

OPERATION AND MAINTENANCE PLAN

**11th Street Ditch Removal Response Action
Anniston PCB Site
Anniston, Alabama**

May 12, 2005

ROUX ASSOCIATES, INC.

Environmental Consulting & Management



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1.0 INTRODUCTION

This Operations and Maintenance Plan (O&M Plan) has been prepared for the 11th Street Ditch Removal Response Action remedy (remedy) constructed at the Anniston PCB Site in Anniston, Alabama. The purpose of this O&M Plan is to provide procedures for routine inspection, maintenance and repairs to the remedy. The 11th Street Ditch is located primarily within a Norfolk Southern railroad right-of-way in the City of Anniston, Calhoun County, Alabama. A site location map is included as Figure 1, and a road map is included as Figure 2. The remedy included select excavation and installation of a liner within approximately 9,560 linear feet of ditch in accordance with an October 5, 2001 Consent Order. The remedy was implemented between July and December, 2004 in accordance with the United States Environmental Protection Agency (USEPA)- and Norfolk Southern-approved Design Documents (drawings and specifications) dated May 2003, as amended in February 2004.

The primary components of the remedy include:

- Concrete liner within 11th Street Ditch;
- Concrete and rip rap liner within the Alabama Power Company (APCO) ditch;
- Rip rap within a vegetated swale north of ditch segment B3 and Snow Creek;
- Geotextile and gravel between the tracks in ditch segment D1;
- Geotextile and gravel within ditch segment E1; and
- Notification signs.

This O&M Plan is divided into five sections. Section 1.0 provides an introduction and background information regarding the remedy. Section 2.0 includes contact information and notification requirements for the O&M activities. Actual O&M procedures are included in Section 3.0 which includes a description of the remedy features to be inspected and their locations, inspection activities, inspection frequency, repair procedures if needed and photographs of key inspection points. Section 4.0 outlines reporting requirements, and Section 5.0 includes a sampling and analysis plan. Supporting tables, figures and appendices are located at the end of this O&M Plan.

It should be noted that a comprehensive Completion Report describing the remedial activities performed at the 11th Street Ditch has been prepared under separate cover.

2.0 CONTACT INFORMATION AND NOTIFICATION REQUIREMENTS

Key contacts for O&M of the remedy include the following:

Contact	Role/Responsibility
Craig Branchfield - Solutia Inc. Manager, Remedial Projects 702 Clydesdale Avenue Anniston, Alabama 36201-5328 256-231-8404	Ensuring compliance with the O&M Plan. Must be contacted if the remedy has been damaged or vandalized or if there is any failure of the integrity of the remedy.
Brad Kerchof - Norfolk Southern Division Engineer 1400 Norfolk Southern Drive Birmingham, Alabama 35210 205-951-4723	Must receive at least 72 hours notice prior to entry onto Norfolk Southern right-of-way to perform O&M activities. Must be notified if any unstable conditions are observed within the right-of-way.
Mickey Ward - Norfolk Southern Track Supervisor 1724 1 st Avenue South Pell City, Alabama 35125 205-951-4883 - office 205-492-6194 - cell	Must receive notice prior to entry onto Norfolk Southern right-of-way to perform O&M activities.
Phillip Burgett - Anniston Water Works Water Engineer 131 West 11 th Street Anniston, Alabama 36202 256-2363429 x-22 Backup in case of emergency: Billy Beachman 256-236-3429 weekdays 8:00 AM - 4:00 PM 256-237-4781 any time 256-831-5050 home	Must be contacted if there is a concern with the water line (i.e., a leak) or if any invasive activities are required proximate to the water line.
Steve Cabeza - Alabama Power Company Transfer Station Manager P.O. Box 129 Anniston, Alabama 36202 256-231-3407	Must be contacted to access Alabama Power Company property for inspection of the APCO ditch.

Copies of Norfolk Southern and Alabama Power Company access agreements are available at the Solutia Inc. facility in Anniston for review if needed.

3.0 REQUIRED OPERATION AND MAINTENANCE ACTIVITIES

Each of the remedy features that require inspection is described in the following sections. Figure 3 presents an as-built site plan showing the key remedy features to be inspected. Each section below includes a description of the feature, the location, required inspection activity, inspection frequency, repair procedures and a photograph(s). No remedy was implemented in ditch segments B7, C8 and D3; therefore, no inspection is required. Ditch segments consisting of a concrete liner include C1 through C7, D2 and D4, F1, F2 and G1 through G5 and are described in Section 3.1. Ditch segment A1 (APCO) is described in Section 3.2; rip rap swales and the Snow Creek tie-in are described in Section 3.3; ditch segment D1 liner which consists of geotextile and gravel (located between the rail lines just east of the railroad relay building) is described in Section 3.4; ditch segment E1 liner which consists of geotextile and gravel is described in Section 3.5; and notification signs are described in Section 3.6. An inspection form and maintenance log are included as Appendix A.

3.1 11th Street Ditch Concrete Liner

Description

The liner consists of a geocomposite overlain with 6 inches of wire mesh- reinforced concrete. Five (5) rubber energy dissipation curbs are also located in select locations within the ditch as shown on Figure 3.

Location

The 11th Street Ditch concrete liner is installed within approximately 6,704 linear feet of ditch within the Norfolk Southern right-of-way. Ditch segments B1 through B6 are located on the north side of the rail line west of Clydesdale Avenue. Ditch segments C1 through C7 and D2 are located on the south side of the rail line west of Clydesdale Avenue. Ditch segment D4 is located on the south side of the rail line east of Clydesdale Avenue. Ditch segments F1, F2 and G1 through G5 are located on the north side of the rail line east of Clydesdale Avenue.

Inspection Frequency

The 11th Street Ditch Concrete Liner will be inspected quarterly. If sufficient sediment has accumulated behind the rubber energy dissipation curbs, sampling will be conducted in accordance with the Sampling and Analysis Plan presented in Section 5.0.

Inspection Procedures

The concrete surface will be inspected for the presence of spalling, cracks, holes and vegetation growing within the cracks. Rubber curbs and expansion and contraction joints will be inspected for damage and/or vegetation growth.

Repair Procedures

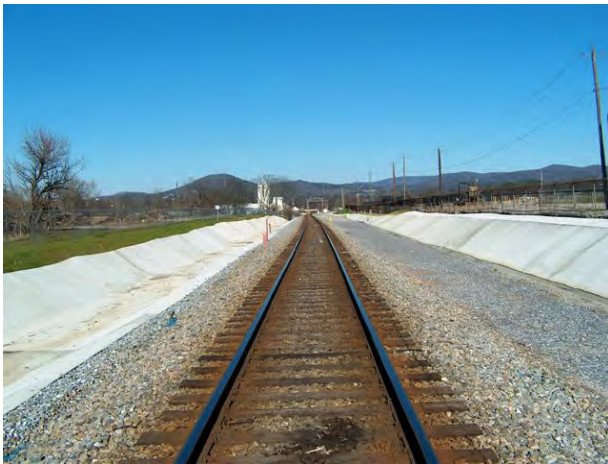
If excessive cracking or spalling is observed in the concrete that may compromise its structural integrity, appropriate repairs will be made. Cracks may be repaired using a variety of products depending on the size and severity of the crack. Any vegetation will be removed and the crack will be cleaned so it is free of accumulated debris, washed out and allowed to dry. The crack may need to be deepened or widened to achieve bonding and penetration as required by the individual repair product. A grout or epoxy repair product may be used as appropriate. A bonding agent may also be required. All crack repair products will be installed in accordance with the manufacturer's instructions. Some examples of concrete repair products with instructions are included in Appendix B.

If there is a breach in the concrete cover and the geocomposite is exposed, the geocomposite will be inspected for damage. The concrete will first be saw cut to create a clean edge. The geocomposite will then be patched as appropriate in accordance with the manufacturer's instructions. A copy of the Gundle/SLT Environmental, Inc. (GSE) geocomposite specification is included as Appendix C and includes repair procedures (end of the specification). Once the geocomposite is repaired, the concrete will be replaced. Rubber curbs observed to be damaged will be replaced and the repaired curb will be bolted to the concrete liner. Expansion joints or contraction joints will be installed as appropriate, dependent on the size of the repair area. Contraction joints will be located on 20-foot centers, and expansion joints will be located on 60-foot centers. Expansion joints must be replaced with REFLEX[®] or equal. Information for REFLEX[®] is included in Appendix D.

If any required repairs are located in an area of flowing water within the ditch, a temporary dam will be constructed upstream of the repair location. Water will be pumped from upstream of the temporary dam to a location downstream of the repair area within the ditch. If soils below the concrete liner are exposed during repair activities, it is imperative that contact with water resulting from ditch flow and/or precipitation runoff be prevented. Appropriate Best Management Practices (BMPs), including silt fence, hay bales and/or dust control measures, will be implemented.

If excessive vegetation growth is observed in the REFLEX[®] expansion joints or curbs, vegetation will be removed manually. If necessary, an herbicide may be applied to the expansion joints and curbs. It is imperative that any herbicide applied to the expansion joints or curbs be approved by USEPA and the Alabama Department of Environmental Management (ADEM) for use in waterways and be applied in accordance with the manufacturer's instructions.

Photographs



Ditch segment B is on the left and ditch segment C is on the right. Photo looks east.



Ditch segment D4. Photo looks east.



Ditch segment G. Photo looks east.



Ditch segment D2. Photo looks west.

3.2 APCO Ditch Rip Rap/Concrete Liner

Description

The liner consists of pre-existing rip rap with concrete installed to fill in voids between the rip rap stone.

Location

The APCO ditch includes approximately 420 feet of rip rap and concrete-lined ditch located on Alabama Power Company property. The APCO ditch is designated as ditch segment A1 and is accessible off of 1st Street.

Inspection Frequency

The APCO ditch liner will be inspected quarterly.

Inspection Procedures

The concrete within the ditch will be inspected for the presence of spalling, cracks, voids and vegetation growing within the cracks.

Repair Procedures

If excessive cracks or voids are observed in the concrete that may compromise its coverage of the soil below the rip rap, appropriate repairs will be made. Cracks and voids may be repaired using FastSet™ Non-Shrink Grout or equivalent (Appendix B). The surface of the APCO ditch

is not smooth; therefore, repairs are only required to achieve adequate coverage of the soil below the rip rap.

