Bao Doan

To: Larry Hudgens; Utilities Office Staff
Cc: Brett Taylor; Norm Collins; Gary J. Van Riessen
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

Thank you for your work plan submittal, this work plan is released for construction as noted. Please continue working with Marianne or Tyler regarding other onsite observation and flagging requirements:

- It is the responsibility of the Licensee and/or Contractor to ensure all construction meets or exceeds UPRR and/or AREMA standards.

Description of Work: - exception noted

- Rock cutting head shall extend maximum 2" in front of the leading edge of the casing as submitted.
- All Boring operation shall be progressed on 24/7 basis , while boring under zone A of UPRR track. The cutting head must not extend outside the carrier or casing pipe at all time during boring operation. More info of UPRR zone can be found on UPRR shoring guidelines.

https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_temp-shoring.pdf

Track and Ground Monitoring: - exception noted

- Survey shots to be taken on both rails at the CL of the crossing and in increments up and down the track CL (not less than 5 points per rail).
- Track and ground monitoring must be done continuously throughout zone A (at least twice per shift) and once per day for 7 days post installation.

Shoring: - no exception taken

Other Notes:

- The Foreman performing the work is always to have paper copies of the following items available :
  - All executed Pipeline Crossing Agreement (AKA License Agreement)
  - Current UPRR CBUD
  - Compiled Work Plan
- Contractor and/or Licensee is/are responsible for ensuring construction is in compliance with the terms and standards contained in the UPRR Agreement.
- If any field issues prevent the installation in accordance to the approved plan, notify the railroad representative immediately. A new/revised plan shall be submitted before work can resume. No unsupported excavation within ROW will be allowed without review from the Railroad.
- CBUD ticket: IMPORTANT Each contractor who will be digging/ drilling on UPRR right of way must have a CBUD ticket under their company's name.
  - Subcontractors are not covered by their prime's CBUD (or vice versa).
  - It is each contractor's responsibility to keep their CBUD up to date.
- Maintenance of Traffic (MOT) – Any portion of the work in public streets may require additional permitting.
  - Contractor is responsible for permits and approvals by the local governing agency(s).

- RailPros does not review MOT plans.
- If pipe markers are required, please send picture verification with UPRR folder number included to utilities.office.staff@railpros.com, once installed.

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Thursday, January 13, 2022 10:40 AM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>; Gary J. Van Riessen <gvrlsmo@aol.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan, I have attached letter from Mr. Gary J Van Riessen Geotechnical Engineer as requested for variance to procced with 42" Shale / rock bore please review at your earliest convenience . Look forward to receiving approval any questions please let us know .

Redford Construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Tuesday, January 11, 2022 9:34 AM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

We await additional information from your geotech engineer regarding risk to the railroad due to proposed mean and methods.

Thanks,

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Monday, January 10, 2022 2:45 PM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Boan, I have attached boring machine specification as requested please review at your earliest convenience questions please let me know . Just to let I do have meeting tomorrow afternoon with Geotech Engineer .

Redford Construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Wednesday, January 05, 2022 6:53 PM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

Thank you for providing additional information, to avoid lost communication, please reply all to existing email thread going forward.

- Please provide boring equipment specifications/cutsheet, make and model of boring equipment.
- A geotech recommendation is required for the variance request regarding the risk to the railroad due to proposed mean and methods.

Please call or contact me for any clarification.

Thanks,

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Bao Doan <bao.doan@railpros.com>
Sent: Monday, December 20, 2021 11:16 AM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

Thank you for your email, however, a geotech recommendation is required for this variance request and is the responsibility of the owner/contractor of the project:

- Provide boring equipment specifications/cutsheet, make and model.
- A variance request shall be submitted to UPRR with recommendation from geotech engineer regarding the risk to the railroad due to proposed means and methods.

Thanks,

Bao Doan, E.I.T.
RAILPROS

1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Monday, December 20, 2021 11:01 AM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan This rock bore will be dry bore using rock cutting head , dirt bore specification won.t work in rock you cannot punch casing thru solid Rock .We can request a variance but Redford or Augers re not Geotech engineer . Rock bore method is not un common for rock bore .

Redford Construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Monday, December 20, 2021 10:52 AM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12
Importance: High

Larry,

UPRR specifies all dry bore and jack to not have any cutting head in front of the casing at all times to reduce the risk of overbore and soil loss. Please provide more details on proposed means and method for the installation. A variance request shall be submitted to UPRR with recommendation from geotech engineer regarding the risk to the railroad due to proposed means and methods.

Let me know if you have any other questions or concern.

Thanks,

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Monday, December 20, 2021 10:35 AM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Norm Collins <norm@augersinc.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan, I need to point out this 42” bore will be rock bore , Rock bore requires different equipment & method than traditional dirt / auger bore .Rock bore requires cutting head in front of the casing with the casing following cutting head this is all done simultaneously . Rock bore opening needs to be bigger than the casing so casing can slide thru .

Track Boring / Zone A 30 LF will be complete in one continuous operation , one crew working required hours to complete boring operations in this area .

Track Monitoring will be completed as outlined below.

Please review , hope this meets with your approval if you have any additional comments or questions let me know

Redford Construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Thursday, December 16, 2021 6:11 PM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

Thank you for providing additional information, please confirm below requirements to move this project forward:

- It is the responsibility of the Licensee and/or Contractor to ensure all construction meets or exceeds UPRR and/or AREMA standards.

Description of Work: - exception taken , please confirm.

- All Boring operation shall be progressed on 24/7 basis , while boring under zone A of UPRR track. The cutting head must not extend outside the carrier or casing pipe at all time during boring operation. More info of UPRR zone can be found on UPRR shoring guidelines.

https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_temp-shoring.pdf

Track and Ground Monitoring: - exception taken , please confirm.

- Survey shots to be taken on both rails at the CL of the crossing and in increments up and down the track CL (not less than 5 points per rail).
- Track and ground monitoring must be done continuously throughout zone A (at least twice per shift) and once per day for 7 days post installation.

Thanks,

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Thursday, December 16, 2021 2:51 PM

To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan I have attach updated work coving track monitoring please review let me know if you need anything additional . Look forward in receiving approval to start railroad bore .

Redford construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Wednesday, December 15, 2021 2:54 PM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12
Importance: High

Larry,

Thank you for touching base with us, please see updated comments below regarding this work plan:

- It is the responsibility of the Licensee and/or Contractor to ensure all construction meets or exceeds UPRR and/or AREMA standards.

Description of Work: - exception taken

- All Boring operation shall be progressed on 24/7 basis , while boring under zone A of UPRR track. The cutting head must not extend outside the carrier or casing pipe at all time during boring operation. More info of UPRR zone can be found on UPRR shoring guidelines.

https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_temp-shoring.pdf

Track and Ground Monitoring: - exception taken , please provide.

- Provide name of Surveyor and company info.
- Provide survey instrument make and model that will be used.
- Provide more details on track and ground monitoring: survey location, frequency prior, during, and 7 days after installation.
- Survey shots to be taken on both rails at the CL of the crossing and in increments up and down the track CL (not less than 5 points per rail).
- Track and ground monitoring must be done continuously throughout zone A (at least twice per shift) and once per day for 7 days post installation.
- Indicate how the monitoring data will be recorded/stored.

Thanks,

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Wednesday, December 15, 2021 2:38 PM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan Just checking on status for getting approval for constructing UPRR bore for Big Creek Interceptor ? Would Like to get started as soon as possible as our schedule requires Big Creek Interceptor
Big Creek Interceptor to be completed July of 2022 so new Lee's Summit Middle school can open for 2022 / 2023 school year .

Redford Construction
Larry Hudgens

From: Larry Hudgens
Sent: Monday, December 13, 2021 9:44 AM
To: Bao Doan <bao.doan@railpros.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Mr. Doan, I have attached updated Work Plan along with plan sheets C-1 & C-8 for your review and approval . I still need to provide you some additional information regarding track monitoring survey from Olsson associates .

Redford construction
Larry Hudgens

From: Bao Doan <bao.doan@railpros.com>
Sent: Tuesday, December 07, 2021 2:11 PM
To: Larry Hudgens <larry@redfordconstruction.com>; Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; Marianne O'Bagy <Marianne.O'Bagy@railpros.com>; Jason Murray <Jason.Murray@railpros.com>
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

Larry,

Thank you for your work plan submittal, please see comments below regarding this work plan

- It is the responsibility of the Licensee and/or Contractor to ensure all construction meets or exceeds UPRR and/or AREMA standards.

Description of Work: - exception taken

- Is the pipeline encroachment included in this scope of work? If yes please provide details, will it be installed via open cut or trenchless method?
- Provide/confirm method of installation (Jack and Bore) on work plan and combine Lat/Long into one entry.
- All Boring operation shall be progressed on 24/7 basis , while boring under zone A of UPRR track. The cutting head must not extend outside the carrier or casing pipe at all time during boring operation. More info of UPRR zone can be found on UPRR shoring guidelines.

https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_temp-shoring.pdf

Track and Ground Monitoring: - exception taken

- Provide name of Surveyor and company info.
- Provide survey instrument make and model that will be used.
- Provide more details on track and ground monitoring: survey location, frequency prior, during, and 7 days after installation.
- Survey shots to be taken on both rails at the CL of the crossing and in increments up and down the track CL (not less than 5 points per rail).
- Track and ground monitoring must be done continuously throughout zone A (at least twice per shift) and once per day for 7 days post installation.
- Indicate how the monitoring data will be recorded/stored.

Shoring: - exception taken

- Backfill within ROW shall comply to UPRR standards: 95 % compaction, within 2% optimum moisture content, lift not to exceed 8 in per lift, tested with ASTM D1557.

Other Notes:

- The Foreman performing the work is always to have paper copies of the following items available :
  - All executed Pipeline Crossing Agreement (AKA License Agreement)
  - Current UPRR CBUD
  - Compiled Work Plan
- Contractor and/or Licensee is/are responsible for ensuring construction is in compliance with the terms and standards contained in the UPRR Agreement.
- If any field issues prevent the installation in accordance to the approved plan, notify the railroad representative immediately. A new/revised plan shall be submitted before work can resume. No unsupported excavation within ROW will be allowed without review from the Railroad.
- CBUD ticket: IMPORTANT Each contractor who will be digging/ drilling on UPRR right of way must have a CBUD ticket under their company's name.
  - Subcontractors are not covered by their prime's CBUD (or vice versa).
  - It is each contractor's responsibility to keep their CBUD up to date.
- Maintenance of Traffic (MOT) – Any portion of the work in public streets may require additional permitting.
  - Contractor is responsible for permits and approvals by the local governing agency(s).
  - RailPros does not review MOT plans.
- If pipe markers are required, please send picture verification with UPRR folder number included to utilities.office.staff@railpros.com, once installed.

Bao Doan, E.I.T.
RAILPROS
1320 Greenway Dr | Suite 490 | Irving | Texas | 75038
Bao.doan@railpros.com | www.railpros.com
D: (682) 223-6698
C: (346) 719-7035

From: Larry Hudgens <larry@redfordconstruction.com>
Sent: Tuesday, December 7, 2021 10:14 AM
To: Utilities Office Staff <utilities.office.staff@railpros.com>
Cc: Brett Taylor <btaylor@mccowngordon.com>; tdbuck@up.com
Subject: RE: Big Creek Interceptor UPRR Folder 3287-12

I forgot to included Trench box information see attach

Redford Construction
Larry Hudgens

From: Larry Hudgens
Sent: Tuesday, December 07, 2021 9:41 AM
To: utilities.office.staff@railpros.com
Cc: Brett Taylor <btaylor@mccowngordon.com>; tdbuck@up.com
Subject: Big Creek Interceptor UPRR Folder 3287-12

To Whom it may concern

Please find attached , Customer Billing Information , work plan ,pipeline agreement , Exhibit A location , Augers Unlimited boring Method letter , plan sheets C-1 C-8 nd Redford summary letter for Big Creek Interceptor Bore under UPRR Sedalia Subdivision MP 256.29 any questions or need additional information please let us know .

Thanks
Redford Construction
Larry Hudgens
larry@redfordconstruction.com
Phone 816-540-2030

WORK PLAN

Union Pacific Railroad Folder Number: 03287-12

Date Submitted to RailPros Field Services: December 7, 2021

Work Plan Directions:

This project has been identified by Union Pacific Railroad (UPRR) as requiring third party construction observation. RailPros will be providing the Construction Observation services for this project and is here to assist in moving this project to completion.

The Union Pacific Railroad Real Estate Agreement outlines the requirements and standards for this installation. This work plan describes the specific details of the project, in terms of the site layout, schedule, means and methods, and general requirements, to ensure compliance with the agreement. This work plan, once released, is the basis that the Construction Observer will assess the work. Any field changes from the work plan shall be submitted via email to utilities.office.staff@railpros.com for review and must meet or exceed UPRR and/or AREMA standards.

Work Plan Submittal Check List: **(Please check off all requirements in list, or strike through text if item is not required)**

1. ***Engineering Plan and Profile (Exhibit A does not qualify)***:
    a. Mark locations of launch and receiving locations.
    b. Dimension the distances from the centerline of track and any existing utilities.
    c. Dimension depth of excavation.
    d. Railroad right of way and railroad tracks clearly outlined

2. ***Track Monitoring Plan (if required):***
    a. See attached Track Monitoring Guideline (pdf)

3. ***HDD Installations Only: N/A***

4. ***Shoring Plan Only for excavation within UPRR property and Zone A or Zone B:***
    a. Calculations for shoring within zone a.
    b. Cut sheets for proprietary systems as applicable.
    c. Description of shoring to include but is not limited to:
    d. Exploration (pot holing)
    e. Demolition
    f. Excavation
    g. Fall protection/confined space entry
    h. Work process
    i. Backfill
    j. Close-out
    k. Contingencies which include weather events and hazmat
    l. Reference the following link to assure compliance.
    Https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operationsspecs/@specifications/documents/up_pdf_nativedocs/pdf_up_str_temp-shoring.pdf

Prime Contractor Contact Name: Redford Construction, Inc.
Email Address: larry@redfordconstruction.com
Phone Number: Office: 816-540-2030 Cell: 816-918-0558
Note: The field contact will be asked to sign the daily report to verify hours. Okay
Sub-Contractor (if performing the installation) Contact Name: Auger's Unlimited
Email Address: norm@augersinc.com
Phone Number: 913-422-3610
Note: The field contact will be asked to sign the daily report to verify hours. Okay

Project Information

Item	Response	Item	Response
Lat/Long (Decimal Form)	38 52".001 North	Number of Tracks	1 track set alive 1 track set abandoned
Method of Installation (HDD, Jack and Bore, Etc.)	94 20"55.4 West	Casing Pipe Length	164 LF
Depth from top of pipe to base of rail	19.5	Casing Pipe Type	Steel
Distance from face of receiving pit to Nearest Track CL	60 LF	Casing Pipe Diameter	42" Steel
Distance from face of jacking pit to Nearest Track CL	50 LF	Casing Pipe Thickness	.625
Excavation depth of jacking pit from base of rail	25 VF	Carrier Pipe Type	PVC
Excavation depth of receiving pit from base of rail	10 VF	Carrier Pipe Diameter	30"
Estimated Start Date: Augers	To be determined upon approval	Carrier Pipe Thickness	1.231
Estimated Project Duration (on, under, or above UPRR property): Augers	20 Days	Is the crossing within a roadway?	No
Will there be hot work within UPRR ROW? (welding, open flame, cutting, etc.)	NO	Will there be abandonment work within UPRR ROW?	Yes Existing 15" Sewer

Description of Work: Provide a description of Means and Methods the contractor will use to complete the authorized work on, under, or above UPRR property. Excavation or potholing within 15 feet of track centerline is not acceptable, unless approved by UPRR Engineering.

