Bryan W. Shaw, Ph.D., *Chairman* Toby Baker, *Commissioner* Zak Covar, *Commissioner* Richard A. Hyde, P.E., *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 13, 2015

RECEIVED

FEB 1 7 2015

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

COUNTY ENGINEER

Re: PROJECT NAME: Capitol Aggregates Solms Operation, located at 5858 FM 482, New Braunfels, Texas

PLAN TYPE: Application for Contributing Zone Water Pollution Abatement Plan (CZP) 30 Texas Administration Code (TAC) Chapter 213; Edwards Aquifer Protection Program EAPP Additional ID.: 13-150021001

Dear Mr. Hornseth:

The referenced application is being forwarded to you pursuant to the Edwards Aquifer Rules. The Texas Commission on Environmental Quality (TCEQ) is required by 30 TAC Chapter 213 to provide copies of all applications to affected incorporated cities and underground water conservation districts for their comments prior to TCEQ approval. More information regarding this project may be obtained from the TCEQ Central Registry website at <u>http://www.tceq.state.tx.us/permitting/central_registry/</u>.

Please forward your comments to this office by March 13, 2015.

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

Sincerely

Todd Jones Water Section Work Leader San Antonio Regional Office

TJ/eg

TCEQ Region 13 • 14250 Judson Rd. • San Antonio, Texas 78233-4480 • 210-490-3096 • Fax 210-545-4329

Capitol Aggregates, Inc.

Water Pollution Abatement Plan (WPAP) Modification

Capitol Aggregates Solms Operation 5858 FM 482 New Braunfels, TX 78123 Comal County

RECEIVED

FEB I 7 2015

COUNTY ENGINEER

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Submitted to: TCEQ Region 13, San Antonio

Prepared By:



Boerne, Texas 830-249-8284

Date: February 2015 Project No. 10072-187 -MES- MARY ELLEN P SCHULLE 114545

TCEQ-R13

FEB 1 0 2015

SAN ANTONIO

Signature: Mary Ellen P. Schulle, PE - License No. 114545 TX PE Firm No. 4524 Date: 2/16 15

CAPITOL AGGREGATES, INC. CAPITOL AGGREGATES SOLMS OPERATION

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Agent Authorization Forms Application Fee Form Copy of Fee Check TCEQ Core Data Form Drainage Report

Texas Commission on Environmental Quality Edwards Aquifer Application Cover Page

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 <u>30 TAC 213</u>.

Administrative Review

1. <u>Edwards Aquifer applications</u> 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: <u>http://www.tceq.texas.gov/field/eapp</u>.

- 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 if not withdrawn the application will be denied and 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 to you:

- You can withdraw your application, and your fees will be refunded or credited for a resubmittal.
- 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 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 effected 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.

1. Regulated Entity N Operation	ame: Capito	l Aggre	gates S	olms	2. Regulated Entity No.: 105203939						
3. Customer Name:	Capitol Aggreg	gates, Ir	4. Customer No.: 604635722								
5. Project Type: (Please circle/check one)	New	Modi	ficatior	$\mathbf{>}$	Exter	ision	Exception				
6. Plan Type: (Please circle/check one)	WPAP CZP	SCS	UST	AST	EXP	EXT	Technical Clarification	Optional Enhanced Measures			
7. Land Use: (Please circle/check one)	Residential	Non-J	residen	tial	>	8. Sit	e (acres):	1015			
9. Application Fee:	\$10,000	10. P	ermai	nent I	BMP(s):	Earthen berms, veg. buffers & filter strips, ponds, pit				
11. SCS (Linear Ft.):	N/A	12. A	ST/US	ST (No	o. Tar	ıks):	N/A				
13. County:	County: Comal 14. Watershed:							Guadalupe River Basin			

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

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

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

	San Antonio Region												
County:	Bexar	Comal	Kinney	Medina	Uvalde								
Original (1 req.)	_	_ <u>X</u> _											
Region (1 req.)		_ <u>X_</u>											
County(ies)		<u>_X</u>											
Groundwater Conservation District(s)	Edwards Aquifer Authority Trinity-Glen Rose	<u>X</u> Edwards Aquifer Authority	Kinney	EAA Medina	EAA Uvalde								
City(ies) Jurisdiction	Castle Hills Fair Oaks Ranch Helotes Hill Country Village Hollywood Park San Antonio (SAWS) Shavano Park	Bulverde Fair Oaks Ranch Garden Ridge _X_New Braunfels Schertz	NA	San Antonio ETJ (SAWS)	NA								

I certify that to the best of my l application is hereby submitted Mary Ellen P. Schulle, PE <u>License No. 114545</u> Firm No. 2 Print Name of Customer/Auth Signature of Customer/Author	knowledge, that the applic d to TCEQ for administrat 1524 orized Agent ized Agent	ation is co ive review Date	mplete and accurate and technical rev	ATE. This iew P. SCHULLE 4545 ENSE ATEL STATES			
FOR TCEQ INTERNAL USE ONI	_Y						
Date(s)Reviewed:	Date	Administ	ratively Complete	:			
Received From:	Corr	Correct Number of Copies:					
Received By:	Dist	Distribution Date:					
EAPP File Number:	Com	Complex:					
Admin. Review(s) (No.):	No. J	AR Round	s:				
Delinquent Fees (Y/N):	Revi	ew Time S	spent:				
Lat./Long. Verified:	SOS	Customer	Verification:				
Agent Authorization Complete/Notarized (Y/N):	Гее	Paya	Payable to TCEQ (Y/N):				
Core Data Form Complete (Y/N):	Chec	k: Sign	Signed (Y/N):				
Core Data Form Incomplete Nos.:		Less	Less than 90 days old (Y/N):				

•

Water Pollution Abatement Plan Checklist

- <u>X</u> General Information Form (*TCEQ-0587*) ATTACHMENT A - Road Map ATTACHMENT B - USGS / Edwards Recharge Zone Map ATTACHMENT C - Project Description
- <u>X</u> Geologic Assessment Form (*TCEQ-0585*) ATTACHMENT A - Geologic Assessment Table (*TCEQ-0585-Table*) Comments to the Geologic Assessment Table ATTACHMENT B - Soil Profile and Narrative of Soil Units ATTACHMENT C - Stratigraphic Column ATTACHMENT D - Narrative of Site Specific Geology Site Geologic Map(s) Table or list for the position of features' latitude/longitude (if mapped using GPS)
- X Water Pollution Abatement Plan Application Form (*TCEQ-0584*) ATTACHMENT A - Factors Affecting Water Quality ATTACHMENT B - Volume and Character of Stormwater ATTACHMENT C - Suitability Letter from Authorized Agent (if OSSF is proposed) ATTACHMENT D - Exception to the Required Geologic Assessment (if requesting an exception) Site Plan
- X 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 sealing a feature ATTACHMENT F - Structural Practices 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
- X Permanent Stormwater Section (*TCEQ-0600*)

ATTACHMENT A - 20% or Less Impervious Cover Waiver, if project is multi-family residential, a school, or a small business and 20% or less impervious cover is proposed for the 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 BMPs not based on *Complying with the Edwards Aquifer Rules: Technical Guidance for BMPs*ATTACHMENT I - Measures for Minimizing Surface Stream Contamination

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

General Information Form

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

REGU COUN	ILATED ITY: <u>Co</u>	ENTITY NAMI	E: <u>Capitol Aggregates</u>	Solms Operation	n M BA	SIN: <u>Guadalupe River Basin</u>						
EDWA	RDS A	QUIFER:	X RECHARGE ZC									
PLAN	TYPE:		_X_WPAP SCS	AST UST		EXCEPTION _X_MODIFICATION						
CUST	OMER	INFORMATION	N									
1.	Custor	mer (Applicant)	:									
	Contac Entity: Mailing City, S Teleph	ct Person: g Address: tate: none:	Paul Detterline Capitol Aggregates, P.O. Box 33240 San Antonio, Texas 210-871-6145	Inc.	Zip: FAX:	78265 210-871-6923						
	Agent/Representative (If any):											
	Contac Entity: Mailing City, S Teleph	ct Person: g Address: tate: none:	Mary Ellen P. Schulle Westward Environme P.O. Box 2205 Boerne, Texas 830-249-8284	e, PE or Gary D. ental, Inc.	Nicho Zip: FAX:	NIIS, PE 78006 830-249-0221						
2.	<u>x</u>	This project is This project is <u>New Braunfels</u> This project is	inside the city limits of s outside the city limit <u>s</u> not located within any	of s but inside the y city's limits or E	ETJ (ETJ.	extra-territorial jurisdiction) of						
3.	The lo and cla for a fie	cation of the p arity so that the eld investigatio	project site is describe e TCEQ's Regional sta n.	d below. The c aff can easily loc	lescrip ate th	otion provides sufficient detail e project and site boundaries						
	<u>On the</u> Kruege	north side of H er Canyon.	FM 482, approx. 0.75 1	niles west of the	inters	ection of FM 482 &						
4.	<u>X</u>	ATTACHMEN the project site	IT A - ROAD MAP. A e is attached at the en	road map show d of this form.	ing di	rections to and the location of						

5. X ATTACHMENT B - USGS / EDWARDS RECHARGE ZONE MAP. A copy of the official 7 ¹/₂ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached behind this sheet. The map(s) should clearly show:

- X Project site.
- X USGS Quadrangle Name(s).
- X Boundaries of the Recharge Zone (and Transition Zone, if applicable).
- X Drainage path from the project to the boundary of the Recharge Zone.
- 6. X 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. The TCEQ must be able to inspect the project site or the application will be returned.
- 7. <u>X</u> ATTACHMENT C PROJECT DESCRIPTION. Attached at the end of this form is a detailed narrative description of the proposed project.

8. Existing project site conditions are noted below:

- Existing commercial site
- X Existing industrial site
- Existing residential site
- X Existing paved and/or unpaved roads
- X Undeveloped (Cleared)
- X Undeveloped (Undisturbed/Uncleared)
- ___ Other: __

PROHIBITED ACTIVITIES

- 9. <u>X</u> 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).
- 10. <u>X</u> 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

- 11. The fee for the plan(s) is based on:
 - X For a Water Pollution Abatement Plan and Modifications, the total acreage of the site where regulated activities will occur.

- ____ For an Organized Sewage Collection System Plans and Modifications, the total linear footage of all collection system lines.
- ____ For a UST Facility Plan or an AST Facility Plan, 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.
- 12. 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)
 - X San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)
- 13. <u>X</u> 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.
- 14. X 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.

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:

	TE OF TEXN
Mary Ellen P. Schulle, PE	
Print Name of Customer/Engineer	<u> </u>
TX License No. 114545 Firm No. 4524	MARY ELLEN P. SCHULLE
	114545 8:5
$\Delta \Delta \Delta$	2.00 LICENSED
	2 10 15
Signature of Customer/ Engineer	Date

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

AREA MAP





General Information Form Attachment C

Project Description

Approval for a WPAP (EAPP ID No. 2643.00) at the New Braunfels Quarry was received by Holcim (US) Inc. on July 12, 2007 to authorize a limestone quarry on the subject 1,015 acre tract of land in Comal County. The following year, a WPAP was obtained by Comal County on 21.4 acres of this same property for the Dry Comal Creek Flood Retarding Structure (FRS) (EAPP ID No. 2824.00). Capitol Aggregates, Inc. (Capitol) has since purchased the quarry operation and changed the name to the Capitol Aggregates Solms Operation. Capitol has begun removing the stockpile of excess material left from the FRS project to an off-site location. Construction of the entry/exit roads, the temporarily located crushing plant, and the initial guarry pit where the final crushing plant will be located are currently under way, as authorized by the original WPAP. This WPAP Modification is being submitted to change the quarry limits; move the proposed plant location; move the proposed paved entrance; construct truck scales with a scale house, a shop/office building, an access/haul road, on-grade and raised crossings, recycled water pond(s), Hot Mix Asphalt and Concrete Batch plants, and a stormwater treatment pond. These modifications will result in the temporary sealing and removal of three additional sensitive features. A total of 169 acres of impervious cover is proposed to be added to the property through this Modification. Approximately 96 acres of the 169 acres are located on the recharge zone and will include roads, crossings, the Hot Mix and Concrete Batch plant area, ponds, and the fueling/shop area The remaining 73 acres of proposed impervious cover are located on the Transition Zone and will include roads, process water pond area, and stockpile area. Approximately 17 acres of existing impervious cover (approximately 14 acres on the Recharge Zone and 3 acres on the Transition Zone) includes the existing paved entrance from FM 482 and ranch roads.

Best Management Practices (BMPs) approved for this facility under EAPP ID No. 2643.00 include earthen berms, rock berms, silt fencing, mulch, vegetated buffers, engineered vegetated filter strips, temporary construction entrances, and the quarry pit. Quarrying was approved to within 25 feet of the groundwater table (685 feet amsl in the southern portion and 705 feet amsl in the northern portion of the site). These BMPs will continue to be used by Capitol, along with base and paved pads for fueling and maintenance, a stormwater detention pond, a wheel wash, and a vacuum truck.

Trash generated on-site will be disposed of in a dumpster and handled by a licensed waste service. No on-site sewage facility is proposed on the Recharge Zone portion of the site at this time. Portable toilets will be used and serviced by a licensed waste company.

An aboveground storage tank (AST) plan application will be submitted in the near future to address proposed hydrocarbon storage tanks to be constructed. Approval will be obtained prior to the installation of ASTs.

(W) Westward Environmental, Inc.

Activities authorized in the previously approved WPAP such as clearing of the initial (temporary) plant area, initial quarry area and roads, as well as construction of BMPs (i.e.: earthen berms, silt fences, mulching, and construction entrance/exits) are ongoing at this time. A number of ranch roads are existing and will continue to be used for access within the site for quarry and ongoing ranching operations. Aside from the modifications proposed below, Capitol intends to continue quarry operations and BMPs on-site as described in the currently approved WPAP. Material stockpiles will be stored both on the Recharge Zone and on the Transition Zone.

A geologic assessment (GA) was conducted in October and November of 2006 at the site (approved with the original WPAP). A copy of the original GA is included in this WPAP application. Nineteen (19) of the 109 mapped features were classified as sensitive. The sensitive features are; two (2) caves, two (2) solution cavities, three (3) sink holes, one (1) solution enlarged fracture, two (2) faults, two (2) man-made features in bedrock and seven (7) zones of various types. Since the date of the original GA, three of the wells have been plugged (S-34, S-44, and S-83) three previously unknown wells (S-110 – S-112) have been discovered, and one additional Trinity Aquifer well (S-113) has been drilled. These wells are now shown on the attached WPAP Mod Existing Conditions Site Plan and an updated GA table has been included.

Sensitive features will be protected by the use of silt fences, rock berms, and earthen berms and flow to naturally occurring sensitive features will be maintained to the maximum extent possible. Because the proposed land use calls for the removal, by excavation, of the sensitive features within the quarry limits, no permanent sealing of features is requested herein. However, in order to protect water quality during construction of the quarry, sensitive features that lie within the proposed quarry area will be temporarily sealed prior to their excavation.

Capitol proposes to modify the existing WPAP at the Capitol Aggregates Solms Operation in order to:

Change the quarry limits: The total area proposed to be mined has been expanded from 613 acres, as originally approved, to 700 acres. In particular, quarrying is proposed to expand from the originally proposed boundaries on the west side of Dry Comal Creek due to Comal County's concurrence that quarrying in the inundation area of the FRS will increase the storage capacity of the reservoir created by the FRS. The quarry limits are setback to a distance of 50 feet from the northern property line. Setbacks will also be established a minimum of 25 feet from the 100-year floodplain and from any stream Floodplain and stream setbacks within the present without a mapped floodplain. quarrying limits will be temporary until approval can be obtained to mine within the floodplain. There will be no setback on the eastern and western property line where a boundary exists with other existing quarry operations, if an agreement with those entities to quarry to the property line can be obtained. BMPs such as grade breaks and berms may be put in place as necessary to prevent flow of stormwater between the neighboring properties. Otherwise a 50' setback from the east and west property lines will be established. See the attached Proposed Conditions Plan for newly proposed quarry limits.

(W) Westward Environmental, Inc.

Move the proposed plant location: The original WPAP approved the primary crushing plant on the Recharge Zone with a conveyor transporting material over to the secondary crushing plant on the Transition Zone. Capitol proposes to construct the entire plant on the Recharge Zone as shown on the attached Proposed Conditions Plan. The primary crusher will be constructed first and operate alone until the quarry pit is established. At that time, the primary crusher will be relocated into the pit and crushing will continue until there is room to construct the secondary plant, stockpiles and access roads in the pit. Runoff from each of these activities will be related in the pit. As the quarry pit expands, the primary crusher may be relocated to better facilitate operations.

Move the proposed entrance road to access the new plant location: A ranch road near the southwest corner of the Recharge Zone portion of the property was originally approved to be paved as the main entrance to the quarry pit.

This road will now remain unimproved and a new entrance is proposed to allow better access to the quarrying area. The entrance will be paved to the wheel wash. The road will be compacted base or paved from the wheel wash to the pit. Mulch and/or natural vegetation, silt fencing and earthen berms will be employed during construction to control dust and TSS. Silt fencing will be installed downgradient of this area to filter stormwater until soil stabilization has been achieved. See the attached Proposed Conditions Plan.

Construct truck scales and scale house: The original WPAP approved the construction of truck scales on the Transition Zone along with a portable building to serve as the scale house. Capitol proposes to also construct a pre-check scale in the quarry pit, as shown on the attached Proposed Conditions Plan. Silt fencing and an earthen berm will be installed downgradient of this area to treat stormwater until soil stabilization has been achieved. A berm will be established north of this area to prevent upgradient stormwater from running across.

Construct a shop/office building near the proposed plant entrance: A metal shop/office building will be constructed on a concrete foundation near the new entrance. Mulch and natural vegetation will control dust and TSS during construction. Silt fencing will be installed downgradient of this area to filter stormwater until soil stabilization has been achieved. A permanent berm will be established north of this area to prevent upgradient stormwater from running across. A combination earthen and rock berm will be installed downgradient of this area. See the attached Proposed Conditions Plan.

Construct an access road along western side of the property: To allow better access to the site, and to provide haul truck access to the future Hot Mix Asphalt and Concrete Batch plants, an access road is proposed to be constructed as shown on the attached Proposed Conditions Plan. This road will be 100 ft. wide and crowned to drain to either side. A 50 ft. natural vegetated buffer will be maintained on both sides of the road to treat runoff, except for areas where it drains back into the pit (see Proposed Conditions Plan).

Construct road crossings: To facilitate the access within the site, three crossings (Crossing 1, Crossing 2, & Crossing 3) will be constructed as shown on the attached Proposed Conditions Plan. The drainage area to Crossing 1 has been calculated to be approximately 40 acres, and the crossing will be constructed on-grade. Crossing 1 will be paved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding. The access road approaching Crossing 1 from the south will be approximately 600 feet long, with a 10% slope, and will be excavated into the limestone hillside with an engineered swale to direct drainage and mitigate erosion. This portion has been designed with a 2% cross-slope to drain runoff towards the swale to convey stormwater to the creek while reducing erosion.

Crossing 2 will be a paved bridge with four 18-inch culverts that can accommodate the 2-year storm without overtopping the road.

Crossing 3 is an existing on-grade crossing established during the installation of the pipeline that runs under the site. This crossing will be widened and improved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding.

Outside of the pit, 50-foot vegetated buffers will be maintained on either side of the roads leading up to and away from each crossing, where feasible, to treat for TSS. TSS from these crossings will also be over-treated for by the stormwater detention pond described below.

Construct a recycled water/process water ponds: This pond will supply the processing plant with fresh and/or recycled water to wash aggregate. The pond will be constructed per the attached plans, with compacted limestone berms and a clay and/or geotextile liner per RG-500. See the attached Proposed Conditions Plan for pond placement. Additional ponds may be constructed as necessary to continue quarry operations. In the future, the wash operation will be expanded to include process water ponds on the Transition Zone. Transition Zone ponds will not be lined.

Construct a Hot Mix Asphalt Plant and Concrete Batch Plant: A proposed Hot Mix Plant (HMP) and Concrete Batch Plant (CBP) will be constructed near the northern property line. This will be located in a 62 acre drainage area which includes a 55 acre pad site and a stormwater detention pond. The 55 acre pad site will be constructed to accommodate both plants and associated appurtenances. An AST Plan will be submitted in the near future to address tanks associated with the HMP. Approval will be obtained prior to the installation of tanks. This area will be accessed from the west by the 100 foot wide haul road, and from the east by a 40 foot wide road, as shown on the attached Proposed Conditions Plan. Drainage from the pad site will be treated by the stormwater detention pond as described below.

Construct a stormwater treatment pond: The stormwater detention pond will be an approximately 10 foot deep 5 acre pond, constructed near the HMP/CBP plants as shown on the attached Proposed Conditions Plan. This pond will treat runoff from the 55 acre pad site, as well as providing overtreatment for the crossings and paved areas of the January 2015 (\mathbf{W}) Westward Environmental, Inc.

entrance road and fueling/shop area. The pond will be constructed per the attached plans, with a clay and/or geotextile liner per RG-500.

Sealing and removing sensitive features: The original WPAP approved seven sensitive features located within the mining limits to be temporarily sealed and ultimately removed through mining. With this Modification and the associated change in mining limits, Capitol proposes to also seal and remove three additional sensitive features. In order to protect the aquifer from possible contamination from sediment in storm water during construction of the quarry, Capitol will temporarily seal the naturally occurring sensitive features listed above, in the same manner that was previously approved. Flow will be maintained to each of these features until such time as quarrying progresses near the feature, at which time each will be sealed with topsoil, overburden, base material or flowable fill/concrete until they are quarried out.

Capitol will obtain any other necessary permits, such as floodplain, species habitat, and/or County permits, etc. as needed before construction continues into affected areas.

(W) Westward Environmental, Inc.

Geologic Assessment

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

REGULATED ENTITY NAME: Holcim +/- 1015 Acre Site

TYPE OF PROJECT: X WPAP AST SCS UST

LOCATION OF PROJECT: X Recharge Zone Transition Zone Contributing Zone within the Transition Zone

PROJECT INFORMATION

- 1. <u>X</u> Geologic or manmade features are described and evaluated using the attached GEOLOGIC ASSESSMENT TABLE.
- 2. 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.

Soil Units, Inf Characteristics &	iltration Thicknes	* Soil Group Definitions (Abbreviated)	
Soil Name	Group*	Thicknes s (feet)	 A. Solls having a <u>htgh Infiltration</u> rate when thoroughly wetted. B. Soils having a <u>moderate infiltration</u> rate when thoroughly wetted.
Comfort – Rock (CrD)	D	<1'	
Eckrant-Rock (ErG)	Ď	1'	wetted.
Medlin-Eckrant (MED)	С	7.6'	D. Soils having a very slow infiltration rate when
Purves Clay (PuC)	C	1.5'	thoroughly wetted.
Rumple-Comfort (RUD)	C	4'	
		· .	

- 3. <u>X</u> A STRATIGRAPHIC COLUMN is attached at the end of this form that shows formations, members, and thicknesses. The outcropping unit should be at the top of the stratigraphic column.
- 4. X A NARRATIVE DESCRIPTION OF SITE SPECIFIC GEOLOGY is attached at the end of this form. The description must include a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure, and karst characteristics of the site.
- 5. X Appropriate SITE GEOLOGIC MAP(S) are attached:

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	

- 6. Method of collecting positional data:
 - X Global Positioning System (GPS) technology.

- ___ Other method(s).
- 7. <u>X</u> The project site is shown and labeled on the Site Geologic Map.
- 8. X Surface geologic units are shown and labeled on the Site Geologic Map.
- 9. X 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.
- 10. X The Recharge Zone boundary is shown and labeled, if appropriate.
- 11. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.):
 - X There are 6 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.

- 3 The wells are not in use and will be properly abandoned.
- 3 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

12. X One (1) original and three (3) copies of the completed assessment has been provided.

Date(s) Geologic Assessment was performed: October 31, November 1, 2, 7, 9, 13, 15, 20, 21, 27, 28, and 29, 2006

Date(s)

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.

_Thomas O. Mathews II, P.G. #5321	830-249-8284
Print Name of Geologist	Telephone
Torfactor	Fax 4-3-07
Signature of Geologist	Date 5321
Representing: Westward Environmental, Inc. (Name of Company)	CENSED THE CERSENT

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

GEOL	OGIC ASS	ESSMENT	TABL	E		PROJECT NAME:														
	LOCATIC	N					FEA	TUR	E CHARACT	ERI	STICS				EVA	ALUAT	ION	P	HYSI	CALSETTING
ΪΆ	18*	10*	2Ą	28·	3		4		5	.5A	G	7	ăĄ	5B	9	1	10.		ų	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	<i>Pont</i> as	FORMATICH	DIK E	сиона)	FEET)	TREND (DEGREES)	0.014	DENSITY (NOFT)	APERTURE (FEET)	INFILL	RELATIVE DIFILTRATION	TOTAL	SENS	สนารา	CATCHUA (AC	енгалел Reg)	TOPOGRAPHY
						х	Y	z		-10						~10	>40	<1.5	<u>>1.6</u> ·	
S-1	29 39.85	98 12 59	O-VR	5	Кер	20	3		N14W				0	11	36	Х			X	STREAMBED
S-2	29 39.84	98 12.59	CD	5	Кер	30	7	3	N17E				0	7	12	Х			Х	STREAMBED
S-3	29 39.85	98 12.57	CD	5	Кер	7	10	0.7	N24W				0	9	14	Х			X	STREAMBED
S-4	29.39.88	98 12.58	MB-W	30	Кер				WELL				Х	5	35	Х		X		HILLTOP
S-5	29 39.92	98 12.44	F	20	Кер	2900			N60E	10	*		N/C	7	37	Х			X	HILLSIDE
S-6	29 40	98 12.36	CD	5	Кер	80	200	10	N10E				C	10	15	X _			X	STREAMBED
S-7	29 39.99	98 12.35	MB-W	30	Kep				WELL				Х	5	35	Х		Х		FLOODPLAIN
S-8	29 39.97	9812.44	SC	20	Кер	1	1	1.5	N30W				F/O	15	35	Х		X		HILLTOP
S-9.	29 39.96	98 12:46	SH	20	Кер	4	6	1.5	N56E	10			O/C	9	39	Х		X		HILLTOP
S-10	29 39:97	98 12.46	SH	20	Кер	3	6.	0.5	N40W				F/O	5	-25	Х		X		HILLTOP
S-11	29 39.96	98 12.45	SH	20	Кер	4	6	1	N40E	10			F	.5	35	X	1	Х		HILLTOP
S-12	29 39.98	98 12.48	CD	5	Кер	11	40	1.5	N40E	10			F	5	20	X	1	X		HILLTOP
S-13	29 40.01	98 12.51	Z-CD	30	Kep.	200	300	1.5	N70E				F	9	39	X		Х		HILLTOP
S-14	29 39.96	98 12.74	CD.	5	Кер	8	4	1	N12W				С	15	20	Х		1	Х	STREAMBED
S-15	29 39.96	98 12.81	SC	20	Kep	2	1	1.5	N6E				0	10	30.	X		Х		HILLSIDE
S-16	29 39 98	98 12,78	CD	5	Кер	200	150	3:5	N-S				N	7.	12	Х			Х	HILLSIDE
S-17	29 40.01	98 12.8	SF	20	Këp	4	0:3	2	N80E				0	17	37	X		X		HILLSIDE
• DATUN	1: NAD 83																			
2A TYPE		TYPE		28	POINTS							BA INFIL	LING							
C	Cave.				30		N	None	, exposed bedro	ċk										
SC.	Solution cavity				20		С	Coar	se - cobblas, bre	akdo	wn, san	d, gravel								
SF	Solution-enlarge	ed fracture(s)			20		o	Loos	e or soft mud or	soli, c	organics	leaves,	sticks, o	lark colors						
7	Fault				20	1	F	Fines	, compacted cla	y-rich	sedime	nt, soil pr	rofile, gr	ay or red colors						
0	Other natural be	edrock fealures			5		Ŵ.	Vege	tation: Give deta	ils In	namativ	e descrip	llon							
MB.	Manmade featu	re in bedrock			зo		FS	Flow	slone, cements,	cave	deposit	;								
SW	Swallow hole				30	0 X Other malerials														
SH	Sinkhole				2D									,	_					
CD	Non-karst close	d depression			5					12	TOPOG	RAPHY								
ż	Zone, clustered	or aligned leatur	es		30		,CIIIL	Hillto	p, Hillside, Drain	age,	Floodpl	ain, Strea	mbed							

I have read, I understood, and 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 to the field,

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

F 5.4 1.929997. THOMASO. MATHEWS JULIU? FRUITCES GEOLOGY 5321 CEALCY

Date 4-3-07

Sheet 1 of 7

TCEQ-0585-Table (Rev. 10-01-04)

GEOL	OGIC ASS	SESSMENT	TABL	Ē			PR	OJE	CT NAME											
	LOCATIO	DN					FE/	ATUF	E CHARAC	TER	ISTIC	3.			EV	ALUAT	ION	PHYSICAL SETTING		
tĄ	10 *	10*	'2A	28	з		4	5		·5A	6	7	BA:	80	.0		10		п	12
FEATURE IO	LYTHROE	LONGITUDE	FEATURE FYPE	PCINIC	FORMATION	DATE	1510(15 (FLET)	TREND (DEGREES)	22	DENSITY (HO/FT)	AFFENTUNE (FEET)	INFILL	חפוגזועע אורת זתגיזסא מאדע	LOTAL	26110	ידועודא	-CATCINI (ÁC	A3.5A TIG (23 ח	TOPOORATICY
						X٠	Y.	Z		10 -						<40	240	51.0	>1.0	
S-18	29 40.06	98 12.34	CD	5	Кер	15	18	4	N10E				С	10	1.5	Х.			X	STREAMBED
S-19	29 40.04	98 12.53	SC	20	Кер	8	1	2	N23W				O/F	10	30	X		X		HILLSIDE
S-20	29 40.03	98 12.85	SC	20	Кер	15	0.5	1	N16E				0	11	31	X		X		HILLTOP
S-21	29/40:05	98,1218	SH	20	Kep	12	22	4	N50E	190	1204		N	40	70		X	X.		HILLSIDE
S-22	29 41.1	98 13,43	CD.	5	Кер	35	15	2.5	N60W				F	7	. 12	X		X		HILLTOP
S#23	29/39/98	98812163	SC	20	Кер	0:3	012	1.3	N5DE	110	2-23	Sec.	N	20	50	5-22-01	X		No. of Street	HILLTOP
S-24	29 40.56	98 12.78	SC	20	Кер	1	0.8	2					C	10	30	X		X		HILLSIDE
S-25	29 40.1	98 12.44	SH	20	Kep	4	2	4	N40E	10			N/C	1.5	45	Х		X		HILLSIDE
S-26.	29 40.11	98 12.49	SF	20	Кер	1.3	1.3	3.5	N10W		1	1.3	O/F	.15	35	Х		X		FLOODPLAIN
S-27	29 40.56	98 12.8	CD	5	Кер	7	7.	0.5					F	5	10	X		X		HILLTOP
S-28	29 40 14	98 12.57	CD	5	Kep	40	20	2.5	NGOW				C	10	15	X			X	STREAMBED
S-29	29140.11	98:12:58	C	30.	Kep	3	5	8	NAOE	100	10.125	2123	0	25	55	Passion	X	RE	X	FLOODPLAIN
S-30	29 40.11	98 12.63	SC	. 20	Кер	1:	4	. 5	N53E	10			O/F	7	37	Х			Х	FLOODPLAIN
S-31	29 40.11	98 12.69	SC	.20	Кер	1	1.7	5	N86E				O	10	30	X		X		HILLSIDE
S-32	29 40.09	98 12.68	SF	.20	Кер	5	0.3	2	N35E	10			O/F	8	38	X		X		HILLTOP
S-33	29 40.12	98 12.62	SC	20	Кер	1	0.3	1:5	N61W				Ø	10	30	X			Х	FLOODPLAIN
S-34	29 40.11	98 12.56	MB-W	-30	Кер	0.4	0.4	50	WELL	1	1		X	5	35	X			X	STREAMBED
* DATUN	1: NAD 83			-										2.2			1			
2A TYPE		TYPE		2	B POINTS]						8A INFIL	LING							
С	Cave				30		М	None	, exposed bedro	ck	•									
SC	Solution cavity				20		С	Coar	se - cobbles, bre	akdo	wn, san	i, grave)								
SF	Solution-enior	od fracturo(s)			20		ò	Loos	e or soft mud or	soll. d	roanics	leaves.	slicks, d	lark colors						
F	Fault				20		F	Fines	. compacied cla	v-rich	sedime	nt, soil pr	ofile. on	ay or red colors						
0	Olher natural b	edrock features			5		V.	Vene	tation. Give deta	lis in	narrativ	descript	lion							
MB	Manmade feat	me in bedrock			30		FS	Flows	ione, coments,	cave	denosite	1.								
SW	Swallow hole				30		X.	Other	materials											
SH	Sinkhole				20															
CD	Non-karst close	ad deprassion			5			_		12	TOPOG	RAPHY			1					
z	Zone, clustered	f or aligned fealur	ros		30		CIIII,	Hilltop	, Hillside, Oraln	ige, l	Floodpla	in, Stream	nbed							

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.

