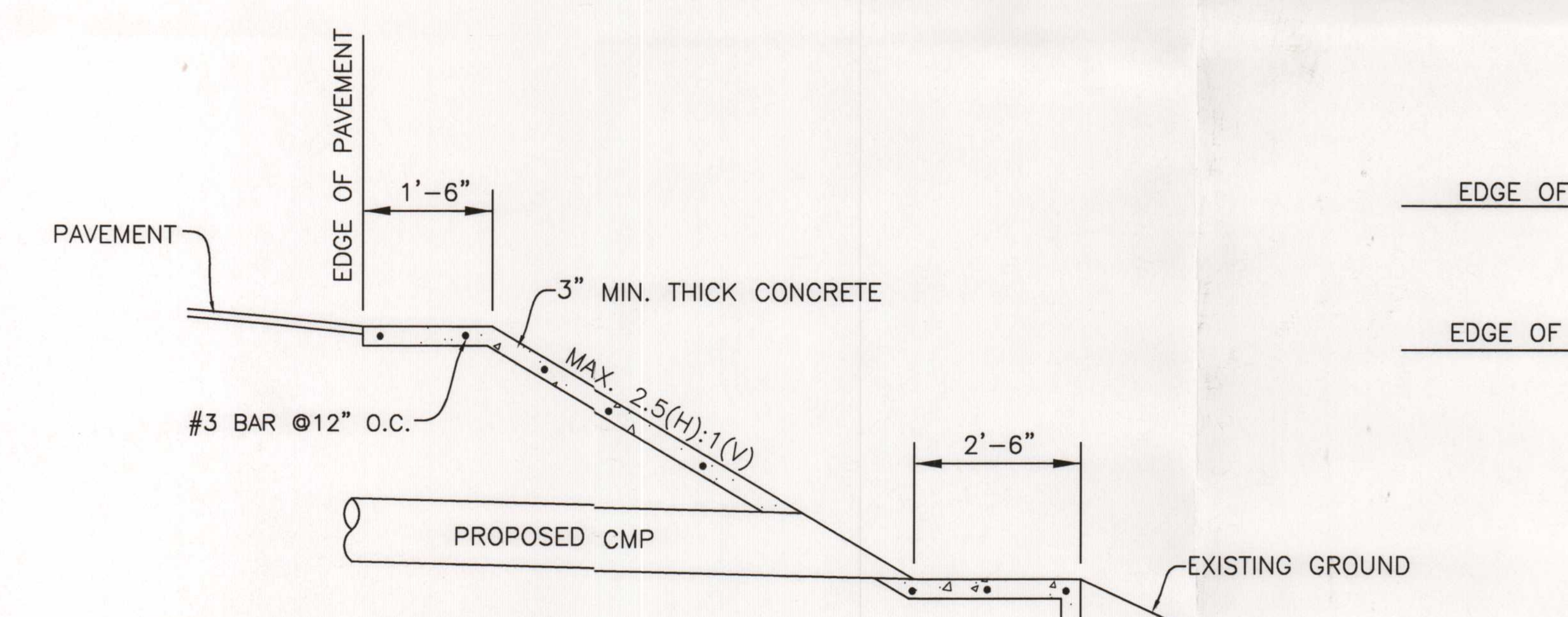
SCALE: N.T.S.



ROCK BERM NOTES:
USE ONLY OPEN GRADED ROCK 3-5 INCHES DIMATER.
THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 1 INCH OPENINGS AND MINIMUM WIRE DIAMETER OR 20 GAUGE.
THE ROCK BERM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE - WOVEN WIRE 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 ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CREATE A SILTATION PROBLEM.
DAILY INSPECTION SHALL BE MADE ON SEVERE SERVICE ROCK BERMS; SILT SHALL BE REMOVED WHEN ACCUMULATION REACHES 6 INCHES.
WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATION SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

