

**ADDENDUM NO. 1
INVITATION FOR BID
HOSPITAL DRIVE LIFT STATION PROJECT**

Date: June, 11 2019

Contracting Agency: Raton Water Works
224 Savage Avenue
Raton, New Mexico 87740
(575) 445-3861

Issued By: Karen Stearns, P.E. *KMS*

Attachments: NMDOT Utility Permits
Engineer Certification
Geotechnical Evaluation Report by Kleinfelder

Solicitors are instructed to incorporate the following information into their bid for the above-referenced Invitation for Bid. Questions from potential bidders and Engineer answers are denoted with "Q" and "A," respectively.

Bid Document	Page	Section	Revision
Notice of Invitation for Bid	NIB-1	Pre-bid conference	The non-mandatory pre-bid conference will be held at 11:00 AM location time on June 25, 2019 at 224 Savage Avenue, Raton, NM.
Technical Specifications	TS-11	HDPE and PVC Sanitary Pipeline Descriptions	<p>Q: Mentions Trace wire. Can this Trace Wire be specified?</p> <p>A: Trace wire to be 14-gauge minimum solid copper with thermoplastic insulation and green jacket recommended for direct burial. Wire connectors to be 3M DBR, or approved equal, and watertight to provide electrical continuity. Each trace wire access point to be composed of one Copperhead® SnakePit® Magnetized Tracer Box, Test and Monitoring Station or approved equal installed in 24"x24"x6" concrete valve box collar. Monitoring stations spaced at 500' maximum.</p>
Plans	M-Sheets	N/A	<p>Q: Where SS hardware is required, will SS hardware be required on the wall penetration seal (Link-Seal)?</p> <p>A: Yes.</p>
Supplementary Conditions	SC-1	Article 5.03	The Geotechnical Evaluation Report by Kleinfelder is attached to this addendum.

Bid Document	Page	Section	Revision
Plans	Plan Sheet M-1.0	N/A	<p>Q: Plan shows a 6" FL TEE, while in the profile a 4"x3" FL Reducer is called out. Should the TEE be a 6"x4" tee or should the reducer be 6"x3"?</p> <p>A: For space considerations it would be best to have a 6"x4" tee with 4"x3" reducer.</p>
N/A	N/A	Utility Permits	The NMDOT Utility Permits have been approved and are attached to this addendum for the contractor's information and conformance with the requirements of the permits.
Engineer Certification	Page ii	N/A	A signed copy of the Engineer and Owner Certification is attached to this addendum.
Technical Specifications	TS-6	Additive Alternate Bid Item A	Replace the last two sentences of the first paragraph with, "The Contractor shall use HDD for the installation of the force main within 5' of the NMDOT rights-of-way for York Canyon Road (a.k.a., SR 555) and 2 nd Street (a.k.a., East US 64/Loop17). All construction within the NMDOT rights-of-way shall comply with the NMDOT Utility Permits."

**Raton Water Works
Hospital Drive Lift Station Project
2019**

Engineer of Record: Engineering Analytics, Inc.
Karen Stearns, P.E.
219 S. 2nd Street
Raton, New Mexico 87740
Telephone (575) 445-7192

The drawings, specifications, technical materials and related project documents for the Raton Water Works Hospital Drive Lift Station Project were prepared under the supervision and direction of Ms. Karen Stearns, Registered Professional Engineer in the State of New Mexico whose seal is affixed below.



Karen M Stearns

Karen Stearns
New Mexico P.E. License No. 14085

6.4.19

Date

Approval:

[Signature]

Raton Water Works General Manager

6/10/19

Date



May 19, 2015

City Of Raton Water Works
c/o Karen Sterns/ Engineering Analytics, Inc.
219 S. 2nd St.
Raton, NM 87740

Subject: Authority to Proceed

Permit: # 4-053-15

To Install: 6" HDPE Force Sewer Line @ a Maximum of 5' from ROW Line
With an exception of where ROW "jogs"

Location: NM555 MP 0.00 to 0.142 (parallel BORE approx. 760')

Dear Applicant,

We have reviewed the proposed utility installations, and find that it substantially meets State utility regulations as proposed. This correspondence is your authority to proceed with the construction of your facility in accordance with the drawings submitted to our office by your organization. This approval is granted contingent on the following conditions:

- **You are required to notify the District Traffic Engineer and/or his representative at least 48 hours before actual commencement, and again upon completion of construction of the installation.** This notification should be addressed to Ms. Heather Sandoval, ADE, Engineering, New Mexico Department of Transportation P.O. Box 10 Las Vegas, NM 87701 Phone: (505) 454-3663.
- Should you find it necessary to deviate from the proposal, any such deviation must be approved in writing by the State prior to proceeding with such construction.
- **Within thirty (30) days of completion of the project,** a set of hard copy as-built plans, stamped by a New Mexico Registered Land Surveyor are to be submitted to this office by the utility owner. The plans shall be plotted on NMDOT AutoCAD DWG (3D) or Micro station DGN (3D) format. The standard horizontal datum shall be North American Datum 1983 (NAD83) and the standard projections shall be the New Mexico State Plane Coordinate System (NMSPCS 83). The Standard vertical datum shall be the North

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Authority to Proceed

Permit # 4-053-15

Page 2

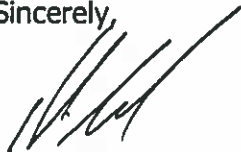
America Vertical Datum 1988 (NAVD 88). The preferred media in which this data must be submitted is CD-ROM; however, a 3.5" diskette may be used for the data submittal, if necessary. The utility location information shall be tied to Department monuments and referenced to highway mileposts or to highway project construction stationing, and certified by a New Mexico Registered Land Surveyor. Metadata or "data about the data" shall be submitted with each utility's as-built electronic file, preferably as a separate text file on the electronic submittal media, and shall include:

1. District Utility Permit Number
2. Name, address, and phone number of responsible land surveyor
3. Date of completion of survey
4. Equipment used to conduct survey
5. Horizontal and vertical control marks used to tie the survey to the NMSPC83 and NAVD88.
6. Ground to grid combination scale factor used. Elevations shall be provided every 500 feet and at all survey break points, including all high and low points.

Once this information has been submitted, and all the requirements have been met, the permits will be issued.

If you have any questions, or need any additional information, please contact my office at (505) 454-3676.

Sincerely,



Heather Sandoval

District Four ADE Engineer- Engineering

cc: Carlos Cordova , Raton Patrol Forman 44-54
District 4 & General Office Files
Dan Campbell,Raton Water Works



NEW MEXICO DEPARTMENT OF
TRANSPORTATION

May 6, 2015

City of Raton
C/O Karen Stearns
Engineering Analytics Inc.
219 So. 2nd Street
Raton, NM 87740

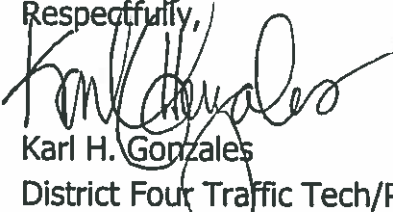
Dear Ms. Stearns,

We have received the "Permit Application for Utility Facilities Installation" package submitted by Engineering Analytics Inc. for the City of Raton Water Works, concerning the installation of a Sanitary Sewer Line, paralleling NM555, crossing & paralleling US64 (Loop17) in Colfax County in Raton New Mexico.

The permits have been assigned to Karl Gonzales Traffic Technician/Permit Agent, for review. As per the Railroads & Utility Regulations, the Department will proceed in reviewing the permits, and should notify you within the next 30 days or June 18th, 2015 as to the status of the permits.

If you have any questions, or need further information, please feel free to Contact Karl Gonzales at 454-3602.

Respectfully,



Karl H. Gonzales
District Four Traffic Tech/Permit Agent

Susana Martinez
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Cabinet Secretary, Designate

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District 6

APPLICATION FOR PERMIT TO INSTALL UTILITY FACILITIES
WITHIN PUBLIC RIGHT OF WAY

Permit No. 4-053-15
 Renewal Permit
 Relocation
 Remain in place
 New Installation

TO NEW MEXICO DEPARTMENT of TRANSPORTATION
P O BOX 1149
SANTA FE, NEW MEXICO 87504 - 1149

1. Pursuant to New Mexico Statutes Annotated, 1978 Compilation, Sections 67-8-13 and 55-2-7, and 17.4.2 NMAC the undersigned
Dan Campbell, General Manager of Raton Water Works

Address: 224 Savage Ave, PO Box 99, Raton, NM 87740
herein makes application to use highway rights of way to install:

Size and Type of Facility 6" HDPE Force Main Sewer

in the following location: N.M. Project No. _____, S.R. No. 555

Highway Station / and or GPS/MP MP 0.142 to Highway Station and/or
GPS/MP MP 0

Colfax County, Section NA, Township NA, Range NA

- 2. For the purpose of this application "within" shall be construed as meaning "on, upon, over, under, across or along."
 - a. "Engineer" shall be construed as meaning the District Engineer of the New Mexico Department of Transportation or the District Engineer's representative.
 - b. "Applicant" shall be construed as meaning the individual, firm, corporation, association, governmental subdivision, or other organization making application, or the successors of any of the above.
 - c. "Facility" shall be construed as meaning, but not limited to any publicly, privately, cooperatively, municipally or governmentally owned facility used for carriage, distribution or transmission of water, gas or electricity, oil and products derived therefrom, sewage, stream or other projects carried by means of pipelines, conduits, wires, culverts, ditches, conveyors or other methods.
 - d. If application is for a parallel installation, justification as to why private right may not be utilized must be furnished.

3. Applicant proposes to relocate, install or leave facility 5 feet within the
South SR 555 right of way line. The proposed installation shall be:

<u>Parallel to SR 555</u>	<u>Subsurface</u>	<u>Boring</u>
(Crossing or Parallel)	(Subsurface or Overhead)	(Boring, Jacking or Pavement Cut)

- a. If Applicant requests installation by pavement cut, complete justification therefore shall be submitted by attachment.
- b. Where application for pavement cut is justified, the application may be held in abeyance pending receipt of cash bond in an amount to be fixed by the Engineer.

4. There is attached hereto a diagrammatic dimensioned drawing showing the location of existing and/or proposed installation referenced to roadway and right of way, right of way lines, any access control lines, distance of proposed installation above, or below grade, highway stationing, identification of materials to be used and any other pertinent data. If application is for parallel installation, nature of adjacent land use must be shown. Proposed installations on or in bridges or other structures, or for the installation of any structures, shall require detailed structural drawings.

5. Applicant desires this permit to be in affect for 25 years. Permit shall not be issued for a period longer than 25 years, and must be renewed upon expiration. The burden of timely renewal is on the Applicant. The Applicant shall formally notify the engineer of actual commencement and completion of construction of the installation. The Applicant shall also formally notify the Engineer of removal or abandonment of the facility, or relinquishment of the permit.

6. This application shall be validated as a permit upon the signing of the application by the Engineer and returning it to the applicant. The granting of this permit shall not be construed as granting any easement or property right.

7. Servicing of facilities shall not be permitted within the access control lines on any controlled access project. Should an emergency occur, the Applicant shall notify the Engineer and shall provide such flagmen, flashers, warning or other safety devices as required by the Engineer. All routine maintenance shall be performed from outside any access control lines.

8. The relocation or installation of facilities within public right of way shall be in strict conformance with all applicable provisions of

regulations of the New Mexico Department of Transportation, 17.4.2 NMAC, all provisions of this application, drawing and the Instructions for Utility Permits, as they may be modified by the Engineer, and no departure therefrom may be made without the written consent of the Engineer. All facilities shall be so placed that they will not interfere with or endanger any roadway features or other existing facilities. All construction of facilities shall be subject to the inspection and approval of the Engineer. All such work shall be performed so that danger, inconvenience and delay to the traveling public will be held to a minimum. Protection and handling of traffic during the installation are the responsibility of the Applicant and must be approved by the Engineer.

9. The Applicant shall, except as otherwise ordered by the Engineer, restore the public right of way, and all bridges or other structures thereon or adjacent thereto which have been altered or affected by facility installation performed hereunder, in accordance with sound construction practices and the Engineer's specifications, and shall cause the work to be done in a workmanlike manner. If any damage is caused to the highway right of way or to any bridge, structure or improvement thereon or adjacent thereto by reason of the design installation, maintenance, alteration or removal of such facilities or other appurtenances, the Applicant shall reimburse the Engineer the full amount thereof promptly upon demand by the Engineer provided, however, that the obligation imposed under this paragraph shall not apply in the event the damage resulted from causes beyond the control of the Applicant or its contractors or its consultants. All such facilities located within the right of way shall at all times be kept in such repair so as not to damage the highway, inconvenience or endanger the traveling public and shall be kept free from advertisement, posters and the like.
10. Should the Applicant at any time fail to promptly and fully perform any of the obligations imposed hereby and after thirty (30) days written notice thereof, the Engineer may, at his option (a) cause the obligations to be fully carried out and performed, and the Applicant shall promptly reimburse the Engineer for all costs and expenses incident thereto, or (b) summarily order the removal of such facility and if the Applicant fails to comply with that removal order within a reasonable time, the Engineer may direct the removal of the facility with all costs and expenses thereto to be borne by Applicant.
11. If by reason of any change in the location, construction, grade or by any other matter affecting the highway upon which any facility is located or because of changing traffic conditions or otherwise, it shall become advisable in the opinion of the Engineer that said facility be removed, relocated or otherwise modified, the Applicant, upon written notice from the Engineer, shall remove, relocate or modify such facility without undue delay in such manner as the Engineer may direct or approve, at the Applicant's expense and at no cost to the Engineer, the New Mexico Department of Transportation or the New Mexico State Transportation Commission. All facilities located on public right of way under the dual jurisdiction of the State and a subordinate governmental entity shall comply with all applicable rules and regulations of such entity properly and lawfully in force and including but not limited to provisions of local franchises not in conflict with the rules and regulations of the New Mexico Department of Transportation. The Engineer makes no express or implied as to the continued existence of any highway in any particular location and expressly assumes no obligation with regard to the facility upon change, vacation or abandonment of any highway or portions thereof.
12. Neither the making of this application nor anything herein contained shall constitute a waiver on the part of the Applicant of any rights or claims had or made by some with respect to the occupancy of the streets and highways under the Constitution and Laws of the State of New Mexico, nor shall anything herein contained in any prejudice or impair any rights or claims existing independent of this application with respect to the construction, operation and maintenance of the Applicant's facilities in the State of New Mexico.
13. The utility owner must indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility, the utility's employees, any agent acting on the utility's behalf, and anyone else engaged by the utility to work on the utility installations, maintenance or relocations of their facilities. Any contractor or subcontractor engaged by the utility to perform utility installations or relocations in conjunction with or prior to highway construction must also indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility's contractor or subcontractor.
14. Each copy of the application shall be signed by the Applicant as an individual owner or by any official designated to execute such documents.
15. Utility owners shall carry insurance in amounts not less than those below specified and as outlined in 17 NMAC 4.2 and the Standard Specifications for Highway and Bridge Construction, 1994 Edition, (hereinafter, "Specifications"), as may be updated from time to time. In the event of conflict between the specification, and the regulations, owner shall carry the larger amount of insurance. If a utility is self-insured, the utility shall provide an Owner's Protective Liability Insurance Policy, in favor of the Department, in the amounts below specified. **Department as additional named insured:** The utility, its contractor or subcontractor shall have the New Mexico State Highway and Transportation Department added as an additional named insured on the Comprehensive General Liability Form or Commercial General Liability Form furnished by the Utility.

This application is hereby granted subject to all provisions herein and including the following special provisions, changes or amendments:

The utility shall provide "as-built" horizontal and vertical location information in hard copy and electronic file (AutoCAD DWG (3D) or Microstation DGN (3D) format. The standard horizontal datum shall be North American Datum 1983 (NAD83) and the standard projections shall be the New Mexico State Plane

Coordinate System 1983 (NMSPCS83). The standard vertical datum shall be North American Vertical Datum 1988 (NAVD 1988). The preferred media in which this data must be submitted is CD ROM. The utility location information shall be tied to Department monuments and referenced to highway mileposts and/or to highway project construction stationing and certified by a New Mexico Registered Land Surveyor. Metadata or "data about the data" shall be submitted with each utility's as-built electronic file, preferably as a separate text file on the electronic submittal media, and shall include: 1. District Utility Permit Number. 2. Name, address and phone number of the responsible land surveyor. 3. Date of completion of survey. 4. Equipment used to conduct the Survey. 5. Horizontal and vertical control marks used to tie the survey to the NMSPC83 and NAVD88. 6. Ground to Grid combined scale factor used. 7. Elevations shall be provided every 500 feet and at all survey break points, including all high and low points.

Note: Highway projects are time sensitive therefore, permit information requested from Authorization to Engineer Letters must be returned by the date indicated within the Authorization to Engineer letter.

16. Pursuant to: MAP-21; <http://www.fhwa.dot.gov/construction/contracts/buyam-qa.cfm> and (23U.S.C313) Applicant/Utility Owner certifies we are in compliance with Buy America for said facility described in Section 1. of this permit document. Applicant agrees and understands nonadherence will void said permit.

Applicant Raton Water Works

By Dan Campbell

Title General Manager

Approval of this permit is hereby given this _____ day of _____, 20_____

NEW MEXICO DEPARTMENT of TRANSPORTATION

By _____



May 19, 2015

City Of Raton Water Works
c/o Karen Sterns/ Engineering Analytics, Inc.
219 S. 2nd St.
Raton, NM 87740

Subject: Authority to Proceed

Permit: # 4-054-15

To Install: 6" HDPE Force Sewer Line

Location: JCT Loop 17/Business I25/US64 MP 347.33 to 347.33 (East to West BORE approx. 200')

Dear Applicant,

We have reviewed the proposed utility installations, and find that it substantially meets State utility regulations as proposed. This correspondence is your authority to proceed with the construction of your facility in accordance with the drawings submitted to our office by your organization. This approval is granted contingent on the following conditions:

- **You are required to notify the District Traffic Engineer and/or his representative at least 48 hours before actual commencement, and again upon completion of construction of the installation.** This notification should be addressed to Ms. Heather Sandoval, ADE, Engineering, New Mexico Department of Transportation P.O. Box 10 Las Vegas, NM 87701 Phone: (505) 454-3663.
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Permit # 4-054-15

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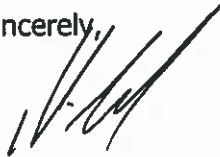
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Once this information has been submitted, and all the requirements have been met, the permits will be issued.

