Request for Proposal
Addendum 3

Addendum Date: 07/12/2024

Project: Esperanza Community Center – General Contractor Services
Project Address: 780 S Hwy 183, Austin, TX. 78741

Owner: The Other Ones Foundation
RFP Contact: hagen@gothams.com

Submit Bids via email no later than:
Submit Bids to: emily.fesette@toofound.org

Dear Bidder,

Your firm is invited to submit a Proposal for the below open-shop scope of work. The following proposal request will outline the project goals and detail the format you should submit your proposal. For your proposal to be considered, your proposal must meet our deadline due date.

If you are interested in bidding, please confirm via reply email. If you cannot provide a price, please let me know by return email.

Proposal due: 8/2/2024
# Table of Contents

**Request for Proposal**
- Table of Contents 1
- Company Overview 2
- Jobsite Walk Pre-Bid 3
- Contract Type 3
- Owner Contacts: 3
- Project Overview 4
- Scope of Work 5
- Bid Instructions 7

**General Bid Instruction**
- 7

**Project Specific Bid Instructions**
- Bid Questions 9
- Bid Documents 9
- Proposal Timeline 9
- Clarifications 9
Company Overview
TOOF, a 501(c)(3) tax-exempt organization, is a nonprofit that provides extremely low-barrier employment, case management, emergency shelter and humanitarian aid to people experiencing homelessness in Austin, TX.

Jobsite Walk Pre-Bid
Bidders may attend the onsite Pre-Bid Walk, June 21st at 11am, at which the requirements of the Bidding Documents are reviewed, and a Project site visit is conducted. The Owner requires all Pre-Bid Conference attendees to arrive for the meeting on time and to sign an attendance list, which in turn is used to determine if Bidders meet this requirement. Email full names and titles of all persons attending to RFP Contact no later than 12:00 Noon Central 1 day prior to job-walk.

Contract Type
The Owner will engage with the Contractor under a Lump Sum arrangement using an industry standard Master Service Agreement (“MSA”) Between Owner and Contractor where Work is provided under multiple Work Orders, and/or Purchase Orders. The selected bidder to perform as the Contractor for this project shall initiate performance of the project upon receipt of a “Bid Award Letter” from the Owner while the Owner and Contractor finalize costs, schedules, and scopes in the purchase order.

Owner Contacts:

Primary:  Alternate:
Emily Fesette  Hagen Patterson
Project Manager  Project Manager
Emily.fesette@toofound.org  hagen@gothams.com
Project Overview

The Other Ones Foundation is requesting proposals for a General Contractor to complete construction of the second phase of the existing Esperanza Community, an emergency shelter that, when finished, will have 200 individual cabins for Austin’s unhoused. Phase 2 Development of the Esperanza Community involves constructing and installing the remaining 100 cabins, hygiene facilities, communal spaces, and associated community amenities (see attachments for details). This General Contractor (GC) will provide services that include but are not limited to, reviewing all site plans, completing construction activities associated with Phase 2, managing site labor and trades, and attending all necessary pre-construction meeting(s). The GC shall be required to have a qualified representative onsite during all construction activities.

Award of contract by the TOOF will be made in the interest of the organization and shall be based upon various factors, including but not limited to the following: proposer’s qualifications, experience with major construction including, availability and cost. TOOF reserves the right to accept or reject any or all Proposals and to be the sole judge of the merits and qualifications of the service and the ability of the Proposer to responsibly perform. TOOF reserves the right to waive any informalities or irregularities in any proposal submitted or in the procedure. Award of contract will be made to the General Contractor meeting all standards and not necessarily to the firm offering the lowest cost. The client (TOOF) oversees the project's overarching goals and compliance, ensures funding and resources are allocated appropriately, and maintains ultimate decision-making authority. The prime contractor manages the project's broader scope, coordinates with major stakeholders, and ensures that the project adheres to the timeline and budget constraints. The general contractor (GC) is responsible for day-to-day construction activities, managing site labor and subcontractors, and ensuring that the construction meets the quality standards and specifications set forth in the project plans.
Scope of Work

Construction SOW
The GC will assist in the completion of The Phase 2 project. This is including but not limited to:

- Erosion Controls and best management practices for construction, following the TOOF Construction Management Safety requirements as well.
- As it stands, the current site is paved. GC will spread and compact additional surface material for structure areas that is drainable rock or a similar material similar to asphalt millings. Additional foundation prep for structures, and potential paving improvements may also be required.
- Site Concrete for structures and drainage – Contingency for additional concrete needed for the building of communal buildings, amphitheater area, elevated slabs for sinks, downspouts or gutter supplement from communal bathrooms, etc.
- Water and sewer lines are stubbed out. French drains, down spouts could be added to improve drainage from structures and communal areas to tie into drainage. No further wastewater lines are required.
- “Service laterals” for water/wastewater to new restroom and communal structures could be needed based on GC assessment in site walk. Sink, hose, spigots, could require the potential need for additional line extensions.
- Structure placing and supplemental labor, and all associated machinery and personnel necessary to complete the project
- Communal bathroom design input and construction
- Communal amenities design and construction
- Structure finishing and improvements, including but not limited to, design input, labor and materials, etc. for the Cabins and other prefabricated and stick-built structures as needed.
- Landscaping and site improvement to include site lighting, fire and life safety.

Admin SOW
The GC will review architectural drawings, engineering, inspection, estimates, subcontractor procurement, and construction management services for the projects. The GC will oversee and coordinate their subcontractors during all construction activities of the project(s) awarded throughout the projects (and ultimately report to the prime contractor). The GC will also perform the following tasks:

1. Procure qualified subcontractors that have experience in construction management and consulting services and possess the communication and coordination skills required to carry out these responsibilities, including appropriate licensed professionals in the State of Texas.

2. With the project management team's assistance, coordinate construction drawing reviews and maintain hard copies of the final approved plans onsite.

3. Review all change orders either resulting from unforeseen circumstances or owner initiated prior to submission for approval by the Organization.

4. Endeavor to achieve satisfactory performance from the subcontractors. Execute courses of action, as approved by the PM (Project Management) team, when the contract requirements are not being fulfilled.

5. Attend regularly scheduled construction meetings.

6. Record the progress of the project and provide weekly reports to the Prime Contractor.

7. Provide all necessary dumpsters, temporary fencing, temporary toilets, and cleanup equipment and execute daily site cleanup and material organization.

8. Finalize all inspections and complete punch lists as designated and provided by the PM team.

9. Provide digital, to scale, CAD as-built files.

10. Prepare all required performance reports and closeout documents.

11. Additional Services as required by TOOF.
Bid Instructions

General Bid Instructions

The purpose of this document is to provide bidding Contractors with instructions to prepare a complete Lump Sum Bid for the project scope.

The following instructions are provided to assist the bidders with scopes of work that may not be clear on the drawings or between trades. This document is in no way to be construed as a complete scope list. Each Contractor is responsible for providing a complete bid that includes all costs for execution of the work in a proper manner.

Bidder, by making a Bid, represents that:

1. Bidder has read, understood, and made the Bid in accordance with the provisions of this Request for Proposal (RFP) and all other Bid Documents.
2. This RFP and all final Bid Documents shall be incorporated into the contract of the awarded bidder. Bidder confirms acceptance of all requirements in this document.
3. Bidder has visited the Project site and is familiar with the conditions under which the Work is to be performed and the local conditions as related to the requirements of the Bid Documents.
4. At the time of submission of the Bid, Bidder and all Subcontractors, regardless of tier, have the appropriate current and active licenses, certifications, etc. as required to perform the Work in the Bid Documents.
5. Bidder has the expertise and financial capacity to perform and complete all obligations under the Bidding Documents.
6. The person executing the Bid Form is duly authorized and empowered to execute the bid forms on behalf of Bidder.
7. The Bidder agrees to submit their bid using the Bid Form provided with the Bid Documents and shall do so providing all pricing, quantities and breakouts indicated.
8. Bidder is aware of and, if awarded the Contract, will comply with all applicable Federal Procurement Requirements in its performance of the Work.
9. Bidder will identify all scope gaps in the Bid Documents and submit to the Owner as a Bid RFI.
10. Contractor shall physically supervise ALL Work performed on site(s), to include self-performed and subcontracted work, investigations, material delivery, inspections, cleanup, maintenance of temporary facilities, etc.
11. Work is to be performed during normal hours (0730 – 1730, M-F) unless coordinated in advance with the Owner. Contractors may work overtime if needed to maintain the project schedule. Overtime to meet the project schedule shall be coordinated between the Owner and Contractor, Overtime or increases in crew sizes to meet the project schedule that have costs in excess of the Contractors Lump Sum price shall not be billed, charged to the Owner – the Contractor establishes working hours, crew sizes, span of control and efficiency to complete the project on time and maximize resources.
12. Contractor agrees to adhere to the TOOF Work Rules while working on the premises.
13. Daily cleanup is a safety requirement. Therefore, include in your bid the cost to clean up the debris generated by all field operations, daily, no exceptions.
14. Provide all warranties specified, to include “Special Warranties” or other similar type warranties, that are to be provided by the manufacturer per the terms and durations in the specifications.
15. Contractor Change Order Requests shall show cost breakouts for labor, material, equipment rentals, subcontractor backup proposals and all markups.
16. Receive, unload, inspect, inventory, document, store, protect, double-handle, if necessary, set and install Owner Furnished Contractor Installed Equipment/Furnishings.
17. Contractor agrees that all non-confirming work for which they or their subcontractors are responsible will be remedied at no scheduled impact or cost to Owner.
18. Contractor agrees to ensure all changes are pre-approved in writing as expeditiously as possible. It is incumbent on the Contractor to solicit scope, schedule, and budget impacts for potential changes from subcontractors as soon as the potential change is recognized.
Project Specific Bid Instructions

1. Include relevant company background and a list of projects related to this scope of work.

2. Include a project schedule and cost summary. This schedule is a requirement for the bid to be considered. Schedules should include major activities and durations that demonstrate to the Owner that the Contractor comprehends the overall project phasing.