Photograph



APCO ditch viewed from the 11th Street Ditch. Photo looks south.

3.3 Rip Rap Areas within Vegetated Swale and Snow Creek

Description

The first rip rap area includes approximately 1,000 square feet of geotextile overlain with 12 inches of rip rap in the swale located north of ditch segment B3. The second rip rap area includes approximately 2,300 square feet of 12 inches of rip rap within the channel of Snow Creek and along the channel banks.

Location

The rip rap area located north of ditch segment B3 can be accessed via Duncan Avenue. The rip rap area within Snow Creek is located at the 11th Street ditch confluence with Snow Creek on the south side of 11th Street.

Inspection Frequency

The rip rap areas will be inspected quarterly.

Inspection Procedures

Rip rap will be inspected for erosion, settling or excessive vegetation growth between stones.

Repair Procedures

If rip rap is eroded, the underlying geotextile will be inspected and repaired, if needed. Damaged geotextile will be replaced with GSE 10 oz. non-woven geotextile (product code GEO 1008002) or equivalent. If excessive settlement is observed, additional rip rap will be installed. Rip rap will have a median size of 12 inches and can be obtained from Vulcan Materials in Wellington, Alabama or another supplier that can provide the appropriate size rip rap. If excessive vegetation is observed, the vegetation will be removed and herbicide may be applied. It is imperative that any herbicide applied in rip rap areas be approved by USEPA and ADEM for use in waterways and be applied in accordance with the manufacturer's instructions.

Photographs



Rip rap area within vegetated swale north of ditch segment B4. Photo looks north.



Rip rap area within Snow Creek. Photo looks west.

3.4 Geotextile and Gravel Within Ditch Segment D1

Description

Gravel area D1 is an approximate 2,500-square foot area that consists of a geotextile and 12-inch layer of gravel.

Location

The D1 gravel area is generally located east of the railroad relay building between ditch segments B1 and C1.

Inspection Frequency

The D1 gravel area will be inspected quarterly.

Inspection Procedures

The gravel will be inspected for significant erosion or exposure of the geotextile.

Repair Procedures

If gravel is eroded or the geotextile is exposed, additional gravel will be installed to maintain an approximate 12-inch depth. If the geotextile is torn or otherwise breached, gravel will be temporarily moved as necessary and the breached geotextile section replaced with a minimum 6-inch overlap with surrounding geotextile. Damaged geotextile will be replaced with GSE 10 oz. non-woven geotextile (product code GEO 1008002) or equivalent. Gravel will be replaced to maintain an approximate 12-inch depth. Gravel will be 1 to 2-inch in size or dense graded aggregate (DGA) may be used. Gravel can be obtained from Vulcan Materials in Wellington, Alabama or another supplier that can provide the appropriate size gravel.

Photograph



Ditch segment D1. Photo looks northeest.

3.5 Geotextile and Gravel Within Ditch Segment E1

Description

Ditch segment E1 consists of geotextile overlain with 6 inches of gravel.

Location

Ditch segment E1 is located south of the rail line. It begins just east of Clydesdale and extends approximately 1,120 feet east.

Inspection Frequency

Ditch segment E1 will be inspected quarterly.

Inspection Procedures

The gravel will be inspected for significant erosion or exposure of the geotextile.

Repair Procedures

If gravel is eroded or the geotextile is exposed, additional gravel will be installed to maintain an approximate 6-inch depth. If the geotextile is torn or otherwise breached, gravel will be temporarily moved as necessary and the breached geotextile section replaced with a minimum 6-inch overlap with surrounding geotextile. Damaged geotextile will be replaced with GSE 10 oz. non-woven geotextile (product code GEO 1008002) or equivalent. Gravel will be replaced to maintain an approximate 6-inch depth. Gravel will be 2 to 3 inches in size (ballast). Gravel can be obtained from Vulcan Materials in Wellington, Alabama or another supplier that can provide the appropriate size gravel.

Photograph



Ditch segment E1. Photo looks east.

3.6 Notification Signs

Description

The four (4) notification signs are yellow with black lettering with the following text:

WARNING (3-inch letters)
DO NOT DIG (3-inch letters)
ENVIRONMENTAL REMEDY IN PLACE (1.5-inch letters)
LOCAL PROJECT CONTACT 256-231-8400 (1.5-inch letters)
NORFOLK SOUTHERN DIVISION ENGINEER 205-951-4723 (1.5-inch letters)

A red “no dig” symbol is located at the bottom of the sign.

Location

The four (4) notification signs are mounted on posts and are located at each side of Clydesdale Avenue and McDaniel Avenue.

Inspection Frequency

The notification signs will be inspected quarterly.

Inspection Procedures

The signs will be inspected for any damage and legibility of the text.

Repair Procedures

Repairs and/or replacement of the signs and posts will be performed as necessary.

Photograph



Typical notification sign.

4.0 REPORTING REQUIREMENTS

All information collected during the quarterly O&M inspections will be recorded on the inspection log, included as Appendix A. The inspection log will also include maintenance and repair information, as required. Remedy features requiring maintenance or repair will be clearly identified and performed as soon as practicable. Inspection logs are considered complete after all maintenance and/or repair items have been addressed. All relevant information will be attached to the inspection logs including but not limited to sediment sample results, maps showing locations of maintenance and/or repair areas, photographs and receipts and paperwork associated with maintenance and repairs performed.

5.0 SAMPLING AND ANALYSIS PLAN

There are five (5) energy dissipation curbs located within the remedy which may capture sediment. Collection of sediment samples is the only O&M activity that requires sampling and analysis protocols. Sediment samples will be collected in accordance with the following schedule, provided an adequate amount of sediment has accumulated behind the rubber curbs:

- Year 1 - Collect two samples (one each from two separate locations) semiannually;
- Year 2 - Collect two samples (one each from two separate locations) semiannually;
- Year 3 - Collect two samples (one each from two separate locations) annually;
- Year 4 - Collect two samples (one each from two separate locations) annually; and
- Year 5 - Collect two samples (one each from two separate locations) annually.

Samples will be analyzed for polychlorinated biphenyls (PCBs) using Method SW846 8082 at a certified laboratory. It is anticipated that additional sampling will not be required beyond the initial 5-year period; however, a final determination will be made pending a review of sample results.

Sediment samples will be collected and analyzed utilizing the standard operating procedures outlined in the *Quality Assurance Project Plan for the Anniston PCB Site* (Revision 2), dated February 2005 and prepared by Blasland, Bouck & Lee or subsequent approved quality assurance project plans.

6.0 REFERENCES

- Blasland, Bouck and Lee, (February 2005), *Quality Assurance Project Plan for the Anniston PCB Site (Revision 2)*.
- Norfolk Southern Railway Company and Solutia Inc./Pharmacia Corporation, (December 12, 2003), *Environmental Right of Entry and Removal Response Action Agreement*.
- Roux Associates, Inc., (October 28, 1998), *Options Analysis Technical Memorandum, Off-Site Interim Measures Plan, 11th Street Ditch Project*.
- Roux Associates, Inc., (October 13, 1999), *Corrective Measures Study 11th Street Ditch*.
- Roux Associates, Inc., (October 11, 2000), *11th Street Ditch Sediment Sampling Report*.
- Roux Associates, Inc., (October 11, 2000), *North Railroad Ditch Sediment Sampling Report*.
- Roux Associates, Inc., (December 27, 2000), *11th Street Ditch Removal Action Sampling Plan (Revision 0.0)*.
- Roux Associates, Inc., (March 16, 2001), *11th Street Ditch Removal Action Sampling Plan (Revision 1.0)*.
- Roux Associates, Inc., (July 9, 2001), *Removal Response Action Work Plan*.
- Roux Associates, Inc., (July 9, 2001), *11th Street Ditch Sediment Sampling Report..*
- Roux Associates, Inc., (April 18, 2002), *Design Memorandum, Design Basis for 11th Street Ditch Response Action, Anniston PCB Site, Anniston, Alabama*.
- Roux Associates, Inc., (May 2003), *11th Street Ditch Remedial Design Drawings*.
- Roux Associates, Inc., (May 2004), *Best Management Practices Plan*.
- Roux Associates, Inc., (May 2004), *Construction Quality Assurance Plan*.
- Roux Associates, Inc., (May 2004), *Dust Control Plan*.
- Roux Associates, Inc., (May 2004), *Technical Specifications*.
- Roux Associates, Inc., (March 2005); *Draft Completion Report*.
- Solutia Inc., (March 12, 2002), Correspondence to USEPA, *Response to USEPA's February 4, 2002 comments on the 11th Street Ditch Removal Response Action Work Plan*.
- Solutia Inc., (March 25, 2002), Correspondence to USEPA, *Request for formal approval of the July 9, 2001 11th Street Ditch Removal Response Action Work Plan*.
- Solutia Inc., (March 25, 2002), *11th Street Ditch Supplemental Sediment Sampling Report*.