ROCK BERM

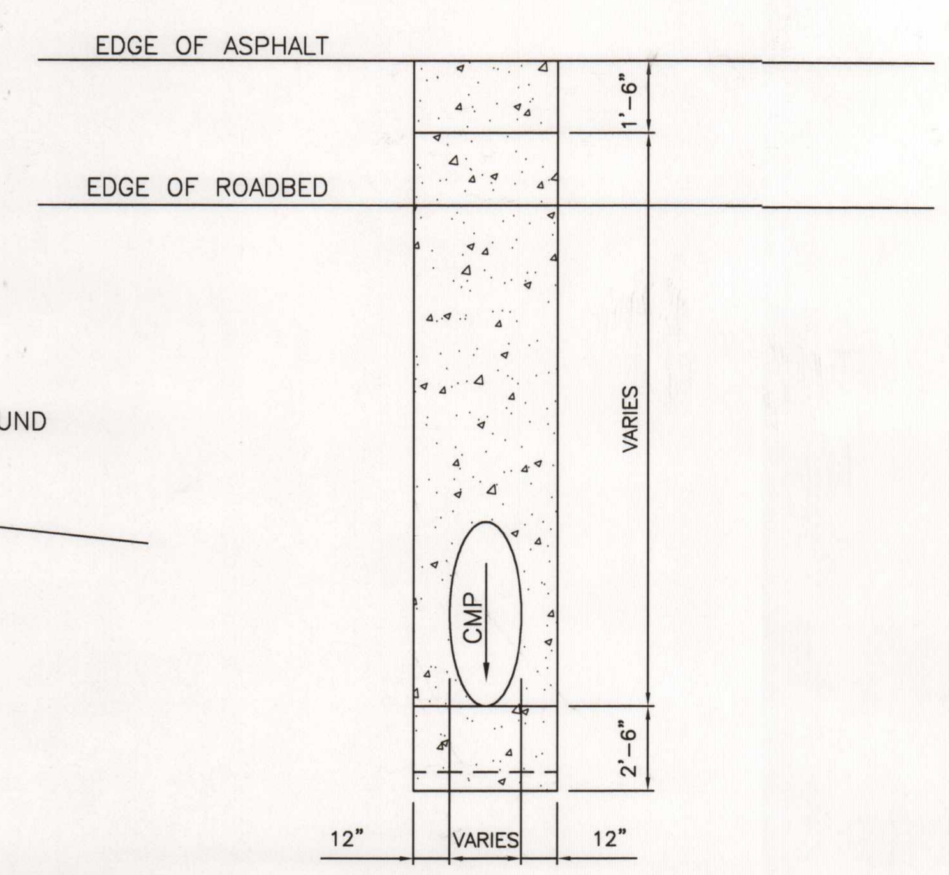
SCALE: N.T.S.

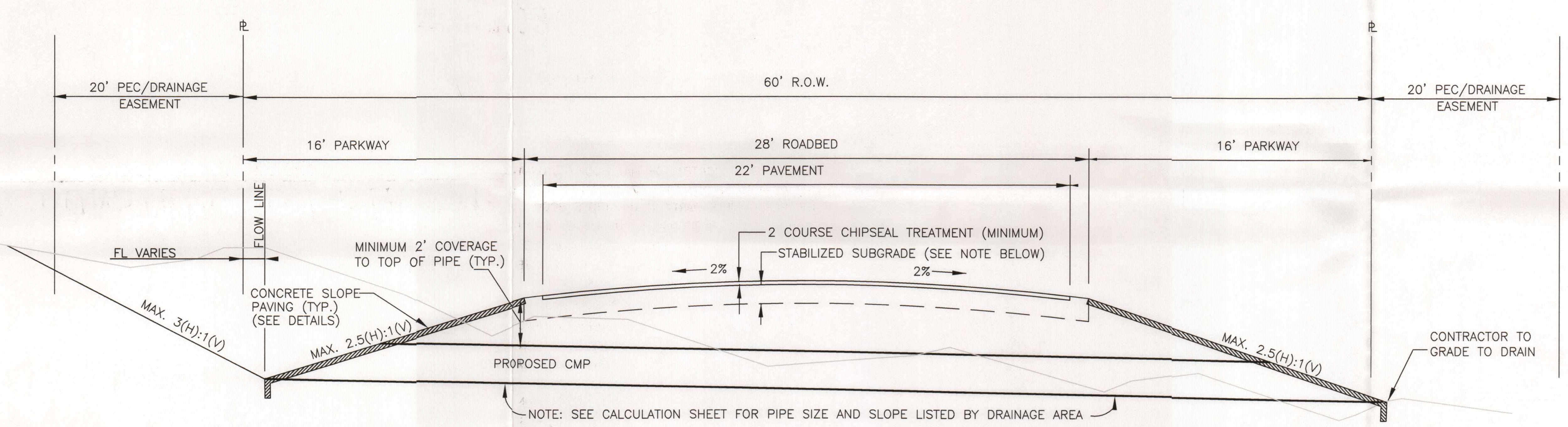


CONC SLOPE PAVING DETAIL

SCALE: N.T.S.