Equipment:	Machine Make & Model:

Description of Process:

1. Jack and Bore 42" Steel Casing / See Attached.
2.
3.
4.
5.
6.
7.
8.

Please review the following link to ensure compliance with all UPRR PPE Requirements.

https://www.up.com/cs/groups/public/@uprr/@suppliers/documents/up_pdf_nativedocs/pdf_up_supplier_safety_req.pdf

Track Monitoring: Track Monitoring Plan is required in accordance with the UPRR Track Monitoring Guideline (attached). If work is occurring in more than one (1) shift, Track Monitoring is required during all shifts. Send track monitoring data to utilities.office.staff@railpros.com.	
Survey Company: Olsson Associates	
Name of Surveyor: Patrick Ward	Instrument: TBD
Will you be using adhesive targets for the track monitoring? Yes or No: Yes	
Description of Process: 1. Set Up Level 2. Read Bench Mark 3. Target 4. Compare Elevation 5. 6. 7. 8.	
Please review the following link to ensure compliance with all UPRR PPE Requirements. https://www.up.com/cs/groups/public/@uprr/@suppliers/documents/up_pdf_nativedocs/pdf_up_supplier_safety_req.pdf	

AUGERS UNLIMITED INC.
4136 Loring Drive
Bonner Springs, Kansas 66012
Ph 913-422-3610 Fax 913-422-3590

SUBMITTAL

Auger Boring Method

Casing will be installed utilizing a Auger Boring Machine 60" America AugersBoring Machine

a Notify Missourione call for utility locates

b Inspect pit (by others) to assure compliance with OSHA Requirements

c. Pour backing block and pit slab if necessary

d Install rails on line and at proper grade

e Set up boring machine

f Install first section of casing on the rail and install by cutting a hole 1" larger than the casing by using a cutter head attached to a section of auger that will transfer the spoils back to the bore pit. AS the material is being removed the casing will be advanced by the thrust of the boring machine to keep the end of the casing at the location of the cutting head.
During this operation the spoils will be hoisted from the pit (Disposal by others)

g When the first section of casing is installed the machine will be moved back on the rails and a section of casing pipe will be attached with a full depth weld. Prior to attaching the new section of casing a lazer will be set up and the location and elevation of the end of the casing will be checked.

h The second section of casing will be advanced utilizing the same method as the first section.

i Steps g & h will be repeated until the full length of the casing has been installed

Installation of Carrier pipe

The specified casing spacers will be attached to the carrier pipe, then the carrier pipe will be inserted into the casing. Power to install the sections of pipe will be supplied by either the boom truck or boring machine.

Check elevation of surface

Elevation of surface will be checked on daily basis and reported to inspector

Removal of obstacles

Casing is large enough to remove obstacles

Safety

See Attach hazard review

CFS ENGINEERS

CFS Engineers, Inc
1100 W. Cambridge Circle Drive, Suite 700
Kansas City, Kansas 66103

BORING NUMBER B26

MH A-Z

CLIENT Lee's Summit R7 District
PROJECT NAME Lee's Summit MS #4 Sewer Line
PROJECT NUMBER 20-1074
PROJECT LOCATION Lee's Summit, MO
DATE STARTED 05/03/21 **COMPLETED** 05/03/21
GROUND ELEVATION 945.8 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR CFS Engineers
GROUND WATER LEVELS:
DRILLING METHOD 6-inch Hollow Stem
▽ **AT TIME OF DRILLING** 13.50 ft / Elev 932.30 ft
LOGGED BY KK **CHECKED BY** JE
AT END OF DRILLING --- Not Recorded
NOTES
AFTER DRILLING --- Not Recorded

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		ORGANIC SOIL, (OL) dark brown, dry, with organics (TOPSOIL)										
		FAT CLAY, (CH) grayish brown and brown, moist, medium stiff to stiff	SPT 1		1-2-3 (5)			35				
								27				
5			SPT 2		2-3-4 (7)			28				
			SPT 3		2-3-5 (8)			17				
10												
		▽ LIMESTONE, highly weathered, with clay seams										
15		LIMESTONE, slightly weathered										
		SHALE, slightly weathered, dark gray	RC 4	100 (53)								
20			RC 5	100 (75)								
25			RC 6	100 (58)								
		LIMESTONE, moderately weathered										

Refusal at 15.0 feet.
Bottom of borehole at 27.0 feet.

CFS Engineers, Inc
1100 W. Cambridge Circle Drive, Suite 700
Kansas City, Kansas 66103

BORING NUMBER B27

CLIENT Lee's Summit R7 District
PROJECT NAME Lee's Summit MS #4 Sewer Line
PROJECT NUMBER 20-1074
PROJECT LOCATION Lee's Summit, MO
DATE STARTED 05/03/21 **COMPLETED** 05/03/21
GROUND ELEVATION 929.6 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR CFS Engineers
GROUND WATER LEVELS:
DRILLING METHOD 6-inch Hollow Stem
AT TIME OF DRILLING --- No Free Water Encountered
LOGGED BY KK **CHECKED BY** JE
AT END OF DRILLING --- No Free Water Encountered
NOTES
AFTER DRILLING --- No Free Water Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		ORGANIC SOIL, (OL) dark brown, dry, with organics (TOPSOIL)										
		FAT CLAY, (CH) dark grayish brown, moist, medium stiff to stiff	SPT 1	100	0-2-3 (5)							
5			SPT 2	89	2-4-5 (9)							
		SHALE, moderately weathered to slightly weathered, dark gray	SPT 3	100	15-33-50/3"							
10												
			SPT 4	20	50/5"							

Refusal at 14.0 feet.
Bottom of borehole at 14.0 feet.

LEGEND:

- SS PIPELINE CROSSING (30" PVC, NEW)
- SS PIPELINE ENCROACHMENT (30" PVC, NEW)
- EXISTING SS PIPELINE CROSSING (15" PVC, TO BE ABANDONED)
- EXISTING SS PIPELINE ENCROACHMENT (12" PVC, TO REMAIN)
- EXISTING SS PIPELINE ENCROACHMENT (15" PVC, TO REMAIN)
- UPRRCO. R/W OUTLINED

CADD FILENAME	0328712.dgn
SCAN FILENAME	X

NOTE: BEFORE YOU BEGIN ANY WORK, SEE AGREEMENT FOR FIBER OPTIC PROVISIONS.

EXHIBIT "A-1"

UNION PACIFIC RAILROAD COMPANY

LEES SUMMIT, JACKSON, MO

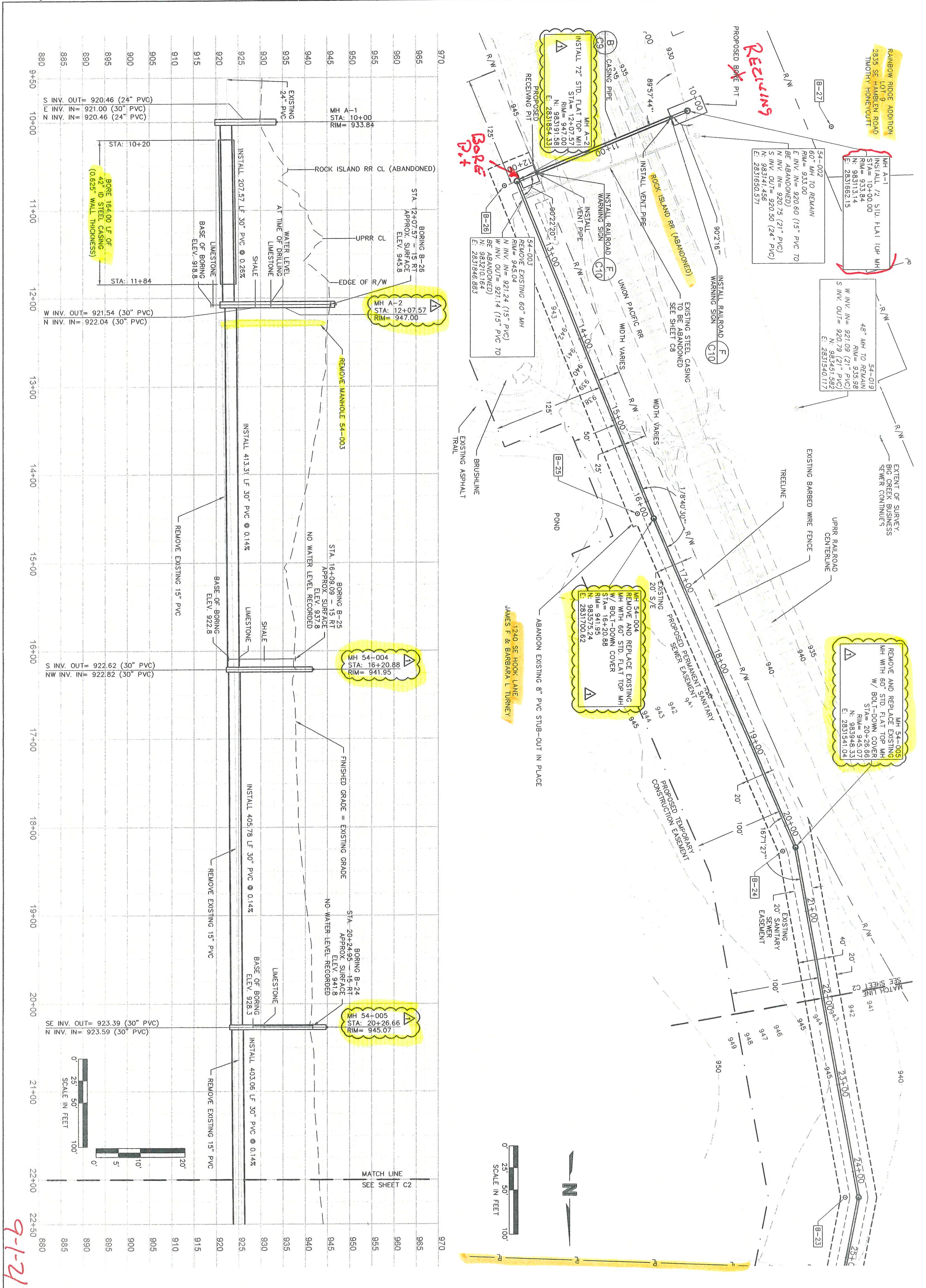
M.P. 256.29 - SEDALIA SUB

MP V-3A/34 & CRIP V-16/4
SCALE: 1" = 200'

OFFICE OF REAL ESTATE
OMAHA, NEBRASKA DATE: 10/5/2021

JDB FILE: 3287-12

DWG: \\oa.ad.oaconsulting.com\lte-ns1\projects-direct\2020\0001-0500\020-0103\40-Design\AutoCAD\Final Plans\Sheets\WTWW\P_SAN01_0200103.dwg USER: bhudlemeyer
DATE: Aug 24, 2021 2:18pm XREFS: P_PBASE_0200103 V_XTOPO-2_00103 P_PTLBK_0200103 V_XBOU-2_00103



REV NO.	DATE	REVISIONS DESCRIPTION	BY
1	8-25-2021	ASI #29 - REVISED PER CITY COMMENTS	

REVISIONS

FINAL DESIGN NOT FOR CONSTRUCTION

SANITARY PLAN AND PROFILE
STATION 10+00 TO 22+00

BIG CREEK INTERCEPTOR SEWER UPSIZING
LEE'S SUMMIT MIDDLE SCHOOL #4

LEE'S SUMMIT, MO 2021

drawn by: NG
checked by: BH
approved by: BH
QA/QC by: JS
project no.: 020-0103
drawing no.:
date: 07.15.2021

SHEET
C1

olsson

Olsson - Civil Engineering
Missouri Certificate of Authority # 001592
1301 Burlington Street
North Kansas City, MO 64116 TEL 816.361.1177 www.olsson.com

Stan Redford, President
P.O. Box 1065
Raymore, Mo. 64083

Certified MBE

Office: 816-540-2030
Fax: 816-540-3071

www.redfordconstruction.com

REDFORD CONSTRUCTION

December 6, 2021

RailPros
utilities.office.staff@railpros.com

RE: Lee's Summit New Middle School
Big Creek Interceptor
Lee's Summit, Missouri
Union Pacific Permit
Folder #: 3287-12 / Lee's Summit, Missouri
MP: 25629 / Sedalia Subdivision

To Whom it May Concern:
Please find attached: Pipeline encroachment and crossing agreement, flagger and RailPros observer information sheet and work plan.

Project Description:
Big Creek Interceptor / Union Pacific Rail Road
Railroad bore 164 LF / 42" steel casing with 30" PVC carrier pipe.
Bore pit east of Railroad Right of Way / 24 VF.
Excavation will be cut down to below 20 VF using a series of trench boxes.
Receiving pit; west side of abandoned track / 55 LF.
Trench excavation 10 VF using manhole trench box for shoring.
(See attached plan sheet)

Redford Construction will be doing the excavation and shoring excavation.
Auger Unlimited, Subcontractor to Redford Construction, will be performing Railroad bore.
After completion of Railroad bore and 30" PVC placed in service, existing service main will be abandoned. (See attached plan)
If you have any questions or need additional information or need any part of the work plan revised or corrected, please let me know.

