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May 13, 2020

Project No.: 303278-003
Report No.: 20-5-34

Attention: Poul Hanson
Oxnard Union High School District
300 South K Street
Oxnard, CA 93030

Project: Oxnard Union High School District Transportation Center
Oxnard High School
Oxnard, California

Subject: Final Structural Paving Sections

This report provides recommendations for grading, utility installation, and preliminary structural paving sections for a proposed transportation center to be located immediately south of the campus of Oxnard High School in the City of Oxnard, California. Plans indicate that the current project scope will include construction of a 490-foot long by 300-foot wide paved area, and a 26-foot wide access road to the site from the campus. The current project will also include installation of utilities stubbed into the paved area for assumed future development of maintenance buildings. The current project does not include any structures. Recommendations included herein were based on the laboratory testing performed on representative samples of the native subgrade soils, traffic data provided by Flewelling & Moody, and our understanding of the project.

On March 27, 2020, representative samples of the anticipated subgrade soils were obtained from within the limits of the proposed transportation center and access road for resistance value (R-value) testing. The R-value tests were performed in accordance with California Method 301. The laboratory tests performed on untreated samples of the native subgrade soils yielded an R-value of 26. A copy of the R-value test result is attached.

Grading Recommendations

Areas to receive paving should be overexcavated to a depth of 2.5 feet below planned finished subgrade. The limits of the excavations should extend at least 2 feet beyond the outside edge of the new pavement when possible. The resulting surface should then be scarified to a depth of 6 inches, uniformly moisture-conditioned to above optimum moisture content, and compacted. The lower sections should be compacted to a minimum relative compaction of 90 percent of the ASTM D 1557 maximum dry density. The upper foot should be compacted to a 95 percent of the ASTM D 1557 maximum dry density.

Utility Trenches

Excavations within the anticipated underground utilities at the site will typically encounter silty clays. These materials should be excavated with conventional earthmoving equipment.

Temporary unshored, unsurcharged, open excavations above the groundwater level may be cut vertically to a maximum height of no more than 4 feet. Excavations extending higher than 4 vertical feet should be sloped back above the 4-foot vertical cut to at least 1H:1V (horizontal to vertical) or flatter provided the adjacent ground is not subject to surcharge loading. If excavations dry out, sloughing will occur.

During the time excavations are open, no heavy grading equipment or other surcharge loads (i.e.excavation spoils) should be allowed within a horizontal distance from the top of any slope equal to the depth of the excavation (both distances measured from the top of the excavation slope).

Utility trench backfill should be governed by the provisions of this report relating to minimum compaction standards. In general, on-site service lines may be backfilled with native soils compacted to 90 percent of the ASTM D1557 maximum dry density to within 12 inches of finished subgrade elevation. The upper 12 inches should be compacted native subgrade soil to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density. Backfill of offsite service lines will be subject to the specifications of the jurisdictional agency or this report, whichever are greater.

Backfill operations should be observed and tested by the Geotechnical Engineer to monitor compliance with these recommendations.

Jetting should not be utilized for compaction in utility trenches.

Preliminary Asphalt Pavement Sections

Based on the exploratory borings drilled by Earth Systems, the near-surface soils within the proposed paved areas are generally silty clays with sand that have a low to moderate traffic support capacity when recompacted and used as pavement subgrade.

Pavement sections for untreated subgrade soils are presented below based on a measured R-value of 26; current Caltrans design procedures, and a calculated traffic index of 8.2 that is required for a 20-year design life. This calculated traffic index (TI) is based on the daily number of buses/trucks at the facility that we understand will be 120 three-axle vehicles. The daily number of buses/trucks should be reviewed by the Owner and/or Project Civil Engineer to confirm these numbers are applicable for this project.

Assuming a Traffic Index of 8.2 for areas to be used for drive lanes or bus or truck parking in the proposed transportation center and using an R-value of 26, the following thicknesses of asphaltic concrete and aggregate base can be used for the project:

Asphaltic Concrete Thickness (inches)	4.0	4.5	5.0	5.5
Aggregate Base Thickness (inches)	14.0	13.5	12.5	11.5

If some areas will only be used for automobile parking, and assuming a Traffic Index of 4.0 and an R-value of 26, paving sections should have a minimum gravel equivalent of 0.95 feet. This can be achieved by using 3 inches of asphaltic concrete on 4 inches of Processed Miscellaneous Base (PMB) compacted to a minimum of 95 percent of maximum dry density on subgrade soils compacted to a minimum of 95 percent of maximum dry density

The preliminary paving sections provided above have been designed for the type of traffic indicated. If the pavement or full thickness of compacted aggregate base material is placed before construction on the project is complete, construction loads, which could increase the traffic index, calculated above, must be taken into account.

The pavement sections provided above are contingent on the following recommendations being implemented during and following construction.

- The subgrade soils in the upper 12 inches below the finished subgrade elevation should be compacted native subgrade soil to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.