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Sheet 2 of 7

TCEQ-0585-Table (Rev. 10-01-04)

GEOL		PROJECT NAME:																		
	LOCATI	ON		-			FE/	ATU	RECHARAC	TER	ISTICS	5			EV.	ALUAT	ION	F	PHYSI	CAL SETTING
tA	18 *	10*	2A	28	3		4		5	.5A	ŭ	7	CA.	88	۵.		10		11	12
FEATURE ID	LATITUDE	LONGTUDE:	FEATURE TYPE	POULTS	FORMATION	OINES	101101	FEET)	מעפאד (מנפאד)	DOn	DENSITY (NO/FT)	APEATURE (FEET).	INFILL .	RECATIVE INFILTRATION	TOTAL	SEN	งกับกัง	CATCHU	IENT AREA DES)	TOPOJIANIA
						х	Y	z		10'							>40	<1.6	>1.9	
S-35	29 40.15	98 12.63	SC	20	Кер	3	1	4.5	E-W				N	5	25	Х			X	FLOODPLAIN
S-36	29 40 14	9812.88	C	30	Кер	15	8	7	N4E	0.0	ADD	Shall &	N.	40	7.0	HOE I	X	X	1	HILLTOP
S-37	29 40:14	98 12.88	SC	20	Кер	3	1.3	1.3	N76W				O	15	35	X	10	X	-	HILLTOP
S-38	29 40.15	98 12.66	SC	20	Кер	0.5	0.5	0.8	E-W				0	15	35	X		X		HILLTOP
S-39	29 40 15	98 12.66	SC	20	Кер	0.8	0.8	1	E-W				0	15	:35	X		X		HILLTOP
S-40	29 40 15	98 12.42	SF	20	Кер	8	12	0,1	N12E		3	0.1	O/F	10	30	X			X	STREAMBED
S-41	29 40.15	98 12.42	SF	20	Кер	0.5	2	1	N30E				F	5	25	X		X		FLOODPLAIN
S-42	29 40.17	98 12:63	SC	20	Kep	1	1	2	N40W				0	15	35	X			Х	FLOODPLAIN
S-43	29 40.19	98 12.68	SC	20	Кер	0.5	0.5	0.8					O/F	5	25	X		Х		HILLTOP
S-44	29 40.2	98 12.51	MB-W	30	Кер	0.3	0.3	150		-			X	5	35	X	1	X		HILLTOP
S-45	29 40.27	98 12.70	SC	20	Kep	1	1	1					O/F	10	30	X		X	1	HILLTOP
S-46	29 40.69	98 12.75	CD	5	Kep	3:5	6	1	N40W				OF	25	30	Х		X		HILLTOP
S-47	29 40.24	98 12.93	O-VR	5	Kep	150	15		N41W		10	0.1 - 0	N	10	15	X		X		HILLSIDE
S-48	29 40.23	98 13:00	SC	20	Кер	0.5	0.5	1.5	N40W	1	1		0	. 8	28	X		X		HILLTOP
S-49	29 40.25	98 12.92	Z-SC	30	Kep	20	4		N80E		0.3	1	0	. 8	38	X		X	1	HILLSIDE
S-50	29 40,25	98 12.86	Z-SC	30	Кер	10	2	2	N11W,N85V	٧			Ò	9	39]	X	X		HILLSIDE
S-51	29 40.3	98 12.61	SC	20	Кер	2	1.3	3	N34E				F	10	30	X			X	STREAMBED
DATUN	1: NAD 03																•			
2A TYPE		TYPE		2	POINTS							BA INFIL	LING							
c	Cave				30		N	None	, exposed bedro	ck										
sc	Solution cavity				20		с	Coar	se - cobbles, bre	akdo	wn, sand	, gravel								
SE	Solution-enlar	and fracture/s)			-20		0	Lons	e or soft-mud or	soli	omanics	leaves	slicks r	iark colors						
E.	Fault	Jea Hadraio(a)			20		Ē	Fine	compacted cla	v_rick	reedime	nt soll or	office ac	av or red colors						
0	Other natural I	edmck features		5		v	Vege	talion Give deta	ils in	namaliw	- descrin	linn								
MB	Manmedelleat	30		ES	Flow	slone camenis	caue	donnelle												
SIA	Swallow fole				30		x	Olbe	r maledals		appont									
SH	Sinkhole				-20															
CD	Non-karst clos	eri denression			-5	5 12 TOPOGRAPHY														
z	Zone: clustered or alloned features							Cliff, Hillion, Hillside, Diginarie, Floodolain, Streamhed												

I have read, I understood; and I have followed the Texas Commission on Environmental Quality's instructions to Geologists. The

Date <u>4-3-07</u>

Information presented here compiles with that document and is a true representation of the conditions observed in the field.

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

12.64 0 1 h TCEQ-0585-Table (Rev. 10-01-04) THOMASO. MATHEWS MANNO! GEOLOGY phur 5321 DRIALAX

Sheet 3 of 7

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GEOL	OGIC ASS	ESSMENT	TABL	E		PROJECT NAME:														
	LOCATIO	NC					FEA	TUR	E CHARAC	ER	ISTICS	j			EV	ALUAT	ION	P	HYSI	CAL SETTING
17	18 *	101	2A	20	3		4		· 5	5A	6	7	8A	88	Ð	10		1	ΪÌ	12
FEATURE ID	. נגזוזטסב	LONGITUDE	FEATURE-	РОШТА	FORMATIC	DHAE	1910/13 (FEET)	TAEND (DEGREED)	22	ענוואני געאסוון)	APERTURE (FEET)	RIFILL	RATE	TOTAL	9CM	אזואנונא	CÀTCHU: (AC	ELIT AREA	TOPODILAPILY
				0.000		·X.	Y	Z	1 A	10						<40	>10	×1.0	>1.0	
S#52	29 40 31	98 12:72	F.	20	Кер	1100		123	N65E	10		11	0/F	15	45	1000	X	1	X	SEREAMBED.
S-53	29.40:29	98,12,78	Z-CD	.30	Кер	7,50	100	3	N65E	10	25-1	1000	Ø/F	15	55		X	RE	X	STREAMBED
S-54	29 40.31	98 12.91	CD	5	Кер	30	17	1	N73E				O/C	. 8	13	X		X		HILLSIDE
S-55	29 40.33	98 12.83	SC	20	Кер	2	2.5	1	N70E				O/N	9	39	Х		Х		HILLSIDE
S-56	29 40.38	98 12.53	SF	20	Кер	0.3	0.5	2		0.20			O/F	10	30	Х		X		HILLTOP
SF57	29-40156	98 13:03	MB-B	30	Кер	0,8	,0 <u>.</u> 8	3	Star Julian	1	the state	1. 6 3	N.	35	65		X	X	100	HIGHTOP
S-58	29.40.39	98 12.69	SC	20	Kep	0.8	1	1.5	N40E	10			F/0	9	-39	X		Х		HILLTOP
S-59	29 40.39	98 12.79	SF	20	Кер	1	0.5	1.5	N28W	1000			0	8	28	X		Х		HILLTOP
S:60	29:40:38	98 12.86	SH	20	Кер	9	4	3	N56E	10		1 J	C/N	35	65	0.00	X	X	5	HILLTOP
S-61	29 40.39	98 12.88	SH	20	Кер	.4	1	1.5	N19W		1	1	0	15.	. 35	Х		X		HILLTOP
S-62	29 40.38	98 12.99	SC	20	Кер	0.3	0.7	0.8	N73E				0	8	28	X		Х		HILLSIDE
S-63	29 40.45	98 12.67	CD	5	Кер	10	5	2	N83W				C/N	10	15	X			X	STREAMBED
S-64	29:40:46	98 12.67	Z-SC_	30	Kep	1,00	300		N40W	100	1		O/C	20	50	Kerry	X	1.11	X	STREAMBED
S-65	29 40.68	98 12.83	SH	20	Кер	9	12	0.5	N82E				O/F	15	35	X		X		HILLTOP
S-66	29 40.46	98-12.65	F	20	Kep	60	8	0.7	N50E	10			X	5	25	X		Х	L	FLOODPLAIN
S-67	29 40.47	98 13.13	CD	5	Кер	20	8	0.7	N67W	1			O/C	10	15	X		Х		HILLTOP
S-68	29 40.47	98 13.14	SF	20	Кер	6	1	2.3	N-S				O/F	10	30	X		Х		HILLTOP
* DATUN	; NAD 83																			
ZA TYPE		TYPE		28 F	POINTS	1	·					8A INFIL	LING							
C	Cave				30		N	None	exposed bedro	ck										
SC	Solution cavity				20		С	Coan	se - cobbles, bro	akdo	wn, sóna	l, gravel								
SF	Solution-enlarg	ed fracture(s)			20		0	Loos	e or soft mud or	soll_c	manics	leaves,	sticks, d	ark colors						
F	Fault	,,,			20		F Figes: compacted clay-rich-sediment soil profile gray or red colors													
0	Other natural b	edrock features		5 V Vegelation. Give details in narralive description																
MB	Manmade fealu	ine in bedrock		30 FS Flowstone, cements, cave deposits																
SW	Swallow hole				30		X	Other	materials											
SH	Sinkhole				20	20														
CD	Non-karst close	d depression			5	5 12 TOPOGRAPHY														
z	Z Zone, clustered or aligned features						0 Cliff, Hillibp, Hillside, Drainage, Floodplain, Streambed													

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Date 4-3-07

Sheet 4 of 7

GEOL	OGIC ASS	ESSMENT	TABL	E			PROJECT NAME:													
	LOCATIO	DN NC	1				FE	ATUR	RE CHARAC	TER	ISTIC	S [.]			EV.	ALUAT	FION	P	HYSI	CAL SETTING
1A	19 *	10'	ZA	28	3		4		5	54	α.	7	84	10	0		10	1	11	12
FEATURE ID	LATHUDS	LONORUDE	FEATURE TYPE	POHITS	FORMATI	DKLE	NDIGNO	(FEET)	TREND (DEGREES)	NEG	DÉHATY SHOATS	ÅPERTURE (PREY)	unfill.	RELATIVE INFERMATION BATE	TOTAL	0536	SUMPY	CATCINI	ent Anea Reja)	TOPOGRAPHY
						×	Y	Z		10						~40	242	<1.0	<u>_>1.0</u>	
S#69	29:40:12	98 12 46	SC	20	Кер	0,8	4444	4	NES	1			0	25	45		X		X	ELOODELAIN
S-70	29:40:23	98 12.43	SC	20	Kep	1.5	0.8	2?5	N58E	110			O/E	15	45		X		X	STREAMBED
S-71	29 40 25	98 12 42	SF	20	Көр	1'	.0.3	015	N80E		2	0:25	0/F.*	25	45		[X	ſ	X	STREAMBED
S-72	29 40 11	98 12:55	Z-C	30	Kep	5	1	4	N30E				Ø/F	25	55		X.		X	GEIEF
S-73	29"40.8	98 12.8	Z-GD	30	Көрн	300	50	9	N50E	10			N/C	30	60		X		X.	STREAMBED
S-74	29 41.26	98 12 88	F.	20	Kep	2400			N40E	10			C/F	15420	45		X		X	STREAMBED
S-75	29 40.79	98 12:92	Z-0	30	Kép	30	80		N-S				·C/O	8	38	X			X	STREAMBED
S-76	29 40.76	98 12.93	SC	20	Кер	0,7	0.7	1,5	N30W				N/F	15	35	X		X	-	HILLTOP
S-77	29 40.98	98 12.93	CD	5	Көр	150	40	3	N40W				F	10	15	Х		1	Х	STREAMBED
S\$7,8	29*41:14	98/13/15	Z4SC	30	[Kêp]	1	7	1017	N45E	10		The second	0N	1.0	50		X		X X	STIREAMBED
S-79	29 41.13	98 13.19	SF	20	Kep	4	.0,4	1.5	N80W				Q/F	10	30	X		X	1	HILLTOP
S-80	29 40.98	98.13.24	CD	'5	Kep	8	6	0.5	N57W				0	8	1.3	Х		X		HILLTOP
S-81	29 40.99	98 13:22	SC	20	Kep	0.5	0.7	2	N77E	T	1		0	13	33	X		X		HILLTOP
S-82	29.41.03	98 13.11	O-FR	5	Кер	40	18		N45E	10	1		O/F	9	24	X		T	X	STREAMBED
S#83	29/40/82	98 13 21	MBPW	30	Kep	015,	0.5	>50					N	40	70		X	X		HILLSTOP
S-84	29.41.33	98 13.52	SC	20	Kep	3	4	3	NGOW	1			0	11	31	X		X	ľ	HILLTOP
S-85	29 41.29	98 13.46	SF	20	Kep	2	0.3	1.5	N46E	10	ř.	-	0	8	38	X	1	X		HILLTOP
* DATUN	: NAD 83																1			
2A TYPE		TYPE		2B F	OINTS	1	[8A INFIL	LING	-10014444444444						
c	Cave				30		N	None	exposed bedro	ck										
sc	Solution cavity				20		c	Cean	se - cobbles, bre	akdo	wn, sant	i, gravel								
SF	Solution-enlarg	ed Tracture(s)		20 O Loose or soll mud or soll, organics, leaves, slicks, dark colors									lark-colors							
F	Fault			20 F Fines, compacted stay-rich sediment, soil profile, gray or red colors									ay or red colors							
0	Other natural bi	edrock fealures		5 V Vegetation. Give details in narrative description																
MB	Manmade Jealo	na in bëdrock			30		FS	Flow	stone, cements,	cave	deposits									
sw	Swallow hole				30		x	Othe	r materials											
SH	Sinkhole.				20															
CD	Non-karst close	d depression			5					12	TOPOG	RAPHY		~~~~	7					
z	Zone, clustered	or aligned featur	. 30		Cliff, Hilliop, Hilliside, Drainage, Floodplain, Streambed															

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Date 4-3-07 E Uŀ. ala A T. PROFESSIONALT SAMAN CO THOMASO. MATHEWS) GEOLOGY 5321 CORRAL GEO

Sheel 5 of 7

GEOL	OGIC ASS	ESSMENT	TABL	Ë		PROJECT NAME:														
	LOCATIC)N					FEATURE CHARACTERISTICS EVALUATION									ION	P	CAL SETTING		
1A	18 *	1.6*	ZA	.28	3		4.		5	5A	6	7	BA	BO	D		10	1	1	12
FEATURE ID	LATITUDE	LONCITUDE	FEATURE TYPE	คอมุกร	FORMATION	DILLE	(510110 (FCCT)	TREND (DEGREES)	rrad	DENSITY (NO/FT)	APERTURE (FEET)	HIFRE	RELATIVE INFLITRATION	TOTAL	OENG	ווזעוזי	CATCHA	ent Area Resj	τοροσπλριγ
			,			x	Υ.	z		to						×40	>10	<1.0	<u>\$1:0</u>	
S-86	29 41.5	98 13 68	SF	20	Кер	2	0.2	1	N55W				0	8	28	X		Х		HILLTOP
S-87	29 41.51	98 13.7	SF	20	Kep	4	Ţ	2	N39W				0	8	28	Х		Х		HILLTOP
S-88	29 41.49	98 13.82	O-FR	5	Кер	40	25	1	N45E	10			O/C	15	,30	X			Х	STREAMBED
S-89	29 41.53	98 13.73	CD	5	Кер	6	4	0.7	N-S				0	8	13	X			X	STREAMBED
S-90	29 41 69	98 13.45	MB-W	30	Кер				WELL				Х	5	35	Х		Х		HILLTOP
S-91	29 41.64	98 13.38	SF	20	Кер	.3.5	2	2	E-W				O/F	18	38	X		Х		HILLTOP
S-92	29 41.56	98 13.5	SC	20	Кер	1.5	0.5	2.5	N70W				0	13	33-	X		Х		HILLTOP
S-93.	29 41.56	98 13.52	SC	20	Кер	3	1	1	N-S				O/F	7.	27	Х		Х		HILLTOP
S-94	29 41.63	98 13.38	SF	20	Кер	3.5	0.4	1.8	N20W				0	7	27	x		Х		HILLTOP
S-95	29 41.63	98 13.41	SF	20	Кер	0.4	3	1.7	N70E				0	11	31	X		Х		HILLTOP
S-96	29 41.66	98 13.86	SC	20	Kep	1.3	1	2.5	N10E				0	13	33	Х		Х		HILLTOP
S-97	29 41.65	98 13.88	SH	20	Кер	4.5	3	2.5	N50E	10			C	9	39	X		X		HILLTOP
S-98	29 41.58	98 13.92	SC	20	Кер	. 1	1	3.5	N-S				0	13	33	Х		X		HILLTOP
S-99	29 41.77	98 13.48	CD	5	Kep	5	.3	0.9	N-S				0	5	10	Х		X		HILLTOP
S-100	29 41.77	98 13 5	SH	20	Кер	50	15	3	NEOE	10	150	1	O/F	20	50	5-1-	X	X	100	HILLTOP
S-101	29 41.82	98 13.57	CD	.5	Кер	40	10	0.9	NSOE	10			Ċ	5	.20	Х		X		HILLTOP
S-102	29 40 18	98 12.61	Z-SC	30	Kep	300	70	8	N-S	Les B	1000	5.00	G/N	35	65	1	X	12	X	STREAMBED
* DATHA	ANAD93																			

E TYPE	28 POINTS		BA INFILLING
Cave	30	N	None, exposed bedrock
Solution cavily	20	C	Coarse - cobbles, breakdown, sand, gravel
Solution-enlarged fracture(s)	20	0	Loose or soft mud or soll, organics, leaves, slicks, dark colors
Fault	20	F	Fines, compacted clay-rich sediment, soil profile, gray or redicolors
Other natural bedrock features	5	v	Vegetation. Give details in narrative description
Manmade feature in bedrock	30	FS	Flowstone, cements, cave deposits
Swallow hole	30	х	Olher materials
Sinkhole	20		
Non-karst closed depression	5		12 TOPOGRAPHY
Zone, clustered or aligned features	30	CIII	If, Hilliop, Hillside, Drainage, Floodplain, Streambed
	TYPE Cave Solution.cavily Solution-enlarged fracture(s) Fault Other natural bedrock features Manmade feature in bedrock Swallow hole Sinkhote Non-karst closed depression Zone; clustered or aligned features	TYPE 2B POINTS Cave 30 Solution-enlarged fracture(s) 20 Solution-enlarged fracture(s) 20 Fault 20 Other natural bedrock features 5 Manmade feature in bedrock 30 Swallow hole 30 Sinkhole 20 Non-karst closed depression 5 Zone; clustered or aligned features 30	TYPE 2B POINTS Cave 30 Solution.cavity 20 Solution.enlarged (racture(s) 20 Fault 20 Other natural bedrock features: 5 V Manmade feature in bedrock 30 Swallow hole 30 Sinkhole 20 Non-karst closed depression 5 Zone, clustered or aligned features 30

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GEOL	OGIC ASS	ESSMENT		PROJECT NAME:																
	LOCATIO	D'N					FEA	TUP	RE CHARACT	TER	ISTIC	5			EV	ALUAT	ION	PHYSICAL SETTING		
1A	10 *	10-	· 2A	28	э		4		5	5A	.0	7	5Ą	4B	9		10		11	12
FEATURE	LATITUDE	LONGTUDE	FEATURE TYPE	POINTS	FORMATIQI	OWE	121045.(1	FEEN	TREND (DEORGES)	Dola	DEHAMY (ITAVOII)	APERTURE (FEET)	MARL	RELATIVE INFILTRATION BATE	TOTAL	SENS	אמאטי	CATCHIA (AC	RELT AREA	TOPOSIAPIN
						×	Y	.Z		10			1			-<40	>40	<1.0	>1.5	
S-103	29 40,68	98 12.75	SH	20	Кер	7	7	0.5					O/F	15	35	Х		X		HILLTOP
S-104	29 39 97	98 12.77	CD	5	Кер	55	20	3	NW-SE				0	15	20	Х			X	STREAMBED
S-105	29 39.94	98 12.72	CD	5	Кер	18	10	1	E-W				C	15	20	X		1	Х	STREAMBED
S-106	29.40.13	98 12.42	CD	.5	Кер	15	10	.0.9	N50W				C	15	20	X			X	STREAMBED
S-107	29 40.14	98 12.37	CD	5	Кер	50	18	3:	NOON				C.	15	20	X			Х	STREAMBED
S-108	29 41.94	98 13.4	CD	5	Кер	250	13	. 1	N50E	10			F	5	20.	X		X		HILLTOP
S-109	29 40.40	98 12.66	CD	5	Kep	35	9	1					F	9	14	X		X		HILLTOP
	10 A A								-											
						1											1	1		
	1									[····							1			
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											1								1	
										<u> </u>								1		
										-						-			[
DATUN	1:NAD83										-				<u> </u>					
2A TYPE		TYPE		2	POINTS	1	1					BA INFIL	LING				-			
C	Cave				.30		N	None	, exposed bedro	ck										
SC	Solution cavity				20		c	Coard	se - cobbles, bre	akdo	vm, san	t, gravel								
SF	Solution-entaro	ed fracture(s)			20		0	Loos	e or solt mud or :	soll.	organics	leaves.	slicks, d	lark colors						
F	Fault			20 E Fines, compacted clawings sediment, soil profile, grav or sed mines										av or red colors						
0	Other natural h	edrock features	cleatures 5 V Venetalion. Give details in narralive description																	
MB	AB Manmade feature in bedrack 30 FS Flowstone, cements, cave deposits																			
SW	Swallow hole				30		X Other materialis													
SH	Sinkhole				20	20														
CD	Non-karst close	ed depression			5					12	TOPOC	RAPHY			1					
z	Z Zone, clustered or aligned features							Cliff, Hilliop, Hillside, Drainage, Floodplain, Streambed												

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Sheel 7 of 7

ATTACHMENT B Soil Profile and Narrative of Soil Units

Twelve soils are present on the subject property. However, only five are present over the area assessed as part of this project. The five soil types in the assessment area are: Eckrant – Rock Outcrop (ErG), Rumple-Comfort Association (RUD), Purves Clay (PuC), Comfort Rock Outcrop (CrD) and the Medlin-Eckrant Association (MED).

1) Eckrant-Rock (ErG) – 8 to 30 percent slopes

This soil is very dark gray, extremely stony and about 10" thick. It is about 35% cobbles and stones in the upper part. and 75% stones in the lower part

The underlying material is indurated, fractured limestone.

Eckrant slopes are convex. The mapped areas consist of long, narrow slopes on high hills and ridges and along escarpments. This soil is well drained and surface runoff is rapid. Permeability is moderately slow and the available water capacity is very low. Water erosion is a severe hazard.

2) Purves Clay (PuC) -1 to 5 percent slopes

This is a shallow gently sloping soil on uplands. Typically, the unit dark gray and is typically 45" thick. The lower layer is approximately 10% coarse limestone

The underlaying material is a indurated and fractured limestone.

This soil is well drained and surface runoff is medium. Permeability is moderately slow with a shallow root zone. The water capacity is very low and water erosion is a moderate hazard.

3) Comfort-Rock (CrD) – complex and undulating

The surface layer is a dark brown and extremely stony olay and about 6" thick. Cobbles and stones as much as 4' across cover about 45% of the surface. The sub-

The underlying material is undurated, fractured limestone. The soil is mildly alkaline and noncalcareous throughout.

The soils are well drained and surface runoff is low to medium. Permeability is slow and the available water capacity is very low. The root zone is shallow and water erosion is a slight hazard.

4) Medlin-Eckrant Association (MED) – 1 to 8 percent slopes

The Medlin soil is on slightly concave slopes and the Eckrant soil is on convex slopes. A typical area is 50% Medlin soil and 30% Eckrant soil.

The Medlin soils can be up to 80" thick and are good for rangeland use. The Eckrant soils are typically 17" deep and are not suited for crops but are for rangeland.

The Medlin soil is well drained and surface runoff is rapid. Permeability is very slow and water enters rapidly when the soil is cracked and dry but slowly when wet. The rooting zone is deep but the clay impedes root development thus creating a severe water erosion hazard. The Eckrant soil is well drained and surface runoff is rapid. Permeability is moderately slow and the available water capacity is very low. Water erosion is a severe hazard.

5) Rumple - Comfort Association (RUD) - undulating 1 to 8 percent slopes

Rumple soil makes up anout 60% and the Comfort soil comprises about 20% of the unit. Slopes are plane or convex. The Rumple interval is very stony and about 28" thick cherty loam with limestone. The underlying unit is indurated limestone fragments. The Comfort soil is an extremely stony olay and is underlain by indurated, fractured limestone. This Comfort soil is dark brown and dark reddish brown that is mildly alkaline. Both soils are well drained and surface runoff is medium. However, runoff from large areas is much slower than from local areas because some of the water enters caves, sinkholes, rock crevices and streambeds. Permeability is moderately slow in the Rumple and slow in the Comfort. The available water capacity is very low for both. The rooting zone is shallow in the Comfort and moderately deep in the Rumple. Water erosion is moderate for both.

The Anhalt Clay (AnB), Branyon Clay (ByA), Bolar Clay Loam (BrB), Branyon Clay (ByB), Heiden Clay (HeB), Heiden Gravelly Clay (HGD), Houston Black Gravelly Clay (HvB), Krum Clay (KrB), and Orif Soils frequently flooded (Or) and Sunev Clay Loam (SuB) have also been mapped at the project site. However these soils are present over the Transition Zone and were not assessed during this project.