If you have any questions, or need any additional information, please contact my office at (505) 454-3676.

Sincerely,



Heather Sandoval
District Four ADE Engineer- Engineering

cc: Carlos Cordova, Raton Patrol Forman 44-54
District 4 & General Office Files
Dan Campbell, Raton Water Works



New Mexico DEPARTMENT OF
TRANSPORTATION

May 6, 2015

City of Raton
C/O Karen Stearns
Engineering Analytics Inc.
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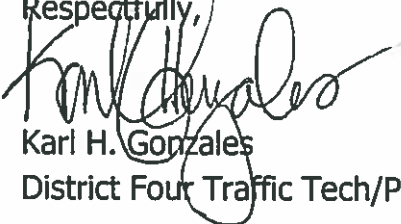
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APPLICATION FOR PERMIT TO INSTALL UTILITY FACILITIES
WITHIN PUBLIC RIGHT OF WAY

Permit No. A-054-15
 Renewal Permit
 Relocation
 Remain in place
 New Installation

TO: NEW MEXICO DEPARTMENT of TRANSPORTATION
P.O. BOX 1149
SANTA FE, NEW MEXICO 87504 - 1149

1. Pursuant to New Mexico Statutes Annotated, 1978 Compilation, Sections 67-8-13 and 55-2-7, and 17.4.2 NMAC the undersigned
Dan Campbell, General Manager of Raton Water Works

Address: 224 Savage Ave, PO Box 99, Raton, NM 87740
herein makes application to use highway rights of way to install:

Size and Type of Facility 6" HDPE Force Main Sewer

in the following location: N.M. Project No. _____, S.R. No. US 64/Loop 17,

Highway Station / and or GPS/MP MP 347.33 to Highway Station and/or
GPS/MP MP 347.33,

Colfax County, Section NA, Township NA, Range NA

- 2. For the purpose of this application "within" shall be construed as meaning "on, upon, over, under, across or along."
 - a. "Engineer" shall be construed as meaning the District Engineer of the New Mexico Department of Transportation or the District Engineer's representative.
 - b. "Applicant" shall be construed as meaning the individual, firm, corporation, association, governmental subdivision, or other organization making application, or the successors of any of the above.
 - c. "Facility" shall be construed as meaning, but not limited to any publicly, privately, cooperatively, municipally or governmentally owned facility used for carriage, distribution or transmission of water, gas or electricity, oil and products derived therefrom, sewage, stream or other projects carried by means of pipelines, conduits, wires, culverts, ditches, conveyors or other methods.
 - d. If application is for a parallel installation, justification as to why private right may not be utilized must be furnished.

3. Applicant proposes to relocate, install or leave facility 5 feet within the East US 64/Loop 17 right of way line. The proposed installation shall be:

<u>Crossing</u> (Crossing or Parallel)	<u>Subsurface</u> (Subsurface or Overhead)	<u>Boring</u> (Boring, Jacking or Pavement Cut)
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- a. If Applicant requests installation by pavement cut, complete justification therefore shall be submitted by attachment.
- b. Where application for pavement cut is justified, the application may be held in abeyance pending receipt of cash bond in an amount to be fixed by the Engineer.

4. There is attached hereto a diagrammatic dimensioned drawing showing the location of existing and/or proposed installation referenced to roadway and right of way, right of way lines, any access control lines, distance of proposed installation above, or below grade, highway stationing, identification of materials to be used and any other pertinent data. If application is for parallel installation, nature of adjacent land use must be shown. Proposed installations on or in bridges or other structures, or for the installation of any structures, shall require detailed structural drawings.

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8. The relocation or installation of facilities within public right of way shall be in strict conformance with all applicable provisions of

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9. The Applicant shall, except as otherwise ordered by the Engineer, restore the public right of way, and all bridges or other structures thereon or adjacent thereto which have been altered or affected by facility installation performed hereunder, in accordance with sound construction practices and the Engineer's specifications, and shall cause the work to be done in a workmanlike manner. If any damage is caused to the highway right of way or to any bridge, structure or improvement thereon or adjacent thereto by reason of the design installation, maintenance, alteration or removal of such facilities or other appurtenances, the Applicant shall reimburse the Engineer the full amount thereof promptly upon demand by the Engineer provided, however, that the obligation imposed under this paragraph shall not apply in the event the damage resulted from causes beyond the control of the Applicant or its contractors or its consultants. All such facilities located within the right of way shall at all times be kept in such repair so as not to damage the highway, inconvenience or endanger the traveling public and shall be kept free from advertisement, posters and the like.
10. Should the Applicant at any time fail to promptly and fully perform any of the obligations imposed hereby and after thirty (30) days written notice thereof, the Engineer may, at his option (a) cause the obligations to be fully carried out and performed, and the Applicant shall promptly reimburse the Engineer for all costs and expenses incident thereto, or (b) summarily order the removal of such facility and if the Applicant fails to comply with that removal order within a reasonable time, the Engineer may direct the removal of the facility with all costs and expenses thereto to be borne by Applicant.
11. If by reason of any change in the location, construction, grade or by any other matter affecting the highway upon which any facility is located or because of changing traffic conditions or otherwise, it shall become advisable in the opinion of the Engineer that said facility be removed, relocated or otherwise modified, the Applicant, upon written notice from the Engineer, shall remove, relocate or modify such facility without undue delay in such manner as the Engineer may direct or approve, at the Applicant's expense and at no cost to the Engineer, the New Mexico Department of Transportation or the New Mexico State Transportation Commission. All facilities located on public right of way under the dual jurisdiction of the State and a subordinate governmental entity shall comply with all applicable rules and regulations of such entity properly and lawfully in force and including but not limited to provisions of local franchises not in conflict with the rules and regulations of the New Mexico Department of Transportation. The Engineer makes no express or implied as to the continued existence of any highway in any particular location and expressly assumes no obligation with regard to the facility upon change, vacation or abandonment of any highway or portions thereof.
12. Neither the making of this application nor anything herein contained shall constitute a waiver on the part of the Applicant of any rights or claims had or made by some with respect to the occupancy of the streets and highways under the Constitution and Laws of the State of New Mexico, nor shall anything herein contained in any prejudice or impair any rights or claims existing independent of this application with respect to the construction, operation and maintenance of the Applicant's facilities in the State of New Mexico.
13. The utility owner must indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility, the utility's employees, any agent acting on the utility's behalf, and anyone else engaged by the utility to work on the utility installations, maintenance or relocations of their facilities. Any contractor or subcontractor engaged by the utility to perform utility installations or relocations in conjunction with or prior to highway construction must also indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility's contractor or subcontractor.
14. Each copy of the application shall be signed by the Applicant as an individual owner or by any official designated to execute such documents.
15. Utility owners shall carry insurance in amounts not less than those below specified and as outlined in 17 NMAC 4.2 and the Standard Specifications for Highway and Bridge Construction, 1994 Edition, (hereinafter, "Specifications"), as may be updated from time to time. In the event of conflict between the specification, and the regulations, owner shall carry the larger amount of insurance. If a utility is self-insured, the utility shall provide an Owner's Protective Liability Insurance Policy, in favor of the Department, in the amounts below specified. **Department as additional named insured:** The utility, its contractor or subcontractor shall have the New Mexico State Highway and Transportation Department added as an additional named insured on the Comprehensive General Liability Form or Commercial General Liability Form furnished by the Utility.

This application is hereby granted subject to all provisions herein and including the following special provisions, changes or amendments:

The utility shall provide "as-built" horizontal and vertical location information in hard copy and electronic file (AutoCAD DWG (3D) or Microstation DGN (3D) format. The standard horizontal datum shall be North American Datum 1983 (NAD83) and the standard projections shall be the New Mexico State Plane

Coordinate System 1983 (NMSPCS83). The standard vertical datum shall be North American Vertical Datum 1988 (NAVD 1988). The preferred media in which this data must be submitted is CD ROM. The utility location information shall be tied to Department monuments and referenced to highway mileposts and/or to highway project construction stationing and certified by a New Mexico Registered Land Surveyor. Metadata or "data about the data" shall be submitted with each utility's as-built electronic file, preferably as a separate text file on the electronic submittal media, and shall include: 1. District Utility Permit Number. 2. Name, address and phone number of the responsible land surveyor. 3. Date of completion of survey. 4. Equipment used to conduct the Survey. 5. Horizontal and vertical control marks used to tie the survey to the NMSPC83 and NAVD88. 6. Ground to Grid combined scale factor used. 7. Elevations shall be provided every 500 feet and at all survey break points, including all high and low points.

Note: Highway projects are time sensitive therefore, permit information requested from Authorization to Engineer Letters must be returned by the date indicated within the Authorization to Engineer letter.

16. Pursuant to: MAP-21; <http://www.fhwa.dot.gov/construction/contracts/buyam-qa.cfm> and (23U.S.C313) Applicant/Utility Owner certifies we are in compliance with Buy America for said facility described in Section 1. of this permit document. Applicant agrees and understands nonadherence will void said permit.

Applicant Raton Water Works

By Dan Campbell 

Title General Manager

Approval of this permit is hereby given this _____ day of _____, 20 _____

NEW MEXICO DEPARTMENT of TRANSPORTATION

By _____



New Mexico DEPARTMENT OF
TRANSPORTATION

May 19, 2015

City Of Raton Water Works
c/o Karen Sterns/ Engineering Analytics, Inc.
219 S. 2nd St.
Raton, NM 87740

Subject: Authority to Proceed

Permit: # 4-055-15

To Install: 6" HDPE Force Sewer Line @ a Maximum of 5' from ROW Line
With an exception of where ROW "jogs"

Location: Loop 17/Business I25/US64 MP 347.33 to 347.52 (parallel BORE approx. 970')

Dear Applicant,

We have reviewed the proposed utility installations, and find that it substantially meets State utility regulations as proposed. This correspondence is your authority to proceed with the construction of your facility in accordance with the drawings submitted to our office by your organization. This approval is granted contingent on the following conditions:

- **You are required to notify the District Traffic Engineer and/or his representative at least 48 hours before actual commencement, and again upon completion of construction of the installation.** This notification should be addressed to Ms. Heather Sandoval, ADE, Engineering, New Mexico Department of Transportation P.O. Box 10 Las Vegas, NM 87701 Phone: (505) 454-3663.
- Should you find it necessary to deviate from the proposal, any such deviation must be approved in writing by the State prior to proceeding with such construction.
- **Within thirty (30) days of completion of the project,** a set of hard copy as-built plans, stamped by a New Mexico Registered Land Surveyor are to be submitted to this office by the utility owner. The plans shall be plotted on NMDOT AutoCAD DWG (3D) or Micro station DGN (3D) format. The standard horizontal datum shall be North American Datum 1983 (NAD83) and the standard projections shall be the New Mexico State Plane Coordinate System (NMSPCS 83). The Standard vertical datum shall be the North

Susana Martinez
Governor

Tom Church
Cabinet Secretary

Commissioners

Ronald Schmeits
Chairman
District 4

Dr. Kenneth White
Secretary
District 1

David Sepich
Commissioner
District 2

Keith Mortensen
Commissioner
District 3

Butch Mathews
Commissioner
District 5

Jackson Gibson
Commissioner
District 6

Authority to Proceed

Permit # 4-055-15

Page 2

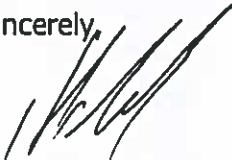
America Vertical Datum 1988 (NAVD 88). The preferred media in which this data must be submitted is CD-ROM; however, a 3.5" diskette may be used for the data submittal, if necessary. The utility location information shall be tied to Department monuments and referenced to highway mileposts or to highway project construction stationing, and certified by a New Mexico Registered Land Surveyor. Metadata or "data about the data" shall be submitted with each utility's as-built electronic file, preferably as a separate text file on the electronic submittal media, and shall include:

1. District Utility Permit Number
2. Name, address, and phone number of responsible land surveyor
3. Date of completion of survey
4. Equipment used to conduct survey
5. Horizontal and vertical control marks used to tie the survey to the NMSPC83 and NAVD88.
6. Ground to grid combination scale factor used. Elevations shall be provided every 500 feet and at all survey break points, including all high and low points.

Once this information has been submitted, and all the requirements have been met, the permits will be issued.

If you have any questions, or need any additional information, please contact my office at (505) 454-3676.

Sincerely,



Heather Sandoval
District Four ADE Engineer- Engineering

cc: Carlos Cordova , Raton Patrol Forman 44-54
District 4 & General Office Files
Dan Campbell, Raton Water Works



NEW MEXICO DEPARTMENT OF
TRANSPORTATION

May 6, 2015

City of Raton
C/O Karen Stearns
Engineering Analytics Inc.
219 So. 2nd Street
Raton, NM 87740

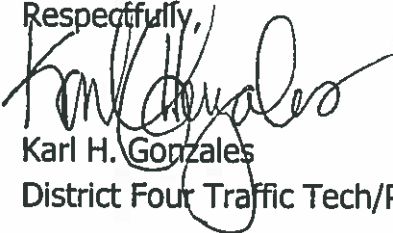
Dear Ms. Stearns,

We have received the "Permit Application for Utility Facilities Installation" package submitted by Engineering Analytics Inc. for the City of Raton Water Works, concerning the installation of a Sanitary Sewer Line, paralleling NM555, crossing & paralleling US64 (Loop17) in Colfax County in Raton New Mexico.

The permits have been assigned to Karl Gonzales Traffic Technician/Permit Agent, for review. As per the Railroads & Utility Regulations, the Department will proceed in reviewing the permits, and should notify you within the next 30 days or June 18th, 2015 as to the status of the permits.

If you have any questions, or need further information, please feel free to Contact Karl Gonzales at 454-3602.

Respectfully,



Karl H. Gonzales
District Four Traffic Tech/Permit Agent

Susana Martinez
Governor

Tom Church
Cabinet Secretary, Designate

Commissioners

Pete K. Rahn
Chairman
District 3

Ronald Schmeits
Vice Chairman
District 4

Dr. Kenneth White
Secretary
District 1

Robert R. Wallach
Commissioner
District 2

Butch Mathews
Commissioner
District 5

Jackson Gibson
Commissioner
District 6

APPLICATION FOR PERMIT TO INSTALL UTILITY FACILITIES
WITHIN PUBLIC RIGHT OF WAY

Permit No. 405515
 Renewal Permit
 Relocation
 Remain in place
 New Installation

TO: NEW MEXICO DEPARTMENT of TRANSPORTATION
P.O. BOX 1149
SANTA FE, NEW MEXICO 87504 - 1149

1. Pursuant to New Mexico Statutes Annotated, 1978 Compilation, Sections 67-8-13 and 55-2-7, and 17.4.2 NMAC the undersigned
Dan Campbell, General Manager of Raton Water Works

Address: 224 Savage Ave, PO Box 99, Raton, NM 87740
herein makes application to use highway rights of way to install:

Size and Type of Facility 6" HDPE Force Main Sewer

in the following location: N.M. Project No. _____, S.R. No. US 64/Loop 17,

Highway Station / and or GPS/MP MP 347.33 to Highway Station and/or
GPS/MP MP 347.52,

Colfax County, Section NA, Township NA, Range NA

- 2. For the purpose of this application "within" shall be construed as meaning "on, upon, over, under, across or along."
 - a. "Engineer" shall be construed as meaning the District Engineer of the New Mexico Department of Transportation or the District Engineer's representative.
 - b. "Applicant" shall be construed as meaning the individual, firm, corporation, association, governmental subdivision, or other organization making application, or the successors of any of the above.
 - c. "Facility" shall be construed as meaning, but not limited to any publicly, privately, cooperatively, municipally or governmentally owned facility used for carriage, distribution or transmission of water, gas or electricity, oil and products derived therefrom, sewage, stream or other projects carried by means of pipelines, conduits, wires, culverts, ditches, conveyors or other methods.
 - d. If application is for a parallel installation, justification as to why private right may not be utilized must be furnished.

3. Applicant proposes to relocate, install or leave facility 5 feet within the
East US 64/Loop 17 right of way line. The proposed installation shall be:

<u>Parallel to US 64/Loop 17</u>	<u>Subsurface</u>	<u>Boring</u>
(Crossing or Parallel)	(Subsurface or Overhead)	(Boring, Jacking or Pavement Cut)

- a. If Applicant requests installation by pavement cut, complete justification therefore shall be submitted by attachment.
- b. Where application for pavement cut is justified, the application may be held in abeyance pending receipt of cash bond in an amount to be fixed by the Engineer.

4. There is attached hereto a diagrammatic dimensioned drawing showing the location of existing and/or proposed installation referenced to roadway and right of way, right of way lines, any access control lines, distance of proposed installation above, or below grade, highway stationing, identification of materials to be used and any other pertinent data. If application is for parallel installation, nature of adjacent land use must be shown. Proposed installations on or in bridges or other structures, or for the installation of any structures, shall require detailed structural drawings.

5. Applicant desires this permit to be in affect for 25 years. Permit shall not be issued for a period longer than 25 years, and must be renewed upon expiration. The burden of timely renewal is on the Applicant. The Applicant shall formally notify the engineer of actual commencement and completion of construction of the installation. The Applicant shall also formally notify the Engineer of removal or abandonment of the facility, or relinquishment of the permit.

6. This application shall be validated as a permit upon the signing of the application by the Engineer and returning it to the applicant. The granting of this permit shall not be construed as granting any easement or property right.

7. Servicing of facilities shall not be permitted within the access control lines on any controlled access project. Should an emergency occur, the Applicant shall notify the Engineer and shall provide such flagmen, flashers, warning or other safety devices as required by the Engineer. All routine maintenance shall be performed from outside any access control lines.

8. The relocation or installation of facilities within public right of way shall be in strict conformance with all applicable provisions of

regulations of the New Mexico Department of Transportation, 17.4.2 NMAC, all provisions of this application, drawing and the Instructions for Utility Permits, as they may be modified by the Engineer, and no departure therefrom may be made without the written consent of the Engineer. All facilities shall be so placed that they will not interfere with or endanger any roadway features or other existing facilities. All construction of facilities shall be subject to the inspection and approval of the Engineer. All such work shall be performed so that danger, inconvenience and delay to the traveling public will be held to a minimum. Protection and handling of traffic during the installation are the responsibility of the Applicant and must be approved by the Engineer.

