

Lhoist North America of Texas, LLC

Water Pollution Abatement Plan Modification  
WPAP Mod

New Braunfels Lime Plant

350 APG Ln.

New Braunfels, Texas 78130

Comal County

Submitted to: TCEQ Region 13, San Antonio

Prepared By:



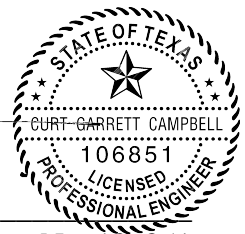
Boerne, Texas  
830-249-8284

Date: February 2023  
Project No. 11026-015  
-BB-

Signature: \_\_\_\_\_

Curt G. Campbell, PE - License No. 106851  
TX PE Firm No. 4524

Date: 5/31/2023



# Modification of a Previously Approved Plan Checklist

- **Edwards Aquifer Application Cover Page (TCEQ-20705)**
- **General Information Form (TCEQ-0587)**
  - Attachment A - Road Map
  - Attachment B - USGS / Edwards Recharge Zone Map
  - Attachment C - Project Description
- **Geologic Assessment Form (TCEQ-0585)**
  - Attachment A - Geologic Assessment Table (TCEQ-0585-Table)
  - Attachment B - Stratigraphic Column
  - Attachment C - Site Geology
  - Attachment D - Site Geologic Map(s)
- **Modification of a Previously Approved Plan (TCEQ-0590)**
  - Attachment A - Original Approval Letter and Approved Modification Letters
  - Attachment B - Narrative of Proposed Modification
  - Attachment C - Current Site Plan of the Approved Project
- **Application Form (include any applicable to the proposed modification):**
  - Aboveground Storage Tank Facility Plan (TCEQ-0575)
  - Organized Sewage Collection System Application (TCEQ-0582)
  - Underground Storage Tank Facility Plan (TCEQ-0583)
  - Water Pollution Abatement Plan Application (TCEQ-0584)
  - Lift Station / Force Main System Application (TCEQ-0624)
- **Temporary Stormwater Section (TCEQ-0602)**
  - Attachment A - Spill Response Actions
  - Attachment B - Potential Sources of Contamination
  - Attachment C - Sequence of Major Activities
  - Attachment D - Temporary Best Management Practices and Measures
  - Attachment E - Request to Temporarily Seal a Feature (if requested)
  - Attachment F - Structural Practices
  - Attachment G - Drainage Area Map
  - Attachment H - Temporary Sediment Pond(s) Plans and Calculations
  - Attachment I - Inspection and Maintenance for BMPs
  - Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices
- **Permanent Stormwater Section (TCEQ-0600), if necessary**
  - Attachment A - 20% or Less Impervious Cover Declaration (if requested for multi-family, school, or small business site)
  - Attachment B - BMPs for Upgradient Stormwater

Attachment C - BMPs for On-site Stormwater

Attachment D - BMPs for Surface Streams

Attachment E - Request to Seal Features, if sealing a feature

Attachment F - Construction Plans

Attachment G - Inspection, Maintenance, Repair and Retrofit Plan

Attachment H - Pilot-Scale Field Testing Plan (if requested)

Attachment I - Measures for Minimizing Surface Stream Contamination

- **Agent Authorization Form (TCEQ-0599), if application submitted by agent**
- **Application Fee Form (TCEQ-0574)**
- **Check Payable to the “Texas Commission on Environmental Quality”**
- **Core Data Form (TCEQ-10400)**

# Texas Commission on Environmental Quality

## Edwards Aquifer Application Cover Page

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### Our Review of Your Application

**The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with [30 TAC 213](#).**

### Administrative Review

1. [Edwards Aquifer applications](#) must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: <http://www.tceq.texas.gov/field/eapp>.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.
3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.
4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
6. If the geologic assessment was completed before October 1, 2004 and the site contains “possibly sensitive” features, the assessment must be updated in accordance with the *Instructions to Geologists* (TCEQ-0585 Instructions).

### Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.
2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be



clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied **the application fee will be forfeited.**
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

**Mid-Review Modifications**

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a “Mid-Review Modification”. Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ’s Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ’s San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

<b>1. Regulated Entity Name:</b> New Braunfels Lime Plant					<b>2. Regulated Entity No.:</b> 100552454				
<b>3. Customer Name:</b> Lhoist North America of Texas, LLC					<b>4. Customer No.:</b> 605752088				
<b>5. Project Type:</b> (Please circle/check one)	New		Modification		Extension		Exception		
<b>6. Plan Type:</b> (Please circle/check one)	WPAP	CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures
<b>7. Land Use:</b> (Please circle/check one)	Residential		Non-residential			<b>8. Site (acres):</b>		444-35	
<b>9. Application Fee:</b>	\$10,000		<b>10. Permanent BMP(s):</b>			Stormwater Ponds			
<b>11. SCS (Linear Ft.):</b>	N/A		<b>12. AST/UST (No. Tanks):</b>			N/A			
<b>13. County:</b>	Comal		<b>14. Watershed:</b>			Guadalupe			

# Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the “Texas Groundwater Conservation Districts within the EAPP Boundaries” map found at:

[http://www.tceq.texas.gov/assets/public/compliance/field\\_ops/eapp/EAPP%20GWCD%20map.pdf](http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf)

For more detailed boundaries, please contact the conservation district directly.

<b>Austin Region</b>			
<b>County:</b>	<b>Hays</b>	<b>Travis</b>	<b>Williamson</b>
Original (1 req.)	—	—	—
Region (1 req.)	—	—	—
County(ies)	—	—	—
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Barton Springs/ Edwards Aquifer <input type="checkbox"/> Hays Trinity <input type="checkbox"/> Plum Creek	<input type="checkbox"/> Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	<input type="checkbox"/> Austin <input type="checkbox"/> Buda <input type="checkbox"/> Dripping Springs <input type="checkbox"/> Kyle <input type="checkbox"/> Mountain City <input type="checkbox"/> San Marcos <input type="checkbox"/> Wimberley <input type="checkbox"/> Woodcreek	<input type="checkbox"/> Austin <input type="checkbox"/> Bee Cave <input type="checkbox"/> Pflugerville <input type="checkbox"/> Rollingwood <input type="checkbox"/> Round Rock <input type="checkbox"/> Sunset Valley <input type="checkbox"/> West Lake Hills	<input type="checkbox"/> Austin <input type="checkbox"/> Cedar Park <input type="checkbox"/> Florence <input type="checkbox"/> Georgetown <input type="checkbox"/> Jerrell <input type="checkbox"/> Leander <input type="checkbox"/> Liberty Hill <input type="checkbox"/> Pflugerville <input type="checkbox"/> Round Rock

<b>San Antonio Region</b>					
<b>County:</b>	<b>Bexar</b>	<b>Comal</b>	<b>Kinney</b>	<b>Medina</b>	<b>Uvalde</b>
Original (1 req.)	—	<input checked="" type="checkbox"/>	—	—	—
Region (1 req.)	—	<input checked="" type="checkbox"/>	—	—	—
County(ies)	—	<input checked="" type="checkbox"/>	—	—	—
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Trinity-Glen Rose	<input checked="" type="checkbox"/> Edwards Aquifer Authority	<input type="checkbox"/> Kinney	<input type="checkbox"/> EAA <input type="checkbox"/> Medina	<input type="checkbox"/> EAA <input type="checkbox"/> Uvalde
City(ies) Jurisdiction	<input type="checkbox"/> Castle Hills <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Helotes <input type="checkbox"/> Hill Country Village <input type="checkbox"/> Hollywood Park <input type="checkbox"/> San Antonio (SAWS) <input type="checkbox"/> Shavano Park	<input type="checkbox"/> Bulverde <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Garden Ridge <input checked="" type="checkbox"/> New Braunfels <input type="checkbox"/> Schertz	NA	<input type="checkbox"/> San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

Curt G. Campbell, P.E.

Print Name of Customer/Authorized Agent



5/31/2023

Signature of Customer/Authorized Agent

Date

**\*\*FOR TCEQ INTERNAL USE ONLY\*\***

Date(s) Reviewed:		Date Administratively Complete:	
Received From:		Correct Number of Copies:	
Received By:		Distribution Date:	
EAPP File Number:		Complex:	
Admin. Review(s) (No.):		No. AR Rounds:	
Delinquent Fees (Y/N):		Review Time Spent:	
Lat./Long. Verified:		SOS Customer Verification:	
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):
Core Data Form Complete (Y/N):			Signed (Y/N):
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):

# General Information Form

## Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) Effective June 1, 1999

**To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.**

**Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.**

## Signature


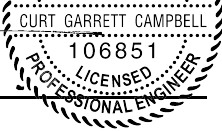
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **General Information Form** is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Engineer: Curt G. Cambell, P.E.

TX License No. 106851 | TX Firm No. 4524

Date: 5/31/2023

Signature of Engineer:

## Project Information

1. Regulated Entity Name: New Braunfels Lime Plant
2. County: Comal
3. Stream Basin: Guadalupe
4. Groundwater Conservation District (If applicable): Comal Trinity GCD & Edwards Aquifer Authority
5. Edwards Aquifer Zone:  
 Recharge Zone  
 Transition Zone
6. Plan Type:  
 WPAP  
 SCS  
 Modification  
 AST  
 UST  
 Exception Request

7. Customer (Applicant):

Contact Person: Aaron Jones

Entity: Lhoist North America of Texas, LLC

Mailing Address: 5600 Clearfork Main Street, Ste. 300

City, State: Fort Worth, Texas

Zip: 76109

Telephone: 817-806-1507

FAX:

Email Address: aaron.jones@lhoist.com

8. Agent/Representative (If any):

Contact Person: Curt G. Campbell, P.E.

Entity: Westward Environmental, Inc.

Mailing Address: 4 Shooting Club Rd.

City, State: Boerne, TX

Zip: 78006

Telephone: 830-246-8284

FAX: 830-249-0221

Email Address: ccampbell@westwardenv.com

9. Project Location:

The project site is located inside the city limits of \_\_\_\_\_.

The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of New Braunfels.

The project site is not located within any city's limits or ETJ.

10.  The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

350 APG Lane, New Braunfels. From the intersection of N Solm Rd. and Old HWY 81, go 0.77 miles north, turn right onto Wald Rd., go 0.17 miles, turn left onto APG Ln., go 0.37 miles and the office is on the right.

11.  **Attachment A – Road Map.** A road map showing directions to, and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

12.  **Attachment B - USGS / Edwards Recharge Zone Map.** A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached. The map(s) clearly show:

Project site boundaries.

USGS Quadrangle Name(s).

Boundaries of the Recharge Zone (and Transition Zone, if applicable).

Drainage path from the project site to the boundary of the Recharge Zone.

13.  **The TCEQ must be able to inspect the project site or the application will be returned.**  
Sufficient survey staking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of the regulated activities and the geologic or manmade features noted in the Geologic Assessment.

Survey staking will be completed by this date: Site is fenced and features are flagged.

14.  **Attachment C – Project Description.** Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:

- Area of the site
- Offsite areas
- Impervious cover
- Permanent BMP(s)
- Proposed site use
- Site history
- Previous development
- Area(s) to be demolished

15. 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: \_\_\_\_\_

### ***Prohibited Activities***

16.  I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

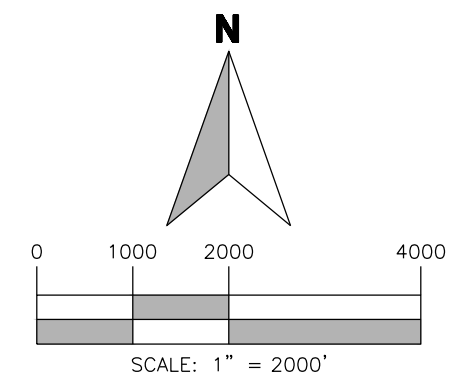
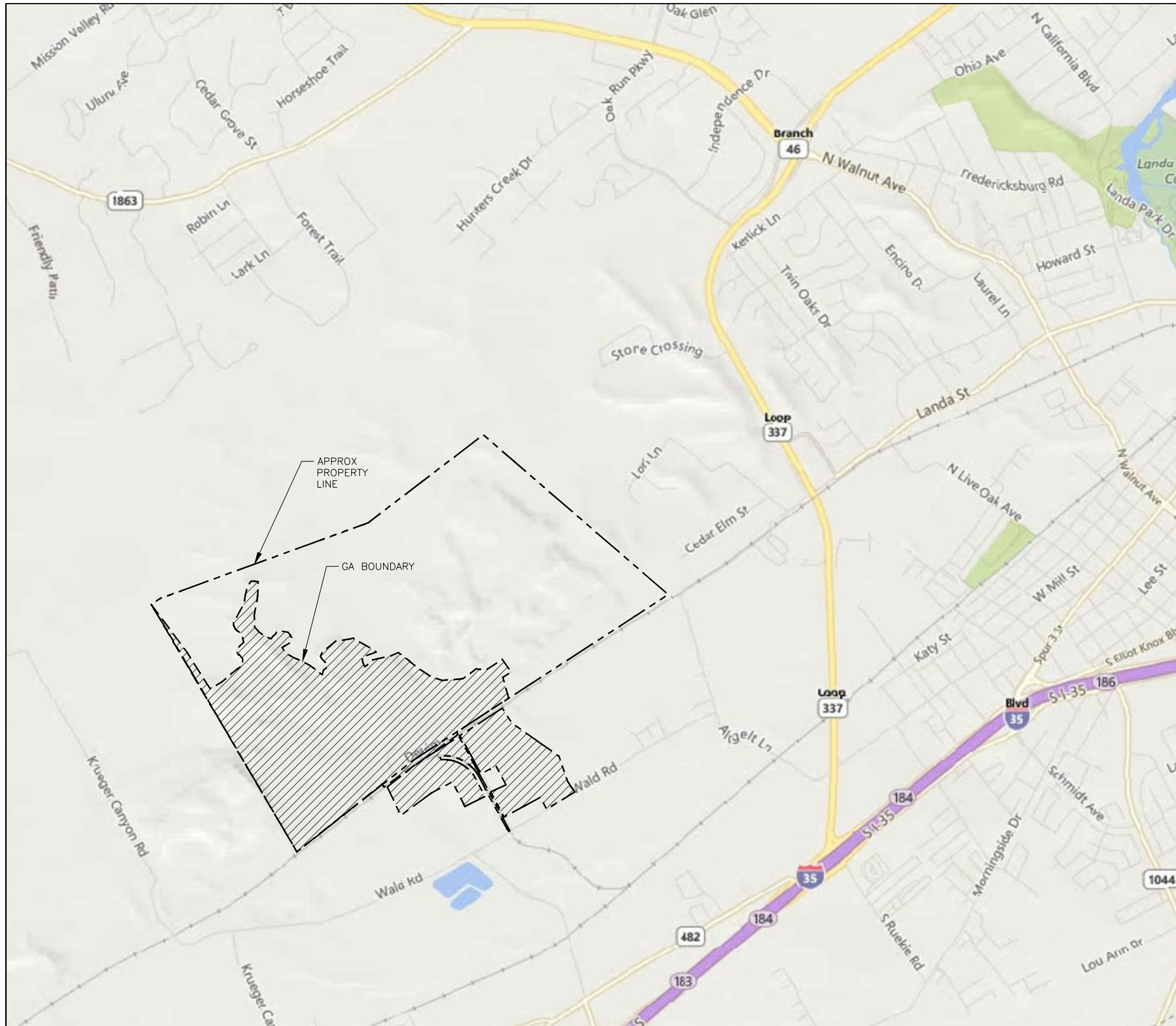
- (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);
- (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;
- (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;
- (4) The use of sewage holding tanks as parts of organized collection systems; and
- (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).
- (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17.  I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:
- (1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);
  - (2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and
  - (3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

### ***Administrative Information***

18. The fee for the plan(s) is based on:
- For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
  - For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
  - For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
  - A request for an exception to any substantive portion of the regulations related to the protection of water quality.
  - A request for an extension to a previously approved plan.
19.  Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:
- TCEQ cashier
  - Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
  - San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)
20.  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.
21.  No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.





- PROPERTY LINE
- GA BOUNDARY LINE

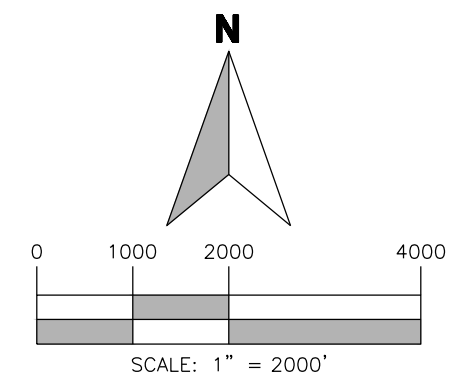
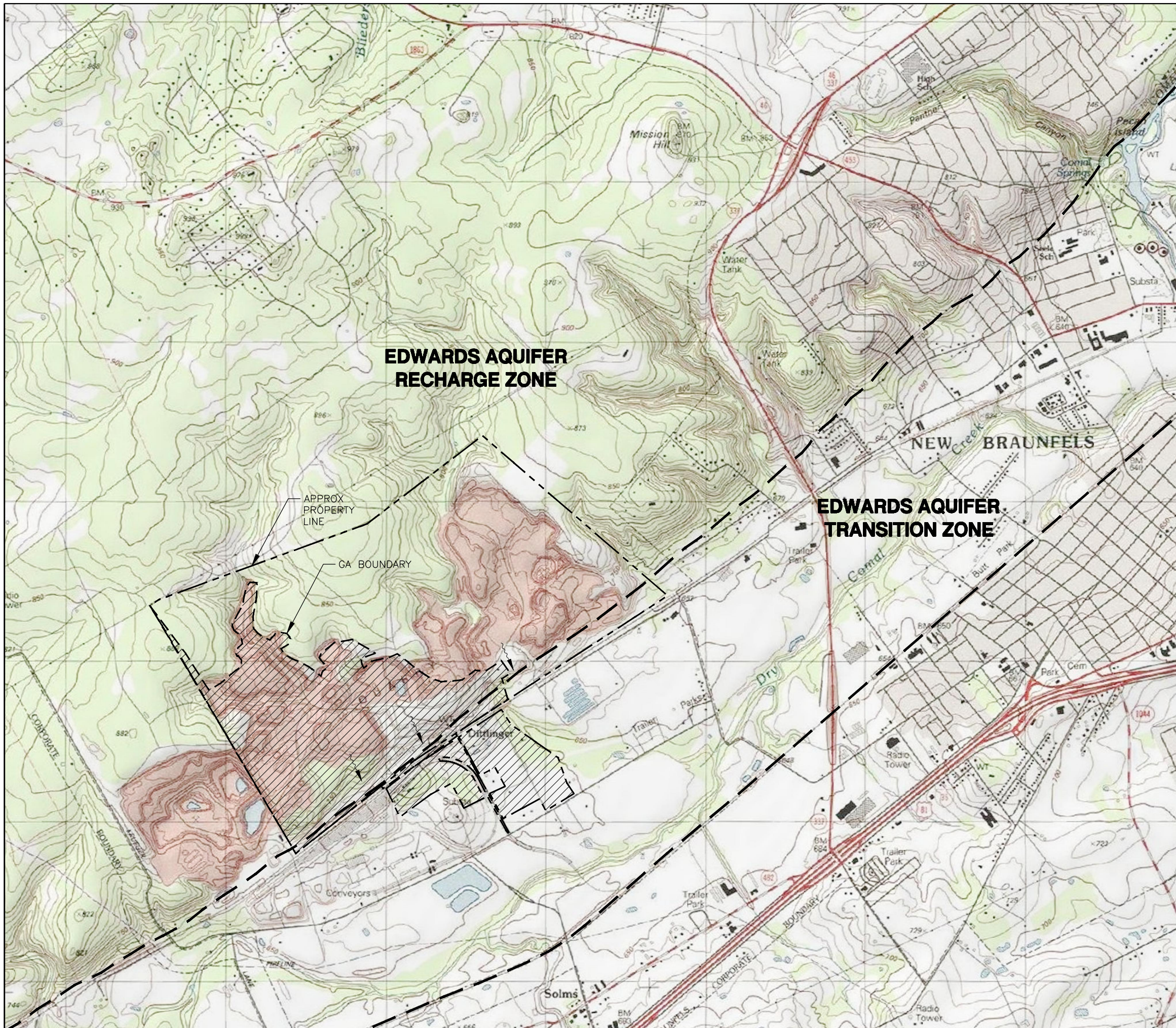
THIS PRODUCT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REPRESENT AN ON-THE-GROUND SURVEY. IT REPRESENTS AN APPROXIMATE RELATIVE LOCATION OF PROPERTY BOUNDARIES.

ROAD MAP	
WPAP MOD	DATE
LHOIST NORTH AMERICA OF TEXAS, LLC	BY
NEW BRAUNFELS LIME PLANT	DATE
DESCRIPTION	BY
REV.	DATE

IMAGE:	BING MAPS 2019
ISSUE DATE:	09/24/2021
DRAWN BY:	AK
CHECKED BY:	CJF
SCALE:	1" = 2000'
JOB NO.:	11026-015

**WESTWARD**  
 Environmental, Engineering, Natural Resources.  
 P.O. Box 2205 Boerne, Texas 78006  
 (830) 249-8284 Fax: (830) 249-0221  
 TBPE REG. NO.: F-4524  
 TBPC REG. NO.: 50112





- EDWARDS BOUNDARY
- PROPERTY LINE
- FLOW ARROW
- GA BOUNDARY LINE

**EDWARDS AQUIFER  
RECHARGE ZONE**

**EDWARDS AQUIFER  
TRANSITION ZONE**

APPROX  
PROPERTY  
LINE

GA BOUNDARY

**WESTWARD**  
Environmental, Engineering, Natural Resources.  
P.O. Box 2205 Boerne, Texas 78006  
(830) 249-8284 Fax: (830) 249-0221  
TBPE REG. NO.: F-4524  
TBPC REG. NO.: 50112

THIS PRODUCT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REPRESENT AN ON-THE-GROUND SURVEY. IT REPRESENTS AN APPROXIMATE RELATIVE LOCATION OF PROPERTY BOUNDARIES.

USGS MAP	
WPAP MODIFICATION	
LHOIST NORTH AMERICA OF TEXAS, LLC	
NEW BRAUNFELS LIME PLANT	
REV.	DATE
DESCRIPTION	BY
	DATE

IMAGE:	BING MAPS 2019
ISSUE DATE:	09/24/2021
DRAWN BY:	ak
CHECKED BY:	cjf
SCALE:	1" = 2000'
JOB NO.:	11026-015



**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**General Information Form (TCEQ-0587)  
Attachment C**

**Project Description**

This Water Pollution Abatement Plan (WPAP) Modification has been prepared on behalf of Lhoist North America of Texas, LLC for the New Braunfels Lime Plant. Approximately four hundred and forty-four (444.34) acres of the site are currently under two existing Water Pollution Abatement Plans (ID 13000997 and 13001417). For this modification, Lhoist proposes to modify a previously approved pond design (Pond B) by converting the approximate 9.3 acres of undeveloped land from a batch detention basin to an extension basin with grassy swales. The area will be cleared of vegetation and covered with compacted base.

The overall subject site is a limestone quarry approved under the previous WPAP (EAPP ID 13000997) as of 01/22/2020. Within the limestone quarry operations area, an additional WPAP Modification has been previously approved as of 01/14/2022 (EAPP ID 13001417) for the commercial lime plant area (4.4-acres). In lieu of a batch detention basin, Pond B has been redesigned as an extended detention pond in series with a grassy swale. Pond B was redesigned, in accordance with RG-348 design guidelines. A Drainage Report is included with of this application to detail the Pond B design parameters. It is our intention to address new proposed regulated activities in this plan modification apart from other previously approved activities within this mine. There are no proposed changes to Pond A or its drainage area. Quarry operations will continue as historically performed.

Trash generated on-site will continue to be disposed of in a dumpster and handled by a Licensed waste service. On-site sewage facilities will consist of portable toilets, which will be pumped out and disposed of by truck on a weekly basis.

A geologic assessment was completed December 18, 2019 and is included with this WPAP Mod. Four sensitive features and three water wells were identified during the geologic assessment. The proposed additional impervious area is not near any of the sensitive features or within the buffer zone for any sensitive features noted on the geologic assessment; there are no proposed changes to the previously approved strategy for operations near sensitive areas.

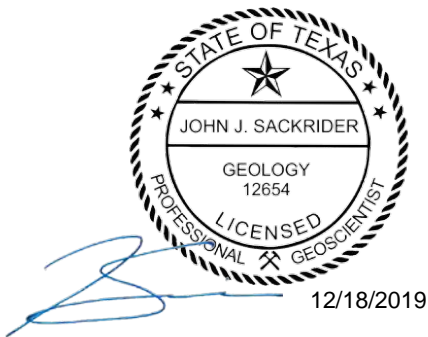
**REVISED - GEOLOGIC ASSESSMENT**  
**New Braunfels Lime Plant**  
**Project No.: 11026-006**

**350 APG Ln.**  
**New Braunfels, Comal County, Texas**

**Submitted to:**  
Texas Commission on Environmental Quality  
Region 13, San Antonio Office  
14250 Judson Rd.  
San Antonio, TX 78233-4480  
210-490-3096

**Prepared for:**  
Lhoist North America of Texas, Ltd.  
350 APG Ln.  
New Braunfels, Texas 78130

**December 2019**



**WESTWARD**  
Environmental. Engineering. Natural Resources.  
4 Shooting Club Road  
Boerne, Texas 78006  
830.249.8284

TEXAS REGISTERED ENGINEERING FIRM NO. 4524  
TEXAS REGISTERED GEOSCIENCE FIRM NO. 50112

# Geologic Assessment

## Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), Effective June 1, 1999

**To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.**

**Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.**

## Signature

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. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist:

Telephone: 830-249-8284

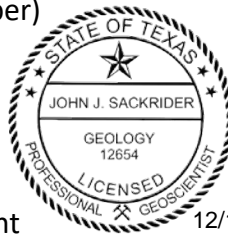
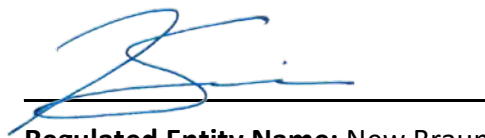
John J. Sackrider, PG #12654

Fax: 830-249-0221

Date: 12/18/2019

Representing: Westward Environmental, Inc., TBPG Registered Geoscience Firm 50012 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:



**Regulated Entity Name:** New Braunfels Lime Plant

12/18/2019

## Project Information

1. Date(s) Geologic Assessment was performed: July 9-12 & 16-18, 2019

2. Type of Project:

WPAP  
 SCS

AST  
 UST

3. Location of Project:

Recharge Zone  
 Transition Zone

Contributing Zone within the Transition Zone

4.  **Attachment A - Geologic Assessment Table.** Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.
5.  Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups\* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

**Table 1 - Soil Units, Infiltration Characteristics and Thickness**

Soil Name	Group*	Thickness(feet)
ByB	D	<7
Pt	D	variable
RUD	C	<3

\* Soil Group Definitions (Abbreviated)

- A. Soils having a high infiltration rate when thoroughly wetted.
- B. Soils having a moderate infiltration rate when thoroughly wetted.
- C. Soils having a slow infiltration rate when thoroughly wetted.
- D. Soils having a very slow infiltration rate when thoroughly wetted.

6.  **Attachment B – Stratigraphic Column.** A stratigraphic column showing formations, members, and thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.
7.  **Attachment C – Site Geology.** A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.
8.  **Attachment D – Site Geologic Map(s).** The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1": 400'  
 Applicant's Site Plan Scale: 1" = 400'  
 Site Geologic Map Scale: 1" = 400'  
 Site Soils Map Scale (if more than 1 soil type): 1" = 400'
9. Method of collecting positional data:
  - Global Positioning System (GPS) technology.
  - Other method(s). Please describe method of data collection: \_\_\_\_\_
10.  The project site and boundaries are clearly shown and labeled on the Site Geologic Map.
11.  Surface geologic units are shown and labeled on the Site Geologic Map.

12.  Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.
- Geologic or manmade features were not discovered on the project site during the field investigation.
13.  The Recharge Zone boundary is shown and labeled, if appropriate.
14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.
- There are 3 (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
- The wells are not in use and have been properly abandoned.
- The wells are not in use and will be properly abandoned.
- The wells are in use and comply with 16 TAC Chapter 76.
- There are no wells or test holes of any kind known to exist on the project site.

### ***Administrative Information***

15.  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.

## **Attachment A**

### **Geologic Assessment Table (Form TCEQ-0585)**

GEOLOGIC ASSESSMENT TABLE			PROJECT NAME: New Braunfels Lime Plant																	
LOCATION			FEATURE CHARACTERISTICS										EVALUATION		PHYSICAL SETTING					
1A	1B *	1C *	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DIP (DEG)	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)		TOPOGRAPHY
						X	Y	Z								<40	≥40	<1.6	≥1.6	
S-1	29.682183	-98.188752	MB	30	Ked, Qle	5500	4900	135					F, V	5	35	X			X	Hillside
S-2	29.675816	-98.189851	MB	30	Qle	0.33	0.33	unknown					X	5	35	X		X		Hillside
S-3	29.679406	-98.184171	F	20	Ked	25			55	10			N, F	5	35	X		X	Hillside	
S-4	29.681877	-98.179394	MB	30	Ked	1.25		250					X	5	35	X		X		Hillside
S-5	29.684197	-98.178909	MB	30	Ked	0.83	0.83	1060					X	5	35	X		X		Hillside
S-6	29.685213	-98.188675	F	20	Ked	25			40				N, F	5	25	X		X	Hillside	
S-7	29.686359	-98.197186	F	20	Ked	25			42				N, F	5	25	X		X	Hillside	
S-8	29.679358	-98.188563	Z	20	Ked	25	235	3	130				N, O	35	55		X		X	Drainage
S-9	29.677596	-98.186869	SH	20	Ked	10	7	2					N, O	20	40		X	X		Hillside
S-10	29.676684	-98.189562	SC	20	Ked	0.083	0.083	0.25	110				O	5	25	X		X		Hillside
S-11	29.679660	-98.189965	SC	20	Ked	0.5	0.125	1	110				N	5	25	X		X		Hillside
S-12	29.681558	-98.190973	SC	20	Ked	0.25	0.125	1	170				N	5	25	X		X		Hillside
S-13	29.681891	-98.190251	C	30	Ked	8	6	5	55	10			N, O	35	75		X	X		Hillside
S-14	29.676909	-98.187798	Z	30	Ked	10	10	2	40				N, O	20	50		X	X		Drainage
															0					
															0					
															0					


\* DATUM: NAD 83

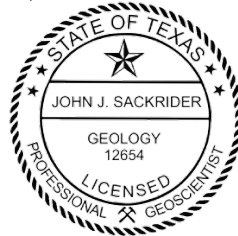
2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The information presented here complies with that document and is a true representation of the conditions observed in the field. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

  
 John J. Sackrider, P.G. (#12654)



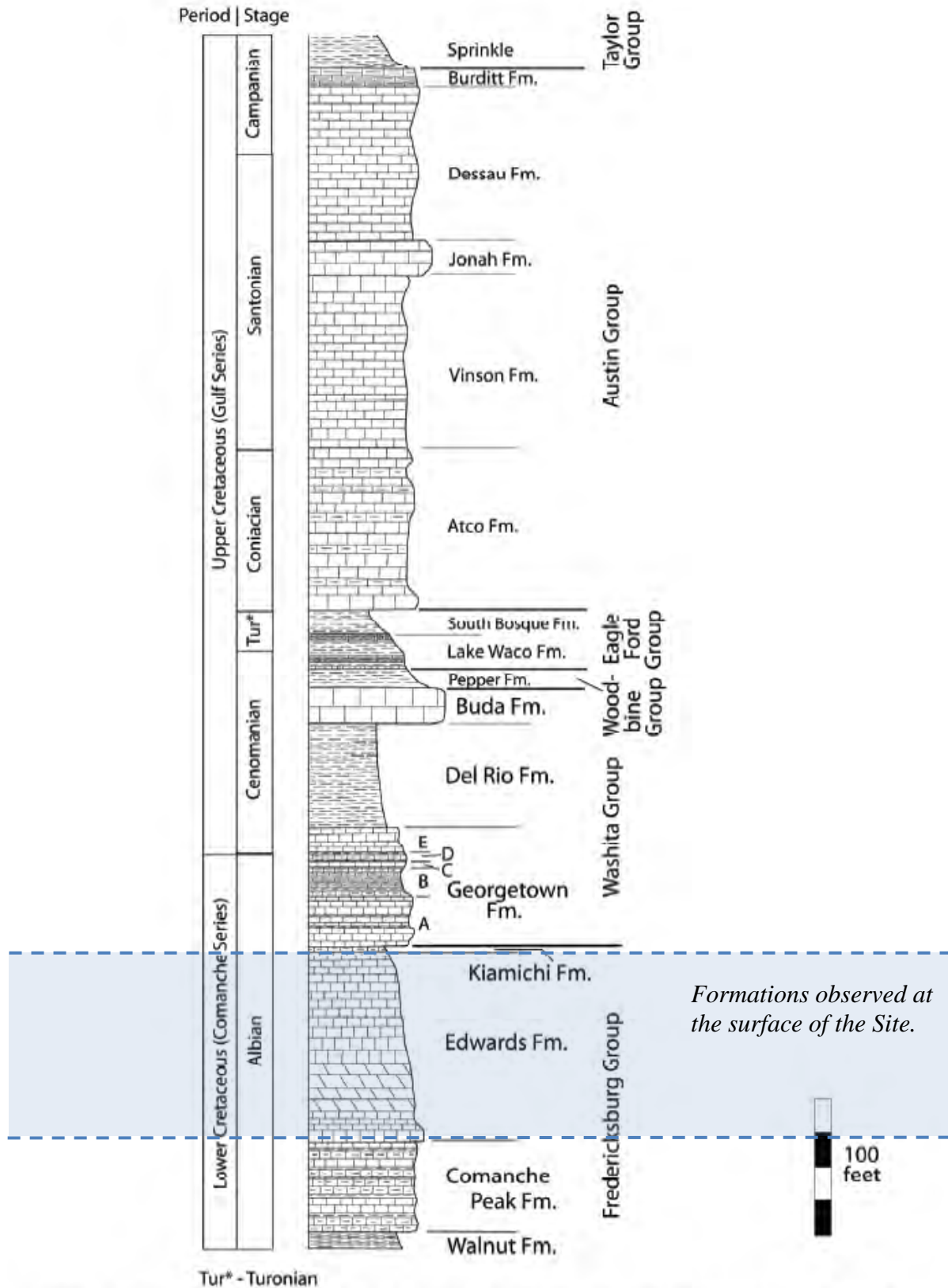
Date 12/18/2019



**Attachment B**

**Stratigraphic Column**

**Generalized Stratigraphic Column Comal County, Texas**



Reference: Todd B Housh, PhD, PG; *Bedrock Geology of Round Rock and Surrounding Areas, Williamson & Travis Counties, Texas*

## **Attachment C**

### **Site Geology (Geologic Narrative)**

## **Revised - Geologic Assessment for the Lhoist North America Site in Comal County, Texas.**

### **1.0 PURPOSE**

Westward Environmental, Inc. (WESTWARD) was retained by Lhoist North America of Texas, Ltd. (Client) to prepare a Geologic Assessment (GA) at their New Braunfels Lime Plant in New Braunfels, Comal County, Texas (Site). This GA was prepared as a required attachment to a Water Pollution Abatement Plan (WPAP) Application for the Site as required by the Texas Commission of Environmental Quality (TCEQ).

A GA dated September 20, 2019 was submitted with the WPAP application packet. Following a review by TCEQ personnel, it was determined that the revised GA would be required in order to continue the WPAP plan review. This GA has been revised to address relevant TCEQ comments in the correspondence dated December 17, 2019.

### **2.0 REGULATORY GUIDANCE**

#### Chapter 30 of the Texas Administrative Code

This report was prepared in accordance with *Instructions for Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 (Rev. 10-01-04))* and will be reviewed pursuant to Title 30, Chapter 213 of the Texas Administrative Code.

### **3.0 PROJECT LOCATION**

The project area is approximately 350 acres and is located on APG Ln. in Comal County, Texas, approximately 1.5 miles northwest of the Interstate 35 and Solms Road intersection. The Site is located over the Edwards Aquifer Recharge Zone (EARZ) and the Edwards Aquifer Transition Zone (EATZ).

### **4.0 METHODOLOGY**

As part of the GA, WESTWARD geologists performed both a desktop review of selected published information and a field investigation in accordance with *Instructions for Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones (TCEQ-0585 (Rev. 10-01-04))*.

#### **4.1 Desktop Review**

WESTWARD geologists conducted a review of aerial imagery, the University of Texas Bureau of Economic Geology (BEG) Geologic Atlas of Texas (GAT) San Antonio Sheet, applicable U.S. Geological Survey (USGS) Topographic quadrangle(s), the Texas Natural Resources Information System (TNRIS), the Texas Water Development Board's (TWDB) Water Data Interactive Groundwater Data Viewer, and the U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey prior to the field investigation.