Attachment C Stratigraphic Column

System	Series	Group	Formation	Member	Thickness (feet)	Lithology	Field ID
		ta		Buda	40-50	Buff, light gray dense mudstone	Porcelaneous limestone with calcite-filled veins
		Washi		Del Rio	40-50	Blue green to yellow brown clay	Marker fossil: Ilmatogyra arietna
				Georgetown	2-20	Reddish brown, gray to light tan marly limestone	Marker fossil: Waconella wacoensis
				Cyclic & Marine Members undivided	80-90	Mudstone to packstone; miliolid grainstone; chert	Thin graded cycles; massive beds to relatively thin beds; cross-bedding
	ean		Person	Leached & Collapsed Members undivided	70-90	Crystalline limestone; mudstone to grainstone; chert; collapsed breccia	Bioturbated iron-stained beds separated by massive limestone beds; stromatolitic limestone
	anche	(s		Regional Dense Member	20-24	Dense; argillaceous mudstone	Wispy iron oxide stains
	Сош	ırg (Edward		Grainstone Member	50-60	Miliolid grainstone; mudstone to wackestone; chert	White cross-bedded grainstone
		Fredricksbu		Kirschberg Evaporite Member	<u>50</u> -60	Highly altered crystalline limestone; chalky mudstone; chert	Boxwork voids, with neospar and travertine frame
			Kainer	Dolomitic Member	110-130	Mudstone to grainstone; crystalline limestone; chert	Massively bedded light gray, <i>Toucasia</i> abundant
				Basal Nodular Member	50-60	Shaly, nodular limestone; mudstone and miliolid grainstone	Massive, nodular and mottled, Exogyra texana

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ATTACHMENT D

Geologic Narrative

Overview:

The site consists of approximately 1015 acres located seven miles southwest of New Braunfels, Texas. The geologic assessment was performed over the entire site. One hundred and nine (109) features were identified and mapped during this investigation. Nineteen (19) of the 109 mapped features were classified as sensitive in accordance with the "Instructions for Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones" (TNRCC-0585-Instructions (Rev. 10-1-04)). The sensitive features are; two (2) caves, two (2) solution cavities, three (3) sink holes, one (1) solution enlarged fracture, two (2) faults, two (2) man-made features in bedrock and seven (7) zones of various types.

Field Work:

Field work was performed at the site on October 31, November 1, 2, 7, 9, 13, 15, 20, 21, 27, 28 and 29, 2006 by Westward field personnel consisting of two registered Professional Geologists and two field technicians. Field transects were walked across the site using a 50-foot spacing. In areas of dense vegetative cover, historic site clearing, grubbing and earth moving activities, geologic or manmade features may have been altered or obscured at the time of site visit. Several areas of recent clearing across the southern portion of the site had created very large piles of cut vegetation that were scattered throughout the clearing route. These piles obscured the surface at the time of this assessment.

Geologic and manmade features were field logged, and GPS coordinates were collected for each feature. GPS data are included on the Geologic Assessment Table.

Stratigraphy:

The Person Formation (Kep) of the Edwards Group, which is Lower Cretaceous in age, is the predominantly exposed geologic unit at the surface across the site. However, the Buda Limestone (Kbu), Del Rio Clay (Kdr) and Georgetown Formation (Kgt) are also mapped at the surface in the northern portion of the site. Attachment E shows the stratigraphic relationships and characteristics of the outcropping rocks and other subsurface units.

Structure:

The subject property is located in the Balcones Fault Zone, approximately seven to eight miles southwest of the Comal Springs. Several faults, and evidence of faulting, were observed on site during this assessment. The Geologic Atlas of Texas, San Antonio Sheet, also shows numerous faults and fault blocks across the site. The average fault trend in this section of the Balcones Fault Zone is approximately N50E. Features trending from N35E to N65E were assigned the extra 10 points for being aligned in the dominant fault trend direction.

Karstic characteristics:

Sixty six (66) possible karst features were identified onsite during this assessment. A summary of features identified is as follows: two (2) caves, one (1) cave zone, thirty (30) solution cavities, four (4) solution cavity zones, eleven (11) sinkholes, sixteen (16) solution enlarged fractures, two (2) other features that could potentially be karst. A total of one hundred and seven (107) geologic and manmade features were logged in Attachment B, the Geologic Assessment Table.

Geologic and Manmade features are described below.

<u>Caves</u>

S-29, S-36: Sensitive

Three caves were identified during this assessment. S-29 occurs in the floodplain above the streambed. There was evidence of downward movement of water through this feature which ranked it as sensitive. Because the entrance to this cave is approximately four feet above the creek bed, it was assessed to have an intermediate infiltration rate. S-36 occurs on a hill top on the southwestern portion of the property. The cave extends downward vertically from the surface for approximately eight feet before turning in a more horizontal direction. Relative infiltration rate is high.

Cave Zone

S-72: Sensitive

S-72 appears to be a zone of caves with the floors sloping outward that are located in the cliff wall above the streambed on the eastern portion of the site. The openings are plugged with organic and fine-grained material. The relative infiltration rate is intermediate.

Closed Depressions

S-2, S-3, S-12, S-16, S-18, S-22, S-27, S-46, S-54, S-67, S-77, S-80, S-99, S-108 and S-109: Not Sensitive

These features are non-karst closed depressions are infilled with either organic or fine grained materials. S-2 and S-3 are large depressions caused by the presence of an elevated road and railroad tracks. S-16 is a large excavation/quarry area that has some fine grained sediment at the lowest part of the depression and appears to hold water. S-108 is large stock pond located in the extreme northeastern corner that was holding water at the time of mapping. Due to lack of evidence to suggest karst involvement, observed ability to hold water and amount of sediment observed, these features have a low to very low probability of rapid infiltration.

S-6, S-14, S-18, S-28, S-63, S-89, S-104, S-105, S-106 and S-107: Not Sensitive

These features are believed to be non-karst in origin that occur in streambeds presumably caused by change in stream load distribution due to obstructions such as downed trees and roads. These features are filled with coarse gravel and cobbles with bedrock visible in many places. Tilted bedrock was not observed in the feature to possibly indicate any connection to structural or karst activity. Probability of rapid infiltration is low.

Other Features

Vuggy Rock Outcrops

S-1 and S-47: Not Sensitive

S-1 is a vuggy rock outcrop located in a streambed near the southern property line. The vugs were infilled with fine soil particles and are up to 1.5" in diameter. The amount of exposed bedrock here is minimal. Based on this, the probability of rapid infiltration was deemed to be low. S-47 is classified as a vuggy rock outcrop. The aperture is less than 1" on average and the vugs are filled with fine-grained sediment.

Fractured Rock Outcrops:

S-75, S-82 and S-88: Not Sensitive

S-75 is a zone of other features that occur in the streambed in the vicinity of fault S-74. Fractures are observed to be the dominant feature in this zone and are not in the dominant trend direction. Probability of rapid infiltration is low. S-82 is an area with fractures that are in the dominant trend direction. The location of this area is in a streambed near the fault S-74. It is anticipated that the fractures are the result of movement along the fault and occur in level bedrock. Probability of rapid infiltration is low. S-88 is a fractured rock outcrop that does follow the dominant trend and has organic and coarse materials as infilling. The probability of rapid infiltration is low.

Solution Cavities

S-8, S-15, S-19, S-20, S-24, S-26, S-30, S-31, S-33, S-35, S-37, S-38, S-39, S-42, S-43, S-45, S-48, S-51, S-55, S-58, S-62, S-76, S-81, S-84, S-92, S-93, S-96 and S-98: Not Sensitive

Solution cavities were the most frequent feature observed during this assessment with 30 being identified as site features. The features listed above were not classified as sensitive due to the presence of organic and fine-grained sediment in the cavity in addition to surrounding soil cover. Some features also have evidence of animal burrowing activity. Based on the amount of fine-grained sediment located in and around the cavities, in addition to some evidence of animal burrowing activity, the probability of rapid infiltration is low.

S-26 and S-35 occur at the bottom of a rock cliff above the streambed but do not appear to extend downward vertically and contains organic as well as fine-grained sediment. S-51 and S-62 appear to have been caused by stream scour. Both are horizontal in nature with no observable vertical component, and are located above the existing the streambed. Based on the absence of a vertical component and the location above the streambed, the probability of rapid infiltration is low.

S-23, S-69 and S-70: Sensitive

These solution cavities were rated as sensitive features. S-23 is a small cavity located on a hill top but does not have any observable infilling. Although this area does not receive much runoff due to its topographic position, any water received would have a moderate to high infiltration rate unless there is a blockage further down in the cavity that could not be seen. S-69 and S-70 occur in a rock wall above the streambed and are infilled with organics and fine-grained sediment. Based on their location, lack of horizontal development, these features have a moderate probability of rapid infiltration.

Sinkholes

S-9, S-10, S-11, S-25, S-61, S-65, S-97 and S-103: Not Sensitive

These features are sinkholes that were identified during this assessment. S-9, S-10 and S-11 occur within close proximity to each other and do line up in the dominant trend direction. S-10 is located approximately 100' southwest of S-9 and S-11. The features are filled with fine-grained sediment and organic material. S-97 has fine-grained sediment and vegetation growing from the center of the feature. The probability of rapid infiltration is low.

S-21, S-60, and S-100: Sensitive

S-21 is a large sinkhole that follows the dominant fault trend. The opening is obscured with large boulders that have algae/moss present on the top portion of the rocks. This could possibly indicate movement of warm moist air across this feature. Algae/moss was not observed anywhere else in the immediate vicinity. After removal of several rocks, the view was still obscured with larger rocks. This feature may be a collapsed cave. The probability of rapid infiltration is high. S-60 occurs on a hill top and the view down into the feature was obscured with large rocks. The probability of rapid infiltration is high. S-60 occurs on a hill top and the view down into the feature was obscured with large rocks. The probability of rapid infiltration is intermediate. S-100 is a large sinkhole area that has a dominant trend. The deepest portion was observed to approximately 3' with obscured views in some portions. Algae was observed growing on the surface rocks inside the feature. The probability of rapid infiltration is low to intermediate.

Solutioned Enlarged Fractures

S-17, S-32, S-40, S-41, S-56, S-59, S-68, S-72, S-79, S-85, S-86, S-87, S-91, S-94, and S-95: Not Sensitive

These features were observed in various areas across the site. Infilling is fine-grained sediment and trees were observed growing in many of the fractures.

S-71: Sensitive

S-71 occurs in a stream bed with little observed infilling. Additionally, the bedrock where the feature was identified appears to dipping at an angle. Probability of rapid infiltration is intermediate.

Faults S-5: Not Sensitive S-5 is the main fault that goes across the southern portion of the site. The fault scarp is comprised of weathered materials and bedrock. Probability of rapid infiltration is low. S-52, S-74: Sensitive

S-52 appears to be part of a horst-graben sequence and does follow the dominant trend. Bedrock outcrops dip away from each other on either side of the CD zone that is feature S-53. Probability of rapid infiltration along these faults appears to be low. S-74 is very pronounced fault that follows the dominant trend. The bedrock is fractured at the contact and appears to be the cause of the streambed that runs parallel to the fault. There is up to 60' of topographic relief from the northern side of the fault down to the streambed. Probability of rapid infiltration is low to intermediate.

There are two faults located in the far northern portion of the site that has been mapped by the Bureau of Economic Geology (BEG) on the Geologic Atlas of Texas, San Antonio Sheet. However, these faults were not readily identifiable in the field and are dotted as discussed in the F-0585 Geologic Assessment Instructions. These faults were not assigned a site feature number.

Man Made Features

S-4, S-7, S-34, S-44 and S-90: Not Sensitive

These features are water wells. S-4, S-7 and S-90 are domestic water wells that are enclosed and are finished on concrete pads. S-34 and S-44 are monitoring wells that have a three foot steel box riser and appear to be sealed with grout/concrete at the surface. The probability of rapid infiltration is low.

S-57 and S-83: Sensitive

S-57 appears to be a boring that was not plugged. It is approximately 9" in diameter and the depth is unknown. The view was obscured by a possible sediment bridge. The probability of rapid infiltration is high. S-83 is a water well that is uncapped and open at the surface. Water is present in the well but it is not known what the static level of the groundwater is. The probability of rapid infiltration is high.

Zone - Closed Depression

S-13: Not Sensitive

S-13 covers a large area of approximately 200' x 300' on a hilltop. However, vertical soil sapping to a depth of approximately 8" was observed in the center of one depression. This may indicate karst activity in the subsurface. But due to the amount of fine-grained sediment observed and vegetation present, the probability of rapid infiltration was rated low.

S-53 and S-73: Sensitive

S-53 is the graben area between two faults that has numerous close depressions that are aligned parallel to the faults and is also in the dominant trend. The features are filled with fine-grained sediment with some depressions up to 4 ft deep possibly indicating soll sapping in the subsurface. Evidence of ponding water was observed. The probability of rapid infiltration is low. S-73 is a series of closed depressions in a streambed presumably caused by change in stream load distribution due to obstructions such as downed trees.
However, the features are also associated with a fault in the vicinity and are oriented in the dominant trend direction. Although fine grained sediment was not observed in the features, the relative infiltration rate is still assessed as low. The fact that the feature has dominant orientation and is classified as a zone, the sensitivity rating is elevated.

Zone - Solution Cavities

S-49: Not Sensitive

S-49 is a 20' long area of solution cavities along the hilltop. The cavities do not appear to be oriented downward but more horizontally and upward. The probability of rapid infiltration is low.

S-50, S-64, S-78 and S-102: Sensitive

S-50 was rated slightly sensitive but the cavities are infilled with fine-grained sediment and organic material. The probability of rapid infiltration is low. S-64 is a zone approximately 100 ft by 300 ft with organic and coarse materials for infilling. This feature is also located in a streambed. The probability of rapid infiltration is low to intermediate. S-78 occurs in a streambed also and follows the dominant trend. The infilling is organic materials where visible. The probability of rapid infiltration is low.

S-102 is a large area located in a streambed. In addition to numerous solution cavities, there are other features such as closed depressions and solutioned enlarged fractures also in this zone. Bedrock is dipping in various locations and there is very minimal stream debris. The depth of some of the depressions is up to 8 ft. The probability of rapid infiltration is high.







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SAN ANTONIO

UPDATED GA TABLES

GEOL	OGIC ASS	SESSMENT	TABL	E			PR	DJE	CT NAME:											
	LOCATIO	NC					FEA	TUR	E CHARACT	ERI	STICS				EVA	ALUAT	ION	P	HYSI	CAL SETTING
1A	1B •	1C*	2A	2B	3		4		5	5A	6	7	8A	88	9		10	1	11	. 12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	VSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	SITIVITY	CATC! AREA (HMENT ACRES)	TOPOGRAPHY
						х	Y	z		10						<40	>40	<1.6	<u>>1,6</u>	
S-1	29 39.85	98 12.59	O-VR	5	Кер	20	3		N14W				0	11	36	Х			Х	STREAMBED
S-2	29 39.84	98 12.59	CD	5	Кер	30	7	3	N17E				0	7	12	Х			Х	STREAMBED
S-3	29 39.85	98 12.57	CD	5	Кер	7	10	0.7	N24W				0	9	14	X			Х	STREAMBED
S-4	29 39.88	98 12.58	MB-W	30	Кер				WELL				Х	5	35	Х		Х		HILLTOP
S-5	29 39.92	98 12.44	F	20	Кер	2900			N60E	10			N/C	7	37	X			Х	HILLSIDE
S-6	29 40	98 12.36	CD	5	Кер	80	200	10	N10E				С	10	15	Х			Х	STREAMBED
S-7	29 39.99	98 12.35	MB-W	30	Кер				WELL				Х	5	35	Х		Х		FLOODPLAIN
S-8	29 39.97	98 12.44	SC	20	Кер	1	1	1.5	N30W				F/O	15	35	Х		Х		HILLTOP
S-9	29 39.96	98 12.46	SH	20	Кер	4	6	1.5	N56E	10			O/C	9	39	X		Х		HILLTOP
S-10	29 39.97	98 12.46	SH	20	Кер	3	6	0.5	N40W				F/O	5	25	Х		Х		HILLTOP
S-11	29 39.96	98 12.45	SH	20	Кер	4	6	1	N40E	10			F	5	35	Х		Х		HILLTOP
S-12	29 39.98	98 12.48	CD	5	Кер	11	40	1.5	N40E	10			F	5	20	Х		Х		HILLTOP
S-13	29 40.01	98 12.51	Z-CD	30	Кер	200	300	1.5	N70E				F	9	39	Х		Х		HILLTOP
S-14	29 39.96	98 12.74	CD	5	Кер	8	4	1	N12W				С	15	20	Х			Х	STREAMBED
S-15	29 39.96	98 12.81	SC	20	Кер	2	1	1.5	N6E				0	10	30	Х		Х		HILLSIDE
S-16	29 39.98	98 12.78	CD	5	Кер	200	150	3.5	N-S				N	7	12	Х			Х	HILLSIDE
S-17	29 40.01	98 12.8	SF	20	Кер	4	0.3	2	N80E				0	17	37	X		Х		HILLSIDE
* DATUM	I: NAD 83																			
2A TYPE		TYPE		28	B POINTS							BA INFIL	LING							
С	Cave				30		N	None	, exposed bedro	ck										
SC	Solution cavity				20		С	Coar	se - cobbles, bre	akdo	wn, sand	t, gravel								
SF	Solution-enlarg	ed fracture(s)			20		0	Loos	e or soft mud or :	soil, d	organics	leaves,	sticks, d	dark colors						
F	Fault				20		F	Fines	s, compacted clar	y-rich	sedime	nt, soil pr	rofile, gi	ray or red colors						
0	Other natural b	edrock features			5		V	Vege	tation. Give deta	ils in	narrativ	e descrip	tion							
MB	Manmade featu	ire in bedrock			30		FS	Flow	stone, cements,	cave	deposits	6								
SW	Swallow hole				30		Х	Othe	r materials								_			
SH	Sinkhole				20										_					
CD	Non-karst close	ed depression			5					12	TOPOG	RAPHY]					
Z	Zone, clustered	l or aligned featur	es		30		Cliff,	Hillto	p, Hillside, Drain	age,	Floodpla	ain, Strea	mbed							

The information presented here complies with that document and is a true oppresentation productions observed in the field. My signature certifies that I am qualified as a geologist as defined to the field of the

TCEQ-0585-Table (Rev. 10-01-04)

Sheet 1 of 8

GEOLOGIC ASSESSMENT TABLE PROJECT NAME:											7										
	LOCATIO	DN NC					FE/	ATUR	RE CHARAC	TER	ISTIC	s			EVA	ALUA	TION	F	PHYSI	CAL SETTING	1
1A	18 *	1C*	2A	28	3		4		5	5A	6	7	8A	88	9		10		11	12	
FEATURE IO	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	OIME	NSIONS	FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SEN	SITIVITY	CATCHN (AC	AENT AREA	TOPOGRAPHY	7
					_	x	Y	Z		10						<40	>40	<1.6	≥1,6		
S-18	29 40.06	98 12.34	CD	5	Кер	15	18	4	N10E				С	10	15	Х			Х	STREAMBED	
S-19	29 40.04	98 12.53	SC	20	Кер	8	1	2	N23W				O/F	10	30	X		Х		HILLSIDE	
S-20	29 40.03	98 12.85	SC	20	Кер	15	0.5	1	N16E				0	11	31	X		Х		HILLTOP	
S-21	29 40.05	98 12.8	SH	20	Кер	12	22	4	N50E	10			N	40	70		Х	Х		HILLSIDE	
S-22	29 41.1	98 13.43	CD	5	Кер	35	15	2.5	N60W				F	7	12	Х		Х		HILLTOP	
S-23	29 39.98	98 12.63	SC	20	Kep	0.3	0.2	1.3	N50E	10	1.13	2.5%	Ν	20	50	1.1.10	X	1000	0.30	HILLTOP	
S-24	29 40.56	98 12.78	SC	20	Кер	1	0.8	2					С	10	30	Х		Х		HILLSIDE	
S-25	29 40.1	98 12.44	SH	20	Кер	4	2	4	N40E	10			N/C	15	45	Х		Х		HILLSIDE	
S-26	29 40.11	98 12.49	SF	20	Кер	1.3	1.3	3.5	N10W		1	1.3	O/F	15	35	Х		Х		FLOODPLAIN	
S-27	29 40.56	98 12.8	CD	5	Кер	7	7	0.5					F	5	10	Х		Х		HILLTOP	
S-28	29 40.14	98 12.57	CD	5	Кер	40	20	2.5	N60W				С	10	15	Х			X	STREAMBED	
S-29	29 40.11	98 12.58	С	30	Кер	3	5	8	N10E				0	25	55		Х		X	FLOODPLAIN	1
S-30	29 40.11	98 12.63	SC	20	Kep	1	4	5	N53E	10			O/F	7	37	Х			X	FLOODPLAIN	7
S-31	29 40.11	98 12.69	SC	20	Кер	1	1.7	5	N86E				0	10	30	Х		Х		HILLSIDE	
S-32	29 40.09	98 12.68	SF	20	Кер	5	0.3	2	N35E	10			O/F	8	38	Х		Х		HILLTOP	7
S-33	29 40.12	98 12.62	SC	20	Кер	1	0.3	1.5	N61W				0	10	30	Х			X	FLOODPLAIN	7
S-3 4	29 40.11	98 12.56	MB-W	30	Кер	0:4	0.4	50	WELL				X	5	35	X			X	STREAMBED	Plugged
* DATUN	1: NAD 83																				7
2A TYPE		TYPE		2	B POINTS							8A INFILI	ING								7
С	Cave				30		N	None,	exposed bedro	ck											
SC	Solution cavity				20		С	Coars	e - cobbles, bre	akdov	wn, sand	d, gravel									
SF	Solution-enlarge	ed fracture(s)			20		0	Loose	e or soft mud or	soil, c	rganics	leaves, s	ticks, d	ark colors							
F	Fault				20		F	Fines	, compacted clar	y-rich	sedime	nt, soil pro	ofile, gra	ay or red colors							
0	Other natural be	edrock features			5		v	Veget	ation. Give deta	ils in	narrative	e descript	on	· · · · · · · · · · · · · · · · · · ·							
MB	Manmade featu	ire in bedrock			30		FS	Flows	tone, cements,	cave	deposits										
sw	Swallow hole				30		х	Other	materials		•										
SH	Sinkhole				20				-											_	
CD	Non-karst close	d depression			5					12	TOPOG	RAPHY			1						
z	Zone, clustered	or aligned featur	es		30		Cliff,	Hilltop	, Hillside, Draina	age, F	loodpla	in, Stream	bed								

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. 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 to the Complex Automatic and the field of the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the Complex Automatic and the field. My signature certifies that I am qualified as a geologist as defined to the field. My signature certifies that I am qualified as a geologist as defined to the field. My signature certifies that I am qualified as a geologist as defined to the field. My signate the field as a geologist as defined to the field as a geologist TCEQ-0585-Table (Rev. 10-01-04)

Sheet 2 of 8

GEOL	OGIC ASS	SESSMENT	TABL	E			PR	OJE	CT NAME:							-				
	LOCATIO	ON					FE/	ATUF	RE CHARACT	TER	ISTICS	5			EV	ALUAT	ION	P	HYSI	CAL SETTING
1A	18 *	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9		10	1	11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	SIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	NTY	CATCHMI (ACI	ENT AREA RES)	TOPOGRAPHY
						х	Y	Z		10						<40	>40	<1.6	<u>>1.6</u>	
S-35	29 40.15	98 12.63	SC	20	Кер	3	1	4.5	E-W				N	5	25	X			Х	FLOODPLAIN
S-36	29 40.14	98 12.88	Ċ	30	Кер	15	8	7	N4E				N	40	70		X	Х		HILLTOP
S-37	29 40.14	98 12.88	SC	20	Кер	3	1.3	1.3	N76W				0	15	35	Х		Х		HILLTOP
S-38	29 40.15	98 12.66	SC	20	Кер	0.5	0.5	0.8	E-W				0	15	35	X		Х		HILLTOP
S-39	29 40.15	98 12.66	SC	20	Кер	0.8	0.8	1	E-W				0	15	35	Х		Х		HILLTOP
S-40	29 40.15	98 12.42	SF	20	Кер	8	12	0.1	N12E		3	0.1	O/F	10	30	Х			Х	STREAMBED
S-41	29 40.15	98 12.42	SF	20	Кер	0.5	2	1	N30E				F	5	25	X		Х		FLOODPLAIN
S-42	29 40.17	98 12.63	SC	20	Кер	1	1	2	N40W				0	15	35	X			Х	FLOODPLAIN
S-43	29 40.19	98 12.68	SC	20	Кер	0.5	0.5	0.8					O/F	5	25	Х		Х		HILLTOP
S-44	29-40-2	98 12.51	MB-W	30	Kep	0.3	0.3	150					X	5	35	X		X		HILLTOP
S-45	29 40.27	98 12.70	SC	20	Кер	1	1	1					O/F	10	30	Х		Х		HILLTOP
S-46	29 40.69	98 12.75	CD	5	Кер	3.5	6	1	N40W				O/F	25	30	Х		Х		HILLTOP
S-47	29 40.24	98 12.93	O-VR	5	Кер	150	15		N41W		10	0.1 - 0	N	10	15	Х		Х		HILLSIDE
S-48	29 40.23	98 13.00	SC	20	Кер	0.5	0.5	1.5	N40W				0	8	28	Х		Х		HILLTOP
S-49	29 40.25	98 12.92	Z-SC	30	Кер	20	4		N80E		0.3	1	0	8	38	Х		Х		HILLSIDE
S-50	29 40.25	98 12.86	Z-SC	30	Кер	10	2	2	N11W,N85V	V			0	9	39		X	Х		HILLSIDE
S-51	29 40.3	98 12.61	SC	20	Кер	2	1.3	3	N34E				F	10	30	X			Х	STREAMBED
* DATUN	1: NAD 83																			
2A TYPE		TYPE		2	B POINTS							8A INFILI	LING							
С	Cave				30		N	None	, exposed bedroo	ck										

С	Cave	30	N	None, exposed bedrock
sc	Solution cavity	20	С	Coarse - cobbles, breakdown, sand, gravel
SF	Solution-enlarged fracture(s)	20	0	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fault	20	F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
0	Other natural bedrock features	5	V	Vegetation. Give details in narrative description
MB	Marimade feature in bedrock	30	FS	Flowstone, cements, cave deposits
SW	Swallow hole	30	х	Other materials
SH	Sinkhole	20		
CD	Non-karst closed depression	5		12 TOPOGRAPHY
Z	Zone, clustered or aligned features	30	Cliff	, 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 tracepresent formation by conditions observed in the field. My signature certifies that I am qualified as a geologist as defines as defines as defines as defined as a geologist as defines as defined as a geologist as defined as a geologist as defined as a geologist as defined as defined as a geologist as defined as a TCEQ-0585-Table (Rev. 10-01-04)

Sheet 3 of 8

GEOL	OGIC ASS	SESSMENT	TABL	E			PRO	JE	CT NAME:											
	LOCATIO	ON					FEA	TUF	RE CHARACT	TER	ISTICS	3			EV	ALUAT	ION	P	HYSI	CAL SETTING
1A	18 •	1C*	2A	28	3		4		5	5A	6	7	8A	88	9		10		11	12
FEATURE ID	LATTUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATI ON	DIME	ISIONS (F	EET)	TREND (DEGREES)	DCM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	SITIVITY	CATCHM (AC	ENT AREA RES)	TOPOGRAPHY
						х	Y	Ζ		10						<40	<u>≥40</u>	<1.6	<u>>1.6</u>	
S-52	29 40.31	98 12.72	F	20	Кер	1100			N65E	10			O/F	15	45		Х		Х	STREAMBED
S-53	29 40.29	98 12.78	Z-CD	30	Кер	750	100	3	N65E	10			O/F	15	55		Х		Х	STREAMBED
S-54	29 40.31	98 12.91	CD	5	Кер	30	17	1	N73E				O/C	8	13	Х		Х		HILLSIDE
S-55	29 40.33	98 12.83	SC	20	Kep	2	2.5	1	N70E				O/N	9	39	Х		Х		HILLSIDE
S-56	29 40.38	98 12.53	SF	20	Кер	0.3	0.5	2					O/F	10	30	Х		X		HILLTOP
S-57	29 40.56	98 13.03	MB-B	30	Кер	0.8	0.8	3					N	35	65		Х	Х		HILLTOP
S-58	29 40.39	98 12.69	SC	20	Кер	0.8	1	1.5	N40E	10			F/O	9	39	Х		Х		HILLTOP
S-59	29 40.39	98 12.79	SF	20	Кер	1	0.5	1.5	N28W				0	8	28	Х		Х		HILLTOP
S-60	29 40.38	98 12.86	SH	20	Кер	9	4	3	N56E	10			C/N	35	65		Х	Х		HILLTOP
S-61	29 40.39	98 12.88	SH	20	Кер	4	1	1.5	N19W		1	1	0	15	35	Х		Х		HILLTOP
S-62	29 40.38	98 12.99	SC	20	Кер	0.3	0.7	0.8	N73E				0	8	28	Х		Х		HILLSIDE
S-63	29 40.45	98 12.67	CD	5	Kep_	10	5	2	N83W				C/N	10	15	Х			Х	STREAMBED
S-64	29 40.46	98 12.67	Z-SC	30	Кер	100	300		N40W				O/C	20	50		Х		Х	STREAMBED
S-65	29 40.68	98 12.83	SH	20	Кер	9	12	0.5	N82E				O/F	15	35	Х		Х		HILLTOP
S-66	29 40.46	98 12.65	F	20	Кер	60	8	0.7	N50E	10			Х	5	25	Х		Х		FLOODPLAIN
S-67	29 40.47	98 13.13	CD	5	Кер	20	8	0.7	N67W				O/C	10	15	Х		X		HILLTOP
S-68	29 40.47	98 13.14	SF	20	Кер	6	1	2.3	N-S				O/F	10	30	Х		Х		HILLTOP
* DATUN	1: NAD 83											it.								
2A TYPE		TYPE		2B F	POINTS							8A INFIL	LING							
С	Cave				30		N	None	, exposed bedro	ck										
SC	Solution cavity				20		С	Coar	se - cobbles, bre	akdov	vn, sand	d, gravel								
SF	Solution-enlarge	ed fracture(s)			20		0	Loos	e or soft mud or s	soil, o	rganics,	leaves,	sticks, d	ark colors						
F	Fault				20		F	Fines	, compacted clay	/-rich	sedime	nt, soil pr	ofile, gra	ay or red colors						
0	Other natural b	edrock features			5		V	Vege	tation. Give deta	ils in	narrative	e descript	ion	-						
MB	Manmade featu	ire in bedrock			30		FS	Flow	stone, cements, o	cave	deposits									
SW	Swallow hole				30		х	Othe	r materials											
SH	Sinkhole				20															
CD	Non-karst close	d depression			5					12	TOPOG	RAPHY]					
Z	Zone, clustered	l or aligned featur	es		30		Cliff,	Hillto	p, Hillside, Draina	age, F	loodpla	in, Strean	nbed							
-			10																	