9. The Applicant shall, except as otherwise ordered by the Engineer, restore the public right of way, and all bridges or other structures thereon or adjacent thereto which have been altered or affected by facility installation performed hereunder, in accordance with sound construction practices and the Engineer's specifications, and shall cause the work to be done in a workmanlike manner. If any damage is caused to the highway right of way or to any bridge, structure or improvement thereon or adjacent thereto by reason of the design installation, maintenance, alteration or removal of such facilities or other appurtenances, the Applicant shall reimburse the Engineer the full amount thereof promptly upon demand by the Engineer provided, however, that the obligation imposed under this paragraph shall not apply in the event the damage resulted from causes beyond the control of the Applicant or its contractors or its consultants. All such facilities located within the right of way shall at all times be kept in such repair so as not to damage the highway, inconvenience or endanger the traveling public and shall be kept free from advertisement, posters and the like.
10. Should the Applicant at any time fail to promptly and fully perform any of the obligations imposed hereby and after thirty (30) days written notice thereof, the Engineer may, at his option (a) cause the obligations to be fully carried out and performed, and the Applicant shall promptly reimburse the Engineer for all costs and expenses incident thereto, or (b) summarily order the removal of such facility and if the Applicant fails to comply with that removal order within a reasonable time, the Engineer may direct the removal of the facility with all costs and expenses thereto to be borne by Applicant.
11. If by reason of any change in the location, construction, grade or by any other matter affecting the highway upon which any facility is located or because of changing traffic conditions or otherwise, it shall become advisable in the opinion of the Engineer that said facility be removed, relocated or otherwise modified, the Applicant, upon written notice from the Engineer, shall remove, relocate or modify such facility without undue delay in such manner as the Engineer may direct or approve, at the Applicant's expense and at no cost to the Engineer, the New Mexico Department of Transportation or the New Mexico State Transportation Commission. All facilities located on public right of way under the dual jurisdiction of the State and a subordinate governmental entity shall comply with all applicable rules and regulations of such entity properly and lawfully in force and including but not limited to provisions of local franchises not in conflict with the rules and regulations of the New Mexico Department of Transportation. The Engineer makes no express or implied as to the continued existence of any highway in any particular location and expressly assumes no obligation with regard to the facility upon change, vacation or abandonment of any highway or portions thereof.
12. Neither the making of this application nor anything herein contained shall constitute a waiver on the part of the Applicant of any rights or claims had or made by some with respect to the occupancy of the streets and highways under the Constitution and Laws of the State of New Mexico, nor shall anything herein contained in any prejudice or impair any rights or claims existing independent of this application with respect to the construction, operation and maintenance of the Applicant's facilities in the State of New Mexico.
13. The utility owner must indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility, the utility's employees, any agent acting on the utility's behalf, and anyone else engaged by the utility to work on the utility installations, maintenance or relocations of their facilities. Any contractor or subcontractor engaged by the utility to perform utility installations or relocations in conjunction with or prior to highway construction must also indemnify and hold harmless the New Mexico Department of Transportation from loss due to any negligent act of the utility's contractor or subcontractor.
14. Each copy of the application shall be signed by the Applicant as an individual owner or by any official designated to execute such documents.
15. Utility owners shall carry insurance in amounts not less than those below specified and as outlined in 17 NMAC 4.2 and the Standard Specifications for Highway and Bridge Construction, 1994 Edition, (hereinafter, "Specifications"), as may be updated from time to time. In the event of conflict between the specification, and the regulations, owner shall carry the larger amount of insurance. If a utility is self-insured, the utility shall provide an Owner's Protective Liability Insurance Policy, in favor of the Department, in the amounts below specified. **Department as additional named insured:** The utility, its contractor or subcontractor shall have the New Mexico State Highway and Transportation Department added as an additional named insured on the Comprehensive General Liability Form or Commercial General Liability Form furnished by the Utility.

This application is hereby granted subject to all provisions herein and including the following special provisions, changes or amendments:

The utility shall provide "as-built" horizontal and vertical location information in hard copy and electronic file (AutoCAD DWG (3D) or Microstation DGN (3D) format. The standard horizontal datum shall be North American Datum 1983 (NAD83) and the standard projections shall be the New Mexico State Plane

Coordinate System 1983 (NMSPCS83). The standard vertical datum shall be North American Vertical Datum 1988 (NAVD 1988). The preferred media in which this data must be submitted is CD ROM. The utility location information shall be tied to Department monuments and referenced to highway mileposts and/or to highway project construction stationing and certified by a New Mexico Registered Land Surveyor. Metadata or "data about the data" shall be submitted with each utility's as-built electronic file, preferably as a separate text file on the electronic submittal media, and shall include: 1. District Utility Permit Number. 2. Name, address and phone number of the responsible land surveyor. 3. Date of completion of survey. 4. Equipment used to conduct the Survey. 5. Horizontal and vertical control marks used to tie the survey to the NMSPC83 and NAVD88. 6. Ground to Grid combined scale factor used. 7. Elevations shall be provided every 500 feet and at all survey break points, including all high and low points.

Note: Highway projects are time sensitive therefore, permit information requested from Authorization to Engineer Letters must be returned by the date indicated within the Authorization to Engineer letter.

16. Pursuant to: MAP-21; <http://www.fhwa.dot.gov/construction/contracts/buyam-qa.cfm> and (23U.S.C313) Applicant/Utility Owner certifies we are in compliance with Buy America for said facility described in Section 1. of this permit document. Applicant agrees and understands nonadherence will void said permit.

Applicant Raton Water Works

By Dan Campbell

Title General Manager



Approval of this permit is hereby given this _____ day of _____, 20 _____

NEW MEXICO DEPARTMENT of TRANSPORTATION

By _____

CULTURAL RESOURCE INVENTORY
NOT REQUIRED
NMDOT, ENVIRONMENTAL SECTION



New Mexico DEPARTMENT
TRANSPORTATION
MOBILITY FOR EVERYONE

REVIEWED
By Gary Pugh on 05/04/2010

A handwritten signature in black ink, appearing to be 'JH'.

Environmental Clearance for Undertakings within 1

ENVIRONMENTAL SURVEY
NOT REQUIRED

In order to receive environmental clearance for permitted projects following information will need to be submitted to the NMDOT Env Submittals (usually) are reviewed Tuesday of each week. Submit not be reviewed until the following Tuesday. Emergency requests are handled on a case-by-case basis.

NMDOT, ENVIRONMENTAL SECTION

- 1. Purpose and Nature of undertaking.** Describe the undertaking along with width, length and depth of ground disturbance. Include the methods and machinery to be used.
Raton Water Works is submitting Utility Permit Application for boring 1930LF of 6" HDPE sanitary sewer force main in SR 555 and US60/Loop 17 in Raton, NM. Depth is ~8'.
- 2. Is your project resulting from a NMDOT project?** If so, provide the control and/or project number.
No.
- 3. Funding Source.** Is the funding private, state or federal? If state and/or federal, list agency(s).
Raton Water Works is the funding source.
- 4. Land status.** Is the project on the right-of-way owned by BLM, Forest Service, Tribal land or State Trust land? (NMDOT does not own all highway rights-of-way!)
The project is within NMDOT right-of-way. The right-of-way is not owned by BLM, Forest Service, Tribal land or State Trust land.
- 5. Permitting agencies.** List other permitting agencies involved besides NMDOT.
N/A
- 6. County.** List the county or counties in which the project is located.
Colfax County.
- 7. Highway number.** Indicate the highway, the project will cross or parallel.
The sanitary sewer is parallel along south SR 555, crossing US 64/Loop 17, and parallel along east US 64/Loop 17.
- 8. BOP and EOP.** Provide the milepost locations for the beginning of the project area (BOP) and the end of the project area (EOP). If highway crossing only, list the milepost location, indicate BOP and EOP on quadrangle maps as well.
BOP SR 555 MP 0.142; EOP US 64/Loop 17 MP 347.52.

9. **Side(s) of the road.** Indicate of which side of the road the project will be located using cardinal directions (north, south, east, west). List all project crossings of the highway by milepost.
SR 555 parallel along south ROW MP 0.142 to MP 0; Crossing US 64/Loop 17 at MP 347.33; and US 64/Loop 17 parallel along east MP 347.33 to MP 347.52.
10. **Length of the project.** Indicate the length of the project within NMDOT right-of-way in terms of feet and/or miles.
1930LF within NMDOT right-of-way.
11. **Provide the legal description of the project area:** Township, Range, and Section(s).
T30N R23E
36.8678, -104.4400
12. **USGS 1:24,000(7.5') Quadrangle map.** List the name(s) of the USGS quadrangle map(s) on which the project is located.
Clifton House.
13. **Include the appropriate portion of the USGS 1:24,000 (7.5') Quadrangle map(s) with the project area indicated by an X if a crossing, or BOP and EOP if linear. Do not reduce or enlarge.** Quad map images can be printed at no charge from the website <http://terraserver.usa.com/>.
14. **Do not send photos (including aerial photos or photo maps) unless they are scanned or sent via US Mail.** Faxed photos come out entirely black.
15. **Include your name, company (if applicable), phone #, fax # and email address (if you use one).**
K. Stearns, Engineering Analytics (o)575-445-7192 (f)575-445-9898 kstearns@enganalytics.com
16. **Submit your requests by email, by fax OR by mail. Send in one format only- DO NOT send in multiple formats.**

Send clearance requests to:

Genevieve Head, NMDOT-Environmental Design Division
1129 Cerrillos Road/P.O. Box 1149
Santa Fe, NM 87504
(for FedEx or UPS the ZIP code is 87501)
Phone: (505) 827-5356; Fax:(505) 827-0417; Email: genevieve.head@state.nm.us

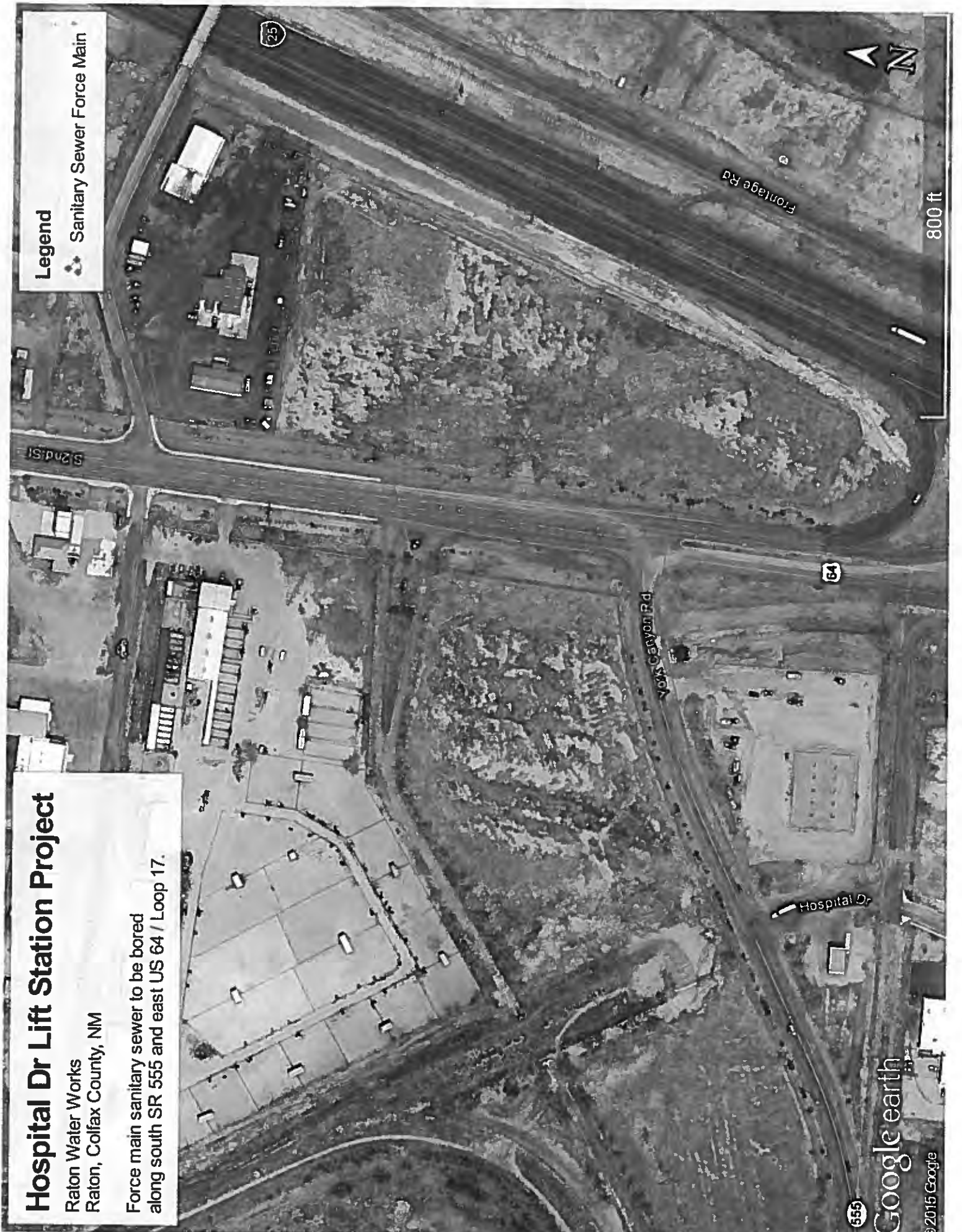
Hospital Dr Lift Station Project

Raton Water Works
Raton, Colfax County, NM

Force main sanitary sewer to be bored
along south SR 555 and east US 64 / Loop 17.

Legend

 Sanitary Sewer Force Main





September 23, 2014
Kleinfelder Project Number: 20151999

Scott Berry, P.E.
Principal Engineer
K. S. Berry Engineering
808 South 2nd Street
Raton, New Mexico 87740
scott@ksberry.net

**Subject: Geotechnical Evaluation Report
Proposed Lift Station Structure and Receiving Manhole Structure
Vicinities of Hospital Drive and Hereford Avenue
Raton, New Mexico**

Mr. Berry:

This letter transmits one electronic copy of our Geotechnical Evaluation Report for the proposed Lift Station Structure on Hospital Drive and proposed Receiving Manhole Structure on Hereford Avenue in Raton, New Mexico. Our services consisted of a subsurface exploration program, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you, and look forward to future endeavors. If you have any questions regarding this report or need additional information or services, please contact our office at (719) 632-3593.

Respectfully submitted,

KLEINFELDER, INC.

Brysen T. Mustain, PG
Engineering Geologist

Hai Ming Lim, PE (Oklahoma)
Senior Professional

Adam D. Tschida, PE
Senior Geotechnical Engineer

BTM/HML/ADT/jkw
Enclosures



**GEOTECHNICAL EVALUATION REPORT
PROPOSED LIFT STATION STRUCTURE AND
RECEIVING MANHOLE STRUCTURE
VICINITIES OF HOSPITAL DRIVE AND
HEREFORD AVENUE
RATON, NEW MEXICO
KLF PROJECT 20151999**

September 23, 2014

**Copyright 2014 Kleinfelder
All Rights Reserved**

**ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC
PROJECT FOR WHICH THIS REPORT WAS PREPARED.**

A Report Prepared for:

Mr. Scott Berry, PE
Principal Engineer
K.S. Berry Engineering
808 South 2nd Street
Raton, New Mexico 87740
scott@ksberry.net

**GEOTECHNICAL EVALUATION REPORT
PROPOSED LIFT STATION STRUCTURE AND
RECEIVING MANHOLE STRUCTURE
VICINITIES OF HOSPITAL DRIVE AND
HEREFORD AVENUE
RATON, NEW MEXICO**

Prepared by:



Brysen T. Mustain, PG
Engineering Geologist



Hai Ming Lim, PE (Oklahoma)
Senior Professional

Reviewed by:



Adam D. Tschida, PE
Senior Geotechnical Engineer



KLEINFELDER

4815 List Drive, Unit 115
Colorado Springs, Colorado 80919
Phone: 719.632.3593
Fax: 719.632.2648

Date: September 23, 2014
Kleinfelder Project No.: 20151999

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Geotechnical Evaluation Report
Proposed Lift Station Structure and Receiving Manhole Structure
Vicinities of Hospital Drive and Hereford Avenue
Raton, New Mexico

1 INTRODUCTION

1.1 GENERAL

This report presents the results of Kleinfelder's Geotechnical Evaluation performed for the proposed Lift Station Structure and Receiving Manhole Structure to be constructed in the vicinities of Hospital Drive and Hereford Avenue in Raton, New Mexico. The attached Exploration Location Plans and Vicinity Map (Plates A-1 and A-2) show the general locations of the planned improvements. Our investigation was performed for K.S. Berry Engineering, Inc. (K.S. Berry) and was authorized by Mr. Scott Berry.

The report includes our recommendations relating to the geotechnical aspects of project design and construction. The conclusions and recommendations stated in this report are based upon the subsurface conditions found at the locations of the exploratory borings at the time the exploration was performed. They are subject to the provisions stated in the report sections titled **Additional Services** and **Limitations**. Our findings, conclusions, and recommendations should not be used for other projects or other sites. Furthermore, they should not be used if the site has been altered, or if a prolonged period has elapsed since the date of the report, without Kleinfelder's prior review to determine if they remain valid.

1.2 PROJECT DESCRIPTION

Based on the information provided by K.S. Berry at the time of preparation of this report, we understand the lift station structure will be a rectangular, reinforced pre-cast concrete box with an invert about 27-feet below the adjacent grade. A maximum of approximately 8-feet of liquid will be in the well. The top of the box will be at ground surface and will have a set of doors or manhole covers for access. No superstructure is planned since the top will be flush-mounted.

The receiving manhole will comprise a set of typical manhole rings with a manhole cover and is anticipated to have an invert elevation no more than 8-feet below the adjacent grade.

We understand that net foundation loads will be low, because the dead weight of the well and manhole structures will be substantially compensated by the weight of soils excavated for

construction. Appurtenant construction will also include minor grading, and installation of underground utilities.

If the type of construction, actual building/equipment loads, or proposed grading plans vary from those described above, Kleinfelder should be notified immediately in order to review and revise our recommendations, as applicable.