Redford Construction, Inc.
Larry Hudgens, Project Manager
larry@redfordconstruction.com
cell: 816-918-0558

Stan Redford, President
P.O. Box 1065
Raymore, Mo. 64083

Certified MBE

Office: 816-540-2030
Fax: 816-540-3071

www.redfordconstruction.com

REDFORD
CONSTRUCTION

November 29, 2021

McCownGordon Construction
Attn: Brett Taylor
850 Main Street
Kansas City, Missouri 64105

RE: Lee's Summit New Middle School
Big Creek Interceptor Sewer
Trench Shoring

Mr. Taylor,

For open cut trenching portion of the above listed project, Redford Construction will be using a series of trench boxes to shore trench during the installation of the 24" and 30" PVC and DIP pipe and manholes.

I have attached information regarding the proposed trench boxes. If you have any questions, please let me know.

Redford Construction, Inc.

Larry Hudgens,
Project Manager

TRENCH SHIELD ASSEMBLY & DISASSEMBLY

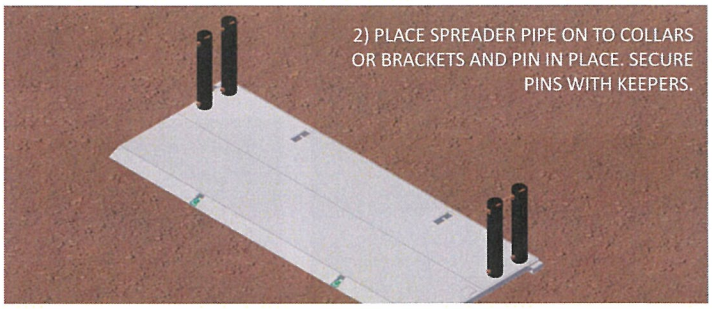
Visit www.naxsa.org/trenchsafetyvideos for trench shield assembly & disassembly video

NAXSA
APPROVED CONTENT & FORMAT

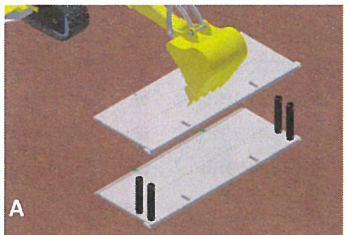
1. ANY USE OF A TRENCH SHIELD WITHOUT MANUFACTURER'S SPREADERS AND PINS OR EQUAL WILL VOID THE TABULATED DATA AND WARRANTY.
2. TRENCH SHIELDS ARE DESIGNED TO BE USED WITHOUT PLATES EXTENDING BELOW, ABOVE, OR NEXT TO IT. ANY USE OF SUCH PLATES OR PANELS MAY VOID THE TABULATED DATA AND MAY REQUIRE SITE SPECIFIC ENGINEERING.
3. TRENCH SHIELDS ARE DESIGNED TO BE PUSHED TO GRADE IF NECESSARY. AS NOTED BELOW, ANY UNNECESSARY ABUSE BY THE EXCAVATOR AND OR OPERATOR (SUCH AS POUNDING WITH THE BUCKET) WILL VOID THE TABULATED DATA AS WELL AS THE WARRANTY.
4. CONDITION OF SHIELD, SPREADER PIPES, AND SPREADER PINS MUST BE CHECKED/ INSPECTED FOR SERVICEABILITY BY THE COMPETENT PERSON PRIOR TO EACH USE. PSF RATING IS NOT VALID IF THERE IS ANY VISIBLE DAMAGE TO, OR REPAIRS MADE TO THE SHIELD THAT HAS NOT BEEN DOCUMENTED AND CERTIFIED BY A REGISTERED PROFESSIONAL ENGINEER.
5. A MINIMUM OF 4 SPREADERS OR A MANUFACTURER-APPROVED ALTERNATIVE, MUST BE INSTALLED ON THE TRENCH SHIELD PRIOR TO USE.
6. WARNING: LIFTING EYES ARE DESIGNED AND INTENDED FOR ASSEMBLY/DISASSEMBLY AND LIFTING ONLY. DO NOT PULL OR LIFT BY EYES WHEN SHIELD IS STUCK OR HAS PRESSURE AGAINST IT. LOOSEN SHIELD BY PULLING ON PULLING EYES OR DIGGING ALONG SIDES.

ASSEMBLY

1) REMOVE FROM TRUCK BY LIFTING PANELS WITH 4 POINT LIFT LUGS. ALWAYS USE OSHA APPROVED SLINGS. PLACE ONE SIDEWALL FLAT ON THE GROUND WITH COLLARS FACING UP.

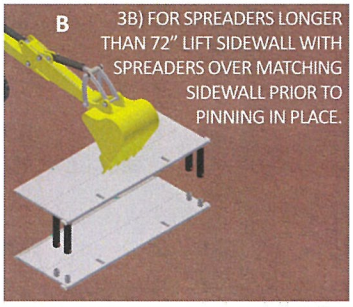


2) PLACE SPREADER PIPE ON TO COLLARS OR BRACKETS AND PIN IN PLACE. SECURE PINS WITH KEEPERS.



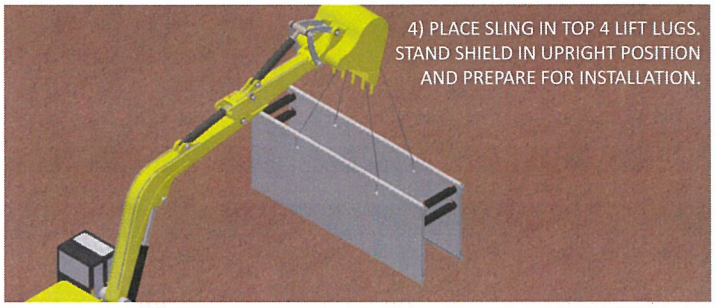
A

3A) LOWER SECOND SIDEWALL ONTO SPREADERS AND PIN IN PLACE.



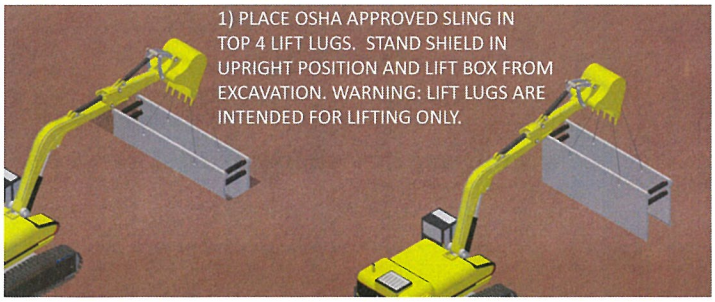
B

3B) FOR SPREADERS LONGER THAN 72" LIFT SIDEWALL WITH SPREADERS OVER MATCHING SIDEWALL PRIOR TO PINNING IN PLACE.



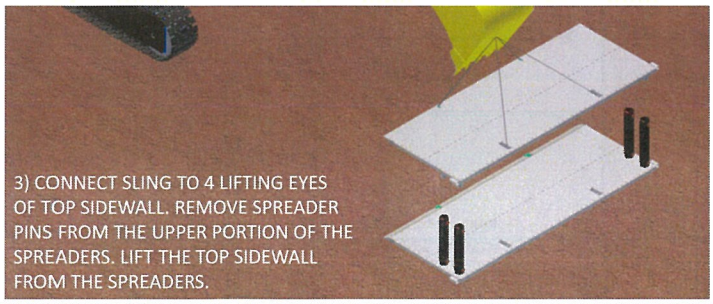
4) PLACE SLING IN TOP 4 LIFT LUGS. STAND SHIELD IN UPRIGHT POSITION AND PREPARE FOR INSTALLATION.

DISASSEMBLY



1) PLACE OSHA APPROVED SLING IN TOP 4 LIFT LUGS. STAND SHIELD IN UPRIGHT POSITION AND LIFT BOX FROM EXCAVATION. WARNING: LIFT LUGS ARE INTENDED FOR LIFTING ONLY.

2) PLACE SHIELD ON EITHER SIDEWALL.



3) CONNECT SLING TO 4 LIFTING EYES OF TOP SIDEWALL. REMOVE SPREADER PINS FROM THE UPPER PORTION OF THE SPREADERS. LIFT THE TOP SIDEWALL FROM THE SPREADERS.

4) UNPIN SPREADERS FROM THE LOWER SIDEWALL AND REMOVE SPREADERS.

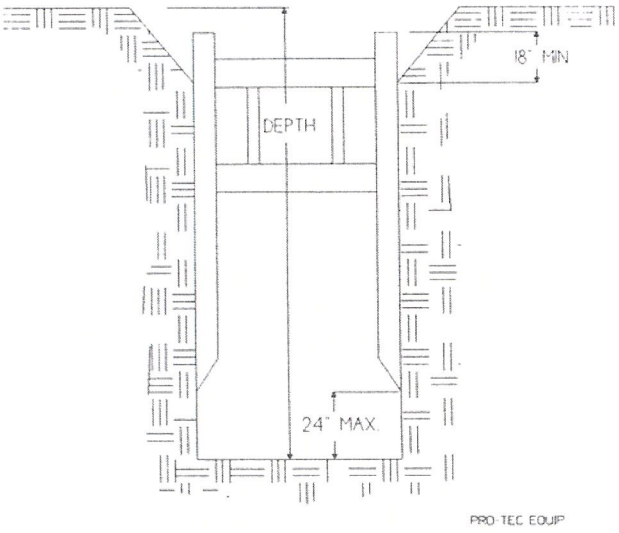
WARNING: ANY USE OF THIS PRODUCT NOT SPECIFICALLY DESCRIBED ON THIS CERTIFICATE COULD CAUSE CAVE-IN, COLLAPSE, OR STRUCTURAL FAILURE, AND MAY RESULT IN INJURY, OR DEATH

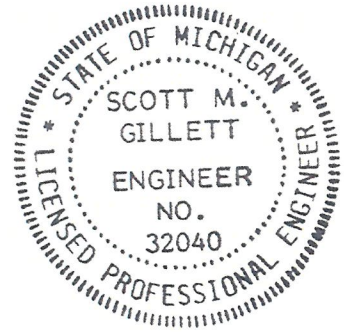
TRENCH SHIELD CERTIFICATION

A COPY OF THIS SHEET MUST ACCOMPANY EACH CORRESPONDING TRENCH SHIELD AT EVERY JOB SITE

MODEL NUMBER	WEIGHT	SERIAL NUMBER	SIZE
PRO8 - 828D	16,994	24212	8' HIGH X 28' LONG

SOIL	MAX DEPTH	PSF	SOIL DESCRIPTION
TYPE A	48 FEET	1200	Stiff Cohesive Soil, 25 PSF per foot, clay, silty clay, clay loam with unconfined compressive strength of 1.5 ton per square foot or greater. See note 7.
TYPE B	26 FEET	1200	Medium Cohesive to granular soil, 45 PSF per foot of depth. Clay with unconfined compressive strength greater than 0.5 TSF but less than 1.5 TSF. Cohesionless gravel, silt, silt loam or sandy loam. See note 8.
TYPE C	20 FEET	1200	Soft Cohesive to Saturated Soil, 60 PSF per foot of depth. Clay with unconfined compressive strength less than 0.5 TSF, saturated sand, clay or fractured rock that is not stable. See note 9.





Scott M. Gillett

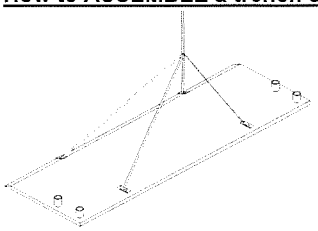
LIMITATIONS

1) Soil above shield must be sloped according to OSHA Subpart P. Slope must begin no less than 18" below the top of shield.
2) Shield may be suspended no more than 2 feet above bottom of the trench and only if there is no possible loss of soil from behind or below bottom of shield.
3) A minimum of 2 spreader pipes are required on each end with manufacturer approved pins and keepers.
4) Repairs and modifications must first be approved by manufacturer or registered professional engineer.
5) Shields may be stacked as long as each is rated to the depth it is used and manufacturer approved stack connections are utilized to prevent lateral movement of the shields.
6) Surcharge loads have not been included in the above depth ratings. The allowable working depth of the shield must be reduced to account for any surcharge loading which occurs within the influence line of the shield.
7) Not Type A if fissured. Subject to vibration, previously disturbed or part of a sloped layered system where layers dip into excavation on a slope of four horizontals to one vertical (4H:1 V) or greater.
8) Previously disturbed soils may be Type B unless they would be classed as Type C. Soil that meets requirements of Type A but is subject to vibration or fissured may be Type B. Dry rock that is not stable or soil that is part of a sloped layered system where layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V) are Type B if material would otherwise be classified as Type B.
9) Soil in a sloped layered system where layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper may be Type C. Saturated soil or soils from which water is freely seeping but is not standing in the trench. .Conditions more severe would require dewatering or the sealing of four sides of the excavation and pumping the trench. Such severe conditions would require the services of a soils engineer to establish the design pressure. Consult the manufacturer for pressures exceeding tabulated values.
10) PRO-TEC trench shields are to be used in accordance with Federal, state and Local laws. Refer to Occupational Safety and Health Administration (OSHA) rules and regulations Vol. 54, No. 209, 10/31/89, Part 1926, Subpart P.

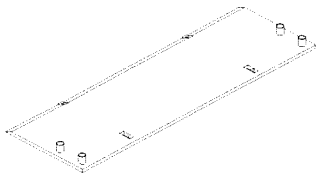
Usage of trench shields other than specified could cause failure or cave-ins resulting in serious injury or death.

Phone (517) 541-0303 • 1-800-292-1225 • Fax (517) 541-0329
Mailing Address: P.O. Box 130 • Charlotte, MI 48813 • **Shipping Address:** 1298 Lipsey Drive • Charlotte, MI 48813

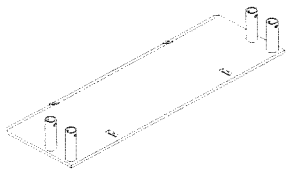
How to ASSEMBLE a trench shield:



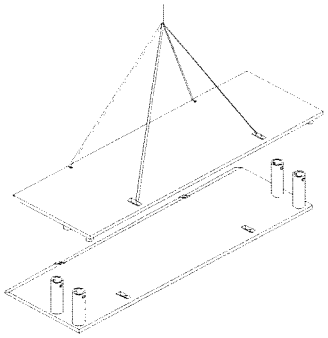
1. Remove from truck by lifting panels with 4 point lift lugs. Always use OSHA approved slings.