3. **Bid Questions**

Submit via email in ONE excel document at ONE time all bid questions directly to

- hagen@gothams.com
- emily.fesette@toofound.org

Faxes will NOT be accepted. Bid questions and answers will be consolidated and distributed to all bidders in an addendum unless the response negates a competitive advantage from the question submitter.

### Bid Documents

1. Request for Proposal (RFP)
2. Attachments - In addition to this RFP document, the following Attachments have been provided along with the RFP to assist Respondents in their RFP bid response.
3. Proposal Deliverables
   a) Proposal Document
   b) Company Background and Relevant Experience
   c) Cost Summary
   d) Project Schedule

### Proposal Timeline

<table>
<thead>
<tr>
<th>Event</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>BID Opening Date</td>
<td>June 10, 2024, 11:00 AM</td>
</tr>
<tr>
<td>Job Site Walk</td>
<td>June 21, 2024, 11:00 AM</td>
</tr>
<tr>
<td>Questions Due</td>
<td>June 28, 2024, 5:00 PM</td>
</tr>
<tr>
<td>Answers Posted</td>
<td>July 12, 2024, 5:00 PM</td>
</tr>
<tr>
<td>Proposals Due</td>
<td>August 2, 2024, 5:00 PM</td>
</tr>
<tr>
<td>Award Date</td>
<td>August 9, 2024, 10 AM</td>
</tr>
<tr>
<td>Construction Start</td>
<td>August 12, 2024</td>
</tr>
</tbody>
</table>

### Clarifications

1. Respondents are reminded that the information contained within this RFP, including other data appended or related to it, is the property of the Owner, is confidential and proprietary to the Owner, and may not be reproduced in whole or in part without the express written permission of the Owner. Respondent shall not disclose or release such information for any use or purpose, other than as required to respond to this RFP, without the Owner's prior written approval. If
requested, all such information shall be destroyed or promptly returned to the Owner. Unless otherwise notified and agreed to in writing, all communications, whether electronic, verbal, written, or by any other means, between personnel or other representatives of the Respondent and the Owner’s associates or other authorized Owner Agents/Representatives, shall also be considered confidential.

2. Proposals will be opened privately. All proposals shall be complete and final and must be guaranteed for 120 calendar days after the date established for the receipt of proposals.

3. By submitting proposals, Respondents represent that they are experienced and qualified firms, capable of performing the work required of them by the proposal documents. Respondents further indicate that they have carefully reviewed the information provided pertaining to the Projects in full and have considered all of the conditions surrounding and relative to the performance of their work. Respondents shall include all applicable State Sales and Use Tax as it pertains to their proposal.

4. The Owner reserves the right to accept or reject any submitted proposals and to revise the services required at its discretion.

Disclaimer: The Owner has issued this RFP to solicit proposals from potential General Contractors for a comprehensive evaluation of their proposals as outlined in the attachments. This is not an offer to contract for services. Only the execution of a written contract will obligate the Owner in accordance with the terms and conditions contained in such a contract. All costs associated with preparing the RFP response are borne by the respondent.
SITE PLAN

Upon project award, it will be the duty of the general contractor to work with TOOF to refine the site layout provided into a final site plan that is inclusive of specific civil site plans, positioning and orientation of all structures, and additional site improvement. The GC should utilize square footage specifications of structure drawings, information provided in the site walk, and past experience when bidding. Emulating an improved product of the first side (Phase 1) is the ultimate goal.

CABINS

For Phase 1 of Esperanza Community, 100 tiny home “Cabins” were donated. For Phase 2, they will also be donated, within this scope of work, there are currently 28 structures that have been donated and sitting vacant and incomplete. Bidders will gain access to assessing these structures on the site walk and will be required to assist in finishing/refurbishing these structures to be suitable for placement on site.

The remaining 72 structures will be manufactured by a structure provider and dropped on site to be placed and finished by the GC. There will be more info shared regarding drawings and specifications of the 72 remaining structures. For the sake of this proposal, please include a budgetary summary of work to install an allotment of 72 structures in similar shape to the structures on the site visit.

RESTROOMS

TOOF requires that the GC assist in the design and construction of () communal restroom buildings with each building containing (4) showers and (4) toilets; each hygiene facility is required to have one ADA stall. Discussions on specifications will take place on the site walk to inform Bidders on lessons learned from Phase 1. The existing design drawings will be provided at the pre-bid site walk for Bidder review and consideration.

STORAGE AND FLEX SPACES

TOOF requires that the general contractor construct and provide solutions to meet the needs of storage and flexible programming spaces within the site layout. There are four proposed flexible spaces in the plan for Phase 2. In the first phase of the project, TOOF utilized a third-party contractor to install prefabricated structures, a GC will be required to propose options similar to these prefabricated structures and/or a design and process for building the flex spaces. Storage space for client worker supplies – chemical safe, lawn care supplies, etc. TOOF is seeking a GC who can suggest multiple options for meeting these storage needs.

ELECTRICAL

As of now, the electrical work will now be in control of TXDOT through a separate contractor as TXDOT owns the land of the site. We do not foresee any impacts to construction scope of work. It will be the
general contractor’s responsibility to coordinate construction timelines with TXDOT contractor should electrical SOW overlap with construction timelines.
Attachment B Answers to Questions

1. **72 structure** – review timing & logistics for final delivery & placement - provide prototype floor plans/elevations & construction type Drawings attached. Provide budgetary summaries for the first 28 structures improvement and placement. The remaining 72 structure type design will be shared with GC upon award. Place budgetary contingency for the placement of structures similar to the structures viewed on the site visit.

2. Please provide a basis of design narrative for communal & flex spaces – ie, fixtures, finishes, construction type, etc. Communal and flex spaces should be adequate structures within footprint of site layout provided and range from 250-350sq ft. Similar design to structure viewed on site walk.

3. Please provide preliminary electrical site plan – show electrical requirements for each structure requiring power – cabins, communal spaces, flex/office spaces, storage, site lighting & power.
   a. It will be difficult to obtain electrical subcontractor bids without some basic layout of electrical requirements. See Electrical SOW

4. Will any underground Telecom/Data be required to any structures? Yes, see telecom line plans.

5. Will any fencing/gates or controlled access be required? Yes, site fencing with sandbags, and privacy screen should be included.
GEOTECHNICAL INVESTIGATION
FOUNDATION & PAVEMENT RECOMMENDATIONS

Esperanza Community
Austin, Texas

Report For:

The Other Ones Foundation
780 US Highway 183 South
Austin, Texas 78741

July 2021
Engineer's Job # 21106100.069

Christopher P. Elliott
Vice President

Timothy R. Weston, P.E.
President

Matthew J. Rodriguez, P.E.
Senior Engineer

MLA Geotechnical
Geotechnical Engineering and Construction Materials Testing
"put us to the test"
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACKGROUND</td>
<td>1</td>
</tr>
<tr>
<td>ARCHITECTURAL AND STRUCTURAL ASSUMPTIONS</td>
<td>2</td>
</tr>
<tr>
<td>FIELD AND LABORATORY INVESTIGATION</td>
<td>2</td>
</tr>
<tr>
<td>SITE TOPOGRAPHY, DRAINAGE AND VEGETATION</td>
<td>2</td>
</tr>
<tr>
<td>SUBSURFACE CONDITIONS AND LOCAL GEOLOGY</td>
<td>2</td>
</tr>
<tr>
<td>CONCLUSIONS</td>
<td>4</td>
</tr>
<tr>
<td>RECOMMENDATIONS - FOUNDATION</td>
<td>6</td>
</tr>
<tr>
<td>RECOMMENDATIONS - PARKING AND DRIVING LANE PAVEMENTS</td>
<td>9</td>
</tr>
<tr>
<td>UNDERSLAB FILL RECOMMENDATIONS</td>
<td>14</td>
</tr>
<tr>
<td>QUALITY ASSURANCE CONSIDERATIONS</td>
<td>15</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>16</td>
</tr>
<tr>
<td>LIMITATIONS OF REPORT</td>
<td>17</td>
</tr>
</tbody>
</table>

**APPENDIX A - GEOTECHNICAL DATA**
- Site Maps
- Plan of Borings
- Logs of Boring

**APPENDIX B - STANDARD FIELD AND LABORATORY PROCEDURES**
GEOTECHNICAL INVESTIGATION
Foundation & Pavement Recommendations

Esperanza Community
Austin, Texas

BACKGROUND

This report presents the results of a soil exploration and analysis for the proposed structures located at Esperanza Community in Austin, Texas. Authorization to perform this exploration and analysis was by Agreement for Engineering Services signed by Kristopher Wade of The Other Ones Foundation on May 29, 2021.

The purposes of this investigation were to determine the soil profile, the engineering characteristics of the foundation soil and to provide criteria for use by the design engineers in preparing foundation designs for the proposed project. The scope included a review of geologic literature, a reconnaissance of the immediate site, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation of the foundation materials.

The exploration and analysis of the subsurface conditions reported herein is considered sufficient in detail and scope to form a reasonable basis for foundation design. The recommendations submitted are based on the available soil information and the assumed preliminary design for the proposed structures. Any revision in the plans for the proposed structures from those stated in this report should be brought to the attention of the Geotechnical Engineer so that he may determine if changes in the foundation recommendations are required. Site work and foundation construction should be monitored by MLA Geotechnical to verify that these recommendations are implemented, and so that deviations from expected conditions can be properly evaluated.

This report has been prepared for the exclusive use of the client and their design professionals for specific application to the proposed project in accordance with generally accepted soils and foundation engineering practice. This report is not intended for use as a
specification or construction contract document, but as a guide and information source to those qualified professionals who prepare such documents.

ARCHITECTURAL AND STRUCTURAL ASSUMPTIONS

The proposed structures are one- or two-story building with associated parking areas and access ways. **The shape factor of this slab should be considered by the structural engineer.** If these assumptions are not correct, please contact the geotechnical engineer so they may review the recommendations contained herein for accuracy, completeness, and appropriateness. As finalized plans become available, they should be shared with the Geotechnical Engineer so they may ascertain whether any modifications to the recommendations presented herein are necessary.