1.3 PURPOSE AND SCOPE

The purpose of our investigation was to explore and evaluate subsurface conditions at the two project sites and provide recommendations relating to the geotechnical aspects of project our field exploration, laboratory tests, and our experience with similar soil and geologic conditions in the area.

Kleinfelder's scope of services included:

- A visual reconnaissance to observe surface and geologic conditions at the project site and locating the exploratory borings.
- Notification of the One-Call Center of New Mexico to locate underground utilities near the boring locations.
- The drilling of one boring within the proposed lift station structure footprint, and one boring within the proposed manhole structure footprint.
- Laboratory testing of selected samples obtained during the field exploration to evaluate relevant physical, analytical, and engineering properties of the soil.
- Evaluation and engineering analyses of the field and laboratory data collected to develop our geotechnical conclusions and recommendations for the foundation and floor slab design and construction.
- Preparation of this report, which includes a description of the proposed project, a description of the surface and subsurface site conditions observed during our investigation, our conclusions and recommendations as to foundation design and construction, other related geotechnical issues, and appendices which summarize our field and laboratory investigations.

2 FIELD EXPLORATION AND LABORATORY TESTING

2.1 FIELD EXPLORATION

Our field exploration program was performed on August 11, 2014 and included drilling two exploratory borings as summarized below in Table 1.

Table 1
Summary of Field Exploration Program

Boring Designation	Approximate Latitude (WGS84)	Approximate Longitude (WGS84)	Approximate Depths of Exploration (feet, bgs)*
B-1 (Lift Station)	N 36.86657°	W 104.44256°	34
B-2 (Manhole)	N 36.87051°	W 104.43967°	29½

**bgs = below ground surface*

The approximate boring locations are shown in the attached Exploration Location Plan and Vicinity Map plates A-1 and A-2; approximate latitude, longitude and elevation are also presented on the boring logs in Appendix B, as estimated by Kleinfelder using a GPS device with an accuracy of 5-feet. The exploratory borings were advanced using a truck-mounted CME-55 drill rig equipped with 4-inch outside-diameter, continuous-flight, solid-stem auger. Subsurface soil samples were obtained during exploration using a California-type sampler (2.5-inch I.D./3.0-inch O.D.) driven into the strata with blows from a 140-pound hammer falling through a 30-inch drop. The blows required to drive the sampler in 6-inch increments into the strata are recorded on the logs. These blow counts are an indication of the relative density or consistency of the strata.

During drilling, a Kleinfelder geologist observed the soil and bedrock encountered, obtained representative soil samples, and logged the subsurface conditions and samples. Samples were placed in plastic bags, labeled, and returned to our laboratory for further examination and testing.

Appendix B includes individual boring logs describing the subsurface conditions encountered in the borings. The lines defining boundaries between soil and rock types on the logs are based on drill rig behavior and interpolation between samples, and are therefore approximate. Transition between soil and rock types may be abrupt or may be gradual.

2.2 LABORATORY TESTING

2.2.1 Geotechnical Laboratory Testing

Laboratory tests were performed on selected soil samples to estimate their relative engineering properties. Tests were performed in general accordance with the local practice, ASTM or other recognized standards-setting entities and included:

- Description and Identification of Soils (Visual-Manual Procedure);
- Sieve Analysis;
- Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils;
- Direct Shear;
- One-Dimensional Swell/Compression Potential;
- Standard Proctor, and;
- Natural Density and Moisture Content.

Results of the laboratory tests are included in Appendix C. Selected test results are also shown on the boring logs contained in Appendix B.

3 SITE CONDITIONS

3.1 SURFACE

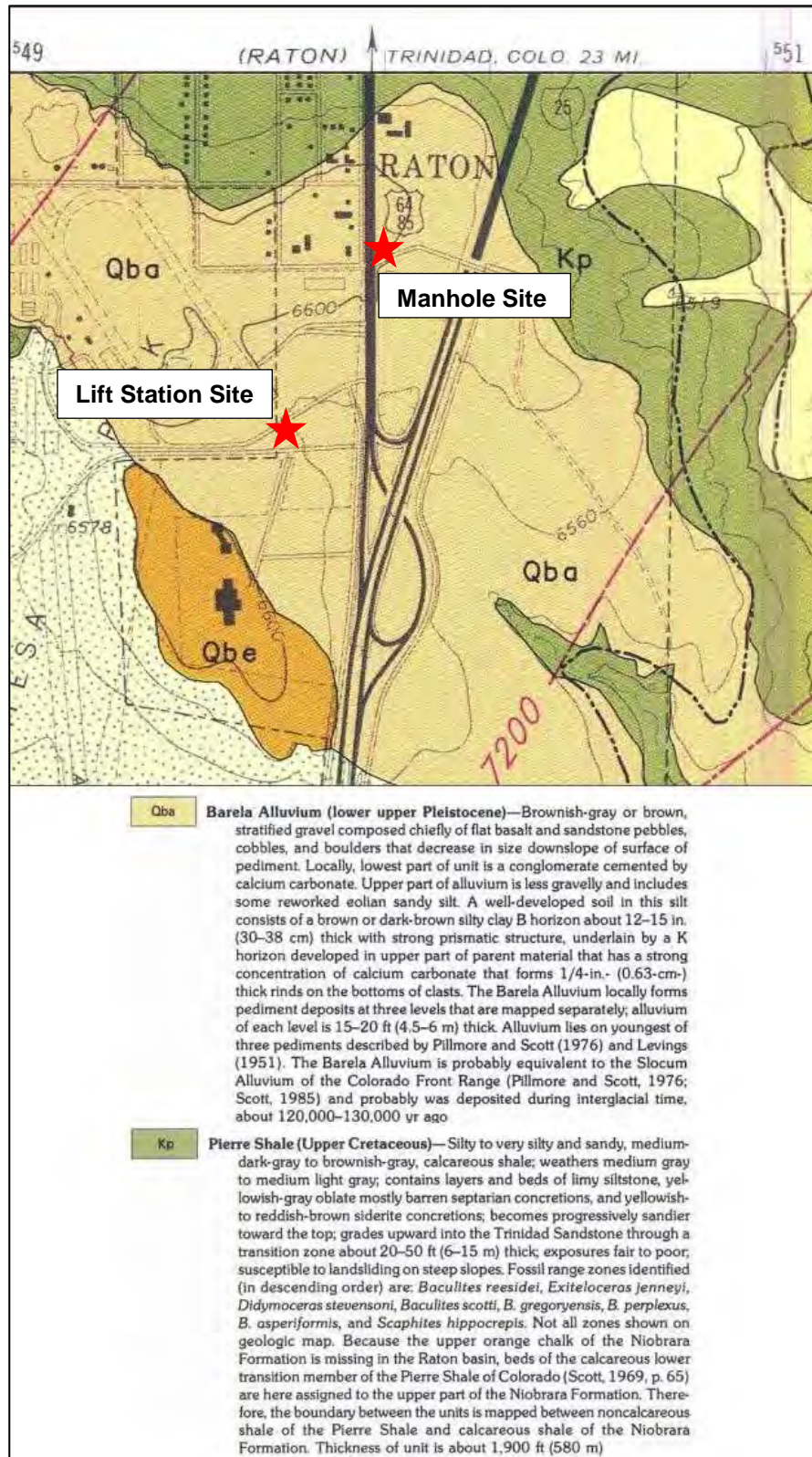
The proposed Lift Station site is located to the south of the intersection of Hospital Drive and York Canyon Road, adjacent to an existing fire and emergency vehicle garage. Overall, the site slopes gently down to the northeast and is relatively flat.

The proposed Receiving Manhole site is located in the eastbound lane of Hereford Avenue, east of the intersection of Hereford Avenue and South 2nd Street. The site slopes gently up to the intersection of Hereford Avenue and South 2nd Street. Commercial properties and vacant parcels were present surrounding the site.

3.2 GEOLOGY

Prior to drilling, site geology was evaluated by reviewing geologic maps including the USGS Geologic Map (Pillmore and Scott, 1994), a portion of which is presented below. The mapping indicates surficial soils in the general area of the project site consist of Barela Alluvium comprised of gravel, cobbles, and boulders with some silt and clay. The bedrock underlying the project site generally is comprised of claystone and shale of the Pierre Shale Formation. This is generally consistent with our subsurface exploration; however, boulders were not encountered in either of the borings. Bedrock was encountered at approximately 23½ and 32½-feet below the ground surface.

Figure 1: Portion of Geologic Map



○ SEISMICITY

Based upon the geologic setting, subsurface soil conditions, and low seismic activity in this region, liquefaction is not expected to be a hazard at the site. The subsurface soil profiles correspond with Site Class D of the 2009 International Building Code (IBC). We recommend the following site coefficients be used at this site.

**Table 2
Design Acceleration for Short Periods**

S_s	F_a	S_{MS} ($S_{MS} = F_a S_s$)	S_{DS} ($S_{DS} = 2/3 S_{MS}$)
0.212	1.6	0.340	0.226

- S_s = The mapped spectral accelerations for short periods (U.S. Geological Survey Earthquake Hazards Web Page, 2014)
- F_a = Site coefficient from Table 1613.5.3(1), 2009 IBC
- S_{MS} = The maximum considered earthquake spectral response accelerations for short periods
- S_{DS} = 5-percent damped design spectral response acceleration at short periods

**Table 3
Design Acceleration for 1-Second Period**

S_1	F_v	S_{M1} ($S_{M1} = F_v S_1$)	S_{D1} ($S_{D1} = 2/3 S_{M1}$)
0.064	2.4	0.153	0.120

- S_1 = The mapped spectral accelerations for 1-second period (U.S. Geological Survey Earthquake Hazards Web Page, 2014)
- F_v = Site coefficient from Table 1613.5.3(2), 2009 IBC
- S_{M1} = The maximum considered earthquake spectral response accelerations for 1-second period
- S_{D1} = 5-percent damped design spectral response acceleration at 1-second period

3.4 SUBSURFACE

The subsurface conditions encountered in our borings generally consisted of fill and alluvium deposits overlying bedrock to boring termination depths. The subsurface conditions encountered at the project site are described in more detail in the following sections.

3.4.1 Gravel, Asphalt, and Existing Fill

A 1-inch thick gravel layer was encountered at the ground surface of B-1. Asphalt was encountered at the ground surface at boring B-2. Asphalt appeared to be placed in two different lifts, including a 4-inch thick lift and an 8-inch thick lift for a total of 12-inches of asphalt. No aggregate base course was encountered underlying the asphalt.

Existing fill was encountered in boring B-2 below the asphalt section to a depth of about 7-feet below the ground surface. The fill was comprised of sandy lean clay with gravel. Field testing indicated the fill varied from firm to hard, was moist, and dark gray in color.

3.4.2 Native Soil

3.4.2.1 Boring B-1

Native soil composed of layers of lean clay with various amounts of sand, silty clayey sand with gravel, and poorly-graded sand with gravel and silt were encountered below the surficial gravel layer and extended to the bedrock depth of approximately 32½-feet. Field penetration testing indicated the consistency of the sands varied from dense to very dense, and the clays were hard. Soils were dry to moist, and tan to reddish-brown to brown in color.

3.4.2.2 Boring B-2

Native lean clay with sand was encountered below the asphalt and fill layers and extended to the bedrock depth of approximately 23½-feet. Field penetration testing indicated the consistency of the alluvial clay soils varied from firm to hard. The alluvial clay soils were moist and dark gray in color.

3.4.3 Bedrock

Weathered claystone overlying relatively unweathered shale bedrock associated with the Pierre Shale Formation was encountered at approximately 32½ and 23½-feet below ground surface in borings B-1 and B-2, respectively, and extended to the termination depth of the boring. Field penetration testing (blow counts) indicated the density of the bedrock was hard to very hard. The weathered claystone layer was approximately 1½ and 2½-feet thick.

3.5 GROUNDWATER

Groundwater was not encountered in either boring at the time of drilling, after completion of drilling, or when checked 24 hours (a temporary piezometer was installed at completion of drilling) after the completion of drilling activities. It should be noted that soil moisture levels and groundwater levels commonly vary over time and space depending upon seasonal precipitation, irrigation practices, land use, and runoff conditions. In addition, groundwater can be found

perched above clay zones and bedrock formations at random locations and times as well. Accordingly, the soil moisture and groundwater data in this report pertain only to the locations and times at which exploration was performed. They can be extrapolated to other locations and times only with caution. It should be noted that Kleinfelder has not performed a hydrologic study to assess the seasonal groundwater conditions.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 GEOTECHNICAL FEASIBILITY OF PROPOSED CONSTRUCTION

Based on the information presented herein, it is Kleinfelder's opinion that development of the sites as planned is feasible, provided that the recommendations in this report are incorporated in the design and construction of the project.

Based on the planned invert elevations of the well and manhole, these structures can be founded on conventional mat foundations. The primary geotechnical concern for construction will be protection of any adjacent structures and improvements during the construction excavations.

The following sections of this report provide more detailed recommendations relating to site preparation, excavation, and foundation construction and design.

4.2 CONSTRUCTION CONSIDERATIONS

4.2.1 Site Preparation and Grading

All site preparation and earthwork operations should be performed in accordance with applicable codes, safety regulations and other local, state or federal guidelines. Initial site work should consist of stripping any organics or other deleterious materials from the work areas.

After performing the required stripping and excavations and prior to the placement of any new fill, processing of the subgrade should be performed. This should include scarifying the subgrade to a depth of 8-inches, and compacting as recommended in Section 4.2.5 of this report. The prepared subgrade should be observed by Kleinfelder prior to placement of structural elements. Areas that are soft or yielding should be stabilized. Typical stabilization methods include utilizing a combination of geosynthetic grid and aggregate to form a stable base on which to place structural fill, or pushing rock into the subgrade until a firm and stable subgrade is achieved. All new fill materials should be placed in horizontal loose lifts not to exceed 8-inches in thickness, unless otherwise accepted by the geotechnical engineer.

4.2.2 Excavation Characteristics

We anticipate that excavations on the order of 8 to 27-feet below the ground surface will be required to construct foundations on properly prepared subgrade. Based on the subsurface profile encountered in our borings, excavation will be in predominately sand and clay soil. We

anticipate that excavation of the on-site soils can be performed with standard heavy-duty earthmoving equipment.

Groundwater was not encountered in our borings, but may be encountered during excavation. Dewatering of excavation may be required, and will be the responsibility of the excavation contractor.

All excavations must comply with the applicable local, state, and federal safety regulations, and particularly with the excavation standards of the Occupational Safety and Health Administration (OSHA). Construction site safety, including excavation safety, is the sole responsibility of the Contractor as part of its overall responsibility for the means, methods and sequencing of construction operations. Kleinfelder's discussion of excavation support are intended for the Client's use in planning the project, and in no way relieve the Contractor of its responsibility to construct, support and maintain safe excavations. Under no circumstances should the following recommendations be interpreted to mean that Kleinfelder is assuming responsibility for either construction site safety or the Contractor's activities.

We believe that the soils on these sites will classify as Type C materials using OSHA criteria. OSHA requires that unsupported cuts be laid back no steeper than 1½H:1V (horizontal to vertical) for cuts up to 20-feet in height. For the lift station structure, the deep excavation will require design by a Professional Engineer, because it will exceed 20-feet in depth. Additionally, **both project sites have existing structures or improvements adjacent to the planned locations. Shoring of excavations or other methods may be required to protect these structures. The design of the excavation slopes or the shoring are beyond the scope of this report.** The actual determination of soil type, allowable excavation slopes and the need for shoring must be made in the field by the contractor's OSHA-qualified "competent person."

4.2.3 Structural Fill and Imported Granular Fill Criteria

Native on-site sand soils are considered suitable for use as structural fill, if required, beneath the proposed structure foundations. Any imported structural fill should consist of a non-expansive, mainly granular material as specified below:

Table 4
Imported Structural Fill Criteria

Gradation Requirements	
Standard Sieve Size	Percent Passing
2-inch	100
No. 200	10 - 30
Plasticity Requirements (Atterberg Limits)	
Liquid Limit	30 or less
Plasticity Index	8 or less

Prior to placement of the fill, it should be moisture conditioned as described in this report. A sample of any imported fill material should be submitted to our office for approval and testing at least 3 days prior to stockpiling at the site. Structural fill should be compacted according to the recommendations in Section 4.2.5 of this report.

4.2.4 Utility Trench Backfill

Backfill material should be essentially free of plant matter, organic soil, debris, trash, other deleterious matter and rock particles larger than 2-inches and may be sourced from the on-site soils. However, backfill material in the “pipe zone” should observe any requirements specified by the utility agency for bedding and pipe-zone fill. In general, backfill above the pipe zone in utility trenches should be placed in lifts of 6- to 8-inches and compacted using power equipment designed for trench work. Compact trench backfill as recommended in Section 4.2.5 of this report.

4.2.5 Compaction Requirements

Fill materials should be compacted to the following specifications:

Table 5
Compaction Specifications

Fill Location	Material Type	Percent Compaction* (ASTM D-1557)	Moisture Content
Foundation Subgrade	On-site Sand Soil (8-inches Scarified, Moisture Conditioned, Re-Compacted)	95% minimum	± 2% of optimum

Fill Location	Material Type	Percent Compaction* (ASTM D-1557)	Moisture Content
Wall Backfill	On-site Sand Soil/ Imported Structural Fill	100% minimum for portion greater than 10-feet below grade; 95% above this zone	± 2% of optimum
Utility Trenches	On-Site Soil/ Imported Structural Fill	92 minimum	± 2% of optimum

* In non-structural, non-paved, or landscaped areas, the compaction specification may be reduced to 90 percent. Where two or more fill locations coincide use the more stringent compaction specification.

4.2.6 Construction in Wet or Cold Weather

During construction, grade the site such that surface water can drain readily away from the structural areas. Promptly pump out or otherwise remove any water that may accumulate in excavations or on subgrade surfaces, and allow these areas to dry before resuming construction. The use of berms, ditches, and similar means may be used to prevent stormwater from entering the work area and to convey any water off site efficiently.

If earthwork is performed during the winter months when freezing is a factor, no grading fill, structural fill or other fill should be placed on frosted or frozen ground, nor should frozen material be placed as fill. Frozen ground should be allowed to thaw or be completely removed prior to placement of fill. A good practice is to cover the compacted fill with a “blanket” of loose fill to help prevent the compacted fill from freezing.