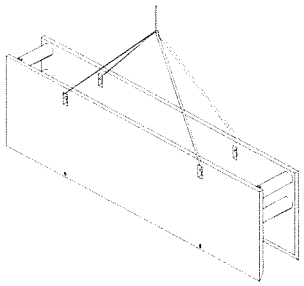
2. Place one sidewall flat on the ground with collars pointing up.



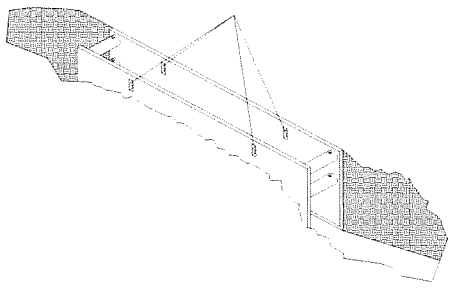
3. Set the spreader pipes over the collars and insert pins and keepers.



4. Set matching panel over bottom panel. Install Spreader pipes in collars and insert pins and keepers.

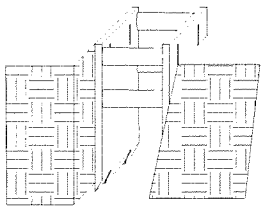


5. Place sling in top 4 lift lugs. Stand shield and install into trench.

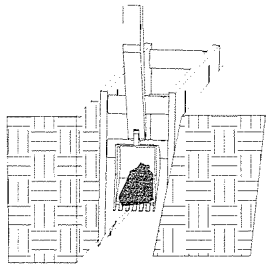


6. WARNING: Lift eyes are designed and intended for assembly and lifting only. Do not pull or lift by eyes when shield is stuck or has pressure against it. Loosen shield by pulling on spreader or digging along sides before using lift eyes.

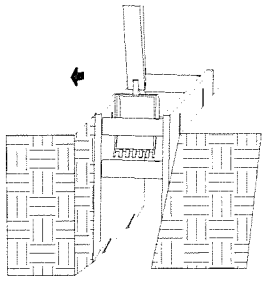
How to use a trench shield in STABLE soils:



1. Excavate trench to grade, slightly wider than shield. Lift and lower shield into trench.

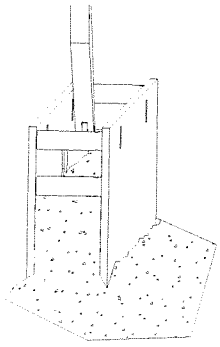


2. Perform desired work, then excavate in front of shield.

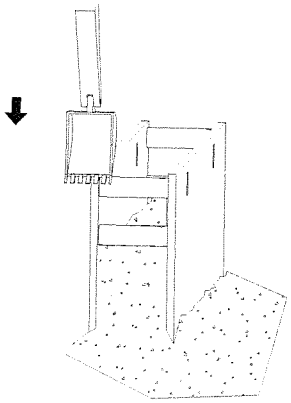


3. Pull shield forward by front spreaders or pulling eyes. Continue excavating and pull shield forward. Back fill as work progresses.

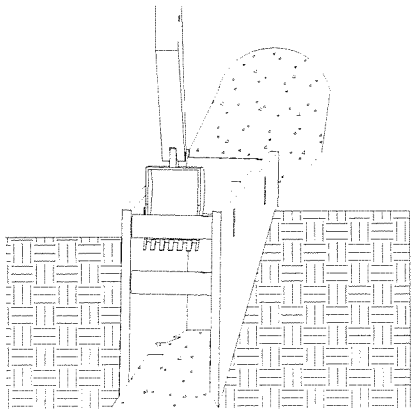
How to use a trench shield in UNSTABLE soils:



1. Excavate until soil begins to crumble beyond desired trench width. Place shield on line of excavation and excavate from within.



2. Continue excavating with in shield while alternately pushing down on shield corners, until proper grade is reached.



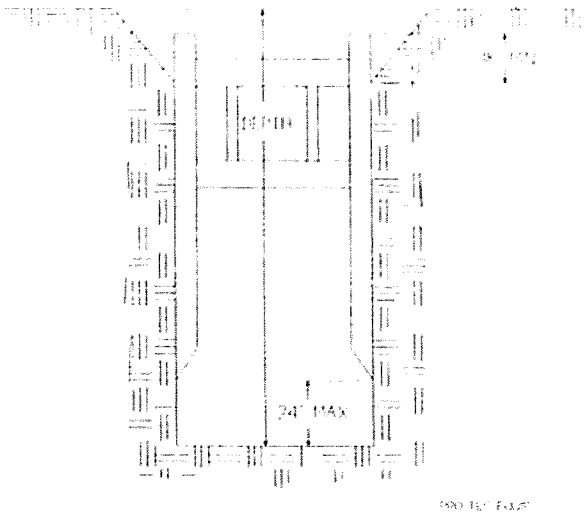
3. Perform desired work, then pull shield forward and up at appropriate angle and repeat steps (2) and (3) as necessary.

TRENCH SHIELD CERTIFICATION

A COPY OF THIS SHEET MUST ACCOMPANY EACH CORRESPONDING TRENCH SHIELD AT EVERY JOB SITE

MODEL NUMBER	WEIGHT	SERIAL NUMBER	SIZE
CAT6 - 824DNOKE	12211	2AR6959	8' HIGH X 24' LONG

SOIL	MAX DEPTH	PSF	SOIL DESCRIPTION
TYPE A	41 FEET	1068	Stiff Cohesive Soil, 25 PSF per foot, clay, silty clay, clay loam with unconfined compressive strength of 1.5 ton per square foot or greater. See note 7.
TYPE B	23 FEET	1068	Medium Cohesive to granular soil, 45 PSF per foot of depth. Clay with unconfined compressive strength greater than 0.5 TSF but less than 1.5 TSF. Cohesionless gravel, silt, silt loam or sandy loam. See note 8.
TYPE C	18 FEET	1068	Soft Cohesive to Saturated Soil, 60 PSF per foot of depth. Clay with unconfined compressive strength less than 0.5 TSF, saturated sand, clay or fractured rock that is not stable. See note 9.



STATE OF MICHIGAN
SCOTT M. GILLETT
ENGINEER NO. 32040
LICENSED PROFESSIONAL ENGINEER

Scott M. Gillett

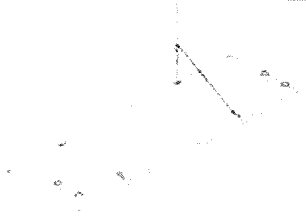
LIMITATIONS

1) Soil above shield must be sloped according to OSHA Subpart P. Slope must begin no less than 18" below the top of shield.
2) Shield may be suspended no more than 2 feet above bottom of the trench and only if there is no possible loss of soil from behind or below bottom of shield.
3) A minimum of 2 spreader pipes are required on each end with manufacturer approved pins and keepers.
4) Repairs and modifications must first be approved by manufacturer or registered professional engineer.
5) Shields may be stacked as long as each is rated to the depth it is used and manufacturer approved stack connections are utilized to prevent lateral movement of the shields.
6) Surcharge loads have not been included in the above depth ratings. The allowable working depth of the shield must be reduced to account for any surcharge loading which occurs within the influence line of the shield.
7) Not Type A if fissured. Subject to vibration, previously disturbed or part of a sloped layered system where layers dip into excavation on a slope of four horizontals to one vertical (4H:1 V) or greater.
8) Previously disturbed soils may be Type B unless they would be classed as Type C. Soil that meets requirements of Type A but is subject to vibration or fissured may be Type B. Dry rock that is not stable or soil that is part of a sloped layered system where layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V) are Type B if material would otherwise be classified as Type B.
9) Soil in a sloped layered system where layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper may be Type C. Saturated soil or soils from which water is freely seeping but is not standing in the trench. .Conditions more severe would require dewatering or the sealing of four sides of the excavation and pumping the trench. Such severe conditions would require the services of a soils engineer to establish the design pressure. Consult the manufacturer for pressures exceeding tabulated values.
10) PRO-TEC trench shields are to be used in accordance with Federal, state and Local laws. Refer to Occupational Safety and Health Administration (OSHA) rules and regulations Vol. 54, No. 209, 10/31/89, Part 1926, Subpart P.

Usage of trench shields other than specified could cause failure or cave-ins resulting in serious injury or death.

Phone (517) 541-0303 • 1-800-292-1225 • Fax (517) 541-0329
Mailing Address: P O Box 130 • Charlotte, MI 48813 • Shipping Address: 1298 Lipsey Drive • Charlotte, MI 48813

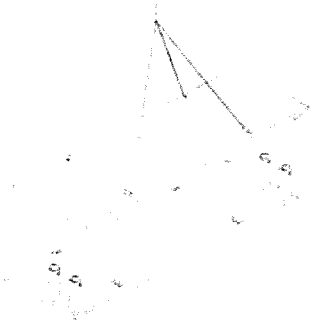
How to ASSEMBLE a trench shield:



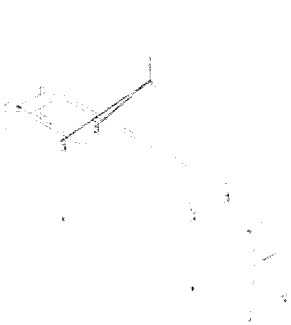
1. Remove from truck by lifting panels with 4 point lift lugs. Always use OSHA approved slings.

2. Place one sidewall flat on the ground with collars pointing up.

3. Set the spreader pipes over the collars and insert pins and keepers.



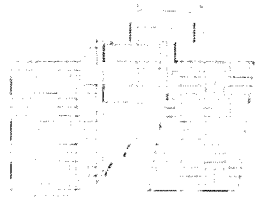
4. Set matching panel over bottom panel. Install Spreader pipes in collars and insert pins and keepers.



5. Place sling in top 4 lift lugs. Stand shield and install into trench.

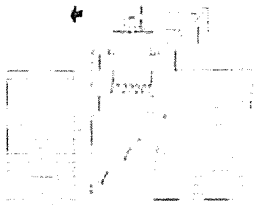
6. WARNING: Lift eyes are designed and intended for assembly and lifting only. Do not pull or lift by eyes when shield is stuck or has pressure against it. Loosen shield by pulling on spreader or digging along sides before using lift eyes.

How to use a trench shield in STABLE soils:



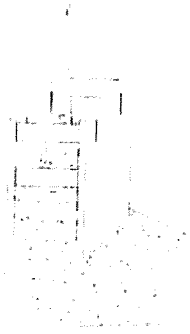
1. Excavate trench to grade, slightly wider than shield. Lift and lower shield into trench.

2. Perform desired work, then excavate in front of shield.

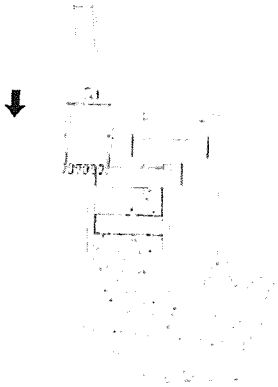


3. Pull shield forward by front spreaders or pulling eyes. Continue excavating and pull shield forward. Back fill as work progresses.

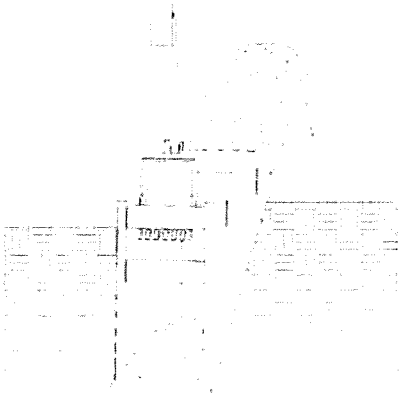
How to use a trench shield in UNSTABLE soils:



1. Excavate until soil begins to crumble beyond desired trench width. Place shield on line of excavation and excavate from within.



2. Continue excavating with in shield while alternately pushing down on shield corners, until proper grade is reached.



3. Perform desired work, then pull shield forward and up at appropriate angle and repeat steps (2) and (3) as necessary.

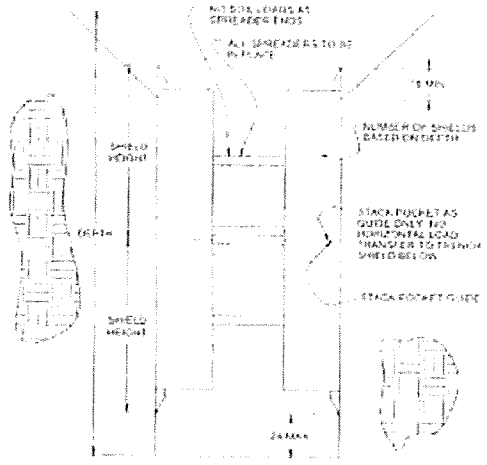
MANHOLE TRENCH SHIELD CERTIFICATION

A COPY OF THIS SHEET MUST ACCOMPANY EACH CORRESPONDING TRENCH SHIELD AT EVERY JOB SITE

MODEL NUMBER	WEIGHT	SERIAL NUMBER	SIZE
MAN4 - 812D	6549	4AR7728	8' HIGH X 12' LONG

SOIL	MAX DEPTH	PSF	SOIL DESCRIPTION
TYPE A	67 Feet	1680	Stiff Cohesive Soil, 25 PSF per foot, clay, silty clay, clay loam with unconfined compressive strength of 1.5 ton per square foot or greater. See note 7
TYPE B	37 Feet	1680	Medium Cohesive to granular soil, 45 PSF per foot of depth. Clay with unconfined compressive strength greater than 0.5 TSF but less than 1.5 TSF. Cohesionless gravel, silt, silt loam or sandy loam. See note 8.
TYPE C	28 Feet	1680	Soft Cohesive to Saturated Soil, 60 PSF per foot of depth. Clay with unconfined compressive strength less than 0.5 TSF, saturated sand, clay or fractured rock that is not stable. See note 9.