NOTES:
1. CONCRETE SLOPE PAVING TO USE #3 BAR @ 12" O.C. EACH WAY.





NOTE: SEE CALCULATION SHEET FOR PIPE SIZE AND SLOPE LISTED BY DRAINAGE AREA

SUBGRADE NOTE: PAVEMENT DESIGN, SUBGRADE REQUIREMENTS, AND BASE REQUIREMENTS ARE BY OTHERS AND NOT ADDRESSED HEREIN. THEY REMAIN THE RESPONSIBILITY OF THE OWNER. THIS DETAIL FOR INFORMATION RELATED ONLY TO CULVERT END TREATMENT AND COVER REQUIREMENTS.

TYPICAL CULVERT CROSS SECTION

SCALE: N.T.S.

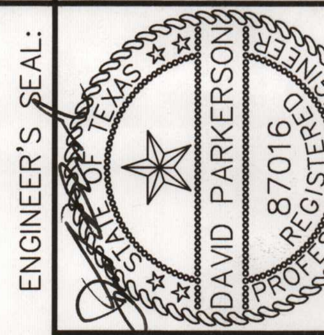
GENERAL NOTES:
1. IF NECESSARY, CONTRACTOR MAY MODIFY STORMWATER CONTROLS TO ACHIEVE THE DESIRED INTENT, ANY CHANGES ARE TO BE NOTED, SIGNED AND DATED BY THE RESPONSIBLE PARTY IN THE TPDES BOOK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL STORMWATER CONTROLS.
3. REFER TO TPDES BOOK FOR THIS PROJECT FOR MORE INFORMATION/DETAILS.
4. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER FOR ANY QUESTIONS REGARDING THE INTENT OF THIS PLAN.
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR FILING ALL NOI's (NOTICE OF INTENT) AND NOT's (NOTICE OF TERMINATION) FOR ALL PARTIES REQUIRED FOR THIS PROJECT. REFER TO THE TPDES BOOK FOR THE NECESSARY FORMS.
6. A COPY OF THIS PLAN AND THE TPDES BOOK MUST REMAIN AT THE CONSTRUCTION SITE AT ALL TIMES.
7. ENGINEER IS NOT RESPONSIBLE FOR THE DESIGN OF ANY UTILITIES RELATED TO THIS PROJECT. THIS DESIGN IS FOR DRAINAGE CULVERTS ONLY TO ACCOMMODATE A PRIVATE STREET.
8. CONTRACTOR IS RESPONSIBLE FOR ALL PAVEMENT DESIGN AND CONSTRUCTION OF FUTURE ROADWAYS TO ACCOMMODATE AND TIE INTO THE PROPOSED CULVERTS AS SHOWN, INCLUDING ANY GEOTECHNICAL REQUIREMENTS.
9. CONTRACTOR TO CUT PIPE ENDS TO FINAL PARKWAY SLOPE. (SEE TYPICAL CULVERT CROSS SECTION). PARKWAY WILL HAVE A MAXIMUM SLOPE OF 3(H):1(V) UNLESS NOTED OTHERWISE.
10. MINIMUM PIPE COVER FOR ALL CULVERTS IS 2 FEET.
11. CONTRACTOR TO GRADE TO DRAIN BOTH INFLOW AND OUTFLOW FLOW LINES @ MINIMUM SLOPE OF 1% AND MINIMUM DEPTH OF 2' TO AVOID PONDING.
12. CONTRACTOR TO GRADE ROADSIDE DITCHES TO A MINIMUM DEPTH OF 1.5' WITH A MINIMUM SLOPE OF 1% UNLESS NOTED OTHERWISE.

No.	Date	Revisions	App.