If the structures are erected during cold weather, foundations, concrete slabs-on-grade, or other concrete elements should not be constructed on frozen soil. Frozen soil should be completely removed from beneath the concrete elements, or thawed, scarified and re-compacted. The amount of time passing between excavation or subgrade preparation and placing concrete should be minimized during freezing conditions to prevent the prepared soils from freezing. Blankets, soil cover or heating as required may be utilized to prevent the subgrade from freezing.

4.2.7 Construction Testing and Observation

Testing and construction observation should take place under the direction of Kleinfelder to support our professional opinion as to whether the earthwork does or does not substantially

conform to the recommendations in this report. Furthermore, the opinions and conclusions of a geotechnical report are based upon the interpretation of a limited amount of information obtained from the field exploration. It is therefore not uncommon to find that actual site conditions differ somewhat from those indicated in the report. Kleinfelder should remain involved throughout the project to evaluate such differing conditions as they appear, and to modify or add to the geotechnical recommendations as necessary.

4.2.8 Surface Drainage and Landscaping

Positive drainage away from the structures is essential to the performance of foundations and flatwork, and should be provided during the life of the structure. Surface drainage should be created such that water is diverted off the site and away from backfill areas of adjacent buildings. Bare earthen and landscaped areas within 10-feet of the structures should slope away at a minimum gradient of 8 percent. Areas where pavements or slabs are constructed adjacent to the structures should slope away at a minimum grade of 2 percent.

4.2.9 Permanent Cut and Fill Slopes

Permanent cut and fill slopes exposing the materials encountered in our borings are anticipated to be stable at slopes as steep as 3H:1V under dry conditions. New slopes should be re-vegetated as soon as possible after completion to reduce erosion.

4.3 FOUNDATIONS

4.3.1 Lift Station Foundation

We understand that the bottom of the lift station structure is planned to be constructed at about 27-feet below the existing ground surface, within the dense silty gravel with sand alluvium layer encountered in Boring B-1. It is recommended that the proposed Lift Station structure be supported by a reinforced mat foundation system placed on at least 8-inches of properly prepared subgrade soils as described in Section 4.2.5.

We have assumed that the lift station will be constructed water-tight. Design and construction recommendations for a mat foundation follow:

1. Mat foundations placed on a properly prepared subgrade as described above may be designed for a maximum allowable soil bearing pressure of 2,500 pounds per square foot (psf). A modulus of subgrade reaction of 100 psi per inch deflection can be used for mat slab design.

2. We estimated total settlement for a mat foundation placed on structural fill as discussed above would be less than 1-inch.
3. Buoyancy of the well can be resisted using a backfill density of 100 pcf acting on horizontal surfaces.
4. Lateral loads, if any, may be resisted using an ultimate coefficient of friction for sliding, between the bottom of the mat and the underlying soil, of 0.35 for foundations cast directly on properly prepared subgrade soils. An ultimate passive earth pressure in the form of equivalent fluid pressure of 326 pounds per cubic foot (pcf) can be used. As large movements are generally required to mobilize the full passive earth pressure, we recommend a minimum factor of safety of 2.0 be applied.
5. Well walls should be designed for saturated soil backfill “at-rest” earth density of at least 90 pcf.
6. All foundations should have at least 36-inches of cover above the bottom of the mat for frost protection, or that required by the applicable building code, whichever is greater.
7. The foundation subgrade should be protected from wetting and drying prior to and after concrete placement. The structure should be backfilled as soon as practical.
8. A representative of Kleinfelder should observe the foundation excavations prior to foundation placement.

4.3.2 Manhole Foundation

We understand that the invert of the manhole structure is planned to be constructed at about 8-feet below the ground surface, within the clay alluvium layer encountered in Boring B-2. We recommend the manhole vault, as required, be placed on a properly prepared subgrade comprising 8-inches of scarified, moisture-conditioned, re-compacted on-site clay soils. The manhole structure should only bear on compacted native soils, not bear on existing fill materials. Any existing fill materials that may remain below mat foundation elevation should be removed in its entirety and replaced with properly compacted structural fill, as required.

We have assumed the manhole construction will be with manhole rings that will not be water-tight and will allow backfill to drain. We recommend the manhole be designed and constructed in accordance with the following criteria:

1. Manholes bearing upon a properly prepared subgrade may be designed for a maximum allowable soil bearing capacity of 2,000 psf and a modulus of subgrade reaction of 80 psi per inch.
2. Lateral loads may be resisted using a ultimate coefficient of friction for sliding of 0.25 and an unfactored passive earth pressure of 240 pcf for the foundation backfill consisting of compacted clay soils. As large movements are generally required to mobilize the full passive earth pressure, we recommend a factor of safety of 2 be applied to the above passive earth pressure value.
3. We estimated total settlement for a mat foundation placed on structural fill as discussed above would be less than 1 inch.
4. Manhole should be designed for backfill "at-rest" earth density of at least 86 pcf.
5. All foundations should have at least 36-inches of cover above the bottom of the mat for frost protection, or that required by the applicable building code, whichever is greater.
6. The foundation subgrade should be protected from wetting and drying prior to and after concrete placement. The structure should be backfilled as soon as practical.
7. A representative of Kleinfelder should observe the foundation excavations prior to foundation placement.

4.3.3 Excavation Backfill

Backfill against these structures should be properly placed and compacted as recommended in Section 4.2.5 of this report. Care should be taken when placing backfill so as not to damage the walls. Compaction of each lift adjacent to and near the walls should be accomplished with hand-operated tampers or other lightweight compactors. Over-compaction may cause excessive lateral earth pressures, which could result in distress or damage to the structures.

4.3.4 Concrete

Based on our experience in the area and the subsurface conditions encountered in the borings, Type V cement is recommended for concrete in contact with the soil on this site.

5 ADDITIONAL SERVICES

5.1 REQUIREMENTS FOR ADDITIONAL SERVICES

In most cases, other services beyond completion of a geotechnical report are necessary or desirable to complete a project satisfactorily. It also sometimes happens that, while performing our services, we discover conditions or circumstances that require the performance of additional work that was not anticipated when the geotechnical report was written. Kleinfelder offers a range of environmental, geological, geotechnical, and construction services to suit the varying needs of our clients. This section outlines some of those services that may pertain to this project. Kleinfelder will be happy to submit a proposal for performing any such services upon request.

5.2 REVIEW OF PLANS AND SPECIFICATIONS

We strongly recommend that Kleinfelder be given an opportunity to review the plans and specifications for this project before they are finalized. Such a review allows us to verify that our recommendations and concerns have been adequately incorporated in the design. It also gives us an opportunity to discuss those recommendations and concerns with other members of the design team so that we can clear up misunderstandings or ambiguities before the project reaches the construction stage.

5.3 PRE-CONSTRUCTION MEETINGS

We recommend that the Owner, the Contractor, and the other members of the design team hold a pre-construction meeting with Kleinfelder's project engineer. The purpose of this meeting is to go over geotechnical aspects of the project so that all parties have a clear understanding of the geotechnical issues that affect the Contractor's work and how they will be handled. The meeting also allows us to set up the communication and coordination needed for construction observation and testing, and to identify points of confusion or disagreement that need to be resolved.

5.4 CONSTRUCTION OBSERVATION AND TESTING

The recommendations in this report depend on the assumption that an adequate program of testing and observation will be made during construction to verify compliance with our recommendations. These tests and observations may include, but not necessarily be limited to, the following:

- Observations and density testing during site preparation and earthwork.
- Observation of foundation excavations and foundation installation.
- Observation and testing of construction materials.
- Consultation as may be required during construction.

Adequate testing and observation is essential to successful and economical completion of a construction project. Testing and observation allow us to verify that our recommendations are being followed. They also make it possible to identify new or changed conditions that require us to modify those recommendations. Construction testing and observation should be scheduled in advance so that our personnel can plan to be available for the work. It is also desirable that we receive a set of project plans and specifications at the time our work is first scheduled.

6 LIMITATIONS

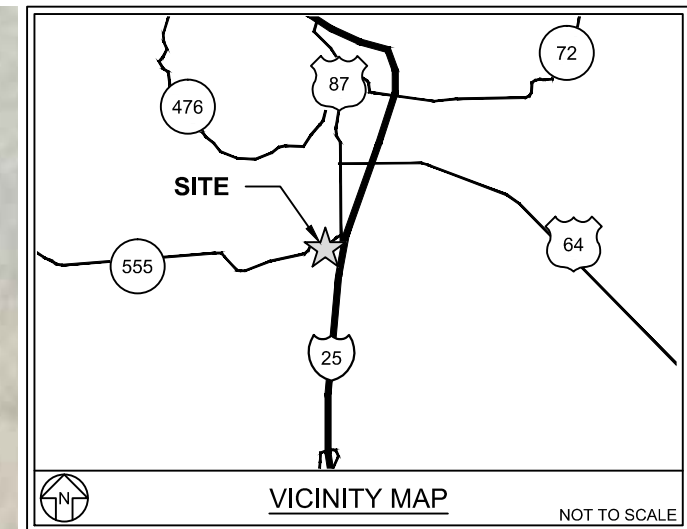
This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is likely that subsurface conditions vary from those documented on the boring logs. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder that such changes do not affect our recommendations. Failure to do so will vitiate these recommendations.

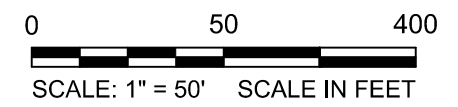
APPENDIX A
Plates

CAD FILE: W:\2015\1999_Raton Lift Station_GEO\2.0 - Technical Information\2.8 - Technical & CADD Figures\CADD\2015\1999_GEO 01.dwg LAYOUT: SITE 1 PLOTTED: 8/20/2014 11:57 AM BY: pamela foster



- NOTES:**
1. BASE MAP IMAGE CREATED FROM DATA COMPILED BY ArcGIS, DATE AUGUST 2014.
 2. VICINITY MAP CREATED FROM DATA COMPILED BY USGS.

<u>LEGEND</u>	
	SOIL BORING



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 DATE: 08/20/2014
 REVISED:

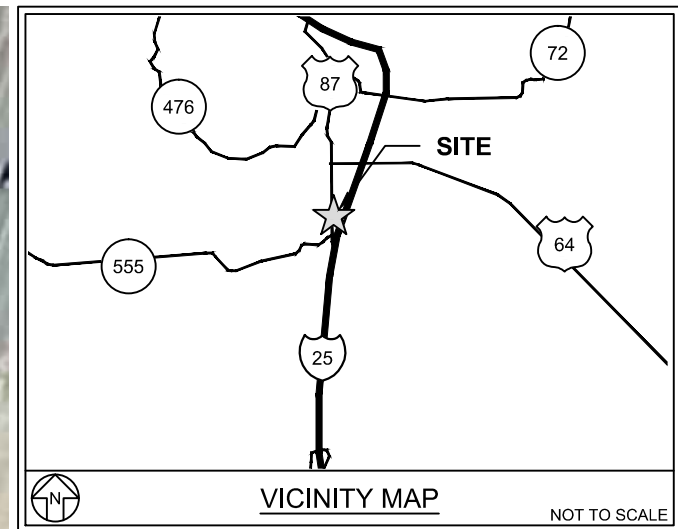
**EXPLORATION LOCATION PLAN
 AND VICINITY MAP**

Proposed Lift Station Structure
 Vicinity of Hospital Drive and York Canyon Road.
 Raton, New Mexico

PLATE

A-1

CAD FILE: W:\20151999_Raton Lift Station_GEO\2.0 - Technical Information\2.8 - Technical & CADD Figures\CADD\20151999_GEO 01.dwg LAYOUT: SITE 2 PLOTTED: 8/20/2014 11:58 AM BY: pamela foster



- NOTES:**
1. BASE MAP IMAGE CREATED FROM DATA COMPILED BY ArcGIS, DATE AUGUST 2014.
 2. VICINITY MAP CREATED FROM DATA COMPILED BY USGS.

LEGEND

SOIL BORING



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 DATE: 08/20/2014
 REVISED:

**EXPLORATION LOCATION PLAN
 AND VICINITY MAP**

Proposed Manhole Structure
 Vicinity of Hereford Avenue and S. 2nd Street
 Raton, New Mexico

PLATE
A-2

APPENDIX B
Boring Logs

PLOTTED: 09/22/2014 09:55 AM BY: BMustain

Date Begin - End: 8/11/2014 **Drilling Company:** Custom Auger
Logged By: N. Farny **Drill Crew:** Nick
Hor.-Vert. Datum: Not Available **Drilling Equipment:** CME-55 **Hammer Type - Drop:** 140 lb. Cathead - 30 in.
Plunge: -90 degrees **Drilling Method:** Solid Stem Auger
Weather: Sunny, 75° **Exploration Diameter:** 4 in. O.D.

BORING LOG B-1

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								Additional Tests/Remarks
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
			Latitude: 36.86657° N Longitude: -104.44256° W Approximate Ground Surface Elevation (ft.): 6,594.0 Surface Condition: Gravel												
			GRAVEL: 1 inch thick												
			Lean CLAY (CL): some sand, brown, dry to slightly moist, hard, white streaks												
6590	5			BC=20 22	10"	CL	11.1	105.3	100	92	40	23			
			Sandy Lean CLAY (CL): non-plastic to low plasticity, reddish brown, dry to slightly moist, hard, white streaks, porous												
6585	10			BC=17 17	10"		8.6	89.7							
			Silty Clayey SAND with Gravel (SC-SM): fine grained sand, fine grained gravel, sub-rounded, non-plastic, tan to brown, dry to slightly moist, dense to very dense												
6580	15			BC=50/6"	6"	SC-SM	3.9	109.6	75	20	19	5			
			Poorly-graded SAND with Gravel and Silt (SP-SM): fine grained gravel, medium to coarse grained sand, sub-angular, non-plastic, brown, dry to moist, very dense												
6575	20			BC=19 22 22	12"		5.2								
			Pierre Shale Formation Weathered CLAYSTONE: medium to high plasticity												
6570	25			BC=50/9"	6"	SP-SM	6.6		62	11	20	2			
			Pierre Shale Formation SHALE: medium to high plasticity, dark gray, dry to moist, very hard, laminated												
6565	30		- some clay below about 29 feet	BC=30 41	8"		6.2								
6560	35			BC=50/2"	2"										
			The exploration was terminated at approximately 34 ft. below ground surface. The exploration was backfilled with auger cuttings on August 12, 2014.												
6555															

ASTM D 698 Method A=
Max. Dry Unit Wt.: 114.2 pcf
Opt. Water Content: 13.8%

Expansion/Compression=
Compression= 2.7% under 1 ksf when wetted.

Gravel and auger grinding from about 12 to 18 feet

Expansion/Compression=
Compression= 2.7% under 1 ksf when wetted.

Clay content of cuttings increases and drilling action is smoother at about 18 feet

Drilling resistance increases and drilling action is smoother at about 32.5 feet

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder using a GPS device with an accuracy of 5 feet.

GINT FILE: W:\20151999_raton Lift Station_geo\2.0 - Technical Information\2.8 - Technical & Cadd Figures\gint\20151999 Raton Master.gpj
GINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2014.GLB [KLF_BORING/TEST PIT SOIL LOG]



PROJECT NO.: 20151999
DRAWN BY: NJF
CHECKED BY: ADT
DATE: 9/19/2014
REVISED: -

BORING LOG B-1

Proposed Lift Station Structure and
Receiving Manhole Structure
Vicinity of Hospital Drive and Hereford Avenue
Raton, New Mexico

PLATE

B-1

PAGE: 1 of 1

PLOTTED: 09/22/2014 09:55 AM BY: BMustain

Date Begin - End: 8/11/2014	Drilling Company: Custom Auger	BORING LOG B-2
Logged By: N. Farny	Drill Crew: Nick	
Hor.-Vert. Datum: Not Available	Drilling Equipment: CME-55	Hammer Type - Drop: 140 lb. Cathead - 30 in.
Plunge: -90 degrees	Drilling Method: Solid Stem Auger	
Weather: Sunny, 80°	Exploration Diameter: 4 in. O.D.	

Approximate Elevation (feet)	Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
			Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
			Latitude: 36.87051° N Longitude: -104.43967° W Approximate Ground Surface Elevation (ft.): 6,610.0 Surface Condition: Asphalt												
		ASPHALT: 4 inch thick overlay													
		ASPHALT: 8 inches thick													
		<u>Existing Fill</u>													
		Sandy Lean CLAY with Gravel (CL): fine grained gravel, fine grained sand, dark gray, moist, firm to hard													
6605	5			BC=4 4	10"	CL	17.7	105.8	79	54	35	20		ASTM D 698 Method A= Max. Dry Unit Wt.: 113.2 pcf Opt. Water Content: 16.6%	
		Lean CLAY with Sand (CL): fine grained sand, dark gray, moist, firm to hard													
6600	10			BC=8 11	3"		32.1							Expansion/Compression= Compression= 0.1% under 1 ksf when wetted.	
		- white streaks at about 14 feet												Gravel from about 6 to 7 feet	
6595	15			BC=8 11	9"		20.8	103.6						Expansion/Compression= Expansion= 0.3% under 1 ksf when wetted.	
6590	20			BC=10 13	8"	CL	18.7	106.0	100	81	33	18			
6585	25	<u>Pierre Shale Formation</u>													
		Weathered CLAYSTONE: medium to high plasticity, brown to dark gray, moist, hard		BC=11 19	10"		116.6	113.4						Drilling resistance increases at about 23.5 feet	
		<u>Pierre Shale Formation</u>												Expansion/Compression= Expansion= 0.8% under 1 ksf when wetted.	
		SHALE: medium to high plasticity, dark gray, dry to moist, very hard, laminated												Drilling resistance increases at about 26 feet	
6580	30		The exploration was terminated at approximately 29.5 ft. below ground surface. The exploration was backfilled with auger cuttings and asphalt cold patched at the surface on August 12, 2014.	BC=50/4"	4"		11.6	120.1							
														GROUNDWATER LEVEL INFORMATION: Groundwater was not encountered during drilling or after completion.	
														GENERAL NOTES: The exploration location and elevation are approximate and were estimated by Kleinfelder using a GPS device with an accuracy of 5 feet.	
6575	35														

<p>KLEINFELDER Bright People. Right Solutions.</p>	PROJECT NO.: 20151999	BORING LOG B-2	PLATE
	DRAWN BY: NJF	Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	B-2
CHECKED BY: ADT	DATE: 9/19/2014		
REvised: -			PAGE: 1 of 1

GINT FILE: W:\20151999_raton Lift Station_geo\2.0 - Technical Information\2.8 - Technical & Cad Figures\gim\2015199 Raton Master.gpj
GINT TEMPLATE: PROJECTWISE: KLF_STANDARD_GINT_LIBRARY_2014.GLB [KLF_BORING/TEST PIT SOIL LOG]

SAMPLE/SAMPLER TYPE GRAPHICS

	BULK SAMPLE
	CALIFORNIA SAMPLER (3 in. (76.2 mm.) outer diameter)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches a 3 inches diameter by 2.5 inches inch long 60 degree conical point driven with a 170 ±2 pound hammer dropped 24 ±0.5 inches.