#### **4.2 Field Investigation**

A field investigation was performed at the Site by Westward staff, under the direction of John J Sackrider, P.G.(TBPG Lic. No.: 12654) from July 9-12, and 16-18, 2019. Field transects were walked across much of the site. Areas which were inaccessible due to safety concerns were observed from the perimeter and via drone technology. Select areas of the historic pit which were primarily obscured by material piles were not directly observed. These areas are identified on the Unsafe/Obscured Areas Map included in Attachment D.

## 5.0 DESKTOP REVIEW

The desktop review was utilized for the preliminary planning of the field investigation. The accuracy of the desktop review was limited by the accessibility, scale, and age of the data available.

### 5.1 Published Surface Geology

The GAT San Antonio Sheet and the digital GAT database available through TNRIS show the Edwards Limestone (Ked) and Leona Formation (Qle) mapped at the surface of the Site.

### 5.2 Published Structure

The desktop review revealed one (1) mapped fault at the Site, along the south to southeastern property boundary. The average bearing of the mapped fault is 60° and is the defining fault for the dominant trend of the area. For the purpose of this assessment, the dominant trend range is 45°-70°.

### 5.3 Karst Features

The desktop review did not reveal any karst features.

### 5.4 Non-karst & Manmade Features

The desktop review revealed three (3) water wells at the Site.

### 5.5 Soils

Three (3) soil units were identified onsite through the NRCS Web Soil Survey. They are detailed below as well as included on the Geologic Assessment Form TCEQ-0585 (Rev. 02-11-15). Their distribution across the site is shown in the Site Soils Map included in Attachment D.

<b>Published Soil Unit Descriptions</b>			
<i>Soil Name</i>	<i>Group</i>	<i>Thickness (Inches)</i>	<i>Description</i>
Branyon Clay (ByB), 1 to 3 Percent Slopes	D	0" – 80"	Moderately well drained with very low (0.00 in/hr) to moderately low (0.06 in/hr) Ksat Values
Pits (Pt)	D	Variable	Variable
Rumple-Comfort association (RUD), 1 to 8 Percent Slopes	C	0" – 28"	Well drained with moderately high (0.20 to 0.57 in/hr) Ksat Values

## 6.0 FIELD INVESTIGATION

The field investigation was performed on July 9-12 and 16-18, 2019 to verify the presence or absence of features identified in the desktop review and identify other features not found during the desktop review. Field reconnaissance was performed in accordance with the “*Instructions for Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones*” (TNRCC-0585-Instructions (Rev. 10-1-04)).

### 6.1 Surface Geology

The surface formation across most of the Site is mapped as the Lower Cretaceous-aged Edwards Limestone (Ked) which consists mostly of aphanitic to fine-grained limestone of variable hardness. With the exception of historic highwalls, the formation was only observed in a few places at the Site due to the bedrock being obstructed by overgrown vegetation, rock piles, and consolidated ash piles.

### 6.2 Structure

Three (3) faults (S-3, S-6 and S-7) were observed during the field investigation. The location of S-3 corresponds to the mapped fault identified in the desktop review. The orientation of all three faults are within the dominant trend range for the area.

### 6.3 Karst Features

Six (6) karst features (S-9 through S-14) were observed during the field investigation. Of these, four (4) are categorized as sensitive (S-8, S-9, S-13, and S-14).

### 6.4 Non-karst & Manmade Features

Three (3) water wells, S-2, S-4, and S-5, were observed and recorded during the field investigation. The numerous pits and closed depressions that have been created by past mining activity have been encompassed into a single feature, S-1. None of these features are classified as sensitive.

### 6.5 Feature Descriptions

#### S-1 (MB)

#### Not Sensitive

Feature S-1 represents the limits of historic mining activity on the site. This feature encompasses most of the site and is included to address the numerous pits and closed depressions remaining from historic mining activity. Based on Google Earth imagery and elevation data, the feature measures approximately 5,500' x 5,500' x 150'. With the exception of historic highwalls, natural bedrock was sparsely observed during the field investigation. Much of the ground was obscured by overgrown vegetation, trees, large boulders to fine-grained sediment, loose organics and consolidated ash piles at the time of field reconnaissance. Standing water was observed in several locations, as was evidence of extended retention. This feature is included because it meets the definition of a manmade feature in bedrock and to incorporate the numerous non-karst closed depressions distributed across the site. A low probability of rapid infiltration is assigned to this feature because of the limited bedrock exposure. Additional features observed within this feature are recorded and evaluated individually herein.

**S-2 (MB)**

**Not Sensitive**

Feature S-2 is an old belt-driven water well that is not currently in use. It is located near the southernmost corner of the property boundary. A concrete water trough and pump house are located near the well. There are no belts connecting the well to the motor. The trough is made of concrete and measures approximately 10' x 10' x  $\leq 2'$  and was holding water at the time of field reconnaissance. The probability of rapid infiltration is low.

**S-3 (F)**

**Not Sensitive**

Feature S-3 is a mapped fault located along the southeastern property boundary. A roughly 25' long section of the fault was observed in the field and is generally in the mapped location. It is oriented at 55° which is within the dominant trend range for the area. Slickensides were observed, however, there were no joints nor fractures observed in the vicinity at the time of field reconnaissance. The probability of rapid infiltration is low.

**S-4 (MB)**

**Not Sensitive**

Feature S-4 is an industrial water well (state well #6823506) located on the far eastern part of the Site. It is surrounded by a locked chain-linked fence that prohibited close examination of the well head at the time of field investigation. According to the Texas Water Development Board (TWDB) Groundwater Database Well Information Report, this well was drilled to a depth of 250'. The well is in use and appears to comply with 16 TAC Chapter 76. The probability of rapid infiltration is low.

**S-5 (MB)**

**Not Sensitive**

Feature S-5 is an industrial water well (state well #6823509) located on the northeastern part of the Site. It has a ~10" diameter casing that is sealed with concrete and sits on a concrete surface slab. According to the State of Texas Well Report, this well was drilled to a depth of 1060'. The well is in use and appears to comply with 16 TAC Chapter 76. There is no visual indication of damage to the well head seal. The probability of rapid infiltration is low.

**S-6 (F)**

**Not Sensitive**

Feature S-6 is a fault that was observed on the highwalls of the north central property line while facing to the southwest. Looking across at the high walls on the opposite side of the pit to the northeast, the fault seems to extend over the entire area. It is oriented at approximately 40° which is outside of the dominant trend range for the area. The voids created from this structural activity are observed to be infilled with fine-grained sediment. The probability of rapid infiltration is low.

**S-7 (F)**

**Not Sensitive**

Feature S-7 is a fault that was observed along the highwalls in the northwest portion of the Site. This fault corresponds to faulting on the opposite side of the pit facing north-northeast. It is oriented at approximately 42° which is outside of the dominant trend range for the area. The voids created from this structural activity are observed to be infilled with fine-grained sediment. The probability of rapid infiltration is low.

**S-8 (Z)**

**Sensitive**

Feature S-8 is a roughly 25' x 235' zone of clustered and aligned solution cavities within a small drainage. The surface expression of features within the zone ranged from a few inches, up to 2'. The deepest feature was in excess of 3' below ground. The trend of the aligned features is about 130°. Located in a drainage, this zone has a large natural catchment area. The probability of rapid infiltration is high. This feature zone is considered sensitive.

**S-9 (SH)**

**Sensitive**

Feature S-9 is a sinkhole with an oval shape, roughly 10' x 7' x 2'. The base of the feature is primarily covered with leaves and other organic litter. Several trees are growing out of the base, and there are a few exposures of vuggy rock. Based on the existing vegetation, the lack of a well-defined soil profile, and a small catchment area, the probability of rapid infiltration is intermediate. The feature is considered sensitive.

**S-10 (SC)**

**Not Sensitive**

Feature S-10 is a solution cavity with a roughly 1' x 1' surface expression and extends beyond 3" below ground. The feature is infilled with compact, dark organic rich soils and has a small catchment area. The probability of rapid infiltration is low.

**S-11 (SC)**

**Not Sensitive**

Feature S-11 is a solution cavity roughly 6" x 1.5" x 12" in size, located at the base of a historic highwall. The catchment area is small, and the probability of rapid infiltration is low.

**S-12 (SC)**

**Not Sensitive**

Feature S-12 is a solution cavity roughly 3" x 1" x 12" in size, located at the base of a historic highwall. The catchment area is small, and the probability of rapid infiltration is low.

**S-13 (C)**

**Sensitive**

Feature S-12 is a cave located at the base of a historic highwall. The surface expression of the cave is roughly 8' x 6' x 5'. The vertical extent of the cave was not observed and likely extends beyond 5'. The cave appears to be formed from a collection of fallen boulders, however at the time of observation, the it was expelling cool, moist air, and had moss growing on the surrounding rock which suggests some degree of interconnection. A small opening was observed at the back of the feature which has an approximate trend of 55° which is within the dominant trend of the area. This feature has a small catchment area and the probability of rapid infiltration is high. This feature is considered sensitive.



**S-14 (Z)**

**Sensitive**

Feature S-14 is a zone roughly 10' x 10' and encompasses a cluster of solution cavities. The largest being approximately 3' x 2' x 2'. A nearby solution cavity appears to open up into a small chamber which does not meet the size requirements of a cave. The trend of these features was recorded at 40° which is outside the dominant trend for the area. The zone is located along the edge of a small drainage and is likely only inundated during flood conditions. Dark organic soil was observed at the base of each feature within the zone and moss was observed growing on the sides. This feature has a small catchment area and the probability for rapid infiltration is intermediate. This feature is considered sensitive.

### SELECT PHOTOGRAPHS



Feature S-1: Piles in a historic pit on the eastern part of the Site, view to the north.



Feature S-1: Material piles within a historic pit





Feature S-1: Very fine-grained sediment floor within a non-karst closed depression.



Feature S-1: Historic pit on the northwestern part of the Site. Numerous material piles on the pit floor. View to the southeast.





Feature S-2: Old water well, S-2, that is no longer in use.



Water storage tank next to feature S-2.





Motor in the pump house by feature S-2.



Fault, S-3, along the southeastern property boundary, view to the northwest.



Industrial well, S-4, surrounded by a locked fence.



View to the west of S-4 and the lower part of the water tower.





Industrial water well, S-5, on the northwestern part of the Site.



Concrete seal and surface slab on feature S-5.





Fault, S-6, along the north central part of the Site, view to the southwest.



Fault, S-7, on the far northwestern part of the Site, view to the northeast.





Zone S-8: Clustered and aligned solution cavities



Large solution cavity in Zone S-8





Feature S-9: Sinkhole



Vuggy rock in Feature S-9





Feature S-11: Small Solution Cavity

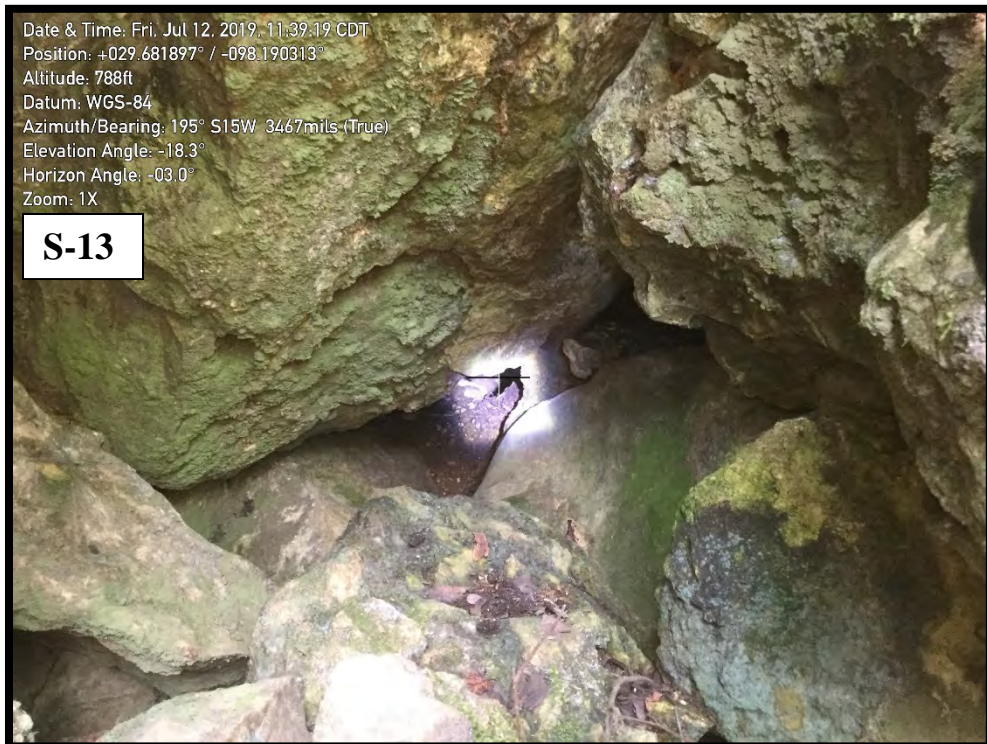


Feature S-12: Solution Cavity at the base of a historic highwall





Feature S-13: Cave



Feature S-13: Small solution cavity at the back of the cave





Zone S-14: Cluster of solution cavities



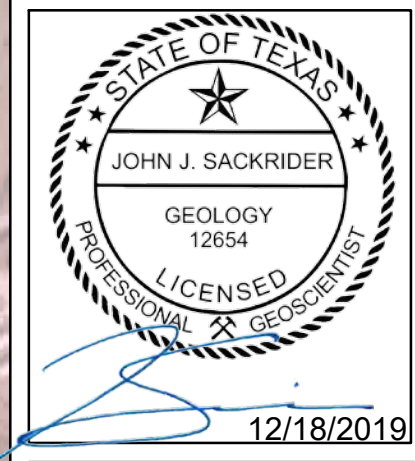
Zone S-14: Solution cavity opening to small chamber with moss

## **Attachment D**

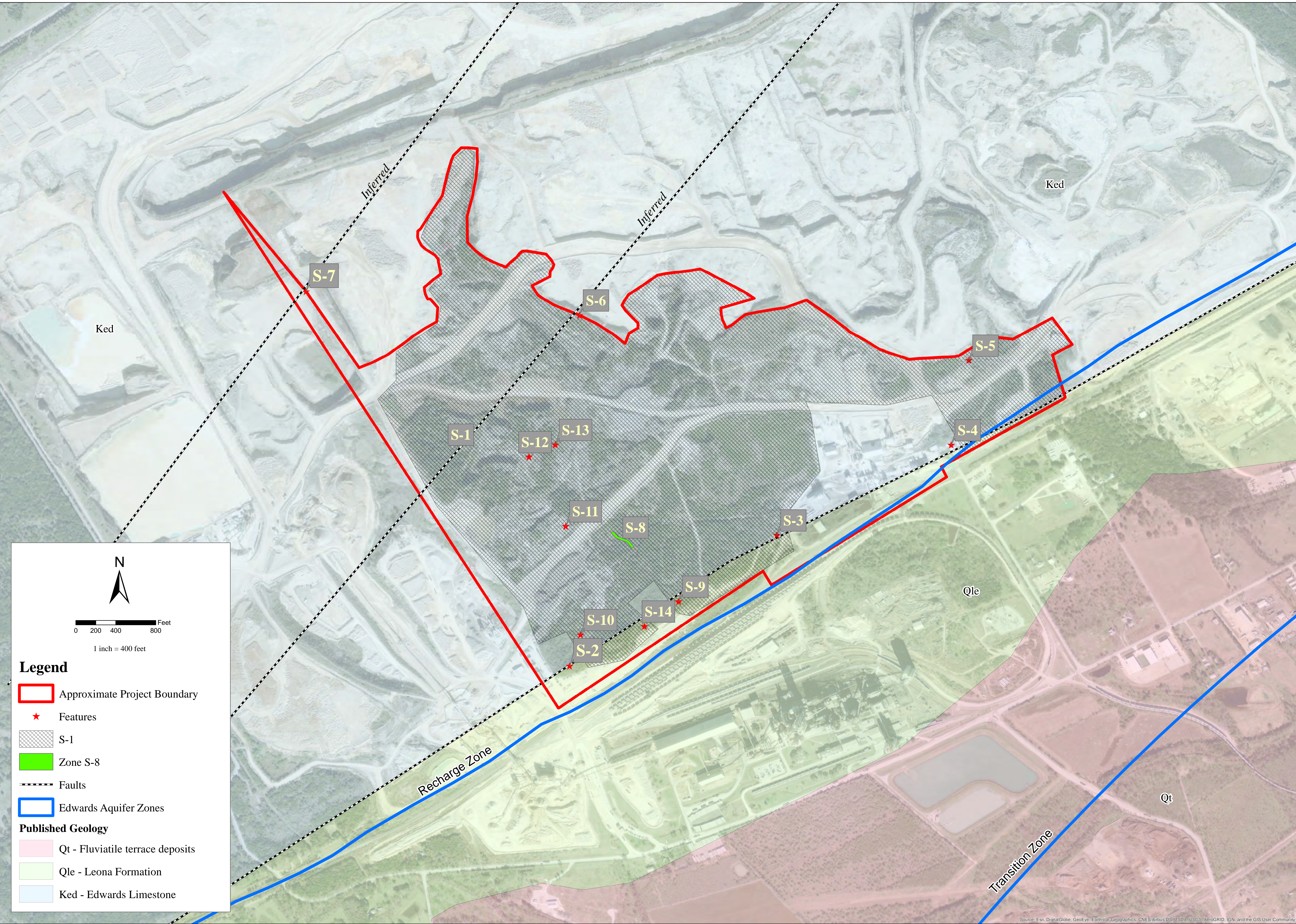
### **Site Geologic Map** **Site Soils Map** **Unsafe / Obscured Areas Map**



REV	DESCRIPTION	BY	DATE



**SITE GEOLOGIC MAP**  
**NEW BRAUNFELS LIME PLANT**  
**LHOIST NORTH AMERICA**  
**NEW BRAUNFELS, COMAL COUNTY, TEXAS**

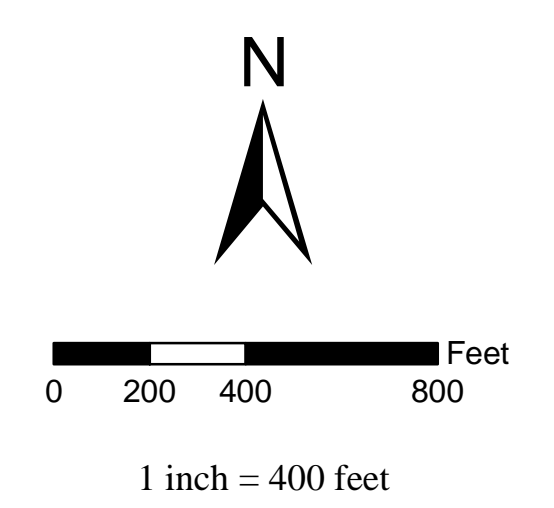


**Legend**

- Approximate Project Boundary
- ★ Features
- S-1
- Zone S-8
- Faults
- Edwards Aquifer Zones

**Published Geology**

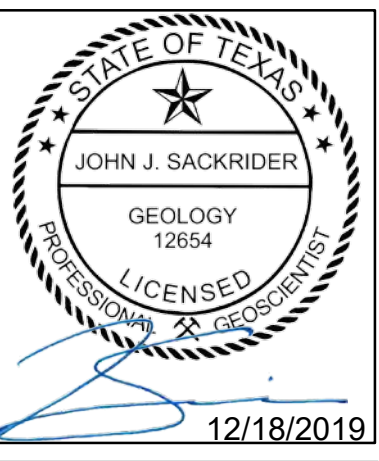
- Qt - Fluvial terrace deposits
- Qle - Leona Formation
- Ked - Edwards Limestone



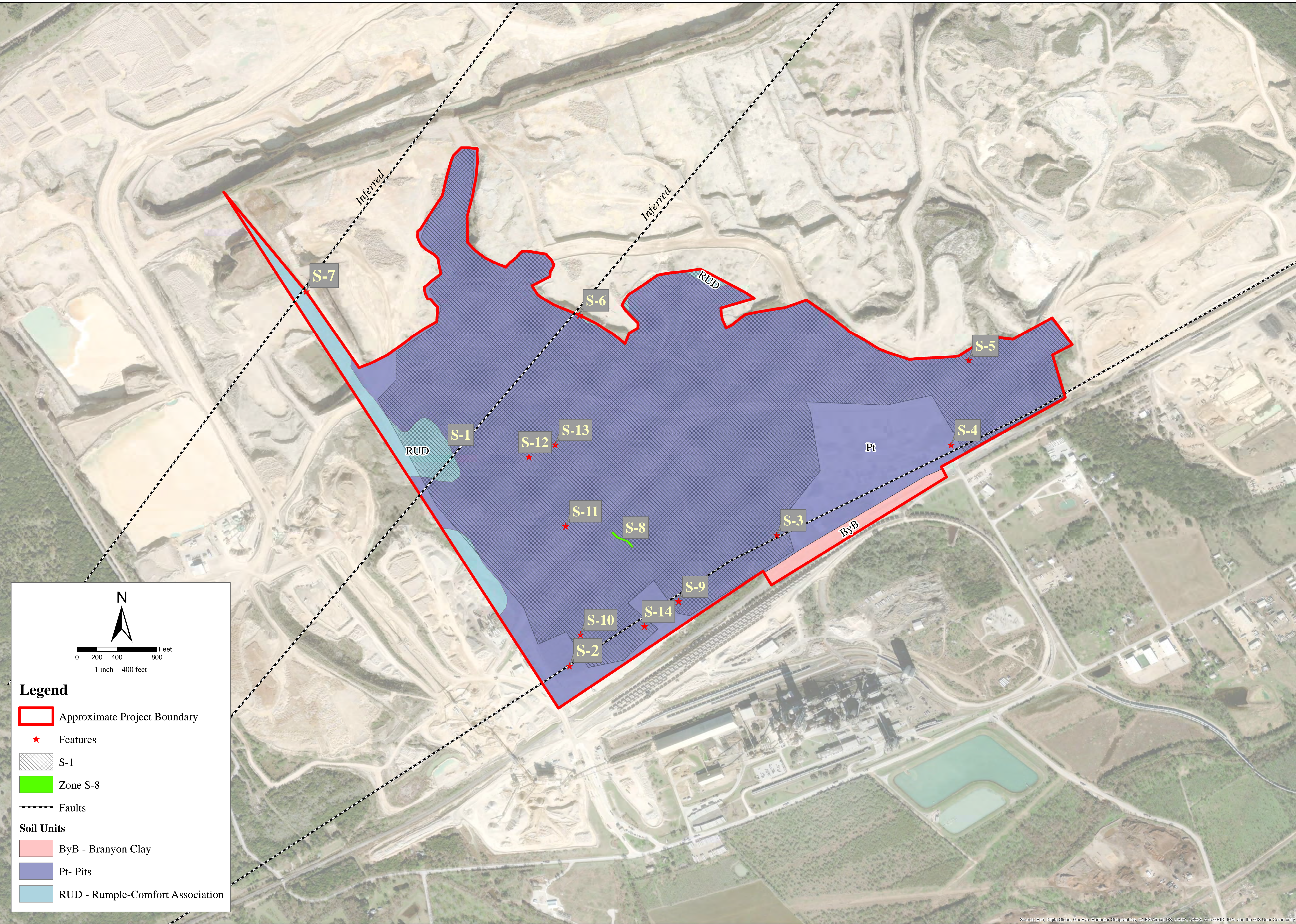
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



REV	DESCRIPTION	BY	DATE



**SITE SOILS MAP**  
**NEW BRAUNFELS LIME PLANT**  
**LHOIST NORTH AMERICA**  
**NEW BRAUNFELS, COMAL COUNTY, TEXAS**



**Legend**

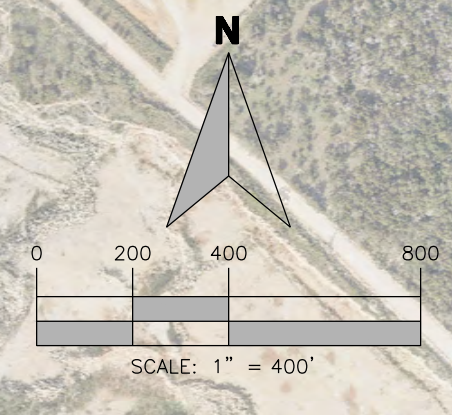
- Approximate Project Boundary
- Features
- S-1
- Zone S-8
- Faults

**Soil Units**

- ByB - Branyon Clay
- Pt- Pits
- RUD - Rumple-Comfort Association

Source: Esri, DigitalGlobe, GeoEye, Earthstar/Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**LEGEND**

--- PROPERTY LINE

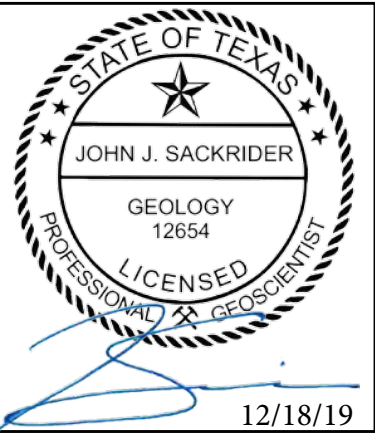
▨ AREAS WHICH WERE INACCESSIBLE DUE TO SAFETY CONCERNS WERE OBSERVED FROM THE PERIMETER AND VIA DRONE TECHNOLOGY. SELECT AREAS OF THE HISTORIC PIT WHICH WERE PRIMARILY OBSCURED BY MATERIAL PILES WERE NOT DIRECTLY OBSERVED.

IMAGE:  
NA  
ISSUE DATE: 12/12/2019  
DRAWN BY: NM  
CHECKED BY: CC  
SCALE: 1" = 400'  
JOB NO.: 11026-006

SHEET NO.:  
**01**  
OF 01

**WESTWARD**  
Environmental, Engineering, Natural Resources,  
P.O. Box 2205 Boerne, Texas 78006  
(830) 249-8284 Fax: (830) 249-0221  
TBPE REG. NO.: F-4524  
TBPE REG. NO.: 50112

REV	DESCRIPTION	BY	DATE



**UNSAFE / OBSCURED AREAS**  
WATER POLLUTION ABATEMENT PLAN  
LHOIST NORTH AMERICA OF TEXAS, LTD.  
NEW BRAUNFELS LIME PLANT



# Modification of a Previously Approved Plan

## Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Transition Zone and Relating to 30 TAC 213.4(j), Effective June 1, 1999

**To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.**

**Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.**

## Signature


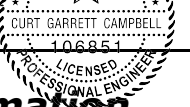
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This request for a **Modification of a Previously Approved Plan** is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

Print Name of Engineer: Curt G. Campbell, P.E.

TX License No. 106851 | TX Firm No. 4524

Date: 5/31/2023

Signature of Engineer:

## Project Information

1. Current Regulated Entity Name: New Braunfels Lime Plant  
Original Regulated Entity Name: New Braunfels Lime Plant  
Regulated Entity Number(s) (RN): 100552454  
Edwards Aquifer Protection Program ID Number(s): 13000997  
 The applicant has not changed and the Customer Number (CN) is:  
 The applicant or Regulated Entity has changed. A new Core Data Form has been provided.
2.  **Attachment A: Original Approval Letter and Approved Modification Letters.** A copy of the original approval letter and copies of any modification approval letters are attached.

3. A modification of a previously approved plan is requested for (check all that apply):
- Physical or operational modification of any water pollution abatement structure(s) including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
  - Change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
  - Development of land previously identified as undeveloped in the original water pollution abatement plan;
  - Physical modification of the approved organized sewage collection system;
  - Physical modification of the approved underground storage tank system;
  - Physical modification of the approved aboveground storage tank system.
4.  Summary of Proposed Modifications (select plan type being modified). If the approved plan has been modified more than once, copy the appropriate table below, as necessary, and complete the information for each additional modification.

<b><i>WPAP Modification</i></b>	<b><i>Approved Project</i></b>	<b><i>Proposed Modification</i></b>
<b><i>Summary</i></b>	<b><i>EAPP ID 13000997</i></b>	
Acres	<u>444.35</u>	<u>444.35</u>
Type of Development	<u>Quarry</u>	<u>Quarry</u>
Number of Residential Lots	<u>N/A</u>	<u>N/A</u>
Impervious Cover (acres)	<u>57.06</u>	<u>57.06</u>
Impervious Cover (%)	<u>12.8</u>	<u>12.8</u>
Permanent BMPs	<u>Ponds</u>	<u>Extended Detention Ponds and Grassy Swales</u>
Other	_____	_____

<b><i>SCS Modification</i></b>	<b><i>Approved Project</i></b>	<b><i>Proposed Modification</i></b>
<b><i>Summary</i></b>		
Linear Feet	_____	_____
Pipe Diameter	_____	_____
Other	_____	_____

<b>AST Modification</b>	<b>Approved Project</b>	<b>Proposed Modification</b>
<b>Summary</b>		
Number of ASTs	_____	_____
Volume of ASTs	_____	_____
Other	_____	_____

<b>UST Modification</b>	<b>Approved Project</b>	<b>Proposed Modification</b>
<b>Summary</b>		
Number of USTs	_____	_____
Volume of USTs	_____	_____
Other	_____	_____

5.  **Attachment B: Narrative of Proposed Modification.** A detailed narrative description of the nature of the proposed modification is attached. It discusses what was approved, including any previous modifications, and how this proposed modification will change the approved plan.
  
6.  **Attachment C: Current Site Plan of the Approved Project.** A current site plan showing the existing site development (i.e., current site layout) at the time this application for modification is attached. A site plan detailing the changes proposed in the submitted modification is required elsewhere.
  - The approved construction has not commenced. The original approval letter and any subsequent modification approval letters are included as Attachment A to document that the approval has not expired.
  - The approved construction has commenced and has been completed. Attachment C illustrates that the site was constructed as approved.
  - The approved construction has commenced and has been completed. Attachment C illustrates that the site was **not** constructed as approved.
  - The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was constructed as approved.
  - The approved construction has commenced and has **not** been completed. Attachment C illustrates that, thus far, the site was **not** constructed as approved.
  
7.  The acreage of the approved plan has increased. A Geologic Assessment has been provided for the new acreage.
  - Acreage has not been added to or removed from the approved plan.
  
8.  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.

Jon Niermann, *Chairman*  
Emily Lindley, *Commissioner*  
Bobby Janecka, *Commissioner*  
Toby Baker, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

January 22, 2020

Mr. Steven Curerri  
Lhoist North America of Texas, Ltd.  
3880 Hulen Street, Ste. 400  
Fort Worth, Texas 76107

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: New Braunfels Lime Plant; Located at 350 APG Ln, 0.17 miles away from Wald Rd., New Braunfels, Texas

TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Regulated Entity No. RN100552454; Additional ID No. 13000997

Dear Mr. Curerri:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP application for the above-referenced project submitted to the San Antonio Regional Office by Lhoist North America of Texas, Ltd. on September 20, 2019. Final review of the WPAP was completed after additional material was received on December 2, 2019, December 16, 2019, January 2, 2020, January 15, 2020, and January 17, 2020. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected 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.*

### PROJECT DESCRIPTION

The proposed limestone quarry will have an area of approximately 444.35 acres but only 350 acres of the quarry is located on the Edwards Aquifer recharge zone. The quarry pit was approved to disturb approximately 350 acres within the recharge zone. The proposed activities include quarrying to an elevation no deeper than 6544 feet above mean sea level (a.m.s.l), construction of a lime plant, and a mechanic shop. Impervious cover will be 52.66 acres (11.85 percent), which includes the lime plant area, the mechanic shop, and haul roads in and around the pit. Wastewater collected in the portable toilets shall be disposed of by a TCEQ registered waste disposal service.

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### 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, one batch detention basin and one extended detention with a grassy swale in series, designed using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will treat stormwater runoff. The required total suspended solids (TSS) treatment for this project is 47,270 pounds of TSS generated from the 52.66 acres of impervious cover (IC). The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

To prevent the pollution of stormwater runoff originating on-site or upgradient of the site and potentially flowing across and off the site, the various controls described below will be utilized.

Earthen berms (safety berms) composed of compacted soil and/or overburdens will be constructed. At the full extent of the quarry pits, the earthen berms will encircle the quarry pit. Upgradient storm water will be diverted around the site, and onsite flows will be prevented from leaving the site.

Rock berms will be installed on the downgradient side of the earthen berm in areas of concentrated flow.

Refueling and maintenance activities for vehicles and equipment will be performed outside of the quarry pits except under extenuating circumstances. If emergency maintenance occurs or if refueling within the pits, appropriate protection measures will be implemented. Portable secondary containment will be utilized and will be disposed of according to the applicable regulations.

### GEOLOGY

According to the geologic assessment included with the application, the site lies on the lower Cretaceous-aged Edwards Limestone. Four non-sensitive manmade features, six non-sensitive geologic features, and four sensitive geologic features were identified by the project geologist. The site assessment conducted on December 19, 2019 revealed that the site was generally as described in the application.

The sensitive features are located within the proposed quarry limits and will be excavated and mined. Prior to quarry excavation of the features, the sensitive features shall be protected by natural vegetation buffers until such time as the area of the quarry containing the sensitive features will be mined. The size of the buffers is generally based on the drainage area for each sensitive feature, which is a minimum of 50 feet.

### SPECIAL CONDITIONS

- I. The permanent pollution abatement measures and other BMPs and measures proposed in the application or described in this letter must be operational prior to soil disturbing activities within their respective drainage areas.
- II. In addition to the requirements for discovered features, the on-site quarry manager will receive annual training from a licensed Professional Geoscientist on feature identification and protection. Each occurrence of this training must be documented, and documentation must be presented when requested by TCEQ representatives.
- III. The on-site Quarry Manager experienced in feature identification will conduct visual surveys of the pit to ensure adequate identification and reporting of encountered sensitive features. Visual surveys will be conducted monthly. Results of each visual survey conducted by the on-site Quarry Manager must be documented and the documentation must be presented when requested by TCEQ representatives.
- IV. This approval does not authorize the construction or installation of aboveground storage tanks at the site.



- V. If a new Edwards Aquifer protection plan is submitted to the TCEQ under 30 TAC §213.4(h)(3), the approved plan will continue in effect until the executive director makes a determination on the new plan.
- VI. This letter addresses regulated activities (as defined in Chapter 213) and for best management practices presented in the application. Failure to obtain all necessary authorizations may result in enforcement actions.

#### 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. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.
5. 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 WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP 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.
7. 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 date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, 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.
9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet

must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

**During Construction:**

10. During the course of regulated activities related to this project, the applicant or 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.
11. 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. 6, above.
12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the San Antonio Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.
13. Three wells exist on site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.
14. 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 reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden 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.
16. 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.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

**After Completion of Construction:**

18. 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.
19. 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. The regulated 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 San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.

20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection 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.
21. An Edwards Aquifer protection 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 Edwards Aquifer protection 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.
22. 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 the Edwards Aquifer Protection Program at the San Antonio Regional Office at 210-490-3096.

Sincerely,



Robert Sadlier, Section Manager  
Edwards Aquifer Protection Program  
Texas Commission on Environmental Quality

RCS/ndlg

Enclosures: Deed Recordation Affidavit, Form TCEQ-0625

cc: Mr. Curt G Campbell, P.E., Westward Environmental Engineering  
Mr. Thomas H. Hornseth, P.E., Comal County Engineer  
Mr. Roland Ruiz, Edwards Aquifer Authority  
Mr. H. L. Saur, Comal Trinity Groundwater Conservation District

Jon Niermann, *Chairman*  
Emily Lindley, *Commissioner*  
Bobby Janecka, *Commissioner*  
Toby Baker, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

January 14, 2022

Mr. Chris Scholl  
Lhoist North America of Texas, LLC  
5600 Clearfork Main Street, Ste. 300  
Fort Worth, Texas 76109

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: New Braunfels Lime Plant; Located at 350 APG Lane, New Braunfels, Texas

TYPE OF PLAN: Request for Modification of an Approved Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer

Regulated Entity No. RN100552454; Additional Program ID No. 13001417

Dear Mr. Scholl:

The Texas Commission on Environmental Quality (TCEQ) has completed its review of the WPAP application for the above-referenced project submitted to the San Antonio Regional Office by Westward Environmental, LLC on behalf of Lhoist North America of Texas, LLC on October 20, 2021. Final review of the WPAP was completed after additional material was received on December 7, 2021. As presented to the TCEQ, the Temporary and Permanent Best Management Practices (BMPs) were selected, 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 current WPAP was approved on January 22, 2020 (AI-13000997) for an approximate 444.35-acre site owned and operated by Lhoist North America of Texas, Ltd. Recently the company changed their legal name to Lhoist North America of Texas, LLC. (Lhoist). Lhoist participates in the TCEQ Self Reporting Disclosure under the Audit Privilege Act. On June 25, 2021, Lhoist notified TCEQ Office of Compliance & Enforcement of several Environmental Violations discovered during Environmental Compliance Audit CN600130470, Lhoist North America of Texas, Ltd/RN100552454-New Braunfels Lime Plant, Investigation 1709223. Disclosure of Violation (DOV) #2 identified an area of approximately 3.6-acres west of the existing lime kilns that had been disturbed and developed as impervious cover when that area was not included in the impervious cover designation in the approved WPAP. The Corrective Action Plan was to submit this WPAP Modification.