BAKER SURVEYING, INC.
PH. (830) 833-2250
FAX. (830) 833-2257
2250 US 281 N.
BLANCO TX. 78606

KAVANAUGH CONSULTING, LLC
108 RIVER OAKS DR
WIMBERLEY, TEXAS 78676
PHONE: (512) 587-7397
KAVANAUGHCONSULTING@GMAIL.COM
TBPE FIRM #6711

ENGINEER'S SEAL:



THE HILLS AT CANYON LAKE COMAL COUNTY

PRIVATE ROAD DRAINAGE DETAILS

TCEQ-R13
APR 16 2012
SAN ANTONIO

FOR REVIEW

Scale:	As Shown
Designed by:	MRK
Drawn by:	MRK
Checked by:	DP
Date:	FEBRUARY 2012
Project No.	11-096

SHEET 3 OF 16

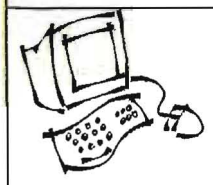
N:\DRAW 2011\11-096 TYE\dwg\11-096 PLAT.dwg, 3/8/2012 11:28:25 AM, HP Designjet T1100 44in HPGL2

EXHIBIT S

Copy of Notice of Intent (NOI)

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

TCEQ Office Use Only
Permit No.: TXR15
RN:
CN:
Ref No:



Sign up now for ePermits NOI at https://www6.tceq.state.tx.us/steers/
Get Instant Permit Coverage and only pay a $225 application fee.

If filing a paper NOI you can pay the application fee on line? Go to https://www6.tceq.texas.gov/epay/

IMPORTANT:
- Use the **INSTRUCTIONS** to fill out each question in this form.
- Use the attached **CUSTOMER CHECKLIST** to make certain all you filled out all required information.
- Incomplete applications **WILL** delay approval or result in **automatic Denial**.

Renewal of General Permit
Is this NOI to renew an ACTIVE permit?
Yes - What is your permit number? **Permit No. TXR15** _____
(No) - a permit number will be issued.

Application Fee if mailing a paper NOI:
You must pay the $325 Application Fee to TCEQ for the application to be considered complete.
Payment and NOI must be mailed to separate addresses. See instructions for correct mailing addresses.

Provide your payment information below, for us to verify payment of the application fee:

Mailed:	Check/Money Order No.: 1484	Company Name on checking account: CROSS CANYON RANCH LTD
EPAY:	Voucher No.:	Is the Payment Voucher copy attached? (Yes)

A. OPERATOR (applicant)

1. If the applicant is currently a customer with TCEQ, what is the Customer Number (CN) issued to this entity?
CN 603004656 (Search Central Registry)

2. What is the Legal Name of the entity (applicant) applying for this permit?
CROSS CANYON RANCH, LTD
(The legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal document forming the entity.)

3. What is the name and title of the person signing the application?
(The person must be an official meeting signatory requirements in TAC 305.43(a).)

Name: JOEY GUERRA	Title: MGR

4. What is the Operator's (applicant) mailing address as recognized by the US Postal Service? (verify at USPS.com)

Address: P.O. BOX 65101	Suite No./Bldg. No./Mail Code:	
City: SAN ANTONIO	State: TX	ZIP Code: 78216
Country Mailing Information (if outside USA).	Country Code:	Postal Code:

5. Phone No.: (210) 495 8777	Extension:
6. Fax No.: (210) 499 4217	E-mail Address: JOEY@INTEGRATEDREALTYGROUP.COM

7. Indicate the type of Customer:

☐ Individual	☐ Sole Proprietorship-D.B.A.	☒ Limited Partnership
☐ Corporation	☐ Federal Government	☐ General Partnership
☐ State Government	☐ County Government	☐ City Government
☐ Other Government	☐ Other (describe):	

8. Independent Operator: [X] Yes [ ] No (If governmental entity, subsidiary, or part of a larger corporation, check "No".)

9. Number of Employees: [X] 0-20; [ ] 21-100; [ ] 101-250; [ ] 251-500; or [ ] 501 or higher

10. Customer Business Tax and Filing Numbers *(This item is not applicable to Individuals, Government, GP or Sole Proprietor.)*
REQUIRED for Corporations and Limited Partnerships (Verify the entity's status and filing no. with TX SOS at 512/463-5555)

State Franchise Tax ID Number: 32035384281	Federal Tax ID: 20-3019546
TX SOS Charter (filing) Number: 800507545	DUNS Number (if known):

B. APPLICATION CONTACT

If TCEQ needs additional information regarding this application, who should be contacted?