Solutia Inc., (May 6, 2003), *Correspondence (signed by both parties) to The Water Works and Sewer Board of the City of Anniston regarding procedures for performing repairs proximate to water lines and the remedy.*

Solutia Inc., (May 2004), *11th Street Ditch Removal Response Action Addendum to Design Documents.*

Solutia Inc., (2004), *11th Street Ditch Removal Response Action Work Plan for Relocating NSRC Communication Lines.*

Solutia Inc., (March 25, 2002), *11th Street Ditch Supplemental Sediment Sampling Report.*

United States Environmental Protection Agency, (December 3, 1990), *Memorandum: Policy on Management of Post-Removal Site Control (OSWER Directive 9360.2-02).*

United States Environmental Protection Agency, (June 1994), *Superfund Removal Procedures, Removal Response Reporting: POLREPs and OSC Reports.*

United States Environmental Protection Agency, (July 1, 1999), *CFR Title 40, Part 300 National Oil and Hazardous Substances Pollution Contingency Plan.*

United States Environmental Protection Agency, (January 31, 2001), *Correspondence to Solutia Inc., Comments on the December 27, 2000 11th Street Ditch Removal Action Sampling Plan.*

United States Environmental Protection Agency, (October 5, 2001), *Administrative Order on Consent (Docket No. CER-04-2002-3752).*

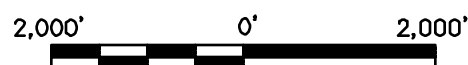
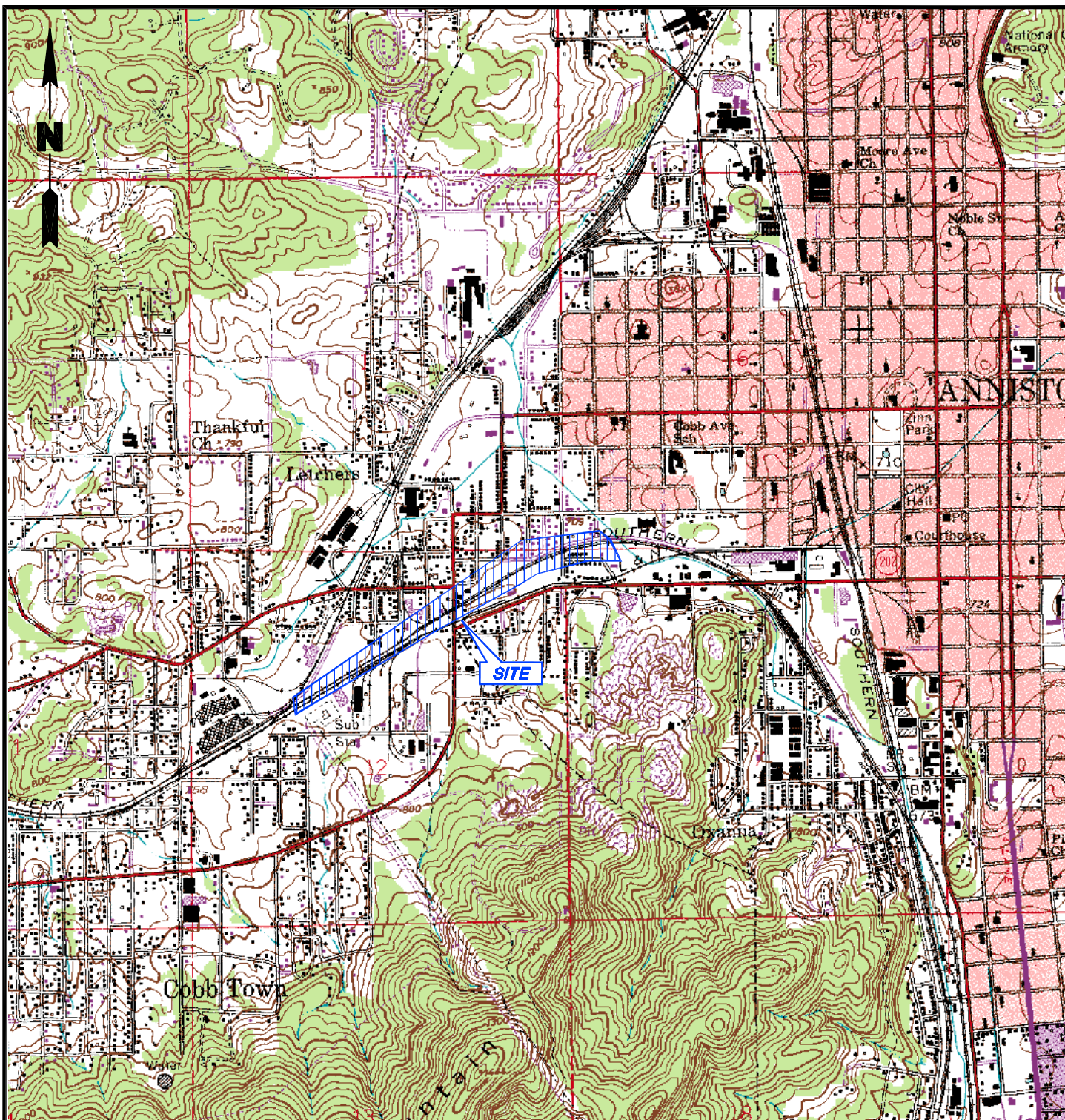
United States Environmental Protection Agency, (February 4, 2002), *Correspondence to Solutia Inc., Comments on the July 6, 2001 11th Street Ditch Removal Response Work Plan and the October 12, 2001 Correspondence from Solutia Inc. providing additional information to support the proposed removal alternative.*

United States Environmental Protection Agency, (April 4, 2002), *Correspondence to Solutia Inc., Approval of the July 6, 2001 11th Street Ditch Removal Response Work Plan.*

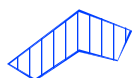
United States Environmental Protection Agency, (August, 2003), *Partial Consent Decree.*

Table 1. Summary of Required O&M Activities. 11th Street Ditch Removal Response Action. Anniston, Alabama.

Remedy Feature	Inspection Frequency	Inspection Procedure	Repair Procedures
11th Street Ditch Concrete Liner			
Concrete	Quarterly	Inspect for cracking, spalling and vegetation.	Repair with grout or epoxy product as appropriate.
Geocomposite	Quarterly	If exposed, inspect for tears.	Repair in accordance with manufacturer specification.
Expansion/Contraction Joints	Quarterly	Inspect for damage.	If significant repairs are required for concrete, expansion joints will need to be replaced at 60-foot centers and contraction joints at 20-foot centers (expansion joints must be REFLEX or equal).
Sediment Samples	Semiannually Years 1-2 Annually Years 3-5	If sufficient sediment is present, collect sediment samples behind concrete curb in two locations.	Not applicable.
APCO Ditch			
Rip Rap and Concrete	Quarterly	Inspect for cracking, spalling, vegetation and voids.	Repair with non-shrink grout.
Rip Rap Areas			
Swale north of segment B3	Quarterly	Inspect for erosion, settling or excessive vegetation growth.	If rip rap is eroded, inspect/repair geotextile and add stone as necessary. If settling, add stone as necessary
Snow Creek	Quarterly	Inspect for erosion, settling or excessive vegetation growth.	If rip rap is eroded, inspect/repair geotextile and add stone as necessary. If settling, add stone as necessary
Gravel Areas			
D1 gravel area	Quarterly	Inspect for erosion or exposure of geotextile.	If geotextile is torn, replace geotextile with minimum 6-inch overlap. Add gravel as necessary to maintain 12-inch depth.
E1 gravel area	Quarterly	Inspect for erosion or exposure of geotextile.	If geotextile is torn, replace geotextile with minimum 6-inch overlap. Add gravel as necessary to maintain 6-inch depth.
Notification Signs			
Signs	Quarterly	Inspect for damage or obstruction of sign.	Repair sign as necessary and/or clear obstructions.
Posts	Quarterly	Inspect for damage.	Repair posts as necessary.



LEGEND



GENERAL SITE LOCATION

SOURCE

U.S.G.S ANNISTON, ALABAMA QUADRANGLE 1972 (PHOTOREVISED)
7.5 MINUTES SERIES (TOPOGRAPHIC)

Title:

SITE LOCATION MAP

11th STREET DITCH
ANNISTON, ALABAMA

Prepared For:

SOLUTIA

ROUX

ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: M.M.H.

Prepared by: B.J.F.

Project Mgr: M.M.H.

File No: 56903001

Date: 01/12/05

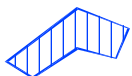
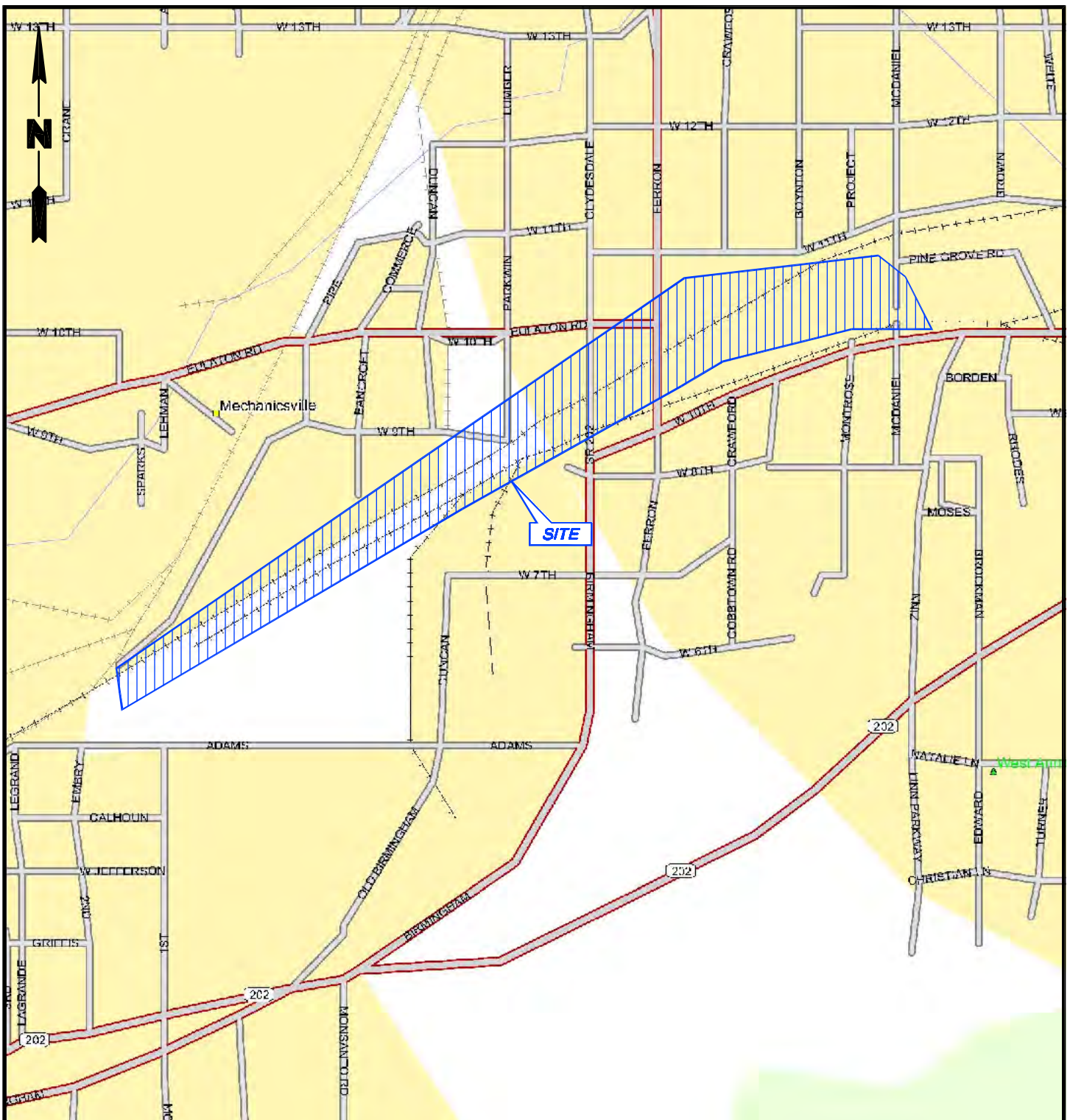
Scale: AS SHOWN