- All trench backfill for culverts, utilities and pipes underlying paved areas should be properly placed and compacted to at least 90 percent relative compaction (ASTM D1557) to within 12 inches of finished subgrade elevation. The upper 12 inches should be compacted native subgrade soil to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.

- The subgrade soils should be in a stable, non-pumping condition at the time the aggregate base material is placed and compacted.

- Aggregate base materials should conform to the specifications stated in the 2017 "Greenbook" and be compacted as engineered fill to at least 95 percent relative compaction.

- Asphalt paving materials and placement methods should meet specifications stated in the 2017 "Greenbook" for asphalt concrete.

- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become continuously wet.

- All concrete curbs separating pavement and adjacent undeveloped areas should extend at least 6 inches into the subgrade and below the bottom of the adjacent aggregate base to provide a barrier against lateral migration of water or runoff into the pavement section.

- Periodic maintenance should be performed to repair degraded areas and seal cracks with appropriate filler.

If, following site grading, subgrade soils differ from those encountered in our borings and tested in the laboratory, a representative subgrade sample should be obtained and additional R-value testing be performed. If the results of the R-value testing vary significantly from those assumed, the pavement sections presented above will need to be revised.

To reduce the thickness of AC and AB required within the drive lanes and access road into the transportation center, the subgrade soils can be improved by lime treating or cement treating the subgrade soils. Earth Systems can evaluate stabilization of the subgrade, if desired.

If you have any questions concerning this letter, please do not hesitate to contact the undersigned.

Respectfully submitted,

EARTH SYSTEMS PACIFIC

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Attach: R-Value Test Results
Site Plan Showing Sampling Locations

Copies: 2 - Hanson at OUHSD (1 via US mail, 1 via email)
1 - Eric Searcy & Scott Gaudineer at Flewelling & Moody (via email)
1 - Project File

Oxnard UHSD Transportation Center

303278-003

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

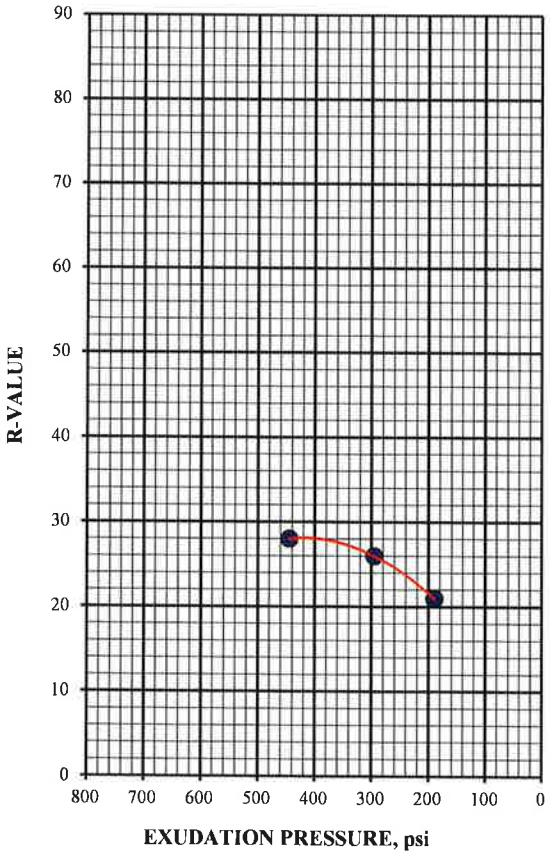
ASTM D 2844/D2844M-13

April 24, 2020

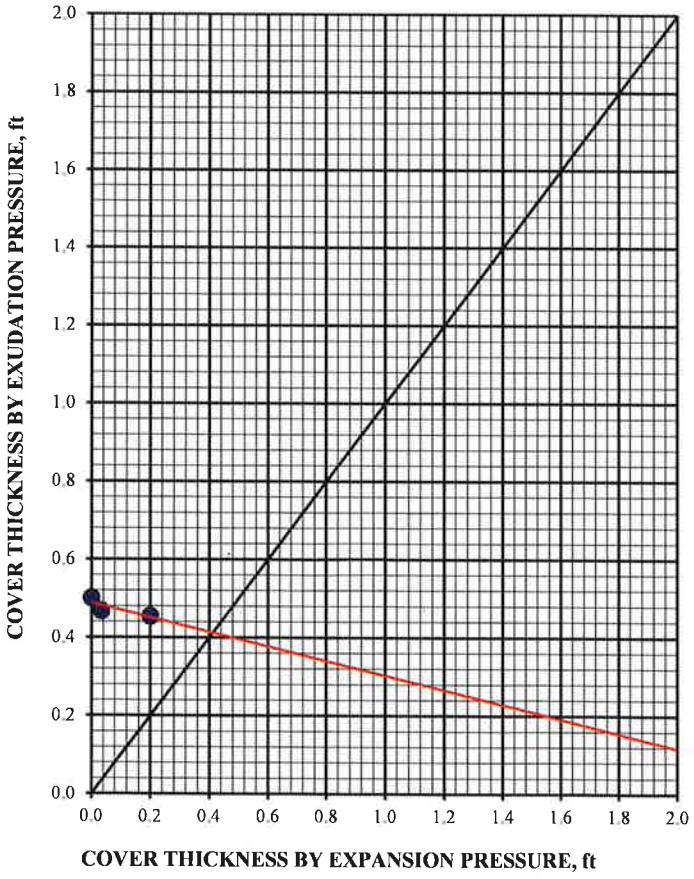
HA-3 @ 0.0 - 5.0'
Brown Silty, Clayey Sand (SC)
Specified Traffic Index: 5.0

