PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0003
Service Date: 03/05/20
Report Date: 03/11/20
Task: 01 - Earthwork Observation and Testing

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client
Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Building pad and Pavement subgrade

Elevation: Varies from 3 feet to 13 feet below top of grade

Proofrolled Surface: Exposed subgrade after stripping

Equipment Used: Fully loaded fuel truck

Observed with: Norm Hellings with Axiom Construction and Shawn Shipps with Larry Bair Excavating

Observation:
As requested, a Terracon representative observed proofrolling of the exposed subgrade soils at the above-referenced location using the above-referenced equipment. The subgrade soils in the area proofrolled supported the applied load without significant rutting or apparent deflection. Based on our observations, in our opinion, the subgrade soils in the referenced proofrolled area appear suitable for placement of engineered fill.

Comments:
A fuel truck is not typically used to perform a proofroll, as the gross weight and weight distribution of a fuel truck is often different than the gross weight and weight distribution of a tandem-axle dump truck fully loaded with soil or asphalt. However, a fuel truck was the only proofrolling equipment provided by the contractor at the time of our site visit. If areas of the proofrolled surface begin to show signs of distress during engineered fill placement, we recommend that Terracon be contacted for review.

The recommendations provided in this report are based on the subgrade soil conditions present at the time of our site visit. Should any changes occur to the subgrade soils prior to improvement or placement of engineered fill, Terracon should be contacted to review the subgrade soil conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of engineered fill in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Feras El-Ghussein
Reported To: Norm with Axiom
Contractor: Axiom Northwest Construction
Report Distribution:
(1) Axiom Northwest Construction, Inc.,
norm@axiomnw.com

Reviewed By:
rvw2: cjw

Feras El-Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0021
Service Date: 04/15/20
Report Date: 04/16/20
Task: 01 - Earthwork Observation and Testing

*** Report Contains Deviation(s)**

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client
Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Building pad

Elevation: 2 feet below finished subgrade

Proofrolled Surface: Prepared subgrade

Equipment Used: Fully loaded tandem-axle dump truck

Observed with: Norm with Axiom Northwest

Observation with Exceptions:

As requested, a Terracon representative observed proofrolling of the prepare subgrade soils at the above-referenced location using the above-referenced equipment. Pumping of the subgrade soils was observed under the applied load. A test pit was excavated using a dozer blade and extended through the wet soils which were encountered at a depth of 24 to 30 inches below the proofrolled surface. In our opinion, the subgrade soils will require improvement prior to placement of Low volume change material (LVC) in order to provide support of construction traffic, which will include loaded dump trucks and the following recommendations are based on this requirement. Should alternative construction methods be considered, Terracon should be contacted to review, and if necessary, revise the recommendations provided below.

Recommendations:

Prior to placement of LVC, in our opinion, one of the following methods should be considered for improving the subgrade soils:

Removal and replacement - The low-strength and disturbed subgrade soils should be removed to depths of about 24 to 30 inches below the prepared subgrade elevation and replaced with crushed limestone (well-graded with 1½-inch maximum particle size) that is compacted in accordance with the project specifications. During excavation, the low-strength or disturbed materials should be removed using equipment from the edges of the excavation and construction traffic should be kept off the newly exposed subgrade. The backfill material should be placed from the edges and compacted after a suitable amount of material is in place to avoid disturbing the subgrade soils.

Chemical improvement - Chemical treatment such as fly ash, cement, or lime could be considered. If you like to consider this alternative, further recommendations can be discussed upon request.

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0021
Service Date: 04/15/20
Report Date: 04/16/20
Task: 01 - Earthwork Observation and Testing

*** Report Contains Deviation(s)**

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client

Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project

DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Comments:

The recommendations provided in this report are based on the subgrade soil conditions present at the time of our site visit. Should any changes occur to the subgrade soils prior to improvement or placement of LVC, Terracon should be contacted to review the subgrade soil conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of LVC in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Richard N. Cohen
Reported To: Norm with Axiom
Contractor: Axiom Northwest Construction
Report Distribution:
(1) Axiom Northwest Construction, Inc., norm@axiomnw.com

Reviewed By:
rvw2: cjw

Feras El-Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0024
Service Date: 05/04/20
Report Date: 05/06/20
Task: 01 - Earthwork Observation and Testing

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
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Client
Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Building pad