Office: NJ

Project: 56903J



FIGURE

1



GENERAL SITE LOCATION

SOURCE:
DELRORME STREET ATLAS, USA 2000

Title:			
LOCAL ROAD MAP			
ANNISTON, ALABAMA			
Prepared For:			
			
 ROUX ROUX ASSOCIATES, INC. <i>Environmental Consulting & Management</i>	Compiled by: M.M.S.	Date: 01/12/05	FIGURE 2
	Prepared by: B.J.F.	Scale: AS SHOWN	
	Project Mgr: M.M.S.	Office: NJ	
	File No: 56903002	Project: 56903J	



LEGEND

- (B5) DITCH SEGMENT LOCATION AND IDENTIFICATION
- RIP RAP AND CONCRETE
- BALLAST AND GEOTEXTILE FABRIC
- CONCRETE LINER WITH DITCH INVERT LINES
- RIP RAP & GEOTEXTILE
- RIP RAP

AS-BUILT MAP SHOWING REMEDY FEATURES			
ANNISTON, ALABAMA			
Prepared For: SOLUTIA			
ROUX ROUX ASSOCIATES, INC. <i>Environmental Consulting & Management</i>	Compiled by: ML	Date: 03/11/05	3
	Prepared by: BF	Scale: AS SHOWN	
	Project Mgr: MH	Office: NJ	
	File No: 56903004	Project: 56903J	

APPENDIX A

INSPECTION FORM
AND
MAINTENANCE LOG

**INSPECTION FORM
11TH STREET DITCH
REMOVAL RESPONSE ACTION**

Page 1 of 1

Inspection Item	Checklist	Yes	No	If yes, describe
11th Street Ditch Concrete Liner				
Concrete (B1 - B3, B5 - B6, C1-C7, D2, D4, F1, F2, and G1-G5)	Is significant cracking or spalling observed?			
	Is vegetation growing through cracks, expansion joints or curbs?			
	Is geocomposite exposed?			
	Are rubber curbs damaged?			
	Are contraction/expansion joints damaged?			
Sediment Samples	Is there enough sediment behind the rubber curbs to collect two samples, one each from two locations?			
APCO Ditch				
Concrete	Is significant cracking or spalling observed?			
	Is vegetation growing through cracks?			
Rip Rap Areas				
Swale north of segment B3	Is erosion or wash-out of the rip rap observed?			
	Is the underlying geotextile exposed?			
	Is excessive vegetation growth observed?			
	Is significant settlement observed?			
Snow Creek	Is erosion or wash-out of the rip rap observed?			
	Is the underlying geotextile exposed?			
	Is excessive vegetation growth observed?			
	Is significant settlement observed?			
Gravel Areas				
D1	Is gravel eroded or washed out?			
	Is geotextile exposed?			
E1	Is gravel eroded or washed out?			
	Is geotextile exposed?			
Signs				
Signs	Are the signs damaged in any way?			
	Are the signs obstructed by vegetation or other structures?			
Posts	Are the posts damaged in any way?			

Inspector Name: _____ Date: _____

Notes:

1. Representative photographs should be attached to inspection form.
2. If repairs or maintenance are required, the location should be marked on the as-built map, a photograph taken and attached to inspection form.
3. All recommended maintenance and repair activities should be detailed on the attached maintenance log.

**MAINTENANCE LOG
11TH STREET DITCH
REMOVAL RESPONSE ACTION**

Page 1 of 1

[illegible]

Notes:

1. Photographs, work orders, receipts and other maintenance/repair information should be attached to the maintenance log as appropriate.
2. The maintenance log should be attached to the appropriate inspection form.

APPENDIX B

CONCRETE REPAIR PRODUCTS

**Do-It-Yourself**[Project of the Month](#)[Search Projects](#)[FAQ's](#)[Glossary of Terms](#)[The 'How To' Book](#)[Product Locator](#)**Professional Contractors****Product Catalog****Inside QUIKRETE®****Quantity Calculator****Contact Us****Search****Project****Repairing Concrete**

Cracks, chips and broken or flaking areas in concrete are not only unsightly, they can lead to further deterioration of the surface. The result is a costly replacement project as opposed to a simple repair. Inspect your concrete and masonry walls, walks and slabs for damage on a regular basis. Early spring is an excellent time to assess any damage from winter freeze/thaw cycles.

When repairing concrete it's important to select the right repair product for the job. A product ideally suited for general patching may not work well on small cracks and fractures. And not all products are suited for overlaying large areas. That's why QUIKRETE® offers a complete line of concrete repair products formulated to meet all your patching and repair needs.

Minor Cracks and Fractures

Small cracks and fractures 1/8" to 1/2" wide are often difficult to patch using cement-based products. There's just no way to force the mixture into such a small opening. QUIKRETE® Gray Concrete Crack Seal and QUIKRETE® Concrete Repair Caulk solve this problem. Gray Concrete Crack Seal is a thick liquid that can be poured directly into cracks in walks, slabs and other horizontal surfaces. Concrete Repair Caulk is a textured sealant that can be applied to cracks in walls and other vertical surfaces.

Required Tools & Materials

- QUIKRETE® Gray Concrete Crack Seal
- QUIKRETE® Concrete Repair Caulk
- QUIKRETE® Concrete & Asphalt Cleaner
- QUIKRETE® All-Purpose Sand
- Scrub brush
- Wire brush
- Caulking gun

Step by Step

Minor Cracks in Horizontal Surfaces

1. Use a wire brush or similar tool to clean all dirt, concrete chips and organic matter from the crack. Clean grease and heavy dirt deposits using QUIKRETE® Concrete & Asphalt Cleaner.



2. Shake bottle of QUIKRETE® Gray Concrete Crack Seal. Cut the tip of the bottle so the opening matches the width of the cracks to be repaired. If the crack is deep fill to within $\frac{1}{4}$ " of the surface with QUIKRETE® All-Purpose Sand.



3. Apply the sealer in $\frac{1}{4}$ " layers. Allow each $\frac{1}{4}$ " layer to setup overnight before applying the next layer.

Minor Cracks in Vertical Surfaces

1. Clean the crack as just described.
2. Cut tip of QUIKRETE® Concrete Repair Caulk tube on an angle to make a $\frac{1}{4}$ " to $\frac{3}{8}$ " hole. Use cartridge in standard caulking gun.
3. Apply by pushing cartridge tip over surface and forcing

bead of Concrete Repair deep into the crack. Apply no thicker than 3/8" at a time.



For Best Results

- On hot days, cool the caulking tube in your refrigerator for an hour or so before application. The caulk will run less and be easier to apply.
- Use QUIKRETE® Concrete Repair Caulk to seal joints where concrete and masonry meet wooden or metal framing or other surfaces. Fill the joint completely and slightly overlap the caulk onto the adjacent surfaces.

Larger Cracks and Holes in Vertical Surfaces

Wide, deep cracks and holes in concrete blocks and concrete walls require patching with a cement-based repair product. QUIKRETE® Quick-Setting Cement is an excellent product for this type of repair because it has superior bonding capabilities.

Required Tools & Materials

- QUIKRETE® Quick-Setting Cement
- QUIKRETE® Concrete Acrylic Fortifier
- QUIKRETE® Concrete & Asphalt Cleaner
- Cold Chisel
- Hammer
- Wire brush
- Broom
- Safety glasses or goggles
- Sponge
- Pointing trowel
- Finishing Trowel

Step by Step

1. Clean the loose concrete and dirt from the damaged area using the hammer, chisel and a wire brush. Clean grease and dirt from the area to be repaired with QUIKRETE® Concrete & Asphalt Cleaner. Rinse the area thoroughly.



2. Make sure to dampen the area to be repaired before mixing the patching material.



3. Mix the QUIKRETE® Quick-Setting Cement with water according to the directions on the package. If the area to be repaired is less than 1" deep x 1" wide, add QUIKRETE® Concrete Acrylic Fortifier to the mix water. Keep in mind the QUIKRETE® Quick-Setting Cement is a stiff mix and will have the consistency of modeling clay.

4. Press the patching material as deep as possible into the area to be repaired using a pointing trowel or similar tool. Completely fill the area to be repaired.



5. Use a steel finishing trowel to compact the repair and screed off any excess material. Feather edge the patching

material onto the adjoining surfaces to create a smooth, clean repair.



6. Mist the repair area several times daily to promote better curing and a strong bond. (This step is not necessary if QUIKRETE® Concrete Acrylic Fortifier was mixed with the QUIKRETE® Quick-Setting Cement.)

For Best Results

- Keep the trowel clean and damp when applying QUIKRETE® Quick-Setting Cement. This will keep the mix from curling up on the trowel.
- Do not add too much water to the QUIKRETE® Quick-Setting Cement during mixing. Mix only as much material as can be placed in 10 minutes.

Larger Cracks and Holes in Horizontal Surfaces

For wider cracks or damaged areas of concrete up to one square foot in size, use QUIKRETE® Vinyl Concrete Patcher. Vinyl Concrete Patcher is an excellent product for repairing isolated patches of crumbling or pitted concrete up to a depth of 1/2". Because it contains fine sand and vinyl resins, it can be troweled to a finish as thin as 1/16" so it is smooth with the surrounding concrete.

1. Vigorously rub the wire brush over the flaking concrete to loosen all damaged concrete. The tip of the trowel can be used to pry up loose sections of the flaked concrete.
2. Sweep away all loose particles and dust.
3. If needed, clean the surface using QUIKRETE® Concrete & Asphalt Cleaner. Rinse with clean water. Do not leave any standing water on the surface to be repaired.