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 as a g THOMAS CEOL 5321 CENSEL CENSEL IT P65321 2/4/15 10 THOMASO. MATHEWS TCEQ-0585-Table (Rev. 10-01-04)

Sheet 4 of 8

VICATION FEATURE CHARACTERISTICS EVALUATION PHYSICAL SETTING Note: State of the set	GEOL	OGIC ASS	SESSMENT	TABL	E			PR	OJE	CT NAME	:											
IA IS- SA 28 34 6 5 6 6 9 10 71 I2 resture Lowerroot resture		LOCATIO	DN NC					FE	ATUR	RE CHARAC	TER	ISTIC	S			EV	ALUAT	ION	F	PHYSI	CAL SETTING	
Feature in Unique Loadmare Feature in the mark in the mark in the mark intermed intermed in the mark intermed intermed in the mark intermed intermed intermed in the mark intermed interme	1A	1B •	1C*	2A	2B	з		4		5	5A	6	7	8A	8B	9	2	10		11	12	
C X Y Z 10 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260 440 260	FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATI ON	DIME	NSIONS (FEET)	TRENO (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	imvitY	CATCHA (AC	AENT AREA	TOPOGRAPHY	
S-69 29.40.12 98.12.46 SC 20 (kep 0.8 4 4/N-S 0 25 45 X X FLOODPLAIN S-70 29.40.23 98.12.43 SC 20 (kep 1.5 0.8 2.5 N56E 10 0/F 15 45 X X STREAMBED S-71 29.40.25 98.12.42 SF 20 (kep 1.0 0.5 N80E 2 0.25 0/F 25 45 X X STREAMBED S-72 29.40.76 98.12.48 F 20 (Kep 300 50 N40E 10 N/F 15 35 X X STREAMBED S-74 29.40.76 98.12.93 SC 20 (kep 30 80 N-S C/O 8 88 X STREAMBED S-76 29.40.76 98.12.93 SC 20 (kep 1.7 0.7 N.5 N40W N/F 15 35 (X X HILLTOP S-78 29.40.78 98.13.19 SF 20 (kep 40 0.4 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>х</td><td>Y</td><td>Z</td><td></td><td>10</td><td></td><td></td><td></td><td></td><td></td><td><40</td><td>>40</td><td><1.6</td><td>>1.6</td><td></td><td></td></td<>							х	Y	Z		10						<40	>40	<1.6	>1.6		
S-70 29 40.23 98 12.42 SC 20 (Kep 1.5. 0.8 2.5 NS5E 10 0.7F 15 4.5 X X STREAMBED S-71 29 40.25 98 12.42 SF 20 (Kep 10.3. 0.5 N80E 2 0.25 0/F 25 45 X X STREAMBED S-72 29 40.8 98 12.8 Z-CD 30 (Kep 300 50 9 N50E 10 N/C 30 60 X X STREAMBED S-74 29 41.26 98 12.88 F 20 (Kep 2400 N40E 10 C/F 15-20 45 X X STREAMBED S-74 29 41.28 F 20 (Kep 300 80 N-S C/O 8.38 (X X X STREAMBED S-76 29 40.76 98 12.93 SC 20 (Kep 17.0 1.5 N40W N/F 15 35 (X X HILLTOP S-76 29 40.98 98 13.24 CD 5 (Kep 10.3 0/F 10 3/X X STREAMBED S-72 29 41.13 </td <td>S-69</td> <td>29 40.12</td> <td>98 12.46</td> <td>SC</td> <td>20</td> <td>Kep</td> <td>0.8</td> <td>4</td> <td>4</td> <td>N-S</td> <td></td> <td></td> <td></td> <td>0</td> <td>25</td> <td>45</td> <td>_</td> <td>X</td> <td></td> <td>Х</td> <td>FLOODPLAIN</td> <td></td>	S-69	29 40.12	98 12.46	SC	20	Kep	0.8	4	4	N-S				0	25	45	_	X		Х	FLOODPLAIN	
Sr-71 29 40.25 98 12.42 SF 20 (Kep) 1 0.3 0.5 N80E 2 0.25 O/F 25 X X STREAMBED Sr-72 29 40.1 98 12.85 Z-C 30 Kep 300 50 9 N50E 10 N/C 30 60 X X STREAMBED Sr-74 29 40.8 98 12.83 Z-CD 30 Kep 300 50 9 N50E 10 N/C 30 60 X X STREAMBED Sr-74 29 40.76 98 12.93 CD 30 N40E 10 C/F 15 X X STREAMBED Sr-76 29 40.76 98 12.93 CD SKep 15 40 3 N40W N40W F 10 15 X X STREAMBED Sr-78 29 41.14 98 13.15 Z-SC 30 Kep 17 0.7 N40W 0/F 10 30/X X HILLTOP S-78 29 41.93 98 13.24 CD SKep	S-70	29 40.23	98 12.43	SC	20	Кер	1.5	0.8	2.5	N58E	10			O/F	15	45		X		Х	STREAMBED	
S.72 29 40.11 98 12.85 Z-C 30 Kep 5 1 4 N30E O/F 25 55 X X CLIFF S.73 29 40.8 98 12.8 Z-CD 30 Kep 300 50 9 N50E 10 N/C 30 60 X X STREAMBED S.74 29 40.78 98 12.82 Z-CO 30 Kep 2400 N40E 10 C/F 15-20 45 X X STREAMBED S.76 29 40.78 98 12.93 S.CD 5 Kep 0.7 1.5 N30W N/F 15 35 X HILTOP S.77 29 40.98 98 12.93 CD 5 Kep 1.0 0/N 10 50 X X STREAMBED S.78 29 41.14 98 13.16 Z-SC 30 Kep 1 7 0.7 N45E 10 0/N 10 50 X X STREAMBED S.78 29 41.13 98 13.24 CD 5 Kep 40	S-71	29 40.25	98 12.42	SF	20	Kep	1	0.3	0.5	N80E		2	0.25	O/F	25	45		X		Х	STREAMBED	
S-73 29 40.8 98 12.8 Z-CD 30 Kep 300 50 91 N50E 10 N/C 30 60 X X STREAMBED S-74 29 41.26 98 12.88 F 20 Kep 2400 N40E 10 C/F 15-20 45 X X STREAMBED S-75 29 40.76 98 12.93 SC 20 Kep 30 80 N-S C/O 8 38 X X STREAMBED S-76 29 40.76 98 12.93 SC 20 Kep 10 N/F 15 35 X X HILLTOP S-77 29 40.98 98 13.15 Z-SC 30 Kep 10 O/N 10 50 X X STREAMBED S-78 29 41.13 98 13.15 Z-SC 30 Kep 4 0.7 1.5 NSV O 8 13 <x< td=""> X HILLTOP S-80 29 40.98 98 13.24 CD 5 Kep 40 18<</x<>	S-72	29 40.11	98 12.55	Z-C	30	Кер	5	1	4	N30E				O/F	25	55		X		Х	CLIFF	
S-74 29 41.26 98 12.88 F 20 Kep 2400 NA0E 10 C/F 15-20 45 X X STREAMBED S-75 29 40.79 98 12.93 SC 20 Kep 0.7 1.5 N30W N/F 15 35 X X STREAMBED S-76 29 40.78 98 12.93 CD 5 Kep 150 40 3 N40W F 10 15 X X STREAMBED S-77 29 40.98 98 12.93 CD 5 Kep 150 40 3 N40W F 10 15 X X STREAMBED S-77 29 41.14 98 13.19 SF 20 Kep 4 0.4 1.5 N80W 0/F 10 30 X X HILLTOP S-80 29 41.03 98 13.24 CD 5 Kep 40 18 N45E 10 0/F 9 24 X X HILLTOP S-81 29 40.98 98 13.24 CD C2 Kep 4 3 N60W 0 11 <td< td=""><td>S-73</td><td>29 40.8</td><td>98 12.8</td><td>Z-CD</td><td>30</td><td>Kep</td><td>300</td><td>50</td><td>9</td><td>N50E</td><td>10</td><td></td><td></td><td>N/C</td><td>30</td><td>60</td><td></td><td>Х</td><td></td><td>X</td><td>STREAMBED</td><td></td></td<>	S-73	29 40.8	98 12.8	Z-CD	30	Kep	300	50	9	N50E	10			N/C	30	60		Х		X	STREAMBED	
S-75 29 40.79 98 12.92 Z-O 30 Kep 30 R C/O 8 38 X X STREAMBED S-76 29 40.76 98 12.93 SC 20 Kep 15 N30W N/F 15 35 X X HILLTOP S-77 29 40.98 98 12.93 CD 5 Kep 150 40 3 N40W F 10 15 X X STREAMBED S-77 29 40.98 98 13.15 Z-SC 30 Kep 1 7 0.7 N45E 10 O/N 10 50 X X STREAMBED S-79 29 41.13 98 13.24 CD 5 Kep 86 0.5 N57W O 8 13 X X HILLTOP S-80 29 40.99 98 13.24 CD 5 Kep 40 18 N45E 10 O/F 9 24 X X STREAMBED S-82 29 41.03 98 13.21 SC 6.0 5 Kep 40 18 N45E 10 O/F 9 24 X<	S-74	29 41.26	98 12.88	F	20	Кер	2400			N40E	10			C/F	15-20	45		X		Х	STREAMBED	
S-76 29 40.76 98 12.93 SC 20 Kep 0.7 0.7 1.5 N30W N/F 15 35 X X HILLTOP S-77 29 40.98 98 12.93 CD 5 Kep 150 40 3 N40W F 10 15 X X STREAMBED S-78 29 41.14 98 13.15 Z-SC 30 Kep 1 7 0.7 N45E 10 O/N 10 50 X X STREAMBED S-79 29 41.13 98 13.19 SF 20 Kep 4 0.4 1.5 N80W O/F 10 30 X X HILLTOP S-80 29 40.98 98 13.24 CD 5 Kep 8 6 0.5 N57W O 13 33 X X HILLTOP S-81 29 40.99 98 13.24 CD 5 N 0.5 N.7 2 N7FE O 13 33 X HILLTOP S-82 29 41.33 98 13.16 N-FE 10 N N <t< td=""><td>S-75</td><td>29 40.79</td><td>98 12.92</td><td>Z-0</td><td>30</td><td>Kep</td><td>30</td><td>80</td><td></td><td>N-S</td><td></td><td></td><td></td><td>C/O</td><td>8</td><td>38</td><td>Х</td><td></td><td></td><td>Х</td><td>STREAMBED</td><td></td></t<>	S-75	29 40.79	98 12.92	Z-0	30	Kep	30	80		N-S				C/O	8	38	Х			Х	STREAMBED	
S-77 29 40.98 98 12.93 CD 5 Kep 150 40 3 N40W F 10 15 k X STREAMBED S-78 29 41.14 98 13.15 Z-SC 30 Kep 1 7 0.7 N45E 10 O/N 10 50 X X STREAMBED S-79 29 41.13 98 13.19 S-F 20 Kep 4 0.4 1.5 Nave O/N 10 30 X X HILLTOP S-80 29 40.98 98 13.24 CD 5 Kep 8 6 0.5 N57W O 8 13 X X HILLTOP S-81 29 40.99 98 13.24 CD 5 Kep 40 18 N45E 10 O/F 9 24 X X X TREAMBED S-82 29 41.03 98 13.21 C-FR 5 Kep 40 18 N45E 10 O/F 9 24 X X HILLTOP S-82 29 41.33 98 13.22 SC 20 Kep 3 4 3 N60W O 11	S-76	29 40.76	98 12.93	SC	20	Kep	0.7	0.7	1.5	N30W				N/F	15	35	Х		Х		HILLTOP	
S-78 29 41.14 98 13.15 Z-SC 30 (kep 1 7 0.7 (N45E 10 O/N 10 50 X X STREAMBED S-79 29 41.13 98 13.19 SF 20 (kep 4 0.4 1.5 N80W O/F 10 30 X X HILLTOP S-80 29 40.98 98 13.24 CD 5 (kep 8 6 0.5 N57W O 8 13 X X HILLTOP S-81 29 40.99 98 13.21 O-FR 5 (kep 40 18 N45E 10 O/F 9 24 X X STREAMBED S-82 29 41.03 98 13.51 O-FR 5 (kep 40 18 N45E 10 O/F 9 24 X X X STREAMBED S-84 29 41.33 98 13.25 SC 20 (kep 3 4 3 (N60W O 11 31 X X HILLTOP S-84 29 41.29 98 13.26 SF 20 (kep 2 0.3 1.5 (N60W O	S-77	29 40.98	98 12.93	CD	5	Kep	150	40	3	N40W				F	10	15	Х			Х	STREAMBED	
S-79 29 41.13 98 13.19 SF 20 kep 4 0.4 1.5 N80W O/F 10 30 X X HILLTOP S-80 29 40.98 98 13.22 SC 20 Kep 8 6 0.5 N57W 0 8 13 X X X HILLTOP S-81 29 40.99 98 13.22 SC 20 Kep 0.5 0.7 2 N77E 0 0 13 33 X X HILLTOP S-82 29 40.92 98 13.21 O-FR 5 Kep 40 18 N45E 10 0/F 9 24 X X X HILLTOP S-84 29 41.33 98 13.52 SC 20 Kep 3 4 3 N60W 0 11 31 X X HILLTOP S-84 29 41.29 98 13.46 SF 20 Kep 13 N60W 0 13 31 X X HILLTOP > DATUM: NAD 83 2 24 1.29 98 13.46 SF 20 Kep <t< td=""><td>S-78</td><td>29 41.14</td><td>98 13.15</td><td>Z-SC</td><td>30</td><td>Kep</td><td>1</td><td>7</td><td>0.7</td><td>N45E</td><td>10</td><td></td><td></td><td>O/N</td><td>10</td><td>50</td><td></td><td>X</td><td></td><td>Х</td><td>STREAMBED</td><td></td></t<>	S-78	29 41.14	98 13.15	Z-SC	30	Kep	1	7	0.7	N45E	10			O/N	10	50		X		Х	STREAMBED	
S-80 29 40.98 98 13.24 CD 5 Kep 8 6 0.5 INSTW O 8 13 X X HILLTOP S-81 29 40.99 98 13.22 SC 20 Kep 0.5 0.7 2 N77E O 13 33 X X HILLTOP S-82 29 40.99 98 13.11 O-FR 5 Kep 40 18 N45E 10 O/F 9 24 X X X STRAMBED S-83 29-40.82 98-13.24 MB-W 30 Kep 0.6 65 60 N 40 70 X X HILLTOP S-84 29-40.82 98-13.24 MB-W 30 Kep 0.5 6.6 560 N 40 70 X X HILLTOP S-84 29-41.33 98 13.52 SC 20 Kep 2 0.3 1.5 N46E 10 O 8 38 X X HILLTOP S-85 29.41.29 98 13.46 SF 20 Kep 2 0.3 1.5 N46E 10 O 8.38 X X HILLTOP	S-79	29 41.13	98 13.19	SF	20	Kep	4	0.4	1.5	N80W				O/F	10	30	Х		Х		HILLTOP	
S-81 29 40.99 98 13.22 SC 20 Kep 0.5 0.7 2 N77E 0 13 33 X X HILLTOP S-82 29 41.03 98 13.11 O-FR 5 Kep 40 18 N45E 10 O/F 9 24 X X STREAMBED S-84 29 40.82 98 13.22 SC 20 Kep 0.6 >60 >60 >60 N 40 70 X X HILLTOP S-84 29 41.33 98 13.26 SC 20 Kep 3 4 3 N60W 0 11 31 X X HILLTOP S-85 29 41.29 98 13.26 SF 20 Kep 2 0.3 1.5 N46E 10 0 8 38 X X HILLTOP 2A TYPE TYPE 2B POINTS S C Coarse - cobles, breakdown, sand, gravei C <td>S-80</td> <td>29 40.98</td> <td>98 13.24</td> <td>CD</td> <td>5</td> <td>Кер</td> <td>8</td> <td>6</td> <td>0.5</td> <td>N57W</td> <td></td> <td></td> <td></td> <td>0</td> <td>8</td> <td>13</td> <td>Х</td> <td></td> <td>Х</td> <td></td> <td>HILLTOP</td> <td></td>	S-80	29 40.98	98 13.24	CD	5	Кер	8	6	0.5	N57W				0	8	13	Х		Х		HILLTOP	
S-82 29 41.03 98 13.11 O-FR 5 Kep 40 18 N45E 10 O/F 9 24 X X STREAMBED Plugged S-83 29 40.82 98 13.24 MB-W 30 Kep 0.5 6.6 >50 N N 40 70 X X HILLTOP S-84 29 41.33 98 13.52 SC 20 Kep 3 4 3 N60W O 11 31 X X HILLTOP S-85 29 41.29 98 13.46 SF 20 Kep 2 0.3 1.5 N46E 10 O 11 31 X X HILLTOP > DATUM: NAD 83	S-81	29 40.99	98 13.22	SC	20	Kep	0.5	0.7	2	N77E				0	13	33	Х		Х		HILLTOP	
S-83 29 40.82 98 13.24 MB-W 30 Kep 0.5 0.5 0.5 >50 N 40 70 X X HILLTOP S-84 29 41.33 98 13.52 SC 20 Kep 3 4 3 N60W 0 11 31 X X HILLTOP S-84 29 41.29 98 13.46 SF 20 Kep 2 0.3 1.5 N46E 10 0 8 38 X X HILLTOP * DATUM: NAD 83 * TYPE TYPE 2B POINTS 8 N None, exposed bedrock N None, exposed bedrock S S in NFILLING V C C carse - cobbles, breakdown, sand, gravei S S S S S in None, exposed bedrock S S C C carse - cobbles, breakdown, sand, gravei S S S S S S in None, exposed bedrock S	S-82	29 41.03	98 13.11	O-FR	5	Кер	40	18		N45E	10			O/F	9	24	Х			X	STREAMBED	
S-84 29 41.33 98 13.52 SC 20 Kep 3 4 3 N60W 0 11 31 X X HILLTOP S-85 29 41.29 98 13.46 SF 20 Kep 2 0.3 1.5 N46E 10 0 8 38 X X HILLTOP *DATUM: NAD 83 * TYPE 2B POINTS * Al INFILLING X HILLTOP 2A TYPE TYPE 2B POINTS 8A INFILLING * Al INFILLING * * HILLTOP SC Solution cavity 20 C Coarse - cobbles, breakdown, sand, gravei * * * * * SF Solution-enlarged fracture(s) 20 Coarse - cobbles, breakdown, sand, gravei *	8-83	29 40.82	98-13.21	MB-W	30	Kep	0.5	0.5	>50					N	40	70		X	X		HILLTOP	Plugged
S-85 29 41.29 98 13.46 SF 20 Kep 2 0.3 1.5 N46E 10 O 8 38 X X HILLTOP * DATUM: NAD 83 ZA TYPE TYPE 2B POINTS 8A INFILLING 8A INFILING 8A INFILING 8A INFIN	S-84	29 41.33	98 13.52	SC	20	Kep	3	4	3	N60W				0	11	31	Х		Х		HILLTOP	
• DATUM: NAD 83 2A TYPE TYPE 2B POINTS 8A INFILLING C Cave 30 N None, exposed bedrock SC Solution cavity 20 C Coarse - cobbles, breakdown, sand, gravel SF Solution-enlarged fracture(s) 20 O Loose or soft mud or soil, organics, leaves, sticks, dark colors F Fault 20 F Fines, compacted clay-rich sediment, soil profile, gray or red colors O Other natural bedrock features 5 V Vegetation. Give details in narrative description MB Manmade feature in bedrock 30 FS Flowstone, cements, cave deposits SW Swallow hole 30 X Other materials SH Sinkhole 20 Ciff, Hilltop, Hillside, Drainage, Floodplain, Streambed Z Zone, clustered or aligned features 30 Streambed	S-85	29 41.29	98 13.46	SF	20	Kep	2	0.3	1.5	N46E	10			0	8	38	Х		Х		HILLTOP	
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O Other natural bedrock features 5 V Vegetation. Give details in narrative description MB Manmade feature in bedrock 30 FS Flowstone, cements, cave deposits SW Swallow hole 30 X Other materials SH Sinkhole 20 CD Non-karst closed depression 5 12 TOPOGRAPHY Z Zone, clustered or aligned features 30 Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed	F	Fault				20		F	Fines	, compacted cla	y-rich	sedime	nt, soil pr	ofile, gra	ay or red colors							
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SH Sinkhole 20 CD Non-karst closed depression 5 Z Zone, clustered or aligned features 30 Cliff, Hilltop, Hillside, Drainage, Floodplain, Streambed	SW	Swallow hole				30		х	Other	materials												
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	Z	Zone, clustered	l or aligned featur	es		30		Cliff,	Hilltop	, Hillside, Drain	age, I	loodpla	in, Stream	nbed								

I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists. The

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Sheet 5 of 8

GEOL	OGIC ASS	ESSMENT	TABL	E _			PR	OJEC	T NAME:											
	LOCATIC	DN					FE/	ATUR	E CHARAC	TER	ISTIC	3			EV	ALUAT	ION	P	HYSI	CAL SETTING
1A	1B •	10.	2A	2B	3		4		5	5A	6	7	8A	8B	9		10		11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMEN	ISIONS ((FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	ITMTY	CATC AREA (HMENT (ACRES)	TOPOGRAPHY
						x	Y	Z		10						<40	≥40	<1.6	<u>>1.6</u>	
S-86	29 41.5	98 13.68	SF	20	Кер	2	0.2	11	155W				0	8	28	X		Х		HILLTOP
S-87	29 41.51	98 13.7	SF	20	Кер	4	1	21	139W				0	8	28	Х		Х		HILLTOP
S-88	29 41.49	98 13.82	O-FR	5	Кер	40	25	11	N45E	10			O/C	15	30	Х			X	STREAMBED
S-89	29 41.53	98 13.73	CD	5	Кер	6	4	0.7	N-S				0	8	13	Х			X	STREAMBED
S-90	29 41.69	98 13.45	MB-W	30	Кер			1	NELL				Х	5	35	Х		Х		HILLTOP
S-91	29 41.64	98 13.38	SF	20	Kep	3.5	2	2 8	E-W				O/F	18	38	X		Х		HILLTOP
S-92	29 41.56	98 13.5	SC	20	Kep	1.5	0.5	2.5	170W				0	13	33	Х		Х		HILLTOP
S-93	29 41.56	98 13.52	SC	20	Кер	3	1	11	N-S				O/F	7	27	X		Х		HILLTOP
S-94	29 41.63	98 13.38	SF	20	Кер	3.5	0.4	1.8	120W				0	7	27	Х		Х		HILLTOP
S-95	29 41.63	98 13.41	SF	20	Кер	0.4	3	1.7	170E				0	11	31	Х		Х		HILLTOP
S-96	29 41.66	98 13.86	SC	20	Кер	1.3	1	2.5	V10E				0	13	33	Х		Х		HILLTOP
S-97	29 41.65	98 13.88	SH	20	Кер	4.5	3	2.5	150E	10			С	9	39	Х		Х		HILLTOP
S-98	29 41.58	98 13.92	SC	20	Кер	1	1	3.5 1	V-S				0	13	33	X		Х		HILLTOP
S-99	29 41.77	98 13.48	CD	5	Кер	5	3	0.91	N-S				0	5	10	X		Х		HILLTOP
S-100	29 41.77	98 13.5	SH	20	Кер	50	15	31	160E	10			O/F	20	50		X	Х		HILLTOP
S-101	29 41.82	98 13.57	CD	5	Кер	40	10	0.9	150E	10			С	5	20	Х		Х		HILLTOP
S-102	29 40.18	98 12.61	Z-SC	30	Кер	300	70	81	N-S	12-3	1	10.24	C/N	35	65	18.1.34	X	2	Х	STREAMBED
* DATUN	1:NAD83																			
2A TYPE		TYPE	-	28	B POINTS] [BA INFIL	LING							
С	Cave				30		N	None,	exposed bedro	ck										
SC	Solution cavity				20		С	Coarse	- cobbles, bre	akdo	wn, san	d, gravel								
SF	Solution-enlarge	ed fracture(s)			20		0	Loose	or soft mud or	soil, d	organics	leaves,	sticks, d	lark colors						
F	Fault				20		F	Fines,	compacted cla	y-rich	sedime	nt, soil pr	rofile, gr	ay or red colors						
0	Other natural be	drock features			5		V	Vegeta	tion. Give deta	ails in	narrativ	e descrip	tion							
MB	Manmade featu	re in bedrock			30		FS	Flowst	one, cements,	cave	deposits									
SW	Swallow hole				30		Х	Other r	materials											
SH	Sinkhole				20															
CD	Non-karst close	d depression			5					12	TOPOG	RAPHY			1					

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 substitutions observed in the field. My signature certifies that I am qualified as a geologist as defined by a charter 213

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TCEQ-0585-Table (Rev. 10-01-04)

Zone, clustered or aligned features

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Sheet 6 of 8

GEOL	OGIC ASS	SESSMENT	TABL	E			PR	OJE	CT NAME:											
	LOCATIO						FE/	ATUF	RE CHARAC	TER	ISTIC	S			EV	ALUAT	ION	P	PHYSI	CAL SETTING
1A	18 *	1C*	2A	28	3		4		5	5A	6	7	8A	88	9		10		11	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	SNOIS	FEET)	TREND (DEGREES)	Dow	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	SITIVITY	CATCHM (AC	ENT AREA RES)	TOPOGRAPHY
						х	Y	Z		10						<40	>40	<1.6	>1.6	
S-103	29 40.68	98 12.75	SH	20	Kep	7	7	0.5					O/F	15	35	Х		Х		HILLTOP
S-104	29 39.97	98 12.77	CD	5	Kep	55	20	3	NW-SE				0	15	20	Х			Х	STREAMBED
S-105	29 39.94	98 12.72	CD	5	Кер	18	10	1	E-W				С	15	20	X			Х	STREAMBED
S-106	29 40.13	98 12.42	CD	5	Кер	15	10	0.9	N50W				C	15	20	Х			Х	STREAMBED
S-107	29 40.14	98 12.37	CD	5	Кер	50	18	3	N30W				С	15	20	Х			Х	STREAMBED
S-108	29 41.94	98 13.4	CD	5	Kep	250	13	1	N50E	10			F	5	20	Х		Х		HILLTOP
S-109	29 40.40	98 12.66	CD	5	Кер	35	9	1					F	9	14	X		Х		HILLTOP
* DATUN	I:NAD83																			
2A TYPE		TYPE		28	B POINTS							8A INFIL	LING							
С	Cave				30	ļ	N	None	, exposed bedro	ck										
sc	Solution cavity				20		С	Coars	se - cobbles, bre	akdo	wn, sand	l, gravel								
SF	Solution-enlarge	ed fracture(s)			20		0	Loose	e or soft mud or :	soil, c	rganics	leaves, s	sticks, d	lark colors						
F	Fault	,			20		F	Fines	. compacted clar	v-rich	sedime	nt, soil pre	ofile, ara	av or red colors						
0	Other natural be	edrock features			5		v	Vege	tation. Give deta	ils in	narrative	descript	ion	,						
MB	Manmade featu	re in bedrock			30		FS	Flows	stone, cements.	cave	deposits									
SW	Swallow hole				30	(х	Other	materials		,									
SH	Sinkhole				20							-	-							
CD	Non-karst close	d depression			5				-	12	TOPOG	RAPHY			1					
z	Zone, clustered	or aligned feature	es		30		Cliff,	Hilltop	, Hillside, Draina	ige, F	loodplai	n, Stream	bed							

TCEQ-0585-Table (Rev. 10-01-04)

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Sheet 7 of 8

GEOL	OGIC ASS	ESSMENT	TABL	E																
	LOCATIO	DN					FE/	ATUR	RE CHARAC	TER	ISTICS	3	<i>.</i>		EV	ALUAT	ION	P	HYSI	CAL SETTING
1A	1B •	1C*	2A	2B	3		4		5	5A	6	7	8A	8B	9		10	1	1	12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIME	NSIONS (FEET)	TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENS	πτινετγ	CATCHME (ACI	ENT AREA RES)	TOPOGRAPHY
						х	Y	z		10						<40	≥40	<1.6	<u>>1.6</u>	
S-110	29°39.77	98°12.53	MB-W	30	Кер				WELL				X	5	35	X		Х		HILLTOP
S-111	29°39.99	98°12.33	MB-W	30	Кер				WELL	_			Х	5	35	х		Х		HILLSIDE
S-112	29°40.03	98°12.32	MB-W	30	Кер				WELL				Х	5	35	Х		Х		FLOODPLAIN
S-113	29°40.07	98°12.90	MB-W	30	Кер				WELL				X	5	35	х		Х		HILLSIDE
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2A TYPE	.114000	TYPE		21		1							ING							_
c	Cave				30		N	None	exposed bedro	ck										
SC	Solution cavity				20		С	Coar	se - cobbles, bre	akdo	wn, sand	, gravel								
SF	Solution-enlarge	ed fracture(s)			20		0	Loose	e or soft mud or :	soil. c	rganics.	leaves, s	sticks. d.	ark colors						
F	Fault				20		F	Fines	compacted clav	-rich	sedimer	nt. soil pro	ofile, ara	av or red colors						
0	Other natural be	edrock features			5		V	Vege	tation. Give deta	ils in	narrative	descripti	ion	,						
MB	Manmade featu	re in bedrock			30		FS	Flows	stone, cements.	cave	deposits									
SW	Swallow hole				30		х	Other	materials											
SH	Sinkhole				20											_			_	
CD	Non-karst close	d depression			5				-	12	TOPOG	RAPHY		_						
z	Zone, clustered	or aligned feature	es		30		Cliff,	Hilltop	, Hillside, Draina	ige, F	loodplai	n, Stream	nbed							

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 spectra provide the provided in the field. My signature certifies that I am qualified as a geologist as defined on a draw of the complex structure. 100/00 THOMASO. MATHEW State P& 5321 ANNUL: TCEQ-0585-Table (Rev. 10-01-04)

Sheet 8 of 8

Modification of a Previously Approved Plan

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

 1.
 Current Regulated Entity Name: Capitol Aggregates Solms Operation

 Original Regulated Entity Name: New Braunfels Quarry

 Assigned Regulated Entity Numbers (RN): 1) 105203939_, 2) _____, 3) _____

The applicant has not changed and the Customer Number (CN) is: CN______

- X The applicant has changed. A new Core Data Form has been provided.
- 2. X Attachment A: Original Approval Letter and Approved Modification Letters: A copy of the original approval letter and copies any letters approving modification are found at the end of this form.
- 3. A modification of a previously approved plan in requested for (check all that apply):
 - X 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;
 - X 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.