FIELD AND LABORATORY INVESTIGATION

Four borings were drilled to various depths spaced at locations as shown on the enclosed Logs of Boring and Plan of Borings using a truck-mounted drilling rig. Water was not introduced into the borings. The field investigation included completing the soil borings, performing field tests, and recovering samples. Pocket penetrometer tests were performed on specimens during sampling. Representative soil samples were selected for laboratory index tests including Atterberg Limits, sieve analysis, and moisture content tests. The results of these tests and stratigraphy are presented on the Logs of Boring found in *Appendix A*. A key to the Soil Classification and symbols is located behind the last Log of Boring. See *Appendix B* for details of field and laboratory procedures, as applicable.

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‡ The shape factor is defined as the perimeter of the slab squared divided by the slab area.
SITE TOPOGRAPHY, DRAINAGE AND VEGETATION

The site is situated on gently sloping topography with existing slopes ranging up to approximately 4 percent. Regionally, this site drains to the northeast. The vegetation at this site included grasses and scattered mature trees.

SUBSURFACE CONDITIONS AND LOCAL GEOLOGY

Fill

The fill encountered in Borings B-2, B-3, and B-4 generally consists of gray and tan, dark brown, and tan low plasticity clay (CL) and dark brown high plasticity clay (CH).

Soil Profiles

The native soil profile identified in the borings consists of an upper layer of dark gray to reddish brown high plasticity clay (CH) and is underlain by reddish brown clayey sand (SC) and reddish brown to brown clayey gravel (GC). Underlying and interlaying these layers is reddish brown and gray low plasticity clay (CL). This soil profile has the potential for volume change with respect to varying moisture contents. This potential is taken into consideration for the foundation recommendations.

Geology

Local geologic maps indicate terrace deposits known as the Lower Colorado River Terrace Deposits, Qlcr, underlying this site\(^{(1,2)}\). These terrace deposits generally consist of high and low plasticity clay and sand with gravel layers. The proportion of sand and clay in these deposits was dependent on the depositional energies of these sediments. During periods of flooding, gravel layers were deposited and, as the floods receded, sands and clays were deposited. Generally, the older or lower portions of this formation are comprised of large materials such as sand and gravel. The more recent or upper portions of this terrace deposit consist primarily of clay with fine sand and occasionally fine gravel layers. This formation was
also subject to periods of drought. These droughts lowered the water table in the sediments, which resulted in the deposition of calcareous material called evaporite. More recent alluvial material consisting of high plasticity clay overlies this formation, but is often not mapped separately.

**Ground Water**

Ground water was encountered in Boring B-1 during this investigation. Ground water is a transient problem and may be encountered at other locations and in varying quantities depending on antecedent rainfall conditions and changes in land use.
CONCLUSIONS

1. Excavation and site work:
   a. Excavation for the construction of a slab-on-ground foundation may be performed using ordinary power equipment.
   b. All excavations should be braced and shored according to applicable law and building code. Consultation on excavations can be provided by the geotechnical engineer upon request. If shoring is required on this project, specific design recommendations can be developed upon analysis of the application.
   c. Ground water is possible in shallow and deep excavations depending on antecedent rainfall. During periods of high rainfall, perched ground water may cause the soils to become soft and difficult to compact.

2. Settlement potential:
   a. The potential for settlement greater than 1 inch of the natural soils on this site for light, one to two story structures may be categorized as low.
   b. Settlement potential of any uncontrolled (non-approved) fill is unpredictable.
   c. Heavy structures or structures more than three stories in height will require analysis beyond the scope of this report.

3. Expansive soil potential:

   The soils at this project site exhibited plasticity indices ranging from non-plastic (NP) to 43. A point estimate of the potential vertical rise, PVR, of the in-situ soil profile was found to be 2 ¼ to 3 inches \(^3\). Thus, the potential for disruptive foundation movements due to swelling soils may be categorized as high to very high. Other magnitudes of PVR may be estimated by other methods and at other locations with varying results. However, the TxDOT Method is widely used and should be considered an index property of the site. PVR is considered in the final foundation recommendations.
4. Foundation Type:

The foundation type recommended for this project is a soil-supported, stiffened concrete slab. If recommendations for other foundation types are desired, please contact the Geotechnical Engineer. The shape factor of the slab should be considered by the structural engineer. The shape factor is defined as the perimeter of the slab squared divided by the slab area.

5. Faults:

Published geology maps do not indicate the presence of a fault on the project site and faulted conditions were not noted in the borings.

6. Slab Moisture:

The recommendations in this report are not intended to address the effects of moisture migration through slabs. The design team should address moisture retardant schemes and the requirements of this project.

7. Past Use of Site:

There was no evidence in the samples obtained for this study that indicated the past use of this site as a municipal landfill. See the section *Limitations of Report.*
Esperanza Community
Engineer’s Job No. 21106100.069

**RECOMMENDATIONS - FOUNDATION**

A stiffened, slab-on-ground foundation system is recommended for this project. The following recommendations are for such a foundation system. This type of foundation system is designed to dampen soil movements beneath the foundation. These soil movements arise from varying soil moisture. Many of the recommendations in this report are intended to reduce this soil moisture variation. Some foundation movements may occur even in properly designed slab-on-ground foundations. Please contact the Geotechnical Engineer if alternate designs are desired.

1. This type of foundation includes reinforced perimeter and interior stiffening beams, monolithically cast with a reinforced slab. The following design parameters are recommended for use in sizing the foundation elements for the soil-supported stiffened concrete slab foundation. The structural engineer should also take into account the loads and the geometrics of the planned structures.
   a. Post-tensioned slab – Post-Tension Design Parameters (4)
      
      Edge moisture variation distance (feet)
      \[ e_m (\text{center}) = 7.5 \]
      \[ e_m (\text{edge}) = 3.8 \]
      
      Differential Swell (inches)
      \[ y_m (\text{center lift}) = 2.16 \]
      \[ y_m (\text{edge lift}) = 3.17 \]
      
      Where \( e_m \) = edge moisture variation distance in feet.  
      \( y_m \) = differential swell in inches.
   b. Conventional reinforcing Historically Equivalent BRAB #33 (5) Parameters
      
      Equivalent PI = 60-F$ (see note “f” on the next page)
   c. If the WRI (6) design method is to be used for foundation design on this site, the following parameters may be used:
      
      Equivalent PI = 60-F
      Climatic Rating, \( C_w = 18 \)

§ Where F indicates the presence of unapproved fill beneath the foundation.

-6-
d. Notes:

Engineering judgment has been applied to the BRAB PI calculations. The Equivalent BRAB PI is included for historical purposes and for contractor’s use in cost estimating. The primary design values are the WRI or Post-Tension Design parameters and may be used in the specified design method for slabs on ground.

e. Allowable Bearing Capacity:

Footings on this site established a minimum of 12 inches into the natively deposited clay soils should be sized for allowable bearing pressures of at most 2,000 psf. Any non-approved fill encountered should not be relied upon to provide adequate bearing capacity.

f. The fill encountered in the borings on this site is considered unapproved for supporting a slab-on-ground foundation and will need to be removed and placed back in compacted lifts. For non-approved fill to be approved for supporting foundations it must meet the enclosed On-Site Fill Recommendations if fill is relied upon for footing and slab support.

2. Strip and remove from the construction area any topsoil, organics, and vegetation to a minimum depth of 6 inches below the existing natural ground surface. Any fill of unknown consistency should be removed and replaced in accordance with the enclosed On-Site Fill Recommendations if it is to be relied upon for slab support. Fill sections may be composed of on-site material excluding topsoil, vegetation, and organics.

3. A moisture retardant layer of sealed, overlapping plastic sheeting should be provided between the subgrade and all slab areas and beam excavations to retard the transmission of moisture upward through the slab. ASTM 1745 can be used as a guideline (7). The design team should address moisture retardant schemes and the requirements of this project.
Esperanza Community
Engineer’s Job No. 21106100.069

4. Floor slabs may be formed on grade, if desired for economy.

5. Trees must not be planted or remain closer to the foundation than the mature drip line of the tree without consideration by the structural engineer. Please contact the structural engineer.

6. Air conditioner condensation overflow drains should be piped into the sanitary sewer, where the building code allows. Otherwise, the air conditioner condensation overflow drain should discharge clear and away from the foundation.

7. Drainage should be maintained away from the foundation, both during and after construction. Water should not be allowed to pond near the foundation. The following items should provide for positive drainage of water away from the foundation: sidewalks and other concrete flatwork, parking areas, driveways and other surface drainage features, and landscaping.

8. French drains are recommended around any slabs where seeping ground water is encountered during construction.

9. Sidewalks and other flatwork should be doweled to the foundation elements, with adequate consideration of the differential forces that may develop.

10. Prior to construction, the Geotechnical Engineer should be given the opportunity to review the plans in order to ensure that all recommendations have been properly implemented. Also, the Geotechnical Engineer should be retained to complete necessary inspections to ensure that the foundation is installed in accordance with these recommendations.
Esperanza Community
Engineer’s Job No. 21106100.069

RECOMMENDATIONS - PARKING AND DRIVING LANE PAVEMENTS

No truck traffic loads or frequencies were available at the time this report was written. Therefore, pavement thickness sections are based on primarily passenger cars and light trucks with an average of ten heavy-duty trucks per day. No specific tests (such as CBRs or resilient moduli) were performed for this study.

A. Subgrade and Foundation Soil Preparation

1. Strip and remove from the construction area all topsoil, organics, and vegetation to a minimum depth of 6 inches.

2. Proof-roll the subgrade in accordance with TxDOT Item 216 to reveal soft spots. Soft areas should be reworked and compacted until they can be successfully proof-rolled. The success of the pavement system will very much depend on the care taken to provide a sound subgrade.

B. Base Course

1. Base material shall be Type A, Grade 2 or better, according to the Texas Department of Transportation Specification Item 247.

2. Thickness of the base course should be in accordance with Table 1.

3. Base course compaction should be 100 percent of TxDOT TEX-113-E. Density control by means of field density determinations shall be exercised. The base course should be within 3 percent of optimum moisture at time of compaction.

4. Proof-roll the base course in accordance with TxDOT Item 216.

5. After compaction, testing and curing of the base material, the surface should be primed using an Asphalt Emulsion prime coat meeting TxDOT Specification Item 310.