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### PROJECT DESCRIPTION

The proposed commercial lime plant project will have an area of approximately 4.4-acres within the approved 444.35-acre approved site. The impervious cover will be 57.05-acres (12.8 percent). It will include addition of the 4.4-acre laydown yard to the now existing lime plant, mechanic shop and haul roads in and around the quarry pit. Wastewater collected in portable toilets shall be disposed of by a TCEQ registered waste disposal service.

### 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, one existing batch detention basin (Pond B-13000997); and one existing extended detention pond (Pond A-13000977), re-designed in series with a grassy swale; using the TCEQ technical guidance document, Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices (2005), will be utilized to treat stormwater runoff. The total site required total suspended solids (TSS) treatment for this project is 51,212 pounds of TSS generated from the 57.05-acres of impervious cover. The required total suspended solids (TSS) treatment for this modification is 42,588 pounds of TSS generated from the 47.45-acres of impervious cover (including the added increment of 4.4-acre laydown yard with 3,941 pounds of TSS). The approved measures meet the required 80 percent removal of the increased load in TSS caused by the project.

### GEOLOGY

According to the geologic assessment included with the application, the site lies on the lower Cretaceous-aged Edwards limestone. Four non-sensitive manmade features, six non-sensitive geologic features, and four sensitive geologic features were identified by the project geologist within the proposed quarry limits. No features are located within the added 4.4-acre laydown yard. The San Antonio Regional Office site assessment conducted on January 5, 2022 revealed the site was generally as described in the application.

### SPECIAL CONDITIONS

- I. This modification is subject to all Special and Standard Conditions listed in the WPAP approval letter dated January 22, 2020.
- II. All permanent pollution abatement measures shall be operational prior to occupancy of the facility.
- III. All sediment and/or media removed from the water quality basins during maintenance activities shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

### 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. Within 60 days of receiving written approval of an Edwards Aquifer Protection Plan, the applicant must submit to the San Antonio Regional Office, proof of recordation of notice in the county deed records, with the volume and page number(s) of the county deed records of the county in which the property is located. A description of the property boundaries shall be included in the deed recordation in the county deed records. A suggested form (Deed Recordation Affidavit, TCEQ-0625) that you may use to deed record the approved WPAP is enclosed.
5. 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 WPAP and this notice of approval shall be maintained at the project location until all regulated activities are completed.
6. Modification to the activities described in the referenced WPAP 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.
7. 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 date on which the regulated activity will commence, the name of the approved plan and program ID number for the regulated activity, and the name of the prime contractor with the name and telephone number of the contact person. The executive director will use the notification to determine if the approved plan is eligible for an extension.
8. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berms, stabilized construction entrances, or other controls described in the approved WPAP, 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.
9. All borings with depths greater than or equal to 20 feet must be plugged with non-shrink grout from the bottom of the hole to within three (3) feet of the surface. The remainder of the hole must be backfilled with cuttings from the boring. All borings less than 20 feet must be backfilled with cuttings from the boring. All borings must be backfilled or plugged within four (4) days of completion of the drilling operation. Voids may be filled with gravel.

During Construction:

10. During the course of regulated activities related to this project, the applicant or 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.
11. 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. 6, above.
12. If any sensitive feature (caves, solution cavities, sink holes, etc.) is discovered during construction, all regulated activities near the feature must be suspended immediately. The applicant or his agent must immediately notify the San Antonio Regional Office of the discovery of the feature. Regulated activities near the feature may not proceed until the executive director has reviewed and approved the methods proposed to protect the feature



and the aquifer from potentially adverse impacts to water quality. The plan must be sealed, signed, and dated by a Texas Licensed Professional Engineer.

13. Three wells exist on site. All water wells, including injection, dewatering, and monitoring wells must be in compliance with the requirements of the Texas Department of Licensing and Regulation under Title 16 TAC Chapter 76 (relating to Water Well Drillers and Pump Installers) and all other locally applicable rules, as appropriate.
14. 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 reduced by 50 percent. Litter, construction debris, and construction chemicals shall be prevented from becoming stormwater discharge pollutants.
15. Intentional discharges of sediment laden 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.
16. 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.
17. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, and construction activities will not resume within 21 days. When the initiation of stabilization measures by the 14th day is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable.

After Completion of Construction:

18. 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.
19. 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. The regulated 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 San Antonio Regional Office within 30 days of the transfer. A copy of the transfer form (TCEQ-10263) is enclosed.
20. Upon legal transfer of this property, the new owner(s) is required to comply with all terms of the approved Edwards Aquifer protection plan. If the new owner intends to commence any new regulated activity on the site, a new Edwards Aquifer protection 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.
21. An Edwards Aquifer protection 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 Edwards Aquifer protection 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.

Mr. Chris Scholl  
Page 5  
January 14, 2022

22. 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 Mr. Don Vandertulip, PE, BCEE of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4057.

Sincerely,



Lillian Butler, Section Manager  
Edwards Aquifer Protection Program  
Texas Commission on Environmental Quality

LIB/dv

Enclosures: Deed Recordation Affidavit, Form TCEQ-0625A  
Change in Responsibility for Maintenance of Permanent BMPs, Form TCEQ-10263

cc: Ms. Andrea Kidd, PE, Westward Environmental, Inc.

**Lhoist North America of Texas, LLC**  
**New Braunfels Lime Plant**

**Modification of a Previously Approved Plan (TCEQ-0590)**

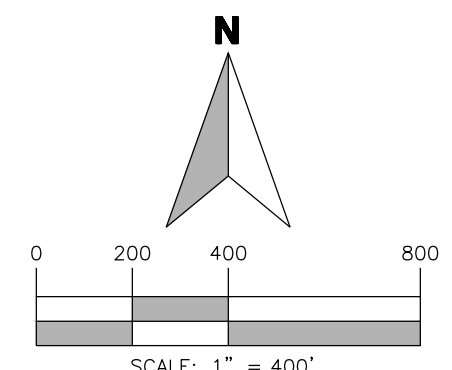
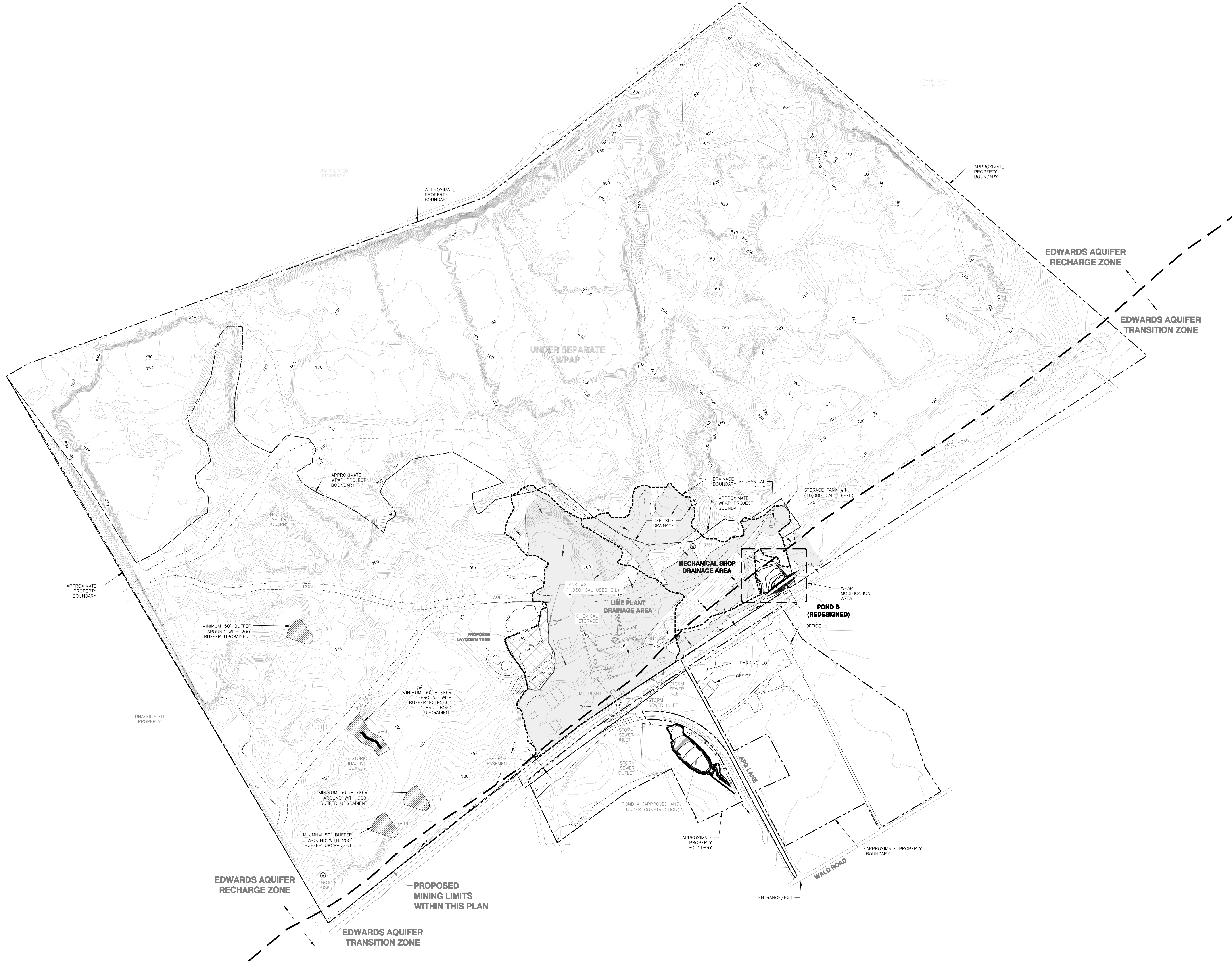
**Attachment B**

**Narrative of Proposed Modification**

Previously approved WPAPs for the subject area include EAPP ID 13000997 and 13001417. For this modification, Lhoist proposes to change the design of Pond B by converting it from a batch detention pond to an extended detention basin with a grassy swale. To accommodate the runoff from the previously approved Mechanical Shop drainage area, Pond B has been redesigned, in accordance with RG-348 design guidelines. It is our intention to address new proposed regulated activities in this plan modification apart from other previously approved activities within this mine. There are no proposed changes to other regulated activities described at this site in the previously approved WPAP Plans. There are no proposed changes to the modifications of impervious cover or the overall drainage area that will be treated by Pond B. Quarry operations will continue as historically performed.

Trash generated on-site will continue to be disposed of in a dumpster and handled by a licensed waste service. On-site sewage facilities will consist of portable toilets, which will be pumped out and disposed of by truck on a weekly basis.





**LEGEND**

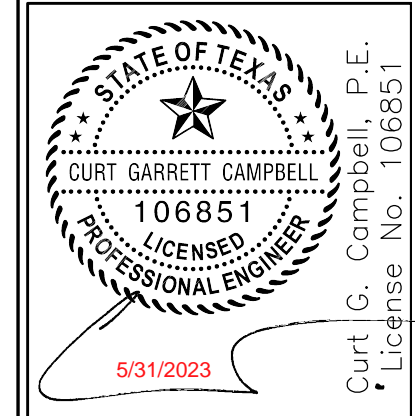
	EDWARDS AQUIFER BOUNDARY
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	DRAINAGE AREAS
	PROJECT BOUNDARY
	PROPERTY LINE
	WATER WELL
	FLOW ARROW
	IMPERVIOUS COVER

IMAGE:	N/A
ISSUE DATE:	04/24/2021
DRAWN BY:	NEM
CHECKED BY:	CJF
SCALE:	1" = 400'
JOB NO.:	11026-015

SHEET NO.: **01**  
OF 03

**WESTWARD**  
Environmental Engineering, Natural Resources,  
P.O. Box 2205 Boerne, Texas 78006  
(830) 249-8284 Fax: (830) 249-0221  
TBP REG. NO.: F-4524  
TBP REG. NO.: 50112

REV.	DESCRIPTION	DATE



**OVERALL SITE MAP**  
WPAP MODIFICATION  
LHOIST NORTH AMERICA OF TEXAS, LLC  
NEW BRAUNFELS LIME PLANT



# Water Pollution Abatement Plan Application

## Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b), Effective June 1, 1999

*To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.*

*Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.*

## Signature

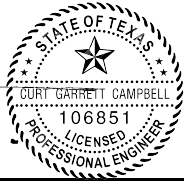
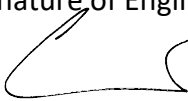
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Water Pollution Abatement Plan Application Form** is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, P.E.

TX License No. 106851 | TX Firm No. 4524

Date: 5/31/2023

Signature of Engineer :



Regulated Entity Name: New Braunfels Lime Plant

## Regulated Entity Information

1. The type of project is:

- Residential: Number of Lots: \_\_\_\_\_
- Residential: Number of Living Unit Equivalents: \_\_\_\_\_
- Commercial
- Industrial
- Other: \_\_\_\_\_

2. Total site acreage (size of property): 444.35

3. Estimated projected population: 13

4. The amount and type of impervious cover expected after construction are shown below:

1 of 5

**Article I. Table 1 - Impervious Cover Table**

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	152,986	÷ 43,560 =	3.51
Parking		÷ 43,560 =	
Other paved surfaces (incl. Plant and shops)	2,330,763	÷ 43,560 =	53.51
Total Impervious Cover	2,483,749	÷ 43,560 =	57.02

**Total Impervious Cover  $57.02 \div$  Total Acreage  $444.35 \times 100 = 12.8\%$  Impervious Cover**

5.  **Attachment A - Factors Affecting Surface Water Quality.** A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.
6.  Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

**For Road Projects Only**

**(a) Complete questions 7 - 12 if this application is exclusively for a road project.**

7. 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.

8. Type of pavement or road surface to be used:

- Concrete
- Asphaltic concrete pavement
- Other: \_\_\_\_\_

9. Length of Right of Way (R.O.W.): \_\_\_\_\_ feet.

Width of R.O.W.: \_\_\_\_\_ feet.

$L \times W =$  \_\_\_\_\_  $\text{Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} =$  \_\_\_\_\_ acres.

10. Length of pavement area: \_\_\_\_\_ feet.

Width of pavement area: \_\_\_\_\_ feet.

$L \times W =$  \_\_\_\_\_  $\text{Ft}^2 \div 43,560 \text{ Ft}^2/\text{Acre} =$  \_\_\_\_\_ acres.

Pavement area \_\_\_\_\_ acres  $\div$  R.O.W. area \_\_\_\_\_ acres  $\times 100 =$  \_\_\_\_\_% impervious cover.

11.  A rest stop will be included in this project.

A rest stop will not be included in this project.

12.  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***

13.  **Attachment B - Volume and Character of Stormwater.** A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

### ***Wastewater to be generated by the Proposed Project***

14. The character and volume of wastewater is shown below:

_____ % Domestic	_____ 0 Gallons/day
_____ % Industrial	_____ Gallons/day
_____ % Commingled	_____ Gallons/day

TOTAL gallons/day 0 (No additional domestic wastewater generated from this modification)

15. Wastewater will be disposed of by:

On-Site Sewage Facility (OSSF/Septic Tank):

**Attachment C - 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 (authorized agent) written approval is attached. 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.

Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

Sewage Collection System (Sewer Lines):

Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

The SCS was previously submitted on \_\_\_\_\_.

The SCS was submitted with this application.

The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

The sewage collection system will convey the wastewater to the \_\_\_\_\_ (name) Treatment Plant. The treatment facility is:

- Existing.  
 Proposed.

16.  All private service laterals will be inspected as required in 30 TAC §213.5.

## **Site Plan Requirements**

**(b) Items 17 – 28 must be included on the Site Plan.**

17.  The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 400'.

18. 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): 48091C0430F eff. 9/2/2009, 48091C0435F eff. 9/2/2009, 48091C0440F eff. 9/2/2009, 4891C0445F eff. 9/2/2009

19.  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, open space, etc. are shown on the plan.

The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):

There are 3 wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

The wells are not in use and have been properly abandoned.

The wells are not in use and will be properly abandoned.

The wells are in use and comply with 16 TAC §76.

There are no wells or test holes of any kind known to exist on the project site.

21. Geologic or manmade features which are on the site:

All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.

No sensitive geologic or manmade features were identified in the Geologic Assessment.



- Attachment D - Exception to the Required Geologic Assessment.** A request and justification for an exception to a portion of the Geologic Assessment is attached.
22.  The drainage patterns and approximate slopes anticipated after major grading activities.
23.  Areas of soil disturbance and areas which will not be disturbed.
24.  Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
25.  Locations where soil stabilization practices are expected to occur.
26.  Surface waters (including wetlands).  
 N/A
27.  Locations where stormwater discharges to surface water or sensitive features are to occur.  
 There will be no discharges to surface water or sensitive features.
28.  Legal boundaries of the site are shown.

### ***Administrative Information***

29.  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.
30.  Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.

**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**WPAP (TCEQ-0584)  
Attachment A**

**Factors Affecting Water Quality**

Water quality is affected by ongoing industrial activity onsite. During construction, temporary controls will be in place to minimize the effects of construction. After construction, permanent controls will function to reduce the impact of ongoing facility operations. Impervious cover will increase as a result of this modification and therefore increased sediment in stormwater runoff will be addressed. More remote factors include construction vehicle traffic, fuels and lubricants from vehicles and equipment, and trash/debris items.

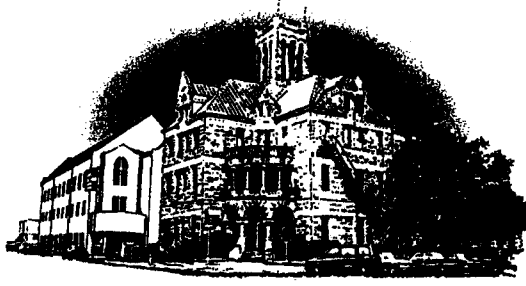
Existing Pond B has been designed to meet RG-348 requirements. Pond A drainage area and design remains unchanged from previous approved WPAP Modification. Any spills or leaks will be cleaned up immediately and will be disposed of properly. A trash receptacle will be placed on-site for use by employees and visitors.

**WPAP (TCEQ-0584)  
Attachment B**

**Volume and Character of Stormwater**

Stormwater from the mechanical shop areas will continue to drain to the redesigned Pond B located, over the Edwards Aquifer Transition Zone. Upgradient stormwater will flow to Pond B over both the Edwards Aquifer Recharge Zone and Transition Zone. The water quality goal to remove 80% of the total suspended solids (TSS) will be accomplished by redesigning Pond B in order to treat the runoff from the existing upgradient basin. The resulting on-site water quality volume (WQV) was calculated to be 40,485 cu. ft. (0.93 ac-ft) and the total capture volume (TCV) was calculated to be 88,928 cu. ft (2.04 ac-ft).

The stormwater discussion for other areas of this site is unchanged from what is represented in the approved WPAP Plans dated 1/22/2020 (EAPP ID 13000997) and 1/14/2022 (EAPP ID 13001417).



# Comal County

OFFICE OF COMAL COUNTY ENGINEER

## License to Operate

### On-site Sewage Treatment and Disposal Facility

Date Issued: 3/4/2009

Permit Number: 91593

Location Description: 350 APG Road - 190.25 ac, New Braunfels, TX 78132

John Fonske Tract Subdivision

Type of System: Aerobic Treatment with Drip Emitters Discharge

License issued to: Chemical Lime New Braunfels, Ltd

This license is authorization for the owner to operate and maintain a private facility at the location described in accordance to the rules and regulations for on-site sewerage facilities of Comal County, Texas, and the Texas Natural Resource Conservation Commission.

The license grants permission to operate the facility. It does not guarantee successful operation. It is the responsibility of the owner to maintain and operate the facility in a satisfactory manner.

Inspection and licensing of a facility indicates only that the facility meets certain minimum requirements. It does not impede any governmental entity in taking the proper steps to prevent or control pollution, to abate nuisance, or to protect the public health.

This license to operate is valid for an indefinite period. The holder may transfer it to a succeeding owner, provided the facility has not been remodeled and is functioning properly.

Licensing Authority

**Comal County Environmental Health**

  
OS0023773  
ENVIRONMENTAL HEALTH INSPECTOR

  
ENVIRONMENTAL HEALTH COORDINATOR OS 0025599



**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
WATER POLLUTION ABATEMENT PLAN  
GENERAL CONSTRUCTION NOTES**

- WRITTEN CONSTRUCTION NOTIFICATION MUST BE SUBMITTED TO THE TCEQ REGIONAL OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF ANY REGULATED ACTIVITIES. THIS NOTICE MUST INCLUDE:
  - THE NAME OF THE APPROVED PROJECT;
  - THE ACTIVITY START DATE; AND
  - THE CONTACT INFORMATION OF THE PRIME CONTRACTOR.
- ALL CONTRACTORS CONDUCTING REGULATED ACTIVITIES ASSOCIATED WITH THIS PROJECT MUST BE PROVIDED WITH COMPLETE COPIES OF THE APPROVED WATER POLLUTION ABATEMENT PLAN (WPAP) AND THE TCEQ LETTER INDICATING THE SPECIFIC CONDITIONS OF ITS APPROVAL. DURING THE COURSE OF THESE REGULATED ACTIVITIES, THE CONTRACTORS ARE REQUIRED TO KEEP ON-SITE COPIES OF THE APPROVED PLAN AND APPROVAL LETTER.
- IF ANY SENSITIVE FEATURE(S) (CAVES, SOLUTION, CAVITY, SINK HOLE, ETC.) IS DISCOVERED DURING CONSTRUCTION, ALL REGULATED ACTIVITIES NEAR THE SENSITIVE FEATURE MUST BE SUSPENDED IMMEDIATELY. THE APPROPRIATE TCEQ REGIONAL OFFICE MUST BE IMMEDIATELY NOTIFIED OF ANY SENSITIVE FEATURES ENCOUNTERED DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT BE RESUMED UNTIL THE TCEQ HAS REVIEWED AND APPROVED THE APPROPRIATE PROTECTIVE MEASURES IN ORDER TO PROTECT ANY SENSITIVE FEATURE AND THE EDWARDS AQUIFER FROM POTENTIALLY ADVERSE IMPACTS TO WATER QUALITY.
- NO TEMPORARY OR PERMANENT HAZARDOUS SUBSTANCE STORAGE TANK SYSTEM SHALL BE INSTALLED WITHIN 150 FEET OF A WATER SUPPLY SOURCE, DISTRIBUTION SYSTEM, WELL, OR SENSITIVE FEATURE.
- PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITY, ALL TEMPORARY EROSION AND SEDIMENTATION (E&S) CONTROL MEASURES MUST BE PROPERLY INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND MANUFACTURERS' SPECIFICATIONS. IF INSPECTIONS INDICATE A CONTROL HAS BEEN USED INAPPROPRIATELY, OR INDIRECTLY, THE APPLICANT MUST REPLACE OR MODIFY THE CONTROL FOR SITE SITUATIONS. THESE CONTROLS MUST REMAIN IN PLACE UNTIL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED.
- ANY SEDIMENT THAT ESCAPES THE CONSTRUCTION SITE MUST BE COLLECTED AND PROPERLY DISPOSED OF BEFORE THE NEXT RAIN EVENT TO ENSURE IT IS NOT WASHED INTO SURFACE STREAMS, SENSITIVE FEATURES, ETC.
- SEDIMENT MUST BE REMOVED FROM THE SEDIMENT TRAPS OR SEDIMENTATION BASINS NOT LATER THAN WHEN IT OCCUPIES 50% OF THE BASIN'S DESIGN CAPACITY.
- LITTER, CONSTRUCTION DEBRIS, AND CONSTRUCTION CHEMICALS EXPOSED TO STORMWATER SHALL BE PREVENTED FROM BEING DISCHARGED OFFSITE.
- ALL SPILLS (EXCAVATED MATERIAL) GENERATED FROM THE PROJECT SITE MUST BE STORED ON-SITE WITH PROPER E&S CONTROLS. FOR STORAGE OR DISPOSAL OF SPILLS AT ANOTHER SITE ON THE EDWARDS AQUIFER RECHARGE ZONE, THE OWNER OF THE SITE MUST RECEIVE APPROVAL OF A WATER POLLUTION ABATEMENT PLAN FOR THE PLACEMENT OF FILL MATERIAL OR MASS GRADING PRIOR TO THE PLACEMENT OF SPILLS AT THE OTHER SITE.
- IF PORTIONS OF THE SITE WILL HAVE A TEMPORARY OR PERMANENT CEASE IN CONSTRUCTION ACTIVITY LASTING LONGER THAN 14 DAYS, SOIL STABILIZATION IN THOSE AREAS SHALL BE INITIATED AS SOON AS POSSIBLE PRIOR TO THE 14TH DAY. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS POSSIBLE.
- THE FOLLOWING RECORDS SHALL 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.
- THE HOLDER OF ANY APPROVED EDWARDS AQUIFER PROTECTION PLAN MUST NOTIFY THE APPROPRIATE REGIONAL OFFICE IN WRITING AND OBTAIN APPROVAL FROM THE EXECUTIVE DIRECTOR PRIOR TO INITIATING ANY OF THE FOLLOWING:
  - ANY PHYSICAL OR OPERATIONAL MODIFICATION OF ANY WATER POLLUTION ABATEMENT STRUCTURE(S), INCLUDING BUT NOT LIMITED TO PONDS, DAMS, BERMS, SEWAGE TREATMENT PLANTS, AND DIVERSIONARY STRUCTURES;
  - ANY CHANGE IN THE NATURE OR CHARACTER OF THE REGULATED ACTIVITY FROM THAT WHICH WAS ORIGINALLY APPROVED OR A CHANGE WHICH WOULD SIGNIFICANTLY IMPACT THE ABILITY OF THE PLAN TO PREVENT POLLUTION OF THE EDWARDS AQUIFER;
  - ANY DEVELOPMENT OF LAND PREVIOUSLY IDENTIFIED AS UNDEVELOPED IN THE ORIGINAL WATER POLLUTION ABATEMENT PLAN.

AUSTIN REGIONAL OFFICE 12100 PARK 35 CIRCLE BLDG A AUSTIN, TEXAS 78753-1808 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) 543-3229
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THESE GENERAL CONSTRUCTION NOTES MUST BE INCLUDED ON THE CONSTRUCTION PLANS PROVIDED TO THE CONTRACTOR AND ALL SUBCONTRACTORS.

**BMP CONSTRUCTION NOTES**

- COMPACTED EARTHEN BERM
 

INSTALLATION:  
COMPRISED OF SOIL AND OVERBURDEN MATTER EITHER GENERATED ONSITE OR DELIVERED FROM OFFSITE. COMPACT WITH HEAVY EQUIPMENT IN 12" (MAX) LIFTS.

MAINTENANCE (TEMPORARY):  
INSPECT BERMS ONCE A MONTH UNTIL SUFFICIENTLY VEGETATED. REPLACE AS NECESSARY.
- ROCK BERM
 

SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING, MAX. OPENING 1" AND MIN. WIRE DIA. 20 GAUGE GALVANIZED. SECURE WITH SHORT RINGS.

INSTALLATION:  
AGGREGATE USED SHOULD BE COMPRISED OF OPEN GRADED 3-5" DIAMETER ROCK. BERM SHOULD BE PLACED PERPENDICULAR TO FLOW LINE. SIDE SLOPE MUST BE 2:1 OR FLATTER. WIRE SHEATHING MUST BE SECURED WITH THE WIRE SO THEY OVERLAP AT LEAST 2".  
BERM SHOULD BE BURIED IN A TRENCH APPROX. 4" DEEP.

MAINTENANCE (TEMPORARY):  
INSPECT BERMS ONCE A WEEK. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6". REPLACE WHEN ROCK BECOMES CLOGGED WITH SEDIMENT.  
ALTERNATE #1 & #2 ROCK BERMS (WEI)
- SILT FENCE W/ TRENCHED TOE
 

INSTALLATION:  
3.1 STEEL POSTS SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MIN. OF 1' DEEP AND SPACED NOT MORE THAN 8' ON CENTER, WHERE WATER CONCENTRATES, THE MAX. SPACING SHOULD BE 6'.  
3.2 LAY OUT FENCING DOWN SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE.  
3.3 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 IN. OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.  
3.4 THE TRENCH MUST BE A MIN. OF 6 IN. DEEP AND 6 IN. WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.  
3.5 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.  
3.6 INSPECT SILT FENCES ONCE A WEEK. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6". REPLACE SILT FENCES WHEN TORN OR OTHERWISE UNABLE TO FILTER SEDIMENT.
- STABILIZED CONSTRUCTION ENTRANCE
 

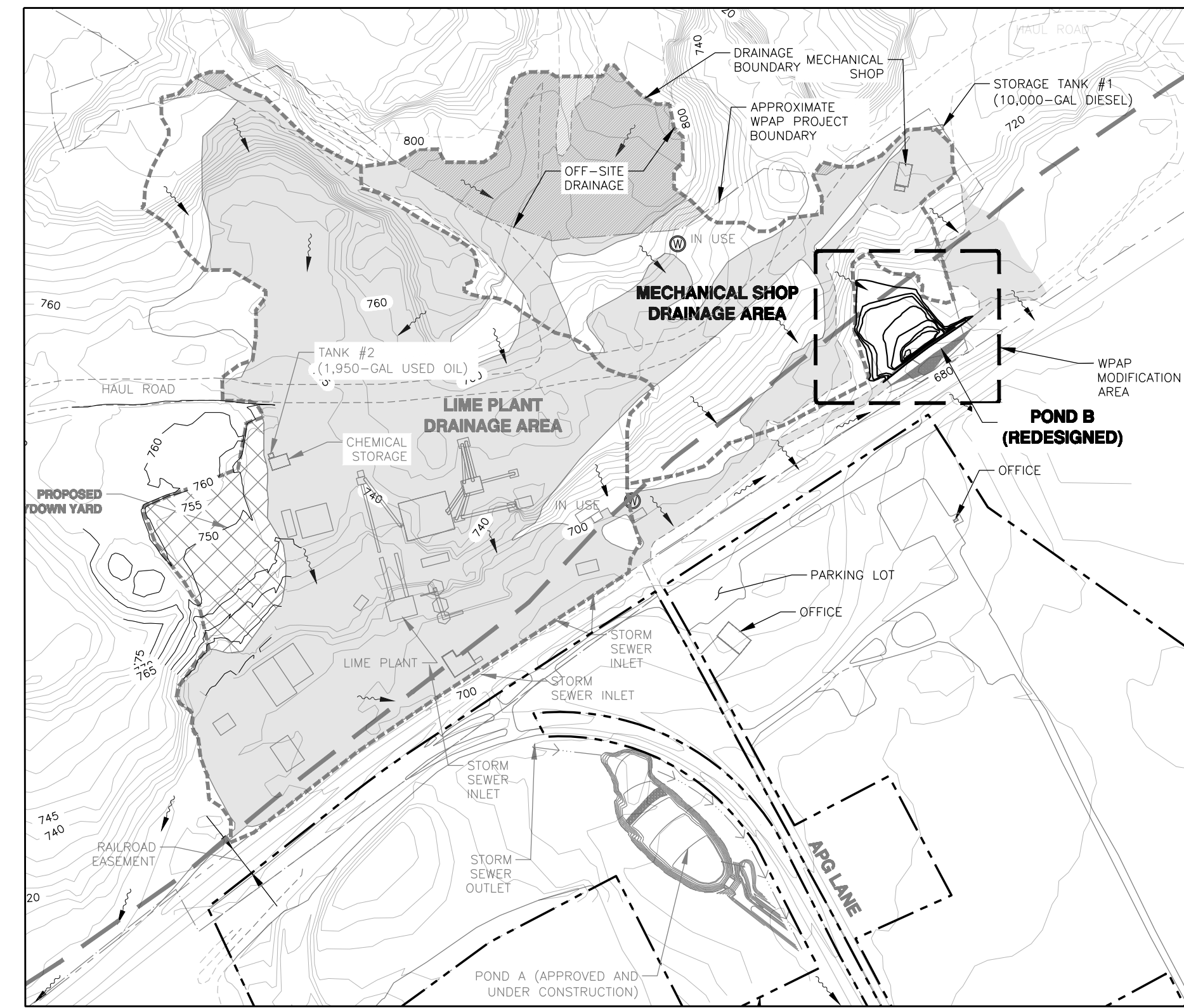
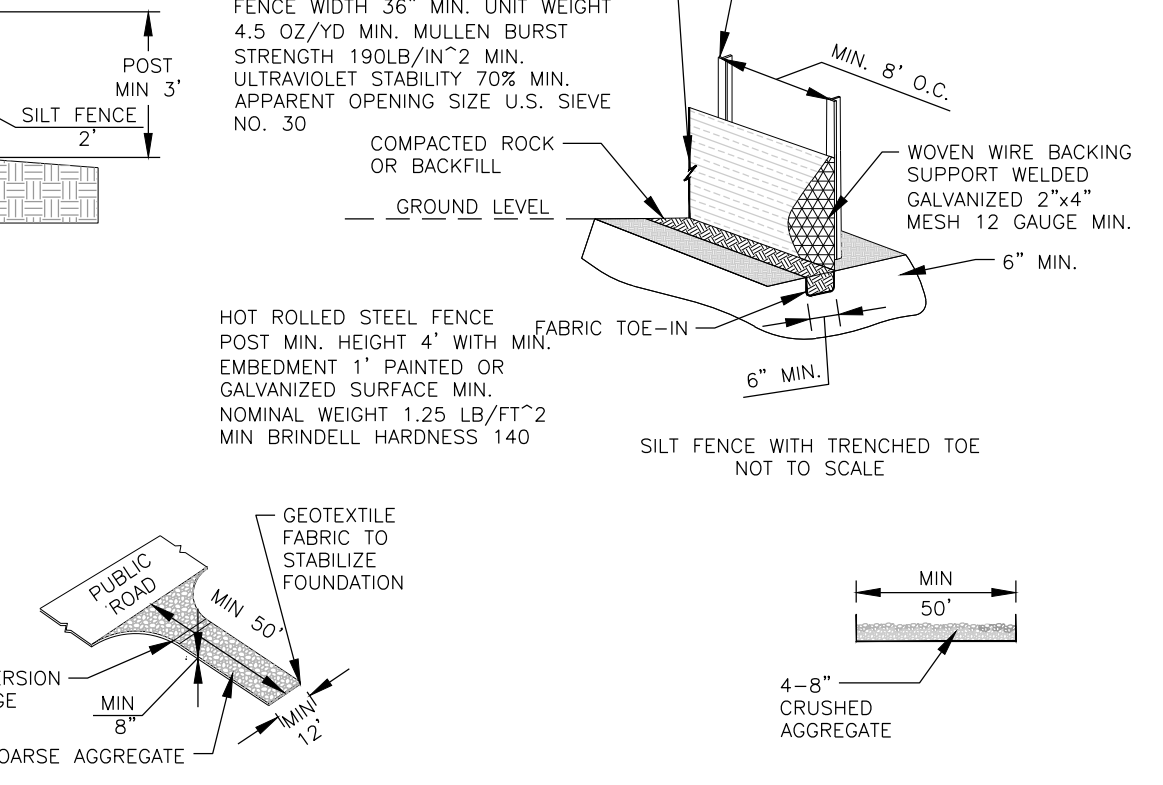
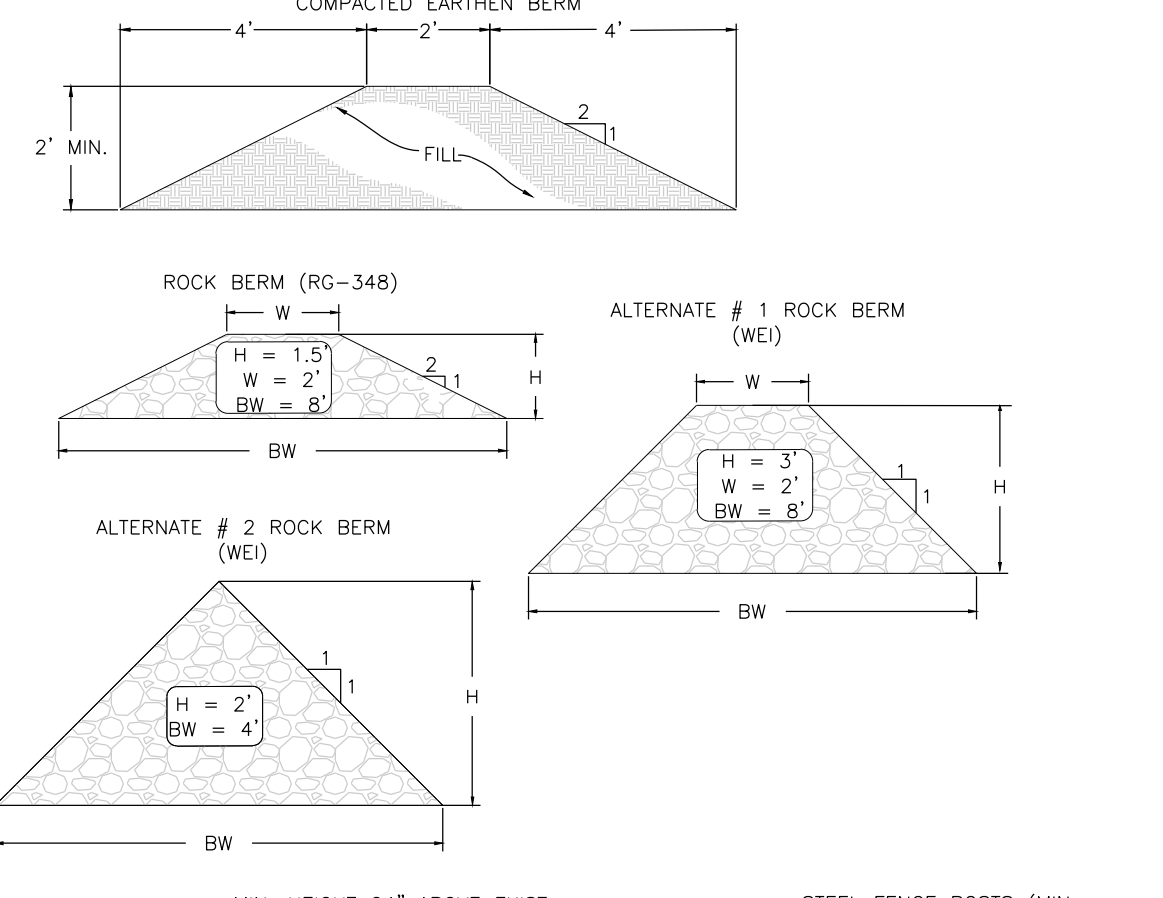
INSTALLATION:  
4.1 AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.  
4.2 THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12' OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.  
4.3 THE CONSTRUCTION ENTRANCE SHOULD BE 50' LONG.  
4.4 IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6-8" HEIGHT WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.  
4.5 PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.  
4.6 PLACE STONE TO DIMENSION AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.  
4.7 INSTALL A PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

MAINTENANCE: INSPECT WEEKLY. REPLACE STONE AS NECESSARY TO PREVENT TRACKING OFF-SITE.