4. Apply the QUIKRETE® Vinyl Concrete Patcher with a trowel. Feather edge the patching mixture out onto the surrounding concrete to create a smooth repair.



5. Apply the patcher in $\frac{1}{4}$ " layers. If the hole is deeper than $\frac{1}{4}$ ", apply the patcher in stages, allowing each layer to cure for several days before applying the next layer.

For patches greater in depth than $\frac{1}{2}$ ", but less than 2", QUIKRETE® Sand Mix should be used.



1. Undercut the edge of the repair area at least 1" below the surface using a hammer and cold chisel. Brush out all loose concrete, dust, and other material until there is a solid base for the repair.
2. Clean the exposed area as needed, using QUIKRETE® Concrete Bonding Adhesive to the surface after it has dried. Brush the adhesive on as thick as a coat of paint.
3. If the repair is 1" to 2", apply a coat of QUIKRETE® Concrete Bonding Adhesive to the surface after it has dried. Brush the adhesive on as thick as a coat of paint.
4. Allow the Bonding Adhesive to dry completely before applying the patching material.

5. Mix the QUIKRETE® Sand Mix with water to a plastic-like consistency.
6. Press the sand mix into the hole. Immediately smooth and level the patch using a trowel.



7. After the sand mix patch has lost its water sheen, trowel the area to desired finish.

Overlaying Larger Surfaces

QUIKRETE® Latex Cement is a two-part repair product consisting of a special latex powder and liquid latex bonding agent. This material is made for patching and smoothing concrete and masonry surfaces over larger areas. It can be applied from a thickness of 1/16" TO A FULL 1/4". QUIKRETE® Latex Cement can be used indoors and out, and as an underlayment or finished wear surface. It is designed for long-lasting, durable repairs.

Required Tools & Materials

- QUIKRETE® Latex Cement
- QUIKRETE® Concrete & Asphalt Cleaner
- Scrub brush
- Broom
- Wire brush
- Trowel
- Large mixing container
- Straightedge

Step by Step

Surface Preparation

1. Remove all loose flakes, dirt and dust from repair area.
2. Scrub away grease, oil and stubborn dirt using QUIKRETE® Concrete & Asphalt Cleaner.
3. Dampen the surface to be repaired with clean water, but do not leave standing water.

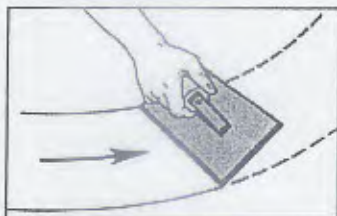
Mixing and Application

Each pail of QUIKRETE® Latex Cement contains a 44-pound bag of latex cement powder and a 1-gallon jug of latex bonding agent.

1. Pour most of the latex bonding agent into a clean container and gradually mix in all of the latex cement powder.
2. Slowly add in additional amounts of latex bonding agent until the desired workable consistency is achieved. Do not add water to the mix.



3. Do not mix more cement than can be placed in 20 minutes. Avoid overmixing in mechanical mixers. It can lead to air entrapment and a reduced bond.
4. Apply the latex cement to the surface using a large finishing trowel. Apply pressure to ensure a good bond.



5. Run a straightedge back and forth over the repaired area to level the patching material.



6. If desired, trowel the surface to a smoother finish.
7. Under normal circumstances, QUIKRETE® Latex Cement does not require moist-curing. But in hot, windy,

or low humidity conditions, it is best to moist-cure the overlayment for at least 48 hours.

For Best Results

- Do not use QUIKRETE® Latex Cement when the temperature is expected to fall below 40° F within the next 48 hours.
- For fills deeper than ¼" apply QUIKRETE® Latex Cement in layers, allowing for curing between applications. Deeper fills up to 2" deep should be filled with QUIKRETE® Sand Mix and QUIKRETE® Concrete Bonding Adhesive as described earlier in this section.

The QUIKRETE® Companies

CONCRESE[®] 1440 SBA

Normal-set segmental bridge
adhesive and bonding agent

PRODUCT DATA

3 03930

**Concrete
Rehabilitation**

Description

Concresive[®] 1440 SBA is a two-component paste epoxy bonding agent for bonding rigid materials exposed to sustained loads or high ambient temperatures. It is used in variable temperature environments and cure schedules.

Yield

Smooth surfaces (1/8" thickness):
12 ft²/gallon (0.3 m²/L)

Rough surfaces:
6 ft²/gallon (0.15 m²/L)

Packaging

3 gallon (11.4 L) units

Color

Gray when mixed

Shelf Life

2 years when properly stored

Storage

Store in unopened containers in a clean, dry area at temperatures less than 80° F (27° C) and ideally between 40 and 60° F (4 and 16° C). Shelf life is significantly reduced once the container is opened.

Features

- High modulus of elasticity
- High heat-deflection temperature (HDT)
- Nonsag paste
- Moisture tolerant

Benefits

Good stress transfer
Creep resistant at high service temperatures
Easy vertical and overhead application
Bonds to damp surfaces

Where to Use

APPLICATION

- Bonding precast concrete segments
- Anchoring bolts, dowels, and rebar into concrete
- Bonding external steel reinforcing plates or beams to concrete

How to Apply

Surface Preparation

1. Surfaces being bonded must be clean and sound. Determine the most cost-effective method by preparing and evaluating a small area before a full-scale operation.
2. The direct tensile strength of the surface may be determined by a pipe cap pull-off test (ACI 503-R) or a commercially available adhesion tester (Elcometer Adhesion Test). Pull-off strength should be a minimum of 200 psi (1.4 MPa).
3. Bonding to a clean, damp surface is possible but less desirable than a dry surface. When applying this product to damp surfaces, remove free-standing water by air blast.

CONCRETE

1. Remove grease, wax, and oil contaminants by scrubbing with an industrial-grade detergent or degreasing compound, followed with mechanical cleaning.
2. Remove weak or deteriorated concrete to a sound substrate by bushhammering, gritblasting, scarifying, waterblasting, or other suitable mechanical means.

3. Remove dirt, dust, laitance, and curing compounds by gritblasting or sanding. Acid etching should only be used if there is no practical alternative. It must be followed by scrubbing and flushing with copious amounts of clean water. Check for removal of acid with moist pH paper; reading should be no more than 10.
4. Follow mechanical cleaning with vacuum cleaning.

STEEL SURFACES

1. Remove dirt, grease, and oil with suitable industrial-grade detergents and degreasing compounds.
2. Remove rust and mill scale by gritblasting. Blast steel to white metal. Follow gritblasting with vacuum or oil-free dry-air blast.

Mixing

1. Mix only the amount of material that can be used before the expiration of the pot life.
2. The mix ratio is 2 to 1. If the pot life and application area permit, mix the entire contents of the pre-proportioned unit. If less than a unit size is used, first stir each component, then measure out portions of Parts A and B in the proper volumetric ratio.
3. Mix the components thoroughly using a slow-speed (600 rpm) drill with a Jiffy-type mixing paddle. Proper mixing will take from 3 – 5 minutes.
4. For best results in cooler temperatures, precondition the individual components to 80° F (27° C) or higher. Use 1 unit of accelerator down to 50° F (10° C) and 2 units down to 40° F (4° C).



Protection and Repair

Technical Data

Composition

Concrete® 1440 SBA is a two-component paste epoxy.

Compliances

- ASTM C 881, Type I, II, IV, V, and VI, Grade 3, B and D with accelerator added

Typical Properties¹

PROPERTY	VALUE	
Gel time , min, 100 g mass		
75° F (24° C), no accelerator	93	
50° F (10° C), with accelerator	65	
Density , lbs/gallon	12.2	
Specific gravity , kg/L	1.46	
Min application temp. , ° F (° C)	40 (4)	
Application temp range , ° F (° C)	40 – 110 (4 – 43)	
Color		
Part A	White	
Part B	Black	
Mixed	Gray	
	80° F (27° C)	105° F (41° C)
Pot life , min		
1 quart	55	45
1 gallon	45	35
Open time² , min, minimum	60	60
Nonsag thickness , inches (ASTM D 2730)	1/8	1/8
Initial cure³ , hrs (AASHTO T-237)	24	24
Cure time⁴ , days (ASTM D695)	7	5

¹Properties listed in this bulletin are typical and descriptive of the product and should not be used for specification purposes.

²From start of mixing to joining of parts being bonded

³5,000 psi (34.5 MPa) minimum

⁴Isothermal cure to eliminate effect of exotherm

Unless otherwise noted, test samples were cured 7 days at 73° F (23° C) and 50 % relative humidity.

Test Data

PROPERTY	RESULTS	TEST METHODS
Tensile strength , psi, (MPa)	4,500 (31)	
Elongation at break , %	1.0	ASTM D 638
Compressive strength , psi		ASTM D 695
3 day cure	9,400	
7 day cure	10,800	
Compressive modulus , psi	6.2 x 10 ⁶	ASTM D 695
Slant shear strength , damp-to-damp concrete	100% concrete failure	AASHTO T-237

Cure schedule: 7 days at 77° F (25° C); test temperature: 77° F (25° C)

Application

GENERAL BONDING

1. Deep surface irregularities can be faired with a 1 to 1 sand and epoxy mix. Allow this fairing material to set.
2. Within 24 hours, apply neat bonding agent with a trowel in sufficient quantities to fill all gaps between the mated surfaces. The bond-line thickness should be 1/32 – 1/8" (0.8 – 3 mm). Ideally, a small amount of bonding agent should extrude from the joint when the surfaces are mated and pressure is applied.
3. Surfaces must be mated while the epoxy is still tacky (within the open time).

PATCHING MORTARS AND GROUTS

Use washed, kiln-dried, and bagged graded silica sand. Carefully selected sand blends with a low void content will require less epoxy for a given volume of mortar compared to ungraded sands. A good skip gradation for low void content is a blend by weight of 2 parts #12 or #16 mesh to one part #80 or #100 mesh. When graded sands are not available, a good general-purpose sand is #30 mesh silica.

BOLT AND REBAR GROUTING

1. Holes may be cut either by rotary-percussion drilling, followed by air blowout with oil-free compressed air, or diamond core boring, followed by water flush. Where holes are precast into the concrete, cast them undersized and drill to fit.
2. The optimum hole size is 1/4" (6 mm) larger than the bar diameter. Larger annular spaces are less desirable.
3. Install a measured amount of bonding agent into the bottom of the hole with a caulking gun equipped with an extension nozzle. Insert the bar, displacing the bonding agent, and secure it in the center of the hole. Remove excess bonding agent from around the hole before it hardens. For grouting holes deeper than 2 feet, pressure grouting is recommended.