WPAP Modification Summary Acres	Approved Project 1015	Proposed Modification 1015
Type of Development Number of Residential Lots	Industrial (Quarry) N/A	Industrial (Quarry) N/A
Impervious Cover (acres) Impervious Cover (%)	80	<u> </u>
Permanent BMPs	N/A	Quarry Pit, Stormwater Detention Pond
Other		
SCS Modification Summary Linear Feet Pipe Diameter Other	Approved Project	Proposed Modification
AST Modification Summary Number of ASTs Volume of ASTs Other	Approved Project	Proposed Modification
UST Modification Summary Number of USTs Volume of USTs	Approved Project	Proposed Modification

- 5. X Attachment B: Narrative of Proposed Modification. A narrative description of the nature of the proposed modification is provided at the end of this form. It discusses what was approved, including previous modifications, and how this proposed modification will change the approved plan.
 - X 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 provided at the end of this form. 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.
 - X 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.
 - X Acreage has not been added to **or** removed from the approved plan.
- 8. <u>X</u> 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.

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** TO A PREVIOUSLY APPROVED PLAN is hereby submitted for TCEQ review and executive director approval. The request was prepared by:

5

Mary Ellen P. Schulle, PE	
Print Name of Customer/Engineer	
TX License No. 114545 Firm No. 4624	
MARY FLIEN P SCHULLE	
N 114545	2/10/1
Signature of Customer/Engineer	Date
122 ALL LANDER	

6.

Kathleen Hartnett White, Chairman Larry R. Soward, Commissioner H. S. Buddy Garcia, Commissioner Glenn Shankle, Executive Director



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 12, 2007

Mr. Jim Addams Holcim (US) Inc. 122 W. Carpenter Freeway, Suite 485 Irving, Texas 75039

Re: Edwards Aquifer, Comal County

NAME OF PROJECT: New Braunfels Quarry; Located on the north side of FM 482, approximately 3 miles southwest of the intersection with IH 35; New Braunfels ETJ, Texas TYPE OF PLAN: Request for Approval of a Water Pollution Abatement Plan (WPAP); 30 Texas Administrative Code (TAC) Chapter 213 Edwards Aquifer Edwards Aquifer Protection Program ID No. 2643.00; Investigation No. 557130; Regulated

Edwards Aquilet Protection Program ID No. 2643.00; investigation No. 55/130; Regulated Entity No. RN105203939

Dear Mr. Addams:

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, Inc. on behalf of Holcim (US) Inc. on April 6, 2007. Final review of the WPAP was completed after additional material was received on June 14, 2007 and June 25, 2007. As presented to the TCEQ, the Temporary Best Management Practices (BMPs) and construction plans were prepared by a Texas Licensed Professional Engineer to be in general compliance with the requirements of 30 TAC Chapter 213. These planning materials were sealed, signed and dated by a Texas Licensed Professional Engineer. Therefore, based on the engineer's concurrence of compliance, the planning materials for construction of the proposed project and pollution abatement measures are hereby approved subject to applicable state rules and the conditions in this letter. The applicant or a person affected may file with the chief clerk a motion for reconsideration must be filed no later than 23 days after the date of 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 commercial project is a limestone quarry that will have an area of approximately 1,015 acres with 853 acres on the Recharge Zone. Quarrying activities will only occur on the Recharge Zone and be divided into 4 pits separated by 25 foot setbacks from the 100 year floodplain. Fifty foot setbacks will be provided for property boundaries. The total impervious cover for the site is approximately 80 acres. Twelve acres of existing ranch roads, consisting of compacted base material, are located on the recharge zone and the roads will not be widened or improved. Approximately 68 acres of impervious cover is proposed within the transition zone and will include the plant site, a portable building, scale house, truck scale, secondary processing plant, rail siding and cement storage facility. The quarry pit area will have a portable rock crushing plant and a conveyor system to transport product. Quarrying will occur to an elevation no deeper than 25 feet above the maximum potentiometric surface of the Edwards Aquifer stated to be 685 feet in the southern portion and 705 feet in the northern portion of the site. Project wastewater (domestic) will be collected in portable toilets and disposed of by a TCEQ registered waste disposal service.

REPLY TO: REGION 13 • 14250 JUDSON RD. • SAN ANTONIO, TEXAS 78233-4480 • 210-490-3096 • FAX 210-545-4329

P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • Internet address: www.tceq.state.bc.us

PERMANENT POLLUTION ABATEMENT MEASURES

To prevent the pollution of storm water runoff originating on-site or upgradient of the site and potentially flowing across and off the site after construction, various controls describe below will be utilized.

- Site Preparation and Excavation/Processing
 - · A two foot high (minimum) earthen berm will direct upgradient water around the plant site.
 - A four to six foot high earthen bern will be located on the downgradient side of the plant area and will store storm water runoff from this area.
 - Silt fence, earthen berms and rock berms will be constructed to prevent pollutants from entering surface streams and sensitive features.
 - A 25 foot natural undisturbed vegetated buffer area will be maintained between the quarry disturbance and the 100 year floodplain.

Pit/Site Closure

· Storm water runoff that contacts sediment in the quarry will be retained in the quarry pit.

A request was made for an exception to the requirement of permanent BMP for this project after pit and/or site closure. Based upon the plan review, the justification review, the nature of the regulated activity, the BMPs provided during the excavation and processing phase, TCEQ regulations and consistency with previous quary approvals pursuant to 30 TAC 213, the TCEQ grants the exception request for not providing BMPs after the quarrying operations have been completed.

GEOLOGY

According to the geologic assessment included with the application, 109 geologic and manmade features exist at the project site. Nineteen features (6 zones, 3 swallow holes, 2 faults, 1 solution enlarged fracture, 2 caves, 3 solution cavities, 1 well and 1 manmade boring) were rated as sensitive (>40). Any sensitive geologic feature in the quarry pit will be undisturbed until mining operations progress near the feature. The feature will be temporarily sealed until the feature can be mined out in the quarrying process. The San Antonio Regional Office conducted a site assessment on June 25, 2007 and found the site to be in general agreement with the geologic assessment.

SPECIAL CONDITIONS

General

- I. The holder of the approved Edwards Aquifer WPAP must comply with all provisions of 30 TAC Chapter 213 and all best management practices and measures contained in the application.
- II. In addition to the rules of the Commission, the applicant may also be required to comply with federal, state and local ordinance and regulations providing for the protection of water quality.
- III. This approval does not authorize manufacturing of explosives on the site.
- IV. This approval does not authorize the construction of an above ground storage tank facility. A separate AST facility plan shall be submitted and approved by the TCEQ. This AST plan shall provide an illustration that depicts the layout of the plant area including the AST facility, portable building, scale house, truck scale, secondary processing plant, rail siding and cement storage facility and any other structures on the transition zone.
- V. As stated in the WPAP application, a Texas Licensed Professional Geologist will conduct a quarterly survey of the pit area looking for geologic features. Records of the survey shall be maintained at the site and available for review by TCEQ staff for the life of the project.
- VI. As stated in the Westward Environmental, Inc. response dated June 13, 2007, the ranch roads located throughout the project site will not be widened or improved.

- VII. It is the responsibility of the applicant to comply with Chapter 11 of the Texas Water Code. This letter does not provide authorization or approval for any regulations of the Watermaster Program of the TCEQ.
- VIII. This letter does not provide authorization or approval for any regulations of the U.S. Fish and Wildlife Service.

Best Management Practices

- IX. Intentional discharges of sediment laden storm water are not allowed. If dewatering becomes necessary, the discharge will be filtered through appropriately selected best management practices to meet the requirements of the TPDES General Permit No. TXR050000 Sector J. These may include vegetated filter strips, sediment traps, rock berms, silt fence rings, etc.
- X. Perimeter berms shall be inspected and maintained annually, or more often if necessary, to ensure functionality. Inspection and maintenance records shall be kept on site and available for review by TCEQ staff for the life of the project. The perimeter berms shall be maintained after closure of the site unless a modification to the approved WPAP is submitted and approved by the TCEQ.
- XI. The BMPs for the plant site and stockpile area shall be operational prior to any crushing, processing, washing, stockpiling, etc.
- XII. Inspection and maintenance records of temporary BMPs shall be kept on site for a period of three years.
- XIII. A copy of pages 1-35 through 1-60 of the TCEQ TGM RG-348 (2005) shall be provided and kept on-site as a guide for soil stabilization. Temporary and/or permanent soil stabilization consistent with RG-348 (2005) shall be provided on all earthen berm structures
- XIV. All other temporary BMPs provided at the site shall conform to RG-348 (2005).
- XV. Any sediment deemed as waste or hazardous waste that is removed from any temporary BMP structure (silt fence, berms) or from the quarry pit area shall be properly disposed of according to 30 TAC 330 or 30 TAC 335, as applicable.

Other

- XVI. Pursuant to 30 TAC §213.4(j)(2&3), the holder of an approved Edwards Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating 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, and any development of land previously identified as undeveloped in the original water pollution abatement plan.
- XVII. Within 60 days of the date of this letter provide written confirmation that the three wells to be abandoned have been properly abandoned.
- XVIII. Within 60 days of the date of this letter address the pipeline along the eastern boundary of the site. Disclose the contents and the owner of the pipeline and describe how the pipeline will be protected during the earthen berm construction.
 - XIX. For clarification, feature recognition training will be provided for plant and quarry operators and personal. If a geologic feature is discovered by personal or operators, a Texas Licensed Professional Geologist shall further evaluate the feature and submit the required notifications and forms to the TCEQ.

STANDARD CONDITIONS

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

Prior to Commencement of Construction:

- 2. 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.
- 3. 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.
- 4. 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.
- 5. 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.
- 6. Temporary erosion and sedimentation (E&S) controls, i.e., silt fences, rock berns, 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.
- 7. 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:

- 8. 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.
- 9. 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.

- 10. Six 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.
- 11. 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.
- 12. 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.
- 13. 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:

- 14. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the San Antonio Regional Office within 30 days of site completion.
- 15. The applicant shall be responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. 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.
- 16. 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.
- 17. 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.

18. At project locations where construction is initiated and abandoned, or not completed, the site shall be returned to a condition such that the aquifer is protected from potential contamination.

If you have any questions or require additional information, please contact Charlyne Fritz of the Edwards Aquifer Protection Program of the San Antonio Regional Office at (210) 403-4065.

Sincerely, Glenn Shankle

Executive Director Texas Commission on Environmental Quality

GS/CEF/eg

Enclosure: Deed Recordation Affidavit, Form TCEQ-0625

 Mr. Gary Nicholls, P.E., Westward Environmental, Inc. Mr. Bruce Boyer, City of New Braunfels
 Mr. Robert Potts, Edwards Aquifer Authority
 Mr. Tom Hornseth, Comal County
 TCEQ Central Records, Building F, MC 212

Modification of a Previously Approved Plan Attachment B

Narrative of Proposed Modification

Approved WPAP – Approval for a WPAP (EAPP ID No. 2643.00) at the New Braunfels Quarry was received by Holcim (US) Inc. on July 12, 2007 to authorize a limestone quarry on the subject 1,015 acre tract of land in Comal County. Of the 1,015 acre property approximately 853 are located in the Edwards Aquifer Recharge Zone; the remaining 162 acres are located on the Edwards Aquifer Transition Zone. The original approval authorized quarrying activities over the Recharge Zone, divided into 4 pits separated by 25 foot setbacks from the 100 year floodplain. The primary portable rock crusher was to be located within the southernmost quarry pit. Fifty foot setbacks were to be provided for property boundaries. 14 acres of existing entrance and ranch roads are existing as impervious cover on the recharge zone. Approximately 68 acres of impervious cover were proposed within the transition zone including a secondary crusher, a portable scale house building, truck scales, rail siding and cement storage facility. Quarrying was approved to within 25 feet of the groundwater (685 feet in the southern portion and 705 feet in the northern portion of the site). An exception was requested and granted for the permanent best management practices requirement. Holcim (US) Inc. did not start construction under the WPAP but filed extension requests and received approvals on August 10, 2009; January 12, 2010; August 23, 2010; March 7, 2011; August 24, 2011; January 30, 2012; July 30, 2012; February 15, 2013; July 25, 2013; February 7, 2014; and July 30, 2014.

<u>Approved WPAP</u> – A WPAP was approved on September 29, 2008 for Comal County on 21.4 acres of this same property for the Dry Comal Creek FRS (EAPP ID No. 2824.00). This added 1.5 acres of impervious cover to the property. This acreage is not included in this Modification because the FRS area is controlled by Comal County. This project is complete. The FRS boundary is shown on the attached plans.

<u>Change of Ownership</u> – The New Braunfels Quarry was purchased by Capitol who changed the name of the site to Capitol Aggregates Solms Operation and filed an Intent to Commence Construction notice on July 16, 2014.

Note: Aside from the modifications proposed below, approved regulated activities onsite have not changed from the last modification and are ongoing at this time.

<u>Proposed Modification</u> – Capitol proposes to modify the existing WPAP at the Capitol Aggregates Solms Operation in order to:

Change the quarry limits: The total area proposed to be mined has been expanded from 613 acres, as originally approved, to 700 acres. In particular, quarrying is proposed to expand from the originally proposed boundaries on the west side of Dry Comal Creek due to Comal County's concurrence that quarrying in the inundation area of the FRS will increase the storage capacity of the reservoir created by the FRS. The quarry limits are setback to a distance of 50 feet from the northern property line. Setbacks will also be

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established a minimum of 25 feet from the 100-year floodplain and from any stream present without a mapped floodplain. Floodplain and stream setbacks within the quarrying limits will be temporary until approval can be obtained to mine within the floodplain. There will be no setback on the eastern and western property line where a boundary exists with other existing quarry operations, if an agreement with those entities to quarry to the property line can be obtained. BMPs such as grade breaks and berms may be put in place as necessary to prevent flow of stormwater between the neighboring properties. Otherwise a 50' setback from the east and west property lines will be established. See the attached Proposed Conditions Plan for newly proposed quarry limits.

Move the proposed plant location: The original WPAP approved the primary crushing plant on the Recharge Zone with a conveyor transporting material over to the secondary crushing plant on the Transition Zone. Capitol proposes to construct the entire plant on the Recharge Zone as shown on the attached Proposed Conditions Plan. The primary crusher will be constructed first and operate alone until the quarry pit is established. At that time, the primary crusher will be relocated into the pit and crushing will continue until there is room to construct the secondary plant, stockpiles and access roads in the pit. Runoff from each of these activities will be related in the pit. As the quarry pit expands, the primary crusher may be relocated to better facilitate operations.

Move the proposed entrance road to access the new plant location: A ranch road near the southwest corner of the Recharge Zone portion of the property was originally approved to be paved as the main entrance to the quarry pit.

This road will now remain unimproved and a new entrance is proposed to allow better access to the quarrying area. The entrance will be paved to the wheel wash. The road will be compacted base or paved from the wheel wash to the pit. Mulch and/or natural vegetation, silt fencing and earthen berms will be employed during construction to control dust and TSS. Silt fencing will be installed downgradient of this area to filter stormwater until soil stabilization has been achieved. See the attached Proposed Conditions Plan.

Construct truck scales and scale house: The original WPAP approved the construction of truck scales on the Transition Zone along with a portable building to serve as the scale house. Capitol proposes to also construct a pre-check scale in the quarry pit, as shown on the attached Proposed Conditions Plan. Silt fencing and an earthen berm will be installed downgradient of this area to treat stormwater until soil stabilization has been achieved. A berm will be established north of this area to prevent upgradient stormwater from running across.

Construct a shop/office building near the proposed plant entrance: A metal shop/office building will be constructed on a concrete foundation near the new entrance. Mulch and natural vegetation will control dust and TSS during construction. Silt fencing will be installed downgradient of this area to filter stormwater until soil stabilization has been achieved. A permanent berm will be established north of this area to prevent upgradient stormwater from running across. A combination earthen and rock berm will be installed downgradient of this area. See the attached Proposed Conditions Plan.

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Construct an access road along western side of the property: To allow better access to the site, and to provide haul truck access to the future Hot Mix Asphalt and Concrete Batch plants, an access road is proposed to be constructed as shown on the attached Proposed Conditions Plan. This road will be 100 ft. wide and crowned to drain to either side. A 50 ft. natural vegetated buffer will be maintained on both sides of the road to treat runoff, except for areas where it drains back into the pit (see Proposed Conditions Plan).

Construct road crossings: To facilitate the access within the site, three crossings (Crossing 1, Crossing 2, & Crossing 3) will be constructed as shown on the attached Proposed Conditions Plan. The drainage area to Crossing 1 has been calculated to be approximately 40 acres, and the crossing will be constructed on-grade. Crossing 1 will be paved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding. The access road approaching Crossing 1 from the south will be approximately 600 feet long, with a 10% slope, and will be excavated into the limestone hillside with an engineered swale to direct drainage and mitigate erosion. This portion has been designed with a 2% cross-slope to drain runoff towards the swale to convey stormwater to the creek while reducing erosion.

Crossing 2 will be a paved bridge with four 18-inch culverts that can accommodate the 2-year storm without overtopping the road.

Crossing 3 is an existing on-grade crossing established during the installation of the pipeline that runs under the site. This crossing will be widened and improved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding.

Outside of the pit, 50-foot vegetated buffers will be maintained on either side of the roads leading up to and away from each crossing, where feasible, to treat for TSS. TSS from these crossings will also be over-treated for by the stormwater detention pond described below.

Construct a recycled water/process water ponds: This pond will supply the processing plant with fresh and/or recycled water to wash aggregate. The pond will be constructed per the attached plans, with compacted limestone berms and a clay and/or geotextile liner per RG-500. See the attached Proposed Conditions Plan for pond placement. Additional ponds may be constructed as necessary to continue quarry operations. In the future, the wash operation will be expanded to include process water ponds on the Transition Zone. Transition Zone ponds will not be lined.

Construct a Hot Mix Asphalt Plant and Concrete Batch Plant: A proposed Hot Mix Plant (HMP) and Concrete Batch Plant (CBP) will be constructed near the northern property line. This will be located in a 62 acre drainage area which includes a 55 acre pad site and a stormwater detention pond. The 55 acre pad site will be constructed to accommodate both plants and associated appurtenances. An AST Plan will be submitted in the near future to address tanks associated with the HMP. Approval will be obtained

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prior to the installation of tanks. This area will be accessed from the west by the 100 foot wide haul road, and from the east by a 40 foot wide road, as shown on the attached Proposed Conditions Plan. Drainage from the pad site will be treated by the stormwater detention pond as described below.

Construct a stormwater treatment pond: The stormwater detention pond will be an approximately 10 foot deep 5 acre pond, constructed near the HMP/CBP plants as shown on the attached Proposed Conditions Plan. This pond will treat runoff from the 55 acre pad site, as well as providing overtreatment for the crossings and paved areas of the entrance road and fueling/shop area. The pond will be constructed per the attached plans, with a clay and/or geotextile liner per RG-500.

Sealing and removing sensitive features: The original WPAP approved seven sensitive features located within the mining limits to be temporarily sealed and ultimately removed through mining. With this Modification and the associated change in mining limits, Capitol proposes to also seal and remove three additional sensitive features. In order to protect the aquifer from possible contamination from sediment in storm water during construction of the quarry, Capitol will temporarily seal the naturally occurring sensitive features listed above, in the same manner that was previously approved. Flow will be maintained to each of these features until such time as quarrying progresses near the feature, at which time each will be sealed with topsoil, overburden, base material or flowable fill/concrete until they are quarried out.

Capitol will obtain any other necessary permits, such as floodplain, species habitat, and/or County permits, etc. as needed before construction continues into affected areas.

A total of 169 acres of impervious cover is proposed to be added to the property through this Modification. Approximately 96 acres of the 169 acres are located on the recharge zone and will include roads, crossings, the Hot Mix and Concrete Batch plant area, ponds, and the fueling/shop area The remaining 73 acres of proposed impervious cover are located on the Transition Zone and will include roads, process water pond area, and stockpile area. Approximately 17 acres of existing impervious cover (approximately 14 acres on the Recharge Zone and 3 acres on the Transition Zone) includes the existing paved entrance from FM 482 and ranch roads.

Water Pollution Abatement Plan Application

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

REGULATED ENTITY NAME: Capitol Aggregates Solms Operation

REGULATED ENTITY INFORMATION

4				
1.	I he typ	e of p	roject	IS:

- ____ Residential: # of Lots:
 - Residential: # of Living Unit Equivalents:
- ___ Commercial
- X Industrial
- ____ Other: _____
- 2. Total site acreage (size of property): <u>1015 acres</u>
- 3. Projected population: <u>25 employees</u>
- 4. The amount and type of impervious cover expected after construction are shown below:

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	9576	÷ 43,560 =	0.22
Parking		÷ 43,560 =	
Other paved surfaces	7,352,056.8	÷ 43,560 =	168.78
Total Impervious Cover	7,361,632.8	÷ 43,560 =	169
Total Impervious Cover ÷ Total Acreage x 100 =			16.7%

- 5. X ATTACHMENT A Factors Affecting Water Quality. A description of any factors that could affect surface water and groundwater quality is provided at the end of this form.
- 6. X Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

FOR ROAD PROJECTS ONLY 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: _____

- Length of Right of Way (R.O.W.): 9. feet. Width of R.O.W.: feet. $L \times W =$ _____ Ft² ÷ 43,560 Ft²/Acre = acres. Length of pavement area: 10. ____feet. _____ feet. Width of pavement area: $L \times W =$ _____ Ft² ÷ 43,560 Ft²/Acre =
 - $L \times W =$ _____ $Ft^2 \div 43,560 Ft^2/Acre =$ _____ 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 description of the Х volume and character (quality) of the stormwater runoff which is expected to occur from the proposed project is provided at the end of this form. The estimates of stormwater runoff quality and quantity should be based on area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and postconstruction conditions.

WASTEWATER TO BE GENERATED BY THE PROPOSED PROJECT

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

<u>100</u> % Domestic	50	_ gallons/day
% Industrial		_gallons/day
% Commingled		gallons/day

TOTAL 50 gallons/day THIS NUMBER BASED ON 25 EMPLOYEES USING PORTABLE TOILETS

- 15. Wastewater will be disposed of by:
 - **On-Site** Sewage Facility (OSSF/Septic Tank): N/A
 - ATTACHMENT C Suitability Letter from Authorized Agent. An on-site sewage facility will be used to treat and dispose of the wastewater. The appropriate licensing authority's (authorized agent) written approval is provided at the end of this form. It states that the land is suitable for the use of an onsite sewage facility or identifies areas that are not suitable.
 - 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.
 - N/A 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

TCEQ-0584 (Rev. 10-01-10)

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. <u>N/A</u> All private service laterals will be inspected as required in 30 TAC §213.5.

SITE PLAN REQUIREMENTS

Items 17 through 27 must be included on the Site Plan.

- 17. The Site Plan must have a minimum scale of 1'' = 400'. Site Plan Scale: $1'' = \underline{300}'$.
- 18. 100-year floodplain boundaries
 - X Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.
 - ____ No part of the project site is located within the 100-year floodplain.

The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s):

FEMA FIRM 48091C0440F – effective September 2, 2009	
LOMR 13-06-2849P – effective May 5, 2014	

- 19. ____ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Show lots, recreation centers, buildings, roads, etc.
 - X The layout of the development is shown with existing contours. Finished topographic contours will not differ from the existing topographic configuration and are not shown. FINAL CONTOURS ARE UNKNOWN AT THIS TIME; THE FINAL FLOOR ELEVATION WILL DEPEND ON SEVERAL VARIABLES SUCH AS ROCK QUALITY AND OPERATIONAL CONSIDERATIONS UNFORESEEABLE AT THIS TIME. HOWEVER, IT IS ANTICIPATED THAT THE FINAL ELEVATION WILL BE 25 FEET ABOVE THE GROUNDWATER LEVEL (APPROX. 685 FT IN THE SOUTHERN PIT AND 705 FT IN THE NORTHERN PIT).
- 20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):
 - X There are <u>7</u>(#) 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.
 - \overline{X} 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:
 - <u>X</u> 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. An exception to the Geologic Assessment requirement is requested and explained at the end of this form.
- 22. X The drainage patterns and approximate slopes anticipated after major grading activities.
- 23. X Areas of soil disturbance and areas which will not be disturbed.
- 24. <u>X</u> Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
- 25. <u>X</u> Locations where soil stabilization practices are expected to occur.
- 26. X Surface waters (including wetlands).
- 27. X Locations where stormwater discharges to surface water or sensitive features. There will be no discharges to surface water or sensitive features.

ADMINISTRATIVE INFORMATION

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

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:

Mary Ellen P. Schulle, PE Print Name of Customer/ Engineer TX License No. 114545 Firm No. 45	24 THE OF TELL
Signature of Customer/ Engineer	MARY ELLEN P. SCHULLE MARY ELLEN P. SCHULLE Date Date

WPAP Application Attachment A

Factors Affecting Water Quality

The major factor that could potentially affect water quality is sediment in stormwater runoff after the clearing of vegetation. More remote factors include rock crushing activities, in-plant roads, material loading areas, stockpiles, fuels and lubricants from vehicles and equipment, and trash/debris items.

Temporary and permanent BMPs (earthen berms, rock berms, vegetated buffers, engineered vegetated filter strips, temporary silt fencing, and mulch) located downgradient of the disturbed area(s), as well as the stormwater detention pond are proposed to capture sediment and control the flow of stormwater. Vehicle maintenance and fueling will be performed in the shop/fueling area near the main entrance, located as shown on the Proposed Conditions Plan. Large, slow moving equipment may be fueled or have emergency maintenance preformed within the pit. Spill kits will be kept readily available and may include drip pans, absorbent pads, base material, etc. Excavation equipment on-site may be used to construct berms in response to spills. If quarrying requires the maintenance/fueling area to be relocated, a similar base pad and berm will be constructed at a location to be determined at that time. Any spills or leaks will be cleaned up in a timely manner and will be disposed of properly. A trash receptacle will be placed onsite for use by employees and visitors.

Attachment B

Volume and Character of Stormwater

The stormwater from disturbed areas may carry an increased level of total suspended solids (TSS); however, temporary and permanent BMPs including downgradient earthen berms, rock berms, silt fencing, and the stormwater detention pond will intercept and retain/treat this stormwater flow. The rock berms will filter stormwater flows prior to leaving the active project areas. The proposed temporary and permanent 25 foot vegetated buffer on both sides of Dry Comal Creek and tributaries will also serve to treat stormwater runoff. Temporary BMPs such as mulch and natural vegetated areas will be used where feasible to control and filter runoff from paved areas of the site.

Due to the use of these Temporary BMPs during construction the character of stormwater runoff which is expected to occur from the proposed project will be essentially the same as prior to the proposed project. As quarrying activities continue, the volume of stormwater runoff will be reduced because the quarry pit will ultimately retain the anticipated onsite and upgradient stormwater runoff. The runoff coefficient for the proposed impervious areas is 0.9 and for the disturbed quarry area is 0.75. The runoff coefficient for predevelopment ranges from 0.25 to 0.6.

Temporary Stormwater Section

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

REGULATED ENTITY NAME: Capitol Aggregates Solms Operation

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:
 - ____ Aboveground storage tanks with a cumulative storage capacity of less that 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.
 - X 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.
 - ____ Fuels and hazardous substances will not be stored on-site.
- 2. <u>X</u> ATTACHMENT A Spill Response Actions. A description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is provided at the end of this form.
- 3. X 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. <u>X</u> ATTACHMENT B Potential Sources of Contamination. Describe in an attachment at the end of this form any other activities or processes which may be a potential source of contamination.
 - _ There are no other potential sources of contamination.

SEQUENCE OF CONSTRUCTION

- 5. X 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 provided at the end of this form. For each activity described, an estimate of the total area of the site to be disturbed by each activity is given.
- 6. X 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. X ATTACHMENT D Temporary Best Management Practices and Measures. A description of the TBMPs and measures that will be used during and after construction are provided at the end of this form. For each activity listed in the sequence of construction, include appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
 - X 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 has been provided in the attachment at the end of this form
 - a. 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.
 - b. 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.
 - c. A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
 - d. 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.
 - X ATTACHMENT E Request to Temporarily Seal a Feature. A request to temporarily seal a feature is provided at the end of this form. 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. X ATTACHMENT F Structural Practices. Describe 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. Placement of structural practices in floodplains has been avoided.
- 10. X ATTACHMENT G Drainage Area Map. A drainage area map is provided at the end of this form to support the following requirements. SEE PROPOSED CONDITIONS PLAN
 - ____ 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.
 - X 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.
- 11. <u>N/A</u> **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 has 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 provided as at the end of this form.
- 12. X ATTACHMENT I Inspection and Maintenance for BMPs. A plan for the inspection of temporary BMPs and measures and for their timely maintenance, repairs, and, if necessary, retrofit is provided at the end of this form. A description of documentation procedures and recordkeeping practices is included in the plan.
- 13. X 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. X 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. X 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. X 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. X 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 at the end of this form.
- 18. X 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. <u>X</u> Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

ADMINISTRATIVE INFORMATION

- 20. <u>X</u> All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
- 21. X 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. X 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.