**GENERAL NOTES**

- THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION FOR THE PROTECTION OF ALL EXISTING AND NEWLY INSTALLED FACILITIES FROM DAMAGE OR DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY, AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.
- FACILITIES PROPOSED HEREIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS. DEVIATIONS FROM THE APPROVED PLANS MUST BE APPROVED IN ADVANCE BY THE ENGINEER OF RECORD.
- UPON COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL ACCEPTANCE OF THE WORK, A FINAL INSPECTION SHALL BE MADE TO VERIFY PROPER ADHERENCE TO ALL FACETS OF THE PLANS AND SPECIFICATIONS.
- AS-BUILT DRAWINGS SHALL BE PREPARED BY A REGISTERED LAND SURVEYOR, REGISTERED IN THE STATE OF TEXAS, AND SUBMITTED BY THE CONTRACTOR TO THE ENGINEER OF RECORD. CONTRACTOR TO PROVIDE RECORD INFORMATION WHICH LOCATES ALL UNDERGROUND UTILITIES, SITE GRADING AND CLEARANCE TO WATER MAIN FROM OTHER UTILITIES HORIZONTAL AND VERTICAL.
- CONTRACTOR SHALL NOTIFY TEXAS811 ONE CALL SYSTEM (1-800-344-8377) 48 HOURS IN ADVANCE OF CONSTRUCTION.
- ALL VEGETATION, DEBRIS, CONCRETE OR OTHER UNSUITABLE MATERIAL SHALL BE LEGALLY DISPOSED OF OFF-SITE IN AN APPROPRIATE AREA AT THE CONTRACTORS EXPENSE.
- CONTRACTOR SHALL UTILIZE CONSTRUCTION METHODS AND DEVICES, SUCH AS TURBIDITY SCREENS, CURTAINS AND FLOATING SILT BARRIERS WHERE NECESSARY IN ORDER TO COMPLY WITH ALL STATE AND LOCAL WATER QUALITY STANDARDS.
- ALL CONSTRUCTION SHALL BE DONE IN A SAFE MANNER, SPECIFICALLY, THE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE STRICTLY OBSERVED.
- MINIMUM COVER SHALL BE 3.0 FEET FOR ALL PIPES, (TYPICAL UNLESS OTHERWISE NOTED ON DRAWINGS).
- ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAY OR WALKWAYS SHALL BE PROPERLY MARKED AND BARRIQUADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.
- CONTRACTOR SHALL MONITOR AND PROHIBIT THE DEDICATING OF FRESHLY PLACED CONCRETE SURFACES. ANY CONCRETE SURFACES DEFACED SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- CLEARING AND GRUBBING SHALL INCLUDE REMOVAL OF ALL VEGETATION AS REQUIRED TO CONSTRUCT THE REQUIRED IMPROVEMENTS.
- PROJECT SITE SAFETY:
  - THE ENGINEER/OWNER OR THEIR EMPLOYEES HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER THE CONTRACTOR, ANY SUB-CONTRACTOR OR OTHER ENTITY OR THEIR EMPLOYEES IN CONNECTION WITH THEIR WORK OR ANY JOBSITE HEALTH OR SAFETY PRECAUTIONS.
  - THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOBSITE SAFETY, AND WARRANTIES THAT THIS INTENT IS MADE EVIDENT BY THE AGREEMENT BETWEEN OWNER AND CONTRACTOR.
  - ALL EXISTING OVERHEAD AND UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS OR ENCOUNTERED THROUGH THE PROGRESSION OF WORK AT THIS PROJECT SITE ARE ASSUMED TO BE LIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS WHEN WORKING AROUND EXISTING OVERHEAD OR UNDERGROUND UTILITIES.
  - ALL CONCRETE SHALL DEVELOP A MINIMUM OF 4000 P.S.I. COMPRESSIVE STRENGTH AT 28 DAYS, UNLESS OTHERWISE STATED.
  - THE SEQUENCE OF CONSTRUCTION SHALL BE SUCH THAT ALL UNDERGROUND INSTALLATION OF ANY KIND THAT WILL COME UNDER THE PAVEMENT OR WITHIN 10 FEET OF ITS EDGES SHALL BE INSTALLED PRIOR TO THE CONSTRUCTION OF THE BASE.
  - TRENCHES SHALL BE DRY WHEN PIPES ARE INSTALLED. PIPES PLACED BELOW THE WATER TABLE SHALL BE BEDDED ON PEA GRAVEL AND WELL POINT SYSTEMS SHALL BE USED. ALL Dewatering PERMITS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
  - SIX (6) COPIES OF ALL SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION. ALL REQUESTS FOR MATERIAL SUBSTITUTIONS MUST BE APPROVED PRIOR TO DELIVERY TO THE SITE. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL MANUFACTURED ITEMS.
  - ALL ROOTS IN THE PAVED AREA MUST BE REMOVED ONE FOOT BELOW THE BOTTOM OF SUB GRADE.
  - ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STDS OF TCEQ
  - CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO LOCATE, EXCAVATE AND PREPARE FOR CONNECTIONS TO THE EXISTING SYSTEMS AS SHOWN ON THE DRAWINGS.
  - IF SOD IS USED ONSITE, IT SHALL BE PLACED 2" BELOW THE EDGES OF PAVEMENT TO ALLOW WATER TO INfiltrate.
  - CONTOURS SHOWN ARE PRE DEVELOPMENT CONTOURS
  - COMPACTION NOTES:  
FOR FILL AREAS WHERE WATER WILL BE IMPOUNDED:  
23.1. PLACE FILL IN LIFTS NO MORE THAN 12" DEEP AT NEAR OPT. MOISTURE CONTENT.  
23.2. COMPACT TO AT LEAST 95% RC (ASTM D698)  
23.3. COMPACT TO SLOPE OF FACE  
FOR ON GRADE BERMS AND OTHER MISC. FILL  
23.4. PLACE CLEAN FILL IN 12" LIFTS  
23.5. COMPACT WITH ON-SITE HEAVY EQUIPMENT  
24. ALL CONCRETE SURFACES TO BE BROOM FINISH UNO
  - DRAINAGE STRUCTURES TO MEET MIN. TxDOT SPECIFICATIONS FOR CONSTRUCTION AND PLACEMENT OF TYPE 3 DROPS
  - CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND GRADING PRIOR TO CONSTRUCTION. ENGINEER OF RECORD SHALL BE NOTIFIED OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
  - ALL RIP RAP SHALL BE COARSE GRADED ROCK AND SHALL BE SIZED IN ACCORDANCE WITH THE FOLLOWING TABLE.
- MIN THICKNESS OF RIPRAP TO BE 1.5 TIMES THE STONE DIAMETER UNO
- GEOTEXTILE FABRIC (FILTER FABRIC) SHALL BE A NON-WOVEN POLYPROPYLENE FABRIC DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA w/ APPROX. WEIGHT 6 OZ/10'2, A MULLEN BURST RATING OF 140 P.SI. AND AN EQUIVALENT OPENING SIZE (EOS) GREATER THAN #50 SIEVE. TENGATE MIRIF N-SERIES OF APPROVED EQUAL.
- BASIN LINERS SHALL COMPLY w/ RC-348 FOR COMPACTED CLAY LINERS
- ALL DISTURBED AREAS TO BE SEEDED AND MULCHED FOR SLOPE STABILIZATION. SEED TO BE BERMUDA GRASS OR APPROVED ALTERNATES.
- ALL CONCRETE SLABS TO HAVE #5 BARS EACH WAY AT 12" c/c IN CENTER OF SLAB UNO.

SLOPE	RIP RAP SIZE
0.5%-1%	4" ROCK
1.1% TO 2%	6" ROCK
2.1% TO 4%	8" ROCK
4.1% TO 5%	8"-12" ROCK



**PROPOSED CONDITIONS MAP**  
SCALE: 1" = 400'

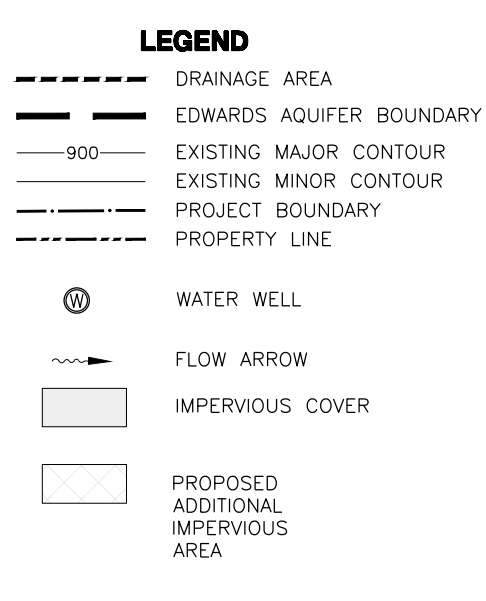
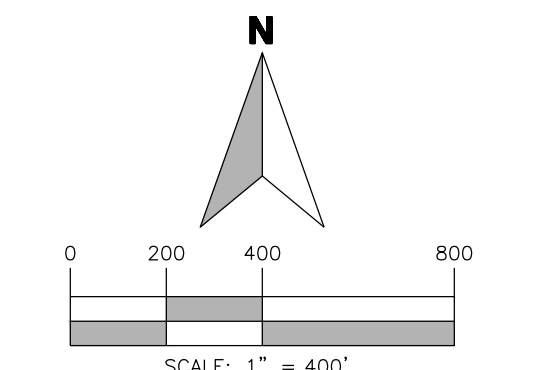


IMAGE: N/A  
ISSUE DATE: 10/11/2021  
DRAWN BY: AK  
CHECKED BY: CJF  
SCALE: 1" = 400'  
JOB NO.: 11026-015

SHEET NO.: **01**  
OF 03

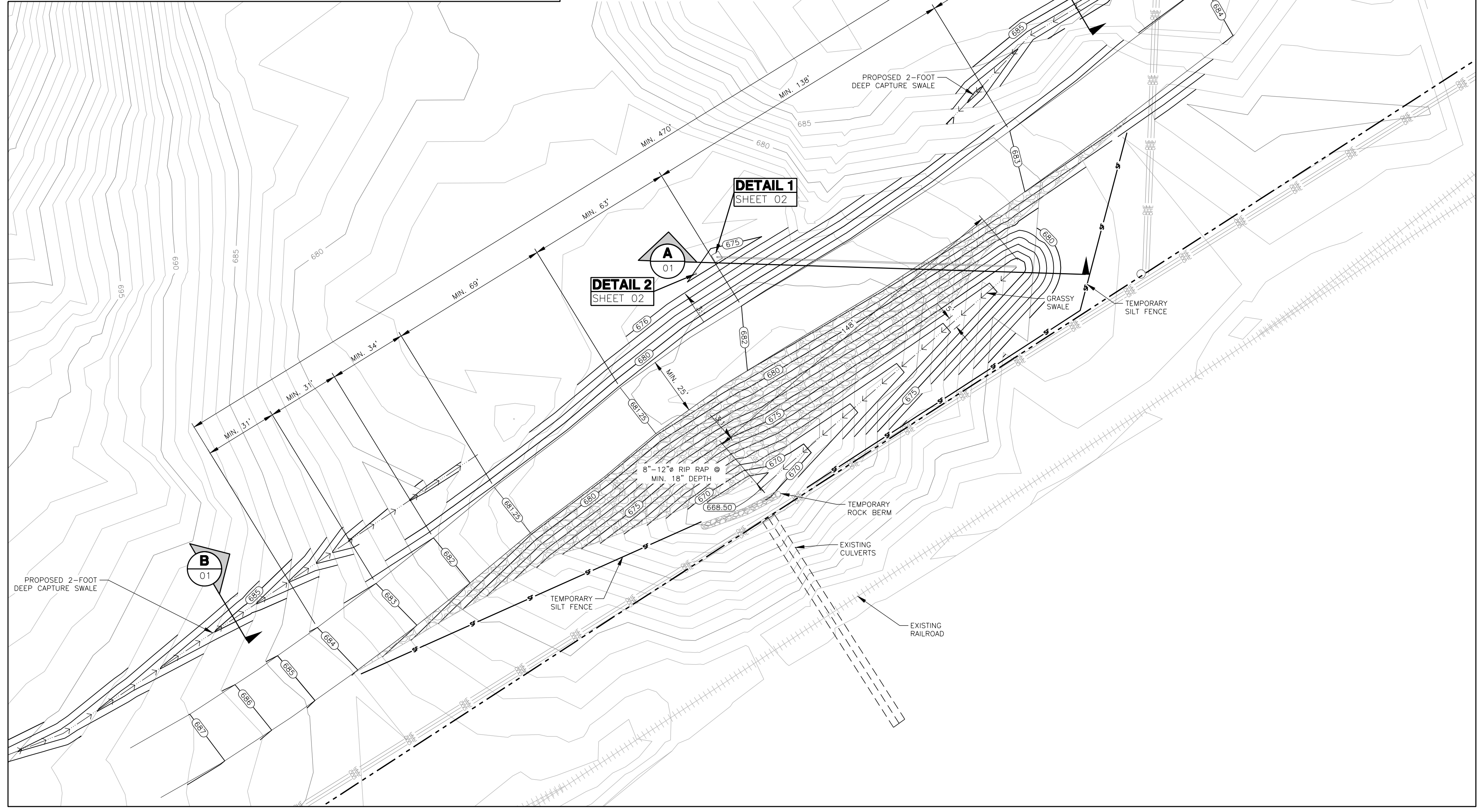
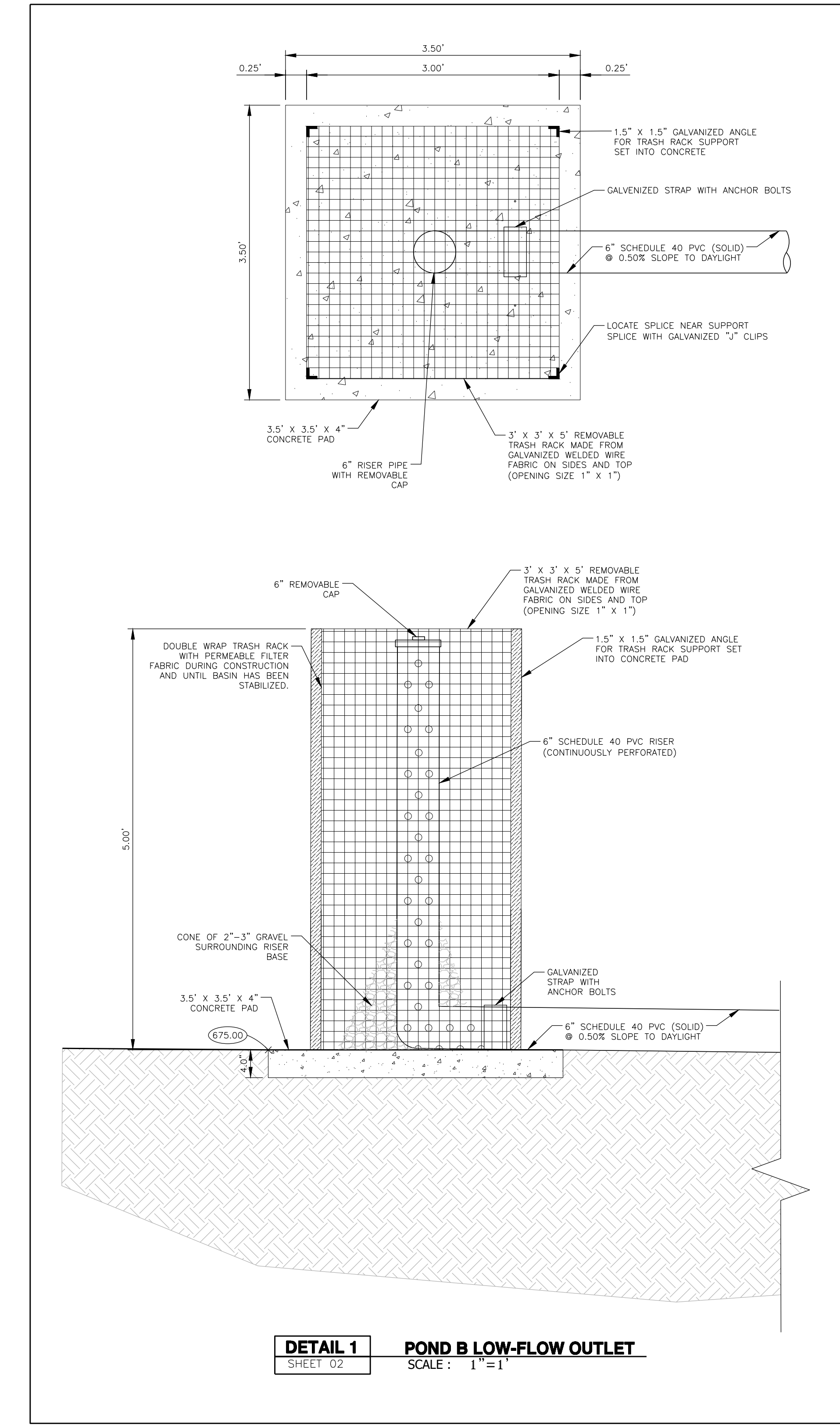
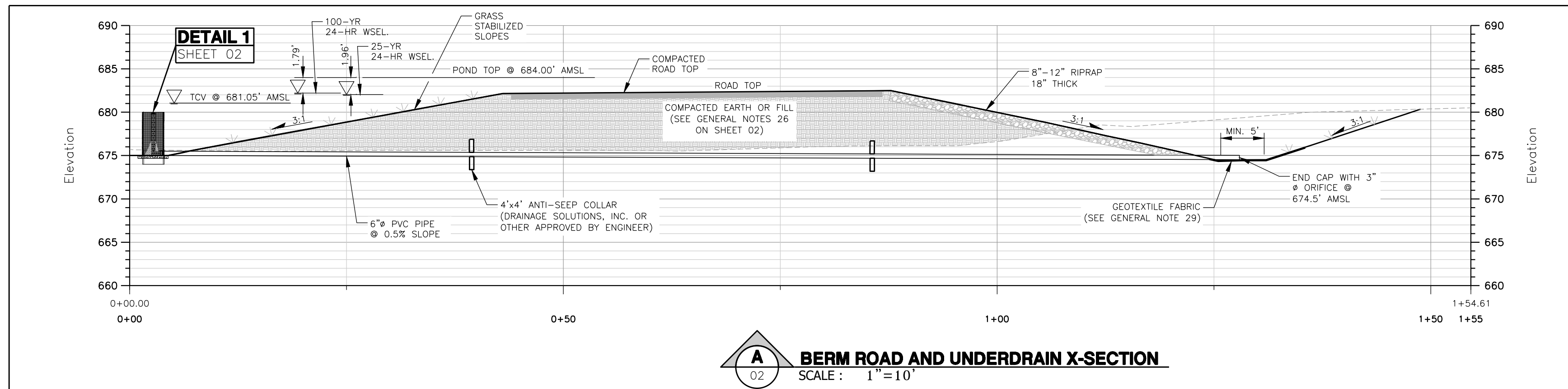
**WESTWARD**  
Environmental Engineering, Natural Resources.  
P.O. Box 2205 Boerne, Texas 78006  
(830) 249-8284, Fax: (830) 249-0221  
TBE REG. NO.: F-4524  
TBEF REG. NO.: 50112

NO.	DATE	DESCRIPTION

STATE OF TEXAS  
10685  
PROFESSIONAL ENGINEERING  
SILVIA GARRETT CAMPBELL  
SILVIA GARRETT CAMPBELL  
5/31/2023  
Cart Q. Campbell, P.E.  
License No. 106851

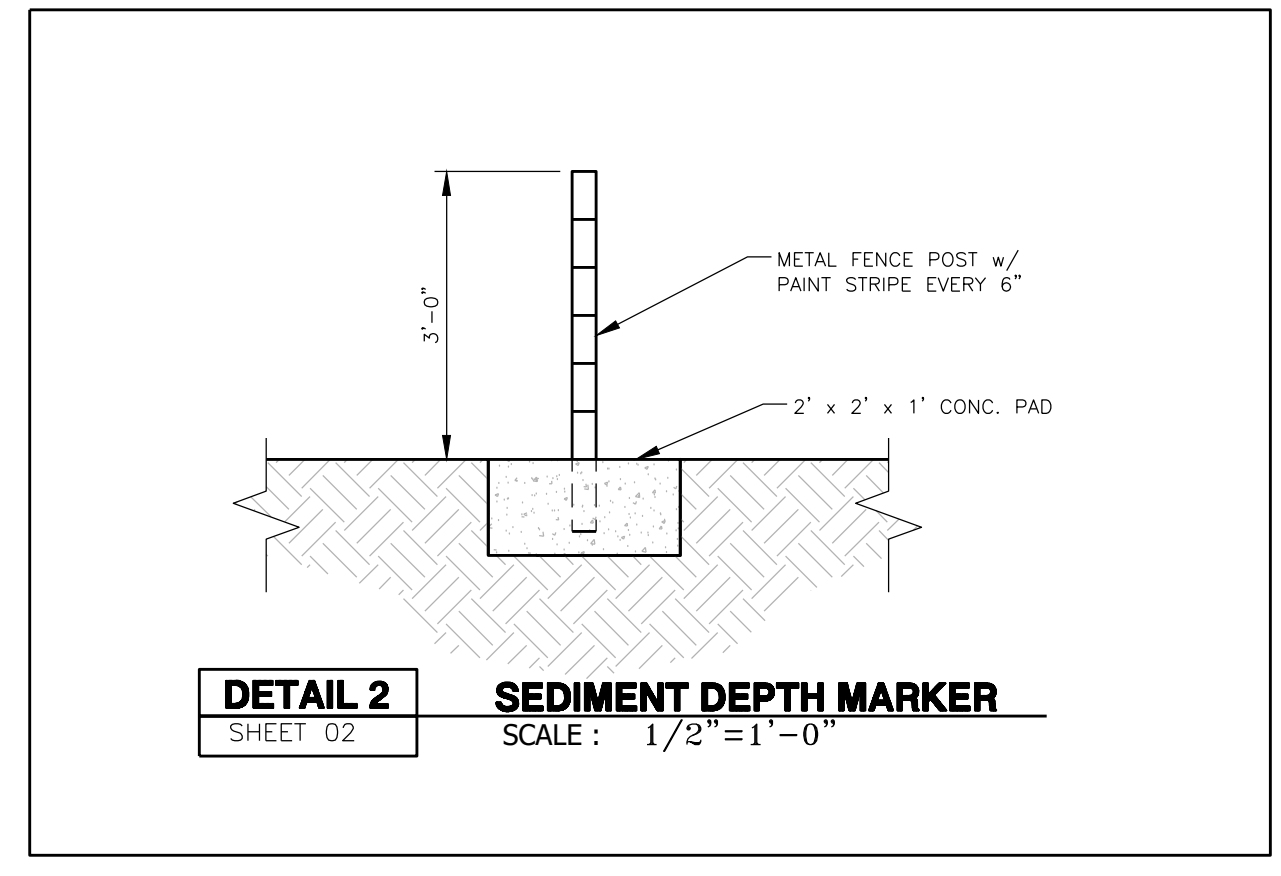
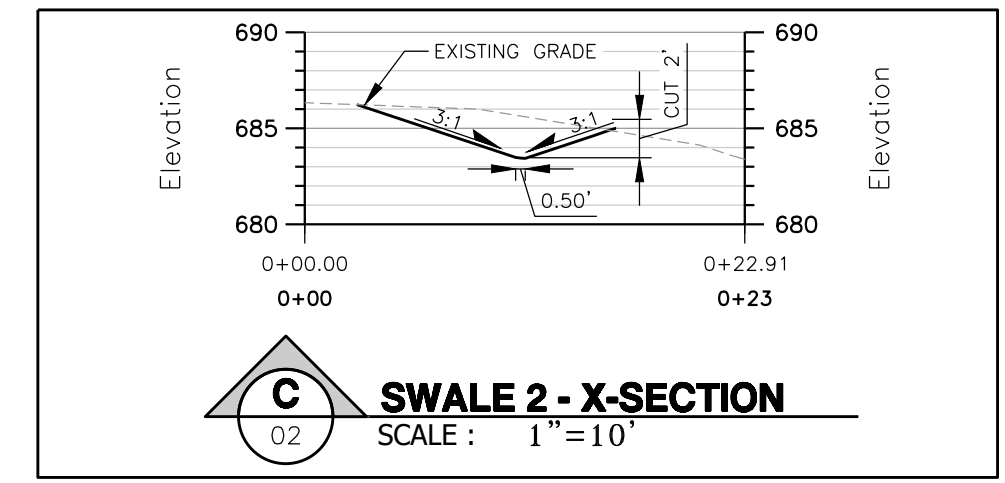
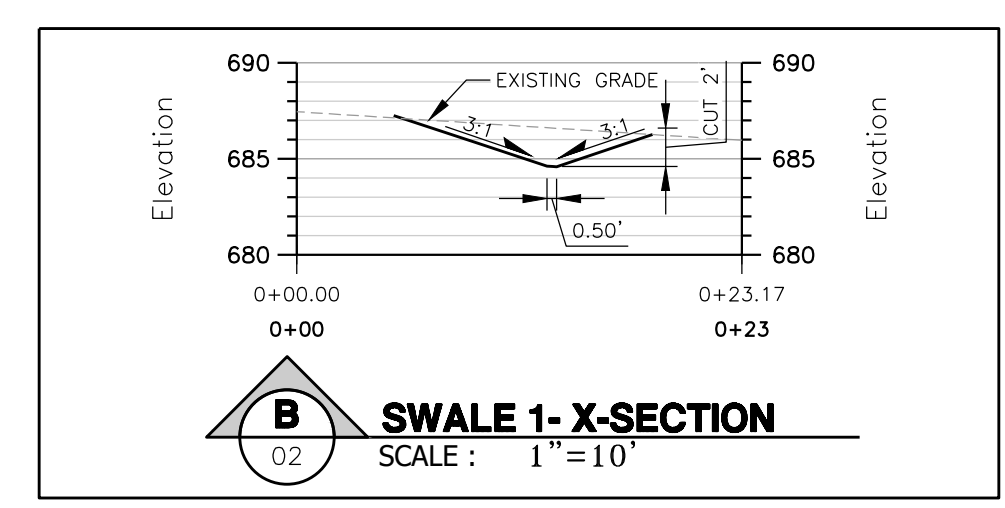
**EXISTING - PROPOSED CONDITIONS**  
WPAP MODIFICATION  
LHOIST NORTH AMERICA OF TEXAS, LLC  
NEW BRAUNFELS LIME PLANT





**STAGE STORAGE TABLE**

ELEV.	AREA (sq. ft.)	DEPTH (ft)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
675.00	130.78	N/A	N/A	0.00
676.00	1,404.52	1.00	654.62	654.62
677.00	4,663.93	1.00	2875.95	3530.58
678.00	13,661.38	1.00	8769.18	12299.75
679.00	20,556.34	1.00	16991.88	29291.64
680.00	29,891.13	1.00	25078.54	54370.18
681.00	35,705.71	1.00	32755.38	87125.56
682.00	42,697.71	1.00	39149.65	126275.21
683.00	53,040.73	1.00	47775.83	174051.04
684.00	78,062.97	1.00	65150.18	239201.23



ISSUE DATE: 03/01/2023  
 DRAWN BY: NEM  
 CHECKED BY: CCG  
 SCALE: 1" = AS SHOWN  
 JOB NO.: 11026-006

SHEET NO.: **02**  
 OF 03

**WESTWARD**  
 Environmental Engineering, Natural Resources  
 P.O. Box 2205 Boerne, Texas 78006  
 (830) 249-8284 Fax: (830) 249-0221  
 TBPE REG. NO.: F-4524  
 TBPG REG. NO.: 50112

REV.	DESCRIPTION	DATE	BY

STATE OF TEXAS  
 CURT GARRETT CAMPBELL  
 10685  
 LICENSED PROFESSIONAL ENGINEER  
 License No. 110685-1  
 5/31/2023

**POND B CONSTRUCTION PLAN**  
 WATER POLLUTION ABATEMENT PLAN MOD  
 LHOIST NORTH AMERICA, LTD.  
 NEW BRAUNFELS LIME PLANT



**RG-348; 3.5.6 EXTENDED DETENTION BASINS MAINTENANCE GUIDELINES**

EXTENDED DETENTION BASINS HAVE MODERATE TO HIGH MAINTENANCE REQUIREMENTS, DEPENDING ON THE EXTENT TO WHICH FUTURE MAINTENANCE NEEDS ARE ANTICIPATED DURING THE DESIGN STAGE. RESPONSIBILITIES FOR BOTH ROUTINE AND NONROUTINE MAINTENANCE TASKS NEED TO BE CLEARLY UNDERSTOOD AND ENFORCED. IF REGULAR MAINTENANCE AND INSPECTIONS ARE NOT UNDERTAKEN, THE BASIN WILL NOT ACHIEVE ITS INTENDED PURPOSES. THERE ARE MANY FACTORS THAT MAY AFFECT THE BASINS OPERATION AND THAT SHOULD BE PERIODICALLY CHECKED. THESE FACTORS CAN INCLUDE MOWING, CONTROL OF POND VEGETATION, REMOVAL OF ACCUMULATED BOTTOM SEDIMENTS, REMOVAL OF DEBRIS FROM ALL INFLOW AND OUTFLOW STRUCTURES, UNBLOCKING OF GRITCHES, PERFORATIONS, AND THE UPKEEP OF ALL PHYSICAL STRUCTURES THAT ARE WITHIN THE DETENTION POND AREA. ONE SHOULD CONDUCT PERIODIC INSPECTIONS AND AFTER EACH SIGNIFICANT STORM, REMOVE FLOATABLES AND CORRECT EROSION PROBLEMS IN THE POND SLOPES AND BOTTOM. PAY PARTICULAR ATTENTION TO THE OUTLET CONTROL PERFORATIONS FOR SIGNS OF CLOGGING. IF THE GRITCHES ARE CLOGGED, REMOVE SEDIMENT AND OTHER DEBRIS THE GENERIC ASPECTS THAT MUST BE CONSIDERED IN THE MAINTENANCE PLAN FOR A DETENTION FACILITY ARE AS FOLLOWS:

- INSPECTIONS. BASINS SHOULD BE INSPECTED AT LEAST TWICE A YEAR (ONCE DURING OR IMMEDIATELY FOLLOWING WET WEATHER) TO EVALUATE FACILITY OPERATION. WHEN POSSIBLE, INSPECTIONS SHOULD BE CONDUCTED DURING WET WEATHER TO DETERMINE IF THE POND IS MEETING THE TARGET DETENTION TIMES. IN PARTICULAR, THE EXTENDED DETENTION CONTROL DEVICE SHOULD BE REGULARLY INSPECTED FOR EVIDENCE OF CLOGGING, OR CONVERSELY, FOR TOO RAPID A RELEASE. IF THE DESIGN DRAWDOWN TIMES ARE EXCEEDED BY MORE THAN 24 HOURS, THEN REPAIRS SHOULD BE SCHEDULED IMMEDIATELY. THE UPPER STAGE PILOT CHANNEL, IF ANY, AND ITS FLOW PATH TO THE LOWER STAGE SHOULD BE CHECKED FOR EROSION PROBLEMS. DURING EACH INSPECTION, EROSION AREAS INSIDE AND DOWNSTREAM OF THE BMP SHOULD BE IDENTIFIED AND REPAIRED OR REVEGETATED IMMEDIATELY.
- MOWING. THE UPPER STAGE, SIDE SLOPES, EMBANKMENT, AND EMERGENCY SPILLWAY OF AN EXTENDED DETENTION BASIN MUST BE MOWED REGULARLY TO DISCOURAGE WOODY GROWTH AND CONTROL WEEDS. GRASS AREAS IN AND AROUND BASINS SHOULD BE MOWED AT LEAST TWICE ANNUALLY TO LIMIT VEGETATION HEIGHT TO 18 INCHES. MORE FREQUENT MOWING TO MAINTAIN AESTHETIC APPEAL MAY BE NECESSARY IN LANDSCAPED AREAS. WHEN MOWING OF GRASS IS PERFORMED, A MULCHING MOWER SHOULD BE USED, OR GRASS CLIPPINGS SHOULD BE CAUGHT AND REMOVED.
- DEBRIS AND LITTER REMOVAL. DEBRIS AND LITTER WILL ACCUMULATE NEAR THE EXTENDED DETENTION CONTROL DEVICE AND SHOULD BE REMOVED DURING REGULAR MOWING OPERATIONS AND INSPECTIONS. PARTICULAR ATTENTION SHOULD BE PAID TO FLOATING DEBRIS THAT CAN EVENTUALLY CLOG THE CONTROL DEVICE OR RISER.
- EROSION CONTROL. THE POND SIDE SLOPES, EMERGENCY SPILLWAY, AND EMBANKMENT ALL MAY PERIODICALLY SUFFER FROM SLUMPING AND EROSION. ALTHOUGH THIS SHOULD NOT OCCUR OFTEN IF THE SOILS ARE PROPERLY COMPACTED DURING CONSTRUCTION, REGRADING AND REVEGETATION MAY BE REQUIRED TO CORRECT THE PROBLEMS. SIMILARLY, THE CHANNEL CONNECTING AN UPPER STAGE WITH A LOWER STAGE MAY PERIODICALLY NEED TO BE REPLACED OR REPAIRED.
- STRUCTURAL REPAIRS AND REPLACEMENT. WITH EACH INSPECTION, ANY DAMAGE TO THE STRUCTURAL ELEMENTS OF THE SYSTEM (PIPES, CONCRETE DRAINAGE STRUCTURES, RETAINING WALLS, ETC.) SHOULD BE IDENTIFIED AND REPAIRED IMMEDIATELY. THESE REPAIRS SHOULD INCLUDE PATCHING OF CRACKED CONCRETE, SEALING OF VOIDS, AND REMOVAL OF VEGETATION FROM CRACKS AND JOINTS. THE VARIOUS INLET/OUTLET AND RISER WORKS IN A BASIN WILL EVENTUALLY DEGRADE AND MUST BE REPLACED. PUBLIC WORKS EXPERTS HAVE ESTIMATED THAT CORRUGATED METAL PIPE (CMP) HAS A USEFUL LIFE OF ABOUT 25 YR, WHEREAS REINFORCED CONCRETE BARRELS AND RISERS MAY LAST FROM 50 TO 75 YR.
- NUISANCE CONTROL. STANDING WATER (NOT DESIRED IN A EXTENDED DETENTION BASIN) OR SOGGY CONDITIONS WITHIN THE LOWER STAGE OF THE BASIN CAN CREATE NUISANCE CONDITIONS FOR NEARBY RESIDENTS, ODORS, MOSQUITOES, WEEDS, AND LITTER ARE ALL OCCASIONALLY PERCEIVED TO BE PROBLEMS. MOST OF THESE PROBLEMS ARE GENERALLY A SIGN THAT REGULAR INSPECTIONS AND MAINTENANCE ARE NOT BEING PERFORMED (E.G., MOWING, DEBRIS REMOVAL, CLEARING THE OUTLET CONTROL DEVICE).
- SEDIMENT REMOVAL. WHEN PROPERLY DESIGNED, DRY EXTENDED DETENTION BASINS WILL ACCUMULATE QUANTITIES OF SEDIMENT OVER TIME. SEDIMENT ACCUMULATION IS A SERIOUS MAINTENANCE CONCERN IN EXTENDED DETENTION DRY PONDS FOR SEVERAL REASONS. FIRST, THE SEDIMENT GRADUALLY REDUCES AVAILABLE STORMWATER MANAGEMENT STORAGE CAPACITY WITHIN THE BASIN. SECOND, UNLIKE WET EXTENDED DETENTION BASINS (WHICH HAVE A PERMANENT POOL TO CONCEAL DEPOSITED SEDIMENTS), SEDIMENT ACCUMULATION CAN MAKE DRY EXTENDED DETENTION BASINS VERY UNSIGHTLY. THIRD, AND PERHAPS MOST IMPORTANTLY, SEDIMENT TENDS TO ACCUMULATE AROUND THE CONTROL DEVICE. SEDIMENT DEPOSITION INCREASES THE RISK THAT THE ORIFICE WILL BECOME CLOGGED, AND GRADUALLY REDUCES STORAGE CAPACITY RESERVED FOR POLLUTANT REMOVAL. SEDIMENT CAN ALSO BE RESUSPENDED IF ALLOWED TO ACCUMULATE OVER TIME AND ESCAPE THROUGH THE HYDRAULIC CONTROL TO DOWNSTREAM CHANNELS AND STREAMS. FOR THESE REASONS, ACCUMULATED SEDIMENT NEEDS TO BE REMOVED FROM THE LOWER STAGE WHEN SEDIMENT BUILDUP FILLS 20% OF THE VOLUME OF THE BASIN OR AT LEAST EVERY 10 YEARS.