6. A full thickness of the base course should be extended 2 feet beyond the back of curb line.

-9-
C. Flexible Pavement - Hot Mixed Asphalt Concrete (HMAC)

1. Surfacing shall consist of hot mix asphaltic concrete meeting the requirements of TxDOT Item 340, Type D mixture. The HMAC should be compacted to a minimum of 91 to 96 percent of the maximum theoretical density with all rolling completed before the HMAC temperature drops below 175° F.

2. Thickness of the HMAC should be in accordance with Table 1.

3. A flexible pavement system is not recommended in areas that will be subject to significant truck traffic. See Table 1 notes.

D. Rigid Pavement - Jointed, Reinforced Portland Cement Concrete

1. Concrete paving shall consist of thickness as given in Table 1.

2. The concrete should develop a minimum 28-day flexural strength of 500 psi with 4 to 6 percent entrained air. The 28-day compressive strength of concrete required to achieve 500 psi of flexural strength may be approximated using the following formula taken from ACI 330R: $M_r = 2.3f_c^{(2/3)}$ where $M_r =$ flexural strength of concrete in psi, $f_c =$ compressive strength of concrete in psi.

3. Contraction, control, and expansion jointing should be as per ACI 330-R (7). As an alternative, an accepted local practice that has been proven to work satisfactorily in similar circumstances may be used. The success of this pavement system will be strongly dependent on adequacy of the jointing. Minimum reinforcing should be No. 3 bars at 18 inches on center each way, centered in the slab or as determined by the ACI “Drag Formula.”

4. ACI 330-R contains material, construction, inspection and testing, and maintenance recommendations that are appropriate for this project. They are recommended.

5. Concrete paving should be used for dumpster pads and around dumpster loading areas as per Heavy Duty Truck Lanes.
6. Contractions joint spacing is typically 15 feet on center each way. Contraction joint spacing should not exceed 20 feet on center without engineering consultation.

7. Full depth, full width isolation joints with bituminous fiber or preformed joint filler should be installed at all rigid structure interfaces, such as light pole bases, planters and buildings or older sections of pavement.

8. All expansion joints and crack control joints should be sealed to prevent the infiltration of water into the subsurface. This is particularly important around irrigated landscaping and along the drainage path of roof downspouts.

E. General Conditions

1. Should at any stage in the construction of the pavement a non-stable or weaving condition of the subgrade or base course be noted under the wheel loads of construction equipment, such areas should be delineated and the Geotechnical Engineer consulted for remediation before completing the pavement section.

2. Seepage areas or unusual foundation soil conditions should be similarly brought to the Geotechnical Engineer’s attention before proceeding with pavement completion.

3. Landscaped islands should be backfilled with low plasticity clays to reduce water intrusion into the subsurface pavement structures. Curbs should be provided with weep holes in landscaped areas to reduce the build up of hydrostatic pressure and to reduce the intrusion of water into the subsurface materials.

4. Trenches beneath pavements should be backfilled with borrow or suitable material excavated from the trench and free of stone or rock over 4 inches in diameter. The backfill should be compacted to 95 percent of the maximum dry density when determined by TxDOT test method Tex-114-E. The moisture
content should be within 3 percent of the optimum moisture content at the time of compaction.

5. If ground water or seepage is encountered at the time of construction, French drains may be required to drain or intercept the flow of water from the subsurface pavement materials. These drains should be sloped a minimum of 0.5 percent to provide positive drainage to daylight.

<table>
<thead>
<tr>
<th>Expected Traffic</th>
<th>Average Daily Truck Traffic</th>
<th>Flexible Pavement</th>
<th>Rigid Pavement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HMAC</td>
<td>CLB</td>
</tr>
<tr>
<td>Passenger Vehicles</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Heavy Duty Trucks*</td>
<td>Up to 10</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

**Notes:**
- A thickness of lime stabilized subgrade may be used in order to minimize maintenance but is not required for expected traffic loading.
- Abbreviations: HMAC - Hot Mixed Asphalt Concrete, CLB - Crushed Limestone Base, JRPCC - Jointed, Reinforced Portland Cement Concrete
- *Heavy-duty truck parking, loading, unloading, and turning areas should use the rigid pavement option.
- The pavement thicknesses above, once complete, will be capable of supporting a total vehicle live load of 80,000 pounds and meets the HS-20 (16 kips per wheel) load carrying capacity required.
- Average Daily Truck Traffic excludes pickup and panel trucks.
- Inadequate drainage of the pavement system will accelerate pavement distress and result in increased maintenance costs. Adequate drainage should be provided for the pavement system. Adequate drainage consists of a curb and gutter or a shoulder and bar ditch system.
- These pavement thickness designs are intended to transfer the load from the anticipated traffic conditions. Deep seated soil swelling or settlement of fill materials may cause long wave surface roughness. The recommendations above are intended to reduce maintenance costs and increase the serviceable lifespan of the pavement system.
Esperanza Community
Engineer’s Job No. 21106100.069

ON-SITE FILL RECOMMENDATIONS

A. Selection of on-site fill material shall be guided by the following criteria:
   1. The material shall not contain any rocks having a maximum dimension greater than six inches.
   2. The material shall have at least 50% passing the #4 sieve.
   3. The material shall be reasonably free of roots, trash, concrete rubble and other organic material.

B. Compaction shall be to 95 percent of maximum laboratory density determined in accordance with ASTM D 698. The material shall be within three percent of optimum moisture content during compaction.

C. Placement shall be in lifts not exceeding eight inches after compaction. Each compacted lift should be inspected and/or tested for density compliance by the Geotechnical Engineer prior to placing the next lift. The fill area should extend at least 24 inches (36 inches on fills over six feet in height) beyond the back of curb or foundation line before sloping downward on not more than 1 on 3 slope to natural soil. Backslopes shall be well-compacted. Maximum fill heights should not exceed ten feet without engineering consultation.

D. Testing and Certification of the on-site fill material shall be performed by the Geotechnical Engineer. A 110 lb. sample of the proposed material shall be submitted to the Geotechnical Engineer for approval and determination of a moisture-density relationship in advance of the fill and compaction operations in order to permit inspection and testing as the fill is placed. Fill placement will be inspected and tested for uniformity, acceptable material and field densities at the rate of one per density per 5,000 square feet per lift (a minimum of three per lift per pad).

E. Deviations from the above recommendations may be permitted upon approval from the Geotechnical Engineer.
UNDERSLAB FILL RECOMMENDATIONS

A. **Selection** of fill material should be guided by the following criteria:

1. Maximum plasticity index: 20
   Minimum plasticity index: 3
2. Minimum and maximum passing #200 sieve: 10% to 70%
3. No stones larger than 1-1/2”

B. **Compaction** should be 95 percent of maximum laboratory density determined in accordance with American Society of Testing Materials, method ASTM D 698, using a compactive effort of 7.16 foot-lbs./in³.

C. **Placement** should be in lifts not exceeding eight inches before compaction. The top of finished fill shall be within ten inches of underslab grade (but not above) and be bladed flat. Material excavated from beam trenches may be used for fine grading. Each compacted lift should be inspected and tested for density compliance by the Geotechnical Engineer prior to placing the next lift. Fill should extend at least 36 inches (72 inches on fills over six feet) beyond neat slab lines before sloping downward at not more than one on three slope to natural soil, unless grade changes are accomplished by properly designed deep foundation beams. Fill shall be within 2 percent of optimum moisture content during compaction. Backslopes shall be well compacted.

D. **Testing and qualification** of raw fill material, placement, and compaction may be performed by the Geotechnical Engineer. A 110 lb. sample of proposed fill material should be submitted to Geotechnical Engineer for approval and for determination of Moisture-Density Relationship, in advance of filling and compaction operations to permit inspection and testing as fill is placed. Not less than one field density test per 2000 square feet or minimum of 3 per lift is required.

E. Beam trenches shall be cut directly into compacted fill to plan dimensions and sacking of trenches will be permitted for inside of perimeter beams. In case sacking is used, density testing will not be performed closer than 4 feet from inside of perimeter beam face. The Geotechnical Engineer may require deepened exterior beams in lieu of excessively high fills.

F. **Deviations** from the above criteria may be permitted upon approval of the Geotechnical Engineer on an individual basis.

G. **Compliance** with these recommendations as stated above or as modified by the Geotechnical Engineer for specific conditions can be the basis for certification of compliance with FHA Data Sheet 79G and VA requirements.

H. **Structural support** of slab foundations may be carried through underslab fill to natural soil at the designer’s option. In this case, paragraphs “B” through “G” of this recommendation are void and the underslab fill will be considered “forming fill” only.
### QUALITY ASSURANCE CONSIDERATIONS