Clean Up

Remove material from equipment and tools using xylene or mineral spirits. Cured product must be removed mechanically.

For Best Performance

- Do not thin with solvents.
- Nonsag characteristics will diminish at the upper end of the application temperature range.
- For structural use above a service temperature of 110° F (43° C), evaluate sustained load conditions before application.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current version.
- Proper application is the responsibility of the user. Field visits by Degussa personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

CONCRESE® 1440 SBA PART A

Warning

Concresive® 1440 SBA Part A contains epoxy resin diglycidyl ether of neopentyl glycol.

Risks

May cause skin, eye and respiratory irritation. May cause dermatitis and allergic responses. Potential skin and/or respiratory sensitizer. Ingestion may cause irritation.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. Use only with adequate ventilation. Avoid contact with skin, eyes and clothing. Keep container closed when not in use. Wash thoroughly after handling. DO NOT take internally. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable federal, state and local regulations.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. Remove and wash contaminated clothing. If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

Refer to Material Safety Data Sheet (MSDS) for further information.

Proposition 65

This product contains materials listed by the state of California as known to cause cancer, birth defects, or other reproductive harm.

VOC Content

0 lbs/gal or 0 g/L, less water and exempt solvents when components are mixed and applied according to Degussa instructions.

CONCRESE 1440 PART B

Danger—Corrosive

Concresive 1440 Part B contains polyamine adduct, tris, (2,4,6-dimethylaminomethyl) phenol, and diethylenetriamine.

Risks

Contact with skin or eyes may cause burns. Ingestion may cause irritation and burns of mouth, throat and stomach. Inhalation of vapors may cause irritation. May cause dermatitis and allergic responses. Potential skin and/or respiratory sensitizer. Repeated or prolonged contact with skin may cause sensitization. INTENTIONAL MISUSE BY DELIBERATELY INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. DO NOT get in eyes, on skin or clothing. Wash thoroughly after handling. Keep container closed. DO NOT take internally. Use only with adequate ventilation. DO NOT breathe vapors. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable Federal, state and local regulations.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. Remove and wash contaminated clothing. If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

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**For medical emergencies only,
call ChemTrec (1-800-424-9300).**

Degussa Building Systems

889 Valley Park Drive
Shakopee, MN, 55379

www.degussabuildingsystems.com

Customer Service 800-433-9517
Technical Service 800-243-6739

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Technical Data

GUIDE TO POLYUREA JOINT FILLERS/CONCRETE REPAIR

Dayton Superior Polyureas are two component self leveling, rapid set elastomeric joint sealants/fillers. Polyureas can be used inside or outside in a wide range of temperatures. Dayton Superior Polyureas are available in a range of elongation and shore hardness depending upon project requirements.

The benefits of Polyurea Joint Fillers include:

- Traffic in 90 minutes or less
- Cures down to -40°F (-40°C)
- Odorless
- No vapors
- Chemical resistance
- Meets USDA requirements
- Shave in 30 minutes or less
- Greater adhesion to concrete joint walls than most other sealants.

The benefits of a Polyurea Repair Material include:

- Traffic bearing in 20 minutes @ 70°F (21.1°C)
- Cures down to -40°F (-40°C)
- Chemical Resistance
- Meets USDA requirements
- Repairs cracks and spalls

Polyurea Joint Sealant/Filler

Cleaning is the most important part of any quality installation. Joint walls should be clean and free of all dust, dirt, sealing and curing compounds. Make sure that the joints are dry and free of any moisture. Moisture in the joint may cause the material to bubble.

Proper cleaning of joints requires mechanical cleaning with dry diamond blades, and then blown with dry compressed air (the air compressor should deliver around 120 cfm) or vacuum out the joints.

Do not wash the joints with water. This will only delay the start time of installation of the polyurea. Do not wash joints with any chemical solvents or other chemicals that will trap contaminants in the concrete.

Polyurea must be installed by mechanical action (Pump or Cartridges) to insure proper mixing. Do not hand mix. When using a pump, make sure the pump is delivering the components at a ratio of 1:1. If the ratio is off 5% to 10% the performance of the product may drop substantially or may never set up at all. Improper ratios and mixing can cause:

Soft spots	Bubbling
Stickiness	Pin Holing
Brittle material	Swelling of material

It is recommended to mix both A & B side separately prior to installation.

Polymer Repair Material

Dayton Superior CM 2000 is a high-tech polymer concrete repair material that can withstand traffic within 20 minutes @ 70°F (21°C). CM 2000 is a two component rapid curing concrete repair material that can be used in a wide range of temperatures from 200°F (93°C) down to -40°F (-40°C).

When mixed with quartz sand it becomes a tough 4500 psi polymer concrete that adheres tenaciously and withstands abrasion. CM 2000 is available in bulk or in convenient cartridges.

Surface preparations are the most important part of any quality repair; the repair area should be clean and free of all dust, dirt, sealing and curing compounds. Make sure that the area to be repaired is dry and free of any moisture. Moisture in the repair area may cause the material to bubble.

CM 2000 can be used to repair hairline cracks, spalls and almost any concrete repair. When repairing hairline cracks use CM 2000 in cartridges (neat). The low viscosity material will flow down into the crack to make a fast, long lasting repair. On larger cracks from 1/4" to 1/2" also use CM 2000 in cartridges. First fill cracks with silica sand and strike off flush (any fine sand will do as long as it is cleaned and screened). Then use CM 2000 to saturate sand until flooded with material, followed by broadcasting additional sand then striking off flush with the surrounding surface.

On larger repair projects we recommend using CM 2000 in bulk. Use one part CM 2000 (A&B mixed) mixed with two parts silica sand to make a repair mortar. Trowel into the repair area and let set for 20 minutes, longer in cold temperatures, before opening to traffic.

APPENDIX C

GEOCOMPOSITE REPAIR SPECIFICATION

SECTION 02621

GEOCOMPOSITE DRAINAGE LAYER

PART 1: GENERAL

1.01 SECTION INCLUDES

- A. Specifications and guidelines for MANUFACTURING and INSTALLING geocomposite.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D 1505-98 Standard Test Method for Density of Plastics by the Density-Gradient Technique
 - 2. D 1603-94 Standard Test Method for Carbon Black in Olefin Plastics
 - 3. D 4355-02 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus
 - 4. D 4491-99 Standard Test Method for Water Permeability of Geotextiles by Permittivity
 - 5. D 4716-00 Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
 - 6. D 4751-99 Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - 7. D 4833-88 (1996) Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
 - 8. D 5035-95 Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
 - 9. D 5199-99 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
 - 10. D 5261-92 (1996) Standard Test Method for Measuring the Mass Per Unit Area of Geotextiles
- B. Geosynthetic Research Institute (GRI)
 - 1. GRI GC-7 Determination of Adhesion and Bond Strength of Geocomposites.
- C. Relevant publications from the Environmental Protection Agency (EPA):
 - 1. Daniel, D.E. and R.M. Koerner, (1993), *Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities*, EPA/600/R-93/182.

1.03 DEFINITIONS

- A. Construction Quality Assurance Consultant (CONSULTANT)- Party, independent from MANUFACTURER and INSTALLER that is responsible for observing and documenting activities related to quality assurance during the lining system construction.

- B. ENGINEER- The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.
- C. Geocomposite Manufacturer (MANUFACTURER)- The party responsible for manufacturing the geocomposite rolls.
- D. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY)- Party, independent from the MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.
- E. INSTALLER- Party responsible for field handling, transporting, storing and deploying the geocomposite.
- F. Lot- A quantity of resin (usually the capacity of one rail car) used to manufacture polyethylene geocomposite rolls. The finished rolls will be identified by a roll number traceable to the resin lot.

1.04 QUALIFICATIONS

A. MANUFACTURER

- 1. Geocomposite shall be manufactured by the following:
 - a. GSE Lining Technology, Inc.
 - b. approved equal
- 2. MANUFACTURER shall have manufactured a minimum of 10,000,000 square feet of polyethylene geocomposite material during the last year.

B. INSTALLER

- 1. Installation shall be performed by one of the following installation companies (or approved equal):
 - a. GSE Lining Technology, Inc.
 - b. GSE Approved Dealer/ Installer
- 2. INSTALLER shall have installed a minimum of [] square feet of geocomposite in the last [] years.
- 3. INSTALLER shall have worked in a similar capacity on at least [] projects similar in complexity to the project described in the contract documents, and with in at least [] square feet of geonet installation on each project.
- 4. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.

1.05 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

- A. Labeling- Each roll of geocomposite delivered to the site shall be wrapped and labeled by the MANUFACTURER. The label will identify:
 - 1. manufacturer's name
 - 2. product identification
 - 3. length
 - 4. width
 - 5. roll number
- B. Delivery- Rolls of geonet will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.
- C. Storage- The on-site storage location for the geocomposite, provided by the CONTRACTOR to protect the geonet from abrasions, excessive dirt and moisture shall have the following characteristics:
 - 1. level (no wooden pallets)
 - 2. smooth
 - 3. dry
 - 4. protected from theft and vandalism
 - 5. adjacent to the area being lined
- D. Handling
 - 1. The CONTRACTOR and INSTALLER shall handle all geocomposite in such a manner as to ensure it is not damaged in any way.
 - 2. The INSTALLER shall take any necessary precautions to prevent damage to underlying layers during placement of the geocomposite.

1.06 WARRANTY

- A. Material shall be warranted, on a pro-rata basis against defects for a period of 1-year from the date of the geocomposite installation.
- B. Installation shall be warranted against defects in workmanship for a period of 1-year from the date of geocomposite completion.

PART 2: PRODUCTS

2.01 GEOCOMPOSITE PROPERTIES

- A. A geocomposite shall be manufactured by extruding two crossing strands to form a bi-planar drainage net structure with a non-woven geotextile bonded to one or both sides.
- B. The geocomposite specified shall have properties that meet or exceed the values listed in the following tables below.