LIMITATIONS



STATE OF MICHIGAN
SCOTT M. GILLETT
ENGINEER
NO. 32040
LICENSED PROFESSIONAL ENGINEER

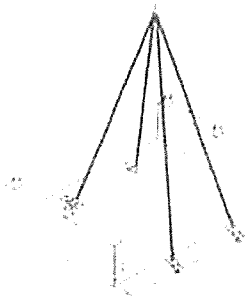
Scott M. Gillett
2/18/05

1) Soil above shield must be sloped according to OSHA Subpart P. Slope must begin no less than 18" below the top of shield.
2) Shield may be suspended no more than 2 feet above bottom of the trench and only if there is no possible loss of soil from behind or below bottom of shield.
3) The sides of the excavation shall be cut vertical and narrow to prevent lateral movement of the Manhole Shield. If necessary, backfill around the Manhole Shield to a height sufficient to prevent lateral movement.
4) Repairs and modifications must first be approved by manufacturer or registered professional engineer.
5) Shields may be stacked as long as each is rated to the depth it is used and manufacturer approved stack connections are utilized.
6) Surcharge loads have not been included in the above depth ratings. The allowable working depth of the shield must be reduced to account for any surcharge loading which occurs within the influence line of the shield.
7) Not Type A if fissured. Subject to vibration, previously disturbed or part of a sloped layered system where layers dip into excavation on a slope less steep than four horizontal to one vertical (4H:1V) are Type B if material would otherwise be classified as Type B.
8) Previously disturbed soils may be Type B unless they would be classed as Type C. Soil that meets requirements of Type A but is subject to vibration or fissured may be Type B. Dry rock that is not stable or soil that is part of a sloped layered system where layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V) are Type B if material would otherwise be classified as type B.
9) Soil in a sloped layered system where layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper may be Type C. Saturated soil or soils from which water is freely seeping but is not standing in the trench. Conditions more severe would require dewatering or the sealing of the sides of the excavation and pumping the trench. Such severe conditions would require the services of a soils engineer to establish the design pressure. Consult the manufacturer for pressures exceeding tabulated values.
10) PRO-TEC shields are to be used in accordance with Federal, state and local laws. Refer to Occupational Safety and Health Administration (OSHA) rules and regulations Vol. 54, No. 209, 10/31/89, Subpart P.
11) Shields are for occupational safety use only. Dependent on specific site conditions, soil movement could occur. Affects on adjacent areas from potential soil movement shall be the responsibility of others.

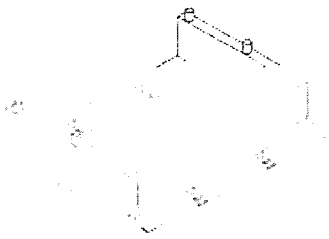
Usage of shields other than specified could cause failure or cave-ins resulting in serious injury or death.

Phone (517) 541-0303 ~ 1-800-292-1225 ~ Fax (517) 541-0329
Mailing Address: P O. Box 130 ~ Charlotte, MI 48813 ~ Shipping Address: 1298 Lipsey Drive ~ Charlotte, MI 48813

How to Assemble a Manhole Trench Shield

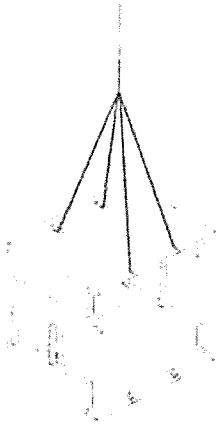


1. Remove from truck by lifting shield with 4 point lift lugs. Always use OSHA approved slings.

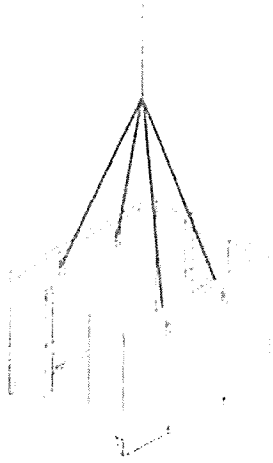


2. Place one sidewall flat on the ground with collars pointing up.

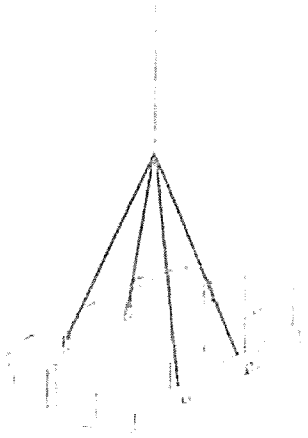
3. Set the spreader pipes over the collars and insert pins and keepers.



4. Set matching panel over bottom panel. Install spreader pipes over collars and insert pins and keepers.



5. Place sling in top 4 lift lugs. Stand shield and install into trench.



6. WARNING: Lift eyes are designed and intended for assembly and lifting only. Do not pull or lift by eyes when shield is stuck or has pressure against it. Loosen shield by pulling on spreader or digging along sides before using lift eyes.

NOTE:

Refer to Certification shown on other side of this page and Manufacturer's Tabulated data for proper usage of Manhole Trench Shields.

TRENCH SHIELD TABULATED DATA

A COPY OF THIS SHEET MUST ACCOMPANY EACH CORRESPONDING TRENCH SHIELD AT EVERY JOB SITE

MODEL NUMBER: PRO6-824DNKE

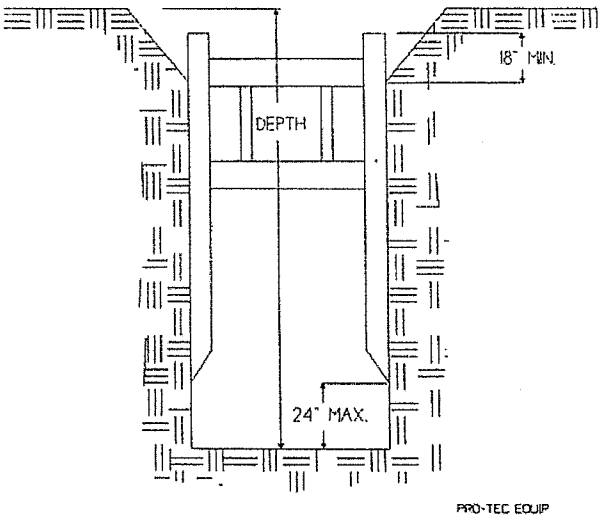
SERIAL NUMBER: 37328

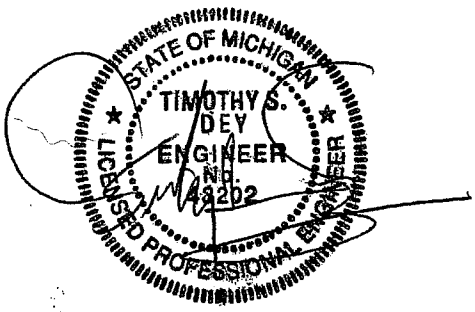
DATE MANUFACTURED: 05/2020

SHIELD SIZE: 8 - FT X 24 - FT
SPREADER SIZE: 8 IN SCH 80
MAX SPREADER LENGTH: 20 - FT

SOIL	MAX DEPTH	*PSF
TYPE A	40 - FT	1,140
TYPE B	24 - FT	
TYPE C60	19 - FT	
TYPE C80	15 - FT	

*Shield Capacity based on C60 soil at bottom of the excavation.





LIMITATIONS:

1. Soil above shield must be sloped according to OSHA Subpart P. Slope must begin no less than 18" below the top of shield.
2. Shield may be suspended no more than 2 feet above bottom of the trench and only if there is no possible loss of soil from behind or below bottom of shield.
3. A minimum of 2 spreader pipes are required on each end with manufacturer approved **1 3/4-in diameter pins** and keepers.
4. Repairs and modifications shall be approved in writing by the manufacturer and a registered professional engineer.
5. Shields may be stacked as long as each is rated to the depth it is used and manufacturer approved stack connections are utilized.
6. Surcharge loads have not been included in the above depth ratings. The allowable working depth of the shield must be reduced to account for all surcharge loading which occurs adjacent to the trench. (Adjacent is defined as within a distance equal to the depth of the trench.)
7. The Soil Types A, B , and C - 80 are as defined in the OSHA Standard. Soil Type C - 60 is a moist, cohesive soil or a moist dense granular soil, which is not flowing or submerged and has an Equivalent Fluid Pressure (EFP) of 60 PSF per foot of depth. The competent person must monitor the excavation for signs of deterioration that may alter soil pressures and produce the Soil Type C - 80 condition. Such signs are indicated by, but not limited to, freely seeping water or flowing soil entering the excavation around or below the shield.
8. PRO-TEC trench shields have been designed by a registered professional engineer as required to comply with Occupational Safety and Health Administration (OSHA) standard 29 CFR Part 1926, Subpart P.
9. Maximum depths are based on shields being in structurally sound condition. Trench Shields should be inspected prior to each use for any damage or deterioration. If a shield has sustained major structural damage or permanent deformation of a structural member or connection, the Tabulated Data is void until repairs are made as specified by a registered professional engineer.

TRINITY SHORING PRODUCTS, INC.
A TRINITY MINING & CONSTRUCTION EQUIPMENT, INC. COMPANY

23285

Usage of trench shields other than specified could cause failure or cave-ins resulting in serious injury or death.

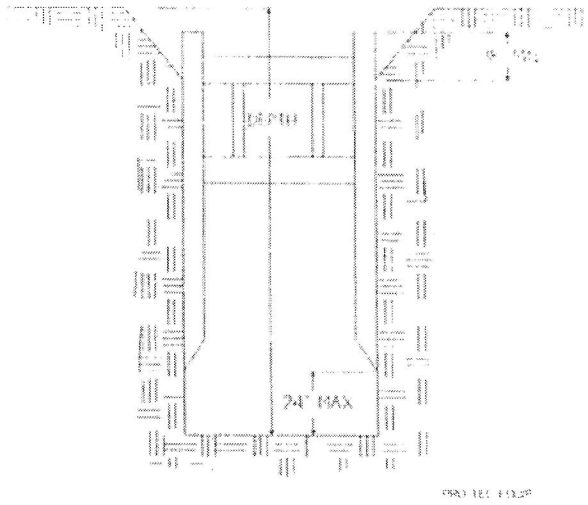
Phone (517) 541-0303 • 1-800-292-1225 • Fax (517) 541-0329
Mailing Address: 4837 W. Grand River Drive, Lansing , MI 48905

TRENCH SHIELD CERTIFICATION

A COPY OF THIS SHEET MUST ACCOMPANY EACH CORRESPONDING TRENCH SHIELD AT EVERY JOB SITE

MODEL NUMBER	WEIGHT	SERIAL NUMBER	SIZE
CAT4 - 824D	10323	2AR6956	8' HIGH X 24' LONG

SOIL	MAX DEPTH	PSF	SOIL DESCRIPTION
TYPE A	28 FEET	793	Stiff Cohesive Soil, 25 PSF per foot, clay, silty clay, clay loam with unconfined compressive strength of 1.5 ton per square foot or greater. See note 7.
TYPE B	17 FEET	793	Medium Cohesive to granular soil, 45 PSF per foot of depth. Clay with unconfined compressive strength greater than 0.5 TSF but less than 1.5 TSF. Cohesionless gravel, silt, silt loam or sandy loam. See note 8.
TYPE C	13 FEET	793	Soft Cohesive to Saturated Soil, 60 PSF per foot of depth. Clay with unconfined compressive strength less than 0.5 TSF, saturated sand, clay or fractured rock that is not stable. See note 9.



STATE OF MICHIGAN
SCOTT M. GILLETT
ENGINEER
NO. 32040
LICENSED PROFESSIONAL ENGINEER

Scott M. Gillett

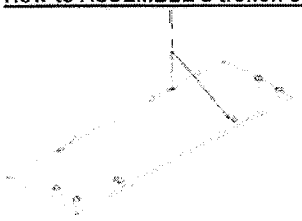
LIMITATIONS

1) Soil above shield must be sloped according to OSHA Subpart P. Slope must begin no less than 18" below the top of shield.
2) Shield may be suspended no more than 2 feet above bottom of the trench and only if there is no possible loss of soil from behind or below bottom of shield.
3) A minimum of 2 spreader pipes are required on each end with manufacturer approved pins and keepers.
4) Repairs and modifications must first be approved by manufacturer or registered professional engineer.
5) Shields may be stacked as long as each is rated to the depth it is used and manufacturer approved stack connections are utilized to prevent lateral movement of the shields.
6) Surcharge loads have not been included in the above depth ratings. The allowable working depth of the shield must be reduced to account for any surcharge loading which occurs within the influence line of the shield.
7) Not Type A if fissured. Subject to vibration, previously disturbed or part of a sloped layered system where layers dip into excavation on a slope of four horizontals to one vertical (4H:1 V) or greater.
8) Previously disturbed soils may be Type B unless they would be classed as Type C. Soil that meets requirements of Type A but is subject to vibration or fissured may be Type B. Dry rock that is not stable or soil that is part of a sloped layered system where layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V) are Type B if material would otherwise be classified as Type B.
9) Soil in a sloped layered system where layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper may be Type C. Saturated soil or soils from which water is freely seeping but is not standing in the trench. .Conditions more severe would require dewatering or the sealing of four sides of the excavation and pumping the trench. Such severe conditions would require the services of a soils engineer to establish the design pressure. Consult the manufacturer for pressures exceeding tabulated values.
10) PRO-TEC trench shields are to be used in accordance with Federal, state and Local laws. Refer to Occupational Safety and Health Administration (OSHA) rules and regulations Vol. 54, No. 209, 10/31/89, Part 1926, Subpart P.

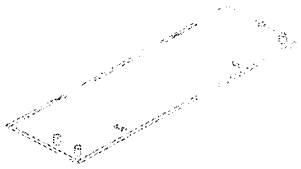
Usage of trench shields other than specified could cause failure or cave-ins resulting in serious injury or death.

Phone (517) 541-0303 • 1-800-292-1225 • Fax (517) 541-0329
Mailing Address: P.O. Box 130 • Charlotte, MI 48813 • Shipping Address: 1298 Lipsey Drive • Charlotte, MI 48813

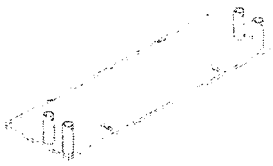
How to ASSEMBLE a trench shield:



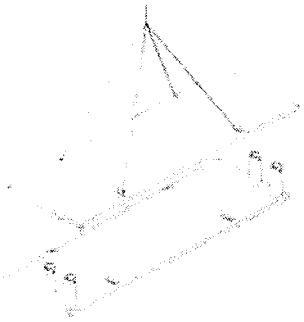
1. Remove from truck by lifting panels with 4 point lift lugs. Always use OSHA approved slings.