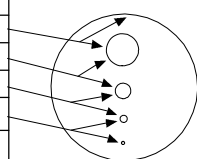
UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

GRAVELS (More than half of coarse fraction is larger than the #200 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
		Cu <4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES	
	GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES	
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES	
		Cu <4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES	
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES	
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES	
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES	
	COARSE GRAINED SOILS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1 ≤ Cc ≤ 3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/or 1 > Cc > 3		SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES	
Cu <6 and/or 1 > Cc > 3				SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES	
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES	
SANDS WITH > 12% FINES				SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES	
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES	
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES	
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)		SILTS AND CLAYS (Liquid Limit less than 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	SILTS AND CLAYS (Liquid Limit greater than 50)		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY		
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT		
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY			

 Bright People. Right Solutions.	PROJECT NO.: 20151999	GRAPHICS KEY Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	PLATE
	DRAWN BY: NJF CHECKED BY: BTM DATE: 9/8/2014 REVISED: -		B-3

GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #10	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller

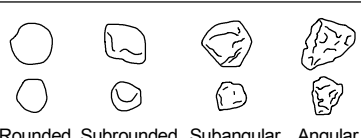


Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges



PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N ₆₀ (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q _u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

NOTE: AFTER TERZAGHI AND PECK, 1948

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

	PROJECT NO.: 20151999 DRAWN BY: NJF CHECKED BY: BTM DATE: 9/8/2014 REVISED: -	SOIL DESCRIPTION KEY Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	PLATE B-4
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APPENDIX C
Geotechnical Laboratory Test Results

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-1	0.0 - 20.0	SANDY LEAN CLAY (CL)			100	88	60	35	15	20	ASTM D 698 Method A= Maximum Dry Unit Weight: 114.2 pcf Optimum Water Content: 13.8%
B-1	4.0	LEAN CLAY (CL)	11.1	105.3		100	92	40	17	23	
B-1	9.0	SANDY LEAN CLAY (CL)	8.6	89.7							Expansion/Compression= Compression= 2.7% under 1 ksf when wetted.
B-1	14.0	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	3.9	109.6	100	75	20	19	14	5	Expansion/Compression= Compression= 2.7% under 1 ksf when wetted.
B-1	19.0	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	5.2								
B-1	24.0	POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM)	6.6		100	62	11	20	18	2	
B-1	29.0	POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM)	6.2								
B-2	0.0 - 10.0	SANDY LEAN CLAY (CL)			100	94	69	40	14	26	ASTM D 698 Method A= Maximum Dry Unit Weight: 113.2 pcf Optimum Water Content: 16.6%
B-2	4.0	FILL - SANDY LEAN CLAY WITH GRAVEL (CL)	17.7	105.8	100	79	54	35	15	20	Expansion/Compression= Compression= 0.1% under 1 ksf when wetted.
B-2	9.0	LEAN CLAY WITH SAND (CL)	32.1								
B-2	14.0	LEAN CLAY WITH SAND (CL)	20.8	103.6							Expansion/Compression= Expansion= 0.3% under 1 ksf when wetted.
B-2	19.0	LEAN CLAY WITH SAND (CL)	18.7	106.0		100	81	33	15	18	
B-2	24.0	WEATHERED CLAYSTONE	116.6	113.4							Expansion/Compression= Expansion= 0.8% under 1 ksf when wetted.
B-2	29.0	SHALE	11.6	120.1							

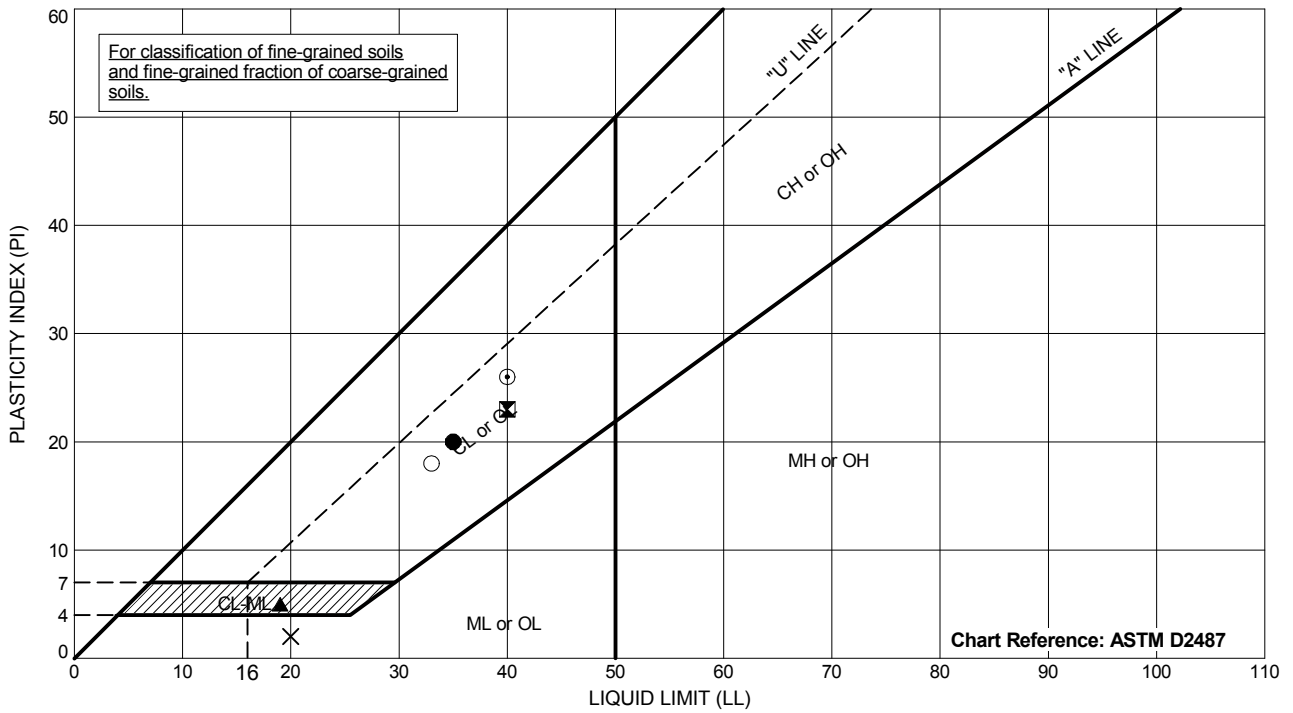
Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic



PROJECT NO.: 20151999
 DRAWN BY: NJF
 CHECKED BY: BTM
 DATE: 9/8/2014
 REVISED: -

LABORATORY TEST RESULT SUMMARY
 Proposed Lift Station Structure and Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

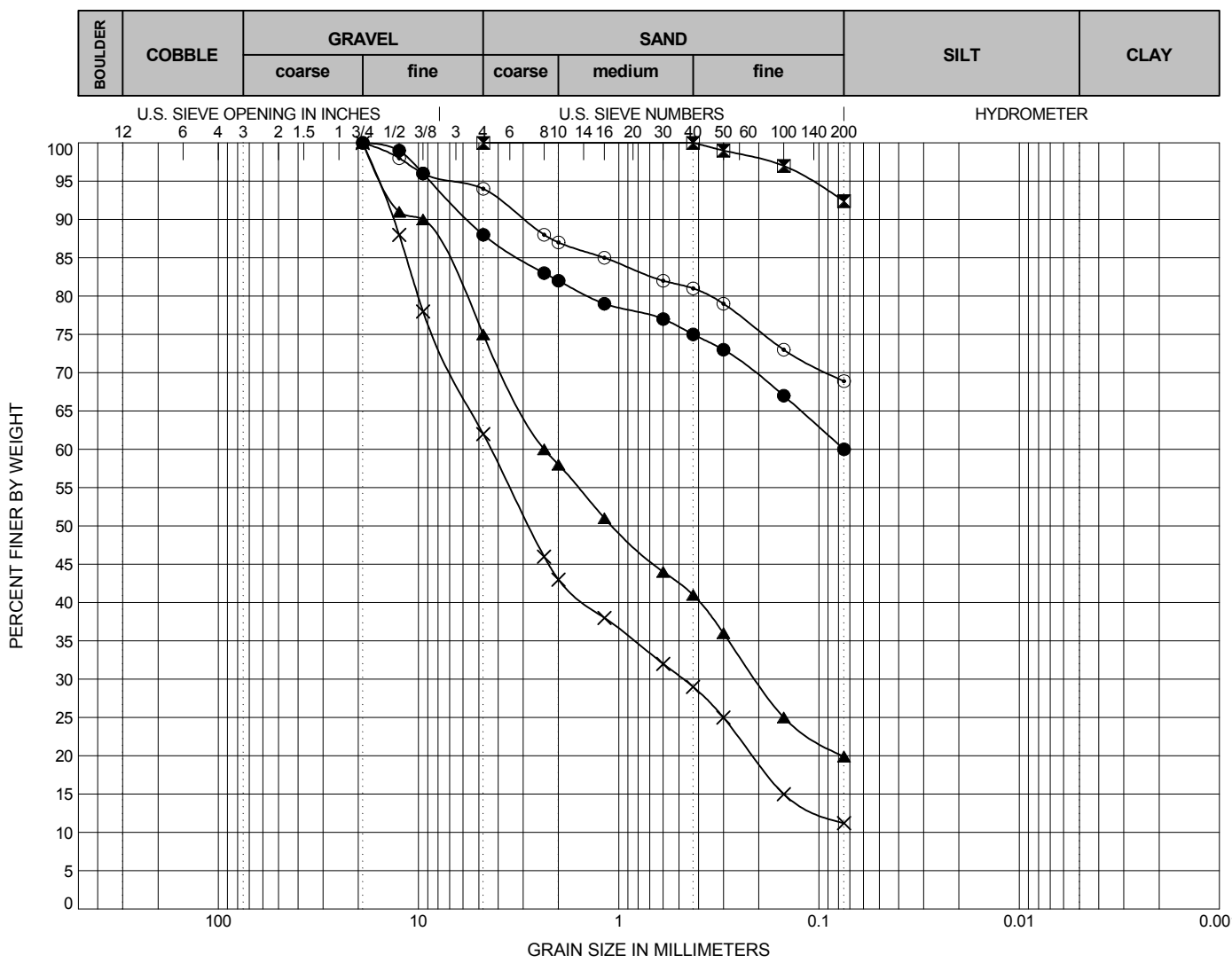
TABLE
C-1



Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
● B-1	0 - 20	SANDY LEAN CLAY (CL)	60	35	15	20
☒ B-1	4	LEAN CLAY (CL)	92	40	17	23
▲ B-1	14	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	20	19	14	5
✕ B-1	24	POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM)	11	20	18	2
⊙ B-2	0 - 10	SANDY LEAN CLAY (CL)	69	40	14	26
⊕ B-2	4	FILL - SANDY LEAN CLAY WITH GRAVEL (CL)	54	35	15	20
○ B-2	19	LEAN CLAY WITH SAND (CL)	81	33	15	18

Testing performed in general accordance with ASTM D4318.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20151999 DRAWN BY: NJF CHECKED BY: ADT DATE: 9/19/2014 REVISED: -	ATTERBERG LIMITS <hr/> Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	PLATE <hr/> C-2
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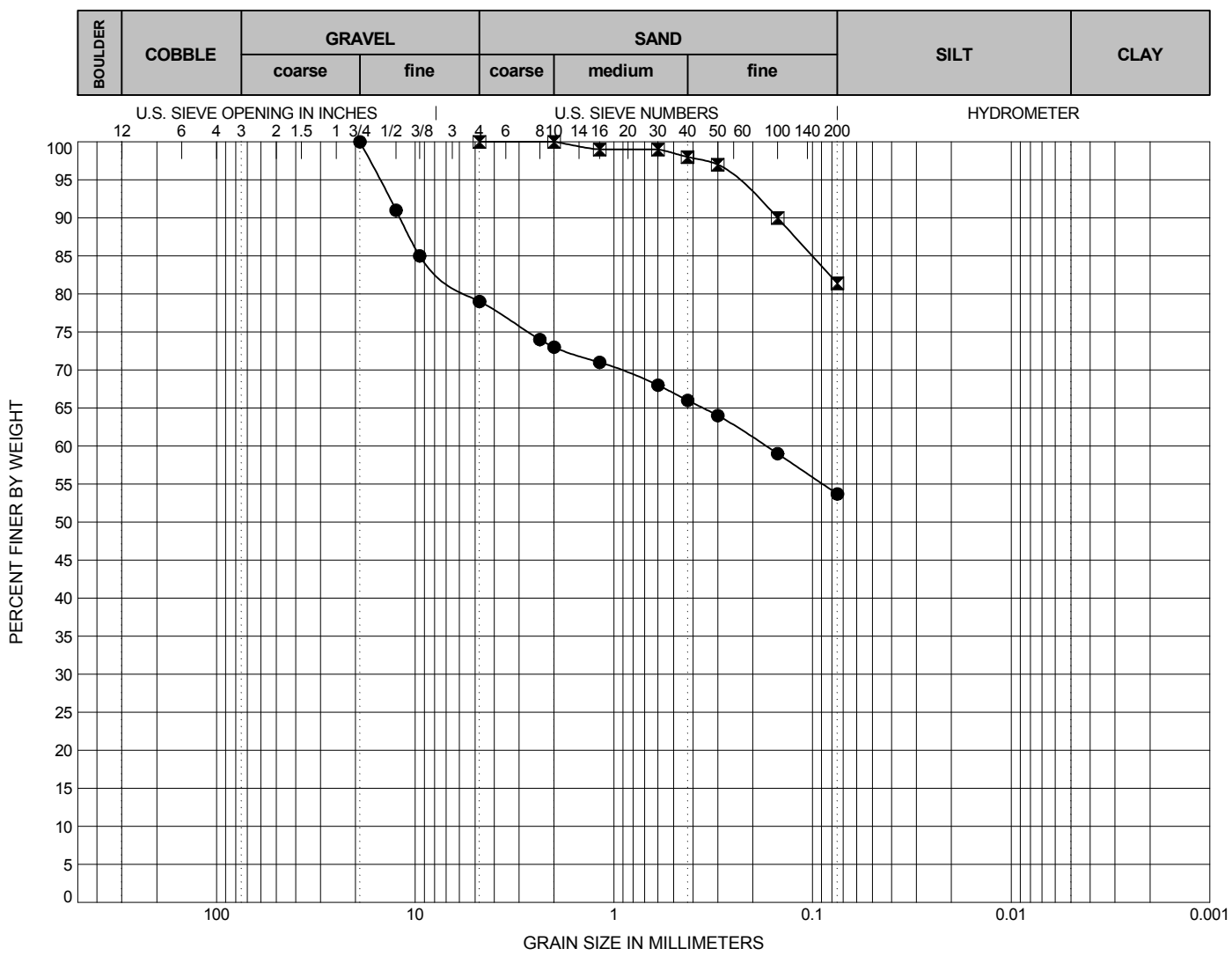
Exploration ID	Depth (ft.)	Sample Description	LL	PL	PI
● B-1	0 - 20	SANDY LEAN CLAY (CL)	35	15	20
☒ B-1	4	LEAN CLAY (CL)	40	17	23
▲ B-1	14	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	19	14	5
✕ B-1	24	POORLY GRADED SAND WITH GRAVEL AND SILT (SP-SM)	20	18	2
⊙ B-2	0 - 10	SANDY LEAN CLAY (CL)	40	14	26

Exploration ID	Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	C _c	C _u	Passing #3/4"	Passing #4	Passing #200	%Silt	%Clay
● B-1	0 - 20	19	0.075	NM	NM	NM	NM	100	88	60	NM	NM
☒ B-1	4	4.75	NM	NM	NM	NM	NM	100	92	60	NM	NM
▲ B-1	14	19	2.36	0.206	NM	NM	NM	100	75	20	NM	NM
✕ B-1	24	19	4.352	0.477	NM	0.87	72.23	100	62	11	NM	NM
⊙ B-2	0 - 10	19	NM	NM	NM	NM	NM	100	94	69	NM	NM

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
 Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
 D₆₀ = Grain diameter at 60% passing
 D₃₀ = Grain diameter at 30% passing
 D₁₀ = Grain diameter at 10% passing

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20151999	SIEVE ANALYSIS Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	PLATE
	DRAWN BY: NJF CHECKED BY: ADT DATE: 9/19/2014 REVISED: -		C-3