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:

<u>Mary Ellen P. Schulle, PE</u> Print Name of Customer/Engineer TX License No. 114545 | Firm No. 4524

Signature of Customer/Engine MARY ELLEN P. SCHU 114545

2/10/15

Date

Temporary Stormwater Section 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 a 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, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up in a timely manner.

(2) Store hazardous materials and wastes in covered containers and protect from vandalism.

(3) Place a stockpile of spill cleanup materials where it will be readily accessible.

(4) Train employees in spill prevention and cleanup.

(5) Designate responsible individuals to oversee and enforce control measures.

(6) Spills should be covered and protected from stormwater run on during rainfall to the extent that it doesn't compromise clean-up activities.

(7) Do not bury or wash spills with water.

(8) Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.

(9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.

(10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.

(11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.

(12) Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

(1) Clean up leaks and spills in a timely manner.

(2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.

(3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

(1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.

(2) Use absorbent materials on small spills rather than hosing down or burying the spill.

(3) Absorbent materials should be promptly removed and disposed of properly.

- (4) Follow the practice below for a minor spill:
- (5) Contain the spread of the spill.
- (6) Recover spilled materials.
- (7) Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up in a timely manner:

(1) Contain spread of the spill.

(2) Notify the project foreman in a timely manner.

(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 in a timely manner by constructing an earthen dike. Dig up and properly dispose of contaminated soil.

(5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

(1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.

(2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.

(3) Notification should first be made by telephone and followed up with a written report.

(4) The services of a spills contractor or a Haz-Mat team should be obtained in a timely manner. 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.
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 in a timely manner. Follow company policy when responding to an emergency.

State Emergency Response Commission	(512) 463-7727
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 San Antonio	(210) 490-3096

Vehicle and Equipment Maintenance

(1) Minor vehicle maintenance tasks (changing of tires, oil and oil filters) will be performed on a designated maintenance/fueling area located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills. Minor and major maintenance like engine and body work is performed in the maintenance shop or offsite. Where maintenance cannot be performed in the shop, a flex base pad surrounded by a one foot high base berm will be constructed for this purpose. When quarrying requires the maintenance/fueling area to be relocated, a similar base pad and berm will be constructed at a location to be determined at that time. In situations where the construction of a base pad is not feasible, alternate methods of containment will be used, including, but not limited to, drip pans, spill kits, and earthen berms.

(2) Regularly inspect onsite vehicles and equipment for leaks and repair in a timely manner

(3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.

(4) Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.

(5) Place drip pans or absorbent materials under paving equipment when not in use.

(6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.

(7) Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.

(8) Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before

disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.

(9) Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

(1) Vehicle fueling will be performed on a designated maintenance/fueling area located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills. A concrete or flex base pad surrounded by a one foot high base berm will be constructed for this purpose. When quarrying requires the maintenance/fueling area to be relocated, a similar base pad and berm will be constructed at a location to be determined at that time.

(2) Discourage "topping off" of fuel tanks.

(3) Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

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:

Emergency Number for the National Response Center 1-800-424-8802

Portable Toilet BMPs:

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

- Locate portable toilets at least 20 feet from the nearest storm-drain inlet or sensitive-feature buffer area
- Prepare a level ground surface with clear access to the toilets.
- Secure all portable toilets to prevent tipping by accident, weather, or vandalism.
- 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.

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.

Attachment C

Sequence of Major Activities

Clearing has begun in the initial plant area, as shown on the attached Existing Conditions Plan. Topsoil is being cleared to create an earthen berm that will surround the initial plant and stockpile areas. After clearing is completed, excavation of the initial quarry pit will begin. A temporary rock crushing plant is being set up and crushing and screening operations started in order to make product for use onsite and shipment offsite. When the initial pit is large enough, the rock crushing plant will be relocated into the pit. It is estimated that this will take 12-18 months. As quarrying in the main pit (area north of the plant) is initiated, areas less than 10 acres will be cleared in stages as the quarrying progresses ultimately encompassing the areas labeled "Proposed Mining Limits" on the attached Proposed Conditions Plan. The cleared topsoil will be used to construct everexpanding berms surrounding the cleared area.

Clearing has also commenced for the newly proposed entrance drive which is being constructed as shown on the Proposed Conditions Plan. This will include a construction entrance and will be treated by mulch and/or natural vegetation, along with temporary downgradient silt fencing until the entrance can be paved A shop/fueling area will be

constructed north of this entrance road and both will be controlled by a downgradient earthen/rock berm. A temporary silt fence will be used downgradient of the earthen/rock berm until the earthen berm has been stabilized with vegetation. Undisturbed natural vegetated buffers downgradient of the earthen/rock berm will serve as final treatment for this area. A wheel wash will be located near the entrance. A pre-check truck scale will then be installed along the road in the pit, as shown on the Proposed Conditions Plan. Earthen berms, rock berms and silt fencing will temporarily control stormwater in this area during construction. Ultimately the pit will control runoff from this area.

Soon after construction commences in the shop/fueling area, clearing will begin for the HMP/CBP and the stormwater detention pond. The 55 acre pad site and associated drive way will be constructed to house the proposed Hot Mix Asphalt Plant (HMP) and Concrete Batch Plant (CBP), as well as miscellaneous equipment storage/parking. TSS from this area will be treated by the stormwater detention pond. An AST Plan will be submitted in the near future to address tanks associated with the site. Approval will be obtained prior to the installation of tanks. The stormwater detention pond will be constructed per the attached plans, with compacted limestone berms and clay and/or geotextile lining. After completion, the stormwater detention pond will treat TSS in stormwater flows from the HMP/CBP area and provide overtreatment for the shop/fueling area and entrance road, as well as for the three crossings. The exact location of the HMP/CBP area may vary, but the pad site and pond will be built in the same manner as described above.

As clearing continues, a 100 ft. wide access road will be constructed as shown on the Proposed Conditions Plan. The road will be constructed at least 50 ft. from the property line so that a naturally vegetated buffer will remain undisturbed along both sides of the road. This road will include two crossings (Crossing 1 & Crossing 2). Crossing 1 will be constructed on-grade through the Dry Comal Creek inundation area. The crossing will be paved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding. Crossing 2 will be a paved raised crossing with four 18-inch culverts that can accommodate the 2-year storm without overtopping the road. A third crossing (Crossing 3) is proposed to connect the pit on the west side of Dry Comal Creek to the pit on the east side of Dry Comal Creek. Crossing 3 is an existing on-grade crossing established during the installation of the pipeline that runs under the site. This crossing will be widened and improved with concrete and cleaned regularly by a vacuum truck to reduce TSS washout during times of flooding. Outside of the pit, naturally vegetated buffers will be maintained on either side of the roads leading up to and away from each crossing, where feasible, to treat for TSS. TSS from these crossings will also be over-treated for by the stormwater detention pond described above.

As aggregate production increases and Capitol prepares to wash material, a recycled water pond will be constructed on the Recharge Zone per the attached plans, with compacted limestone berms and clay and/or geotextile lining. Unlined process water ponds will be constructed in the future on the Transition Zone.

Attachment D

Temporary Best Management Practices (TBMPs)

7a) Pollution of surface water, groundwater or stormwater that originates upgradient from the proposed quarry pit will be redirected by earthen berms surrounding the plant and pit areas as shown on the Proposed Conditions Plan. Runoff from the disturbed plant area is retained in the quarry. As the size of the quarry expands, the earthen berms will expand throughout the life of the project to the "Proposed Mining Limits" shown on the WPAP Mod. Site Plan. Earthen berms will be used to direct upgradient stormwater around the HMP/CBP area and stormwater detention pond.

7b) Pollution of surface water, groundwater or stormwater that originates on-site or flows off site will be retained in the quarry or in the stormwater detention pond. As the size of the quarry expands, the earthen berms will expand throughout the life of the project to the "Proposed Mining Limits", as shown on the Proposed Conditions Plan. It is not expected that groundwater will be encountered in the quarry excavation or as surface flow anywhere on site. The stormwater detention pond will provide treatment so that site-wide TSS is reduced by 80%.

7c) The prevention of pollutants from entering surface streams, sensitive features or the aquifer will be mitigated by silt fences, earthen berms and rock berms, vegetated buffers, vegetative filter strips, the stormwater detention pond, and the construction entrance which will be constructed as shown on the attached Proposed Conditions Plan. Setbacks will be established a minimum of 25 feet from the 100-year floodplain and from any stream present without a mapped floodplain. Floodplain and stream setbacks within the quarrying limits will be temporary until approval can be obtained to mine within the floodplain. These naturally vegetated setbacks will serve as a final treatment for stormwater runoff leaving the active portion of the site. Earthen berms surrounding the pit will expand with the pit up to these setback points until approval can be obtained to mine within the floodplain. Temporary vegetated buffers will also be established, as shown on the Proposed Conditions Plan, around sensitive features located within the proposed mining limits, until the features are sealed and removed through mining.

Crossings 1 and 3 will be constructed of steel-reinforced concrete and built on-grade. A raised crossing is not warranted in these areas due to local topography. Installing a raised crossing would pose a greater risk of flooding and TSS contamination during larger storm events. These new crossings will be stabilized with concrete to reduce TSS and will be cleaned weekly using a vacuum sweeper truck. The access road approaching Crossing 1 from the south will be approximately 600 feet long, with a 10% slope, and will be excavated into the limestone hillside with an engineered swale to direct drainage and mitigate erosion. This portion has been designed with a 2% cross-slope to drain runoff towards the swale to convey stormwater to the creek while reducing erosion. Crossing 2 will be a paved bridge with culverts that can accommodate the 2-year storm without overtopping the road. Vegetated filter strips will be maintained on either side of the roads leading up to and away from each crossing to treat for TSS as indicated on the Proposed Conditions Plan.

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7d) 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.

Flow will be maintained to naturally occurring sensitive features, to the maximum extent possible, by using rock berms, silt fences and natural vegetated areas upgradient of the sensitive features. These types of BMP's slow the flow of water allowing for sedimentation, but allow the flow to be maintained. Earthen berms, the stormwater detention pond and the quarry, which store flows, will be used as pollution prevention measures to mitigate runoff from larger disturbed areas. These larger disturbed areas have a greater potential to contain sediment, therefore detention of these flows will be used to provide a higher level of protection to the water quality of the aquifer.

A Professional Geoscientist will inspect the quarry quarterly for sensitive features. Any possibly sensitive geologic feature discovered by mining staff or the Professional Geoscientist will be handled in the following manner: Sediment that can be easily removed from the area adjacent to the feature without disturbing the feature will be removed. Then a rock berm will be placed around the feature to control and filter any potential flows into the feature. After placement of the rock berm, the active work area of the quarry will be moved to another portion of the pit where the feature cannot be impacted by the continuing quarry operations. A Professional Geologist will observe and rate the feature. If the feature is determined to be sensitive in accordance with TAC 213 rules, the TCEQ will be notified and an appropriate method for addressing the feature will be formulated and submitted for TCEQ approval. Work will not resume in the area of the feature until the TCEQ approved method for addressing the feature has been carried out.

A Professional Geoscientist will be called to observe the locations of any new ponds in the pit, prior to construction, to verify that no new features are present. If sensitive features are identified, they will be treated in the same manner described above.

Temporary Stormwater Section Attachment E

Request to Temporarily Seal a Feature

The original WPAP approved the following sensitive features to be temporarily sealed and removal through mining:

S-21	S-23
S-36	S-70
S-71	S-78
S-100	

With this Modification, Capitol proposes to also temporarily seal and remove through mining the following sensitive features:

S-57 S-60 S-83

Because the ultimate proposed land-use at the site is for quarrying, each of the naturally occurring sensitive features identified in the Geologic Assessment that are located within the proposed quarrying footprint will eventually be mined out. In order to protect the aquifer from possible contamination from sediment in storm water during construction of the quarry, Capitol will temporarily seal the naturally occurring sensitive features listed above, in the same manner that was previously approved. Flow will be maintained to each of these features until such time as quarrying progresses near the feature, at which time each will be sealed with topsoil, overburden, base material or flowable fill/concrete until they are quarried out.

The alternative to sealing these features would be to not seal them, which would pose a greater threat to the aquifer, due to the potential for sediment to enter in runoff from adjacent disturbed areas. It is not reasonable or practical to avoid mining near or upgradient of sensitive features due to their spacing onsite. Mining around the sensitive features would create a safety hazard within the quarry because the features would be left atop pinnacles that would be very tall and slender. These pinnacles would be prone to collapse and would create unsafe working conditions within much of the quarry area.

Attachment F

Structural Practices

Temporary best management practices proposed for the limestone quarry include rock berms, natural vegetated buffers, engineered vegetative filter strips, mulch, silt fencing, earthen berms, construction entrances, a stormwater detention pond, and use of a vacuum truck. The rock berms are used to limit runoff discharge of sediment. The earthen berms are used to retain runoff and limit runoff discharge of pollutants from exposed areas of the site as well as to divert runoff away from exposed (disturbed) soils. Natural vegetative buffers will be left in place in areas not disturbed and will treat runoff from upgradient disturbed areas. Engineered vegetative filter strips will be located along the 40-foot HMP/CBP access road. The stormwater detention pond and quarry pit will also be utilized to retain runoff and reduce runoff discharge of pollutants from exposed areas of the site. The temporary and permanent 25 ft. vegetated buffers surrounding the floodplain and creek tributaries will treat runoff approaching the creek from upgradient disturbed areas. The on-grade crossings will be cleaned regularly by a vacuum truck.

Attachment I

Inspection and Maintenance for BMPs

The earthen berms, vegetated buffer areas, engineered vegetative filter strips, mulch, and stormwater detention pond should be inspected monthly. 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 berms should be backfilled and compacted as soon as possible. Any trash should be removed from vegetated and/or mulched areas. Eroded vegetated buffers should be reseeded and displaced mulch should be replaced.

The silt fences, rock berms, and construction entrance will be inspected weekly. When silt accumulates in excess of 6" at the silt fence it will be removed and placed in a protected area onsite to restore the effectiveness of the silt fence. If the silt fence is no longer able to properly filter sediment due to contamination from silt, torn fencing, collapsed fencing or any other damage to the fence it will be repaired or replaced. If a rock berm is no longer able to properly filter the sediment from the stormwater due to contamination from silt, it should be replaced.

The paved crossing and construction entrance (while present) should also be inspected weekly. Stones will be replaced in the construction entrance as necessary to prevent offsite tracking or sediment flow. The paved crossing with be cleaned with a vacuum truck weekly to reduce TSS washout.

During construction phases of the quarry stormwater discharges will be authorized under the TPDES General Permit No. TXR150000 for construction activities. Requirements of the general permit include maintaining a Stormwater Pollution Prevention Plan (SWP3) and performing inspections of the best management practices utilized to control stormwater pollution. Ultimately the Capitol Aggregates Solms Operation 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.

If necessary, mine dewatering will be accomplished according to the TCEQ storm water regulations noted in the TPDES General Permit No. TXR050000 under Sector J for Mineral Mining and Dressing Facilities. Requirements of this general permit, including the storm water pollution prevention plan (SWP3), will be in place at the site prior to beginning industrial activity. The numeric effluent limitations for Total Suspended Solids (TSS) when mine dewatering are 45 mg/L for a daily maximum and 25 mg/L for a daily average. The estimated background concentration as stated in the Edwards Aquifer Technical Guidance Manual (RG-348) is 80 mg/L for undeveloped areas and 170 mg/L for paved areas. This means that any water to be pumped from the quarry and discharged will be subject to sampling and analytical testing prior to discharge and the allowable TSS concentration will be lower than the estimated background concentration from

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undisturbed, undeveloped areas of the recharge zone. The water would be discharged to a natural drainage area onto a rip rap pad such that soil erosion would be mitigated. Appropriate rock berm(s) would be constructed downgradient of the rip rap pad if needed.

Capitol Aggreg	gates Solms Operation ment Practices Inspection F	orm											Capitol Aggregates, Inc. Temporacy Stormwater Section Attrichment I
				WEEKLY			1	**************************************	MON	THLY			remporary stanmater section Actuenment i
		Silt F	encing	Constructio	n Entrance	Crossing	Vegetated I	ilter Strips/Buffers	Mulch	Roc	k Berms	Earthen Berms	
Date	Inspector Signature	>6" Silt Retained	Damaged	Diminished Stones	Clogged Sediment	Sediment Accumulated	Trash	Vegetative Cover/Erosion	Mulch Cover/Erosian	>6" Silt Retained	Rock Berm Clogged	Erosion of Earthen Berm	Additional Comments
							•						

If the answer to any of the above questions is "yes", perform maintenance/repair/replacement as described below or in accordance with TCEQ Technical Guidance on BMPs.

Rock Berm

* >6" of silt retained - remove silt, place in protected area

* Rock berm clogged - the rock berm should be replaced when

accumulated silt, washout or damage to berm occurs

Earthen Berm

* Erosion of earthen berm - fill eroded areas and compact

Natural Vegetated Buffers

* Remove trash if present

* Reseeed eroded areas to reestablish vegetation

Construction Entrance

* Construction entrance should be inspected weekly

* Replace stones if needed

* Clean out sediment build-up if necessary

Paved Crossing

Mulch

* Clean w/ vacuum/sweeper weekly

* Remove trash if present

* Replace displaced mulch

Inspection Form

Attachment J

Schedule of Soil Stabilization Practices

Interim Stabilization

A. Outside the Pit:

Cleared areas and interim earthen berms may be disturbed for more than 14 days without stabilization because it is not practical to be continually stabilizing small areas prior to their excavation or stabilizing the earthen berms that are frequently relocated. The operator requires ample space in areas to be blasted for drilling and related equipment. It is a common industry practice to clear areas that are 2 or 3 times the proposed blast pattern width. These cleared areas will remain cleared until they are blasted. This timing depends upon many factors such as shot sizes, depths, production and sales rates, quality of rock, etc.

Because the soils and overburden in these cleared areas have been removed and placed in an earthen berm adjacent to the cleared areas, erosion of these areas is mitigated. The earthen berms upgradient of the cleared areas divert upgradient stormwater away from cleared areas and earthen berms downgradient of cleared areas retain stormwater runoff from the cleared area.

B. Inside the Pit:

Roads and stockpile areas do not need to be stabilized; the requirement for soil stabilization exists in order to control erosion and prevent pollutants from entering surface waters, streams, and the aquifer through sensitive recharge features. The disturbed soils in the quarry pit will be retained in the pit thereby eliminating the need for soil stabilization in the pit to prevent pollutants from entering surface waters or streams. The BMP discussed in the WPAP Temporary Stormwater Section Attachment D (7.d. third paragraph) will mitigate infiltration of stormwater into the quarry floor. In addition it is not practical to stabilize areas of the pit with vegetation because often times areas of the pit will remain inactive for some period of time, then be reactivated.

Permanent Stabilization

A. Outside the Pit:

Final earthen berms outside the pit will be stabilized with native grasses. In addition, in areas outside of the "Proposed Mining Limits", a natural vegetated buffer with a minimum width of 25 feet will be maintained between the edge of disturbance for the quarry activities and the onsite 100-year floodplain. Similar buffers will be established temporarily around other on-site creek tributaries. 50 feet of natural vegetation will remain undisturbed as shown on the attached Proposed Conditions Plan. These natural vegetated buffers will serve as a final treatment for stormwater runoff leaving the active portion of the site.

The quarry pits and stormwater detention pond will capture onsite stormwater flows. Any disturbed areas on-site at the end of quarrying that have not been quarried and do not drain into the pits or the stormwater detention pond will be re-vegetated to stabilize soils and reduce sediment in runoff.

B. Inside the Pit

The disturbed soils in the quarry pit will be retained in the pit thereby eliminating the need for soil stabilization. The BMP discussed in the WPAP Temporary Stormwater Section Attachment D (7.d. third paragraph) will mitigate infiltration of stormwater into the quarry floor.

Permanent Stormwater Section

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

REGULATED ENTITY NAME: Capitol Aggregates Solms Operation

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

- 1. <u>X</u> Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.
- 2. X 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.
 - X The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.
 - A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is provided below:
- 3. <u>X</u> Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.
- 4. X Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
 - ____ This site will be used for low density single-family residential development and has 20% or less impervious cover.
 - ____ This site will be used for low density single-family residential development but has more than 20% impervious cover.
 - X This site will not be used for low density single-family residential development.
- 5. X The executive director may waive the requirement for other permanent BMPs for multifamily 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. This site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is found at the end of this form.
- ____ This site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
- X This site will not be used for multi-family residential developments, schools, or small business sites.

6. **ATTACHMENT B - BMPs for Upgradient Stormwater.**

- X 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 identified as **ATTACHMENT B** at the end of this form.
- ____ If no surface water, groundwater or stormwater originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT B** at the end of this form.
- _____ If permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, an explanation is provided as **ATTACHMENT B** at the end of this form.

7. ATTACHMENT C - BMPs for On-site Stormwater.

- X 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 identified as **ATTACHMENT C** at the end of this form.
- If permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, an explanation is provided as **ATTACHMENT C** at the end of this form.
- 8. X 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 provided at the end of this form. Each feature identified in the Geologic Assessment as "sensitive" has been addressed.
- 9. X 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.
 - X The permanent sealing of or diversion of flow from a naturally-occurring "sensitive" or "possibly sensitive" feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed for any naturally-occurring "sensitive" or "possibly sensitive" features on this site.
 - ____ ATTACHMENT E Request to Seal Features. A request to seal a naturallyoccurring "sensitive" or "possibly sensitive" feature, that includes a justification as to why no reasonable and practicable alternative exists, is found at the end of this form. A request and justification has been provided for each feature.
- 10. X ATTACHMENT F Construction Plans. Construction plans and design calculations for the proposed permanent BMPs and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information have been signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed permanent BMPs and measures are provided at the end of this form. Design Calculations, TCEQ

Construction Notes, all man-made or naturally occurring geologic features, all proposed structural measures, and appropriate details must be shown on the construction plans.

- 11. X ATTACHMENT G Inspection, Maintenance, Repair and Retrofit Plan. A plan for the inspection, maintenance, repair, and, if necessary, retrofit of the permanent BMPs and measures is provided at the end of this form. The plan has been prepared and certified by the engineer designing the permanent BMPs and measures. The plan has been signed by the owner or responsible party. The plan includes procedures for documenting inspections, maintenance, repairs, and, if necessary, retrofits as well as a discussion of record keeping procedures.
- 12. X The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.
 - Pilot-scale field testing (including water quality monitoring) may be required for BMPs that are not contained in technical guidance recognized by or prepared by the executive director.
 - **ATTACHMENT H Pilot-Scale Field Testing Plan.** A plan for pilot-scale field testing is provided at the end of this form.
- 13. X 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 provided at the end of this form. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity which increase erosion that results in water quality degradation.

Responsibility for maintenance of permanent BMPs and measures after construction is complete.

- 14. X 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.
- 15. <u>X</u> 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.

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:



Permanent Stormwater Section Attachment B

BMPs for Upgradient Stormwater

The final earthen berm surrounding the quarry and plant area will prevent upgradient runoff from contacting the disturbed soils in the plant area. As the size of the quarry expands, the earthen berms will expand throughout the life of the project to the "Proposed Mining Limits" shown on the attached Proposed Conditions Plan. Upgradient berms prevent stormwater from contacting the HMP/CBP pad site.

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 and the stormwater detention pond. Upgradient stormwater will be directed around the site by the "Proposed Mining Limits". A 50 foot vegetated buffer will be located as shown on the attached Proposed Conditions Plan. No surface water or groundwater upgradient will flow across the site.

Attachment C

BMPs for On-site Stormwater

It is not expected that any significant amount of groundwater will be encountered in the quarry excavation or as surface flow in disturbed areas of the site.

The main entrance will be paved, at least to the wheel wash, to prevent tracking of sediment onto the adjacent road and to reduce the generation of dust. This area and the HMP/CBP pad site will be treated by the stormwater detention pond. Additional TSS protection is provided by the vegetated filter strips and buffers in place along both sides of the entrance roads.

The earthen berm surrounding the quarry and plant area will prevent on-site stormwater from discharging from disturbed areas and will retain any runoff from the plant area in the quarry pit. As the size of the quarry expands, the earthen berms will expand throughout the life of the project to the "Final Earthen Berm" limits, as shown on the Proposed Conditions Plan. No surface water or groundwater upgradient will flow across disturbed portions of the site.

The stormwater detention pond will be an approximately 10 foot deep 5 acre pond, constructed near the HMP/CBP plants as shown on the attached Proposed Conditions Plan. This pond will treat runoff from the 55 acre pad site, as well as providing overtreatment for the crossings and paved areas of the entrance road and fueling/shop area. The pond will be constructed per the attached plans, with a clay and/or geotextile liner per RG-500.

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 and the stormwater detention pond. A 50 foot vegetated buffer will be located as shown on the attached Proposed Conditions Plan. No surface water or groundwater upgradient will flow across the site.

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:

The earthen berm surrounding the quarry and plant area will prevent upgradient runoff from contacting the disturbed soils in the plant area and will retain any runoff from the plant area in the quarry pit.

The quarry pits and the stormwater detention pond will capture onsite stormwater flows. Any disturbed areas on-site at the end of quarrying that have not been quarried will be revegetated to stabilize soils and reduce sediment in runoff.

Vegetation is used to permanently stabilize sediment and reduce erosion from disturbed areas that do not drain into the pit. Permanent vegetative cover is an effective method for stabilizing soils by protecting bare soils from raindrop impact and by reducing the velocity and volume of overland flow. By stabilizing soils the quality of runoff will be improved.

In addition, setbacks will be established a minimum of 25 feet from the 100-year floodplain and from any stream present without a mapped floodplain. Only floodplain and stream setbacks which are located outside of the proposed mining limits will be permanent. Natural vegetation will remain undisturbed as shown on the attached Proposed Conditions Plan. These natural vegetated buffers will serve as a final treatment for stormwater runoff leaving the active portion of the site.

Attachment F

Construction Plans

See Proposed Conditions Plan.

Attachment G

Inspection, Maintenance, Repair and Retrofit Plan

Final Earthen Berm:

Final earthen berms should be inspected monthly until stabilized with vegetation. 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 berms should be backfilled and compacted as soon as possible.

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Natural Vegetated Buffers:

Natural vegetated buffers should be inspected at least twice annually, until the Final Earthen Berm has been vegetated, for erosion or damage to vegetation. Bare spots and areas of erosion identified during inspections must be replanted and restored to meet specifications. Trash and debris items should be removed.

Ponds:

Maintenance requirements for wet basins are outlined below, along with design tips that can help to reduce the maintenance burden (modified from Young et al., 1996).

Routine Maintenance

• *Mowing.* The side-slopes and embankment of the basin should be mowed at least twice a year to prevent woody growth and control weeds.

• *Inspections*. Wet 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 basin is functioning properly. There are many functions and characteristics of these BMPs that should be inspected. The embankment should be checked for subsidence, erosion, leakage, cracking, and tree growth. The condition of the emergency spillway should be checked. The inlet, barrel, and outlet should be inspected for clogging. The adequacy of upstream and downstream channel erosion protection measures should be checked. Stability of the side slopes should be checked. Modifications to the basin structure and contributing watershed should be evaluated. During semi-annual inspections, replace any dead or displaced vegetation. Cracks, voids and undermining should be patched/filled to prevent additional structural damage. Trees and root systems should be removed to prevent growth in cracks and joints that can cause structural damage.

• *Debris and Litter Removal.* As part of periodic mowing operations and inspections, debris and litter should be removed from the surface of the basin. Particular attention should be paid to floatable debris around the riser, and the outlet should be checked for possible clogging.

• *Erosion Control.* The basin side slopes and embankment all may periodically suffer from slumping and erosion. Corrective measures such as regrading and revegetation may be necessary. Similarly, the riprap protecting the channel near the outlet may need to be repaired or replaced.

• *Nuisance Control.* Most public agencies surveyed indicate that control of insects, weeds, odors, and algae may be needed in some ponds. Nuisance control is probably the most frequent maintenance item demanded by local residents. If the ponds are properly sized and vegetated, these problems should be rare in wet ponds except under extremely dry weather conditions. Twice a year, the facility should be evaluated in terms of nuisance control (insects, weeds, odors, algae,

etc.). Biological control of algae and mosquitoes using fish such as fathead minnows is preferable to chemical applications.

Non-routine maintenance

• *Structural Repairs and Replacement*. Eventually, the various inlet/outlet and riser works in the wet basin will deteriorate and must be replaced. Some public works experts have estimated that corrugated metal pipe (CMP) has a useful life of about 25 years, while concrete barrels and risers may last from 50 to 75 years. The actual life depends on the type of soil, pH of runoff, and other factors.

• Sediment Removal. Wet ponds will eventually accumulate enough sediment to significantly reduce storage capacity of the permanent pool. As might be expected, the accumulated sediment can reduce both the appearance and pollutant removal performance of the ponds. Sediment accumulated in the concrete sediment basin will be removed as necessary based on visual inspection. Dredging of the permanent pool should occur as necessary, or when accumulation of sediment impairs functioning of the outlet structure. A pump will be used to facilitate drawdown and emptying of the permanent pool to assist with sediment removal and inspection of pond liners.

• *Harvesting.* If vegetation is present on the fringes or in the ponds, it can be periodically harvested and the clippings removed to provide export of nutrients and to prevent the basin from filling with decaying organic matter.

Vegetative Filter Strips:

Vegetative Filter Strips should be inspected at least twice annually for erosion or damage to vegetation, until the associated road is located within the quarry pit, or until the quarrying and HMP/CBP activities are complete. Bare spots and areas of erosion identified during inspections must be replanted and restored to meet specifications. Filter strips should be mowed at least twice annually. Regular mowing should also include weed control practices, however herbicide use should be kept to a minimum. Trash and debris items should be removed.