**GENERAL NOTES**

- THE LOCATION OF THE EXISTING UTILITIES AS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE FACILITIES SHOWN NOR FOR ANY FACILITY NOT SHOWN. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IF OTHER UTILITIES (NOT SHOWN ON THE PLAN) EXIST WITHIN THE AREA OF CONSTRUCTION. SHOULD THERE BE UTILITY CONFLICTS, THE CONTRACTOR SHALL INFORM THE UTILITY SUPPLIER AND THE ENGINEER OF RECORD OF THE UTILITY CONFLICTS AND THE UTILITY ADJUSTMENTS AS REQUIRED.
- CONTRACTOR SHALL NOTIFY TEXAS 811 ONE CALL SYSTEM (1-800-344-8377) 48 HOURS IN ADVANCE OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES FROM DAMAGE OR DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY, AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.
- FACILITIES PROPOSED HEREIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS. DEVIATIONS FROM THE APPROVED PLANS MUST BE APPROVED IN ADVANCE BY THE ENGINEER OF RECORD.
- UPON COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL ACCEPTANCE OF THE WORK, A FINAL INSPECTION SHALL VERIFY PROPER ADHERENCE TO ALL FACETS OF THE PLANS AND SPECIFICATIONS.
- AS-BUILT DRAWINGS SHALL BE PREPARED BY A REGISTERED LAND SURVEYOR, REGISTERED IN THE STATE OF TEXAS, AND SUBMITTED BY THE CONTRACTOR TO THE ENGINEER OF RECORD. CONTRACTOR TO PROVIDE RECORD INFORMATION WHICH LOCATES ALL UNDERGROUND UTILITIES, SITE GRADING AND CLEARANCE TO WATER MAIN FROM OTHER UTILITIES HORIZONTAL AND VERTICAL.
- ALL VEGETATION, DEBRIS, CONCRETE OR OTHER UNSUITABLE MATERIAL SHALL BE LEGALLY DISPOSED OF OFF-SITE IN AN APPROPRIATE AREA AT THE CONTRACTOR'S EXPENSE.
- SITE INFORMATION BASED ON A TOPOGRAPHICAL DATA PROVIDED BY LHOIST NORTH AMERICA, LTD.
- ALL CONSTRUCTION SHALL BE DONE IN A SAFE MANNER, SPECIFICALLY, THE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES SHALL BE STRICTLY OBSERVED.
- MINIMUM COVER SHALL BE 3.0 FEET FOR ALL PIPES. (TYPICAL) UNLESS OTHERWISE NOTED ON DRAWINGS.
- ALL OPEN TRENCHES AND HOLES ADJACENT TO ROADWAY OR WALKWAYS SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY OF BOTH VEHICULAR AND PEDESTRIAN TRAFFIC.
- CONTRACTOR SHALL MONITOR AND PROHIBIT THE DEFACING OF FRESHLY PLACED CONCRETE SURFACES. ANY CONCRETE SURFACES DEFACED SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- CLEARING AND GRUBBING SHALL INCLUDE REMOVAL OF ALL VEGETATION AS REQUIRED TO CONSTRUCT THE REQUIRED IMPROVEMENTS.
- PROJECT SITE SAFETY: THE ENGINEER/OWNER, OR THEIR EMPLOYEES, HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER THE CONTRACTOR, ANY SUB-CONTRACTOR, OR OTHER ENTITY, OR THEIR EMPLOYEES IN CONNECTION WITH THEIR WORK, OR ANY JOBSITE, HEALTH AND SAFETY PRECAUTIONS SHALL BE UPHOLD. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOBSITE SAFETY, AND WARRANTS THAT THIS INTENT IS MADE EVIDENT BY THE AGREEMENT BETWEEN OWNER AND CONTRACTOR. ALL EXISTING OVERHEAD AND UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS OR ENCOUNTERED THROUGH THE PROGRESSION OF WORK AT THIS PROJECT SITE ARE ASSUMED TO BE LIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS WHEN WORKING AROUND EXISTING OVERHEAD OR UNDERGROUND UTILITIES.
- THE SEQUENCE OF CONSTRUCTION SHALL BE SUCH THAT ALL UNDERGROUND INSTALLATION OF ANY KIND THAT WILL COME UNDER THE PAVEMENT OR WITHIN 10 FEET OF ITS EDGES SHALL BE INSTALLED PRIOR TO THE CONSTRUCTION OF THE BASE.
- TRENCHES SHALL BE DRY WHEN PIPES ARE INSTALLED. PIPES PLACED BELOW THE WATER TABLE SHALL BE BEDDED ON PEA GRAVEL AND WELL POINT SYSTEMS SHALL BE USED. ALL DE-WATERING PERMITS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- SIX (6) COPIES OF ALL SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION. ALL REQUESTS FOR MATERIAL SUBSTITUTIONS MUST BE APPROVED PRIOR TO DELIVERY TO THE SITE. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL MANUFACTURED ITEMS.
- ALL ROOTS IN THE PAVED AREA MUST BE REMOVED ONE FOOT BELOW THE BOTTOM OF SUBGRADE.
- CONTRACTOR SHALL MAINTAIN ACCESS TO PROPERTY AT ALL TIMES.
- CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO LOCATE, EXCAVATE AND PREPARE FOR CONNECTIONS TO THE EXISTING SYSTEMS AS SHOWN ON THE DRAWINGS.
- SOD SHALL BE PLACED 2" BELOW THE EDGES OF PAVEMENT TO ALLOW WATER TO DRAIN.
- ALL CONCRETE SURFACES TO BE BROOM FINISH U.N.O.
- CONTRACTOR TO COORDINATE WITH ENGINEER OF RECORD PRIOR TO POURING ANY CONCRETE OR PLACING ANY BASE MATERIAL.
- ALL FILL TO BE CLEAN FILL WITHOUT LARGE STONES OR DEBRIS.
- INSPECTIONS WILL INCLUDE:
  - SUB-BASE
  - BASE
  - REINFORCEMENT
  - FINAL PAVING
- STORMWATER POND COMPACTION NOTES FOR FILL AREAS WHERE WATER WILL BE IMPOUNDED:
  - PLACE FILL IN LIFTS NO MORE THAN 8" DEEP AT NEAR OPTIMAL MOISTURE CONTENT.
  - COMPACT TO AT LEAST 95% SP (ASTM D698)
  - COMPACT TO SLOPE OF FACE
- UNLESS NOTED OTHERWISE ON THE PLAN, RIPRAP SHALL BE PLACED SHALL BE PLACED AT ALL LOCATIONS WHERE CONCENTRATED FLOW WILL CAUSE EXCESSIVE EROSION ALL RIPRAP SHALL BE COURSE GRADED ROCK AND SHALL BE SIZED IN ACCORDANCE WITH THE FOLLOWING TABLE:
 

SLOPE	RIPRAP SIZE
0.5% - 1%	4" ROCK
1.1% TO 2%	6" ROCK
2.1% TO 4%	8" ROCK
4.1% TO 5%	8"-12" RIPRAP
- MINIMUM THICKNESS OF RIPRAP TO BE 1.5 TIMES THE STONE DIAMETER U.N.O.
- GEOTEXTILE FABRIC (FILTER FABRIC) SHALL BE A NON-WOVEN POLYPROPYLENE FABRIC DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA W/ APPROX. WEIGHT 6 OZ/YD<sup>2</sup>, A MULLEN BURST RATING OF 140 PSI, AND AN EQUIVALENT OPENING SIZE (ESO) GREATER THAN #50 SIEVE. TENTATE MIRFI N-SERIES OR APPROVED EQUAL.
- ALL GRADES ARE SHOWN AS TOP OF FINISHED PAVEMENT U.N.O.

**TCEQ CALCULATIONS**

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **11026-015**  
Date Prepared: **11/21/2019**

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348. Characters shown in red are data entry fields. Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

**1. The Required Load Reduction for the total project:** Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3:  $L_{d1} = 27.2(A_{i1} \times P)$

where:

$L_{d1}$ TOTAL PROJECT =	Required TSS removal resulting from the proposed development = 80% of increased load
$A_{i1}$ =	Net increase in impervious area for the project
P =	Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Comal
Total project area included in plan "	444.35 acres
Predevelopment impervious area within the limits of the plan "	0.00 acres
Total post-development impervious area within the limits of the plan "	52.65 acres
Total post-development impervious cover fraction "	0.12
P =	33 inches

$L_{d1}$  TOTAL PROJECT = 42720 lbs.

\* The values entered in these fields should be for the total project area.

**2. Drainage Basin Parameters (This information should be provided for each basin):**

Drainage Basin/Outfall Area No. =	2
Total drainage basin/outfall area =	20.34 acres
Predevelopment impervious area within drainage basin/outfall area =	0.00 acres
Post-development impervious area within drainage basin/outfall area =	9.81 acres
Post-development impervious fraction within drainage basin/outfall area =	0.47
$L_{d1}$ THIS BASIN =	8623 lbs.

**3. Indicate the proposed BMP Code for this basin.**

Proposed BMP =	Extended Detention	Aquaglogic Cartridge/Filter
Removal efficiency =	75 percent	Bioretention
Proposed BMP =	Grassy Swale	Comtech StormFilter
Removal efficiency =	70 percent	Constructed Wetland
Proposed BMP =	None	Extended Detention
Removal efficiency =	0 percent	Grassy Swale
		None
		Retention / Irrigation
		Sand Filter
		Stormceptor
		Vegetated Filter Strips
		Vortexes
		Wet Basin
		Wet Vault
		Batch Detention Basin

Etot = 86.375

**4. Calculate Maximum TSS Load Removed (L<sub>d</sub>) for this Drainage Basin by the selected BMP Type.**

RG-348 Page 3-33 Equation 3.7:  $L_d = (BMP \text{ efficiency}) \times P \times (A_1 \times 34.6 + A_2 \times 0.54)$

where:

$A_1$ =	Total On-Site drainage area in the BMP catchment area
$A_2$ =	Impervious area proposed in the BMP catchment area
$A_3$ =	Previous area remaining in the BMP catchment area
$L_d$ =	TSS Load removed from this catchment area by the proposed BMP

$A_1$ =	20.34 acres
$A_2$ =	9.61 acres
$A_3$ =	10.73 acres
$L_d$ =	9640 lbs

**5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area**

Desired $L_{d1}$ THIS BASIN =	8623 lbs.
F =	0.89

**6. Calculate Capture Volume required by the BMP Type for this drainage basin/outfall area.** Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	1.60 inches
Post Development Runoff Coefficient =	0.34
On-site Water Quality Volume =	40485 cubic feet
	0.93 ac-ft

Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	7.73 acres
Off-site Impervious cover draining to BMP =	7.09 acres
Impervious fraction of off-site area =	0.92
Off-site Runoff Coefficient =	0.78
Off-site Water Quality Volume =	33622 cubic feet

Storage for Sediment =	14821
Total Capture Volume (required water quality volume(s) x 1.20) =	88928 cubic feet
	2.04 ac-ft

IMAGE:	N/A
ISSUE DATE:	03/01/2023
DRAWN BY:	NEM
CHECKED BY:	CGC
SCALE: 1" =	AS SHOWN
JOB NO.:	11026-006

SHEET NO.:	<b>03</b>
	OF 03

WESTWARD  
Environmental Engineering, Natural Resources  
P.O. Box 2205 Boerne, Texas 78006  
(830) 249-8284 Fax: (830) 249-0221  
TBPE REG. NO.: F-4524  
TBPE REG. NO.: 50112

DATE									
BY									
DESCRIPTION									
REV									

STATE OF TEXAS  
CURT GARRETT CAMPBELL  
106851  
LICENSED PROFESSIONAL ENGINEER  
Curt, G. Campbell, P.E.  
License No. 106851  
5/31/2023

**POND B NOTES AND TCEQ CALCULATIONS**  
WATER POLLUTION ABATEMENT PLAN MOD  
LHOIST NORTH AMERICA, LTD.  
NEW BRAUNFELS LIME PLANT

# Temporary Stormwater Section

## Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

**To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.**

**Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.**

## Signature


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 **Temporary Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, P.E.

TX License No. 106851 | TX Firm No. 4524

Date: 5/31/2023

Signature of Engineer:

Regulated Entity Name: New Braunfels Lime Plant

## Project Information

### Potential Sources of Contamination

*Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.*

1. Fuels for construction equipment and hazardous substances which will be used during construction:

The following fuels and/or hazardous substances will be stored on the site: diesel, gasoline, and used oil

These fuels and/or hazardous substances will be stored in:

- Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.
  - Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.
  - Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project. **AST Plan for this site (ID 13001146) was approved and is effective as of July 9, 2020.**
- Fuels and hazardous substances will not be stored on the site.
2.  **Attachment A - Spill Response Actions.** A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.
  3.  Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
  4.  **Attachment B - Potential Sources of Contamination.** A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

### ***Sequence of Construction***

5.  **Attachment C - Sequence of Major Activities.** A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.
  - For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.
  - For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
6.  Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Dry Comal Creek

### ***Temporary Best Management Practices (TBMPs)***

*Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.*

7.  **Attachment D – Temporary Best Management Practices and Measures.** TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The

construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

- A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
  - A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
  - A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
  - A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.
8.  The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.
- Attachment E - Request to Temporarily Seal a Feature.** A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
  - There will be no temporary sealing of naturally-occurring sensitive features on the site.
9.  **Attachment F - Structural Practices.** A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.
10.  **Attachment G - Drainage Area Map.** A drainage area map supporting the following requirements is attached:
- For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
  - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
  - For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
  - There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be



used in combination with other erosion and sediment controls within each disturbed drainage area. **Disturbed area is 4.39 acres and will drain to existing Pond A.**

- There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.
11.  **Attachment H - Temporary Sediment Pond(s) Plans and Calculations.** Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.
- N/A
12.  **Attachment I - Inspection and Maintenance for BMPs.** A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.
13.  All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
14.  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).
15.  Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.
16.  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).

### ***Soil Stabilization Practices***

*Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.*

17.  **Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices.** A schedule of the interim and permanent soil stabilization practices for the site is attached.



18.  Records must be kept at the site of 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.
19.  Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

### ***Administrative Information***

20.  All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
21.  If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
22.  Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.



**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**Temporary Stormwater Section (TCEQ-0602)  
Attachment A**

**Spill Response Actions**

**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.
- (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, and 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 clean-up 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 run-on during rainfall to the extent that it doesn’t compromise cleanup 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.



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**New Braunfels Lime Plant**

(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 Safety Data Sheets (SDS), 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.



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**New Braunfels Lime Plant**

**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, 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 Spill**

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 110,117, 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.



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**New Braunfels Lime Plant**

In the event of a reportable spill, the following Emergency Response Agencies can be contacted for assistance. Always inform your supervisor of a reportable spill immediately. Follow company policy when responding to an emergency.

State Emergency Response Commission	(512) 424-2208
National Response Center	(800) 424-8802
US EPA Region 6, Dallas, 24-hr Number	(866) 372-7745
National Weather Service	(281) 337-5074
TCEQ 24-hr	(800) 832-8224
TCEQ Region 13	(210) 490-3096

**Vehicle and Equipment Maintenance**

- (1) If maintenance must occur on-site, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills.
- (2) Regularly inspect on-site 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 on-site.
- (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.





**Lhoist North America of Texas, LLC**  
**New Braunfels Lime Plant**

**Vehicle and Equipment Fueling**

- (1) If fueling must occur on site, use designated areas, located away from drainage courses, to prevent the run-on 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.

The site is covered by an AST Plan. Any spills and/or leaks that occur will be cleaned up immediately and will be disposed of properly.



**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**DETAILED TELEPHONE SPILL REPORT FORM**

Date of Incident: \_\_\_\_\_

Location of Incident: \_\_\_\_\_

Description of material spilled: \_\_\_\_\_

Quantity of material spilled: \_\_\_\_\_

Cause of spill: \_\_\_\_\_

\_\_\_\_\_

Authorities notified: \_\_\_\_\_

\_\_\_\_\_

Remediation/clean-up action: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Corrective measures taken for prevention of reoccurrence: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**Portable Toilet BMPs:**

Portable toilets will be used on-site and will be handled in accordance with the following guidelines:

- A licensed waste collector should service all the toilets. **The following tasks will be performed by the portable toilet supplier:**
  - Empty portable toilets before transporting them.
  - Securely fasten the toilets to the transport truck.
  - Use hand trucks, dollies, and power tailgates whenever possible.
  - Suppliers should carry bleach for disinfection in the event of a spill or leak.
  - Inspect the toilets frequently for leaks and have the units serviced and sanitized at time intervals that will maintain sanitary conditions of each toilet.
- Locate portable toilets at least 20 feet from the nearest storm-drain inlet or sensitive-feature buffer area
- A berm will be constructed around all portable toilet facilities.
- Prepare a level ground surface with clear access to the toilets.
- Secure all portable toilets to prevent tipping by accident, weather, or vandalism.

**Temporary Stormwater Section (TCEQ-0602)  
Attachment B**

**Potential Sources of Contamination**

Potential sources of contamination in the project area are the soil, fuels and lubricants from vehicles and equipment, and trash/debris items.

**Temporary Stormwater Section (TCEQ-0602)  
Attachment C**

**Sequence of Major Activities**

The area where Pond B will be developed will be cleared of vegetation prior to construction. Existing Pond A is currently under construction and has been modified to treat the added impervious cover, as discussed in the previously approved WPAP Mod (EAPP ID 13001417). Temporary earthen berms, rock berms, and/or silt fences will be set downstream of the pond and remain in place until the pond modifications are completed. Exposed soils will be stabilized at the completion of construction in accordance with the soil stabilization practices described in Temporary Stormwater Attachment J.

Other grading activities for other areas of this site are covered under the approved WPAP Plan dated 1/22/2020 (EAPP ID 13000997) and WPAP Plan dated 1/14/2022 (EAPP ID 13001417).



**Lhoist North America of Texas, LLC**  
**New Braunfels Lime Plant**

**Temporary Stormwater Section (TCEQ-0602)**  
**Attachment D, E, F, G, and H**

There are no changes to Temporary BMPs from what is described in the existing approved WPAP Plan and therefore there are no changes to Temporary Stormwater Attachments D, F, G, and H as a result of this modification. Temporary BMPs include rock berms, silt fences and/or earthen berms that will be used as necessary to control runoff, and prevent pollution of surface water, groundwater, or stormwater. Temporary Stormwater Attachment E is not needed since there is no request to seal a feature with this modification. Other grading activities for other areas of this site are covered under the approved WPAP Plan dated 1/22/2020 (EAPP ID 13000997).

**Temporary Stormwater Section (TCEQ-0602)**  
**Attachment I**

**Inspection and Maintenance for BMPs**

As a result of this project, there is no change to inspection and maintenance of BMPs as stated in the approved WPAP Plans dated 1/22/2020 (EAPP ID 13000997) or 1/14/2022 (EAPP ID 13001417), however the responsibility for this remains and is repeated here for clarity.

Earthen berms should be inspected quarterly. Rock berms and silt fences should be inspected weekly. Written documentation of these inspections should be kept during the course of construction at the project site (see following example Inspection Form.) Any erosion of earthen berms should be backfilled and compacted as soon as possible. If a berm is no longer able to properly filter the sediment from the stormwater due to contamination from silt, it should be replaced. Silt fencing should be repaired or replaced when damaged and sediment should be removed when buildup reaches 6 inches. Silt should be removed from rock berms when greater than 6 inches of sediment is retained or when berms are clogged.

The site will be authorized to discharge stormwater under the TPDES General Permit No. TXR050000 for industrial activities. Requirements of the general permit include maintaining a SWP3 which includes inspections of stormwater best management practices and sampling of stormwater that is discharged from the site. Trash should be removed and any eroded areas should be reseeded.

If it becomes necessary, mine dewatering will be accomplished according to the TCEQ stormwater regulations noted in the TPDES General Permit No. TXR050000 under Sector J for Mineral Mining and Processing Facilities.

**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**Temporary Stormwater Section (TCEQ-0602)  
Attachment J**

**Schedule of Soil Stabilization Practices**

Stabilization measures must be initiated as soon as practical in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently cease is precluded by weather conditions, stabilization measures shall be initiated as soon as practical. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of the site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures must be initiated as soon as practicable.

Examples of soil stabilization practices may include establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, natural vegetative buffers, protection of trees, preservation of mature vegetation, and other appropriate measures. Soil stabilization practices to be implemented at this site include establishment of permanent vegetation by seeding native grasses and the proposed impervious surfaces.



# Permanent Stormwater Section

## Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(li), (E), and (5), Effective June 1, 1999

**To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.**

**Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.**

## Signature


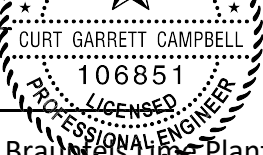
To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This **Permanent Stormwater Section** is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Curt G. Campbell, P.E.

TX License No. 106851 | TX Firm No. 4524

Date: 5/31/2023

Signature of Customer/Agent:

Regulated Entity Name: New Braunfels WWT Plant

## Permanent Best Management Practices (BMPs)

**Permanent best management practices and measures that will be used during and after construction is completed.**

- Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.  
 N/A
- 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: \_\_\_\_\_
- N/A
3.  Owners must ensure 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.
- N/A
4. 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.
- The site will be used for low density single-family residential development and has 20% or less impervious cover.
- The site will be used for low density single-family residential development but has more than 20% impervious cover.
- The site will not be used for low density single-family residential development.
5. 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 A - 20% or Less Impervious Cover Waiver.** The 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 attached.
- The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
- The site will not be used for multi-family residential developments, schools, or small business sites.
6.  **Attachment B - 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 attached.
  - No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.
  - 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, and an explanation is attached.
7.  **Attachment C - 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 attached.
  - 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, and an explanation is attached.
8.  **Attachment D - BMPs for Surface Streams.** A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
- N/A
9.  The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
- The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.
  - Attachment E - Request to Seal Features.** A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10.  **Attachment F - Construction Plans.** All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
- Design calculations (TSS removal calculations)
  - TCEQ construction notes
  - All geologic features
  - All proposed structural BMP(s) plans and specifications
- N/A

11.  **Attachment G - Inspection, Maintenance, Repair and Retrofit Plan.** A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:
- Prepared and certified by the engineer designing the permanent BMPs and measures
  - Signed by the owner or responsible party
  - Procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofit
  - A discussion of record keeping procedures
- N/A
12.  **Attachment H - Pilot-Scale Field Testing Plan.** Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.
- N/A
13.  **Attachment I - 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 attached. 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 increase erosion that results in water quality degradation.
- N/A

### ***Responsibility for Maintenance of Permanent BMP(s)***

***Responsibility for maintenance of best management practices and measures after construction is complete.***

14.  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.
- N/A
15.  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.
- N/A



**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**Permanent Stormwater Section (TCEQ-0600)  
Attachment B**

**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:

Permanent BMPs including compacted earthen berms, grassy swales, and an extended detention pond will be utilized to prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.

**Permanent Stormwater Section (TCEQ-0600)  
Attachment C**

**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:

Drainage that enters this site will run to the low point of the site and be collected in the extended detention pond (Pond B). Pond B is proposed to treat runoff from mechanical shop and its drainage area.

Permanent stormwater controls are those that are to remain in place after construction has been completed. At the time final construction is completed at the subject site, on-site stormwater will be treated by the pond and the grassy swale.

**Permanent Stormwater Section (TCEQ-0600)  
Attachments A, D, E, and H**

Permanent Stormwater Attachments A, D, E, and H are not required for this project. Pond B has been modified to treat the runoff upgradient from the Mechanical Shop and its drainage area. There are no changes proposed for Pond A, which was approved on 1/14/2022 (EAPP ID 13001417).

Permanent stormwater controls are those that are to remain in place after construction has been completed. At the time construction is completed at the subject site, on-site stormwater will be retained inside the quarry pits or treated by Ponds A and B.

**Lhoist North America of Texas, LLC  
New Braunfels Lime Plant**

**Permanent Stormwater Section (TCEQ-0600)  
Attachment F**

**Construction Plans**

See Site Plan.





**Permanent Stormwater Section (TCEQ-0600)**  
**Attachment G**

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

Final Earthen Berms should be inspected quarterly until stabilized with vegetation. Written documentation of these inspections should be kept during the course of construction at the project site. Significant erosion of berms should be backfilled and compacted as soon as possible.

**Extended Detention Basins:**

Extended detention basins have moderate to high maintenance requirements, depending on the extent to which future maintenance needs are anticipated during the design stage.

Responsibilities for both routine and non-routine maintenance tasks need to be clearly understood and enforced. If regular maintenance and inspections are not undertaken, the basin will not achieve its intended purposes.

There are many factors that may affect the basin's operation and that should be periodically checked. These factors can include mowing, control of pond vegetation, removal of accumulated bottom sediments, removal of debris from all inflow and outflow structures, unclogging of orifice perforations, and the upkeep of all physical structures that are within the detention pond area. One should conduct periodic inspections and after each significant storm. Remove floatable and correct erosion problems in the pond slopes and bottom. Pay particular attention to the outlet control perforations for signs of clogging. If the orifices are clogged, remove sediment and other debris. The generic aspects that must be considered in the maintenance plan for a detention facility are as follows:

- *Inspections.* Basins should be inspected at least twice a year (once during or immediately following wet weather) to evaluate facility operation. When possible, inspections should be conducted during wet weather to determine if the pond is meeting the target detention times. In particular, the extended detention control device should be regularly inspected for evidence of clogging, or conversely, for too rapid a release. If the design drawdown times are exceeded by more than 24 hours, then repairs should be scheduled immediately. The upper stage pilot channel, if any, and its flow path to the lower stage should be checked for erosion problems. During each inspection, erosion areas inside and downstream of the BMP should be identified and repaired or revegetated immediately.
  
- *Mowing.* The upper stage, side slopes, embankment, and emergency spillway of an extended detention basin must be mowed regularly to discourage woody growth and control weeds. Grass areas in and around basins should be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing of grass is performed, a mulching mower should be used, or grass clippings should be caught and removed.
  
- *Debris and Litter Removal.* Debris and litter will accumulate near the extended detention control device and should be removed during regular mowing operations and inspections.

Particular attention should be paid to floating debris that can eventually clog the control device or riser.

- *Erosion Control.* The pond side slopes, emergency spillway, and embankment all may periodically suffer from slumping and erosion, although this should not occur often if the soils are properly compacted during construction. Regrading and revegetation may be required to correct the problems. Similarly, the channel connecting an upper stage with a lower stage may periodically need to be replaced or repaired.

- *Structural Repairs and Replacement.* With each inspection, any damage to the structural elements of the system (pipes, concrete drainage structures, retaining walls, etc.) should be identified and repaired immediately. These repairs should include patching of cracked concrete, sealing of voids, and removal of vegetation from cracks and joints. The various inlet/outlet and riser works in a basin will eventually deteriorate and must be replaced. Public works experts have estimated that corrugated metal pipe (CMP) has a useful life of about 25 yr, whereas reinforced concrete barrels and risers may last from 50 to 75 yr.

- *Nuisance Control.* Standing water (not desired in an extended detention basin) or soggy conditions within the lower stage of the basin can create nuisance conditions for nearby residents. Odors, mosquitoes, weeds, and litter are all occasionally perceived to be problems. Most of these problems are generally a sign that regular inspections and maintenance are not being performed (e.g., mowing, debris removal, clearing the outlet control device).

- *Sediment Removal.* When properly designed, dry extended detention basins will accumulate quantities of sediment over time. Sediment accumulation is a serious maintenance concern in extended detention dry ponds for several reasons. First, the sediment gradually reduces available stormwater management storage capacity within the basin. Second, unlike wet extended detention basins (which have a permanent pool to conceal deposited sediments), sediment accumulation can make dry extended detention basins very unsightly. Third, and perhaps most importantly, sediment tends to accumulate around the control device. Sediment deposition increases the risk that the orifice will become clogged, and gradually reduces storage capacity reserved for pollutant removal. Sediment can also be resuspended if allowed to accumulate over time and escape through the hydraulic control to downstream channels and streams. For these reasons, accumulated sediment needs to be removed from the lower stage when sediment buildup fills 20% of the volume of the basin or at least every 10 years.

### **Grassy Swales:**

Maintenance for grassy swales is minimal and is largely aimed at keeping the grass cover dense and vigorous. Maintenance practices and schedules should be developed and included as part of the original plans to alleviate maintenance problems in the future. Recommended practices include (modified from Young et al., 1996):

- *Pest Management.* An Integrated Pest Management (IPM) Plan should be developed for vegetated areas. This plan should specify how problem insects and weeds will be controlled with minimal or no use of insecticides and herbicides.



- *Seasonal Mowing and Lawn Care.* Lawn mowing should be performed routinely, as needed, throughout the growing season. Grass height should not exceed 18 inches. Grass cuttings should be collected and disposed of offsite, or a mulching mower can be used. Regular mowing should also include weed control practices; however, herbicide use should be kept to a minimum (Urbonas et al., 1992). Healthy grass can be maintained without using fertilizers because runoff usually contains sufficient nutrients.

- *Inspection.* Inspect swales at least twice annually for erosion or damage to vegetation; however, additional inspection after periods of heavy runoff is most desirable. The swale should be checked for uniformity of grass cover, debris and litter, and areas of sediment accumulation. More frequent inspections of the grass cover during the first few years after establishment will help to determine if any problems are developing, and to plan for long-term restorative maintenance needs. Bare spots and areas of erosion identified during semi-annual inspections should be replanted and restored to meet specifications. Construction of a level spreader device may be necessary to reestablish shallow overland flow.

- *Debris and Litter Removal.* Trash tends to accumulate in swale areas, particularly along highways. Any swale structures (i.e. check dams) should be kept free of obstructions to reduce floatables being flushed downstream, and for aesthetic reasons. The need for this practice is determined through periodic inspection but should be performed no less than two times per year (Urbonas et al., 1992).

- *Sediment Removal.* Sediment accumulating near culverts and in channels needs to be removed when they build up to 3 inches at any spot or cover vegetation. Excess sediment should be removed by hand or with flat-bottomed shovels. If areas are eroded, they should be filled, compacted, and reseeded so that the final grade is level with the bottom of the swale. Sediment removal should be performed periodically, as determined through inspection.

- *Grass Reseeding and Mulching.* Healthy dense grass should be maintained in the channel and side slopes. Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during swale establishment. If possible, flow should be diverted from the damaged areas until the grass is firmly established.

- *Public Education.* Private homeowners are often responsible for roadside swale maintenance. Unfortunately, overzealous lawn care on the part of homeowners can present some problems. For example, mowing the swale too close to the ground, or excessive application of fertilizer and pesticides will all be detrimental to the performance of the swale. Pet waste can also be a problem in swales and should be removed to avoid contamination from fecal coliform and other waste-associated bacteria. The delegation of maintenance responsibilities to individual landowners is a cost benefit to the locality. However, localities should provide an active educational program to encourage the recommended practices.



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

<b>1. Reason for Submission</b> (If other is checked please describe in space provided.)	
<input type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)	
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)	<input checked="" type="checkbox"/> Other <b>WPAP Mod</b>
<b>2. Customer Reference Number</b> (if issued)	<b>3. Regulated Entity Reference Number</b> (if issued)
CN 605752088	RN 100552454

[Follow this link to search for CN or RN numbers in Central Registry\\*\\*](#)

## SECTION II: Customer Information

<b>4. General Customer Information</b>		<b>5. Effective Date for Customer Information Updates</b> (mm/dd/yyyy)	
<input type="checkbox"/> New Customer		<input type="checkbox"/> Update to Customer Information	
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)		<input type="checkbox"/> Change in Regulated Entity Ownership	
<b>The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).</b>			
<b>6. Customer Legal Name</b> (If an individual, print last name first: eg: Doe, John)		<i>If new Customer, enter previous Customer below:</i>	
Lhoist North America of Texas, LLC			
<b>7. TX SOS/CPA Filing Number</b>	<b>8. TX State Tax ID</b> (11 digits)	<b>9. Federal Tax ID</b> (9 digits)	<b>10. DUNS Number</b> (if applicable)
0803511889	17524058108		
<b>11. Type of Customer:</b>	<input type="checkbox"/> Corporation	<input type="checkbox"/> Individual	Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Other	<input type="checkbox"/> Sole Proprietorship	<input checked="" type="checkbox"/> Other: Ltd.	
<b>12. Number of Employees</b>	<b>13. Independently Owned and Operated?</b>		
<input type="checkbox"/> 0-20 <input checked="" type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
<b>14. Customer Role</b> (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following			
<input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Owner & Operator			
<input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other:			
<b>15. Mailing Address:</b>	5600 Clearfork Main Street		
	Ste 300		
	City	State	ZIP
	Fort Worth	TX	76109
		ZIP + 4	
<b>16. Country Mailing Information</b> (if outside USA)		<b>17. E-Mail Address</b> (if applicable)	
		Aaron.Jones@lhoist.com	
<b>18. Telephone Number</b>	<b>19. Extension or Code</b>	<b>20. Fax Number</b> (if applicable)	
(830) 221-1605			

## SECTION III: Regulated Entity Information

<b>21. General Regulated Entity Information</b> (If 'New Regulated Entity' is selected below this form should be accompanied by a permit application)
<input type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> Update to Regulated Entity Information
<b>The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC).</b>
<b>22. Regulated Entity Name</b> (Enter name of the site where the regulated action is taking place.)
New Braunfels Lime Plant



23. Street Address of the Regulated Entity: (No PO Boxes)	350 APG Lane						
	City	New Braunfels	State	TX	ZIP	78132	ZIP + 4
24. County	Comal						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:						
26. Nearest City			State		Nearest ZIP Code	
New Braunfels			TX		78132	
27. Latitude (N) In Decimal:		29.682222		28. Longitude (W) In Decimal:		-98.181389
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds	
29	40	56	-98	10	53	
29. Primary SIC Code (4 digits)		30. Secondary SIC Code (4 digits)		31. Primary NAICS Code (5 or 6 digits)		32. Secondary NAICS Code (5 or 6 digits)
1422				212312		
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)						
Construction Materials						
34. Mailing Address:		5600 Clearfork Main Street				
		City	Fort Worth	State	TX	ZIP
35. E-Mail Address:		Aaron.Jones@lhoist.com				
36. Telephone Number		37. Extension or Code		38. Fax Number (if applicable)		
(830) 221-1605						

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. See the Core Data Form instructions for additional guidance.