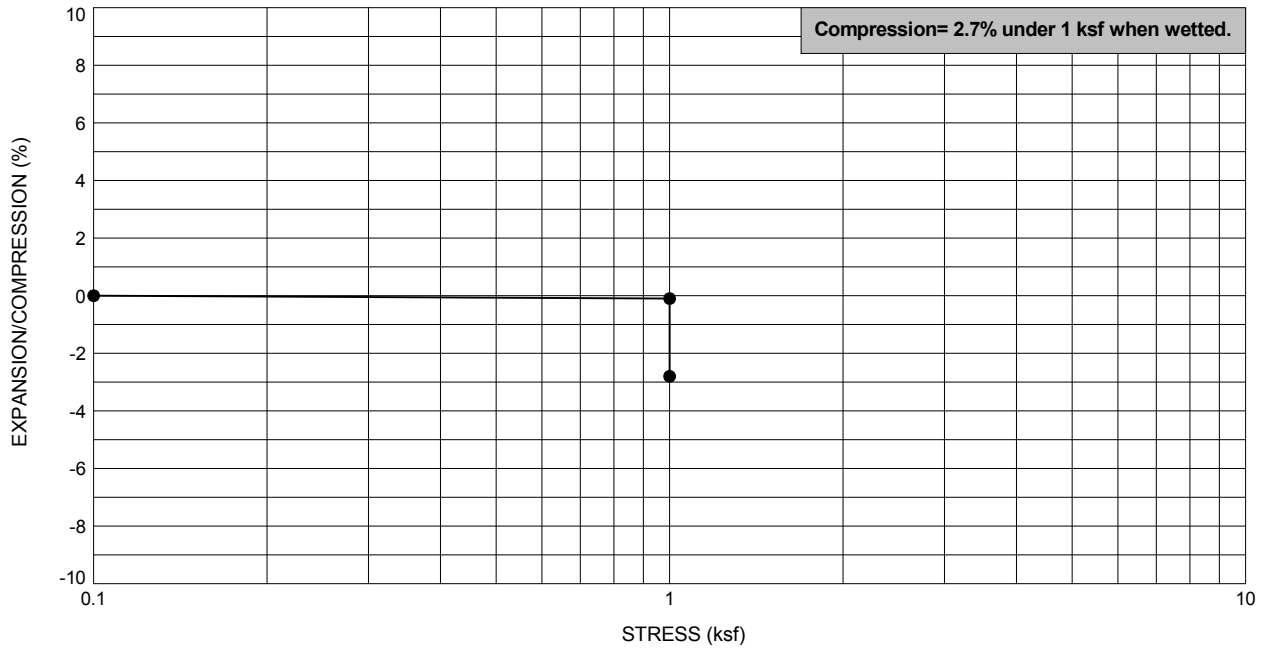
Exploration ID	Depth (ft.)	Sample Description	LL	PL	PI
● B-2	4	FILL - SANDY LEAN CLAY WITH GRAVEL (CL)	35	15	20
☒ B-2	19	LEAN CLAY WITH SAND (CL)	33	15	18

Exploration ID	Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	C _c	C _u	Passing #4	Passing #100	Passing #200	%Silt	%Clay
● B-2	4	19	0.172	NM	NM	NM	NM	79	100	54	NM	NM
☒ B-2	19	4.75	NM	NM	NM	NM	NM	100	100	81	NM	NM

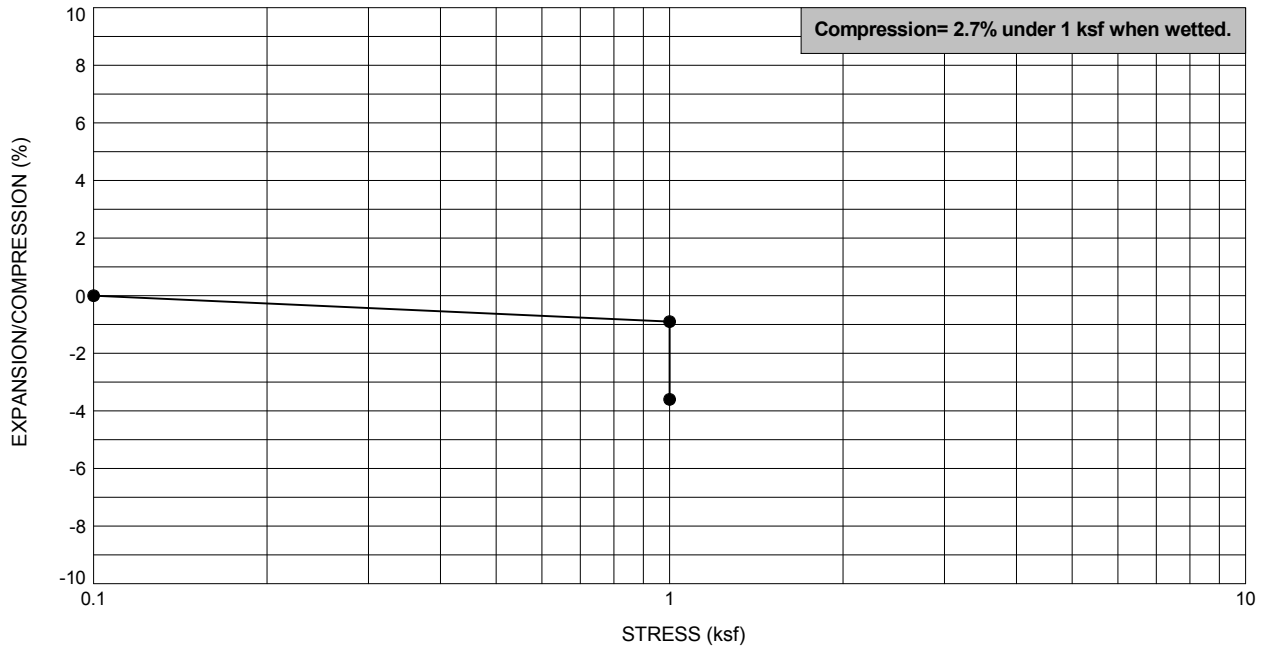
Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
 NP = Nonplastic
 NM = Not Measured

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
 Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
 D₆₀ = Grain diameter at 60% passing
 D₃₀ = Grain diameter at 30% passing
 D₁₀ = Grain diameter at 10% passing

	PROJECT NO.: 20151999 DRAWN BY: NJF CHECKED BY: ADT DATE: 9/19/2014 REVISED: -	SIEVE ANALYSIS Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico	PLATE C-4
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Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
B-1	9	SANDY LEAN CLAY (CL)	8.6	89.7		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
B-1	14	SILTY CLAYEY SAND WITH GRAVEL (SC-SM)	3.9	109.6		

Testing performed in general accordance with ASTM D4546 Method C.

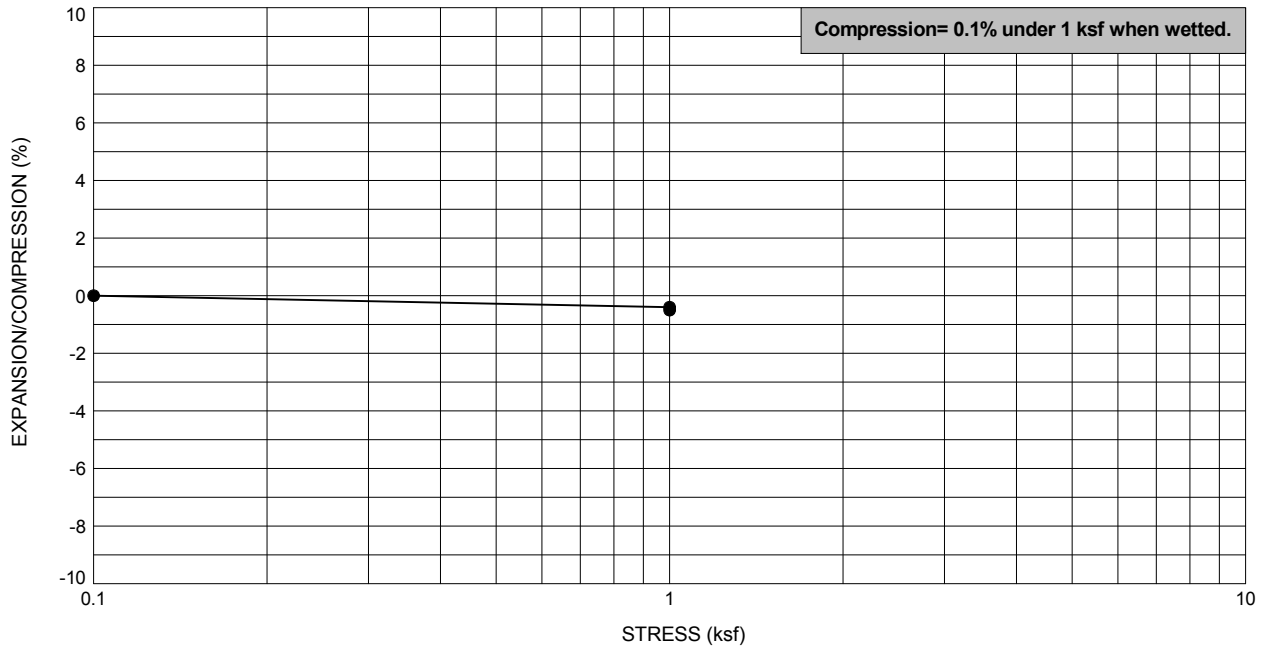


PROJECT NO.: 20151999
 DRAWN BY: NJF
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 REVISED: -

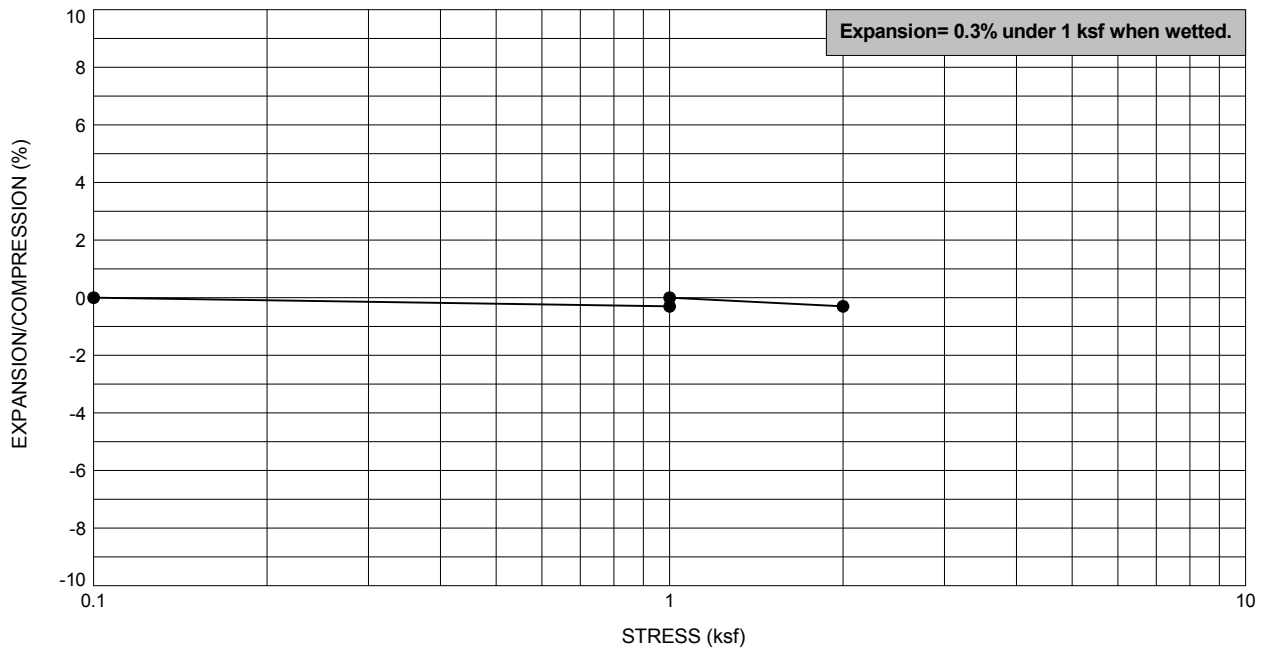
ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS

Proposed Lift Station Structure and Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

PLATE
C-5



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
B-2	4	FILL - SANDY LEAN CLAY WITH GRAVEL (CL)	17.7	105.8		



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
B-2	14	LEAN CLAY WITH SAND (CL)	20.8	103.6		

Testing performed in general accordance with ASTM D4546 Method C.



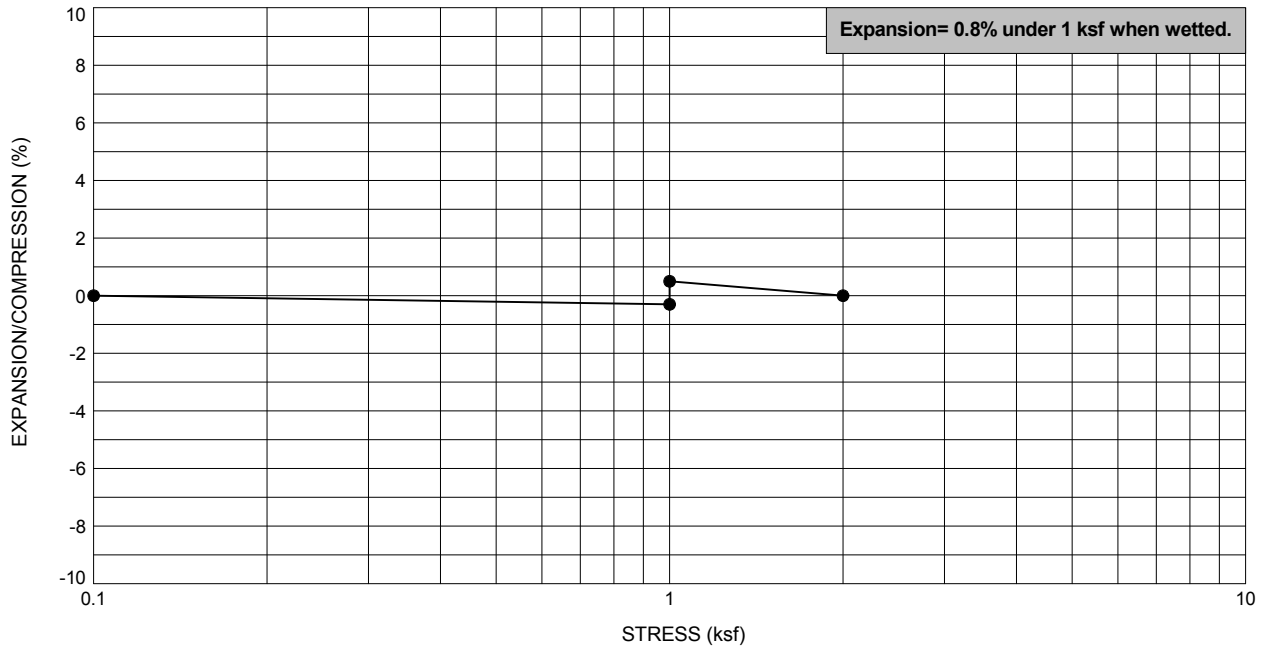
PROJECT NO.: 20151999
 DRAWN BY: NJF
 CHECKED BY: ADT
 DATE: 9/19/2014
 REVISED: -

ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS

Proposed Lift Station Structure and Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

PLATE

C-6



Exploration ID	Depth (ft.)	Sample Description	Initial Water Content (%)	Initial Dry Unit Wt. (pcf)	Final Water Content (%)	Final Dry Unit Wt. (pcf)
B-2	24	WEATHERED CLAYSTONE	116.6	113.4		

Testing performed in general accordance with ASTM D4546 Method C.



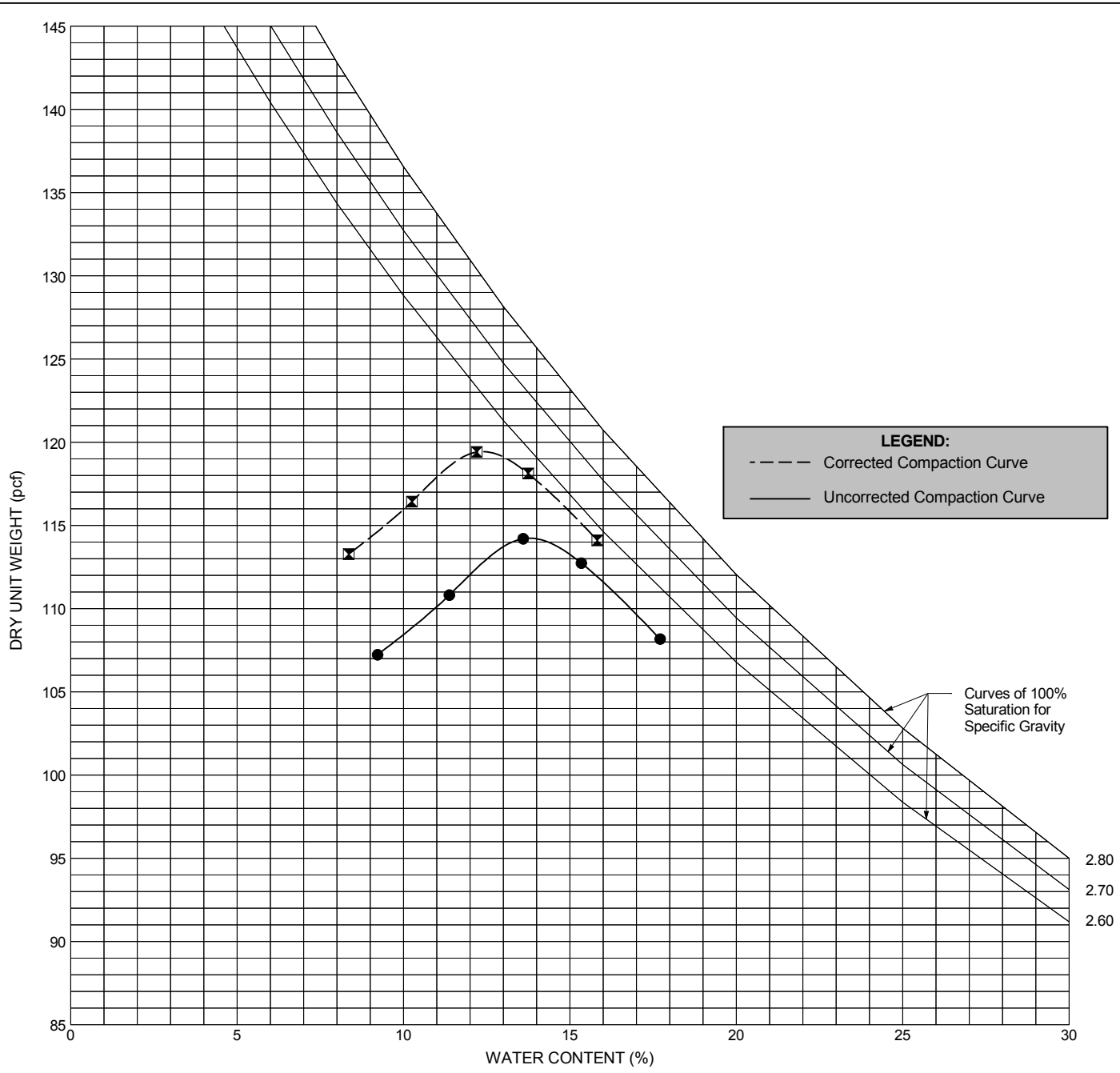
PROJECT NO.: 20151999
 DRAWN BY: NJF
 CHECKED BY: ADT
 DATE: 9/19/2014
 REVISED: -