Elevation: Final subgrade at bottom of LVC

Proofrolled Surface: Prepared subgrade

Equipment Used: Fully loaded tandem axle dump truck

Observed with: Norm w/ Axiom

Observation:
As requested, a Terracon representative observed proofrolling of the prepared subgrade soils at the above-referenced location using the above-referenced equipment. We have previously observed that this area pumped beneath the applied load during a proofrolling observation (refer to Terracon Report No. 02191565.0021). We were not requested to observe remediation efforts per our recommendations, but we were told that the earthwork contractor kept rolling the subgrade until they thought it would support a proofroll. The subgrade soils in the area proofrolled supported the applied load without significant rutting or apparent deflection. Based on our observations, in our opinion, the subgrade soils in the referenced proofrolled area appear suitable for placement of aggregate base.

Comments:
The recommendations provided in this report are based on the subgrade soil conditions present at the time of our site visit. Should any changes occur to the subgrade soils prior to improvement or placement of aggregate base, Terracon should be contacted to review the subgrade soil conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of aggregate base in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Kevin L. McCurdy
Reported To: Norm with Axiom
Contractor: Axiom Northwest Construction
Report Distribution:
(1) Axiom Northwest Construction, Inc., norm@axiomnw.com

Reviewed By:
rvw2: cjw
Feras El-Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0057
Service Date: 08/20/20
Report Date: 08/31/20
Task: 01 - Earthwork Observation and Testing

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client
Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Pavement subgrade north, east, and south sides of building

Elevation: Final soil subgrade, -6" from final subgrade

Proofrolled Surface: Prepared subgrade soils

Equipment Used: Fully loaded tandem-axle dump truck

Observed with: Norm Hellings (Axiom), Shane Bair (Larry Bair Excavating)

Observation:
As requested, a Terracon representative observed proofrolling of the prepared subgrade soils at the above-referenced location using the above-referenced equipment. The subgrade soils in the area proofrolled supported the applied load without significant rutting or apparent deflection. Based on our observations, in our opinion, the subgrade soils in the referenced proofrolled area appear suitable for placement of geogrid and aggregate base.

Comments:
The recommendations provided in this report are based on the subgrade soil conditions present at the time of our site visit. Should any changes occur to the subgrade soils prior to placement of geogrid and aggregate base, Terracon should be contacted to review the subgrade soil conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of geogrid and aggregate base in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Timothy G. Fritz
Reported To: Norm Hellings (Axiom Northwest
Contractor: Axiom Northwest Construction
Report Distribution:
(1) Axiom Northwest Construction, Inc.,
norm@axiomnw.com

Reviewed By:
rvw2: cjw

Feras El Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0058
Service Date: 08/25/20
Report Date: 09/01/20
Task: 01 - Earthwork Observation and Testing

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client
Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Pavement Subgrade, including parking, drive lanes, and curb subgrades

Elevation: Finished subgrade

Proofrolled Surface: Prepared subgrade

Equipment Used: Fully loaded tandem axle dump truck

Observed with: Todd Blake w/ Larry Bair Excavating and Joe w/ City of Lee's Summit

Observation:
As requested, a Terracon representative observed proofrolling of the prepared subgrade material at the above-referenced location using the above-referenced equipment. The subgrade material in the area proofrolled supported the applied load without significant rutting or apparent deflection. Based on our observations, in our opinion, the subgrade soils in the referenced proofrolled area appear suitable for placement of curbs and pavement.

The recommendations provided in this report are based on the subgrade conditions present at the time of our site visit. Should any changes occur to the subgrade soils prior to improvement or placement of curbs and/or pavement, Terracon should be contacted to review the subgrade conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of curbs and/or pavement in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Kevin L. McCurdy
Reported To: Norm Hellings (Axiom Northwest
Contractor: Axiom Northwest Construction
Report Distribution:
(1) Axiom Northwest Construction, Inc.,
norm@axiomnw.com

Reviewed By:
rvw2: cjw
Feras El Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0066
Service Date: 09/16/20
Report Date: 10/19/20
Task: 01 - Earthwork Observation and Testing

*** Report Contains Deviation(s)**

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client

Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project

DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Pavement

Elevation: Finished base rock

Proofrolled Surface: Prepared subgrade with 4" of Crushed limestone base rock over geogrid