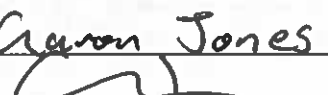
<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input checked="" type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
		13000997		
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:

**SECTION IV: Preparer Information**

40. Name:	Bobbi Bondarenko, GIT	41. Title:	Staff Geologist
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(817) 741-7324		(830) 249-8284	bbondarenko@westwardenv.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 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	Lhoist North America	Job Title:	Plant Manager
Name (In Print):	Aaron Jones	Phone:	(817) 806-1507 830-221-160
Signature:		Date:	2-22-2023

# Application Fee Form

**Texas Commission on Environmental Quality**

Name of Proposed Regulated Entity: New Braunfels Lime Plant

Regulated Entity Location: 350 APG Lane, New Braunfels, TX 78130

Name of Customer: Lhoist North America of Texas, LLC

Contact Person: Aaron Jones

Phone: 830-221-1605

Customer Reference Number (if issued): CN 605752088

Regulated Entity Reference Number (if issued): RN 100552454

**Austin Regional Office (3373)**

Hays

Travis

Williamson

**San Antonio Regional Office (3362)**

Bexar

Medina

Uvalde

Comal

Kinney

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:

Austin Regional Office

San Antonio Regional Office

Mailed to: TCEQ - Cashier

Overnight Delivery to: TCEQ - Cashier

Revenues Section

12100 Park 35 Circle

Mail Code 214

Building A, 3rd Floor

P.O. Box 13088

Austin, TX 78753

Austin, TX 78711-3088

(512)239-0357

**Site Location (Check All That Apply):**

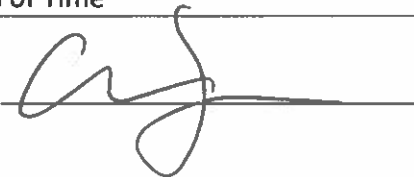
Recharge Zone

Contributing Zone

Transition Zone

<i>Type of Plan</i>	<i>Size</i>	<i>Fee Due</i>
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	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	9.3 Acres	\$ 5,000
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	\$

Signature: \_\_\_\_\_



Date: 2-22-2023



# Application Fee Schedule

Texas Commission on Environmental Quality

Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

## **Water Pollution Abatement Plans and Modifications**

### **Contributing Zone Plans and Modifications**

<i>Project</i>	<i>Project Area in Acres</i>	<i>Fee</i>
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6,500
	100 < 500	\$8,000
	≥ 500	\$10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1	\$3,000
	1 < 5	\$4,000
	5 < 10	\$5,000
	10 < 40	\$6,500
	40 < 100	\$8,000
	≥ 100	\$10,000

### **Organized Sewage Collection Systems and Modifications**

<i>Project</i>	<i>Cost per Linear Foot</i>	<i>Minimum Fee- Maximum Fee</i>
Sewage Collection Systems	\$0.50	\$650 - \$6,500

### **Underground and Aboveground Storage Tank System Facility Plans and Modifications**

<i>Project</i>	<i>Cost per Tank or Piping System</i>	<i>Minimum Fee- Maximum Fee</i>
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

### **Exception Requests**

<i>Project</i>	<i>Fee</i>
Exception Request	\$500

### **Extension of Time Requests**

<i>Project</i>	<i>Fee</i>
Extension of Time Request	\$150

# Owner Authorization Form

Texas Commission on Environmental Quality  
for Required Signature  
Edwards Aquifer Protection Program  
Relating to 30 TAC Chapter 213  
Effective June 1, 1999

## Land Owner Authorization

I, Claron Jones of CHEMICAL LIME N B LTD  
Land Owner Signatory Name Land Owner Name (Legal Entity or Individual)  
Responsible Agent  
am the owner of the property located at  
A-2 SUR- 1 J M VERAMENDI  
Legal description of the property referenced in the application

and am duly authorized in accordance with §213.4(c)(2) and §213.4(d)(1) or §213.23(c)(2) and §213.23(d) relating to the right to submit an application, signatory authority, and proof of authorized signatory.

I do hereby authorize Lhoist North America of Texas, LLC  
Applicant Name (Legal Entity or Individual)  
to conduct application for Water Pollution Abatement Plan modification  
Description of the proposed regulated activities  
at 350 APG Lane, New Braunfels, Texas 78130  
Precise location of the authorized regulated activities

## Land Owner Acknowledgement

I understand that CHEMICAL LIME N B LTD  
Land Owner Name (Legal Entity or Individual)

Is ultimately responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation even if the responsibility for compliance and the right to possess and control the property referenced in the application has been contractually assumed by another legal entity. I further understand that any failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.



**Land Owner Signature**

[Handwritten Signature]

Land Owner Signature  
*Responsible Agent*  
THE STATE OF § Texas

3-1-2023  
Date

County of § comal

BEFORE ME, the undersigned authority, on this day personally appeared Aaron Jones known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 1<sup>st</sup> day of march

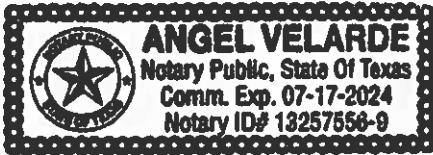
[Handwritten Signature]

NOTARY PUBLIC

Celia Angel Velarde

Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 07-17-2024



Attached: (Mark all that apply)

- Lease Agreement
- Signed Contract
- Deed Recorded Easement
- Other legally binding document

**Applicant Acknowledgement**

I, Caron Jones of Lhoist North America of Texas, LLC  
Applicant Signatory Name Applicant Name (Legal Entity or Individual)

acknowledge that CHEMICAL LIME N B LTD  
Land Owner Name (Legal Entity or Individual)

has provided Lhoist North America of Texas, LLC  
Applicant Name (Legal Entity or Individual)

with the right to possess and control the property referenced in the Edwards Aquifer protection plan.

I understand that Lhoist North America of Texas, LLC  
Applicant Name (Legal Entity or Individual)

is contractually responsible for compliance with the approved or conditionally approved Edwards Aquifer protection plan and any special conditions of the approved plan through all phases of plan implementation. I further understand that failure to comply with any condition of the executive director's approval is a violation is subject to administrative rule or orders and penalties as provided under §213.10 (relating to Enforcement). Such violation may also be subject to civil penalties and injunction.

**Applicant Signature**

[Signature]  
Applicant Signature

3-1-2023  
Date

THE STATE OF § Texas  
County of § Comal

BEFORE ME, the undersigned authority, on this day personally appeared Aaron Jones  
known to me to be the person whose name is subscribed to the foregoing instrument, and  
acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 1 day of March

[Signature]  
NOTARY PUBLIC

Celia Angel Velarde  
Typed or Printed Name of Notary



MY COMMISSION EXPIRES: 07-17-2024



**Lhoist North America of Texas, LLC**

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

I, Caron Jones, have read and understand the Inspection, Maintenance, Repair and Retrofit (IMRR) Plan contained in this Water Pollution Abatement Plan (WPAP) Modification.

I understand the specific Permanent Best Management Practices (PBMPs) and associated inspection and maintenance schedule which are outlined in this IMRR Plan. Lhoist North America of Texas, LLC will implement these inspections and perform maintenance as required to meet the intent of the IMRR Plan.

**Name and signature of responsible party for maintenance of permanent BMPs**

Print Name: Caron Jones  
Lhoist North America of Texas, LLC

Signature [Handwritten Signature]

Date: 2-22-2023

**Name and signature of Engineer**

Print Name: Curt G. Campbell, P.E.  
Westward Environmental, Inc.

Signature [Handwritten Signature] 

Date: 5/31/2023

**Agent Authorization Form**  
For Required Signature  
Edwards Aquifer Protection Program  
Relating to 30 TAC Chapter 213  
Effective June 1, 1999

I Caron Jones  
Print Name

Plant Manager  
Title - Owner/President/Other

of Lhoist North America of Texas, LLC  
Corporation/Partnership/Entity Name

have authorized: Curt G. Campbell, P.E.; Gary D. Nicholls, P.E.; Douglas S. Millsaps, P.E.;  
Vance Houy, P.E.; Nicolas E. Mercado, P.E.; and Andrea Kidd, P.E.

of Westward Environmental, Inc.  
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to \$10,000 per day per violation.
2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.
4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.
5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.



SIGNATURE PAGE:

Applicant's Signature

[Handwritten Signature]

Date 3-1-2023

THE STATE OF TEXAS §

County of Wmali §

BEFORE ME, the undersigned authority, on this day personally appeared Aaron Jones known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 1<sup>st</sup> day of March, 2023



[Handwritten Signature]  
NOTARY PUBLIC

Celia Angel Velarde  
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 07/17/2024

# Water Pollution Abatement Plan Modification Drainage Report

## New Braunfels Lime Plant

New Braunfels, Texas

Comal County

Submitted to: TCEQ Region 13, San Antonio

Prepared By:



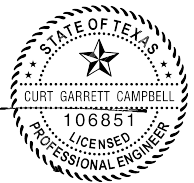
Boerne, Texas  
830-249-8284

Date: April 2023  
Project No. 11026-015  
-NEM-

Signature: \_\_\_\_\_

Curt G. Campbell, PE - License No. 106851  
TX PE Firm No. 4524

Date: 5/31/2023





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**Lhoist North America of Texas, Ltd.**  
**New Braunfels Lime Plant**  
**WPAP Modification Drainage Report**

**1 Executive Summary**

Lhoist North America of Texas, Ltd. (Lhoist) proposes to modify their previously approved Pond B design on their approximately 444-acre site in Comal County, Texas. Pond B is currently approved as a designed Batch Detention Pond. For this modification, Pond B has been redesigned as an Extended Detention Pond with a Grassy Swale. No changes are proposed for Pond A for this modification.

The purpose of the drainage report is to demonstrate compliance with TCEQ guidance for the proposed extended detention pond and grassy swale. The ponds as described in the WPAP Modification application provides an adequate treatment such that additional TSS due to the increase in impervious cover is reduced by 80%.



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## **2 Introduction**

### **2.1 Purpose**

The purpose of this report is to demonstrate the design procedure for the proposed extended detention basin Ponds B. Pond B has been designed to treat the “mechanical shop area” by raising a low crossing road, creating a retention area. The report explains the drainage area characteristics of both drainage basins, the water quality analysis, and the water quantity analysis.

### **2.2 Drainage Area Characteristics**

Pond A includes approximately 47.45 acres of impervious cover (which treats the “limestone plant area” was redesigned and approved in the previous WPAP Modification (EAPP # 13001417). For this WPAP Modification, only Pond B has been redesigned. However, impervious cover from both the limestone plant area and mechanical shop area (Drainage Basin 1 and 2 respectively) is reflected in step 1 of the TSS Removal Calculations Spread Sheet. The mechanical shop area includes approximately 9.61 acres of impervious cover. Additionally, Pond B will treat the additional approximate 7.09 acres of off-site impervious cover. The existing drainage area drains to proposed swales which directs stormwater to Pond B. The total impervious cover being treated by the two ponds is approximately 64.15 acres.

### **2.3 General Analysis Notes**

- 1) The drainage area was analyzed as an independent drainage basin.
- 2) The ponds have been designed as an extended detention pond in series with a grassy swale, which will provide a TSS removal efficiency of at least the minimum 80%.
- 3) The ponds will be located over the Edwards Aquifer Transition Zone and are not required to be lined.

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### 3 Water Quality Analysis

#### 3.1 Methodology

Water quality analysis was performed based on TCEQ technical guidance document RG-348 for best management practices over the Edward Aquifer. The water quality volume (WQV) was determined using the RG-348 excel spreadsheet as provided by TCEQ dated 04-20-2009. The spreadsheet was used to calculate the anticipated increase in TSS, due to the increase in impervious area of the project area, from the existing condition.

#### 3.2 Pond Characteristics

Pond B was designed as an extended detention pond in series with a grassy swale. The pond provides water quality treatment for approximately 28.13 acres of drainage area (20.34 acres on-site and 7.79 acres off-site), of which 16.7 acres will be considered impervious for this analysis (9.61 acres on-site and 7.09 acres off-site). The removal efficiency of an extended detention pond in series of a grassy swale is 86.375%. The required removal TSS reduction was calculated to be  $L_M = 8,623$  lbs. and was used as a desired  $L_M$ . The maximum load reduction was calculated to be  $L_R = 9,640$  lbs. The resultant fraction of annual runoff was calculated to be 0.89, which results in a rainfall depth of 1.6 inches. The on-site WQV was calculated to be 40,485 cu. ft. (0.93 ac-ft) and off-site WQV was calculated to be 33,622 cu. ft. The combined WQV with an additional 20% for storage of sediment give a total capture volume (TCV) of 88,928 cu. ft. (2.04 ac-ft).

The time of concentration was calculated as such:

##### Sheet Flow

$$T_{sh} = \frac{0.007 * (nL)^{0.8}}{P_2^{0.5} * S^{0.4}} = \frac{0.007 * (0.011 * 100)^{0.8}}{4^{0.5} * 0.008^{0.4}} = \mathbf{1.6 \text{ min.}}$$

##### Shallow Flow

$$T_{sh} = \frac{L}{V} = \frac{1447}{118} = \mathbf{12.2 \text{ min.}}$$

$$\text{where } V = K_v * S^{0.5} = 16.1 * 0.015^{0.5} = 1.97 \text{ ft/sec} = 118 \text{ ft/min}$$

##### Channel Flow

$$T_{ch} = \frac{L}{V} = \frac{881}{213.6} = \mathbf{4.1 \text{ min}}$$

$$\text{where } V = \frac{1.486 * r^{0.667} * S^{0.5}}{n} = \frac{1.486 * 0.25^{0.667} * 0.0227^{0.5}}{0.025} = 3.56 \text{ ft/sec} = 213.6 \text{ ft/min}$$

$$\text{where } r = \frac{a}{P_w} = \frac{2.5}{10} = 0.25 \text{ ft}$$

##### Total Flow

$$T_t = 1.6 + 12.2 + 4.1 = \mathbf{17.9 \text{ min.}}$$



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Storm depths were provided by the NOAA's National Weather Service Precipitation Frequency Data Server website (Station: NEW BRAUNFELS) {<https://hdsc.nws.noaa.gov/hdsc/pfds/>} and are as follows:

100-year frequency 24-hour duration:       **12.9 in.**

25-year frequency 24-hour duration:       **8.88 in.**

The storm depth values were used in a HydroCAD model when sizing the pond. The stage storage is calculated to be:

Elevation (ft)	Cum-Storage (cu. ft.)	Cum-Storage (ac-ft)	
675	0	0.000	
676	654	0.015	
677	3,530	0.081	
678	12,299	0.282	
679	29,291	0.672	
680	54,370	1.248	TCV Elevation
681	87,125	2.000	681.05
682	126,275	2.899	
683	174,051	3.996	
684	239,201	5.491	

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## **4 Water Quantity Analysis**

### **4.1 Methodology**

Pond B was analyzed for water quantity by utilizing HydroCAD software. The pond was analyzed for two design conditions. 1) a low flow condition with runoff equivalent to the WQV and 2) a high-flow condition by routing the 25-year 24-hour storm event. The low flow analysis was used to size the low outfall weir for recovery of approximately 50% of the WQV within a minimum of 24 hours. The high flow analysis was utilized to verify available freeboard and size the overflow spillway. In addition, the 100-year 24-hour event was used to analyze the spillway capacity and minimize the likelihood of berm failure.

### **4.2 Flow Analysis**

#### Low Flow Analysis

A 3-inch diameter orifice has been designed as the low flow outfall with an invert elevation of 674.50 ft.-amsl. To model the WQV, the rainfall depth was iterated until the peak volume in the pond was equal to the TCV (or 88,928 cu. ft.). After trial and error, the low flow outfall has been sized to allow approximately 55% of the TCV to leave the pond in 24 hours. In the event that an additional rainfall event would occur prior to the discharge of the full TCV, it is anticipated that the increased head resulting from the runoff would cause the remaining volume to be discharged prior to the end of the rainfall event.

#### High Flow Analysis

The pond top of bank is set at elevation 684.00 ft.-amsl. The retention berm/raised crossing road will act as the overflow spillway inverted at elevation of 681.25 ft.-amsl at the low crossing and will be 25 feet wide at the top. The overflow spillway for this pond was designed to pass the 25-year 24-hour rainfall event of 8.88 inches. The peak stage for this pond during the 25-year design storm is at elevation 682.04 ft.-amsl which is approximately 1.97 feet below the top of the pond. A 100-year 24-hour rainfall event of 12.90 inches produces a peak stage at 682.21 ft.-amsl.

### **4.3 Grassy Swales**

To meet the minimum removal efficiency, a grassy swale will be required downgradient of the low-flow outfall. After running a 1.1 inch/hour storm through the pond, the discharge into the swale was calculated to be 0.54 cfs. The swale is proposed to have a 5-foot-wide bottom with a length of 148 feet at a slope of 0.038 ft/ft. A depth of a minimum 3 feet will be proposed with side slopes proposed to be 3:1 horizontal to vertical. These dimensions and the pond discharge yielded a flow velocity of 0.47 fps, less than the maximum 1.0 fps stated in RG-348, and an average flow depth at 0.21 feet. Per RG-348, the required length is required to be  $L(\text{ft}) = V(\text{ft/s}) \times 300(\text{s})$  was calculated to be  $0.47 \times 300$  equal to 141 feet, which the swale surpasses. The swale provides a minimum 1.0 feet of freeboard for the 100-year 24-hour storm discharge, as required per RG-348.



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**5 Summary**

Pond B is redesigned as an extended detention pond in series with a grassy swale and will provide a removal efficiency of the minimum 80% based on the desired Lm for removal. Additional information on the construction and maintenance procedures for this system are included in the WPAP Mod application submittal package. This report is supplemental to that application and is not a standalone document.

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**I. TCEQ RG-348 SPREADSHEET**



Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.

Characters shown in red are data entry fields.

Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in

**1. The Required Load Reduction for the total project:**

Calculations from RG-348

Pages 3-27 to

Page 3-29 Equation 3.3:  $L_M = 27.2(A_N \times P)$

where:

$L_{M \text{ TOTAL PROJECT}}$  = Required TSS removal resulting from the proposed development

$A_N$  = Net increase in impervious area for the project

$P$  = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	<b>Comal</b>	
Total project area included in plan * =	<b>444.35</b>	acres
Predevelopment impervious area within the limits of the plan * =	<b>0.00</b>	acres
Total post-development impervious area within the limits of the plan * =	<b>52.66</b>	acres
Total post-development impervious cover fraction * =	<b>0.12</b>	
$P$ =	<b>33</b>	inches

$L_{M \text{ TOTAL PROJECT}}$  = **47270** lbs.

\* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **2**

**2. Drainage Basin Parameters (This information should be provided for each basin):**

Drainage Basin/Outfall Area No. = **2**

Total drainage basin/outfall area =	<b>20.34</b>	acres
Predevelopment impervious area within drainage basin/outfall area =	<b>0.00</b>	acres
Post-development impervious area within drainage basin/outfall area =	<b>9.61</b>	acres
Post-development impervious fraction within drainage basin/outfall area =	<b>0.47</b>	
$L_{M \text{ THIS BASIN}}$ =	<b>8623</b>	lbs.

**3. Indicate the proposed BMP Code for this basin.**

Proposed BMP = **Extended Detention**  
 Removal efficiency = **75** percent  
 Proposed BMP = **Grassy Swale**  
 Removal efficiency = **70** percent  
 Proposed BMP = **None**  
 Removal efficiency = **0** percent

- Aqualogic Car
- Bioretention
- Constructed V
- Extended Det
- Grassy Swale
- None
- Retention / Irr
- Sand Filter
- Stormceptor
- Vegetated Fil
- Vortechs
- Wet Basin
- Wet Vault
- Batch Detentic

Etot = 86.375

**4. Calculate Maximum TSS Load Removed ( $L_R$ ) for this Drainage Basin by the selected BMP Type.**

RG-348 Page 3-33 Equation 3.7:  $L_R = (\text{BMP efficiency}) \times P \times (A_i \times 34.6 + A_p \times 0.54)$

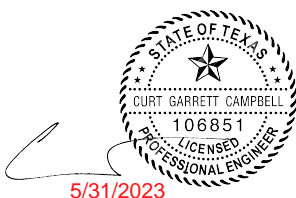
where:

$A_C$  = Total On-Site drainage area in the BMP catchment area

$A_i$  = Impervious area proposed in the BMP catchment area

$A_p$  = Pervious area remaining in the BMP catchment area

$L_R$  = TSS Load removed from this catchment area by the proposed BM



$A_C = 20.34$  acres  
 $A_I = 9.61$  acres  
 $A_P = 10.73$  acres  
 $L_R = 9640$  lbs

**5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area**

Desired  $L_{M \text{ THIS BASIN}} = 8623$  lbs.

$F = 0.89$

**6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area.**

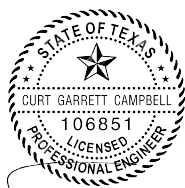

[Calculations from RG-348](#)

Rainfall Depth = **1.60** inches  
Post Development Runoff Coefficient = **0.34**  
On-site Water Quality Volume = **40485** cubic feet      0.93      ac-ft

[Calculations from RG-348](#)    [Pages 3-36 to 3-37](#)

Off-site area draining to BMP = **7.73** acres  
Off-site Impervious cover draining to BMP = **7.09** acres  
Impervious fraction of off-site area = **0.92**  
Off-site Runoff Coefficient = **0.75**  
Off-site Water Quality Volume = **33622** cubic feet

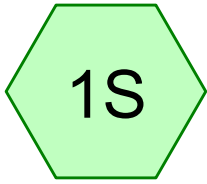
Storage for Sediment = **14821**  
**Total Capture Volume (required water quality volume(s) x 1.20) = 88928** cubic feet      2.04      ac-ft

  
  
**5/31/2023**

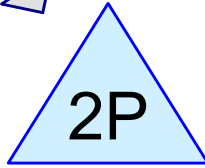
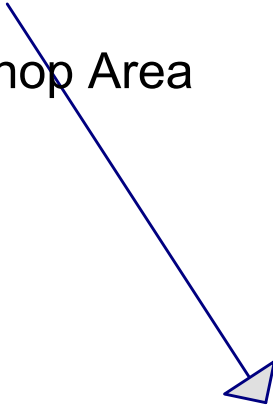


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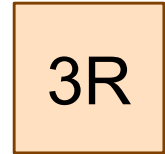
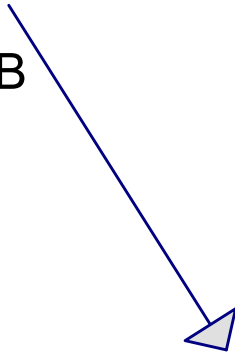
- II. HYDROCAD REPORT**
  - i. 25-YEAR 24-HOUR STORM**
  - ii. 100-YEAR 24-HOUR STORM**
  - iii. WQV DESIGN STORM**
  - iv. SWALE SIZING STORM**



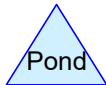
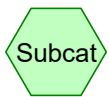
Mechanical Shop Area



Pond B



Grassy Swale





# 11026-006\_Pond B\_ALT\_Storms\_v3

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## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.090	98	Off-site_Impervious Cover (1S)
0.700	86	Off-site_Woods/grass comb., Poor, HSG D (1S)
9.610	98	On-site_Impervious Cover (1S)
10.730	86	On-site_Woods/grass comb., Poor, HSG D (1S)
1.500	100	Pond B (1S)

**Summary for Subcatchment 1S: Mechanical Shop Area**

Runoff = 254.64 cfs @ 12.09 hrs, Volume= 19.844 af, Depth= 8.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 25-Year Rainfall=8.88"

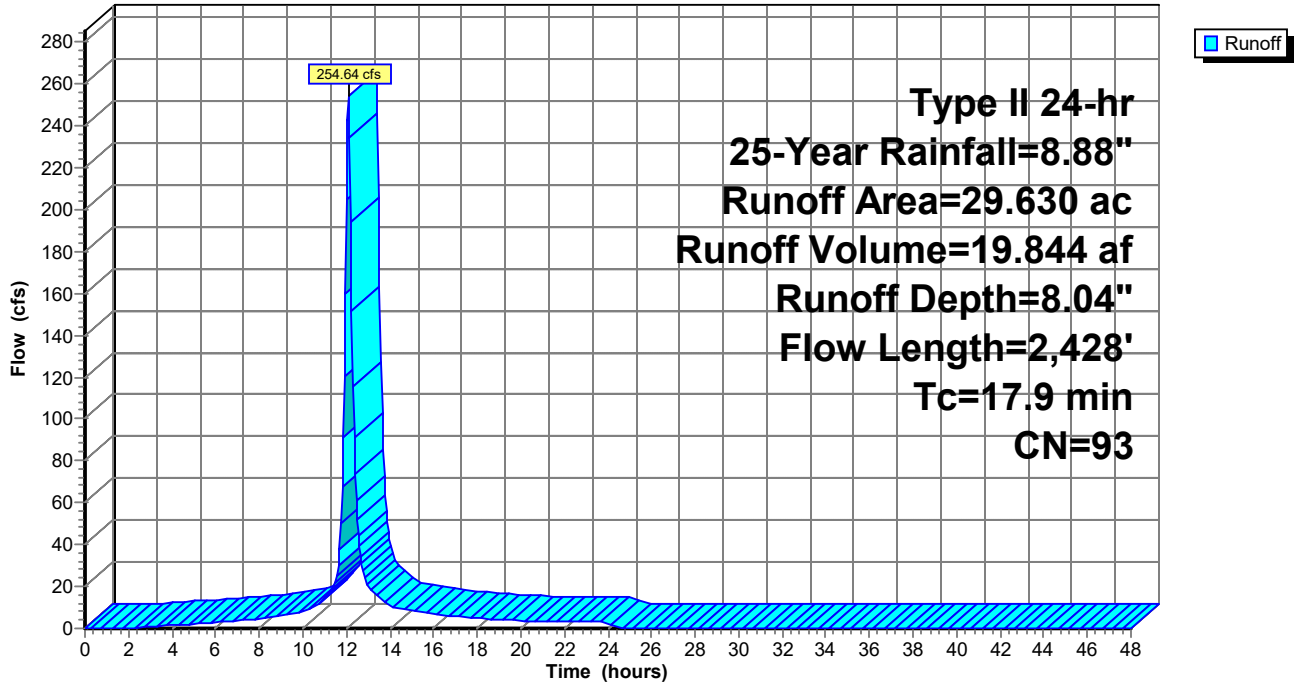
Area (ac)	CN	Description
* 0.700	86	Off-site_Woods/grass comb., Poor, HSG D
* 7.090	98	Off-site_Impervious Cover
* 10.730	86	On-site_Woods/grass comb., Poor, HSG D
* 9.610	98	On-site_Impervious Cover
* 1.500	100	Pond B
29.630	93	Weighted Average
11.430		38.58% Pervious Area
18.200		61.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0080	1.07		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 4.00"
12.2	1,447	0.0150	1.97		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.1	881	0.0227	3.55	8.89	<b>Channel Flow,</b> Area= 2.5 sf Perim= 10.0' r= 0.25' n= 0.025 Earth, clean & straight
17.9	2,428	Total			



### Subcatchment 1S: Mechanical Shop Area

Hydrograph



**11026-006\_Pond B\_ALT\_Storms\_v3**

Type II 24-hr 25-Year Rainfall=8.88"

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**Hydrograph for Subcatchment 1S: Mechanical Shop Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	8.88	8.04	0.00
0.50	0.05	0.00	0.00	26.50	8.88	8.04	0.00
1.00	0.09	0.00	0.00	27.00	8.88	8.04	0.00
1.50	0.14	0.00	0.00	27.50	8.88	8.04	0.00
2.00	0.20	0.00	0.14	28.00	8.88	8.04	0.00
2.50	0.25	0.01	0.52	28.50	8.88	8.04	0.00
3.00	0.31	0.03	0.89	29.00	8.88	8.04	0.00
3.50	0.37	0.05	1.23	29.50	8.88	8.04	0.00
4.00	0.43	0.07	1.55	30.00	8.88	8.04	0.00
4.50	0.49	0.11	1.89	30.50	8.88	8.04	0.00
5.00	0.56	0.14	2.26	31.00	8.88	8.04	0.00
5.50	0.63	0.19	2.63	31.50	8.88	8.04	0.00
6.00	0.71	0.24	3.00	32.00	8.88	8.04	0.00
6.50	0.79	0.30	3.37	32.50	8.88	8.04	0.00
7.00	0.88	0.36	3.74	33.00	8.88	8.04	0.00
7.50	0.97	0.43	4.10	33.50	8.88	8.04	0.00
8.00	1.07	0.50	4.45	34.00	8.88	8.04	0.00
8.50	1.17	0.59	5.20	34.50	8.88	8.04	0.00
9.00	1.31	0.70	6.45	35.00	8.88	8.04	0.00
9.50	1.45	0.82	7.23	35.50	8.88	8.04	0.00
10.00	1.61	0.96	8.27	36.00	8.88	8.04	0.00
10.50	1.81	1.14	10.76	36.50	8.88	8.04	0.00
11.00	2.09	1.39	14.76	37.00	8.88	8.04	0.00
11.50	2.51	1.79	23.19	37.50	8.88	8.04	0.00
12.00	5.89	5.07	<b>204.69</b>	38.00	8.88	8.04	0.00
12.50	6.53	5.70	<b>51.86</b>	38.50	8.88	8.04	0.00
13.00	6.86	6.03	20.13	39.00	8.88	8.04	0.00
13.50	7.10	6.27	14.43	39.50	8.88	8.04	0.00
14.00	7.28	6.45	11.20	40.00	8.88	8.04	0.00
14.50	7.44	6.61	9.34	40.50	8.88	8.04	0.00
15.00	7.58	6.75	8.40	41.00	8.88	8.04	0.00
15.50	7.70	6.87	7.48	41.50	8.88	8.04	0.00
16.00	7.81	6.98	6.56	42.00	8.88	8.04	0.00
16.50	7.91	7.08	5.92	42.50	8.88	8.04	0.00
17.00	8.01	7.17	5.58	43.00	8.88	8.04	0.00
17.50	8.10	7.26	5.25	43.50	8.88	8.04	0.00
18.00	8.18	7.34	4.92	44.00	8.88	8.04	0.00
18.50	8.26	7.42	4.59	44.50	8.88	8.04	0.00
19.00	8.33	7.49	4.26	45.00	8.88	8.04	0.00
19.50	8.39	7.55	3.94	45.50	8.88	8.04	0.00
20.00	8.45	7.61	3.61	46.00	8.88	8.04	0.00
20.50	8.51	7.67	3.40	46.50	8.88	8.04	0.00
21.00	8.57	7.73	3.33	47.00	8.88	8.04	0.00
21.50	8.62	7.78	3.26	47.50	8.88	8.04	0.00
22.00	8.68	7.83	3.20	48.00	8.88	8.04	0.00
22.50	8.73	7.89	3.13				
23.00	8.78	7.94	3.07				
23.50	8.83	7.99	3.00				
24.00	<b>8.88</b>	<b>8.04</b>	2.94				
24.50	8.88	8.04	0.19				
25.00	8.88	8.04	0.00				
25.50	8.88	8.04	0.00				



### Summary for Reach 3R: Grassy Swale

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth > 0.95" for 25-Year event  
 Inflow = 0.64 cfs @ 12.11 hrs, Volume= 2.353 af  
 Outflow = 0.64 cfs @ 12.13 hrs, Volume= 2.351 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 1.38 fps, Min. Travel Time= 1.8 min  
 Avg. Velocity = 1.33 fps, Avg. Travel Time= 1.8 min

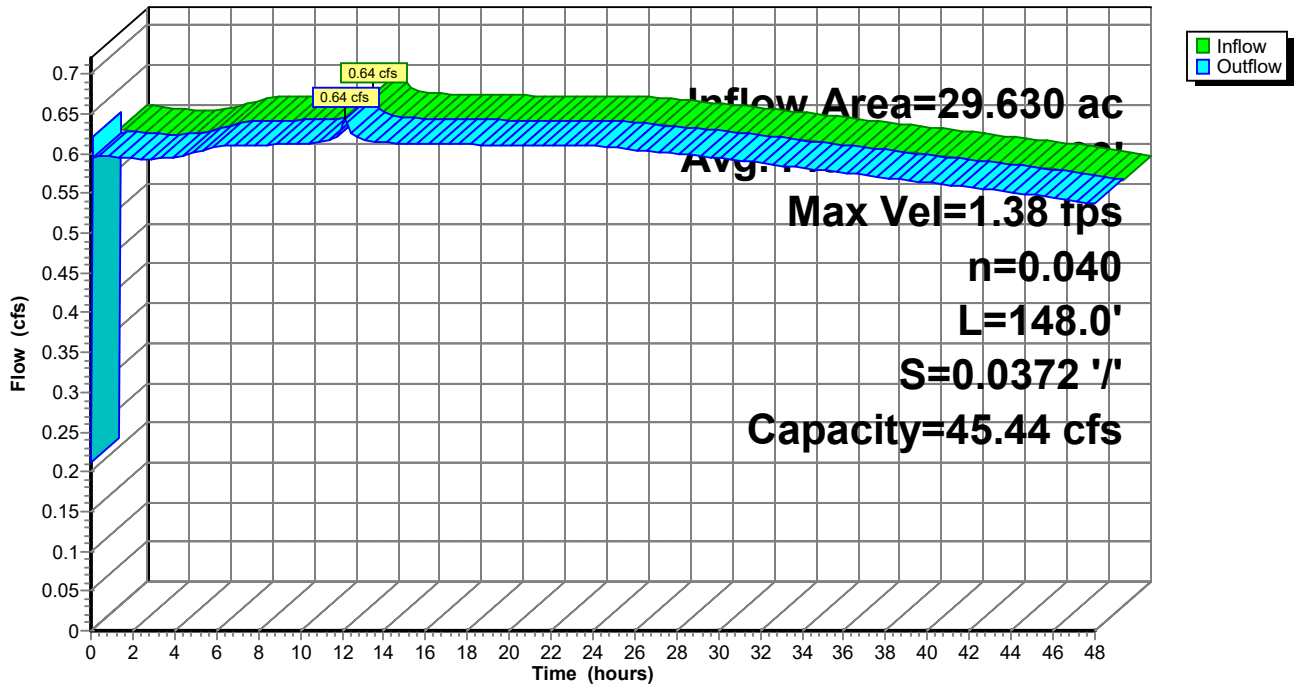
Peak Storage= 69 cf @ 12.13 hrs  
 Average Depth at Peak Storage= 0.09'  
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.44 cfs

5.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 3.0 '/' Top Width= 11.00'  
 Length= 148.0' Slope= 0.0372 '/'  
 Inlet Invert= 674.50', Outlet Invert= 669.00'



Reach 3R: Grassy Swale

Hydrograph



**Hydrograph for Reach 3R: Grassy Swale**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.60	35	674.55	0.21
1.00	0.60	66	674.58	0.60
2.00	0.59	66	674.58	0.59
3.00	0.59	66	674.58	0.59
4.00	0.60	66	674.58	0.60
5.00	0.60	66	674.59	0.60
6.00	0.61	67	674.59	0.61
7.00	0.61	67	674.59	0.61
8.00	0.61	67	674.59	0.61
9.00	0.61	67	674.59	0.61
10.00	0.61	67	674.59	0.61
11.00	0.61	67	674.59	0.61
12.00	<b>0.64</b>	<b>69</b>	<b>674.59</b>	<b>0.64</b>
13.00	<b>0.62</b>	<b>67</b>	<b>674.59</b>	<b>0.62</b>
14.00	0.61	67	674.59	0.61
15.00	0.61	67	674.59	0.61
16.00	0.61	67	674.59	0.61
17.00	0.61	67	674.59	0.61
18.00	0.61	67	674.59	0.61
19.00	0.61	67	674.59	0.61
20.00	0.61	67	674.59	0.61
21.00	0.61	67	674.59	0.61
22.00	0.61	67	674.59	0.61
23.00	0.61	67	674.59	0.61
24.00	0.61	67	674.59	0.61
25.00	0.61	67	674.59	0.61
26.00	0.61	67	674.59	0.61
27.00	0.60	66	674.59	0.60
28.00	0.60	66	674.59	0.60
29.00	0.60	66	674.58	0.60
30.00	0.59	66	674.58	0.59
31.00	0.59	66	674.58	0.59
32.00	0.59	65	674.58	0.59
33.00	0.59	65	674.58	0.59
34.00	0.58	65	674.58	0.58
35.00	0.58	65	674.58	0.58
36.00	0.58	65	674.58	0.58
37.00	0.57	64	674.58	0.57
38.00	0.57	64	674.58	0.57
39.00	0.57	64	674.58	0.57
40.00	0.56	64	674.58	0.56
41.00	0.56	64	674.58	0.56
42.00	0.56	63	674.58	0.56
43.00	0.55	63	674.58	0.55
44.00	0.55	63	674.58	0.55
45.00	0.55	63	674.58	0.55
46.00	0.54	62	674.58	0.54
47.00	0.54	62	674.58	0.54
48.00	0.54	62	674.58	0.54



**Summary for Pond 2P: Pond B**

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth = 8.04" for 25-Year event  
 Inflow = 254.64 cfs @ 12.09 hrs, Volume= 19.844 af  
 Outflow = 250.85 cfs @ 12.11 hrs, Volume= 20.770 af, Atten= 1%, Lag= 1.3 min  
 Primary = 0.64 cfs @ 12.11 hrs, Volume= 2.353 af  
 Secondary = 250.21 cfs @ 12.11 hrs, Volume= 18.418 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Starting Elev= 681.05' Surf.Area= 0.000 ac Storage= 2.045 af  
 Peak Elev= 682.04' @ 12.11 hrs Surf.Area= 0.000 ac Storage= 2.937 af (0.892 af above start)

Plug-Flow detention time= 156.9 min calculated for 18.706 af (94% of inflow)  
 Center-of-Mass det. time= 82.4 min ( 852.5 - 770.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.00'	5.491 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
675.00	0.000
676.00	0.015
677.00	0.081
678.00	0.282
679.00	0.672
680.00	1.248
681.00	2.000
682.00	2.899
683.00	3.996
684.00	5.491