1. Name: MARTIN KELLER	Title: PROJECT MANAGER	Company: BAKER SURVEYING
2. Phone No.: (830) 833 2250	Extension:	
3. Fax No.: 830 833 2257	E-mail Address: MARTIN@ABAKERSURVEY.COM	

C. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

1. TCEQ Issued RE Reference Number (RN): **RN** 104921648
(Search Central Registry)

2. Name of Project or Site (the name as known by the community where this facility/project is located):
THE HILLS AT CANYON LAKE
(example: phase and name of subdivision or name of project that's unique to the site)

3. Does the site have a physical address? NO
If Yes, complete **Section A** for a physical address.
If No, complete **Section B** for site location information.

Section A: Enter the physical address for the site. (verify it with USPS.com or other delivery source)

Street Number:	Street Name:
City:	ZIP Code:

Section B: Enter the site location information.

If no physical address (Street Number & Street Name), provide a written location access description to the site:
(Ex.: phase 1 of Woodland subdivision located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)
THE HILLS AT CANYON LAKE LOCATED 2 MILES NORTH OF INT OF MYSTIC CANYON AND FM 306

City where the site is located or nearest city to site: ~~CANYON LAKE~~ SPRING BRANCH	ZIP Code where site is located: 78070

4. Identify the county where the site is located: COMAL

5. Latitude: 29° 58' 26.535" N	Longitude: 98° 20' 48.524" W

6. What is the primary business of this entity? In your own words, briefly describe the primary business of the Regulated Entity:
(Do not repeat the SIC and NAICS code)
DEVELOPER

7. What is the mailing address for the regulated entity?

Is the RE mailing address the same as the Operator? [X] Yes, address is the same as Operator [ ] No, provide the address

Street Number:	Street Name:	
City:	State:	ZIP Code:

D. GENERAL CHARACTERISTICS

1. Is the site located on Indian Country Lands? [X] No [ ] Yes – If Yes, do not submit this NOI. Contact EPA, Region VI
If the site is on Indian country lands, you must obtain authorization through EPA, Region VI.

2. What is the Standard Industrial Classification (SIC) code (see instructions for common codes): (Search Osha.gov)
Primary: 152 Secondary: 1521

3(a) What is the total number of acres disturbed? 12.47 AC

3(b) Is the project site part of a larger common plan of development or sale? ☐ Yes ☒ No

If Yes, the total number of acres disturbed can be less than 5 acres.

If No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.

4. Discharge Information (all information MUST be provided or the permit will be denied)

4(a) What is the name of the water body(s) to receive the storm water runoff or potential runoff from the site?

DEVIL'S HOLLOW → GUADALUPE RIVER → CANYON LAKE

4(b) What is the segment number(s) of the classified water body(s) that the discharge or potential discharge will eventually reach? 1805

4(c) Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) list of impaired waters?

☐ Yes ☒ No

If Yes, provide the name of the impaired water body(s). _____

4(d) Is the discharge into an MS4? ☐ Yes ☒ No

If Yes, what is the name of the MS4 Operator? _____

Note: The general permit requires you to send a copy of the NOI to the MS4 Operator.

4(e) Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer?

☐ Yes ☒ No

If the answer is Yes, please note that a copy of the agency approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) must be included or referenced in the Storm Water Pollution Prevention Plan.

E. CERT IFICATION

Check "Yes" to the certifications below. **Failure to certify to all items will result in denial.**

☒	Yes	I certify that I have obtained a copy and understand the terms and conditions of the general permit (TXR150000).
☒	Yes	I certify that the full legal name of the entity (Operator) applying for this permit has been provided and is legally authorized to do business in Texas.
☒	Yes	I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed.
☒	Yes	I certify that a storm water pollution prevention plan has been developed and will be implemented prior to construction, and that is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000.

Operator Certification:

I, JOEY GUERRA (Typed or printed name *(Required & must be legible)*) MGR. (Title *(Required & legible)*)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signature: _____ MGR. (Use blue ink) Date: 1/13/2012

Texas Commission on Environmental Quality
General Permit Payment Submittal Form
$325 for a paper Construction NOI Application Fee

Use this form to submit your Application Fee only if you are mailing your payment.