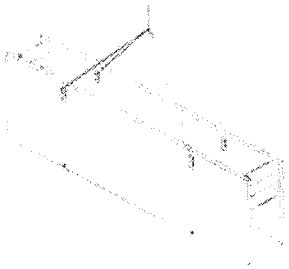
2. Place one sidewall flat on the ground with collars pointing up.



3. Set the spreader pipes over the collars and insert pins and keepers.



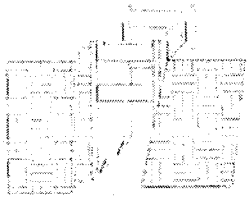
4. Set matching panel over bottom panel. Install Spreader pipes in collars and insert pins and keepers.



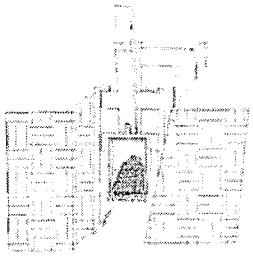
5. Place sling in top 4 lift lugs. Stand shield and install into trench.

6. WARNING: Lift eyes are designed and intended for assembly and lifting only. Do not pull or lift by eyes when shield is stuck or has pressure against it. Loosen shield by pulling on spreader or digging along sides before using lift eyes.

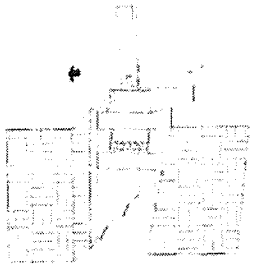
How to use a trench shield in STABLE soils:



1. Excavate trench to grade, slightly wider than shield. Lift and lower shield into trench.

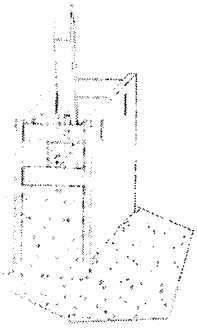


2. Perform desired work, then excavate in front of shield.

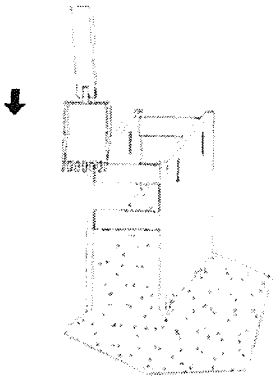


3. Pull shield forward by front spreaders or pulling eyes. Continue excavating and pull shield forward. Back fill as work progresses.

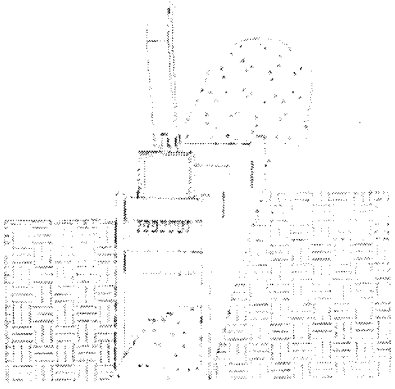
How to use a trench shield in UNSTABLE soils:



1. Excavate until soil begins to crumble beyond desired trench width. Place shield on line of excavation and excavate from within.



2. Continue excavating with in shield while alternately pushing down on shield corners, until proper grade is reached.



3. Perform desired work, then pull shield forward and up at appropriate angle and repeat steps (2) and (3) as necessary.

EFFICIENCY PRODUCTION INC. America's Trench Box Builder

685 HULL ROAD, MASON, MI 48854 PHONE (517) 676-8800

SERIAL NUMBER 1016-1923

STEEL TRENCH SHIELD

MODEL: XLD-1016	4-PIPE "I"	**MAX SPREADER LENGTH**	20 FEET
KNIFE-EDGE YES	**FOAM FILLER** NO	**COLLAR TYPE**	7" O.D. x 3/4" WALL w/2" PIN HOLES
DATE OF MANUFACTURE May-14	**LIFT-LUG RATING** 5,832 LBS	**WEIGHT AS MANUFACTURED**	9,380 LBS

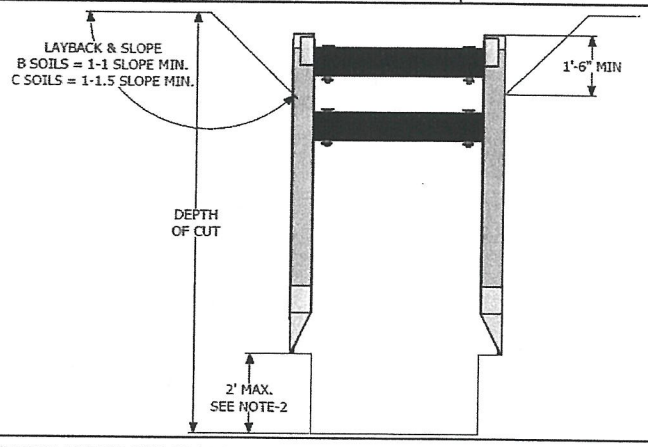
REFERENCE TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION RULES AND REGULATIONS, 29 CFR, NO 209, PART 1926, SUBPART P

SHIELD SIZE		PSF RATING	EXAMPLES OF MAXIMUM ALLOWABLE DEPTH OF CUT (FEET) IN SOIL TYPE TO BE EXCAVATED		
HEIGHT (FEET)	LENGTH (FEET)	MAXIMUM LATERAL EARTH PRESSURE CAPACITY AT TRENCH BOTTOM IN POUNDS PER SQUARE FOOT	**TYPE B-45 (II)** MEDIUM COHESIVE TO GRANULAR SOIL 45 PSF PER FT OF DEPTH	**TYPE C-60 (III)** SOFT COHESIVE TO SATURATED SOIL. 60 PSF PER FT OF DEPTH	**TYPE C-80 (IV)** SOFT SUBMERGED AND FLOWING SOIL. 80 PSF PER FT OF DEPTH
10	**16**	**1320**	**29**	**22**	**17**
			DESCRIPTION CLAY, WITH UNCONFINED COMPRESSIVE STRENGTH GREATER THAN 0.5 TSF BUT LESS THAN 1.5 TSF COHESIONLESS GRAVEL, SILT, SILT LOAM OR SANDY LOAM	**DESCRIPTION** SOFT COHESIVE SOIL UNCONFINED COMPRESSIVE STRENGTH GREATER THAN 0.3 TSF, BUT LESS THAN 0.5 TSF CLAY, SAND AND LOAMY SAND; SATURATED SOIL THAT IS STABLE, DRY SAND, OR DEWATERED SOILS	**DESCRIPTION** SOFT COHESIVE SOIL UNCONFINED COMPRESSIVE STRENGTH LESS THAN 0.3 TSF. FRACTURED ROCK THAT IS NOT STABLE, OR SUBMERGED SAND AND LOAMY SAND THAT IS FLOWING. (SEE NOTE 5)

LIMITATIONS IN USE OF TABLE

1. TRENCH SHIELD TO BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. (SEE PAGE-2)
2. EXCAVATION 2 FEET BELOW BOTTOM OF SHIELD IS PERMITTED WHEN NO LOSS OF SOIL FROM BEHIND OR BELOW THE BOTTOM OF SHIELD IS ENCOUNTERED. SEE PARAGRAPH 1926.652 (e)(2)(i). THE COMPETENT PERSON SHALL MAKE THE DETERMINATION FOR COMPLIANCE. SUDDEN SHIFTING OF THE SHIELD VERTICALLY SHALL BE AVOIDED.
3. DEPTH RATING IS BASED ON TEMPORARY LOADING, CONSULT MANUFACTURER IF SHIELD IS SUBJECT TO LONG TERM LOADING
4. ADDITIONAL SHIELDS MAY BE STACKED WITH NO PENALTY IN DEPTH OF CUT AS LONG AS THE RATING OF THE EACH SHIELD IS NOT EXCEEDED AT THE DEPTH IT IS USED. MANUFACTURER APPROVED STACKING METHOD MUST BE USED.
5. C-80 DOES NOT REPRESENT THE WORST POSSIBLE SOIL CONDITION. OBTAIN SITE-SPECIFIC ENGINEERING FOR EXTREMELY NON-STABLE CONDITIONS SUCH AS MARINE CLAY, PEAT, SOFT SUBMERGED AND FLOWING CLAYS, ETC.
6. ANY MODIFICATIONS OR ALTERATIONS NOT ALLOWED UNLESS APPROVED IN WRITING BY EFFICIENCY PRODUCTION, INC.
7. CONTRACTOR'S COMPETENT/QUALIFIED PERSON SHALL BE RESPONSIBLE FOR MONITORING SOIL CONDITIONS AND SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS, RULES, AND REGULATIONS.
8. SPREADER PINS SHALL BE 8620 COLD DRAWN 80-90 KSI MIN. YIELD AND NO MORE THAN 1/4" SMALLER THAN COLLAR AND SPREADER PIN HOLES AS MANUFACTURED BY EFFICIENCY PRODUCTION, INC.
9. LIFT LUG RATING IS (THE SAFE WORKING LOAD) FOR EACH INDIVIDUAL LIFT LUG.
10. WEIGHT LISTED IS FOR SHIELD ONLY. USE ASSEMBLED WEIGHT INCLUDING SPREADERS FOR RIGGING PURPOSES

CONTINUED ON REVERSE SIDE



MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING U.S. PATENT NUMBERS: 4,090,365-4,114,383-4,259,028 ONE OR MORE OF THE FOLLOWING CANADIAN PATENT NUMBERS: 1,062,683-1,062,684

CERTIFIED BY: EFFICIENCY PRODUCTION INC.

STATE OF MICHIGAN
ALEXANDRE NEDELTCHEV
ENGINEER
No. 6201052055
LICENSED PROFESSIONAL ENGINEER

5/7/2014

ANY USE OF THIS PRODUCT NOT SPECIFICALLY DESCRIBED ON THIS CERTIFICATE COULD CAUSE IN CAVE-IN, COLLAPSE, OR STRUCTURAL FAILURE RESULTING IN DEATH OR SERIOUS INJURY

Stan Redford, President
P.O. Box 1065
Raymore, Mo. 64083

Certified MBE

Office: 816-540-2030
Fax: 816-540-3071

www.redfordconstruction.com

REDFORD CONSTRUCTION

December 6, 2021
Revised: December 13, 2021

RailPros
utilities.office.staff@railpros.com

RE: Lee's Summit New Middle School
Big Creek Interceptor
Lee's Summit, Missouri
Union Pacific Permit
Folder #: 3287-12 / Lee's Summit, Missouri
MP: 25629 / Sedalia Subdivision

To Whom it May Concern:

Please find attached: Pipeline encroachment and crossing agreement, flagger and RailPros observer information sheet and work plan.

Project Description:
Big Creek Interceptor / Union Pacific Rail Road
Railroad bore 164 LF / 42" steel casing with 30" PVC carrier pipe.
Bore pit east of Railroad Right of Way / 24 VF.
Excavation will be cut down to below 20 VF using a series of trench boxes.
Receiving pit; west side of abandoned track / 55 LF.
Trench excavation 10 VF using manhole trench box for shoring.
(See attached plan sheet)

Redford Construction will be doing the excavation and shoring excavation.
Auger Unlimited, Subcontractor to Redford Construction, will be performing Railroad bore.
After completion of Railroad bore and 30" PVC placed in service, existing service main will be abandoned. (See attached plan)
If you have any questions or need additional information or need any part of the work plan revised or corrected, please let me know.

Supplement to pipeline Encroachment
UPRR / Encroachment:

42" bored crossing and installation of sanitary manhole A-1 will encroach on UPRR ROW. Receiving pit and manhole A-1 will require an open cut excavation, approximately 10 VF. (See attached)

Upon completion of the 42" bore and sanitary manhole A-2 the existing 15" PVC and steel casing will be abandoned with flow fill in place. Excavation of existing manhole 54-004 will require excavation on the east side of manhole in order to cut, cap and plug existing 15" sewer. (See attached plan sheet C-8)

Shoring and Backfill
Shoring for sanitary manhole A-1 and receiving pit will be with steel trench boxes / shields. Abandonment of existing 15" sewer also will require shoring.

Backfill will consist of job excavated material compacted to 95%. Compaction testing will be done by Kansas City Testing and Engineering.

Redford Construction will be supplying 2 each Rail Road warning signs.
(See attached detail)
Note: These signs are part of Redford Construction contract with McCown Gordon.

Track and Ground Monitoring
Track monitoring will be completed by Olsson Associates
Survey Staff / Patrick Ward

42" Bore
See attached Auger's Unlimited work plan. Any questions regarding boring operation you can contact:
Norm Collins at 816-985-8848 or by email – norm@augersinc.com.

Sanitary Manholes Location
Manhole A-1 / 10+00 / N 983113.14 / E 2831662.15

Existing Manhole / 54-0002 / N 983141.456 / E 2831650.57

After your review if you require additional information or have any questions, please let us know. We look forward for approval and construction very soon.

Redford Construction, Inc.

Larry Hudgens, Project Manager
larry@redfordconstruction.com
cell: 816-918-0558

AUGERS UNLIMITED INC.
4136 Loring Drive
Bonner Springs, Kansas 66012
Ph 913-422-3610 Fax 913-422-3590

SUBMITTAL

Auger Boring Method

Casing will be installed utilizing a Auger Boring Machine 60" America AugersBoring Machine

a Notify Missourione call for utility locates

b Inspect pit (by others) to assure compliance with OSHA Requirements

c. Pour backing block and pit slab if necessary

d Install rails on line and at proper grade

e Set up boring machine

f Install first section of casing on the rail and install by cutting a hole 1" larger than the casing by using a cutter head attached to a section of auger that will transfer the spoils back to the bore pit. AS the material is being removed the casing will be advanced by the thrust of the boring machine to keep the end of the casing at the location of the cutting head.
During this operation the spoils will be hoisted from the pit (Disposal by others)

g When the first section of casing is installed the machine will be moved back on the rails and a section of casing pipe will be attached with a full depth weld. Prior to attaching the new section of casing a lazer will be set up and the location and elevation of the end of the casing will be checked.

h The second section of casing will be advanced utilizing the same method as the first section.

i Steps g & h will be repeated until the full length of the casing has been installed

Installation of Carrier pipe

The specified casing spacers will be attached to the carrier pipe, then the carrier pipe will be inserted into the casing. Power to install the sections of pipe will be supplied by either the boom truck or boring machine.