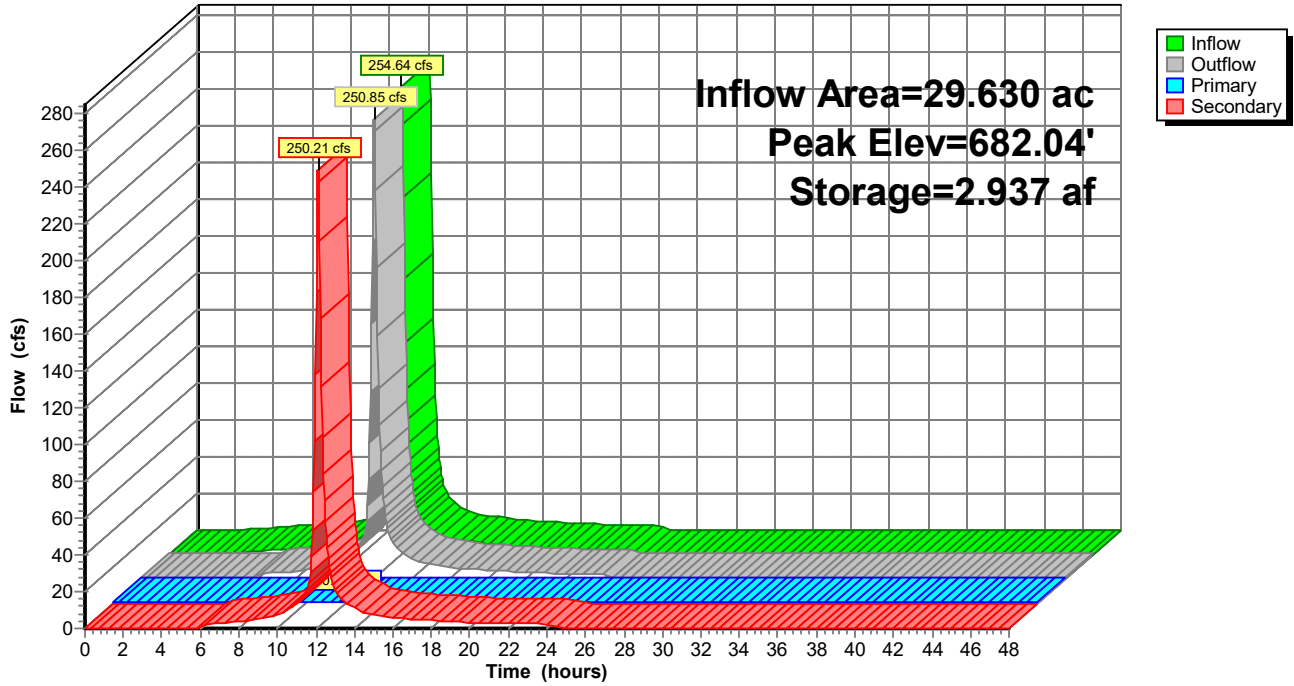
Device	Routing	Invert	Outlet Devices
#1	Primary	674.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#2	Secondary	681.25'	<b>Asymmetrical Weir, C= 3.27</b>
			Offset (feet) 0.00 31.00 61.00 96.00 165.00 228.00 366.00 470.00
			Height (feet) 2.75 1.75 0.75 0.00 0.00 0.75 1.75 2.75

**Primary OutFlow** Max=0.64 cfs @ 12.11 hrs HW=682.03' TW=674.59' (Dynamic Tailwater)  
 ↑1=Orifice/Grate (Orifice Controls 0.64 cfs @ 13.10 fps)

**Secondary OutFlow** Max=247.34 cfs @ 12.11 hrs HW=682.03' (Free Discharge)  
 ↑2=Asymmetrical Weir (Weir Controls 247.34 cfs @ 1.90 fps)

### Pond 2P: Pond B

Hydrograph





**Hydrograph for Pond 2P: Pond B**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	2.045	681.05	0.60	0.60	0.00
1.00	0.00	1.996	680.99	0.60	0.60	0.00
2.00	0.14	1.948	680.93	0.59	0.59	0.00
3.00	0.89	1.941	680.92	0.59	0.59	0.00
4.00	1.55	1.994	680.99	0.60	0.60	0.00
5.00	2.26	2.101	681.11	0.60	0.60	0.00
6.00	3.00	2.255	681.28	2.05	0.61	1.44
7.00	3.74	2.274	681.30	3.64	0.61	3.03
8.00	4.45	2.282	681.31	4.37	0.61	3.76
9.00	6.45	2.298	681.33	6.18	0.61	5.57
10.00	8.27	2.312	681.35	7.96	0.61	7.35
11.00	14.76	2.353	681.39	14.05	0.61	13.44
12.00	<b>204.69</b>	<b>2.821</b>	<b>681.91</b>	<b>183.88</b>	<b>0.64</b>	<b>183.24</b>
13.00	<b>20.13</b>	<b>2.393</b>	<b>681.44</b>	<b>21.39</b>	<b>0.62</b>	<b>20.77</b>
14.00	11.20	2.338	681.38	11.62	0.61	11.01
15.00	8.40	2.317	681.35	8.56	0.61	7.95
16.00	6.56	2.303	681.34	6.74	0.61	6.13
17.00	5.58	2.293	681.33	5.65	0.61	5.04
18.00	4.92	2.288	681.32	5.00	0.61	4.38
19.00	4.26	2.281	681.31	4.34	0.61	3.73
20.00	3.61	2.275	681.31	3.69	0.61	3.08
21.00	3.33	2.271	681.30	3.35	0.61	2.74
22.00	3.20	2.270	681.30	3.22	0.61	2.61
23.00	3.07	2.268	681.30	3.09	0.61	2.48
24.00	2.94	2.267	681.30	2.95	0.61	2.34
25.00	0.00	2.212	681.24	0.61	0.61	0.00
26.00	0.00	2.162	681.18	0.61	0.61	0.00
27.00	0.00	2.112	681.12	0.60	0.60	0.00
28.00	0.00	2.062	681.07	0.60	0.60	0.00
29.00	0.00	2.013	681.01	0.60	0.60	0.00
30.00	0.00	1.964	680.95	0.59	0.59	0.00
31.00	0.00	1.915	680.89	0.59	0.59	0.00
32.00	0.00	1.866	680.82	0.59	0.59	0.00
33.00	0.00	1.817	680.76	0.59	0.59	0.00
34.00	0.00	1.769	680.69	0.58	0.58	0.00
35.00	0.00	1.721	680.63	0.58	0.58	0.00
36.00	0.00	1.674	680.57	0.58	0.58	0.00
37.00	0.00	1.626	680.50	0.57	0.57	0.00
38.00	0.00	1.579	680.44	0.57	0.57	0.00
39.00	0.00	1.532	680.38	0.57	0.57	0.00
40.00	0.00	1.485	680.32	0.56	0.56	0.00
41.00	0.00	1.439	680.25	0.56	0.56	0.00
42.00	0.00	1.392	680.19	0.56	0.56	0.00
43.00	0.00	1.346	680.13	0.55	0.55	0.00
44.00	0.00	1.301	680.07	0.55	0.55	0.00
45.00	0.00	1.255	680.01	0.55	0.55	0.00
46.00	0.00	1.210	679.93	0.54	0.54	0.00
47.00	0.00	1.165	679.86	0.54	0.54	0.00
48.00	0.00	1.121	679.78	0.54	0.54	0.00

**Summary for Subcatchment 1S: Mechanical Shop Area**

Runoff = 374.31 cfs @ 12.09 hrs, Volume= 29.726 af, Depth=12.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 100-Year Rainfall=12.90"

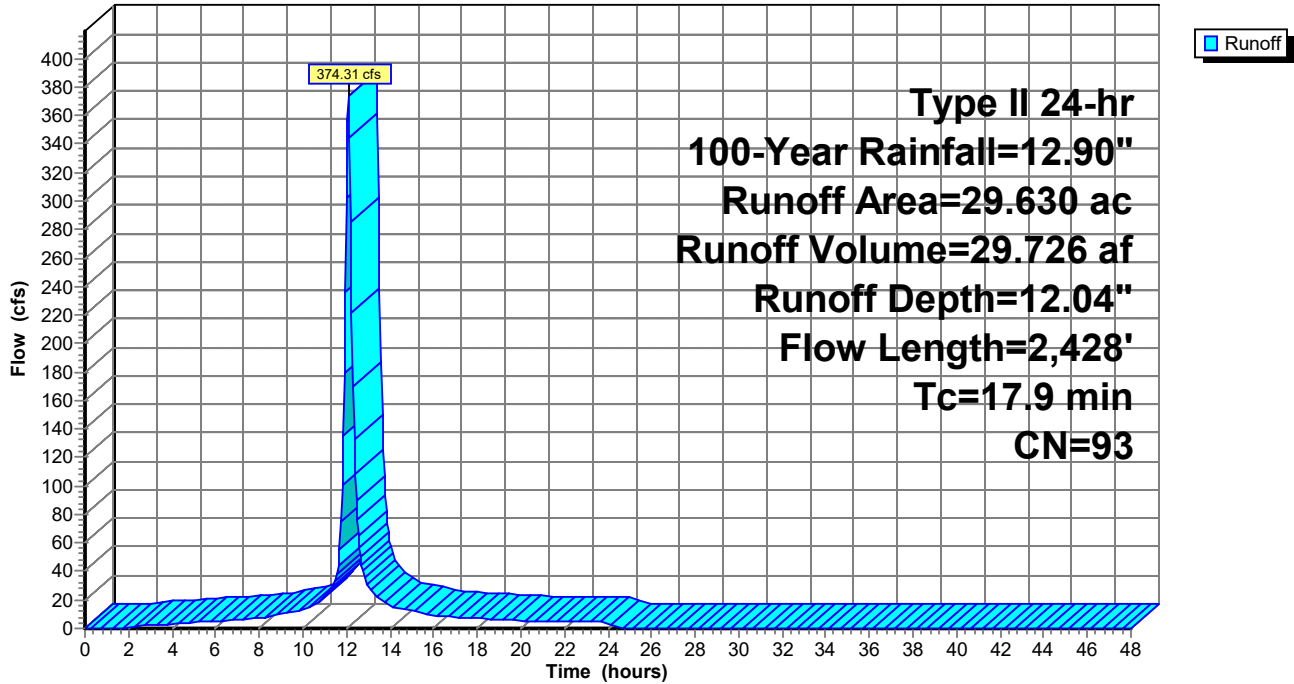
Area (ac)	CN	Description
* 0.700	86	Off-site_Woods/grass comb., Poor, HSG D
* 7.090	98	Off-site_Impervious Cover
* 10.730	86	On-site_Woods/grass comb., Poor, HSG D
* 9.610	98	On-site_Impervious Cover
* 1.500	100	Pond B
29.630	93	Weighted Average
11.430		38.58% Pervious Area
18.200		61.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0080	1.07		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 4.00"
12.2	1,447	0.0150	1.97		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.1	881	0.0227	3.55	8.89	<b>Channel Flow,</b> Area= 2.5 sf Perim= 10.0' r= 0.25' n= 0.025 Earth, clean & straight
17.9	2,428	Total			



### Subcatchment 1S: Mechanical Shop Area

Hydrograph



**Hydrograph for Subcatchment 1S: Mechanical Shop Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	12.90	12.04	0.00
0.50	0.07	0.00	0.00	26.50	12.90	12.04	0.00
1.00	0.14	0.00	0.00	27.00	12.90	12.04	0.00
1.50	0.21	0.00	0.22	27.50	12.90	12.04	0.00
2.00	0.28	0.02	0.92	28.00	12.90	12.04	0.00
2.50	0.36	0.05	1.56	28.50	12.90	12.04	0.00
3.00	0.45	0.08	2.13	29.00	12.90	12.04	0.00
3.50	0.53	0.13	2.64	29.50	12.90	12.04	0.00
4.00	0.62	0.18	3.11	30.00	12.90	12.04	0.00
4.50	0.71	0.24	3.59	30.50	12.90	12.04	0.00
5.00	0.81	0.31	4.13	31.00	12.90	12.04	0.00
5.50	0.92	0.39	4.66	31.50	12.90	12.04	0.00
6.00	1.03	0.48	5.18	32.00	12.90	12.04	0.00
6.50	1.15	0.57	5.69	32.50	12.90	12.04	0.00
7.00	1.28	0.68	6.20	33.00	12.90	12.04	0.00
7.50	1.41	0.79	6.69	33.50	12.90	12.04	0.00
8.00	1.55	0.91	7.18	34.00	12.90	12.04	0.00
8.50	1.71	1.05	8.28	34.50	12.90	12.04	0.00
9.00	1.90	1.22	10.15	35.00	12.90	12.04	0.00
9.50	2.10	1.41	11.27	35.50	12.90	12.04	0.00
10.00	2.33	1.62	12.76	36.00	12.90	12.04	0.00
10.50	2.63	1.90	16.45	36.50	12.90	12.04	0.00
11.00	3.03	2.28	22.38	37.00	12.90	12.04	0.00
11.50	3.65	2.88	34.83	37.50	12.90	12.04	0.00
12.00	8.55	7.71	<b>301.82</b>	38.00	12.90	12.04	0.00
12.50	9.48	8.63	<b>75.90</b>	38.50	12.90	12.04	0.00
13.00	9.96	9.11	29.41	39.00	12.90	12.04	0.00
13.50	10.31	9.46	21.06	39.50	12.90	12.04	0.00
14.00	10.58	9.73	16.34	40.00	12.90	12.04	0.00
14.50	10.81	9.95	13.63	40.50	12.90	12.04	0.00
15.00	11.01	10.16	12.26	41.00	12.90	12.04	0.00
15.50	11.19	10.34	10.91	41.50	12.90	12.04	0.00
16.00	11.35	10.50	9.57	42.00	12.90	12.04	0.00
16.50	11.50	10.64	8.63	42.50	12.90	12.04	0.00
17.00	11.63	10.78	8.14	43.00	12.90	12.04	0.00
17.50	11.76	10.90	7.66	43.50	12.90	12.04	0.00
18.00	11.88	11.02	7.18	44.00	12.90	12.04	0.00
18.50	11.99	11.13	6.70	44.50	12.90	12.04	0.00
19.00	12.10	11.24	6.22	45.00	12.90	12.04	0.00
19.50	12.19	11.33	5.74	45.50	12.90	12.04	0.00
20.00	12.28	11.42	5.26	46.00	12.90	12.04	0.00
20.50	12.36	11.50	4.96	46.50	12.90	12.04	0.00
21.00	12.45	11.59	4.86	47.00	12.90	12.04	0.00
21.50	12.53	11.67	4.76	47.50	12.90	12.04	0.00
22.00	12.60	11.74	4.66	48.00	12.90	12.04	0.00
22.50	12.68	11.82	4.57				
23.00	12.75	11.89	4.47				
23.50	12.83	11.97	4.38				
24.00	<b>12.90</b>	<b>12.04</b>	4.28				
24.50	12.90	12.04	0.28				
25.00	12.90	12.04	0.00				
25.50	12.90	12.04	0.00				



**Summary for Reach 3R: Grassy Swale**

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth > 0.95" for 100-Year event  
 Inflow = 0.65 cfs @ 12.11 hrs, Volume= 2.358 af  
 Outflow = 0.65 cfs @ 12.13 hrs, Volume= 2.356 af, Atten= 0%, Lag= 1.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 1.38 fps, Min. Travel Time= 1.8 min  
 Avg. Velocity = 1.33 fps, Avg. Travel Time= 1.8 min

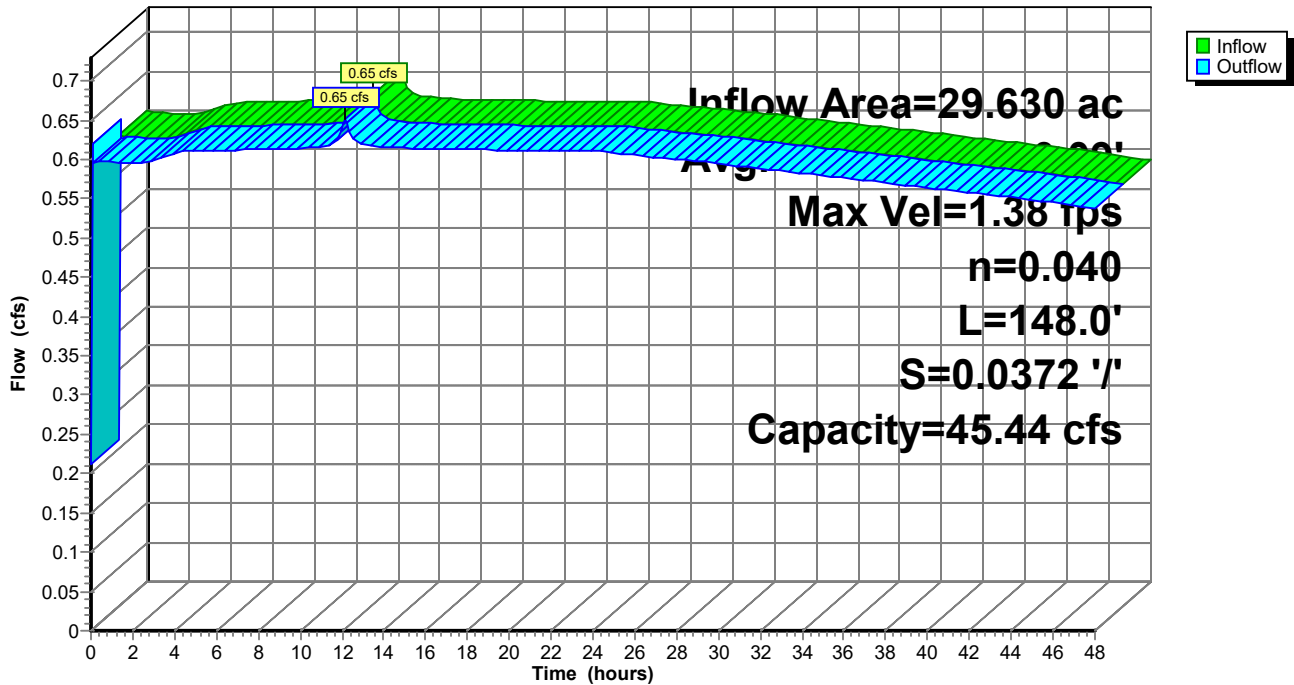
Peak Storage= 70 cf @ 12.13 hrs  
 Average Depth at Peak Storage= 0.09'  
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 45.44 cfs

5.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 3.0 '/' Top Width= 11.00'  
 Length= 148.0' Slope= 0.0372 '/'  
 Inlet Invert= 674.50', Outlet Invert= 669.00'



**Reach 3R: Grassy Swale**

Hydrograph



**11026-006\_Pond B\_ALT\_Storms\_v3**

Type II 24-hr 100-Year Rainfall=12.90"

Prepared by Westward Environmental, Inc.

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**Hydrograph for Reach 3R: Grassy Swale**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.60	35	674.55	0.21
1.00	0.60	66	674.58	0.60
2.00	0.59	66	674.58	0.59
3.00	0.60	66	674.59	0.60
4.00	0.61	67	674.59	0.61
5.00	0.61	67	674.59	0.61
6.00	0.61	67	674.59	0.61
7.00	0.61	67	674.59	0.61
8.00	0.61	67	674.59	0.61
9.00	0.61	67	674.59	0.61
10.00	0.61	67	674.59	0.61
11.00	0.62	67	674.59	0.62
12.00	<b>0.64</b>	<b>69</b>	<b>674.59</b>	<b>0.64</b>
13.00	<b>0.62</b>	<b>68</b>	<b>674.59</b>	<b>0.62</b>
14.00	0.62	67	674.59	0.62
15.00	0.61	67	674.59	0.61
16.00	0.61	67	674.59	0.61
17.00	0.61	67	674.59	0.61
18.00	0.61	67	674.59	0.61
19.00	0.61	67	674.59	0.61
20.00	0.61	67	674.59	0.61
21.00	0.61	67	674.59	0.61
22.00	0.61	67	674.59	0.61
23.00	0.61	67	674.59	0.61
24.00	0.61	67	674.59	0.61
25.00	0.61	67	674.59	0.61
26.00	0.61	67	674.59	0.61
27.00	0.60	66	674.59	0.60
28.00	0.60	66	674.59	0.60
29.00	0.60	66	674.58	0.60
30.00	0.59	66	674.58	0.59
31.00	0.59	66	674.58	0.59
32.00	0.59	65	674.58	0.59
33.00	0.59	65	674.58	0.59
34.00	0.58	65	674.58	0.58
35.00	0.58	65	674.58	0.58
36.00	0.58	65	674.58	0.58
37.00	0.57	64	674.58	0.57
38.00	0.57	64	674.58	0.57
39.00	0.57	64	674.58	0.57
40.00	0.56	64	674.58	0.56
41.00	0.56	64	674.58	0.56
42.00	0.56	63	674.58	0.56
43.00	0.55	63	674.58	0.55
44.00	0.55	63	674.58	0.55
45.00	0.55	63	674.58	0.55
46.00	0.54	62	674.58	0.54
47.00	0.54	62	674.58	0.54
48.00	0.54	62	674.58	0.54



**Summary for Pond 2P: Pond B**

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth = 12.04" for 100-Year event  
 Inflow = 374.31 cfs @ 12.09 hrs, Volume= 29.726 af  
 Outflow = 371.26 cfs @ 12.11 hrs, Volume= 30.649 af, Atten= 1%, Lag= 1.1 min  
 Primary = 0.65 cfs @ 12.11 hrs, Volume= 2.358 af  
 Secondary = 370.61 cfs @ 12.11 hrs, Volume= 28.292 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs  
 Starting Elev= 681.05' Surf.Area= 0.000 ac Storage= 2.045 af  
 Peak Elev= 682.21' @ 12.11 hrs Surf.Area= 0.000 ac Storage= 3.134 af (1.089 af above start)

Plug-Flow detention time= 112.7 min calculated for 28.575 af (96% of inflow)  
 Center-of-Mass det. time= 58.2 min ( 819.9 - 761.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.00'	5.491 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
675.00	0.000
676.00	0.015
677.00	0.081
678.00	0.282
679.00	0.672
680.00	1.248
681.00	2.000
682.00	2.899
683.00	3.996
684.00	5.491

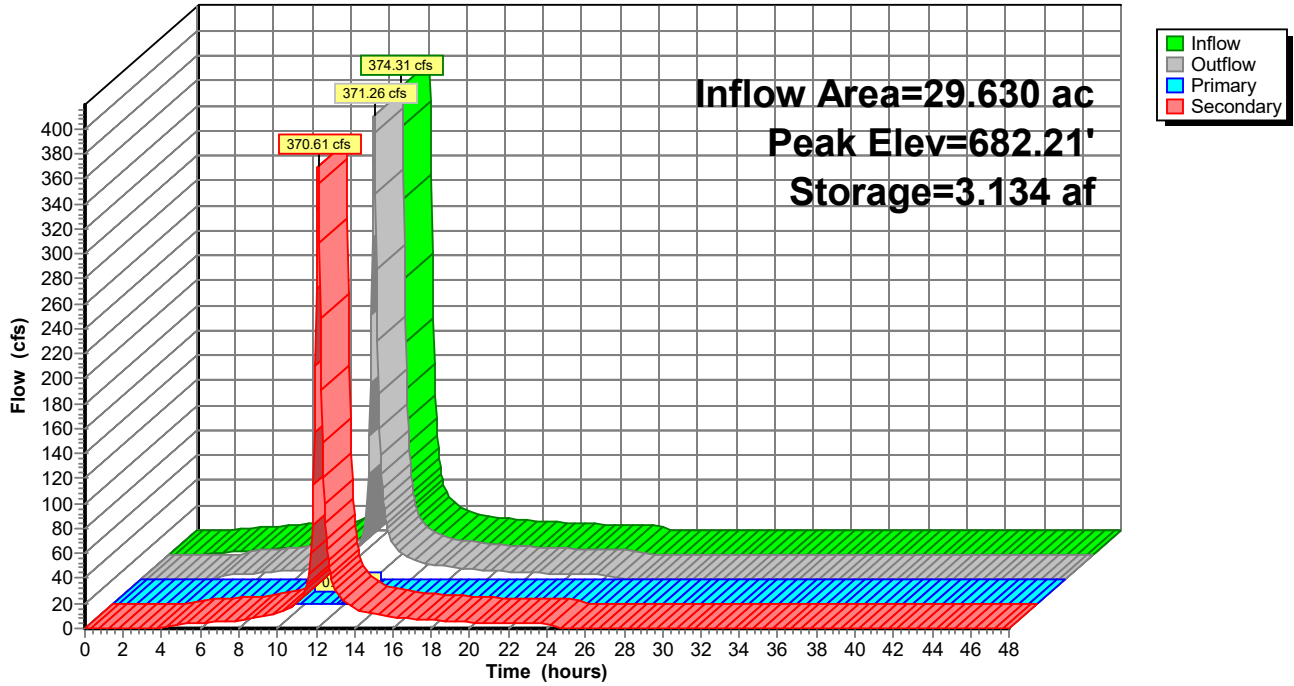
Device	Routing	Invert	Outlet Devices
#1	Primary	674.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#2	Secondary	681.25'	<b>Asymmetrical Weir, C= 3.27</b> Offset (feet) 0.00 31.00 61.00 96.00 165.00 228.00 366.00 470.00 Height (feet) 2.75 1.75 0.75 0.00 0.00 0.75 1.75 2.75

**Primary OutFlow** Max=0.65 cfs @ 12.11 hrs HW=682.21' TW=674.59' (Dynamic Tailwater)  
 ↑1=Orifice/Grate (Orifice Controls 0.65 cfs @ 13.26 fps)

**Secondary OutFlow** Max=366.45 cfs @ 12.11 hrs HW=682.21' (Free Discharge)  
 ↑2=Asymmetrical Weir (Weir Controls 366.45 cfs @ 2.19 fps)

### Pond 2P: Pond B

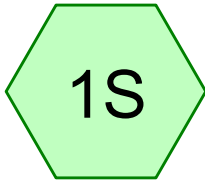
Hydrograph



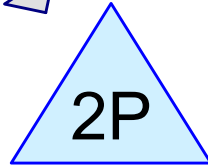
**Hydrograph for Pond 2P: Pond B**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	2.045	681.05	0.60	0.60	0.00
1.00	0.00	1.996	680.99	0.60	0.60	0.00
2.00	0.92	1.972	680.96	0.59	0.59	0.00
3.00	2.13	2.050	681.06	0.60	0.60	0.00
4.00	3.11	2.218	681.24	0.61	0.61	0.00
5.00	4.13	2.278	681.31	3.99	0.61	3.38
6.00	5.18	2.288	681.32	5.06	0.61	4.45
7.00	6.20	2.297	681.33	6.09	0.61	5.48
8.00	7.18	2.305	681.34	7.08	0.61	6.47
9.00	10.15	2.326	681.36	9.83	0.61	9.21
10.00	12.76	2.342	681.38	12.37	0.61	11.75
11.00	22.38	2.393	681.44	21.50	0.62	20.88
12.00	<b>301.82</b>	<b>2.978</b>	<b>682.07</b>	<b>273.35</b>	<b>0.64</b>	<b>272.71</b>
13.00	<b>29.41</b>	<b>2.436</b>	<b>681.49</b>	<b>30.90</b>	<b>0.62</b>	<b>30.28</b>
14.00	16.34	2.369	681.41	16.87	0.62	16.26
15.00	12.26	2.343	681.38	12.46	0.61	11.84
16.00	9.57	2.325	681.36	9.80	0.61	9.18
17.00	8.14	2.314	681.35	8.22	0.61	7.61
18.00	7.18	2.307	681.34	7.27	0.61	6.66
19.00	6.22	2.299	681.33	6.31	0.61	5.70
20.00	5.26	2.291	681.32	5.36	0.61	4.75
21.00	4.86	2.286	681.32	4.88	0.61	4.27
22.00	4.66	2.285	681.32	4.68	0.61	4.07
23.00	4.47	2.283	681.31	4.49	0.61	3.88
24.00	4.28	2.281	681.31	4.30	0.61	3.69
25.00	0.00	2.215	681.24	0.61	0.61	0.00
26.00	0.00	2.165	681.18	0.61	0.61	0.00
27.00	0.00	2.115	681.13	0.60	0.60	0.00
28.00	0.00	2.066	681.07	0.60	0.60	0.00
29.00	0.00	2.016	681.02	0.60	0.60	0.00
30.00	0.00	1.967	680.96	0.59	0.59	0.00
31.00	0.00	1.918	680.89	0.59	0.59	0.00
32.00	0.00	1.869	680.83	0.59	0.59	0.00
33.00	0.00	1.820	680.76	0.59	0.59	0.00
34.00	0.00	1.772	680.70	0.58	0.58	0.00
35.00	0.00	1.724	680.63	0.58	0.58	0.00
36.00	0.00	1.676	680.57	0.58	0.58	0.00
37.00	0.00	1.629	680.51	0.57	0.57	0.00
38.00	0.00	1.582	680.44	0.57	0.57	0.00
39.00	0.00	1.535	680.38	0.57	0.57	0.00
40.00	0.00	1.488	680.32	0.56	0.56	0.00
41.00	0.00	1.442	680.26	0.56	0.56	0.00
42.00	0.00	1.395	680.20	0.56	0.56	0.00
43.00	0.00	1.349	680.13	0.55	0.55	0.00
44.00	0.00	1.304	680.07	0.55	0.55	0.00
45.00	0.00	1.258	680.01	0.55	0.55	0.00
46.00	0.00	1.213	679.94	0.54	0.54	0.00
47.00	0.00	1.168	679.86	0.54	0.54	0.00
48.00	0.00	1.124	679.78	0.54	0.54	0.00

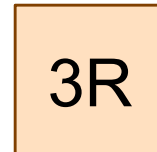




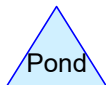
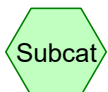
Mechanical Shop Area



Pond B



Grassy Swale



# 11026-006\_Pond B\_ALT\_WQV\_v3

Prepared by Westward Environmental, Inc.

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## Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.090	98	Off-site_Impervious Cover (1S)
0.700	86	Off-site_Woods/grass comb., Poor, HSG D (1S)
9.610	98	On-site_Impervious Cover (1S)
10.730	86	On-site_Woods/grass comb., Poor, HSG D (1S)
1.500	100	Pond B (1S)

**Summary for Subcatchment 1S: Mechanical Shop Area**

Runoff = 23.59 cfs @ 1.06 hrs, Volume= 1.308 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Constant Intensity 1.00 hrs 1.1 in/hr Rainfall=1.10"

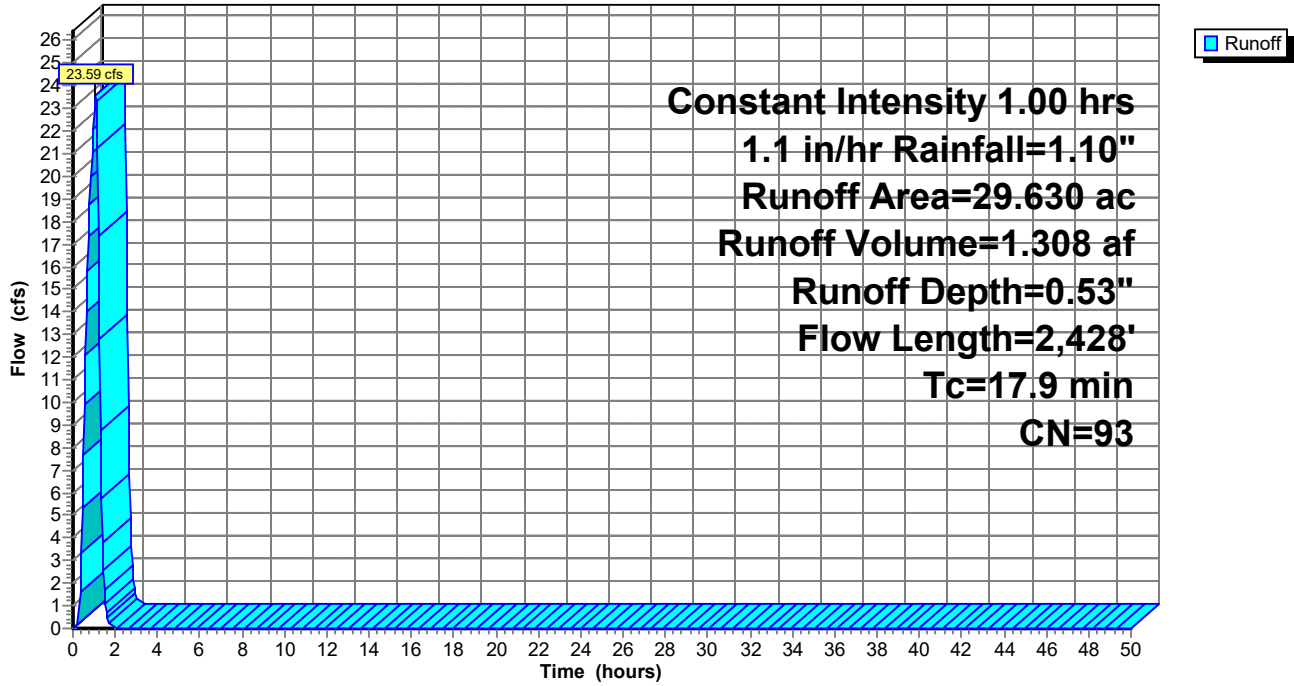
Area (ac)	CN	Description
* 0.700	86	Off-site_Woods/grass comb., Poor, HSG D
* 7.090	98	Off-site_Impervious Cover
* 10.730	86	On-site_Woods/grass comb., Poor, HSG D
* 9.610	98	On-site_Impervious Cover
* 1.500	100	Pond B
29.630	93	Weighted Average
11.430		38.58% Pervious Area
18.200		61.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0080	1.07		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 4.00"
12.2	1,447	0.0150	1.97		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.1	881	0.0227	3.55	8.89	<b>Channel Flow,</b> Area= 2.5 sf Perim= 10.0' r= 0.25' n= 0.025 Earth, clean & straight
17.9	2,428	Total			



### Subcatchment 1S: Mechanical Shop Area

Hydrograph



**Hydrograph for Subcatchment 1S: Mechanical Shop Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	1.10	0.53	0.00
0.50	0.55	0.14	7.65	26.50	1.10	0.53	0.00
1.00	<b>1.10</b>	<b>0.53</b>	<b>22.93</b>	27.00	1.10	0.53	0.00
1.50	1.10	0.53	<b>1.67</b>	27.50	1.10	0.53	0.00
2.00	1.10	0.53	0.00	28.00	1.10	0.53	0.00
2.50	1.10	0.53	0.00	28.50	1.10	0.53	0.00
3.00	1.10	0.53	0.00	29.00	1.10	0.53	0.00
3.50	1.10	0.53	0.00	29.50	1.10	0.53	0.00
4.00	1.10	0.53	0.00	30.00	1.10	0.53	0.00
4.50	1.10	0.53	0.00	30.50	1.10	0.53	0.00
5.00	1.10	0.53	0.00	31.00	1.10	0.53	0.00
5.50	1.10	0.53	0.00	31.50	1.10	0.53	0.00
6.00	1.10	0.53	0.00	32.00	1.10	0.53	0.00
6.50	1.10	0.53	0.00	32.50	1.10	0.53	0.00
7.00	1.10	0.53	0.00	33.00	1.10	0.53	0.00
7.50	1.10	0.53	0.00	33.50	1.10	0.53	0.00
8.00	1.10	0.53	0.00	34.00	1.10	0.53	0.00
8.50	1.10	0.53	0.00	34.50	1.10	0.53	0.00
9.00	1.10	0.53	0.00	35.00	1.10	0.53	0.00
9.50	1.10	0.53	0.00	35.50	1.10	0.53	0.00
10.00	1.10	0.53	0.00	36.00	1.10	0.53	0.00
10.50	1.10	0.53	0.00	36.50	1.10	0.53	0.00
11.00	1.10	0.53	0.00	37.00	1.10	0.53	0.00
11.50	1.10	0.53	0.00	37.50	1.10	0.53	0.00
12.00	1.10	0.53	0.00	38.00	1.10	0.53	0.00
12.50	1.10	0.53	0.00	38.50	1.10	0.53	0.00
13.00	1.10	0.53	0.00	39.00	1.10	0.53	0.00
13.50	1.10	0.53	0.00	39.50	1.10	0.53	0.00
14.00	1.10	0.53	0.00	40.00	1.10	0.53	0.00
14.50	1.10	0.53	0.00	40.50	1.10	0.53	0.00
15.00	1.10	0.53	0.00	41.00	1.10	0.53	0.00
15.50	1.10	0.53	0.00	41.50	1.10	0.53	0.00
16.00	1.10	0.53	0.00	42.00	1.10	0.53	0.00
16.50	1.10	0.53	0.00	42.50	1.10	0.53	0.00
17.00	1.10	0.53	0.00	43.00	1.10	0.53	0.00
17.50	1.10	0.53	0.00	43.50	1.10	0.53	0.00
18.00	1.10	0.53	0.00	44.00	1.10	0.53	0.00
18.50	1.10	0.53	0.00	44.50	1.10	0.53	0.00
19.00	1.10	0.53	0.00	45.00	1.10	0.53	0.00
19.50	1.10	0.53	0.00	45.50	1.10	0.53	0.00
20.00	1.10	0.53	0.00	46.00	1.10	0.53	0.00
20.50	1.10	0.53	0.00	46.50	1.10	0.53	0.00
21.00	1.10	0.53	0.00	47.00	1.10	0.53	0.00
21.50	1.10	0.53	0.00	47.50	1.10	0.53	0.00
22.00	1.10	0.53	0.00	48.00	1.10	0.53	0.00
22.50	1.10	0.53	0.00	48.50	1.10	0.53	0.00
23.00	1.10	0.53	0.00	49.00	1.10	0.53	0.00
23.50	1.10	0.53	0.00	49.50	1.10	0.53	0.00
24.00	1.10	0.53	0.00	50.00	1.10	0.53	0.00
24.50	1.10	0.53	0.00				
25.00	1.10	0.53	0.00				
25.50	1.10	0.53	0.00				