ONE-DIMENSIONAL EXPANSION OR COMPRESSION OF COHESIVE SOILS

Proposed Lift Station Structure and Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

PLATE

C-7

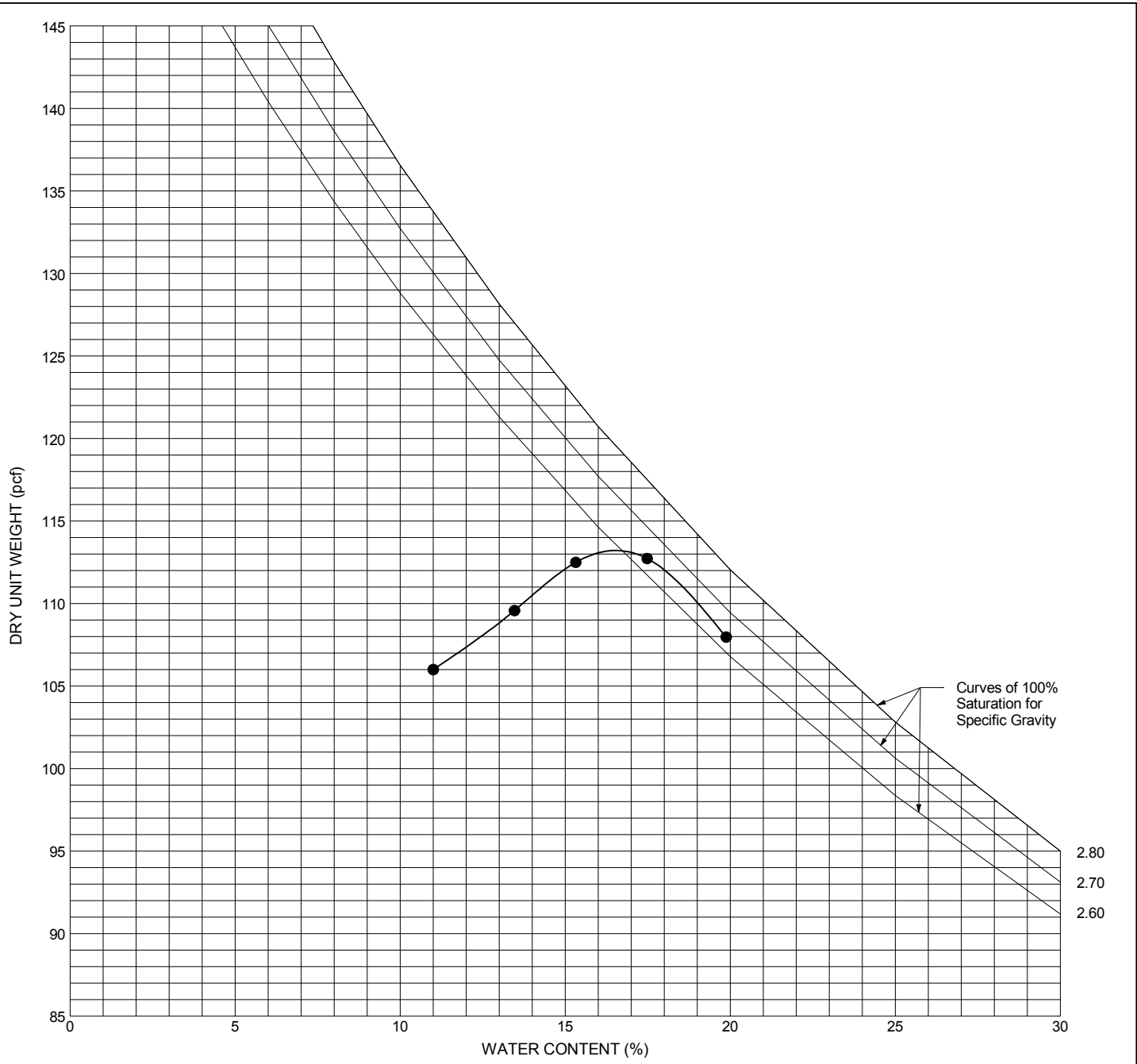


Exploration ID		Depth (ft.)		Sample Description					
●	B-1	0 - 20		SANDY LEAN CLAY (CL)					
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)		Uncorrected Opt. Water Content (%)	
100	88	60	35	15	20	114.2		13.8	
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)		Corrected Opt. Water Content (%)	
☒	B-1	0 - 20		12.0		118.8		13.0	

Testing performed in general accordance with ASTM D 698 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20151999 DRAWN BY: NJF CHECKED BY: BTM DATE: 9/8/2014 REVISED: -	COMPACTION CURVE	PLATE C-8
	Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico		

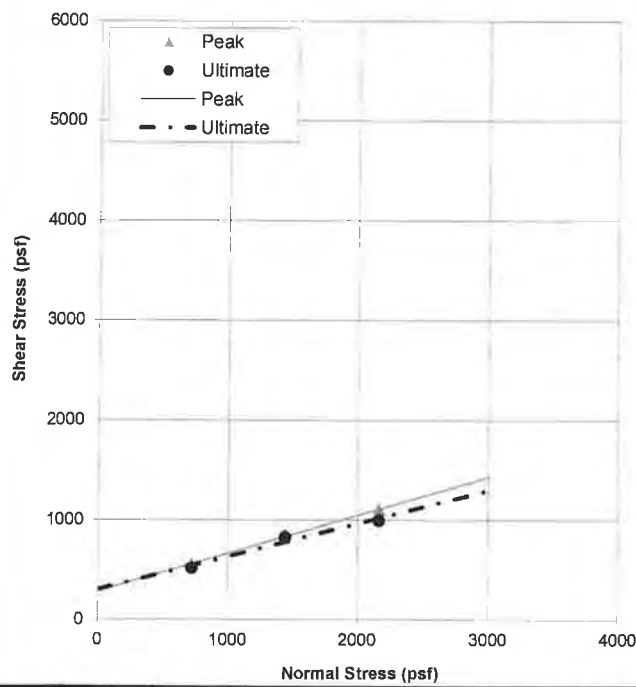
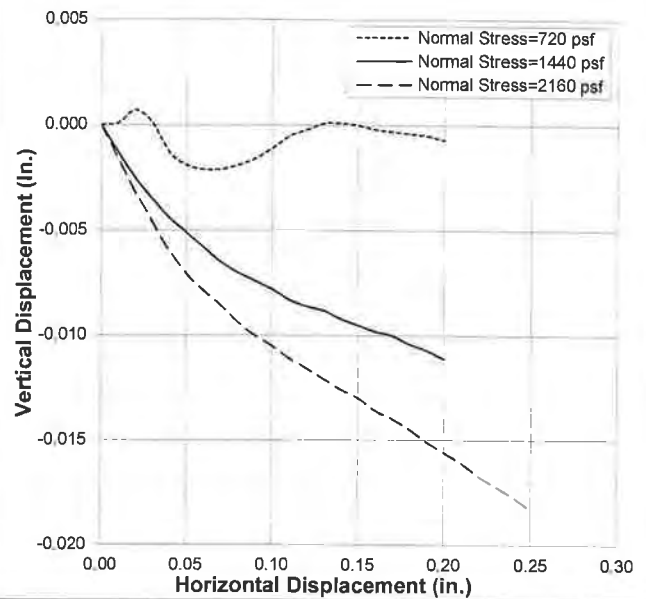
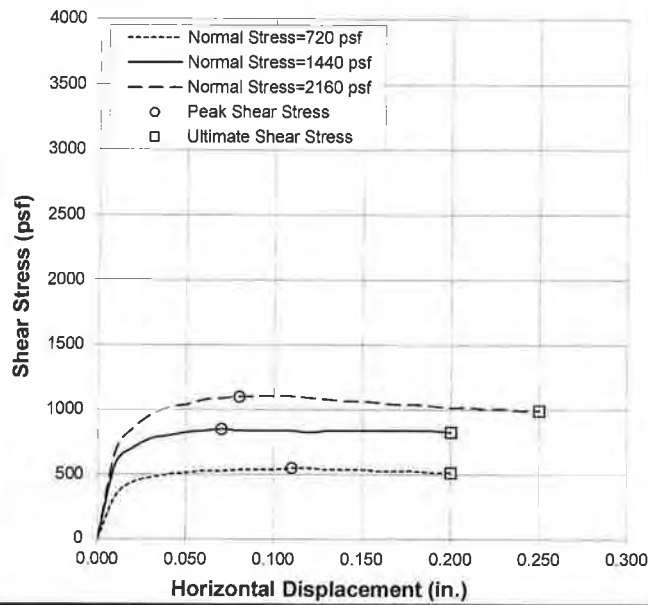
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 PLOTTED: 09/08/2014 11:41 AM BY: NFamy



Exploration ID		Depth (ft.)		Sample Description					
● B-2		0 - 10		SANDY LEAN CLAY (CL)					
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Maximum Dry Unit Weight (pcf)		Optimum Water Content (%)	
100	94	69	40	14	26	113.2		16.6	

Testing performed in general accordance with ASTM D 698 Method A.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20151999 DRAWN BY: NJF CHECKED BY: BTM DATE: 9/8/2014 REVISED: -	COMPACTION CURVE	PLATE
	Proposed Lift Station Structure and Receiving Manhole Structure Vicinity of Hospital Drive and Hereford Avenue Raton, New Mexico		C-9



Specimen Number		1	2	3	4
Initial	Water Content, %	16.2	16.3	16.1	na
	Dry Density, pcf	106.8	106.8	106.9	na
	Saturation, %	75.7	75.9	75.4	na
	Void Ratio	0.577	0.578	0.576	na
	Diameter, in	2.42	2.42	2.42	na
	Height, in	1.00	1.00	1.00	na
Preshear	Water Content, %	20.9	18.8	18.3	na
	Dry Density, pcf	107.2	109.0	110.7	na
	Saturation, %	98.7	93.1	94.7	na
	Void Ratio	0.571	0.545	0.522	na
	Diameter, in	2.42	2.42	2.42	na
	Height, in	0.995	0.978	0.966	na
After	Water Content, %	20.9	18.8	18.5	na
	Normal Stress, psf	720	1440	2160	na
	Peak Shear Stress, psf	551	851	1102	na
	Horz. Displ. at Peak Shear Stress, in.	0.110	0.070	0.080	na
	Ultimate Shear Stress, psf	515	827	994	na
	Horz. Displ. at Ultimate Shear Stress, in.	0.200	0.200	0.250	na
	Strain Rate, in./min.	0.0007	0.0007	0.0007	na
	c, psf	284	20.9	0.38	na
	φ, deg.				na
	Tan φ				na
	Peak	284	20.9	0.38	na
	Ultimate	300	18.4	0.33	na

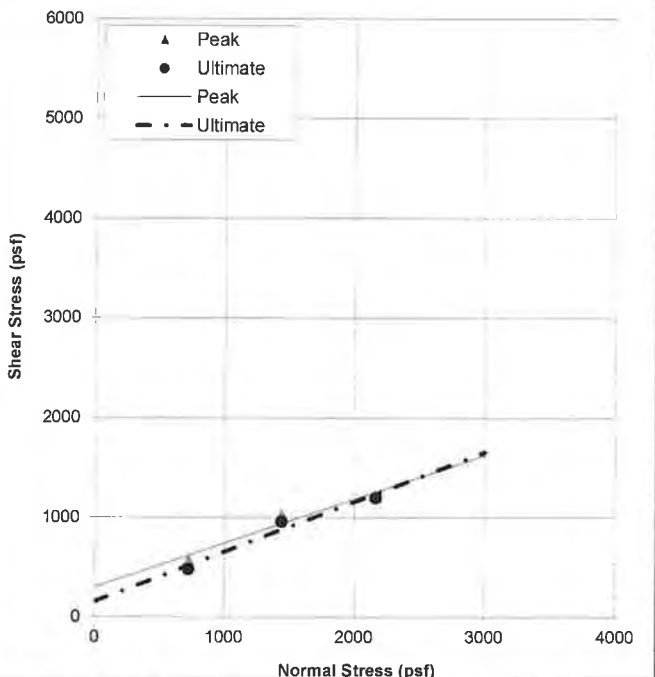
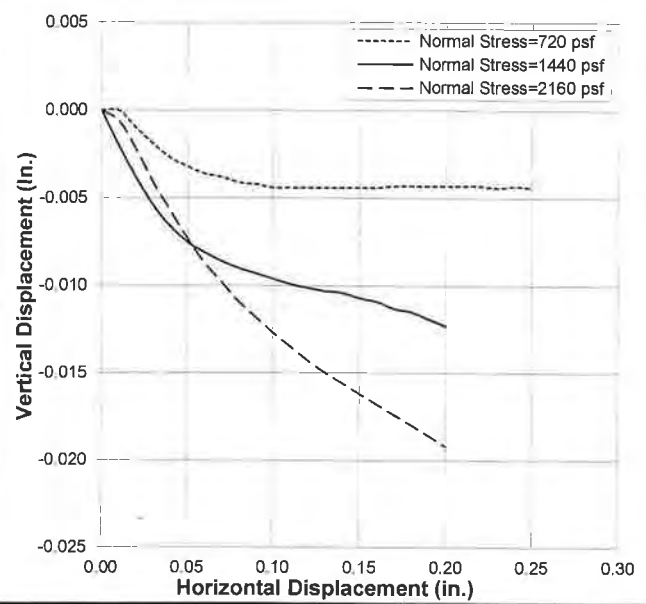
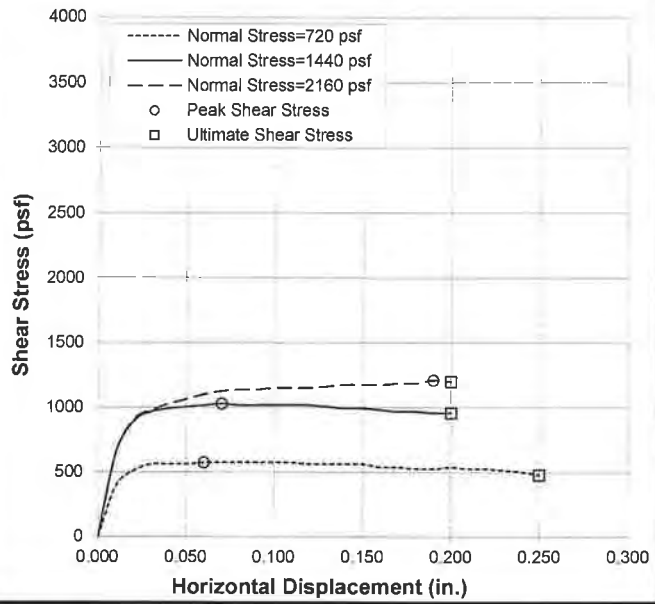
LL:	nm	PL:	nm	PI:	nm	G _s :	2.70	Assumed
Test Conditions:	Remolded / Inundated							
Description:	Brown Lean Clay (CL)							
Boring:	B-2			Remarks: nm = not measured, na = not applicable				
Sample:	1							
Depth, ft:	0-10'							
Test Date:	8/26/14							



Project No:	20151999
Date:	9/2/14
Tested by:	CP
Checked By:	
File Name:	HL7050

**DIRECT SHEAR TEST ASTM
D3080**
**RATON LIFT STATION
AND MANHOLE**

Plate
1 of 1
C-10



Specimen Number		1	2	3	4
Initial	Water Content, %	14.2	14.5	14.6	na
	Dry Density, pcf	109.6	109.4	109.2	na
	Saturation, %	71.6	72.3	72.6	na
	Void Ratio	0.537	0.540	0.542	na
	Diameter, in	2.42	2.42	2.42	na
	Height, in	1.00	1.00	1.00	na
Preshear	Water Content, %	18.5	17.9	16.6	na
	Dry Density, pcf	110.0	111.5	113.4	na
	Saturation, %	94.2	94.5	92.3	na
	Void Ratio	0.531	0.512	0.485	na
	Diameter, in	2.42	2.42	2.42	na
	Height, in	0.995	0.980	0.963	na
After	Water Content, %	18.5	17.9	16.9	na
	Normal Stress, psf	720	1440	2160	na
	Peak Shear Stress, psf	575	1030	1210	na
	Horz. Displ. at Peak Shear Stress, in.	0.060	0.070	0.190	na
	Ultimate Shear Stress, psf	479	958	1198	na
	Horz. Displ. at Ultimate Shear Stress, in.	0.250	0.200	0.200	na
	Strain Rate, in./min.	0.0007	0.0007	0.0007	na
	c, psf	303	23.8	0.44	na
	Ultimate	159	26.5	0.50	na

LL:	nm	PL:	nm	PI:	nm	G _s :	2.70	Assumed
Test Conditions:		Remolded / Inundated						
Description:		Brown Lean Clay (CL)						
Boring:		B-1			Remarks: nm = not measured, na = not applicable			
Sample:		1						
Depth, ft:		0-20'						
Test Date:		8/23/14						



Project No: 20151999
 Date: 9/2/14
 Tested by: CP
 Checked By:
 File Name: HL7050

DIRECT SHEAR TEST ASTM D3080
RATON LIFT STATION AND MANHOLE

Plate
 1 of 1
C-11

APPENDIX D
Site Photos



BORING B-1 (LIFT STATION SITE) - LOOKING SOUTHWEST



BORING B-1 (LIFT STATION SITE) - LOOKING NORTHWEST



PROJECT NO. 20151999
 DRAWN BY: NJF
 CHECKED BY: BTM
 DATE: 9/5/2014
 REVISED

SITE PHOTOS
 Proposed Lift Station Structure and
 Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

PLATE

D-1



DRILLING BORING B-2 (MANHOLE STRUCTURE) - LOOKING SOUTHEAST



BORING B-2 (MANHOLE STRUCTURE) - LOOKING WEST



PROJECT NO. 20151999
 DRAWN BY: NJF
 CHECKED BY: BTM
 DATE: 9/5/2014
 REVISED

SITE PHOTOS
 Proposed Lift Station Structure and
 Receiving Manhole Structure
 Vicinity of Hospital Drive and Hereford Avenue
 Raton, New Mexico

PLATE

D-2



APPENDIX E
Important Information About Your
Geotechnical Engineering Report

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



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