Check elevation of surface

Elevation of surface will be checked on daily basis and reported to inspector

Removal of obstacles

Casing is large enough to remove obstacles

Safety

See Attach hazard review

AUGERS UNLIMITED INC.
4136 Loring Drive
Bonner Springs, Kansas 66012
Ph 913-422-3610 Fax 912-422-3590

Mr. Larry Hudgins
Redford Construction

RE : Railroad crossing Big Creek Intercerceptor Sewer
Lee's Summit Mo..

Dear Larry:
We have reviewed the request from Mr,Dorn.and have the following comments.

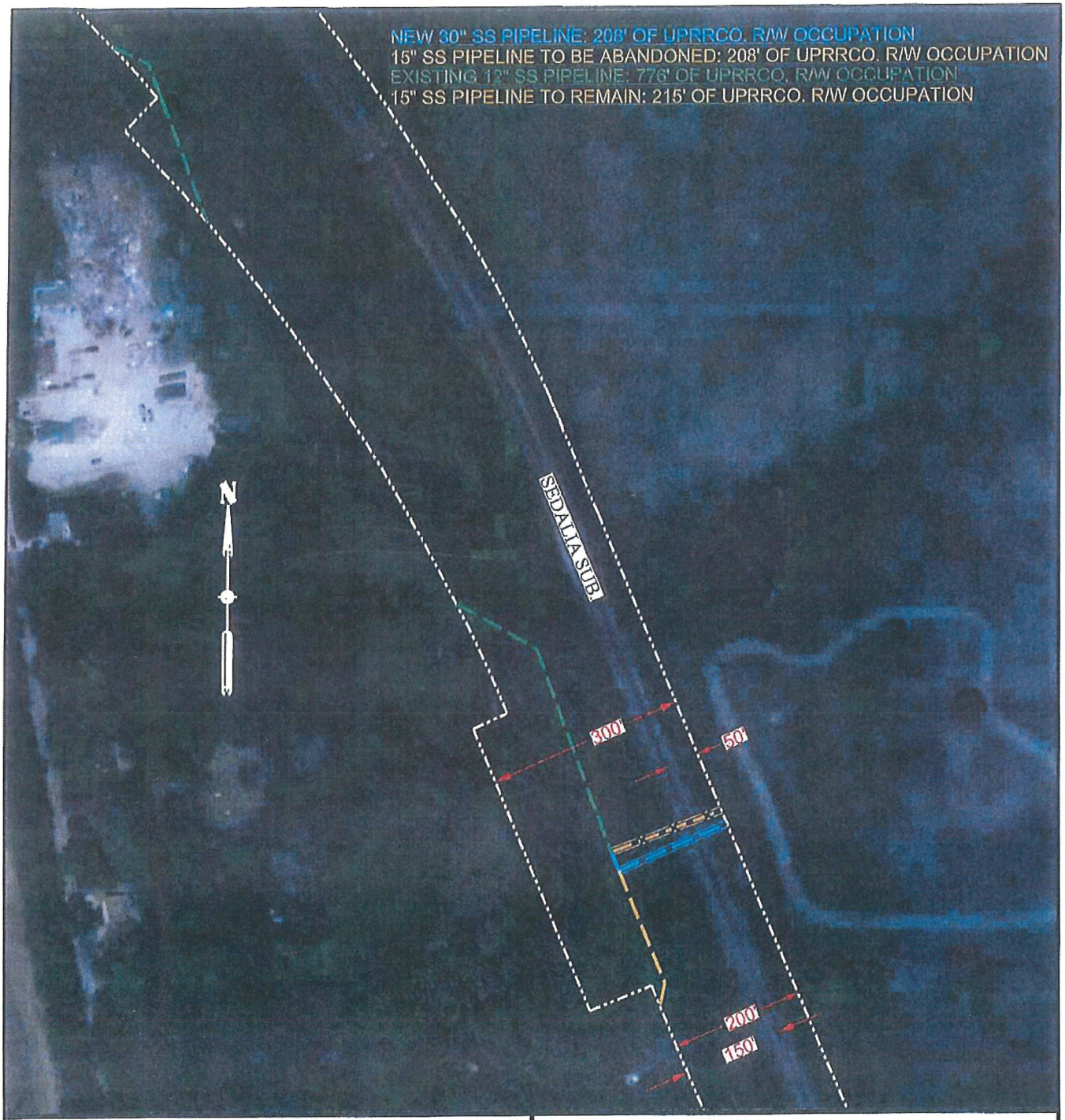
The crossing will be installed in a trenchless manner using the bore and case method, we have looked at the information that we submitted earlier and find nothing to add if Mr.Dorn has any questions we will be happy to respond.

Regarding the 24 hour shift work zone A.We did not plan on three shift work and are not in a position to provide such an operation..
We assume that this requirement is to prevent damage to the casing from the vibrations from passing trains. This crossing is in shale with a ledge of rock above the shale. Therefore the train traffic will not have influence on the casing pipe.

We will plan to complete the work under each track in a single shift.

If you need any further information please let us know.

Norm.



LEGEND:

- SS PIPELINE CROSSING (30" PVC, NEW)
- SS PIPELINE ENCROACHMENT (30" PVC, NEW)
- EXISTING SS PIPELINE CROSSING (15" PVC, TO BE ABANDONED)
- EXISTING SS PIPELINE ENCROACHMENT (12" PVC, TO REMAIN)
- EXISTING SS PIPELINE ENCROACHMENT (15" PVC, TO REMAIN)
- UPRRCO. R/W OUTLINED

CADD FILENAME	0328712.dgn
SCAN FILENAME	X

NOTE: BEFORE YOU BEGIN ANY WORK, SEE AGREEMENT FOR FIBER OPTIC PROVISIONS.

EXHIBIT "A-1"

UNION PACIFIC RAILROAD COMPANY

LEES SUMMIT, JACKSON, MO

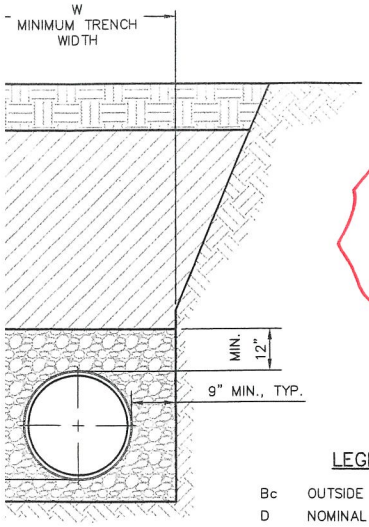
M.P. 256.29 - SEDALIA SUB

MP V-3A/34 & CRIP V-16/4
SCALE: 1" = 200'

OFFICE OF REAL ESTATE
OMAHA, NEBRASKA DATE: 10/5/2021

JOB FILE: 3287-12

UPRR - FOLDER # 3287.12 BIG CREEK INTERCEPTOR SEWER

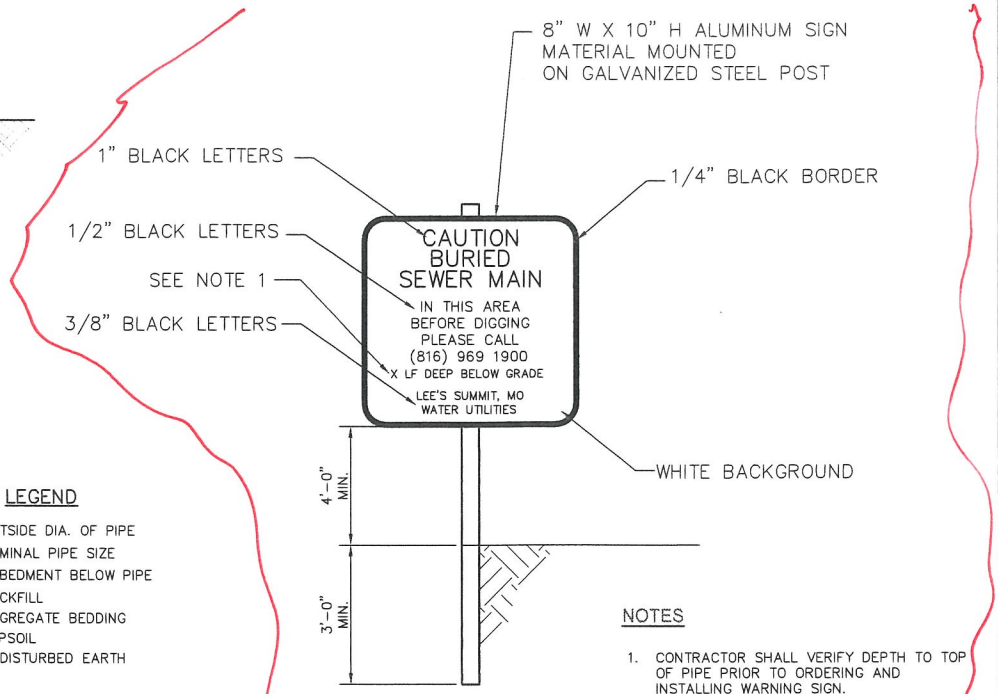


6" IN EARTH TRENCH
9" IN ROCK TRENCH

LEGEND

Bc	OUTSIDE DIA. OF PIPE
D	NOMINAL PIPE SIZE
a	EMBEDMENT BELOW PIPE
	BACKFILL
	AGGREGATE BEDDING
	TOPSOIL
	UNDISTURBED EARTH

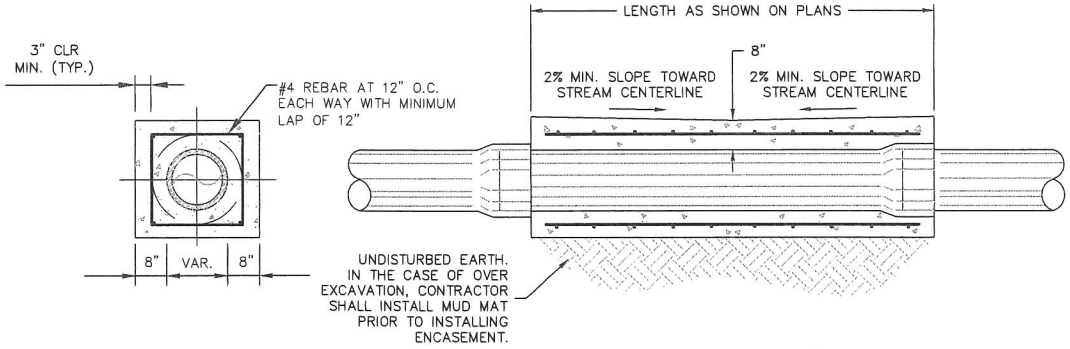
EMBEDMENT DETAIL E
SCALE



NOTES

1. CONTRACTOR SHALL VERIFY DEPTH TO TOP OF PIPE PRIOR TO ORDERING AND INSTALLING WARNING SIGN.

RAILROAD WARNING SIGNS DETAIL F
SCALE: NOT TO SCALE



.L 3' MIN.
PVC PIPE

ISTING 8" PVC
ONTRACTOR TO FIELD
RIFY ELEVATION

LING

REINFORCED CONCRETE ENCASEMENT DETAIL G
SCALE: NOT TO SCALE

NOTE: INTERMEDIATE PIPE BELLS NOT SHOWN FOR CLARITY. INTERMEDIATE PIPE BELLS SHALL BE ENCASE.

H

UPRR FOLDER NO 3287.12

9-1-21

olsson
Olsson - Civil Engineering
Missouri Certificate of Authority # 001562
1301 Burlington Street
North Kansas City, MO 64116
TEL 816.361.1177
www.olsson.com

FINAL DESIGN NOT FOR CONSTRUCTION

REV. NO.	DATE	REVISIONS DESCRIPTION	BY
1	8-25-2021	ASI #29 – REVISED PER CITY COMMENTS	

REVISIONS

STANDARD DETAILS

BIG CREEK INTERCEPTOR SEWER UPSIZING
LEE'S SUMMIT MIDDLE SCHOOL #4

LEE'S SUMMIT, MO

2021

12-9-21

drawn by:	NG
checked by:	BH
approved by:	BH
QA/QC by:	JS
project no.:	020-01030
drawing no.:	
date:	07.15.2021

SHEET
C10

LETTER OF TRANSMITTAL

FROM:

REDFORD CONSTRUCTION
P.O. BOX 1065
RAYMORE, MO 64083

DATE: 1-13-22 JOB NO.: 41-52

RE: Lee's Summit New Middle School
Big Creek Interceptor
UPRR FOLDER
#3287-12

TO: RAIL PROS

ADDRESS: 1320 GREENWAY DR Suite490

CITY: IRVING TEXAS 75038

ATTENTION: BAO DOAN EIT

PLEASE BE ADVISED:

WE ARE SENDING YOU ☒ ATTACHED ☐ UNDER SEPARATE COVER ☐ THE FOLLOWING

☐ PRINTS ☐ PLANS ☐ SHOP DRAWINGS ☐ SAMPLES ☐ SPECIFICATIONS

☐ ARTWORK ☐ PROOFS ☐ PHOTOGRAPHS ☒ COPY OF LETTER ☐ CHANGE ORDER

☐ _____

	NO.	DATE	COPIES	DESCRIPTION
1		1-13-22	1	GARY J VAN RIESSEN PE Letter
2				
3				
4				
5				

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

☒ AS REQUESTED ☐ APPROVED AS IS ☐ SUBMIT_____ COPIES FOR DISTRIBUTION

☒ FOR APPROVAL ☐ APPROVED WITH CORRECTIONS ☐ RETURN_____ CORRECTED

☐ FOR YOUR USE ☐ RETURNED WITH CORRECTIONS ☐ RETURNED AFTER LOAN TO US

☐ FOR YOUR COMMENTS ☐ RESUBMIT_____COPIES FOR APPROVAL ☐ _____

☐ FOR BID(S) DUE_____

COMMENTS: _____

SIGNED: Larry Hudgens

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
Gary Van Riessen, P.C.
A Professional Corporation
34505 East Drinkwater Road
Lone Jack, Missouri 64070-8567
816.566.0133 (Office)
816.566.0139 (Fax)
816.830.6576 (Cell)
Email: gvrlsmo@aol.com

January 13, 2022

Mr. Larry Hudgens
Redford Construction
PO Box 1065
Raymore, Missouri 64083

Reference: Geotechnical Risk Assessment for UPRR Track
Tunneling Means and Methods
Big Creek Interceptor
Lee's Summit, Missouri

Dear Mr. Hudgens:

This brief letter report has been prepared to present engineering conclusions and opinions related to the relative risk of any impacts to the UPRR Track beneath the proposed tunnel being installed from Station 10+20 to Station 11+84 (164 feet) for the referenced project.