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

Mail this form and your check to:

BY REGULAR U.S. MAIL	BY OVERNIGHT/EXPRESS MAIL
Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 P.O. Box 13088 Austin, TX 78711-3088	Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 12100 Park 35 Circle Austin, TX 78753

Fee Code: **GPA** General Permit: TXR150000

1. Check / Money Order No: 1484
2. Amount of Check/Money Order: 325.00
3. Date of Check or Money Order: 2-13-12
4. Name on Check or Money Order: CROSS CANYON RANCH LTD.

5. NOI INFORMATION

If the check is for more than one NOI, list each Project/Site (RE) Name and Physical Address exactly as provided on the NOI. DO NOT SUBMIT A COPY OF THE NOI WITH THIS FORM AS IT COULD CAUSE DUPLICATE PERMIT ENTRIES.

See Attached List of Sites (If more space is needed, you may attach a list.)

Project/Site (RE) Name:

THE HILLS @ CANYON LAKE
CROSS CANYON RANCH, LTD

Project/Site (RE) Physical Address:

2 MILES NORTH OF MYSTIC CANYON AND FM 306
ACCESSIBLE OFF OF CANYON HEIGHTS

1484

CROSS CANYON RANCH, LTD.
11202 DISCO DRIVE
SAN ANTONIO, TX 78216
PH. 210-495-8777

INTERNATIONAL BANK OF COMMERCE
SAN ANTONIO BRANCH
SAN ANTONIO, TX 78265
(210) 518-2525
30-1328-1140

2/13/2012

**325.00

PAY TO THE ORDER OF Texas Commission On Environmental Quality $

Three Hundred Twenty-Five Only****** DOLLARS

Texas Commission On Environmental Quality

MEMO NOI

⑈001484⑈ ⑆111401328⑆600 20910688⑈

EXHIBIT T

Core Data Form (TCEQ-10400)

TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission *(If other is checked please describe in space provided)*

☒ New Permit, Registration or Authorization *(Core Data Form should be submitted with the program application)*

☐ Renewal *(Core Data Form should be submitted with the renewal form)* ☒ Other: CZP Application

2. Attachments — Describe Any Attachments: *(ex. Title V Application, Waste Transporter Application, etc.)*

☐ Yes ☒ No

3. Customer Reference Number *(if issued)*	Follow this link to search for CN or RN numbers in Central Registry**	4. Regulated Entity Reference Number *(if issued)*
CN 603004656		RN 104921648

SECTION II: Customer Information

5. Effective Date for Customer Information Updates (mm/dd/yyyy): 03/01/2012

6. Customer Role (Proposed or Actual) – *as it relates to the Regulated Entity listed on this form. Please check only one of the following:*

☒ Owner ☐ Operator ☐ Owner & Operator
☐ Occupational Licensee ☐ Responsible Party ☐ Voluntary Cleanup Applicant ☐ Other: _____

7. General Customer Information

☐ New Customer ☐ Update to Customer Information ☐ Change in Regulated Entity Ownership
☐ Change in Legal Name (Verifiable with the Texas Secretary of State) ☒ No Change**

If "No Change" and Section I is complete, skip to Section III – Regulated Entity Information.

8. Type of Customer:			
☐ City Government	☐ County Government	☐ Federal Government	☐ State Government
☐ Other Government	☐ General Partnership	☒ Limited Partnership	☐ Other:

9. Customer Legal Name *(If an individual, print last name first: ex: Doe, John)*	*If new Customer, enter previous Customer below*	*End Date:*
Cross Canyon Ranch, Ltd.		

10. Mailing Address: 11202 Disco Dr.

City	State	ZIP	ZIP + 4
San Antonio	TX	78216	

11. Country Mailing Information *(if outside USA)*	12. E-Mail Address *(if applicable)*

13. Telephone Number	14. Extension or Code	15. Fax Number *(if applicable)*
(210)495-8777		( ) -

16. Federal Tax ID *(9 digits)*	17. TX State Franchise Tax ID *(11 digits)*	18. DUNS Number *(if applicable)*	19. TX SOS Filing Number *(if applicable)*
20-3019546	32035384281		

20. Number of Employees: ☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 and higher

21. Independently Owned and Operated? ☒ Yes ☐ No

SECTION III: Regulated Entity Information

22. General Regulated Entity Information *(If 'New Regulated Entity" is selected below this form should be accompanied by a permit application)*

☐ New Regulated Entity ☐ Update to Regulated Entity Name ☐ Update to Regulated Entity Information ☒ No Change** *(See below)*