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Item</th>
<th>Sample Frequency</th>
<th>Sample Size</th>
<th>Minimum Testing</th>
</tr>
</thead>
</table>
| General Earthwork and Fill Material | Soil                    | 1 per Soil Type  | 110 lbs.    | ♦ Sieve  
~~~~|
|                                 |                          |                  |             | ♦ P.I.  
|                                 |                          |                  |             | ♦ Moisture Density Relationship                     |
|                                 | Compaction               | 1 per 5000 ft² per lift (min. of 3 per lift) | Field Density Test |
| Select Under-slab Fill Material | Select Fill Material     | 1 per type per 1000 cu. yds. Min. one per job | 110 lbs. | ♦ Sieve  
|                                 |                          |                  |             | ♦ P.I.  
|                                 |                          |                  |             | ♦ Moisture Density Relationship                     |
|                                 | Compaction               | 1 per 2000 ft² per lift (min. of 3 per lift) | Field Density Test |
| Concrete or HMAC                | Mix Design               | 1 per concrete class |             | ♦ Review & approval with confirmatory cylinders  
|                                 |                          |                  |             | ♦ Plant & materials approval, testing, if questionable |
| Concrete or HMAC                | Aggregates (coarse & fine) | 1 per 500 cu. yd. Min. 1 per job | 30 lbs. | ♦ Sieve, organic impurities, specific gravity  
|                                 | Cement                   | 1 per 1000 cu. yds. Min. 1 per job | 10 lbs. | ♦ Fineness  
|                                 |                          |                  |             | ♦ Chemical compound  
|                                 |                          |                  |             | ♦ See mill reports                     |
|                                 | Concrete Placement       | 1 per 50 cu. yds. Or each days pour (if less) |             | ♦ Slump  
|                                 |                          |                  |             | ♦ Air Test  
|                                 |                          |                  |             | ♦ 5 compressive cylinder tests, test 2 at 7 days, 2 at 28 days, 1 hold |
| HMAC Surface Course             | HMAC                     | 1 per 500 tons or each days laydown |             | ♦ 3 cores for density  
|                                 |                          |                  |             | ♦ Extraction/gradation tests  
|                                 |                          |                  |             | ♦ Stability tests  
|                                 |                          |                  |             | ♦ Thickness  
|                                 |                          |                  |             | ♦ Temperature                     |
| Pier or Footing Inspection     | Inspection and verification of bearing | Each Pier or Slab Footing |             | Qualified Inspector with Engineer’s Review  
|                                 | Concrete & Steel Placement | Each Pier or Slab Footing |             | Qualified Inspector  
|                                 | Inspection of Reinforcing | Slab Pre-pour and Cable Stressing |             | Qualified Inspector  

-15-
REFERENCES

1. Local geologic maps published by The Bureau of Economic Geology. Austin, Texas including:
   “Geologic Map of the Austin Area, Texas 1992” Geology of Austin Area Plate VII.
   “Geologic Map of the West Half of Taylor Texas, 30 x 60 min quad” 2005. misc. map 43
   “Geologic Map of the New Braunfels, Texas 30 x 60 min quad” 2000. misc. map 39


7. “Standard Specification for Plastic Water Vapor Retarders Use in Contact with Soil or Granular Fill under Concrete Slabs.” ASTM E 1745. 100 Barr Harbor Dr., West Conshohocken, PA 19428.

LIMITATIONS OF REPORT

The conditions of the site at locations other than the boring locations are not expressed or implied and conditions may be different at different times from the time of borings. Contractors or others desiring more information are advised to secure their own supplemental borings. This investigation and report, do not, and are not intended to determine the environmental conditions or evaluate possible hazardous or toxic waste conditions on this site or adjacent sites. Interested persons requiring this information are advised to contact MLA Geotechnical.

The recommendations in this report are not intended to address the interior environmental effects of moisture migration through slabs. The Client is responsible for addressing the requirements of this project with respect to moisture migration through slab-on-ground foundations.

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. The geotechnical engineer in charge of this project is not a mold prevention consultant and none of the services performed in connection with this study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report may not of itself be sufficient to prevent mold from growing in or on the structure(s) involved.

The analysis and recommendations contained herein are based on the available data as shown in this report and the writer’s professional expertise, experience and training, and no other warranty is expressed or implied concerning the satisfactory use of these recommendations or data.

© MLA Geotechnical 2021
Approximate location of site in yellow
CAPCOG contours (2008) in orange
Travis County parcels (2019) in black

NAPP Aerial Photograph of Site – 1995

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
3.75-minute DOQQ. 1-meter ground resolution. apx. date 1995-6
(http://www.tnris.state.tx.us/digital.htm)
Approximate location of site in yellow
CAPCOG contours (2008) in orange
Travis County parcels (2019) in black

Aerial Photograph of Site – 2018

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
Apx. Date - 2018
(https://tnris.org/)
Approximate location of site in blue

U.S. 7.5 Minute Series Topographic Map
Montopolis Quadrangle, Texas
Contour Interval = 10 feet
Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
(http://www.tnris.state.tx.us/digital.htm)
Approximate location of site in blue

**Geologic Setting of Site**

**Geologic Map of the Austin Area, Texas 1992**

*Contour Interval = 20 feet*

Source: Bureau of Economic Geology, The University of Texas at Austin, Plate VII
PLAN OF BORINGS

Esperanza Community
Austin, Texas
Job. No.: 21106100.069
Client: The Other Ones Foundation

LEGEND

B-#  Boring Number
📍  Approx. Boring Location
**LOG OF BORING**

**Job Name:** Esperanza Community  
**Job Location:** Austin, Texas  
**Engineer's Job #:** 21106100.069  
**Client:** The Other Ones Foundation

**Drill Date:** June 4, 2021  
**Hole Size:** 4.5 in.  
**Ground Elevation:** n/a

**Ground Water Levels:**  
- AT TIME OF DRILLING: ---  
- AT END OF DRILLING: 25.2 ft  
- AFTER DRILLING: ---

**Termination Depth:** 30.0 feet

---

**MATERIAL DESCRIPTION**

**DEPTH, ft.**  
**GRAPHIC LOG**  
**MOISTURE CONTENT, %**  
**PLASTICITY INDEX, %**

0  
ASPHALT (2 inches)  
CRUSHED LIMESTONE BASE (3.5 inches)  
CLAY, reddish brown, with sand, hard, damp

5  
SAND, reddish brown, fine to coarse grained, with gravel, damp

...gravelly below 10.0'

10  
GRAVEL, reddish brown, with sand, rounded, medium to coarse grained, damp

...brown below 20.0'

15  
CLAY, gray, with sand, with gravel, wet

---

**POCKET PEN. (%):**

- **CL**
- **GC**
- **CH**
- **SC**
- **Qlcr**

**PL**

**LL**

---

**Notes:**

**Drill Date:** June 4, 2021  
**Ground Elevation:** n/a

---

**Materials:**

- ASPHALT (2 inches)
- CRUSHED LIMESTONE BASE (3.5 inches)
- CLAY, reddish brown, with sand, hard, damp
- SAND, reddish brown, fine to coarse grained, with gravel, damp
- GRAVEL, reddish brown, with sand, rounded, medium to coarse grained, damp
- CLAY, gray, with sand, with gravel, wet

---

**Termination Depth:** 30.0 feet
**LOG OF BORING**

**Job Name:** Esperanza Community  
**Job Location:** Austin, Texas  
**Engineer's Job #:** 21106100.069  
**Client:** The Other Ones Foundation

**Drill Date:** June 4, 2021  
**Hole Size:** 4.5 in.  
**Ground Elevation:** n/a

**Notes:**

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Material Description</th>
<th>Moisture Content, %</th>
<th>Plasticity Index, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ASPHALT (4.5 inches)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FILL, dark brown, CLAY, with sand, with gravel, damp</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>FILL, dark brown, CLAY, with sand, with gravel, damp</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-10</td>
<td>CLAY, reddish brown, with sand, with gravel, very stiff, damp</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SAND, reddish brown, fine to coarse grained, with gravel, damp</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>...gravelly below 12.0'</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-15</td>
<td>GRAVEL, brown, with sand, rounded, medium to coarse grained, damp</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-20</td>
<td>Termination Depth: 20.0 feet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Ground Water Levels:**
- AT TIME OF DRILLING: ---
- AT END OF DRILLING: ---
- AFTER DRILLING: ---

**Hole Size:** 4.5 in.  
**Drill Date:** June 4, 2021  
**Ground Elevation:** n/a  
**Ground Water Levels:**
- AT TIME OF DRILLING: ---
- AT END OF DRILLING: ---
- AFTER DRILLING: ---
### LOG OF BORING

**Job Name:** Esperanza Community  
**Job Location:** Austin, Texas  
**Engineer's Job #:** 21106100.069  
**Client:** The Other Ones Foundation

**Drill Date:** June 4, 2021  
**Hole Size:** 4.5 in.  
**Ground Elevation:** n/a  
**Notes:**

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>MATERIAL DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>ASPHALT (7 inches)</td>
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<tr>
<td></td>
<td>FILL, gray and tan, CLAY, with sand, with gravel, stiff, damp</td>
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<tr>
<td></td>
<td>CLAY, dark gray, with sand, very stiff, damp</td>
</tr>
<tr>
<td></td>
<td>CLAY, reddish brown and gray, with sand, hard, damp</td>
</tr>
<tr>
<td></td>
<td>SAND, reddish brown, fine to coarse grained, gravelly, damp</td>
</tr>
<tr>
<td></td>
<td>...brown below 11.7'</td>
</tr>
<tr>
<td>20</td>
<td>Termination Depth: 20.0 feet</td>
</tr>
</tbody>
</table>

**Termination Depth:** 20.0 feet

**MATERIAL DESCRIPTION**

- ASPHALT (7 inches)
- FILL, gray and tan, CLAY, with sand, with gravel, stiff, damp
- CLAY, dark gray, with sand, very stiff, damp
- CLAY, reddish brown and gray, with sand, hard, damp
- SAND, reddish brown, fine to coarse grained, gravelly, damp

**Ground Water Levels:**

- AT TIME OF DRILLING: ---
- AT END OF DRILLING: ---