Generally speaking, it appears that the concern expressed by UPRR (via RailPros) is that the proposed means and methods for tunnel construction (by Augers Unlimited, Inc.) may detrimentally impact the overlying track. Specifically, it appears that RailPros is concerned that the use of a 44-inch diameter cutter head located slightly ahead of the advancing 42-inch diameter steel casing (0.625-inch thick wall) may lead to ground surface subsidence and/or settlement. Therefore, RailPros has required that a variance request be submitted by Redford Construction to allow for the use of a cutter head in advance of the casing, with geotechnical recommendations/opinions being presented that address any perceived risks to the UPRR track.

To that end, this report will present (1) the results of a geotechnical review of the proposed tunneling means and methods in light of the defined ground conditions at the tunnel, and (2) will forward a qualitative assessment of the risk/possibility of potential ground settlement at the track due to the proposed means and methods for tunneling.

Key conclusions/opinions resulting from a review of the tunneling means and methods, along with available drawings, subsurface information, and information developed from a verbal interview with Mr. Norm Collins of Augers Unlimited, are presented below.

1. The crown of the tunnel is approximately 20 feet below the track, with the approximate length of the tunnel that is in "Zone A" being approximately 75 feet. It

is anticipated that the duration of tunneling activities in this zone will occur over a period of 5-6 days. It is anticipated that the entire tunneling activity alone will be accomplished over a period of 15-20 days.

2. Based on Boring B-26 located at Manhole A-2, the entire cross section of the tunnel will be advanced through a slightly weathered, competent shale formation (possible Chanute Shale) that extends vertically from Elevation 928.8 to Elevation 919.3. The unconfined compressive strength of this shale would expect to range from 500-1000 psi. This shale is directly overlain by approximately 3.5 feet of weathered limestone and 13.5 feet of soil overburden. Based on this information, it is the opinion of this office that the overall ground profile is very stable in that it does not contain any known or identified geologic anomalies or groundwater conditions that would detrimentally affect proposed tunneling activities.
3. The strength and intact nature of this shale precludes the use of a conventional "jack and bore" methodology of tunnel construction, specifically because the casing cannot be "jacked" or advanced into the intact shale in a manner that would allow material removal from within the casing. Rather, and consistent with the proposed means and methods, a truncated 44-inch "Christmas Tree" cutting head, with wing cutters located approximately 2 inches in front of the leading edge of the casing, will be used slightly ahead of the 42-inch casing to provide a nominal 1" gap between the tunnel circumference and the outside surface of the casing. The use of this type of cutting head/drilling method will (1) provide improved and consistent tunnel alignment during drilling, (2) reduce the magnitude of any friction against the exterior of the casing during tunnel advancement, (3) provide better face control, and (4) minimize the total volume of shale being removed at the tunnel face. It should be noted that this type of methodology is typically used in shale/soft rock tunnels throughout the industry.
4. Additionally, due to the competent and relatively incompressible nature of the shale stratum, as well as the presence of a stress-shielding, protective layer of overlying limestone stratum, the potential for the development of detrimental issues related to ground loss or material loosening at the tunnel face (as would be typical for tunnels in soil) are relatively insignificant. Further, issues related to loosening or material loss along the tunnel are controlled by the near-continuous advancement of the 42-inch casing.
5. The use of either the American Augers Model 42/54-900 Boring Machine or Model 60-1200 Boring Machine, as proposed by Augers Unlimited, would appear to be appropriate for the tunnel project.
6. Appropriate and necessary track monitoring/surveying will be performed in a manner consistent with UPRR requirements.

Conclusion

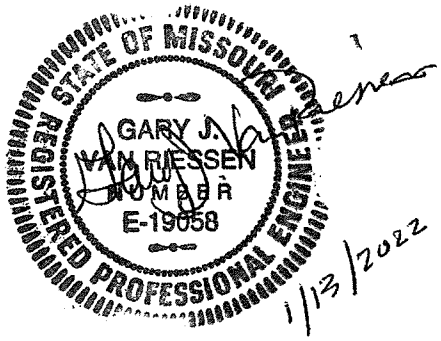
As discussed above, a review of the available project documentation, along with the performance of a qualitative engineering assessment of the proposed means and methods for tunnel construction below the referenced UPRR track, indicates that the risk/possibility of the development of detrimental impacts on the track due to the proposed tunneling methodology

is insignificant to extremely low. It is therefore recommended that a variance proposing the use of a truncated cutter head as described in the submitted means and methods be approved.

The opportunity to assist Redford Construction on this project is appreciated. Please contact me with any questions or comments.

Respectfully submitted,

Gary J. Van Riessen, P.E.
Consulting Geotechnical Engineer
Missouri Registration Number 19058



LETTER OF TRANSMITTAL

FROM:

REDFORD CONSTRUCTION
P.O. BOX 1065
RAYMORE, MO 64083

DATE: 1-10-22 JOB NO.: 41-52

RE: Lee's Summit New Middle School Big Creek Interceptor

UPRR Folder # 3287-12

TO: Rail Pros

ADDRESS: 1320 Greenway DR Suite 490

CITY: Irving Texas 75038

ATTENTION: Bao Doan Ezt

PLEASE BE ADVISED:

WE ARE SENDING YOU ☐ ATTACHED ☐ UNDER SEPARATE COVER ☐ THE FOLLOWING

☐ PRINTS ☐ PLANS ☐ SHOP DRAWINGS ☐ SAMPLES ☒ SPECIFICATIONS

☐ ARTWORK ☐ PROOFS ☐ PHOTOGRAPHS ☐ COPY OF LETTER ☐ CHANGE ORDER

☐ _____

	NO.	DATE	COPIES	DESCRIPTION
1		1-10-22	1	American Auger's Boring Machine Spec
2				
3				
4				
5				

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

☑ AS REQUESTED ☐ APPROVED AS IS ☐ SUBMIT_____ COPIES FOR DISTRIBUTION

☑ FOR APPROVAL ☐ APPROVED WITH CORRECTIONS ☐ RETURN_____ CORRECTED

☐ FOR YOUR USE ☐ RETURNED WITH CORRECTIONS ☑ RETURNED AFTER LOAN TO US

☐ FOR YOUR COMMENTS ☐ RESUBMIT_____COPIES FOR APPROVAL ☐ _____

☐ FOR BID(S) DUE_____

COMMENTS: UPRR Folder # 3287-12

SIGNED: Larry Hudgens

AMERICAN AUGERS®
an Astec Company

Boring Machine Operation & Safety Instruction Manual

WARNING

Unsafe use of this equipment could result in serious injury or death. This manual contains important instructions for the safe operation and recommended maintenance of your earth boring machine. All who operate the boring machine must carefully read and understand this manual before starting the machine. Keep this manual available both as a reminder for your experienced operator and as a training aid for your new staff. Replacement manuals are available by calling American Augers.

Preparation of Casing

Improperly prepared or poor quality casing can make the job more difficult and introduce hazards that are unnecessary. Casing normally has a machine cut bevel on one end and is cut square on the other. Exact 20 foot (6.1 m) lengths will keep the head at the correct location relative to the casing. Smooth walls will reduce the push required and the tendency of the casing to rotate during the bore. Casing is normally coated with a bituminous coating on the outside only.

Preparation of the lead section of casing is best accomplished in the yard. Refer to the Cutting Heads, Appendix D, and Ground Conditions Chart, Appendix C, for selection of a cutting head. American Augers recommends that our steering head be used on long and/or critical bores.

Loading auger into casing is best done in the yard, then transported to the jobsite ready to use. The lead section of casing is cut to determine the head position listed in the Ground Conditions Chart. This section is loaded with the head flush or inside the casing so the male hex shank is exposed for the ease of coupling to the machine chuck. The follow-up casings are loaded male end first so that the female hex socket is exposed for ease of coupling the auger joint at the job site.

When the sections of casing and auger are loaded on the truck, stack the auger with the exposed flight at the same end to simplify the unloading at the job site.

Banding the Casing

The use of a partial band at the head end of the casing is recommended when boring in most soil conditions. The band compacts the soil and relieves pressure on the casing. Placement of the band is a matter of personal experience, but it is usually 3/8 x 6 inch (1 x 15 cm), rolled to fit the casing. A gap of approximately 10 inches (25.4 cm) is left at the bottom. Place the band so that it leads the casing by about 1/2 inch (1.2 cm). Weld securely front inside and rear outside. The inside chamfer of the front weld will provide a lifting action for the casing if the thrust is rapid. If wing cutters are used to overcut the casing, a falling action will occur.

The above method is typical for most applications. However, other approaches to banding the casing can be used and are determined by the application, soil conditions and user experience.

EQUIPMENT SPECIFICATIONS LIBRARY

BASIC MODEL INFORMATION

Manufacturer: American Augers

Model: 60-1200 NG

View Manufacturers | View Models

SPECS

US Metric

Height	7' 5"
Length	14' 7"
Thrust	1,200,000 lbs
Weight	32,400 lbs
Width	7' 1"

ADDITIONAL INFO

DIMENSIONS
Length: 14' 7" (4.43 m)
Width: 7' 1" (2.16 m)
Height: 7' 5" (2.27 m)
Master Track Length: 15' (4.57 m) with 1 1/2" (38 mm) back plate
Master Track Width: 7' 4" (2.23 m)
Centerline: 36.02 in. (915 mm)
Extension Track Length: 10' (3 m)
Extension Track Width: 7' 4" (2.23 m)

WEIGHT
Base Unit (Split Weight): 11,000 lbs. (4,990 kg)
Power Pack (Split Weight): 11,500 lbs. (5,216 kg)

POWER TRAIN
Engine: Deutz TCD914LO6 Tier III Diesel
Rating: 174 HP (130 kW)
Maximum Engine Speed: 2300 RPM
Engine Torque: 373 ft.-lbs. (505.7 Nm) 2300 RPM, 468 ft.-lbs. (634.5 Nm) 1600 RPM
Maximum Noise Rating: 106 dB(A)
Fuel Capacity: 39 U.S. Gallons (148 L)
Hydraulic Capacity: 22 U.S. Gallons (83 L)
Battery: (1) Deka 634MF 12 V, 690 CCA

TRANSMISSION
Type: Eaton FS-5205A
Transmission Ratios: Gear Ratio
1st Gear 7.52:1
2nd Gear 4.35:1
3rd Gear 2.54:1
4th Gear 1.52:1
5th Gear 1.00:1
Reverse 6.27:1
Clutch: Spring Applied with 14 in. (356 mm) Diameter Single Disk/Hydraulically Assisted Clutch Actuator

GEARBOX
Ratio: 38.8:1

TORQUE AND SPEED
Torque Requirements: (2300 RPM)
1st 108,832 ft.-lbs. (147,600 Nm) 8 RPM
2nd 62,955 ft.-lbs. (85,360 Nm) 14 RPM
3rd 36,760 ft.-lbs. (49,840 Nm) 23 RPM
4th 21,998 ft.-lbs. (29,830 Nm) 39 RPM
5th 14,472 ft.-lbs. (19,620 Nm) 59 RPM
Reverse 90,742 ft.-lbs. (123,000 Nm) 9 RPM

Torque Requirements: (1600 RPM)
1st 136,551 ft.-lbs. (185,089 Nm) 5 RPM
2nd 78,989 ft.-lbs. (107,100 Nm) 9 RPM
3rd 46,122 ft.-lbs. (62,530 Nm) 16 RPM
4th 27,601 ft.-lbs. (37,420 Nm) 27 RPM
5th 18,158 ft.-lbs. (24,620 Nm) 41 RPM
Reverse 113,855 ft.-lbs. (154,353 Nm) 7 RPM

HYDRAULIC SYSTEM
Maximum Thrust: 1,200,000 lbs. (544 Tonnes)
Hydraulic Pump: Axial Piston Pump with Load Sensor

Hydraulic Clutch Cylinder: (1) 1 1/2" Bore x 4" Stroke (38 mm x 102 mm)
Hydraulic Thrust Cylinder: (4) 9" Bore x 35" Stroke (229 mm x 889 mm)
Hydraulic Suction Strainer Filter: Suction Strainer with 100 Mesh Screen
Hydraulic Return Filter: High Pressure Return Filter to 6 Micron ABS with Replaceable Element

MASTER PUSHER
Diameter: 60" (1,524 mm)
Working Range: 24" â€“ 60" (610 â€“ 1,524 mm) Casing Diameter
Hex Drive: 5" (127 mm)

MISCELLANEOUS PERFORMANCE DATA
Work Lights: (3) 12 Volt
Extension Track: (2)
Master Saddle: (1) 60" (1,524 mm) compatible

QUIK SPLIT
The Quik Split frame design, allows the machine to be separated into sections to accommodate lighter and faster lifts into and out of the bore pit, and aids the operator in being able to facilitate better and safer machine positioning.

SPOIL DOOR
With a Safety-First commitment, all American Augers horizontal earth boring machines are equipped with a gravity activated manual spoil door, which deflects thrown debris from the spoil chamber.

Hydraulic Push Bar Cylinder: (1) 2" Bore x 4" Stroke (51 mm x 102 mm)
Hydraulic Clutch Cylinder: (1) 1 1/2" Bore x 4" Stroke (38 mm x 102 mm)
Hydraulic Thrust Cylinder: (3) 9" Bore x 35" Stroke (229 mm x 889 mm)
Hydraulic Suction Strainer Filter: Suction Strainer with 100 Mesh Screen
Hydraulic Return Filter: High Pressure Return Filter to 6 Micron ABS with Replaceable Element

MASTER PUSHER
Diameter: 48" (1,219 mm)
Working Range: 24" â€“ 54" (610 â€“ 1,372 mm) Casing Diameter
Hex Drive: 4" (102 mm)

MISCELLANEOUS PERFORMANCE DATA
Work Lights: (3) 12 Volt
Extension Track: (2)
Master Saddle: (1) 48" (1,219 mm) compatible

QUIK SPLIT
The Quik Split frame design, allows the machine to be separated into sections to accommodate lighter and faster lifts into and out of the bore pit, and aids the operator in being able to facilitate better and safer machine positioning.

SPOIL DOOR
With a Safety-First commitment, all American Augers horizontal earth boring machines are equipped with a gravity activated manual spoil door, which deflects thrown debris from the spoil chamber.