### Summary for Reach 3R: Grassy Swale

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth > 0.88" for 1.1 in/hr event  
 Inflow = 0.61 cfs @ 1.10 hrs, Volume= 2.171 af  
 Outflow = 0.61 cfs @ 1.14 hrs, Volume= 2.168 af, Atten= 0%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.49 fps, Min. Travel Time= 5.1 min  
 Avg. Velocity = 0.46 fps, Avg. Travel Time= 5.4 min

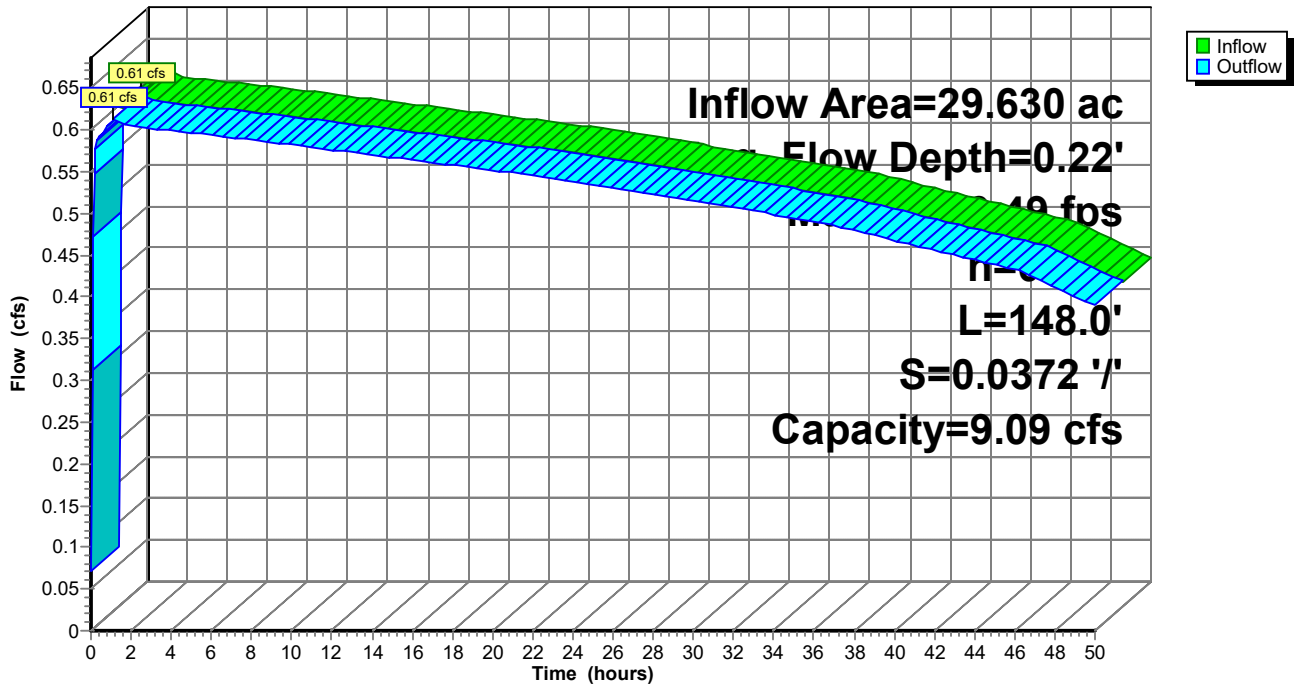
Peak Storage= 187 cf @ 1.14 hrs  
 Average Depth at Peak Storage= 0.22'  
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 9.09 cfs

5.00' x 1.00' deep channel, n= 0.200  
 Side Slope Z-value= 3.0 '/' Top Width= 11.00'  
 Length= 148.0' Slope= 0.0372 '/'  
 Inlet Invert= 674.50', Outlet Invert= 669.00'



Reach 3R: Grassy Swale

Hydrograph





**Hydrograph for Reach 3R: Grassy Swale**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.60	48	674.56	0.07
1.00	<b>0.61</b>	<b>187</b>	<b>674.72</b>	<b>0.61</b>
2.00	<b>0.60</b>	<b>185</b>	<b>674.72</b>	<b>0.60</b>
3.00	0.60	185	674.72	0.60
4.00	0.60	184	674.72	0.60
5.00	0.60	184	674.72	0.60
6.00	0.59	183	674.72	0.59
7.00	0.59	183	674.72	0.59
8.00	0.59	182	674.72	0.59
9.00	0.59	181	674.72	0.59
10.00	0.58	181	674.72	0.58
11.00	0.58	180	674.72	0.58
12.00	0.58	180	674.71	0.58
13.00	0.57	179	674.71	0.57
14.00	0.57	178	674.71	0.57
15.00	0.57	178	674.71	0.57
16.00	0.56	177	674.71	0.56
17.00	0.56	176	674.71	0.56
18.00	0.56	176	674.71	0.56
19.00	0.55	175	674.71	0.55
20.00	0.55	175	674.71	0.55
21.00	0.55	174	674.71	0.55
22.00	0.55	173	674.71	0.55
23.00	0.54	173	674.71	0.54
24.00	0.54	172	674.71	0.54
25.00	0.53	171	674.71	0.53
26.00	0.53	170	674.70	0.53
27.00	0.53	169	674.70	0.53
28.00	0.52	169	674.70	0.52
29.00	0.52	168	674.70	0.52
30.00	0.51	167	674.70	0.51
31.00	0.51	166	674.70	0.51
32.00	0.51	165	674.70	0.51
33.00	0.50	164	674.70	0.50
34.00	0.50	164	674.70	0.50
35.00	0.49	163	674.70	0.49
36.00	0.49	162	674.70	0.49
37.00	0.49	161	674.69	0.49
38.00	0.48	159	674.69	0.48
39.00	0.47	158	674.69	0.47
40.00	0.47	157	674.69	0.47
41.00	0.46	156	674.69	0.46
42.00	0.46	154	674.69	0.46
43.00	0.45	153	674.69	0.45
44.00	0.44	152	674.68	0.44
45.00	0.44	151	674.68	0.44
46.00	0.43	149	674.68	0.43
47.00	0.42	147	674.68	0.42
48.00	0.41	145	674.68	0.41
49.00	0.40	142	674.67	0.40
50.00	0.39	140	674.67	0.39

**Summary for Pond 2P: Pond B**

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth = 0.53" for 1.1 in/hr event  
 Inflow = 23.59 cfs @ 1.06 hrs, Volume= 1.308 af  
 Outflow = 23.09 cfs @ 1.10 hrs, Volume= 3.197 af, Atten= 2%, Lag= 2.4 min  
 Primary = 0.61 cfs @ 1.10 hrs, Volume= 2.171 af  
 Secondary = 22.48 cfs @ 1.10 hrs, Volume= 1.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Starting Elev= 681.05' Surf.Area= 0.000 ac Storage= 2.045 af  
 Peak Elev= 681.45' @ 1.10 hrs Surf.Area= 0.000 ac Storage= 2.401 af (0.356 af above start)

Plug-Flow detention time= 2,041.4 min calculated for 1.151 af (88% of inflow)  
 Center-of-Mass det. time= 919.5 min ( 975.6 - 56.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.00'	5.491 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
675.00	0.000
676.00	0.015
677.00	0.081
678.00	0.282
679.00	0.672
680.00	1.248
681.00	2.000
682.00	2.899
683.00	3.996
684.00	5.491

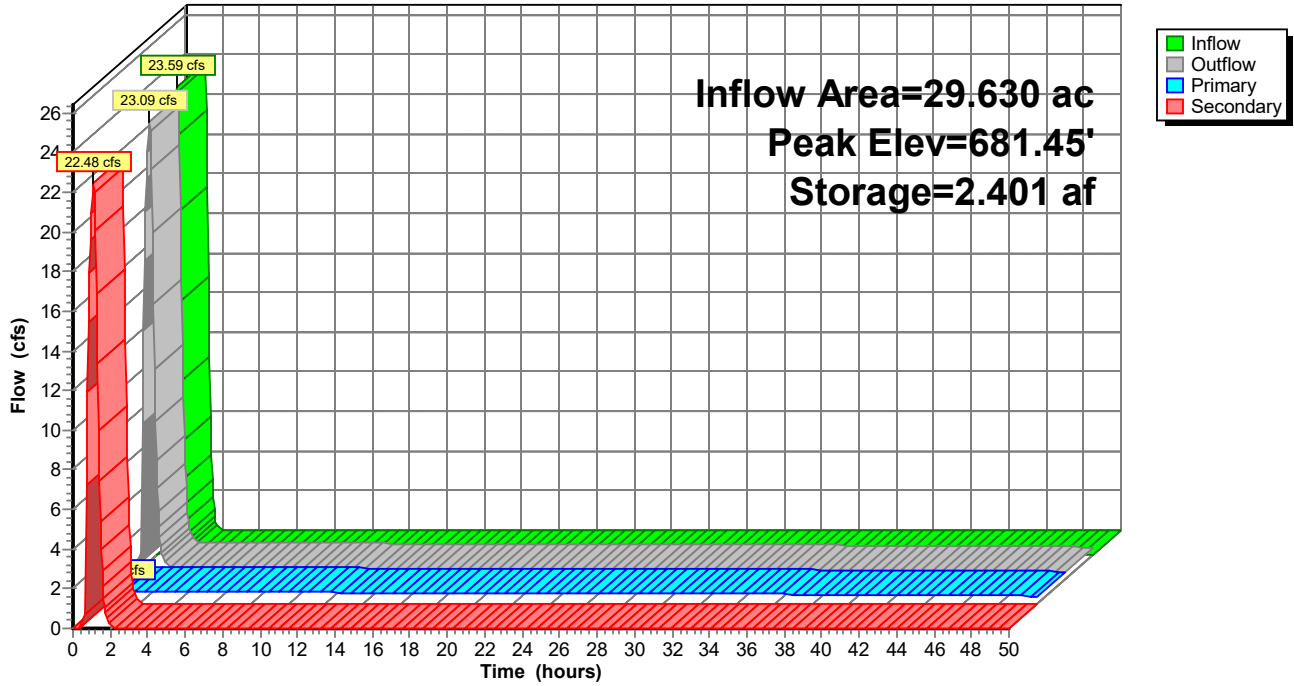
Device	Routing	Invert	Outlet Devices
#1	Primary	674.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#2	Secondary	681.25'	<b>Asymmetrical Weir, C= 3.27</b>
			Offset (feet) 0.00 31.00 61.00 96.00 165.00 228.00 366.00 470.00
			Height (feet) 2.75 1.75 0.75 0.00 0.00 0.75 1.75 2.75

**Primary OutFlow** Max=0.61 cfs @ 1.10 hrs HW=681.45' TW=674.72' (Dynamic Tailwater)  
 ↑1=Orifice/Grate (Orifice Controls 0.61 cfs @ 12.48 fps)

**Secondary OutFlow** Max=22.47 cfs @ 1.10 hrs HW=681.45' (Free Discharge)  
 ↑2=Asymmetrical Weir (Weir Controls 22.47 cfs @ 1.21 fps)

### Pond 2P: Pond B

#### Hydrograph





**Hydrograph for Pond 2P: Pond B**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	2.045	681.05	0.60	0.60	0.00
1.00	<b>22.93</b>	<b>2.393</b>	<b>681.44</b>	<b>21.57</b>	<b>0.61</b>	<b>20.95</b>
2.00	<b>0.00</b>	<b>2.227</b>	<b>681.25</b>	<b>0.63</b>	<b>0.60</b>	<b>0.03</b>
3.00	0.00	2.177	681.20	0.60	0.60	0.00
4.00	0.00	2.128	681.14	0.60	0.60	0.00
5.00	0.00	2.078	681.09	0.60	0.60	0.00
6.00	0.00	2.029	681.03	0.59	0.59	0.00
7.00	0.00	1.980	680.97	0.59	0.59	0.00
8.00	0.00	1.931	680.91	0.59	0.59	0.00
9.00	0.00	1.883	680.84	0.59	0.59	0.00
10.00	0.00	1.835	680.78	0.58	0.58	0.00
11.00	0.00	1.787	680.72	0.58	0.58	0.00
12.00	0.00	1.739	680.65	0.58	0.58	0.00
13.00	0.00	1.691	680.59	0.57	0.57	0.00
14.00	0.00	1.644	680.53	0.57	0.57	0.00
15.00	0.00	1.597	680.46	0.57	0.57	0.00
16.00	0.00	1.551	680.40	0.56	0.56	0.00
17.00	0.00	1.504	680.34	0.56	0.56	0.00
18.00	0.00	1.458	680.28	0.56	0.56	0.00
19.00	0.00	1.412	680.22	0.55	0.55	0.00
20.00	0.00	1.366	680.16	0.55	0.55	0.00
21.00	0.00	1.321	680.10	0.55	0.55	0.00
22.00	0.00	1.276	680.04	0.55	0.55	0.00
23.00	0.00	1.231	679.97	0.54	0.54	0.00
24.00	0.00	1.186	679.89	0.54	0.54	0.00
25.00	0.00	1.142	679.82	0.53	0.53	0.00
26.00	0.00	1.098	679.74	0.53	0.53	0.00
27.00	0.00	1.054	679.66	0.53	0.53	0.00
28.00	0.00	1.011	679.59	0.52	0.52	0.00
29.00	0.00	0.968	679.51	0.52	0.52	0.00
30.00	0.00	0.925	679.44	0.51	0.51	0.00
31.00	0.00	0.883	679.37	0.51	0.51	0.00
32.00	0.00	0.841	679.29	0.51	0.51	0.00
33.00	0.00	0.799	679.22	0.50	0.50	0.00
34.00	0.00	0.757	679.15	0.50	0.50	0.00
35.00	0.00	0.716	679.08	0.49	0.49	0.00
36.00	0.00	0.676	679.01	0.49	0.49	0.00
37.00	0.00	0.635	678.91	0.49	0.49	0.00
38.00	0.00	0.596	678.80	0.48	0.48	0.00
39.00	0.00	0.556	678.70	0.47	0.47	0.00
40.00	0.00	0.517	678.60	0.47	0.47	0.00
41.00	0.00	0.479	678.50	0.46	0.46	0.00
42.00	0.00	0.441	678.41	0.46	0.46	0.00
43.00	0.00	0.404	678.31	0.45	0.45	0.00
44.00	0.00	0.367	678.22	0.44	0.44	0.00
45.00	0.00	0.330	678.12	0.44	0.44	0.00
46.00	0.00	0.294	678.03	0.43	0.43	0.00
47.00	0.00	0.259	677.88	0.42	0.42	0.00
48.00	0.00	0.224	677.71	0.41	0.41	0.00
49.00	0.00	0.191	677.55	0.40	0.40	0.00
50.00	0.00	0.158	677.38	0.39	0.39	0.00

**Summary for Subcatchment 1S: Mechanical Shop Area**

Runoff = 35.71 cfs @ 1.05 hrs, Volume= 2.117 af, Depth= 0.86"

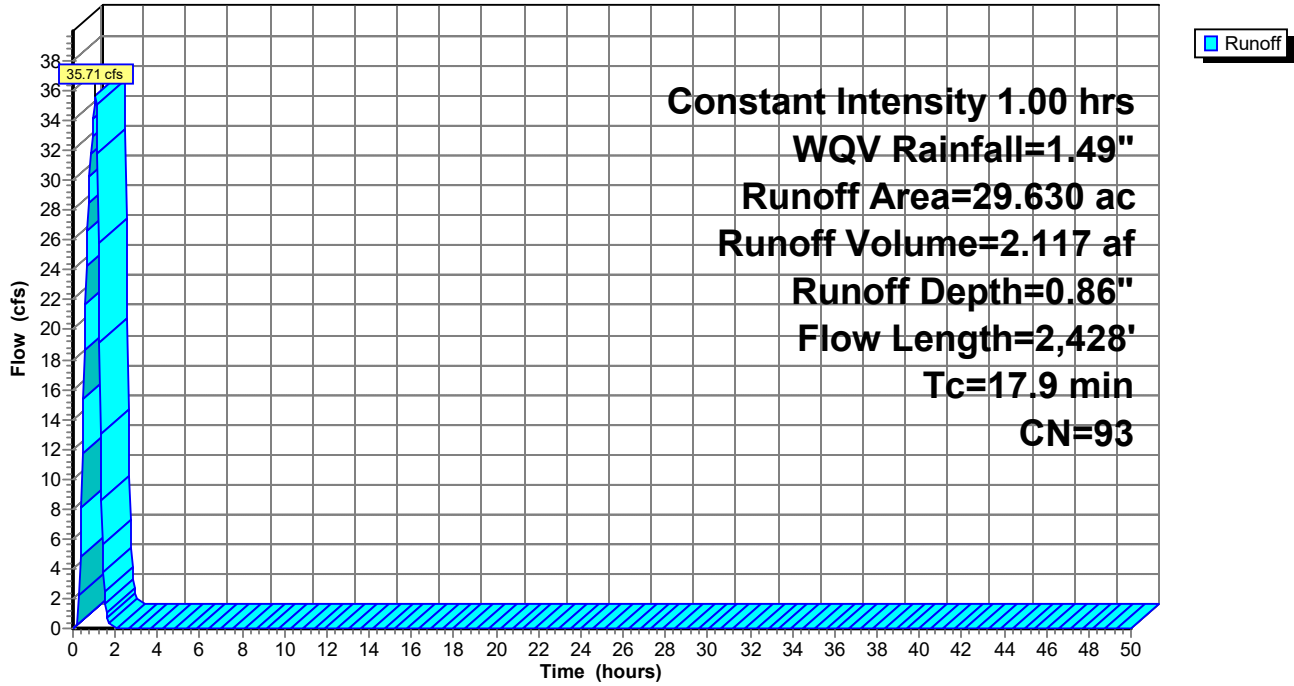
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Constant Intensity 1.00 hrs WQV Rainfall=1.49"

Area (ac)	CN	Description
* 0.700	86	Off-site_Woods/grass comb., Poor, HSG D
* 7.090	98	Off-site_Impervious Cover
* 10.730	86	On-site_Woods/grass comb., Poor, HSG D
* 9.610	98	On-site_Impervious Cover
* 1.500	100	Pond B
29.630	93	Weighted Average
11.430		38.58% Pervious Area
18.200		61.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0080	1.07		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 4.00"
12.2	1,447	0.0150	1.97		<b>Shallow Concentrated Flow,</b> Unpaved Kv= 16.1 fps
4.1	881	0.0227	3.55	8.89	<b>Channel Flow,</b> Area= 2.5 sf Perim= 10.0' r= 0.25' n= 0.025 Earth, clean & straight
17.9	2,428	Total			

### Subcatchment 1S: Mechanical Shop Area

Hydrograph





**Hydrograph for Subcatchment 1S: Mechanical Shop Area**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	1.49	0.86	0.00
0.50	0.75	0.26	15.33	26.50	1.49	0.86	0.00
1.00	<b>1.49</b>	<b>0.86</b>	<b>35.05</b>	27.00	1.49	0.86	0.00
1.50	1.49	0.86	<b>2.48</b>	27.50	1.49	0.86	0.00
2.00	1.49	0.86	0.00	28.00	1.49	0.86	0.00
2.50	1.49	0.86	0.00	28.50	1.49	0.86	0.00
3.00	1.49	0.86	0.00	29.00	1.49	0.86	0.00
3.50	1.49	0.86	0.00	29.50	1.49	0.86	0.00
4.00	1.49	0.86	0.00	30.00	1.49	0.86	0.00
4.50	1.49	0.86	0.00	30.50	1.49	0.86	0.00
5.00	1.49	0.86	0.00	31.00	1.49	0.86	0.00
5.50	1.49	0.86	0.00	31.50	1.49	0.86	0.00
6.00	1.49	0.86	0.00	32.00	1.49	0.86	0.00
6.50	1.49	0.86	0.00	32.50	1.49	0.86	0.00
7.00	1.49	0.86	0.00	33.00	1.49	0.86	0.00
7.50	1.49	0.86	0.00	33.50	1.49	0.86	0.00
8.00	1.49	0.86	0.00	34.00	1.49	0.86	0.00
8.50	1.49	0.86	0.00	34.50	1.49	0.86	0.00
9.00	1.49	0.86	0.00	35.00	1.49	0.86	0.00
9.50	1.49	0.86	0.00	35.50	1.49	0.86	0.00
10.00	1.49	0.86	0.00	36.00	1.49	0.86	0.00
10.50	1.49	0.86	0.00	36.50	1.49	0.86	0.00
11.00	1.49	0.86	0.00	37.00	1.49	0.86	0.00
11.50	1.49	0.86	0.00	37.50	1.49	0.86	0.00
12.00	1.49	0.86	0.00	38.00	1.49	0.86	0.00
12.50	1.49	0.86	0.00	38.50	1.49	0.86	0.00
13.00	1.49	0.86	0.00	39.00	1.49	0.86	0.00
13.50	1.49	0.86	0.00	39.50	1.49	0.86	0.00
14.00	1.49	0.86	0.00	40.00	1.49	0.86	0.00
14.50	1.49	0.86	0.00	40.50	1.49	0.86	0.00
15.00	1.49	0.86	0.00	41.00	1.49	0.86	0.00
15.50	1.49	0.86	0.00	41.50	1.49	0.86	0.00
16.00	1.49	0.86	0.00	42.00	1.49	0.86	0.00
16.50	1.49	0.86	0.00	42.50	1.49	0.86	0.00
17.00	1.49	0.86	0.00	43.00	1.49	0.86	0.00
17.50	1.49	0.86	0.00	43.50	1.49	0.86	0.00
18.00	1.49	0.86	0.00	44.00	1.49	0.86	0.00
18.50	1.49	0.86	0.00	44.50	1.49	0.86	0.00
19.00	1.49	0.86	0.00	45.00	1.49	0.86	0.00
19.50	1.49	0.86	0.00	45.50	1.49	0.86	0.00
20.00	1.49	0.86	0.00	46.00	1.49	0.86	0.00
20.50	1.49	0.86	0.00	46.50	1.49	0.86	0.00
21.00	1.49	0.86	0.00	47.00	1.49	0.86	0.00
21.50	1.49	0.86	0.00	47.50	1.49	0.86	0.00
22.00	1.49	0.86	0.00	48.00	1.49	0.86	0.00
22.50	1.49	0.86	0.00	48.50	1.49	0.86	0.00
23.00	1.49	0.86	0.00	49.00	1.49	0.86	0.00
23.50	1.49	0.86	0.00	49.50	1.49	0.86	0.00
24.00	1.49	0.86	0.00	50.00	1.49	0.86	0.00
24.50	1.49	0.86	0.00				
25.00	1.49	0.86	0.00				
25.50	1.49	0.86	0.00				

### Summary for Reach 3R: Grassy Swale

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth > 0.88" for WQV event  
 Inflow = 0.62 cfs @ 1.08 hrs, Volume= 2.172 af  
 Outflow = 0.62 cfs @ 1.13 hrs, Volume= 2.169 af, Atten= 0%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.49 fps, Min. Travel Time= 5.1 min  
 Avg. Velocity = 0.46 fps, Avg. Travel Time= 5.4 min

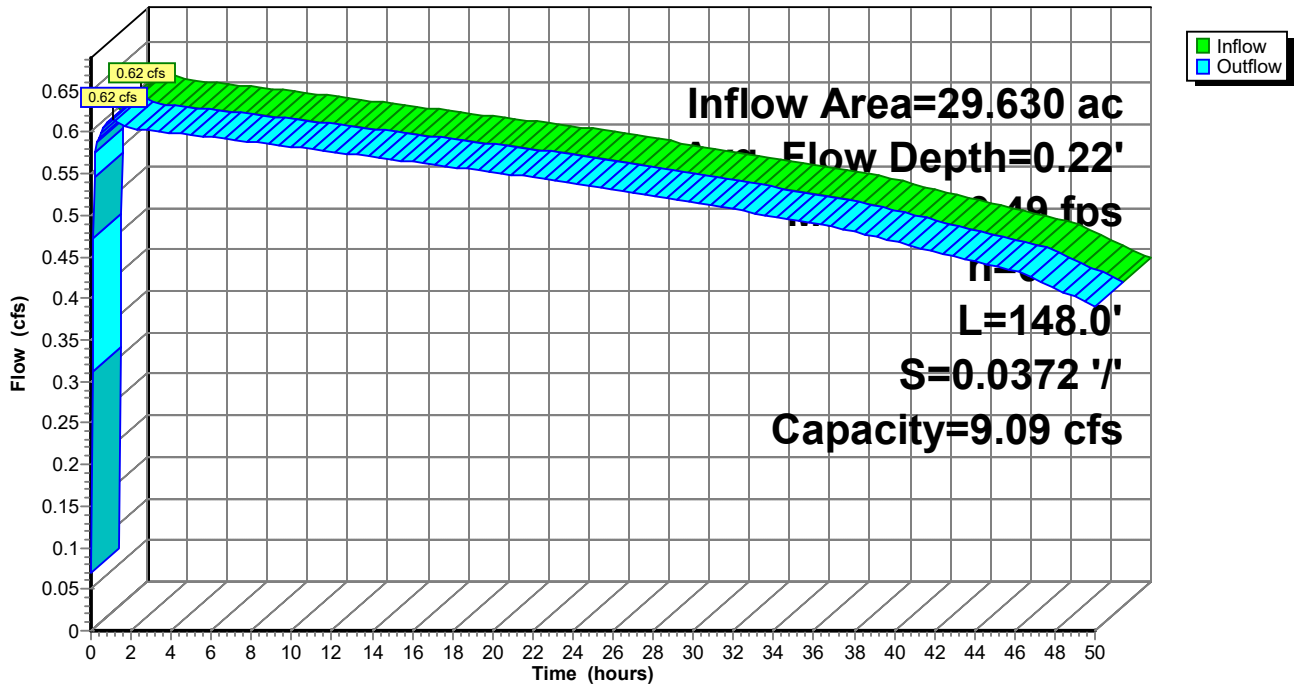
Peak Storage= 187 cf @ 1.13 hrs  
 Average Depth at Peak Storage= 0.22'  
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 9.09 cfs

5.00' x 1.00' deep channel, n= 0.200  
 Side Slope Z-value= 3.0 '/' Top Width= 11.00'  
 Length= 148.0' Slope= 0.0372 '/'  
 Inlet Invert= 674.50', Outlet Invert= 669.00'



Reach 3R: Grassy Swale

Hydrograph



## Hydrograph for Reach 3R: Grassy Swale

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)
0.00	0.60	48	674.56	0.07
1.00	<b>0.62</b>	<b>187</b>	<b>674.72</b>	<b>0.61</b>
2.00	<b>0.60</b>	<b>185</b>	<b>674.72</b>	<b>0.60</b>
3.00	0.60	185	674.72	0.60
4.00	0.60	184	674.72	0.60
5.00	0.60	184	674.72	0.60
6.00	0.59	183	674.72	0.59
7.00	0.59	183	674.72	0.59
8.00	0.59	182	674.72	0.59
9.00	0.59	181	674.72	0.59
10.00	0.58	181	674.72	0.58
11.00	0.58	180	674.72	0.58
12.00	0.58	180	674.71	0.58
13.00	0.57	179	674.71	0.57
14.00	0.57	178	674.71	0.57
15.00	0.57	178	674.71	0.57
16.00	0.56	177	674.71	0.56
17.00	0.56	177	674.71	0.56
18.00	0.56	176	674.71	0.56
19.00	0.55	175	674.71	0.55
20.00	0.55	175	674.71	0.55
21.00	0.55	174	674.71	0.55
22.00	0.55	173	674.71	0.55
23.00	0.54	173	674.71	0.54
24.00	0.54	172	674.71	0.54
25.00	0.53	171	674.71	0.53
26.00	0.53	170	674.70	0.53
27.00	0.53	169	674.70	0.53
28.00	0.52	169	674.70	0.52
29.00	0.52	168	674.70	0.52
30.00	0.51	167	674.70	0.51
31.00	0.51	166	674.70	0.51
32.00	0.51	165	674.70	0.51
33.00	0.50	164	674.70	0.50
34.00	0.50	164	674.70	0.50
35.00	0.49	163	674.70	0.50
36.00	0.49	162	674.70	0.49
37.00	0.49	161	674.69	0.49
38.00	0.48	160	674.69	0.48
39.00	0.47	158	674.69	0.47
40.00	0.47	157	674.69	0.47
41.00	0.46	156	674.69	0.46
42.00	0.46	154	674.69	0.46
43.00	0.45	153	674.69	0.45
44.00	0.44	152	674.68	0.44
45.00	0.44	151	674.68	0.44
46.00	0.43	149	674.68	0.43
47.00	0.42	147	674.68	0.42
48.00	0.41	145	674.68	0.41
49.00	0.40	142	674.67	0.40
50.00	0.39	140	674.67	0.39



**Summary for Pond 2P: Pond B**

Inflow Area = 29.630 ac, 61.42% Impervious, Inflow Depth = 0.86" for WQV event  
 Inflow = 35.71 cfs @ 1.05 hrs, Volume= 2.117 af  
 Outflow = 35.32 cfs @ 1.08 hrs, Volume= 4.005 af, Atten= 1%, Lag= 2.1 min  
 Primary = 0.62 cfs @ 1.08 hrs, Volume= 2.172 af  
 Secondary = 34.70 cfs @ 1.08 hrs, Volume= 1.833 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.05 hrs  
 Starting Elev= 681.05' Surf.Area= 0.000 ac Storage= 2.045 af  
 Peak Elev= 681.51' @ 1.08 hrs Surf.Area= 0.000 ac Storage= 2.454 af (0.409 af above start)

Plug-Flow detention time= 1,491.4 min calculated for 1.960 af (93% of inflow)  
 Center-of-Mass det. time= 736.1 min ( 790.7 - 54.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	675.00'	5.491 af	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (acre-feet)
675.00	0.000
676.00	0.015
677.00	0.081
678.00	0.282
679.00	0.672
680.00	1.248
681.00	2.000
682.00	2.899
683.00	3.996
684.00	5.491

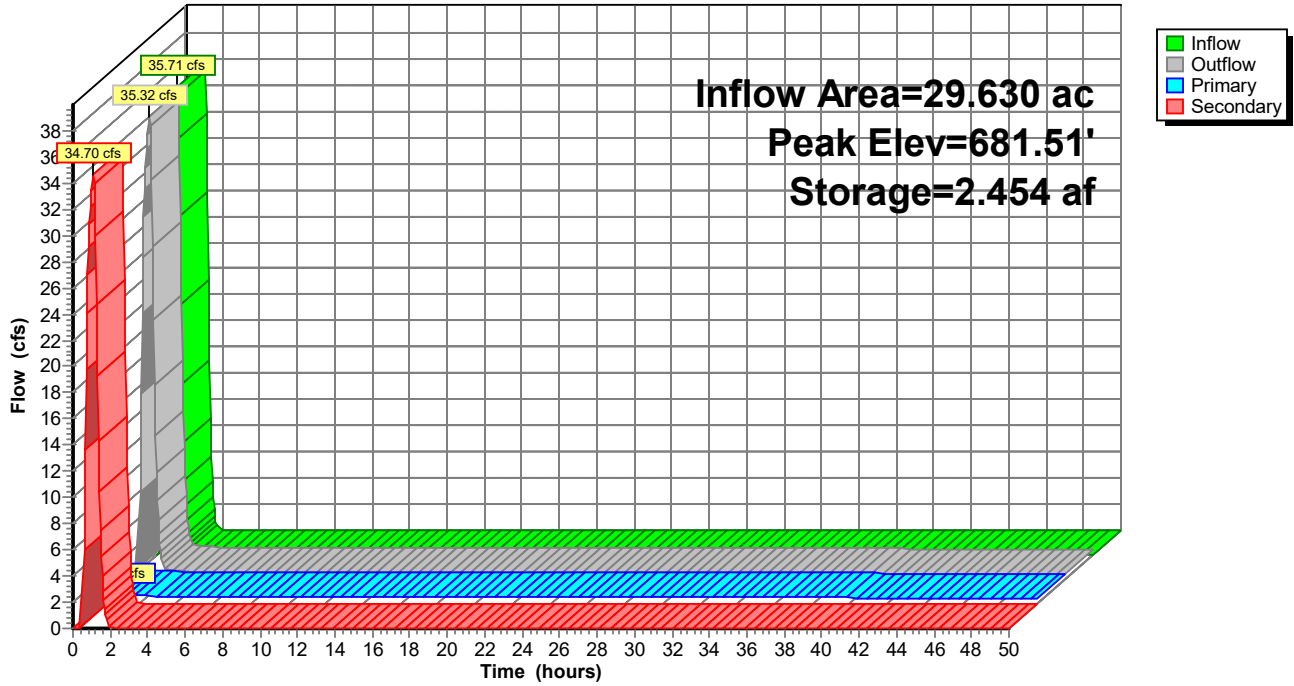
Device	Routing	Invert	Outlet Devices
#1	Primary	674.50'	<b>3.0" Vert. Orifice/Grate</b> C= 0.600
#2	Secondary	681.25'	<b>Asymmetrical Weir, C= 3.27</b>
			Offset (feet) 0.00 31.00 61.00 96.00 165.00 228.00 366.00 470.00
			Height (feet) 2.75 1.75 0.75 0.00 0.00 0.75 1.75 2.75

**Primary OutFlow** Max=0.62 cfs @ 1.08 hrs HW=681.50' TW=674.72' (Dynamic Tailwater)  
 ↑1=Orifice/Grate (Orifice Controls 0.62 cfs @ 12.54 fps)

**Secondary OutFlow** Max=34.54 cfs @ 1.08 hrs HW=681.50' (Free Discharge)  
 ↑2=Asymmetrical Weir (Weir Controls 34.54 cfs @ 1.33 fps)

### Pond 2P: Pond B

Hydrograph



**Hydrograph for Pond 2P: Pond B**

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	2.045	681.05	0.60	0.60	0.00
1.00	<b>35.05</b>	<b>2.449</b>	<b>681.50</b>	<b>34.01</b>	<b>0.62</b>	<b>33.40</b>
2.00	<b>0.00</b>	<b>2.230</b>	<b>681.26</b>	<b>0.69</b>	<b>0.60</b>	<b>0.09</b>
3.00	0.00	2.179	681.20	0.60	0.60	0.00
4.00	0.00	2.130	681.14	0.60	0.60	0.00
5.00	0.00	2.080	681.09	0.60	0.60	0.00
6.00	0.00	2.031	681.03	0.59	0.59	0.00
7.00	0.00	1.982	680.98	0.59	0.59	0.00
8.00	0.00	1.934	680.91	0.59	0.59	0.00
9.00	0.00	1.885	680.85	0.59	0.59	0.00
10.00	0.00	1.837	680.78	0.58	0.58	0.00
11.00	0.00	1.789	680.72	0.58	0.58	0.00
12.00	0.00	1.741	680.66	0.58	0.58	0.00
13.00	0.00	1.694	680.59	0.57	0.57	0.00
14.00	0.00	1.646	680.53	0.57	0.57	0.00
15.00	0.00	1.599	680.47	0.57	0.57	0.00
16.00	0.00	1.553	680.41	0.56	0.56	0.00
17.00	0.00	1.506	680.34	0.56	0.56	0.00
18.00	0.00	1.460	680.28	0.56	0.56	0.00
19.00	0.00	1.414	680.22	0.55	0.55	0.00
20.00	0.00	1.368	680.16	0.55	0.55	0.00
21.00	0.00	1.323	680.10	0.55	0.55	0.00
22.00	0.00	1.278	680.04	0.55	0.55	0.00
23.00	0.00	1.233	679.97	0.54	0.54	0.00
24.00	0.00	1.188	679.90	0.54	0.54	0.00
25.00	0.00	1.144	679.82	0.53	0.53	0.00
26.00	0.00	1.100	679.74	0.53	0.53	0.00
27.00	0.00	1.056	679.67	0.53	0.53	0.00
28.00	0.00	1.013	679.59	0.52	0.52	0.00
29.00	0.00	0.970	679.52	0.52	0.52	0.00
30.00	0.00	0.927	679.44	0.51	0.51	0.00
31.00	0.00	0.884	679.37	0.51	0.51	0.00
32.00	0.00	0.842	679.30	0.51	0.51	0.00
33.00	0.00	0.801	679.22	0.50	0.50	0.00
34.00	0.00	0.759	679.15	0.50	0.50	0.00
35.00	0.00	0.718	679.08	0.49	0.49	0.00
36.00	0.00	0.678	679.01	0.49	0.49	0.00
37.00	0.00	0.637	678.91	0.49	0.49	0.00
38.00	0.00	0.597	678.81	0.48	0.48	0.00
39.00	0.00	0.558	678.71	0.47	0.47	0.00
40.00	0.00	0.519	678.61	0.47	0.47	0.00
41.00	0.00	0.481	678.51	0.46	0.46	0.00
42.00	0.00	0.443	678.41	0.46	0.46	0.00
43.00	0.00	0.405	678.32	0.45	0.45	0.00
44.00	0.00	0.368	678.22	0.44	0.44	0.00
45.00	0.00	0.332	678.13	0.44	0.44	0.00
46.00	0.00	0.296	678.04	0.43	0.43	0.00
47.00	0.00	0.260	677.89	0.42	0.42	0.00
48.00	0.00	0.226	677.72	0.41	0.41	0.00
49.00	0.00	0.192	677.55	0.40	0.40	0.00
50.00	0.00	0.159	677.39	0.39	0.39	0.00