- AFTER DRILLING: ---

**Plasticity Index, %**

- Moisture Content, %
- PL
- LL

**Hole Size:** 4.5 in.

**Drill Date:** June 4, 2021

**Ground Elevation:** n/a

**Notes:**

**Client:** The Other Ones Foundation

**Job Name:** Esperanza Community  
**Job Location:** Austin, Texas  
**Engineer's Job #:** 21106100.069

**Client:** The Other Ones Foundation
## LOG OF BORING

**Job Name:** Esperanza Community  
**Job Location:** Austin, Texas  
**Engineer's Job #:** 21106100.069  
**Client:** The Other Ones Foundation

**Drill Date:** June 4, 2021  
**Hole Size:** 4.5 in.  
**Ground Elevation:** n/a  
**Notes:**

<table>
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<th>DEPTH, ft.</th>
<th>MATERIAL DESCRIPTION</th>
<th>GEOLOGY U.S.C.S.</th>
<th>MOISTURE CONTENT, %</th>
<th>PLASTICITY INDEX, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ASPHALT (3.5 inches)</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CRUSHED LIMESTONE BASE (1 inch)</td>
<td>CH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL, tan, CLAY, with sand, with gravel, damp</td>
<td>CH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLAY, dark gray, with sand, stiff, damp</td>
<td>CH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>...reddish brown, with gravel 5.5' to 8.0'</td>
<td>CH</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>...reddish brown and dark brown, with gravel below 8.0'</td>
<td>CH</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>SAND, reddish tan, fine to coarse grained, with gravel, damp</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>...gravelly below 14.0'</td>
<td>SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>GRAVEL, reddish brown, with sand, rounded, fine to coarse grained, damp</td>
<td>GC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Termination Depth:** 30.0 feet

**Ground Water Levels:**
- **AT TIME OF DRILLING:** ---
- **AT END OF DRILLING:** ---
- **AFTER DRILLING:** ---

**Hole Size:** 4.5 in.

**Drill Date:** June 4, 2021

**Notes:**

**Ground Elevation:** n/a

**Ground Water Levels:**
- **AT TIME OF DRILLING:** ---
- **AT END OF DRILLING:** ---
- **AFTER DRILLING:** ---

**Termination Depth:** 30.0 feet
<table>
<thead>
<tr>
<th>Major Divisions</th>
<th>Symbols</th>
<th>Typical Descriptions</th>
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<tbody>
<tr>
<td>Coarse Grained Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravel and Gravelly Soils</td>
<td>GW</td>
<td>Well-graded gravels, gravel-sand mixtures, little or no fines</td>
</tr>
<tr>
<td>(Little or no fines)</td>
<td>GP</td>
<td>Poorly-graded gravels, gravel-sand mixtures, little or no fines</td>
</tr>
<tr>
<td>Gravels with Fines</td>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures</td>
</tr>
<tr>
<td>(Appreciable amount of fines)</td>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures</td>
</tr>
<tr>
<td>Sand and Sandy Soils</td>
<td>SW</td>
<td>Well-graded sands, gravelly sands, little or no fines</td>
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<tr>
<td>(Little or no fines)</td>
<td>SP</td>
<td>Poorly-graded sands, gravelly sand, little or no fines</td>
</tr>
<tr>
<td>Sands with Fines</td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures</td>
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<tr>
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<td>SC</td>
<td>Clayey sands, sand-clay mixtures</td>
</tr>
<tr>
<td>Fine Grained Soils</td>
<td></td>
<td></td>
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<tr>
<td>Silts and Clays</td>
<td>ML</td>
<td>Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity</td>
</tr>
<tr>
<td>Liquid limit less than 50</td>
<td>CL</td>
<td>Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays</td>
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<tr>
<td>Clays</td>
<td>OL</td>
<td>Organic silts and organic silty clays of low plasticity</td>
</tr>
<tr>
<td>Liquid limit greater than 50</td>
<td>CH</td>
<td>Inorganic clays of high plasticity</td>
</tr>
<tr>
<td>Soils of Moderate Plasticity</td>
<td>CL-CH</td>
<td>Low PI clays with appreciable high PI mottling, clay with borderline classification</td>
</tr>
<tr>
<td>Other Materials</td>
<td>FILL</td>
<td>Material not naturally deposited</td>
</tr>
<tr>
<td>Fill</td>
<td>LS</td>
<td>Weathered limestone</td>
</tr>
<tr>
<td>Intact Limestone</td>
<td>NOTE: Dual symbols are used to indicate borderline soil classifications</td>
<td></td>
</tr>
</tbody>
</table>
### Key to Terms and Abbreviations

#### Descriptive Terms Characterizing Soils and Rock

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argillaceous</td>
<td>having appreciable amounts of clay in the soil or rock mass. Used most often in describing limestones, occasionally sandstones.</td>
</tr>
<tr>
<td>Calcareous</td>
<td>containing appreciable quantities of calcium carbonate. Can be either nodular or “powder.”</td>
</tr>
<tr>
<td>Crumbly</td>
<td>cohesive soils which break into small blocks or crumbs on drying.</td>
</tr>
<tr>
<td>Evaporite</td>
<td>deposits of salts and other soluble compounds. Most commonly calcium carbonate or gypsum. May be in either “powder” or visible crystal form.</td>
</tr>
<tr>
<td>Ferruginous</td>
<td>having deposits of iron or nodules, typically oxidized and dark red in color.</td>
</tr>
<tr>
<td>Ferrous</td>
<td>see Ferruginous</td>
</tr>
<tr>
<td>Fissured</td>
<td>containing shrinkage cracks frequently filled with fine sand or silt, usually more or less vertical.</td>
</tr>
<tr>
<td>Fossiliferous</td>
<td>containing appreciable quantities of fossils, fossil fragments, or traces of fossils</td>
</tr>
<tr>
<td>Laminated</td>
<td>composed of thin layers of varying color or texture. Layers are typically distinct and varying in composition from sand to silt and clay.</td>
</tr>
<tr>
<td>Mottled</td>
<td>characterized as having multiple colors organized in a marbled pattern.</td>
</tr>
<tr>
<td>Slickensided</td>
<td>having inclined planes of weakness that are slick and glossy in appearance.</td>
</tr>
<tr>
<td>Varved</td>
<td>see Laminated</td>
</tr>
</tbody>
</table>

#### Standard Description Abbreviations and Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bm</td>
<td>brown</td>
</tr>
<tr>
<td>dk</td>
<td>dark</td>
</tr>
<tr>
<td>lt</td>
<td>light</td>
</tr>
<tr>
<td>wx</td>
<td>weathered</td>
</tr>
<tr>
<td>calc</td>
<td>calcareous</td>
</tr>
<tr>
<td>sw</td>
<td>severely weathered</td>
</tr>
<tr>
<td>cw</td>
<td>completely weathered</td>
</tr>
<tr>
<td>n/a</td>
<td>not available</td>
</tr>
<tr>
<td>b.</td>
<td>below</td>
</tr>
</tbody>
</table>

#### Engineering Units

<table>
<thead>
<tr>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pcf</td>
<td>pounds per cubic foot</td>
</tr>
<tr>
<td>psf</td>
<td>pounds per square foot</td>
</tr>
<tr>
<td>tsf</td>
<td>tons per square foot</td>
</tr>
<tr>
<td>psi</td>
<td>pounds per square inch</td>
</tr>
<tr>
<td>ksf</td>
<td>kip per square foot</td>
</tr>
</tbody>
</table>

#### Symbols and Abbreviations for Test Data

<table>
<thead>
<tr>
<th>Symbol/Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL</td>
<td>Liquid Limit</td>
</tr>
<tr>
<td>PL</td>
<td>Plastic Limit</td>
</tr>
<tr>
<td>PI</td>
<td>Plastic Index (LL-PL)</td>
</tr>
<tr>
<td>NP</td>
<td>non-plastic</td>
</tr>
<tr>
<td>$\gamma_d$</td>
<td>dry unit weight</td>
</tr>
<tr>
<td>$q_c$</td>
<td>unconfined compressive strength</td>
</tr>
<tr>
<td>$q_c'$</td>
<td>confined compressive strength</td>
</tr>
<tr>
<td>SPT</td>
<td>standard penetration test</td>
</tr>
<tr>
<td>TCP</td>
<td>Texas cone penetration test (Texas Highway Department)</td>
</tr>
<tr>
<td>$N$ or $N_{SPT}$</td>
<td>blows per foot from SPT</td>
</tr>
<tr>
<td>$N_{TCP}$</td>
<td>blows per foot from TCP</td>
</tr>
<tr>
<td>SCR</td>
<td>standard core recovery</td>
</tr>
<tr>
<td>RQD</td>
<td>rock quality designation</td>
</tr>
<tr>
<td>RQI</td>
<td>see RQD</td>
</tr>
</tbody>
</table>

### Terms Describing Consistency of Soil and Rock

#### COARSE GRAINED MATERIAL

<table>
<thead>
<tr>
<th>Descriptive Term</th>
<th>BLOWS/FT (SPT)</th>
<th>Strength, TSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>very loose</td>
<td>0 – 4</td>
<td></td>
</tr>
<tr>
<td>loose</td>
<td>4 – 10</td>
<td>8 – 15</td>
</tr>
<tr>
<td>firm (medium)</td>
<td>10 – 30</td>
<td>15 – 50</td>
</tr>
<tr>
<td>dense</td>
<td>30 – 50</td>
<td>over 50</td>
</tr>
<tr>
<td>very dense</td>
<td>over 50</td>
<td></td>
</tr>
</tbody>
</table>

#### SEDIMENTARY ROCK

<table>
<thead>
<tr>
<th>Descriptive Term</th>
<th>BLOWS/FT (SPT)</th>
<th>Strength, TSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>soft</td>
<td>2 – 4</td>
<td>0.25 – 0.50</td>
</tr>
<tr>
<td>medium stiff</td>
<td>4 – 8</td>
<td>0.50 – 1.00</td>
</tr>
<tr>
<td>stiff</td>
<td>8 – 15</td>
<td>1.00 – 2.00</td>
</tr>
<tr>
<td>very stiff</td>
<td>15 – 30</td>
<td>2.00 – 4.00</td>
</tr>
<tr>
<td>hard</td>
<td>over 30</td>
<td>over 4.00</td>
</tr>
</tbody>
</table>

### Describing Consistency of Fine Grained Soil

<table>
<thead>
<tr>
<th>Descriptive Term</th>
<th>BLOWS/FT (SPT)</th>
<th>Unconfined Compression, TSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>very soft</td>
<td>&lt; 2</td>
<td>&lt; 0.25</td>
</tr>
<tr>
<td>soft</td>
<td>2 – 4</td>
<td>0.25 – 0.50</td>
</tr>
<tr>
<td>medium stiff</td>
<td>4 – 8</td>
<td>0.50 – 1.00</td>
</tr>
<tr>
<td>stiff</td>
<td>8 – 15</td>
<td>1.00 – 2.00</td>
</tr>
<tr>
<td>very stiff</td>
<td>15 – 30</td>
<td>2.00 – 4.00</td>
</tr>
<tr>
<td>hard</td>
<td>over 30</td>
<td>over 4.00</td>
</tr>
</tbody>
</table>

Revised: October 2018

### Sample Type Key

- Auger Cuttings
- Shelby Tube
- Split Spoon (SPT)
- Texas Cone (TCP)
- Rock Core
- No Sample
APPENDIX B

STANDARD FIELD AND LABORATORY PROCEDURES
STANDARD FIELD AND LABORATORY PROCEDURES

STANDARD FIELD PROCEDURES

Drilling and Sampling

Borings and test pits are typically staked in the field by the drillers, using simple taping or pacing procedures and locations are assumed to be accurate to within several feet. Unless noted otherwise, ground surface elevations (GSE) when shown on logs are estimated from topographic maps and are assumed to be accurate to within a foot. A Plan of Borings or Plan of Test Pits showing the boring locations and the proposed structures is provided in the Appendix.

A log of each boring or pit is prepared as drilling and sampling progressed. In the laboratory, the driller’s classification and description is reviewed by a Geotechnical Engineer. Individual logs of each boring or pit are provided in the Appendix. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (ASTM D-2487). A reference key is also provided. The stratification of the subsurface material represents the soil conditions at the actual boring locations, and variations may occur between borings. Lines of demarcation represent the approximate boundary between the different material types, but the transition may be gradual.