Inspection, Maintenance, Repair and Retrofit Plan

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

I understand the specific Permanent Best Management Practices (PBMPs) and associated inspection and maintenance schedule which are outlined in this IMMR Plan. Capitol Aggregates, Inc. will implement these inspections and perform maintenance as required to meet the intent of the IMMR Plan.

Name and signature of responsible party for maintenance of permanent BMPs Print Name: David Disbrow - Capitol Aggregates, Inc.

Date: $\frac{z}{4}/15$ Signature

Name and signature of Engineer Print Name: Mary Ellen P. Schulle, PE - Westward Environmental, Inc.

Date: 2/110/15 Signature

TCEQ-R13 FEB 1 0 2015 SAN ANTONIO



Permanent Stormwater Section Attachment I

Measures for Minimizing Surface Stream Contamination

To avoid surface stream contamination, flows from areas outside of the quarry pits will be minimized by vegetation/undisturbed areas, berms, and the permanent stormwater pond. These BMPs will mitigate increases in stream flows due to the regulated activity (impervious cover associated with the site). The quarry pits will retain stormwater and any associated contaminants without discharge to surface water or stream channels. Because little runoff is expected from the site due to the proposed quarry pits and permanent BMPs, stream flashing, stronger flows, and in-stream velocities are not expected to occur as a result of this project.

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FEB 1 0 2015

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	For Required Signature Edwards Aquifer Protection Program Relating to 30 TAC Chapter 213 Effective June 1, 1999	FEB 1 0 SAN AN
I	David Disbrow	
	Print Name	
An 1911 III III III III III III III III II	Title - Owner/President/Other	
of	Capitol Aggregates, Inc. Corporation/Partnership/Entity Name	
have authorized	Curt Campbell, PE and Gary Nicholls, PE and Mary Elle Print Name of Agent/Engineer	en Schulle, PE

Agent Authorization Form

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:

- The applicant is responsible for compliance with 30 Texas Administrative Code 1. 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.
- No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the 5. activity has been filed with and approved by the Executive Director.

Sa Dut Applicant's Signature

2/4/15 Dath

THE STATE OF TEXAS §

County of <u>BexAR</u>§

BEFORE ME, the undersigned authority, on this day personally appeared $\underline{Dauta Disbrow}$ 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 4^{th} day of February . 2015.

Carol ann alul NOTARY PUBLIC



CAROL Ann Abel Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 8/6/18

Texas Commission on Environmental Quality Edwards Aquifer Protection Program Application Fee Form

NAME OF PROPOSED REGULATED ENTITY: <u>Capito</u> REGULATED ENTITY LOCATION: <u>5858 FM 482, New</u> NAME OF CUSTOMER: Capitol Aggregates. Inc.	ol Aggregates Solms Operation v Braunfels, TX 78123	
CONTACT PERSON: <u>Paul Detterline</u> (Please Print)	PHONE: <u>210-871-72</u>	14
Customer Reference Number (if issued): CN 604	1635722 (nin-	e digits)
Regulated Entity Reference Number (if issued): RN 105	5203939 (nin	e digits)
Austin Regional Office (3373)	🗌 Travis 🔲 Williamson	
San Antonio Regional Office (3362) 🛛 🗌 Bexar	🛛 Comal 🔲 Medina 🗌	Kinney 🗌 Uvalde
Application fees must be paid by check, certified check Environmental Quality. Your canceled check will ser your fee payment. This payment is being submitted to	c, or money order, payable to the rve as your receipt. This form o (Check One):	e Texas Commission on must be submitted with
Austin Regional Office	🛛 San Antonio Regional O	ffice
Mailed to TCEQ: TCEQ – Cashier Revenues Section Mail Code 214 P.O. Box 13088 Austin, TX 78711-3088 Site Location (Check All That Apply): 🕅 Recharge 2	Overnight Delivery to TC TCEQ - Cashier 12100 Park 35 Circle Building A, 3rd Floor Austin, TX 78753 512/239-0347 Zone Contributing Zone	EQ:
Type of Plan	Size	Fee Due
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	1015 Acres	\$10,000
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	Fach	\$

1 2 Signature

2/4/15 Date

If you have questions on how to fill out this form or about the Edwards Aquifer protection program, please contact us at 210/490-3096 for projects located in the San Antonio Region or 512/339-2929 for projects located in the Austin Region.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512/239-3282.

TCEQ-0574 (Rev. 4/25/08)

Texas Commission on Environmental Quality Edwards Aquifer Protection Program Application Fee Schedule 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications Contributing Zone Plans and Modifications

PROJECT	PROJECT AREA IN ACRES	FEE
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5 5 < 10 10 < 40 40 < 100 100 < 500 ≥ 500	\$1,500 \$3,000 \$4,000 \$6,500 \$8,000 \$10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	<pre>< 1 1 < 5 5 < 10 10 < 40 40 < 100 ≥ 100</pre>	\$3,000 \$4,000 \$5,000 \$6,500 \$8,000 \$10,000

Organized Sewage Collection Systems and Modifications

PROJECT	COST PER LINEAR FOOT	MINIMUM FEE MAXIMUM FEE
Sewage Collection Systems	\$0.50	\$650 - \$6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

PROJECT	COST PER TANK OR PIPING SYSTEM	MINIMUM FEE MAXIMUM FEE
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

Exception Requests

PROJECT	FEE
Exception Request	\$500

Extension of Time Requests

PROJECT	FEE
Extension of Time Request	\$150

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TX COMMISSIC Invoice No.	N ON ENVIRONMENTAL, QUALITY, Description	P.O. BOX 13089, AUSTI Date	N TX 78711-3 Gross Amount	Discount Amount	(TEXCO308 Net Amount Paid
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a salar		TOTALS:	\$10,000.00	\$0.00	\$10,000.
PAY TX C	CAPITOL AGGREGATES, P.O. BOX 33240 SAN ANTONIO, TEXAS 78265-3240 Thousand and OO/100 Dollars	NTOGRAPH AND MICROPRIMING IN THE INC. BANK OF WICHITA		ANNS AN ARTIFICIAL WATERMARK	HOLD AT AN ANGLE TO VIEV Number 6699 Amount \$ ****10,000.00 M-Stude
THE ALLA	LITY BOX 13089	1 2 510	· And Bar	Authorized Si	4/1/

MHU UUMPANIES U.S. Pati no. 6,085,407



TCEQ Core Data Form

SECTIO	For detaile N I: Gen	ed instructions regarding completic eral Information	on of this form	n, please rea	id the Core	Data Form Instru	ctions or call 512-239	-5175.
1. Reason fo	or Submissi	on (If other is checked please	e describe in	space pro	vided)	A CONTRACTOR	and a second s	
New Pe	rmit, Registr	ation or Authorization (Core Da	ata Form sh	ould be su	bmitted wi	ith the program a	application)	e - s the state
Renewa	al (Core Dal	a Form should be submitted w	ith the renew	val form)		Other		
2. Attachme	nts	Describe Any Attachments:	(ex. Title V A	pplication <u>,</u> V	Vaste Trans	sporter Application	, etc.)	detter-
⊠Yes	∐No	WPAP Modification Ap	oplication	1				
3. Customer	Reference	Number (if issued)	Follow this for CN or F	link to sear	<u>2h</u> 4. R	Regulated Entity	Reference Numb	er (if issued)
CN 6046	35722		Central	Registry**		N 10520393	9	
SECTION	N II: Cu	stomer Information						
5. Effective	Date for Cu	stomer Information Updates	(mm/dd/yyy	/y)		_		
6. Customer	Role (Propo	sed or Actual) - as it relates to the	Regulated E	ntity listed o	on this form	. Please check on	ly <u>one</u> of the following	E - maintaine
		Operator		wner & Op	erator		0.1	
	onal Licensee	e 🔄 Responsible Party		oluntary Cl	eanup Ap	plicant	Other:	
7. General C	ustomer Inf	ormation				1. A. 194	ACTIVITY STERATOR	
New Cus	tomer		pdate to Cu	stomer Info	rmation		nange in Regulated	Entity Ownership
**if "No Cha	ndo" and So	e (vernable with the rexas Second	Cretary of Si	Regulater	l Entity In	formation	o change	
	uctomor:	Corporation		dividual	i saiding in		nriotorchin D.P.A	_
	ustomer.						phetorship- D.B.A	
	ernment				ernment			
Other Go	vernment	General Partnership	Limited Partnership					
9. Customer	Legal Nam	e (If an Individual, print last name	first: ex: Doe,	John)	If new Cu below	istomer, enter pre	evious Customer	End Dale:
Capitol A	ggregates	, Inc.			Holcim	US, Inc.		6/12/2014
	P.O. Bo	x 33240						
10. Mailing								
Audiess.	City	San Antonio	State	TX	ZIP	78265	ZIP+4	3240
11. Country	Mailing Info	ormation (if outside USA)		12	E-Mail A	ddress (if applica	ible)	
13. Telephor	ne Number	下了以前的人民的	14. Extensi	on or Cod	9	15. Fax	Number (if applica	ible)
(210)87	71-6145	47 TV Clate Frenchies T	ar ID we a		DUNC NO	(210) 871-6923	Altraches a
To. Pederal	Tax ID (9 digits	17427312255		ns) 10.	DONS NU	inn bei (ir applicable)	801525417	
20. Number	of Employe	es	****	- 9 Sec.	and the second	21. h	ndependently Own	ned and Operated?
0-20	21-100	101-250 🛛 251-500	☐ 501 a	nd higher			X Yes	No
SECTIO	N III: Re	egulated Entity Info	rmation					
22. General	Regulated E	Entity Information (If 'New Re	gulated Enti	ily" is selec	ted below	this form should	l be accompanied b	y a permit application)
New Reg	ulated Entity	Update to Regulated E	Intity Name	Upc	late to Re	gulated Entity In	formation	lo Change** (See below)

**If "NO CHANGE" Is checked and Section I is complete, skip to Section IV, Preparer Information. 23. Regulated Entity Name (name of the site where the regulated action Is taking place) Capitol Aggregates Solms Operation

24. Street Address	5858	8 FM 482									
of the Regulated											
(No P.O. Boxes)	City	New Braun	fels	State	TX	ZIP	781	23		ZIP+4	4507
25 Malling	P.O.	Box 33240						_			
Address:			_				T				
- in Alle	City	San Antoni	0	State	TX	ZIP	782	265		ZIP+4	3240
26. E-Mail Address:	pa	ul.detterline(a)capito	olaggregat	es.com						
27. Telephone Numb	er	*		28. Extensio	on or Code	29.	Fax	lumber (if a	pplicable)		
210) 871-6145						(2	210)	871-692	3		
30. Primary SIC Code	e (4 digits)	31. Seconda	ary SIC C	ode (4 digits)	32. Primary (5 or 6 digits)	NAICS	Code	33. (5 o	Second r 6 dialts)	ary NAIC	S Code
1422					212312					-	
34. What is the Prima	ıry Busi	ness of this enti	ty? (Ple	ease do not rej	beat the SIC or N	IAICS de	scriptic	on.)			
Construction Ma	terials	Manufacturi	ng								
C	uestion	ns 34 - 37 addres	ss geogr	aphic locatio	on. Please ref	er to the	e instr	uctions for	applica	bility.	
5. Description to Physical Location:	On t Krue	he north side eger Canyon.	of FM	482, appr	ox. 0.75 m	iles w	est o	f the inte	rsectio	n of FN	1 482 &
6. Nearest City	and the second s	-	の予約	County			State		100 - 10 Mar. 1 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	Nearest	ZIP Code
New Braunfels				Comal			TX			78123	n.
37, Latitude (N) In D	Decimal:	29.66444	5		38. Longi	tude (W	/) In	Decimal:	98.21	0061	
Degrees	Minutes		Seconds		Degrees			Minutes		Sec	conds
29	39		52.00	2	98			12		36	5.219
. TCEQ Programs ar dates may not be made. If	nd ID Nu	Imbers Check all P ram is not listed, chec	rograms and	d write in the per write it in. See	mits/registration nu the Core Data For	umbers th	at will be ons for	e affected by th additional auld	ne updates ance.	submitted o	n this form or the
Dam Safety	[Districts		Edwards	Aquifer		ndustri	al Hazardous	Waste	🗌 Muni	cipal Solid Wast
				13-07040	501						
	A1	10005		DDL L						1-101	

		13-07040001		
New Source Review - Alr		Petroleum Storage Tank	D PWS	Sludge
Stormwater	Tille V – Air	Tires	Used Oil	Utilities
Voluntary Cleanup	Waste Water	Wastewater Agriculture	Water Rights	Other:

SECTION IV: Preparer Information

40. Name:	Chelsey J. Franklin		41. Title:	Environmental Specialist
42. Telephon	e Number 43. Ext./Code	44. Fax Number	45. E-Mail	Address
(830)249	-8284	(830)249-0221	cfrankli	n@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 9 and/or as required for the updates to the ID numbers identified in field 39.

(See the Core Data Form instructions for more information on who should sign this form.)

Company:	Capitol Aggregates, Inc.	Job Title:	C00		
Name(In Print) :	David Disbrow			Phone:	(210)871-6145
Signature:	Nation			Date:	2/4/15

CAPITOL AGGREATES, INC. DRAINAGE REPORT

WPAP MOD SOLMS OPERATION DRAINAGE IMPROVEMENTS

5900 FM 482 New Braunfels, Texas

Submitted to: TCEQ Region 13

February 2015

Prepared by:



Boerne, Texas Project No. 10072-187 Texas Registration No. 4524



Signature: _

Mary Ellen P. Schulle, P.E. - License No. 114545 Date: 2/10/15

This document is released for the purpose of review. It is not to be used for construction.

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APPENDICES

- I. TCEQ RG-348 Spreadsheet
- II. TCEQ RG-348 Spreadsheet Overtreatment
- III. Stage Storage Table
- IV. HydroCAD Report



Mary Ellen P. Schulle, P.E. - License No. 114545 Date: <u>2/10/15</u>

1 EXECUTIVE SUMMARY

The site is approximately 1,015 acres with approximately 853 acres located on the Recharge Zone. Of the 853 acres, approximately 96 acres (in addition to the 14 acres of existing impervious cover on the Recharge Zone) are proposed to be impervious as defined in 30 TAC 213 and TCEQ policy. This refers to either areas that are traditionally considered impervious (such as asphalt or concrete) and areas covered by compacted base. Approximately 30 acres of the proposed impervious cover is treated with vegetated filter strips and natural vegetated areas. Approximately 65 acres of impervious cover will be addressed using the proposed stormwater pond and includes 55 acres of impervious cover located in Drainage Area (DA-1) and approximately 10 acres of impervious cover located outside of DA-1.

DA-1 is a 62 acre drainage area which includes an approximately 55 acre pad site, an approximately 5 acre stormwater pond, and approximately 2 acres of vegetated areas. The 55 acre pad site includes the proposed hot mix plant, concrete batch plant, and equipment storage and parking.

The stormwater pond will overtreat for approximately 10 acres of impervious cover located outside DA-1 which includes three concrete channel crossings and a portion of the fueling/maintenance area to the south. There are currently 9 acres of proposed impervious cover outside of DA-1.

Site Areas		
Drainage Area Name	Total Area	Impervious Area
DA-1	62	55
Overtreatment	10	10
Total	72	65

*Approximately 7 acres of the 62 acres in DA-1 include the pond or are vegetated (stabilized berms and top of pond)

The proposed stormwater pond was designed as wet basin. The pond provides treatment for DA-1 and overtreatment for a portion of the fueling area and the three crossings.

Site wide TSS removal balance						
Treatment Area	Lm -	Lm – Provided				
	Required					
Pond	49368	58344				
Overtreatment (~10 acres)	8976	0				
Totals	58344	58344				

The purpose of this drainage report is to demonstrate compliance with TCEQ guidance for the proposed stormwater pond. The stormwater pond is being designed as a wet basin. The pond, along with the additional BMPs described in the WPAP application, provide adequate treatment such that additional TSS due to the increase in impervious cover is reduced by 80% site-wide.

2 INTRODUCTION

2.1 Purpose

Capitol Aggregates, Inc. proposes to add impervious cover associated with a proposed Hot Mix Plant, Concrete Batch Plant, and equipment storage area; a fueling area; and three crossings located at the Solms Operation. One new stormwater BMP (Pond) will be constructed to control and treat stormwater from these areas. The purpose of this drainage report is to demonstrate compliance with TCEQ guidance for the proposed stormwater pond.

2.2 Drainage Area Characteristics

The site is approximately 1,015 acres with approximately 853 acres located on the Recharge Zone. Of the 853 acres, approximately 96 acres (in addition to the approximately 14 acres of existing impervious cover on the Recharge Zone) are proposed to be impervious as defined in 30 TAC 213 and TCEQ policy. This refers to either areas that are traditionally considered impervious (such as asphalt or concrete) and areas covered by compacted base. Approximately 30 acres of the proposed impervious cover is treated with vegetated filter strips and natural vegetated areas. Approximately 65 acres of impervious cover will be addressed using the proposed stormwater pond and includes 55 acres of impervious cover located in DA-1 and approximately 10 acres of impervious cover located outside of DA-1.

DA-1 is a 62 acre drainage area which includes an approximately 55 acre pad site, an approximately 5 acre stormwater pond, and approximately 2 acres of vegetated areas. The 55 acre pad site includes the proposed hot mix plant, concrete batch plant, and equipment storage and parking.

The stormwater pond will overtreat for approximately 10 acres of impervious cover located outside DA-1 which includes three concrete crossings and a portion of the fueling/maintenance area to the south. There are currently 9 acres of proposed impervious cover outside of DA-1.

Site Areas		
Drainage Area Name	Total Area	Impervious Area
DA-1	62	55
Overtreatment	10	10
Total	72	65

*Approximately 7 acres of the 62 acres in DA-1 include the pond or are vegetated (stabilized berms and top of pond)

2.3 General Analysis notes

- 1) Each drainage area was analyzed as independent drainage basins.
- 2) The overall TSS removal target of 80% was applied to the Recharge Zone Portion of the Site.
- The ponds have been designed as Wet Basins with a TSS removal efficiency of 93%.
- 4) The ponds are located over the Edwards Aquifer Recharge zone and will be lined in accordance with RG-348.
- 5) Interior pond side slopes are 3:1 (H:V).

3 WATER QUALITY ANALYSIS

3.1 Methodology

Water quality analysis was performed based on TCEQ technical guidance document RG-348 for best management practices within the Edwards Aquifer. Water quality volumes (WQV) were 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 site from the existing condition. The water quality volumes were determined by looking at the total TSS removal across the facility. The stormwater pond was designed to provide treatment for DA-1 and overtreatment for approximately 10 additional acres of impervious cover located outside of DA-1.

Site wide TSS removal balance					
Treatment Area	Lm -	Lm – Provided			
	Required				
Pond	49368	58344			
Overtreatment (~10 acres)	8976	0			
Totals	58344	58344			

3.2 Pond Characteristics

The stormwater pond is designed as a wet basin. The pond provides water quality treatment for DA-1 (62 acres) of which 55 acres are considered impervious. Additionally, the pond provides overtreatment for 10 additional acres of impervious cover outside of DA-1. Per RG-348 the removal efficiency of a wet basin is 93%. The desired L_M was increased to include overtreatment for these additional 10 acres. The wet basin as used in this project has been modified from the recommendations outlined in RG-348. The main differences are that there is no aquatic vegetation proposed in these ponds and that there are no sediment forebays proposed. In order to compensate for these modifications we are proposing to provide a permanent pool volume (PPV) that is equivalent to 1.5 times the WQV + 20% for accumulated sediment (1.7 times the WQV). The desired TSS load removed (L_M) by the stormwater pond is 58344 lbs. of TSS, which is the target removal for an 80% reduction in TSS for 65 acres of impervious cover. The resultant fraction of annual runoff was calculated to be 0.75 which results in a rainfall depth equal to 0.92 inches. The WQV was calculated to be 652100 cubic feet. To account for sediment, an additional 20% of the WQV was included (1.2*WQV) and was calculated to be 782520 cubic feet. The permanent pool volume was calculated to be 1108570 cubic feet (25.4 acre-feet). Based on the attached stage-storage, the PPV was set to an elevation of 896.56 feet. The treatment volume for this pond is equal to one WQV and is included above the PPV. The elevation for the treatment volume was calculated to be 899.87 feet.
4 WATER QUANTITY ANALYSIS

4.1 Methodology

The proposed stormwater ponds were 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 yr – 24 hour storm event. The low flow analysis was used to size the low flow outfall weir for recovery 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 pond was analyzed for the 100-year 24-hour event. This additional check was due to the method of construction where a berm will be constructed at the down gradient side of the pond. The 100-year 24-hour event was used to analyze the spillway capacity and minimize the likelihood of berm failure.

4.1 Flow Analysis

Low Flow Analysis

RG-348 requires that a wet detention basin be designed to recover the WQV within a minimum of 24 hours. Since the recovery of a system is driven by the static head above the outfall elevation, the head is constantly decreasing during recovery. Therefore, under gravity flow conditions the rate of recovery is constantly decreasing. Since this project is not designed with any mechanical devices, a storm stacking approach has been utilized to illustrate compliance with the intent of the regulations. A 1 ft wide, 1 ft tall orifice with an invert elevation of 896.56 feet has been designed as the low flow outfall. The low flow outfall has been sized to allow approximately 70% percent of the WQV to leave the pond within 24 hours and 90% of the WQV within 48 hours. In the event that an additional rainfall event was to occur prior to the discharge of the full WQV 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. This pond will be able to treat multiple rainfall events that produce runoff equal to the WQV that occur 24 hours apart.

High Flow Analysis

The overflow spillway for this pond was designed to pass the 25-year 24-hour rainfall event of 7.75 inches. The peak stage for this pond during the design storm is EL 900.86 feet which is 1.14 feet below the top of berm. The spillway invert is set at EL 899.87 feet and is 20 feet wide. The pond top of bank is set at EL 902.00 feet. The peak outfall discharge rate at the spillway is 51.69 cfs. The 100-year 24-hour rainfall event of 10 inches was also considered in the design of the pond.

5 SUMMARY

The proposed ponds provide a site wide total TSS removal efficiency of 80% based on the calculations included in RG-348. Additional information on the construction and maintenance procedures for this system are included in the WPAP application submittal package. This report is supplemental to that application and is not a standalone document.

I. TCEQ RG-348 Spreadsheet – Stormwater Pond

Texas Commission on Environmental Quality			
TSS Removal Calculations 04-20-2009			Project Name: SOLMS Date Prepared: 11/2014
Additional information is provided for cells with a red triangle Text shown in blue indicate location of instructions in the Technical Characters shown in red are data entry fields. Characters shown in black (Bold) are calculated fields. Chang	in the upp I Guidance I ges to these	er right cor Manual - RG e fields will	rner. Place the cursor over the cell. 5-348. I 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 _M =	27.2(A _N x P)		
where: L $_{\rm M}$ total PROJECT = $$A_{\rm H}$$ = $$P_{\rm H}$$	Required TS Net increase Average ann	S removal resi in impervious ual precipitatio	ulting from the proposed development = 80% of increased load area for the project m, inches
Site Data: Determine Required Load Removal Based on the Entire Projec County # Total project area included in plan * Predevelopment impervious area within the limits of the plan * Total post-development impervious cover fraction * P = L_m totaL PROJECT =	Comal 853.00 0.00 65.00 0.08 33 58344	acres acres acres inches lbs.	
 The values entered in these fields should be for the total project area. 			
Number of drainage basins / outfalls areas leaving the plan area =	1		
2. Drainage Basin Parameters (This information should be provided for ea	ch basin);		
Drainage Basin/Outfall Area No. =	1		
Total drainage basin/outfall area = Predevelopment impervious area within drainage basin/outfall area = Post-development impervious area within drainage basin/outfall area = Post-development impervious fraction within drainage basin/outfall area Last area basin	62.00 0.00 55.00 0.89 49368	acres acres acres Ibs.	
3. Indicate the proposed BMP Code for this basin.			
Removal efficiency =	93	percent	Aqualogic Cartridge Filter Bioretention Contech StormFilter Constructed Wetland Extended Detention Grassy Swale Retention / Irrigation Sand Filter Stormceptor Vegstated Filter Strips Vortechs Wet Basin Wet Vault
4. Calculate Maximum SS Load Removed [L _B] for this Drainage Basin by	(BMP efficien	BMP Type.	34 6 + A- × 0 54)
where: Ac = A_{c} = A_{q} = A_{q} = A_{p} = L_{q} =	Total On-Site Impervious a Pervious area TSS Load rea	drainage area rea proposed i a remaining in moved from th	ain the BMP catchment area in the BMP catchment area the BMP catchment area is catchment area by the proposed BMP
A _C =	62.00	acres	
ې مې L _R =	55.00 7.00 58519	acres acres Ibs	
5. Calculate Fraction of Annual Runoff to Treat the drainage basin / ourfall	area		
Desired L _{M THS BASH} =	58344	lbs.	
F a Calculate Capture Volume required by the PMP Type for this definition	1.00	area	Calculations from RG-368 Pages 2.24 IA.2.28
or variousle Capture voiding required by the DMP Type for this drainage b	aauri ouualla	urea.	Concommons non recover rages 3-34 (0.3-30
Rainfall Depth = Post Development Runoff Coefficient = On-site Water Quality Volume =	4.00 0.72 652100	inches cubic feel	x
	Calculations	from RG-348	Pages 3-36 to 3-37
Off-site area draining to BMP = Off-site Impervious cover draining to BMP = Impervious fraction of off-site area = Off-site Runoff Coefficient = Off-site Water Quality Volume =	0.00 0.00 0 0.00 0	acres acres cubic feet	
Storage for Sedimert ≍ Total Capture Velume (required water quality volume(s) x 1.20) =	130420 782520	cubic feet	

II. TCEQ RG-348 Spreadsheet – Overtreatment

Drainage Basin/Outfall Area No. = Overtreat

Total drainage basin/outfall area =	10.00	acres
Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfail area =	10.00	acres
Post-development impervious fraction within drainage basin/outfall area =	1.00	
LM THUS BASIN =	8976	lbs.