Equipment Used: Fully loaded tandem-axle dump truck

Observed with: Norm Hellings with Axiom

Observation with Exceptions:
As requested, a Terracon representative observed proofrolling of the prepared subgrade soils at the above-referenced location using the above-referenced equipment. Rutting of the limestone base rock was observed and ranged from about 1 to 2 inches in depth under the applied load. In our opinion, the subgrade soils/base rock will require improvement prior to placement of pavement in order to provide support of construction traffic, which will include loaded dump trucks and the following recommendations are based on this requirement. Should alternative construction methods be considered, Terracon should be contacted to review, and if necessary, revise the recommendations provided below

The subgrade soils were proofrolled in late August and the base rock was subsequently placed. It is unclear based on this proofroll observation if the subgrade soils have become saturated due to the heavy precipitation during the week ending September 12, 2020 and were yielding or if the base rock itself was rutting from saturation.

Recommendations:
The base rock could be removed to evaluate the underlying subgrade soils or the following method should be considered for improving the base rock:

Scarification and compaction - The 4 inches of crushed stone should be scarified, moisture conditioned and recompacted.

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Project
DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Alternatively, if drying and compacting the base rock is not sufficient to achieve support of a proofroll load and the underlying soils appear wet and unsuitable beneath the geogrid, remediation of the subgrade soils should be performed and could include the following after removal of the base rock and geogrid:

Scarification and compaction - The subgrade soils should be scarified to a depth of about 9 inches, moisture conditioned and compacted in accordance with the project specifications.

Removal and replacement - The low-strength and disturbed subgrade soils could be removed to depths adequate to remove low strength soils below the prepared subgrade elevation and replaced with similar, drier material that is compacted in accordance with the project specifications. The depth of removal should be determined after the base rock and geogrid are removed. During excavation, the low-strength or disturbed materials should be removed using equipment from the edges of the excavation and construction traffic should be kept off the newly exposed subgrade. The backfill material should be placed from the edges and compacted after a suitable amount of material is in place to avoid disturbing the subgrade soils. Installing subdrains is recommended when granular material is placed beneath pavements. Subdrains help avoid collection of water and possible future subgrade softening and frost heave and improve the long-term performance of the pavement. It should be understood that differential frost heave could be experienced with variations in the thickness of granular material placed.

If remediation to the subgrade soils is required, a proofroll should be performed prior to placement of the geogrid and base rock material.

Comments:
The recommendations provided in this report are based on the subgrade conditions present at the time of our site visit. Should any changes occur to the subgrade prior to improvement or placement of pavement, Terracon should be contacted to review the subgrade conditions and re-evaluate our recommendations. If a precipitation event occurs prior to placement of pavement in these areas, another proofroll should be performed and observed by Terracon.

Services:

Terracon Rep.: Richard N. Cohen
Reported To: Norm Hellings (Axiom Northwest
Contractor: Axiom Northwest Construction
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Reviewed By:
rvw2: cjw
Feras El Ghussein
Project Manager

PROOFROLLING OBSERVATION REPORT

Report Number: 02191565.0069
Service Date: 09/22/20
Report Date: 11/08/20
Task: 01 - Earthwork Observation and Testing

Terracon
15620 W 113th St
Lenexa, KS 66219-5102
913-492-7777

Client

Axiom Northwest Construction, Inc.
Attn: Norm Hellings
2232 Broadway
Suite 101
Everett, WA 98201

Project

DCI - Lee's Summit
2001 Shamrock Rd
Lee's Summit, MO

Project Number: 02191565

Observed Location: Parking lot pavement

Elevation: Finished base rock subgrade

Proofrolled Surface: Prepared subgrade

Equipment Used: Loaded end-dump truck

Observed with: Norm Hellings with Axiom and Shane with Larry Bair

Observation:
As requested, a Terracon representative observed proofrolling of the prepared subgrade soils at the above-referenced location using the above-referenced equipment. The subgrade soils in the area proofrolled supported the applied load without significant rutting or apparent deflection.

Comments:
An end-dump truck was the only proofrolling equipment provided by the contractor at the time of our site visit. Terracon recommends that the area be proofrolled with a loaded tandem-axle dump truck prior to paving. If areas of the parking lot begin to show signs of distress during paving, we recommend that Terracon be contacted for review.

Services:

Terracon Rep.: Karl Beckemeier, P.E.
Reported To: Norm Hellings (Axiom Northwest
Contractor: Axiom Northwest Construction
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(1) Axiom Northwest Construction, Inc., tiffani@axiomnw.com

Reviewed By:
rvw2: daw

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Project Manager