**If "NO CHANGE" is checked and Section I is complete, skip to Section IV, Preparer Information.

23. Regulated Entity Name *(name of the site where the regulated action is taking place)*

24. Street Address of the Regulated Entity: *(No P.O. Boxes)*							
	City		State		ZIP		ZIP + 4	
25. Mailing Address:							
	City		State		ZIP		ZIP + 4	
26. E-Mail Address:							
27. Telephone Number		28. Extension or Code		29. Fax Number *(if applicable)*			
( ) -				( ) -			
30. Primary SIC Code (4 digits)	31. Secondary SIC Code (4 digits)	32. Primary NAICS Code (5 or 6 digits)		33. Secondary NAICS Code (5 or 6 digits)			
34. What is the Primary Business of this entity? *(Please do not repeat the SIC or NAICS description.)*							

Questions 34 – 37 address geographic location. Please refer to the instructions for applicability.

35. Description to Physical Location:			
36. Nearest City	County	State	Nearest ZIP Code

37. Latitude (N) In Decimal:			38. Longitude (W) In Decimal:		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form or the updates may not be made. If your Program is not listed, check other and write it in. See the Core Data Form instructions for additional guidance.

☐ Dam Safety	☐ Districts	☐ Edwards Aquifer	☐ Industrial Hazardous Waste	☐ Municipal Solid Waste
☐ New Source Review – Air	☐ OSSF	☐ Petroleum Storage Tank	☐ PWS	☐ Sludge
☐ Stormwater	☐ Title V – Air	☐ Tires	☐ Used Oil	☐ Utilities
☐ Voluntary Cleanup	☐ Waste Water	☐ Wastewater Agriculture	☐ Water Rights	☐ Other:

SECTION IV: Preparer Information

40. Name:	Baker Surveying, Inc., Martin Keller	41. Title:	PM

42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(830)833-2250		(830)833 2257	Martin @ abakersurvey.com

SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 9 and/or as required for the updates to the ID numbers identified in field 39.

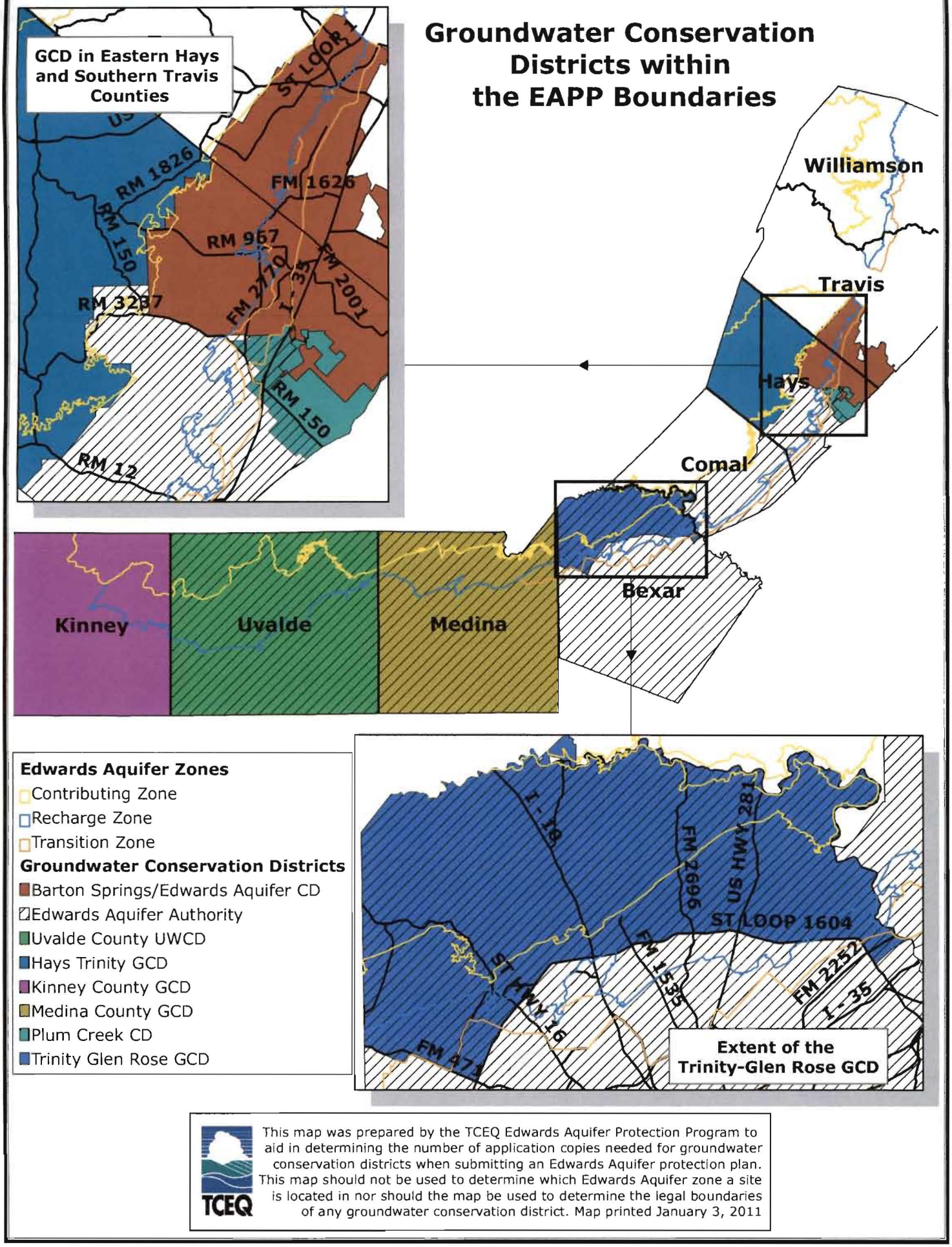
(See the Core Data Form instructions for more information on who should sign this form.)