Site: CAP AGG SOLMS

- 890.00 Minimum Stage for Site (ft above NGVD)
- 902.00 Maximum Stage for Site (ft above NGVD)
 - 0.50 Increment (ft)
 - 1.00 Number of Basins on Site

	Basin #1			
Basin Name:	1.00			
Lower Elevation:	890.00			
Upper Elevation:	902.00			
Lower Area(ac):	3.46	Total Area		
Upper Area(ac):	5.00	5.00		
Stana	Volume (ac-ft)	Total Volume	*	
000.00				
890.00	0.00	0.00		
890.50	1.70	1.70		
091.00	3.0Z	3.0Z 5.02		
891.50	0.33 7.40	0.33 740		
892.00	7,10	7.10		
892.50	9.05	9.05		
893.00	10.96	10.96		
893.50	12.90	12.90		
894.00	14.87	14.67		
894.50	10.87	10.07		
895.00	18.90	10.90		
895.50	20.97	20.97		
896.00	23.07	23.07		
896.50	25.20	25.20	X	000 50
897.00	27.36	27.36	T	896.56
897.50	29.56	29.56		
898.00	31.79	31.79		
898.50	34.05	34.05		
899.00	36.34	36.34		
899.50	38.66	38.66		
900.00	41.02	41.02	*	899.87
900.50	43.40	43.40		
901.00	45.82	45.82		
901.50	48.28	48.28		
902.00	50.76	50.76		

IV. HydroCAD Report

Page 1

2/10/2015

14.932 af, Depth= 2.89" 1.24 hrs, Volume= Runoff 158.12 cfs @

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Constant Intensity 1.00 hrs wqv Rainfall=2.89"



Constant Intensity 1.00 hrs wqv Rainfall=2.89" Page 2 2/10/2015

Prepared by {enter your company name here} HydroCAD® 8.00 s/n 004636 © 2006 HydroCAD Software Solutions LLC

Hydrograph for Subcatchment 1S: (new Subcat)

Time (bours)	Precip.	Excess	Runoff	Time (bours)	Precip.	Excess (inches)	Runoff
0.00	0.00	0.00	0.00	26.00	2 89	2 89	0.00
0.50	1.44	1.44	41.03	26.50	2.89	2.89	0.00
1.00	2.89	2.89	142.59	27.00	2.89	2.89	0.00
1.50	2.89	2.89	131.08	27.50	2.89	2.89	0.00
2.00	2.89	2.89	36.17	28.00	2.89	2.89	0.00
2.50	2.89	2.89	8.41	28.50	2.89	2.89	0.00
3.00	2.89	2.89	1.82	29.00	2.89	2.89	0.00
3.50	2.89	2.89	0.24	29.50	2.89	2.89	0.00
4.00	2.89	2.89	0.00	30.00	2.89	2.89	0.00
4.50	2.89	2.89	0.00	30.50	2.89	2.89	0.00
5.00	2.89	2.89	0.00	31.00	2.89	2.89	0.00
5.50	2.89	2.89	0.00	31.50	2.89	2.89	0.00
6.00	2.89	2.89	0.00	32.00	2.09	2.09	0.00
7.00	2.09	2.09	0.00	32.00	2.09	2.09	0.00
7.00	2.03	2.03	0.00	33.50	2.00	2.03	0.00
8.00	2.89	2.00	0.00	34 00	2.00	2.89	0.00
8.50	2.89	2.89	0.00	34.50	2.89	2.89	0.00
9.00	2.89	2.89	0.00	35.00	2.89	2.89	0.00
9.50	2.89	2.89	0.00	35.50	2.89	2.89	0.00
10.00	2.89	2.89	0.00	36.00	2.89	2.89	0.00
10.50	2.89	2.89	0.00	36.50	2.89	2.89	0.00
11.00	2.89	2.89	0.00	37.00	2.89	2.89	0.00
11.50	2.89	2.89	0.00	37.50	2.89	2.89	0.00
12.00	2.89	2.89	0.00	38.00	2.89	2.89	0.00
12.50	2.89	2.89	0.00	38.50	2.89	2.89	0.00
13.00	2.09	2.09	0.00	39.00	2.09	2.09	0.00
14.00	2.03	2.03	0.00	40.00	2.03	2.03	0.00
14.50	2.89	2.00	0.00	40.50	2.89	2.89	0.00
15.00	2.89	2.89	0.00	41.00	2.89	2.89	0.00
15.50	2.89	2.89	0.00	41.50	2.89	2.89	0.00
16.00	2.89	2.89	0.00	42.00	2.89	2.89	0.00
16.50	2.89	2.89	0.00	42.50	2.89	2.89	0.00
17.00	2.89	2.89	0.00	43.00	2.89	2.89	0.00
17.50	2.89	2.89	0.00	43.50	2.89	2.89	0.00
18.00	2.89	2.89	0.00	44.00	2.89	2.89	0.00
18.50	2.89	2.89	0.00	44.50	2.89	2.89	0.00
19.00	2.89	2.89	0.00	45.00	2.89	2.89	0.00
19.50	2.09	2.09	0.00	45.50	2.09	2.09	0.00
20.00	2.09	2.09	0.00	40.00	2.03	2.03	0.00
21.00	2.00	2.00	0.00	47.00	2.00	2.89	0.00
21.50	2.89	2.89	0.00	47.50	2.89	2.89	0.00
22.00	2.89	2.89	0.00	48.00	2.89	2.89	0.00
22.50	2.89	2.89	0.00				
23.00	2.89	2.89	0.00				
23.50	2.89	2.89	0.00				
24.00	2.89	2.89	0.00				
24.50	2.89	2.89	0.00				
25.00	2.89	2.89	0.00				
25.50	2.09	2.09	0.00				

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Pond 2P: (new Pond)

Inflow Area =	62.000 ac, I	nflow Depth = 2.89"	for wqv event		
Inflow =	158.12 cfs @	1.24 hrs, Volume=	14.932 af		
Outflow =	7.71 cfs @	2.53 hrs, Volume=	13.508 af,	Atten= 95%,	Lag= 77.3 min
Primary =	7.71 cfs @	2.53 hrs, Volume=	13.508 af		
Secondary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af		

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Starting Elev= 896.56' Surf.Area= 0.000 ac Storage= 25.459 af Peak Elev= 899.64' @ 2.53 hrs Surf.Area= 0.000 ac Storage= 39.300 af (13.841 af above start)

Plug-Flow detention time= (not calculated: initial storage excedes outflow) Center-of-Mass det. time= 856.0 min (932.3 - 76.4)

Volume	Invert	Avail.Storag	ge Storage Description
#1	890.00'	50.760	af Custom Stage Data Listed below
Elevatio	on Cum.S	Store	
(fee	et) (acre-	-feet)	
890.0	0 0	0.000	
890.5	50 1	.750	
891.0	0 3	3.520	
891.0)1 5	5.330	
892.0	0 7	7.180	
892.5	50 9	9.050	
893.0	0 10).960	
893.5	50 12	2.900	
894.0	0 14	1.870	
894.5	50 16	6.870	
895.0	0 18	3.900	
895.5	50 20).970	
896.0	0 23	3.070	
896.5	50 25	5.200	
897.0	0 27	7.360	
897.5	50 29	9.560	
898.0	0 31	.790	
898.5	50 34	.050	
899.0	0 36	5.340	
899.5	50 38	3.660	
900.0	0 41	.020	
900.5	50 43	3.400	
901.0	0 45	5.820	
901.5	50 48	3.280	
902.0	0 50).760	
Device	Routing	Invert	Outlet Devices
#1	Secondary	899.87'	20.0' long x 28.0' breadth Broad-Crested Rectangular Weir
	e soonaary	000.0.	Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	894.00'	24.0" x 62.0' long Culvert RCP, square edge headwall. Ke= 0.500





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Hydrograph for Pond 2P: (new Pond)

Time	Inflow	Storage	Elevation	Outflow	Primary	Secondary
(hours)	(cfs)	(acre-feet)	(feet)	(cfs)	(cfs)	(cfs)
0.00	0.00	25.459	896.56	0.00	0.00	0.00
1.00	142.59	29.847	897.56	3.23	3.23	0.00
2.00	36.17	38.828	899.54	7.56	7.56	0.00
3.00	1.82	39.162	899.61	7.67	7.67	0.00
4.00	0.00	38.573	899.48	7.48	7.48	0.00
5.00	0.00	37.964	899.35	7.27	7.27	0.00
6.00	0.00	37.371	899.22	7.06	7.06	0.00
7.00	0.00	36.796	899.10	6.86	6.86	0.00
8.00	0.00	36.238	898.98	6.65	6.65	0.00
9.00	0.00	35.697	898.86	6.44	6.44	0.00
10.00	0.00	35.174	898.75	6.23	6.23	0.00
11.00	0.00	34.668	898.63	6.02	6.02	0.00
12.00	0.00	34.180	898.53	5.81	5.81	0.00
13.00	0.00	33.709	090.42	5.59	5.59	0.00
14.00	0.00	33.200	090.32	0.30 5.16	5.30	0.00
15.00	0.00	32.020	090.23 808 14	3.10	J. 10 4 04	0.00
17.00	0.00	32.402	808.05	4.94	4.54	0.00
18.00	0.00	31 621	807.96	4.75	4.75	0.00
19.00	0.00	31 257	897.88	4.01	4.01	0.00
20.00	0.00	30 912	897.80	4.06	4.06	0.00
21.00	0.00	30 586	897 73	3.83	3.83	0.00
22.00	0.00	30 279	897.66	3.60	3.60	0.00
23.00	0.00	29 992	897.60	3.35	3.35	0.00
24.00	0.00	29.725	897.54	3.10	3.10	0.00
25.00	0.00	29.479	897.48	2.84	2.84	0.00
26.00	0.00	29.254	897.43	2.61	2.61	0.00
27.00	0.00	29.047	897.38	2.40	2.40	0.00
28.00	0.00	28.857	897.34	2.21	2.21	0.00
29.00	0.00	28.681	897.30	2.05	2.05	0.00
30.00	0.00	28.518	897.26	1.90	1.90	0.00
31.00	0.00	28.367	897.23	1.76	1.76	0.00
32.00	0.00	28.227	897.20	1.63	1.63	0.00
33.00	0.00	28.096	897.17	1.52	1.52	0.00
34.00	0.00	27.975	897.14	1.42	1.42	0.00
35.00	0.00	27.861	897.11	1.33	1.33	0.00
36.00	0.00	27.755	897.09	1.24	1.24	0.00
37.00	0.00	27.656	897.07	1.16	1.16	0.00
38.00	0.00	27.563	897.05	1.09	1.09	0.00
39.00	0.00	27.476	897.03	1.02	1.02	0.00
40.00	0.00	27.393	097.01	0.96	0.96	0.00
41.00	0.00	27.310	806.07	0.91	0.91	0.00
42.00	0.00	27.244	896.96	0.00	0.00	0.00
43.00	0.00	27.173	896.94	0.00	0.00	0.00
45.00	0.00	27 049	896.93	0.70	0.70	0.00
46.00	0.00	26,991	896.91	0.68	0.68	0.00
47.00	0.00	26.936	896.90	0.65	0.65	0.00
48.00	0.00	26.884	896.89	0.62	0.62	0.00

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Type II 24-hr 25yr24hr Rainfall=7.75" Page 1 LC 2/10/2015

Subcatchment 1S: (new Subcat)

Runoff = 248.93 cfs @ 12.47 hrs, Volume= 36.339 af, Depth= 7.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type II 24-hr 25yr24hr Rainfall=7.75"

Area	(ac) CN	L Des	cription								
60.	.000 95	5									
62. 62.	.000 65 .000 94 .000	Weig Perv	ghted Ave vious Area	erage a							
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Desci	ription					
50.0					Direc	t Entry,					
			S	ubcatchn	ient 1S	: (new	/ Subo	at)			
				Hydr	ograph	•					
4											Runoff
260	/		248.93 cfs			_			05		
240-	·					1	уре і	I 24-I	1r 25yi	r24nr	
220			- P					Ra		1.15	
180-			10				Inott	Area	=62.00		
(160-			R			Runc		olume	9=36.3	39 ai	[
دلغ ۱40	1						Run	оп и т	eptn=	1.03	
б Ш 120-			A						c=50.0) min	
100-									Ç	N=94	
80-						ļ			ļ		
60-											
40-				The							
20-	min	mm)									7
() 2 4 6	8 10	12 14 1	6 18 20 2 Tii	2 24 26 ne (hours)	28 30	32 34	36 38	40 42 4	4 46 4	8

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Hydrograph for Subcatchment 1S: (new Subcat)

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	7.75	7.03	0.05
0.50	0.04	0.00	0.00	26.50	7.75	7.03	0.01
1.00	0.08	0.00	0.00	27.00	7.75	7.03	0.00
1.50	0.12	0.00	0.00	27.50	7.75	7.03	0.00
2.00	0.17	0.00	0.03	28.00	7.75	7.03	0.00
2.50	0.22	0.01	0.41	28.50	7.75	7.03	0.00
3.00	0.27	0.03	1.04	29.00	7.75	7.03	0.00
3.50	0.32	0.04	1.70	29.50	7.75	7.03	0.00
4.00	0.37	0.07	2.33	30.00	7.75	7.03	0.00
4.50	0.43	0.10	2.93	30.50	7.75	7.03	0.00
5.00	0.49	0.13	3.55	31.00	7.75	7.03	0.00
5.50	0.55	0.17	4.22	31.50	7.75	7.03	0.00
6.00	0.62	0.21	4.89	32.00	7.75	7.03	0.00
6.50	0.69	0.26	5.57	32.50	7.75	7.03	0.00
7.00	0.77	0.32	6.24	33.00	7.75	7.03	0.00
7.50	0.85	0.38	6.91	33.50	7.75	7.03	0.00
8.00	0.93	0.45	7.56	34.00	7.75	7.03	0.00
8.50	1.02	0.52	8.31	34.50	7.75	7.03	0.00
9.00	1.14	0.62	9.81	35.00	7.75	7.03	0.00
9.50	1.26	0.73	11.84	35.50	1.15	7.03	0.00
10.00	1.40	0.85	13.24	36.00	7.75	7.03	0.00
10.50	1.58	1.01	15.72	36.50	7.75	7.03	0.00
11.00	1.02	1.20	20.33	37.00	7.75	7.03	0.00
12.00	Z.19 5.14	1.50	20.47 77 74	38.00	7.75	7.03	0.00
12.00	5 70	4.44 5.00	248.26	38.50	7.75	7.03	0.00
13.00	5.98	5.00	115.88	39.00	7.75	7.03	0.00
13 50	6 19	5 49	52.37	39.50	7 75	7.03	0.00
14.00	6.35	5 65	30.85	40.00	7.75	7.03	0.00
14.50	6.49	5.78	21.76	40.50	7.75	7.03	0.00
15.00	6.61	5.91	17.54	41.00	7.75	7.03	0.00
15.50	6.72	6.01	15.45	41.50	7.75	7.03	0.00
16.00	6.82	6.11	13.67	42.00	7.75	7.03	0.00
16.50	6.91	6.20	12.04	42.50	7.75	7.03	0.00
17.00	6.99	6.28	10.93	43.00	7.75	7.03	0.00
17.50	7.07	6.35	10.22	43.50	7.75	7.03	0.00
18.00	7.14	6.43	9.59	44.00	7.75	7.03	0.00
18.50	7.21	6.49	8.99	44.50	7.75	7.03	0.00
19.00	7.27	6.55	8.38	45.00	7.75	7.03	0.00
19.50	7.33	6.61	7.79	45.50	1.15	7.03	0.00
20.00	7.38	0.00	7.18	46.00	1.15	7.03	0.00
20.50	7.43	0.71	6.62	46.50	7.75	7.03	0.00
21.00	7.40	0.70	6.27	47.00	7.75	7.03	0.00
21.00	7.52	6.86	5.06	47.50	7 75	7.03	0.00
22.00	7.62	6.90	5.85	40.00	1.15	7.05	0.00
23.00	7.66	6.95	5.00				
23.50	7 71	6.99	5.61				
24.00	7.75	7.03	5.48				
24.50	7.75	7.03	4.17				
25.00	7.75	7.03	1.13				
25.50	7.75	7.03	0.26				
	5 G S (5)		- Today and Tob				

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Pond 2P: (new Pond)

Inflow Area	=	62.000 ac, I	nflow Depth	= 7.03"	for 25yr24hr event		
Inflow	=	248.93 cfs @	12.47 hrs, \	Volume=	36.339 af		
Outflow	=	88.30 cfs @	13.16 hrs, \	Volume=	32.422 af, Att	en= 65%,	Lag= 41.0 min
Primary	Ξ	36.61 cfs @	13.16 hrs, \	Volume ≕	25.324 af		
Secondary	=	51.69 cfs @	13.16 hrs, \	Volume=	7.097 af		

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Starting Elev= 896.56' Surf.Area= 0.000 ac Storage= 25.459 af Peak Elev= 900.86' @ 13.16 hrs Surf.Area= 0.000 ac Storage= 45.127 af (19.668 af above start)

Plug-Flow detention time= 1,720.1 min calculated for 6.962 af (19% of inflow) Center-of-Mass det. time= 501.8 min (1,301.0 - 799.2)

Volume	Invert	Avail.Storag	ge Storage Description
#1	890.00'	50.760	af Custom Stage Data Listed below
			-
Elevatio	n Cum.	Store	
(fee	t) (acre-	-feet)	
890.0	0 (0.000	
890.5	i0 ^	1.750	
891.0	0 3	3.520	
891.0	1 5	5.330	
892.0	0 7	7.180	
892.5	0 9	9.050	
893.0	0 10).960	
893.5	0 12	2.900	
894.0	10 14	1.870	
894.5	0 16	5.870	
895.0	0 18	3.900	
895.5	0 20).970	
896.0	0 23	3.070	
896.5	0 25	5.200	
897.0	0 27	7.360	
897.5	0 29	9.560	
898.0	0 31	1.790	
898.5	0 34	1.050	
899.0	0 36	6.340	
899.5	0 38	3.660	
900.0	0 4	1.020	
900.5	0 43	3.400	
901.0	0 45	5.820	
901.5	0 48	3.280	
902.0	0 50).760	
Device	Routing	Invert	Outlet Devices
#1	Secondary	899.87'	20.0' long x 28.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	894.00'	24.0" x 62.0' long Culvert RCP, square edge headwall, Ke= 0.500

#3

#4

Type II 24-hr 25yr24hr Rainfall=7.75" Page 4 LC 2/10/2015

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 Outlet Invert= 892.00'
 S= 0.0323 '/'
 Cc= 0.900
 n= 0.013

 Device 2
 896.56'
 1.00' W x 1.00' H Vert. Orifice/Grate
 C= 0.600

 Device 2
 899.87'
 4.00' x 4.00' Horiz. Orifice/Grate
 Limited to weir flow
 C= 0.600

Primary OutFlow Max=36.61 cfs @ 13.16 hrs HW=900.86' (Free Discharge)

-2=Culvert (Inlet Controls 36.61 cfs @ 11.65 fps)

-3=Orifice/Grate (Passes < 9.37 cfs potential flow)

-4=Orifice/Grate (Passes < 51.25 cfs potential flow)

Secondary OutFlow Max=51.54 cfs @ 13.16 hrs HW=900.86' (Free Discharge) -1=Broad-Crested Rectangular Weir (Weir Controls 51.54 cfs @ 2.61 fps)



Pond 2P: (new Pond)

Type II 24-hr 25yr24hr Rainfall=7.75" Page 5 LC 2/10/2015

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Time	Inflow	Storage	Elevation	Outflow	Primary	Secondary
(hours)	(cfs)	(acre-feet)	(feet)	(cfs)	(cfs)	(cfs)
0.00	0.00	25.459	896.56	0.00	0.00	0.00
1.00	0.00	25.459	896.56	0.00	0.00	0.00
2.00	0.03	25.459	896.56	0.00	0.00	0.00
3.00	1.04	25.497	896.57	0.01	0.01	0.00
4.00	2.33	25.636	896.60	0.03	0.03	0.00
5.00	3.55	25.873	896.66	0.11	0.11	0.00
6.00	4.89	26.208	896.73	0.24	0.24	0.00
7.00	6.24	26.640	896.83	0.46	0.46	0.00
8.00	7.56	27.160	896.95	0.79	0.79	0.00
9.00	9.81	27.774	897.09	1.26	1.26	0.00
10.00	13.24	28.610	897.28	1.98	1.98	0.00
11.00	20.33	29.732	897.54	3.11	3.11	0.00
12.00	77.74	32.143	898.08	4.80	4.80	0.00
13.00	115.88	44.945	900.82	85.24	36.49	48.75
14.00	30.85	43.358	900.49	60.91	34.54	26.37
15.00	17.54	41.896	900.18	27.31	17.77	9.54
16.00	13.67	41.363	900.07	18.02	13.12	4.90
17.00	10.93	41.062	900.01	13.80	11.00	2.81
18.00	9.59	40.871	899.97	11.51	9.84	1.67
19.00	8.38	40.720	899.94	10.27	9.20	1.07
20.00	7.18	40.561	899.90	9.15	8.62	0.53
21.00	6.27	40.402	899.87	8.06	8.06	0.00
22.00	5.96	40.242	899.84	8.01	8.01	0.00
23.00	5.72	40.065	899.80	7.96	7.96	0.00
24.00	5.48	39.873	899.76	7.90	7.90	0.00
25.00	1.13	39.539	899.69	7.79	7.79	0.00
26.00	0.05	38.933	899.56	7.60	7.60	0.00
27.00	0.00	38.315	899.43	7.39	7.39	0.00
28.00	0.00	37.712	899.30	7.18	7.18	0.00
29.00	0.00	37.127	899.17	6.98	6.98	0.00
30.00	0.00	36.559	899.05	6.77	6.77	0.00
31.00	0.00	36.008	898.93	6.56	6.56	0.00
32.00	0.00	35.475	898.81	6.35	6.35	0.00
33.00	0.00	34.959	898.70	6.14	6.14	0.00
34.00	0.00	34.460	898.59	5.93	5.93	0.00
35.00	0.00	33.979	898.48	5.72	5.72	0.00
36.00	0.00	33.516	898.38	5.50	5.50	0.00
37.00	0.00	33.070	898.28	5.29	5.29	0.00
38.00	0.00	32.642	898.19	5.07	5.07	0.00
39.00	0.00	32.232	898.10	4.85	4.85	0.00
40.00	0.00	31.840	898.01	4.64	4.64	0.00
41.00	0.00	31.466	897.93	4.42	4.42	0.00
42.00	0.00	20 773	097.00 907.77	4.19	4.19	0.00
43.00	0.00	30.775	897.77	3.37	3.37	0.00
45.00	0.00	30.455	897.63	3 19	3 19	0.00
46.00	0.00	29 877	897.57	3 25	3 25	0.00
47.00	0.00	29.619	897 51	2 99	2 99	0.00
48.00	0.00	29 382	897 46	2.00	2 74	0.00
40.00	0.00	20.002	07.100	4.1	<u> </u>	0.00

Hydrograph for Pond 2P: (new Pond)

Prepared by {enter your company name here}

Subcatchment 1S: (new Subcat)

Runoff 324.32 cfs @ 12.47 hrs, Volume= 47.909 af, Depth= 9.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Type II 24-hr 100yr24hr Rainfall=10.00"



Hydrograph for Subcatchment 1S: (new Subcat)

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	10.00	9.27	0.07
0.50	0.05	0.00	0.00	26.50	10.00	9.27	0.01
1.00	0.10	0.00	0.00	27.00	10.00	9.27	0.00
1.50	0.16	0.00	0.01	27.50	10.00	9.27	0.00
2.00	0.22	0.01	0.36	28.00	10.00	9.27	0.00
2.50	0.28	0.03	1.24	28.50	10.00	9.27	0.00
3.00	0.34	0.06	2.21	29.00	10.00	9.27	0.00
3.50	0.41	0.09	3.12	29.50	10.00	9.27	0.00
4.00	0.48	0.13	3.95	30.00	10.00	9.27	0.00
4.50	0.55	0.17	4.73	30.50	10.00	9.27	0.00
5.00	0.63	0.22	5.54	31.00	10.00	9.27	0.00
5.50	0.71	0.28	6.40	31.50	10.00	9.27	0.00
6.00	0.80	0.34	7.26	32.00	10.00	9.27	0.00
0.50	0.89	0.42	0.12	32.50	10.00	9.27	0.00
7.00	1.09	0.50	0.90	33.00	10.00	9.27	0.00
8.00	1.05	0.50	10.60	34.00	10.00	9.27	0.00
8.50	1.20	0.78	11.53	34 50	10.00	9.27	0.00
9.00	1.47	0.91	13.50	35.00	10.00	9.27	0.00
9.50	1.63	1.05	16.16	35.50	10.00	9.27	0.00
10.00	1.81	1.22	17.94	36.00	10.00	9.27	0.00
10.50	2.04	1.43	21.15	36.50	10.00	9.27	0.00
11.00	2.35	1.73	27.18	37.00	10.00	9.27	0.00
11.50	2.83	2.19	37.82	37.50	10.00	9.27	0.00
12.00	6.63	5.92	102.17	38.00	10.00	9.27	0.00
12.50	7.35	6.64	323.38	38.50	10.00	9.27	0.00
13.00	7.72	7.00	150.59	39.00	10.00	9.27	0.00
14.00	8 20	7.48	30 08	40.00	10.00	9.27 9.27	0.00
14.00	8.38	7.40	28.18	40.50	10.00	9.27	0.00
15.00	8 53	7.81	22.71	41.00	10.00	9.27	0.00
15.50	8.68	7.95	19.99	41.50	10.00	9.27	0.00
16.00	8.80	8.08	17.69	42.00	10.00	9.27	0.00
16.50	8.91	8.19	15.59	42.50	10.00	9.27	0.00
17.00	9.02	8.29	14.15	43.00	10.00	9.27	0.00
17.50	9.12	8.39	13.23	43.50	10.00	9.27	0.00
18.00	9.21	8.49	12.41	44.00	10.00	9.27	0.00
18.50	9.30	8.57	11.63	44.50	10.00	9.27	0.00
19.00	9.38	8.65	10.85	45.00	10.00	9.27	0.00
19.50	9.45	8.73	10.08	45.50	10.00	9.27	0.00
20.00	9.52	0.79	9.29	40.00	10.00	9.27	0.00
20.00	9.50	8 92	8 11	40.00	10.00	9.27	0.00
21.00	9.00	8.98	7 89	47.50	10.00	9.27	0.00
22.00	9.77	9.04	7.71	48.00	10.00	9.27	0.00
22.50	9.83	9.10	7.56				
23.00	9.89	9.16	7.40				
23.50	9.94	9.22	7.25				
24.00	10.00	9.27	7.09				
24.50	10.00	9.27	5.39				
25.00	10.00	9.27	1.46				
25.50	10.00	9.27	0.33				
				I			

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Pond 2P: (new Pond)

Inflow Area =	62.000 ac, I	nflow Depth = 9.27"	for 100yr24hr event	
Inflow =	324.32 cfs @	12.47 hrs, Volume=	47.909 af	
Outflow =	154.61 cfs @	12.99 hrs, Volume=	43.780 af, Atten= 52%,	Lag= 30.9 min
Primary =	38.75 cfs @	12.99 hrs, Volume=	28.560 af	
Secondary =	115.86 cfs @	12.99 hrs, Volume=	15.220 af	

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs Starting Elev= 896.56' Surf.Area= 0.000 ac Storage= 25.459 af Peak Elev= 901.56' @ 12.99 hrs Surf.Area= 0.000 ac Storage= 48.590 af (23.131 af above start)

Plug-Flow detention time= 1,078.5 min calculated for 18.301 af (38% of inflow) Center-of-Mass det. time= 398.7 min (1,192.1 - 793.3)

Volume	Invert	Avail.Stora	ge Storage Description
#1	890.00'	50.760	af Custom Stage Data Listed below
Elevatic	on Cum	.Store	
(fee	et) (acre	e-feet)	
890.0	00	0.000	
890.5	50	1.750	
891.0	00	3.520	
891.0)1	5.330	
892.0	00	7.180	
892.5	50	9.050	
893.0	0 1	0.960	
893.5	i 0 1	2.900	
894.0	00 1	4.870	
894.5	50 1	6.870	
895.0	0 1	8.900	
895.5	50 2	20.970	
896.0	0 2	23.070	
896.5	50 2	25.200	
897.0	0 2	27.360	
897.5	50 2	29.560	
898.0	0 3	31.790	
898.5	50 3	34.050	
899.0	0 3	36.340	
899.5	50 3	38.660	
900.0	0 ∠	1.020	
900.5	50 Z	13.400	
901.0	0 ∠	15.820	
901.5	50 4	18.280	
902.0	00 5	50.760	
Device	Routing	Invert	Outlet Devices
<u>#1</u>	Secondary	899 87'	20 0' long x 28 0' breadth Broad-Crested Rectangular Weir
71 1	cecondary	000.07	Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Primary	894.00'	24.0" x 62.0' long Culvert RCP, square edge headwall, Ke= 0.500

Type II 24-hr 100yr24hr Rainfall=10.00" Page 9

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			Outlet Invent= 692.00	s = 0.03237	CC= 0.900 n= 0.0	113
#3	Device 2	896.56'	1.00' W x 1.00' H Vert. O	Prifice/Grate	C= 0.600	
#4	Device 2	899.87'	4.00' x 4.00' Horiz. Orific	ce/Grate L	imited to weir flow	C= 0.600

Primary OutFlow Max=38.75 cfs @ 12.99 hrs HW=901.56' (Free Discharge)

-2=Culvert (Inlet Controls 38.75 cfs @ 12.33 fps)

-3=Orifice/Grate (Passes < 10.21 cfs potential flow)

-4=Orifice/Grate (Passes < 100.19 cfs potential flow)

Secondary OutFlow Max=115.71 cfs @ 12.99 hrs HW=901.56' (Free Discharge) -1=Broad-Crested Rectangular Weir (Weir Controls 115.71 cfs @ 3.42 fps)



Pond 2P: (new Pond)

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Hydrograph for Pond 2P: (new Pond)

Time	Inflow	Storage	Elevation	Outflow	Primary	Secondary
(hours)	(cfs)	(acre-feet)	(feet)	(cfs)	(cfs)	(cfs)
0.00	0.00	25.459	896.56	0.00	0.00	0.00
1.00	0.00	25.459	896.56	0.00	0.00	0.00
2.00	0.36	25.465	896.56	0.00	0.00	0.00
3.00	2.21	25.568	896.59	0.02	0.02	0.00
4.00	3.95	25.821	896.64	0.09	0.09	0.00
5.00	5.54	26.199	896.73	0.23	0.23	0.00
6.00	7.26	26.698	896.85	0.49	0.49	0.00
7.00	8.96	27.312	896.99	0.90	0.90	0.00
8.00	10.60	28.024	897.15	1.46	1.46	0.00
9.00	13.50	28.844	897.34	2.20	2.20	0.00
10.00	17.94	29.938	897.58	3.31	3.31	0.00
11.00	27.18	31.407	897.91	4.38	4.38	0.00
12.00	102.17	34.607	898.62	5.99	5.99	0.00
13.00	150.59	48.588	901.56	154.58	38.75	115.83
14.00	39.98	44.888	900.81	84.27	36.45	47.82
15.00	22.71	42.399	900.29	37.71	22.95	14.76
16.00	17.69	41.665	900.14	23.22	15.73	7.49
17.00	14.15	41.317	900.06	17.38	12.80	4.58
18.00	12.41	41.107	900.02	14.43	11.31	3.12
19.00	10.85	40.960	899.99	12.53	10.35	2.18
20.00	9.29	40.823	899.96	10.99	9.57	1.42
21.00	8.11	40.670	899.93	9.91	9.02	0.90
22.00	7.71	40.542	899.90	9.02	8.55	0.46
23.00	7.40	40.450	899.88	8.37	8.22	0.15
24.00	7.09	40.376	899.86	8.05	8.05	0.00
25.00	1.46	40.119	899.81	7.97	7.97	0.00
26.00	0.07	39.507	899.68	7.78	7.78	0.00
27.00	0.00	38.874	899.55	7.58	7.58	0.00
28.00	0.00	38.255	899.41	7.37	7.37	0.00
29.00	0.00	37.655	899.28	7.16	7.16	0.00
30.00	0.00	37.072	899.16	6.96	6.96	0.00
31.00	0.00	36.505	899.04	0.75	0.70	0.00
32.00	0.00	35,950	090.92	0.04	0.04	0.00
33.00	0.00	35.424	090.00	0.00	0.33	0.00
34.00	0.00	34.910	090.09	0.12	5.01	0.00
35.00	0.00	22 024	808 47	5.60	5.69	0.00
37.00	0.00	33.834	808.37	5.03	5.03	0.00
38.00	0.00	33.028	808.27	5.27	5.27	0.00
39.00	0.00	32,602	898.18	5.05	5.05	0.00
40.00	0.00	32.002	898.09	4 83	4.83	0.00
41.00	0.00	31 803	898.00	4 62	4 62	0.00
42.00	0.00	31 431	897.92	4 40	4 40	0.00
43.00	0.00	31 077	897.84	4.17	4.17	0.00
44.00	0.00	30.741	897.76	3.94	3.94	0.00
45,00	0.00	30.425	897.69	3.72	3.72	0.00
46.00	0.00	30.128	897.63	3.47	3.47	0.00
47.00	0.00	29.851	897.57	3.23	3.23	0.00
48.00	0.00	29.595	897.51	2.96	2.96	0.00