A truck-mounted rotary drill rig utilizing rotary wash drilling or continuous flight hollow or solid stem auger procedures is used to advance the borings, unless otherwise noted. A backhoe provided by others is used to place test pits. Test pits are advanced to the required depth, refusal (typically bedrock) or to the limits of the equipment. Samples of soil are obtained from the borings or test pit spoils for subsequent laboratory study. Samples are sealed in plastic bags and marked as to depth and boring/pit locations in the field. Cores are wrapped in a polyethylene wrap to preserve field moisture conditions, placed in core boxes and marked as to depth and core runs. Unless notified to the contrary, samples and cores will be stored for 90 days, then discarded.

Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586) (SPT)

This sampling method consists of driving a 2 inch outside diameter split barrel sampler using a 140 pound hammer freely falling through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven an additional 12 inches. The number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance. The results of the SPT is recorded on the boring logs as "N" values.

Thin-Walled Tube Sampling of Soils (ASTM D-1587) (Shelby Tube Sampling)

This method consists of pushing thin walled steel tubes, usually 3 inches in diameter, into the soils to be sampled using hydraulic pressure or other means. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.
Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of auguring a hole and removing representative soil samples from the auger flight or bit at intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where it is satisfactory to determine the approximate subsurface profile and obtain samples suitable for Index Property testing.

Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water or air is used to remove the cuttings and to cool the bit. Normally, a 3 inch outside diameter by 2-1/8 inch inside diameter coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and in the laboratory and the cores are stored in partitioned boxes. The intactness of all rock core specimens is evaluated in two ways. The first method is the Standard Core Recovery (SCR) expressed as the length of the total core recovered divided by the length of the core run, expressed as a percentage:

\[
SCR = \frac{\text{total core length recovered}}{\text{length of core run}} \times 100\%
\]

This value is exhibited on the boring logs as the Standard Core Recovery (SCR).

The second procedure for evaluating the intactness of the rock cores is by Rock Quality Designation (RQD). The RQD provides an additional qualitative measure of soundness of the rock. This index is determined by measuring the intact recovered core unit which exceed four inches in length divided by the total length of the core run:

\[
RQD = \frac{\text{all core lengths greater than 4”}}{\text{length of core run}} \times 100\%
\]

The RQD is also expressed as a percentage and is shown on the boring logs.

Vane Shear Tests

In-situ vane shear tests may be used to determine the shear strength of soft to medium cohesive soil. This test consists of placing a four-bladed vane in the undisturbed soil and determining the torsional force applied at the ground surface required to cause the cylindrical perimeter surface of the vane to be sheared. The torsional force sufficient to cause shearing is converted to a unit of shearing resistance or cohesion of the soil surrounding the cylindrical surface.
**THD Cone Penetrometer Test**

The THD Cone Penetrometer Test is a standard field test to determine the relative density or consistency and load carrying capacity of foundation soils. This test is performed in much the same manner as the Standard Penetration Test described above. In this test, a 3 inch diameter penetrometer cone is used in place of a split-spoon sampler. This test calls for a 170-pound weight falling 24 inches. The actual test in hard materials consists of driving the penetrometer cone and accurately recording the inches of penetration for the first and second 50 blows for a total of 100 blows. These results are then correlated using a table of load capacity vs. number of inches penetrated per 100 blows.

**Pocket Penetrometer Test**

A pocket penetrometer or hand penetrometer is a small device used to estimate the shear capacity or unconfined compressive strength of a soil sample. The device consists of a spring-loaded probe which measures the pressure required to penetrate the probe into a soil sample for specified depth. This test can only be performed on cohesive soil samples. This pressure is reported in tons per square foot (tsf) on the Logs of Boring. A hyphen (-) indicates that the soil sample was too loose or too soft to perform the test. This test is considered rudimentary and too inaccurate to be used for direct design parameters; however, this test is useful for correlations among soil strata and general stiffness descriptions.

**Ground Water Observation**

Ground moisture observations are made during the operations and are reported on the logs of boring or pit. Moisture condition of cuttings are noted, however, the use of water for circulation precludes direct observation of wet conditions. Water levels after completing the borings or pits are noted. Seasonal variations, temperatures and recent rainfall conditions may influence the levels of the ground water table and water may be present in excavations, even though not indicated on the logs.
STANDARD LABORATORY PROCEDURES

To adequately characterize the subsurface material at this site, some or all of the following laboratory tests are performed. The results of the actual tests performed are shown graphically on the Logs of Boring or Pit.

**Moisture Content - ASTM D-2216**

Natural moisture contents of the samples (based on dry weight of soil) are determined for selected samples at depths shown on the respective boring logs. These moisture contents are useful in delineating the depth of the zone of moisture change and as a gauge of correlation between the various index properties and the engineering properties of the soil. For example, the relationship between the plasticity index and moisture content is a source of information for the correlation of shear strength data.

**Dry Density - ASTM D-7263**

The dry density, $\gamma_d$, (bulk density or unit weight) of the samples is determined for selected samples at depths shown on the respective boring logs using Method B of the aforementioned ASTM standard. The in-situ density was determined from undisturbed SPT samples and the dry density was calculated using moisture content results. These dry density values are useful for calculating other characteristic values such as porosity, void ratio, and mass composition of soil. Additionally, these values can also be used to assess the degree of compaction or consolidation of fill materials.

**Atterberg Limits - ASTM D-4318**

The Atterberg Limits are the moisture contents at the time the soil meets certain arbitrarily defined tests. At the moisture content defined as the plastic limit, Pw, the soil is assumed to change from a semi-solid state to a plastic state. By the addition of more moisture, the soil may be brought up to the moisture content defined as the liquid limit, Lw, or that point where the soil changes from a plastic state to a liquid state. A soil existing at a moisture content between these two previously described states is said to be in a plastic state. The difference between the liquid limit, Lw, and the plastic limit, Pw, is termed the plasticity index, Iw. As the plasticity index increases, the ability of a soil to attract water and remain in a plastic state increases. The Atterberg Limits that were determined are plotted on the appropriate log.

The Atterberg Limits are quite useful in soil exploration as an indexing parameter. Using the Atterberg Limits and grain size analysis, A. Casagrande developed the Unified Soils Classification System (USCS) which is widely used in the geotechnical engineering field. This system related the liquid limit to the plasticity index by dividing a classification chart into various zones according to degrees of plasticity of clays and silts. Although the Atterberg Limits are an indexing parameter, K. Terzaghi has related these limits to various engineering properties of a soil. Some of these relationships are as follows:
1. As the grain size of the soil decreases, the Atterberg Limits increase.
2. As the percent clay in the soil increases, the Atterberg Limits increase.
3. As the shear strength increases, the Atterberg Limits decrease.
4. As the compressibility of a soil increases, the Atterberg Limits increase.

**Free Swell Test - ASTM D-4546-96**

The free swell test assesses the potential for swell of soil. This value is useful for the design of various structures such as slab-on-ground foundations, piers and piles, and underground utilities. Method B of the aforementioned ASTM standard determines the amount of swell (vertical heave) of a sample. This is done by placing the sample in a consolidometer under a seating load equal to the overburden pressure and giving the sample free access to water. The height is measured and the swell is calculated as the vertical displacement divided by the original height of the specimen. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

**Swell Pressure Test - ASTM D-4546-96**

The swell pressure test assesses the potential for swell of soil. This value is useful for the design of various structures such as slab-on-ground foundations, piers and piles, and underground utilities. Method C of the aforementioned ASTM standard determines the pressure required to keep a soil sample at equilibrium under swelling conditions. This is done by placing the sample in a consolidometer under a seating load and giving the sample free access to water. A constant height of the sample is maintained and the vertical pressure on the sample is adjusted until equilibrium is reached. The vertical pressure on the sample at equilibrium is reported as the swell pressure. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

**Soil Suction Test - ASTM D-5298-94**

Soil suction (potential) tests are performed to determine both the matric and total suction values for the samples tested. Soil suction measures the free energy of the pore water in a soil. In a practical sense, soil suction is an indication of the affinity of a given soil sample to retain water. Soil suction provides useful information on a variety of characteristics of the soil that are affected by the soil water including volume change, deformation, and strength.

Soil suction tests are performed using the filter paper method per ASTM D-5298. Results of these tests are shown graphically on the logs of boring and tabulated in summary sheet of laboratory data.

For matric suction values found using this method, it should be noted that when the soil is in a dry state adequate contact between the filter paper and the soil may not be possible. This lack of contact may result in the determination of total suction instead of matric suction.