Company:	BAKER SURVEYING	Job Title:	PM	
Name *(In Print)*:	MARTIN KELLER		Phone:	(830)833 2250
Signature:	Mart. Keller		Date:	03-09-12

EXHIBIT U

MAP - Groundwater Conservation Districts within the EAPP Boundaries

Groundwater Conservation Districts within the EAPP Boundaries



Edwards Aquifer Zones

- Contributing Zone
- Recharge Zone
- Transition Zone

Groundwater Conservation Districts

- Barton Springs/Edwards Aquifer CD
- Edwards Aquifer Authority
- Uvalde County UWCD
- Hays Trinity GCD
- Kinney County GCD
- Medina County GCD
- Plum Creek CD
- Trinity Glen Rose GCD

TCEQ

This map was prepared by the TCEQ Edwards Aquifer Protection Program to aid in determining the number of application copies needed for groundwater conservation districts when submitting an Edwards Aquifer protection plan. This map should not be used to determine which Edwards Aquifer zone a site is located in nor should the map be used to determine the legal boundaries of any groundwater conservation district. Map printed January 3, 2011

EXHIBIT V

Texas Commission on Environmental Quality

Contributing Zone Plan

General Construction Notes

1. Written construction notification should be provided to the appropriate TCEQ regional office no later than 48 hours prior to commencement of the regulated activity. Information should include the date on which the regulated activity will commence, the name of the approved plan for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person.

2. All contractors conducting regulated activities associated with this project should be provided with complete copies of the approved Contributing Zone Plan and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractor(s) should keep copies of the approved plan and approval letter on-site.

3. No temporary aboveground hydrocarbon and hazardous substance storage tank system may be installed within 150 feet if a domestic, industrial, irrigation, or public water supply well.

4. Prior to commencing construction, all temporary erosion and sedimentation (E&S) control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. Controls specified in the SWPPP section of the approved Edwards Aquifer Contributing Zone Plan are required during construction. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. The controls must remain in place until disturbed areas are revegetated and the areas have become permanently stabilized.

5. If sediment escapes the construction site, off-site accumulations of 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).

6. Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake must be provided that can indicate when the sediment occupies 50% of the basin volume.

7. 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. All spoils (excavated material) generated from the project site and stored on-site must have proper E&S controls installed.

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.

10. The following records should be maintained and made available to the TCEQ 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.

11. The holder of any approved Contributing Zone plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:

    A. any physical or operational modification of any best management practices or structure(s), including but not limited to temporary or permanent ponds, dams, berms, silt fences, and diversionary structures;

    B. any change in the nature or character of the regulated activity from that which was originally approved;

    C. any change that would significantly impact the ability to prevent pollution of the Edwards Aquifer and hydrologically connected surface water; or

    D. any development of land previously identified in a contributing zone plan as undeveloped.