GSE FabriNet

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM	AVERAGE	ROLL VALUE ^a
Geocomposite			6 oz/yd²	8 oz/yd²	10 oz/yd²
Product Code			F42060060S	F42080080S	F42100100S
Transmissivity ^c , gal/min/ft ² (m ³ /sec)	ASTM D 4716-00	1/540,000 ft ²	0.48 (1 x 10 ⁻³)	0.48 (1 x 10 ⁻³)	0.43 (9 x 10 ⁻³)
Ply Adhesion, lb/in (g/cm)	GRI GC-7	1/50,000 ft ²	1.0 (178)	1.0 (178)	1.0 (178)
Roll Width, ft (m)			14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
Roll Length, ft (m)			230 (70.1)	200 (60.9)	190 (58.0)
Roll Area, ft ² (m ²)			3,335 (310)	2,900 (269)	2,755 (256)
Geonet core^{b,c}					
Transmissivity ^c , gal/min/ft ² (m ³ /sec)	ASTM D 4716-00		9.66 (2 x 10 ⁻³)	9.66 (2 x 10 ⁻³)	9.66 (2 x 10 ⁻³)
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft ²	200 (5)	200 (5)	200 (5)
Density, g/cm ³	ASTM D 1505	1/50,000 ft ²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft ²	45 (7.9)	45 (7.9)	45 (7.9)
Carbon Black Content, %	ASTM D 1603	1/50,000 ft ²	2.0	2.0	2.0
Geotextile (prior to lamination)^{b,c}					
Mass per Unit Area, oz/yd ² (g/m ²)	ASTM D 5261	1/90,000 ft ²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft ²	170 (755)	220 (975)	260 (1,155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft ²	90 (395)	120 (525)	165 (725)
AOS, US sieve (mm)	ASTM D 4751	1/540,000 ft ²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec ⁻¹)	ASTM D 4491	1/540,000 ft ²	1.5	1.5	1.2
Flow Rate, gpm/ft ² (lpm/m ²)	ASTM D 4491	1/540,000 ft ²	110 (4,480)	110 (4,480)	85 (3,460)
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70

NOTES:

- ^aGradient of 0.1, normal load of 10,000 psf, water at 70° F between steel plates for 15 minutes.
- ^bComponent properties prior to lamination.
- ^cSeveral geotextiles are available and may be supplied as determined by GSE.
- ^dThese are MARV values that are based on the cumulative results of specimens tested and determined by GSE. AOS in mm is maximum average roll value.

GSE FabriNet HF

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE ROLL VALUE ^(a)		
Geocomposite			6 oz/yd ²	8 oz/yd ²	10 oz/yd ²
Product Code:			F52060060S	F52080080S	F52100100S
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00	1/540,000 ft ²	2.41 (5x10 ⁻⁴)	2.41 (5x10 ⁻⁴)	2.41 (5x10 ⁻⁴)
Ply Adhesion, lb/in (g/cm)	GRI GC-7	1/50,000 ft ²	1.0 (178)	1.0 (178)	1.0 (178)
Roll Width, ft (m)			14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
Roll Length, ft (m)			200 (60)	190 (57.9)	180 (54.9)
Roll Area, ft ² (m ²)			2,900 (269)	2,755 (256)	2,610 (242)
Geonet core ^(b)					
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00		14.49 (3x10 ⁻³)	14.49 (3x10 ⁻³)	14.49 (3x10 ⁻³)
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft ²	250 (6.3)	250 (6.3)	250 (6.3)
Density, g/cm ³	ASTM D 1505	1/50,000 ft ²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft ²	55 (9.6)	55 (9.6)	55 (9.6)
Carbon Black Content, %	ASTM D 1603	1/50,000 ft ²	2.0	2.0	2.0
Geotextile (prior to lamination) ^(b,c)					
Mass per Unit Area, oz/yd ² (g/m ²)	ASTM D 5261	1/90,000 ft ²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft ²	170 (755)	220 (975)	260 (1,155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft ²	90 (395)	120 (525)	165 (725)
AOS, US Sieve (mm)	ASTM D 4751	1/540,000 ft ²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec ⁻¹)	ASTM D 4491	1/540,000 ft ²	1.5	1.5	1.2
Flow Rate, gpm/ft ² (l/min/m ²)	ASTM D 4491	1/540,000 ft ²	110 (4,480)	110 (4,480)	85 (3,460)
UV Resistance, % Retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70

NOTES:

- ^(a) Gradient of 0.1, normal load of 10,000 psf, water at 70° F between stainless steel plates for 15 minutes.
- ^(b) Component properties prior to lamination.
- ^(c) Several geotextiles are available and may be supplied as determined by GSE.
- ^(d) These are MARV values and are based on the cumulative results of specimens tested and as determined by GSE. AOS in mm is a maximum average roll value.

GSE FabriNet HS

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE ROLL VALUE ^(d)		
Geocomposite			6 oz/yd ²	8 oz/yd ²	10 oz/yd ²
Product Code:			F72060060S	F72080080S	F72100100S
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00	1/540,000 ft ²	3.38 (7.0 x 10 ⁻⁴)	3.38 (7.0 x 10 ⁻⁴)	3.38 (7.0 x 10 ⁻⁴)
Ply Adhesion, lb/in (g/cm)	GRI GC-7	1/50,000 ft ²	1.0 (178)	1.0 (178)	1.0 (178)
Roll Width, ft (m)			14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
Roll Length, ft (m)			180 (54)	170 (51)	160 (48)
Roll Area, ft ² (m ²)			2,610 (242)	2,465 (229)	2,320 (215)
Geonet core ^(b)					
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00		28.98 (6 x 10 ⁻³)	28.98 (6 x 10 ⁻³)	28.98 (6 x 10 ⁻³)
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft ²	275 (7)	275 (7)	275 (7)
Density, g/cm ³	ASTM D 1505	1/50,000 ft ²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft ²	65 (11.5)	65 (11.5)	65 (11.5)
Carbon Black Content, %	ASTM D 1603	1/50,000 ft ²	2.0	2.0	2.0
Geotextile (prior to lamination) ^(b,c)					
Mass per Unit Area, oz/yd ² (g/m ²)	ASTM D 5261	1/90,000 ft ²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft ²	170 (755)	220 (975)	260 (1,155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft ²	90 (395)	120 (525)	165 (725)
AOS, US Sieve (mm)	ASTM D 4751	1/540,000 ft ²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec ⁻¹)	ASTM D 4491	1/540,000 ft ²	1.5	1.5	1.2
Flow Rate, gpm/ft ² (l/min/m ²)	ASTM D 4491	1/540,000 ft ²	110 (4,480)	110 (4,480)	85 (3,460)
UV Resistance, % Retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70

NOTES:

- ^(a) Gradient of 0.1, normal load of 10,000 psf, water at 70° F (20° C), between stainless steel plates for 15 minutes.
- ^(b) Component properties prior to lamination.
- ^(c) Several geotextiles are available and may be supplied as determined by GSE.
- ^(d) These are MARV values and are based on the cumulative results of specimens tested by GSE. AOS in mm is a maximum average roll value.

GSE FabriNet UF

TESTED PROPERTY	TEST METHOD	FREQUENCY	MINIMUM AVERAGE ROLL VALUE ^(d)		
Geocomposite			6 oz/yd ²	8 oz/yd ²	10 oz/yd ²
Product Code:			F820600605	F820800805	F821001005
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00	1/540,000 ft ²	4.35 (9.0 x 10 ⁻⁴)	4.35 (9.0 x 10 ⁻⁴)	4.35 (9.0 x 10 ⁻⁴)
Ply Adhesion, lb/in (g/cm)	GRI GC-7	1/50,000 ft ²	1.0 (178)	1.0 (178)	1.0 (178)
Roll Width, ft (m)			14.5 (4.4)	14.5 (4.4)	14.5 (4.4)
Roll Length, ft (m)			160 (48)	150 (45)	140 (42)
Roll Area, ft ² (m ²)			2,320 (215)	2,175 (202)	2,030 (188)
Geonet core ^(b)					
Transmissivity ^(a) , gal/min/ft (m ² /sec)	ASTM D 4716-00		38.64 (8 x 10 ⁻³)	38.64 (8 x 10 ⁻³)	38.64 (8 x 10 ⁻³)
Thickness, mil (mm)	ASTM D 5199	1/50,000 ft ²	300 (7.6)	300 (7.6)	300 (7.6)
Density, g/cm ³	ASTM D 1505	1/50,000 ft ²	0.94	0.94	0.94
Tensile Strength (MD), lb/in (N/mm)	ASTM D 5035	1/50,000 ft ²	75 (13.3)	75 (13.3)	75 (13.3)
Carbon Black Content, %	ASTM D 1603	1/50,000 ft ²	2.0	2.0	2.0
Geotextile (prior to lamination) ^(b,c)					
Mass per Unit Area, oz/yd ² (g/m ²)	ASTM D 5261	1/90,000 ft ²	6 (200)	8 (270)	10 (335)
Grab Tensile, lb (N)	ASTM D 4632	1/90,000 ft ²	170 (755)	220 (975)	260 (1,155)
Puncture Strength, lb (N)	ASTM D 4833	1/90,000 ft ²	90 (395)	120 (525)	165 (725)
AOS, US Sieve (mm)	ASTM D 4751	1/540,000 ft ²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, (sec ⁻¹)	ASTM D 4491	1/540,000 ft ²	1.5	1.5	1.2
Flow Rate, gpm/ft ² (l/min/m ²)	ASTM D 4491	1/540,000 ft ²	110 (4,480)	110 (4,480)	85 (3,460)
UV Resistance, % Retained	ASTM D 4355 (after 500 hours)	once per formulation	70	70	70

NOTES:

- ^(a) Gradient of 0.1, normal load of 10,000 psi, water at 70° F (20° C), between stainless steel plates for 15 minutes.
- ^(b) Component properties prior to lamination. Net thickness is a typical value.
- ^(c) Several geotextiles are available and may be supplied as determined by GSE.
- ^(d) These are MARV values and are based on the cumulative results of specimens tested by GSE. AOS in mm is a maximum average roll value.