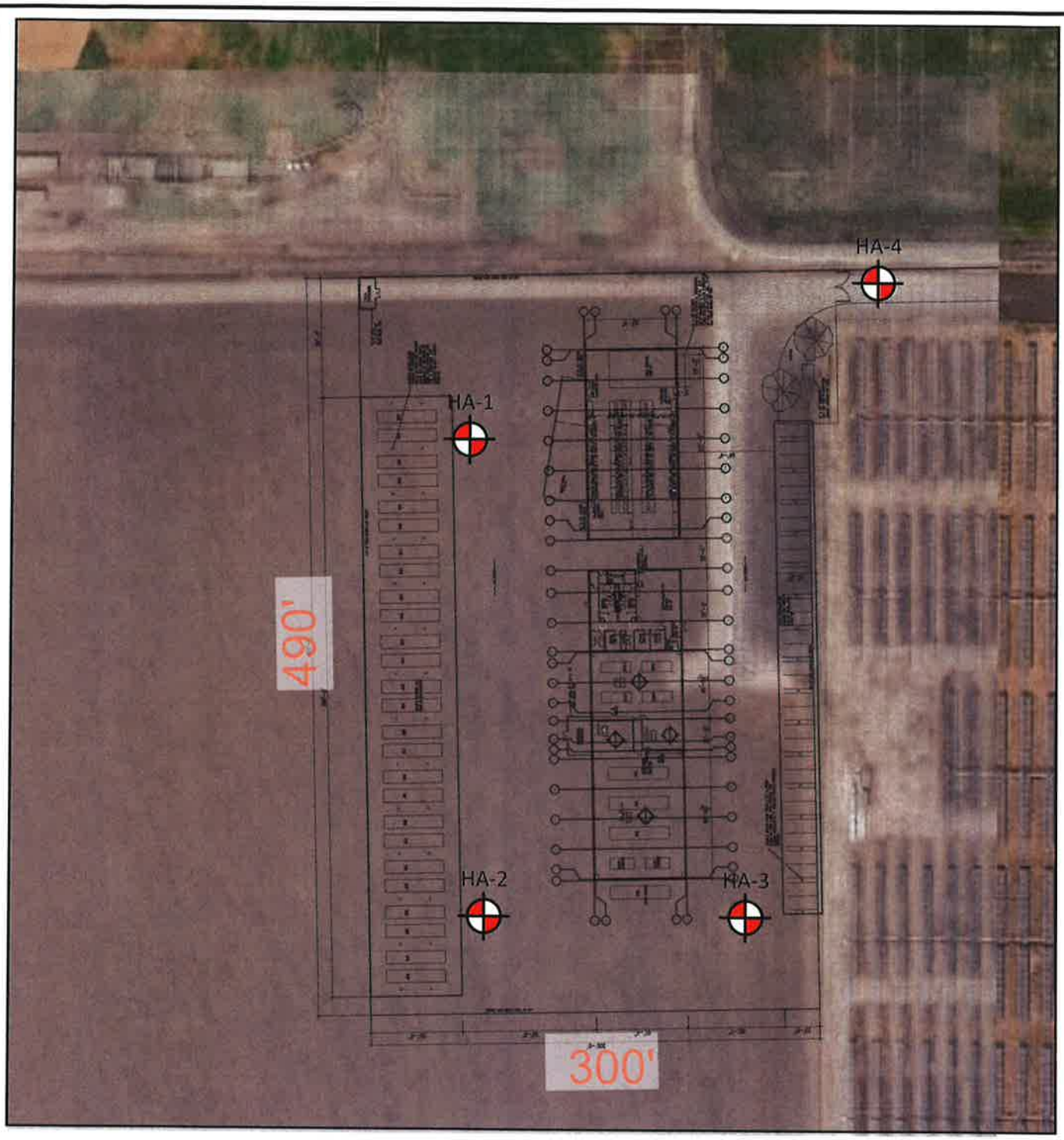
Dry Density @ 300 psi Exudation Pressure: 111.0-pcf
%Moisture @ 300 psi Exudation Pressure: 15.2%
R-Value - Exudation Pressure: 26
R-Value - Expansion Pressure: 35
R-Value @ Equilibrium: 26

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART





HA-2 : Approximate hand auger locations.

*Taken from Google Maps, Oxnard, California, 2020.

Approximate Scale: 1" = 110'

0 110' 220'

N

SITE MAP

Oxnard UHSD Transportation Center
Oxnard, California

Earth Systems

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