C. Resin

1. Resin shall be new first quality, compounded polyethylene resin.
2. Natural resin (without carbon black) shall meet the following additional minimum requirements:

Table 02621-3

Property	Test Method ⁽¹⁾	Value
Density (g/cm ³)	ASTM D 1505	>0.94
Melt Flow Index (g/10 min)	ASTM D 1238	≤1.0

¹GSE utilizes test equipment and procedures that enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

2.02 MANUFACTURING QUALITY CONTROL

- A. The geocomposite shall be manufactured in accordance with the Manufacturer's Quality Control Plan submitted to and approved by the ENGINEER.
- B. The geocomposite shall be tested according to the test methods and frequencies listed below:

Table 02621-4

Manufacturing Quality Control Test Frequencies			
Characteristics	Test Method	Units	FREQUENCY
			Bi-Planar
<i>Resin</i>			
Polymer Density	ASTM D 1505	g/cm ³	Once Per Lot
Melt Flow Index	ASTM D 1238	g/10 min	Once Per Lot
<i>Geonet Test</i>			
Carbon Black	ASTM D 1603	%	1/50,000 ft ²
Tensile Strength, MD	ASTM D 5035	lbs/ ft	1/50,000 ft ²
Density	ASTM D 1505	g/cm ³	1/50,000 ft ²
<i>Geotextile Tests</i>			
Mass per Unit Area	ASTM D 5261	oz/yd ²	1/90,000 ft ²
Grab Tensile	ASTM D 4632	lbs.	1/90,000 ft ²
Puncture	ASTM D 4833	lbs.	1/90,000 ft ²
AOS, US Sieve	ASTM D 4751	mm	1/540,000 ft ²
Water Flow Rate	ASTM D 4491	gpm/ft ²	1/540,000 ft ²
UV Resistance	ASTM D 4355 (after 500 hours)	% retained	Once per resin formulation
<i>Geocomposite Tests</i>			
Ply Adhesion	GRI GC-7	lbs/ in.	1/50,000 ft ²
Transmissivity	ASTM D 4716-00	m ² /sec	1/540,000 ft ²

PART 3: EXECUTION

3.01 FAMILIARIZATION

A. Inspection

1. Prior to implementing any of the work in the Section to be lined, the INSTALLER shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of the Section may properly commence without adverse impact.
2. If the INSTALLER has any concerns regarding the installed work of other Sections, he shall notify the Project ENGINEER.

3.02 MATERIAL PLACEMENT

- A. The geocomposite roll should be installed in the direction of the slope and in the intended direction of flow unless otherwise specified by the ENGINEER.
- B. If the project contains long, steep slopes, special care should be taken so that only full length rolls are used at the top of the slope.
- C. In the presence of wind, all geocomposites shall be weighted down with sandbags or the equivalent. Such sandbags shall be used during placement and remain until replaced with cover material.
- D. If the project includes an anchor trench at the top of the slopes, the geocomposite shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.
- E. In applying fill material, no equipment can drive directly across the geocomposite. The specified fill material shall be placed and spread utilizing vehicles with a low ground pressure.
- F. The cover soil shall be placed in the geocomposite in a manner that prevents damage to the geocomposite. Placement of the cover soil shall proceed immediately following the placement and inspection of the geocomposite.

3.03 SEAMS AND OVERLAPS

- A. Each component of the geocomposite will be secured or seamed to the like component at overlaps.
- B. Geonet Components
 1. Adjacent edges of the geonet along the length of the geocomposite roll shall be placed with the edges of each geonet butted against each other.
 2. The overlaps shall be joined by tying the geonet structure with cable ties. These ties shall be spaced every 5 feet along the roll length.

3. Adjoining geocomposite rolls (end to end) across the roll width should be shingled down in the direction of the slope, with the geonet portion of the top overlapping the geonet portion of the bottom geocomposite a minimum of 12 inches across the roll width.
4. The geonet portion should be tied every 6 inches in the anchor trench or as specified by the ENGINEER.



3.04 REPAIR

- A. Prior to covering the deployed geocomposite, each roll shall be inspected for damage resulting from construction.
- B. Any rips, tears or damaged areas on the deployed geocomposite shall be removed and patched. The patch shall be secured to the original geonet by tying every 6 inches with the approved tying devices. If the area to be repaired is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be cut out and the two portions of the geonet shall be joined in accordance with Subsection 3.03.

END OF SECTION

APPENDIX D

REFLEX® INFORMATION

Now in Production.....!!!!!!!!!!



RUBBER EXPANSION JOINT MATERIAL

Meets or exceeds the performance requirements of ASTM D 1751-97 & D 1752-84 (1996)

Manufactured by

THE J D RUSSELL COMPANY

CONCRETE JOINT FILLER

REFLEX® is made of 100% recycled materials – largely discarded tires!

Did you know America discards over 250,000,000 tires every year? An estimated 3 billion tires clutter our dumps and yards! Why not specify a better performer, REFLEX®, and make the choice to help our environment?

Use REFLEX® on your next single family residence project and consume the equivalent of 8.3 passenger tires. As many as 300 tires can be recycled in just one mile of highway including associated drives, approaches, sidewalks and ramps.

GENERAL DESCRIPTION

REFLEX® Rubber Expansion Joint Material for Concrete is a processed board product formed by blending granular crumb rubber derived from discarded tires and various low density polymer components. Pre-molded under heat and pressure, REFLEX® is far more durable than current alternatives.

APPLICATIONS

REFLEX® Rubber Expansion Joint Material is suitable for use as expansion or control joint in a wide variety of concrete construction projects such as roadways, airport runways, sidewalks, driveways, flooring, parking lots, patios and curbs.

SIZE AND THICKNESSES

Standard Sheet Sizes – 36" wide by 5', 10' and 12' long in thicknesses of 1/4", 3/8", 1/2", 3/4" and 1". Cut to size strips from 2" to 36" in 1/2" increments.

TYPICAL PROPERTIES

Compression (to 50% of original)

Recovery (within 10 minutes)

Extrusion

Density

Water absorption

Ultraviolet light exposure

Cold temperature exposure

REFLEX RUBBER

350 psi

99-100%

<0.10 inch

40 lbs/ft3

<2%

passes

passed@-80degreesF

Submersion in salt solution, gasoline, diesel and motor oil resulted in no change in volume while mass increased indicating absorption of the fluids. No cracking or mechanical degradation occurred.

Durability: Exhibits favorable long term aging characteristics under laboratory testing conditions and will not degrade.

Non-Staining: Will not bleed or migrate to adjacent finished concrete surfaces like petroleum based products can do.

SPECIFICATION STANDARDS: REFLEX® Rubber Expansion Joint meets or exceeds the performance requirements of:

American Association of State Highway and Transportation Officials Specification M-213-95.

Federal Specification HH-F-341f, Type 1.

American Society for Testing Materials Standard Specifications for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction D1751-97

and D1752-84 (1996).

Federal Aviation Administration "Standard Specifications for Construction of Airports," Paragraph 501-2-4 Pre-molded Joint Filler.



www.reflexrubber.com



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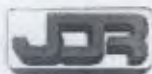
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THE J.D. RUSSELL COMPANY

1400 Duraedge Way
Farmersville, TX 75442



**RUBBER
EXPANSION/CONTROL JOINT**

MATERIAL SAFETY DATA SHEET

Page 1 of 2 REFLEX

For more specific details contact The J D Russell Company Corporate Offices at 520 742-6194

*****GENERAL INFORMATION*****

PRODUCT NAME: REFLEX RUBBER EXPANSION JOINT
MANUFACTURED BY THE J D RUSSELL COMPANY

Creation Date: 3/12/00

*****PRODUCT IDENTIFICATION*****

IDENTIFICATION NAME: EXPANSION JOINT MATERIAL

*****TYPICAL CHEMICAL COMPOSITION*****

N/A

*****PHYSICAL DATA*****

Physical State:	Pliable	Specific Gravity	N/A
Appearance and Odor:	Black/Slight Rubber Smell	Vapor Pressure:	N/A
Boiling Point:	N/A	Vapor Density	N/A
Melting Point:	400F	Evaporation Rate:	N/A
Solubility in Water:	0%	% Volatile by Volume:	N/A
Ph:	N/A		

*****HAZARDOUS INGREDIENTS/ SARA III INFORMATION*****

	OSHA PEL	ACOIM TLV	OTHER LIMITS RECOMMENDED
Polyolefin	-	-	20
Vulcanized Rubber	-	-	79
Talc	-	-	1

*****FIRE AND EXPLOSION HAZARD DATA*****

Flash Point: N/A
Flammable limits in air by volume: N/A
Extinguishing Media: Water, Foam, Dry Powder
 Noxious gases may be formed under fire conditions, wear OSHA approved self contained breathing apparatus.
Special Firefighting Procedures: Fiber dust may be explosive if mixed with air in critical proportions in the presence of an ignition source.
Unusual Fire and Explosion Hazards:

Revision Date 033100

MATERIAL SAFETY DATA SHEET

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*****HEALTH HAZARD DATA*****

Route(s) of Entry
N/AInhalation?
N/ASkin?
N/AIngestion?
N/A

Health Hazards(Acute/Chronic):

NONE

Carcinogenicity:

Not listed as a carcinogen

Emergency and First Aid Procedures:

*****REACTIVITY DATA*****

Stability:

This material is stable

Conditions to avoid:

Burning

Incompatibility (Materials to Avoid):

Hazardous decomposition or byproducts

Thermal decomposition may produce carbon dioxide, carbon monoxide, sulfur dioxide, hydrocarbons.

Hazardous Polymerization

Will not occur

*****SPILL OR LEAK PROCEDURES*****

Stops to be taken in case material is released or spilled:

N/A

Waste Disposal Method:

No hazardous, dispose in accordance with Federal, State, and Local regulations.

*****SPECIAL PROTECTION INFORMATION*****

Respiratory Protection:

N/A

Ventilation:

N/A

Protective Gloves:

N/A

Eye Protection:

N/A

Other Protective Equipment:

N/A

Local Exhaust:

N/A

Special:

N/A

*****SPECIAL PRECAUTIONS*****

Precautions to be taken in handling and storing:

Do not store near flame or ignition sources.

Other Precautions:

If material burns, oils may be released, dispose of in accordance with Federal, State, and Local regulations.

DISCLAIMER: The information provided in this MSDS Sheet was obtained from sources, which we believe are reliable. However, the information is provided without any representation or warranty, expressed or implied regarding the accuracy or correctness.

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