**Triaxial Shear Test - ASTM D-2850-70**

Triaxial tests may be performed on samples that are approximately 2.83 inches in diameter, unless a smaller diameter sample was necessary to achieve a more favorable length:diameter (L:D) ratio. A minimum length to diameter ratio (L:D) of 2.0 is maintained to reduce end effects.

The triaxial tests are typically unconsolidated-undrained using nitrogen gas for chamber confining pressure. Confining pressures are selected to conform to in-situ hydrostatic pressure considering the earth to be a fluid of 120 pcf. In this test, undisturbed Shelby tube samples are trimmed so that their ends are square and then pressed in a triaxial compression machine. The load at which failure occurs is the compressive strength. The results of the triaxial tests and the correlated hand penetrometer strengths can be utilized to develop soil shear strength values. These test provide the confined compressive strength, $q_c$, which are presented on the Logs of Boring at the depth of the samples tested.

**Unconfined Compressive Strength of Rock Cores - ASTM D-2938**

The unconfined compressive strength, $q_u$, is a valuable parameter useful in the design of foundation footings. This value, $q_u$, is related to the shearing resistance of the rock and thus to the capacity of the rock to support a load. In completing this test it is imperative that the length:diameter ratio of the core specimens are maintained at a minimum of 2:1. This ratio is set so that the shear plane will not extend through either of the end caps. If the ratio is less than 2.0 a correction is applied to the result.

**Grain Size Analysis - ASTM D-421 and D-422**

Grain size analysis tests are performed to determine the particle size and distribution of the samples tested. The grain size distribution of the soils coarser than the Standard Number 200 sieve is determined by passing the sample through a standard set of nested sieves, and the distribution of sizes smaller than the No. 200 sieve is determined by a sedimentation process, using a hydrometer. The results are given on the log of Boring/Pit or on Grain Size Distribution semi-log graphs within the report.

**Slake Durability Test - ASTM D-4644**

The slake durability test provides an index for the durability of a shale, or similar rock, considering the effects of wetting, drying, and abrasion. This index is used to quantify the strength of weak rock formations when exposed to natural wetting and drying cycles, especially in the context of underground tunneling and excavation. The index, $I_d(2)$, represents the percentage, by mass, of rock material retained after two wetting and drying cycles. These cycles are simulated by oven drying the sample followed by ten minutes of tumbling and soaking in water within a drum and trough apparatus. After tumbling and soaking, the sample is oven-dried and the mass of the sample is recorded. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.
**Brazilian Tensile Strength - ASTM D-3967**

The Brazilian (splitting) tensile strength, $\sigma_t$, is useful in rock mechanics design, especially in regard to tunneling. This value is an indirect representation of the true uniaxial tensile strength. The Brazilian test is typically used more commonly than direct tensile strength tests because it is less difficult, more cost effective, and more represented of in-situ conditions. The test is conducted by mechanically compressing a rock core sample along its vertical diameter, causing the sample to fail due to tension along the horizontal diameter caused by the Poisson effect.

**CERCHAR Abrasivity Index (CAI) Test - ASTM D-7625**

The CERCHAR Abrasivity Index (CAI) is used to determine the abrasivity of rocks. This is particularly useful in assessing the potential wearing on cutting tools during excavation. The CAI of a rock is determined by the CERCHAR test, which consists of scraping steel pins across a rock surface and measuring the wear of each pin. The rock specimen is held in a mechanical vice, while a conical steel pin fastened to a 15-pound head is drug across the face of the specimen using a lever being pulled 1 centimeter in 1 second. The CAI is calculated based on the resultant diameter on the end of the pin.
Attachment F Property Boundary
FIELD NOTES FOR A 7.107 ACRE (309,562 SQUARE FOOT) PARCEL OF LAND IN THE SANTIAGO DEL VALLE SURVEY, ABSTRACT NO. 24, TRAVIS COUNTY, TEXAS; BEING ALL OF A CALLED 7.104 ACRE TRACT OF LAND DESCRIBED IN EXHIBIT “B” AS CONVEYED TO BERGSTROM STORAGE, LLC BY SPECIAL WARRANTY DEED RECORDED IN DOCUMENT NUMBER 2018029726 OF THE OFFICIAL PUBLIC RECORDS OF TRAVIS COUNTY, TEXAS; SAID 7.107 ACRE PARCEL OF LAND BEING MORE PARTICULARLY DESCRIBED BY METES AND BOUNDS AS FOLLOWS:

BEGINNING at a 1/2-inch iron rod found inside of a 2-inch pipe (NAD-83, Central Zone Surface Coordinates: N: 10,059,217.34, E: 3,133,032.69) on the northwest line of a called 4.0 acre tract of land as conveyed to State of Texas by instrument recorded in Volume 871, Page 623 of the Deed Records of Travis County, Texas, at the most easterly corner of the above described Bergstrom Tract, and at the south corner of Lot 1, THE ROGERS SUBDIVISION, a subdivision recorded in Book 85, Page 55C of the Plat Records of Travis County, Texas, for the most easterly corner and POINT OF BEGINNING of the herein described tract, from which a 1/2-inch iron rod found on the southwest right-of-way line of U.S. Highway 183 (width varies), at the east corner of the remainder of said Lot 1 and at the north corner of the remainder of said State of Texas 4.0 acre tract, bears N 42°25'48" E a distance of 418.11 feet;

THENCE, with the southeast line of said Bergstrom Tract and the northwest line of said State of Texas 4.0 acre tract, SOUTH 42°23'52" WEST a distance of 442.98 feet to 1/2-inch iron rod found at the west corner of said State of Texas 4.0 acre tract, and at the north corner of a called 3.0 acre tract of land as conveyed to State of Texas by instrument recorded in Volume 2270, Page 238 of the Deed Records of Travis County, Texas, for an angle point;

THENCE, with the southeast line of said Bergstrom Tract and the northwest line of said State of Texas 3.0 acre tract, SOUTH 42°00'29" WEST a distance of 414.59 feet to a mag nail found at the west corner of said State of Texas 3.0 acre tract, and at the north corner Lot 1, PALM HARBOR, a subdivision recorded in Book 82, Page 239-240 of the Plat Records of Travis County, Texas, for an angle point;
THENCE, with the southeast line of said Bergstrom Tract and the northwest line of said Lot 1, PALM HARBOR, SOUTH 42°18'32" WEST a distance of 61.15 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found at the south corner of said Bergstrom Tract, and at the east corner of Lot 26, AMENDED PLAT OF FRONTIER AT MONTANA, a subdivision recorded in Document Number 200600392 of the Official Public Records of Travis County, Texas, for the south corner of the herein described tract;

THENCE, departing the northwest line of said Lot 1, PALM HARBOR, with the southwest line of said Bergstrom Tract and the northeast line of said Lot 26, AMENDED PLAT OF FRONTIER AT MONTANA, NORTH 56°06’26” WEST a distance of 263.26 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found at the west corner of said Bergstrom Tract, and at the south corner of a called 19.127 acre tract of land described in Exhibit “A” as conveyed to City of Austin by Special Warranty Deed recorded in Document Number 2011192072 of the Official Public Records of Travis County, Texas, for the west corner of the herein described tract, from which a disturbed 1/2-inch iron rod found on the northeast line of said Lot 26, at the west corner of said City of Austin Tract, bears NORTH 56°07’48” WEST a distance of 510.82 feet;

THENCE, departing the northeast line of said Lot 26, with the northwest line of said Bergstrom Tract and the southeast line of said City of Austin Tract, the following five (5) courses:

1) NORTH 39°56'45" EAST a distance of 120.01 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found for angle point;

2) NORTH 13°46'09" EAST a distance of 60.05 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found for angle point;

3) NORTH 33°27’42” EAST a distance of 264.05 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found for angle point;

4) NORTH 41°33’19” EAST a distance of 281.99 feet to a 1/2-inch iron rod with cap stamped “BURY & PARTNERS” found for angle point; and

5) NORTH 21°45’51” EAST a distance of 257.68 feet to a 1/2-inch iron rod found at the north corner of said Bergstrom Tract, at an easterly corner of said City of Austin Tract, at the west corner of said Lot 1, and at the south corner of Lot 2, both of said THE ROGER SUBDIVISION, for the north corner of the herein described tract;
THENCE, with the northeast line of said Bergstrom Tract and the southwest line of said Lot 1, THE ROGERS SUBDIVISION, SOUTH 47°44'44" EAST a distance of 427.33 feet to the POINT OF BEGINNING and containing 7.107 acres (309,562 square feet) of land, more or less.

I hereby certify that these notes were prepared from a survey made on the ground by BGE Inc., under my supervision on July 19, 2023 and are true and correct to the best of my knowledge. Bearing orientation is based on the Texas State Plane Coordinate System, NAD 83, Texas Central Zone 4203. Distances shown hereon are in surface and can be converted to grid by using the combined scale factor = 1.00011. A survey plat accompanies this description.

Damian G. Fisher RPLS No. 6928
BGE, Inc.
101 West Louis Henna Blvd, Suite 400
Austin, Texas 78728
Telephone: (512) 879-0400
TBPLS Licensed Surveying Firm No. 10106502

Client: Texas Department of Transportation
Date: July 31, 2023
Job No: 7965-01

7/31/2023
Date
SKETCH TO ACCOMPANY LEGAL DESCRIPTION

7.107 ACRES
BERGSTROM STORAGE, LLC
ALL OF A CALLED 7.104 ACRES
(TRACT 2)
DOCUMENT NO. 2018029726 O.P.R.T.C.

STATE OF TEXAS
REMAINDER OF A
CALLED 4.0 ACRES
VOL. 871, PG. 623
D.R.T.C.

STATE OF TEXAS
CALLED 3.0 ACRES
VOL. 2270, PG. 238
D.R.T.C.
GENERAL NOTES

1. BEARING ORIENTATION IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE 4203, NAD83. DISTANCES SHOWN HEREON ARE IN SURFACE AND CAN BE CONVERTED TO GRID BY USING THE COMBINED SCALE FACTOR = 1.00011

2. THE PROPERTY LIES IN UNSHAPED ZONE "X" (UNSHAPED) (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) AS DELINEATED ON THE FLOOD INSURANCE RATE MAPS FOR TRAVIS COUNTY, TEXAS AND INCORPORATED AREAS, MAP NUMBERS 48453C00605K AND 48453C00610L, BOTH REVISED JANUARY 22, 2020. ANY FLOODPLAIN BOUNDARIES SHOWN HEREON ARE APPROXIMATE AND ARE NOT DEPICTED AS A RESULT OF AN ON THE GROUND SURVEY.


RESTRICTIVE CovenANT AND EASEMENT NOTES:

1. RESTRICTIVE COVENANTS OF RECORD IN VOLUME 16, PAGE 82, MAP RECORDS, TRAVIS COUNTY, TEXAS, DO NOT AFFECT THE SUBJECT TRACT, RESTRICTIVE COVENANTS OF RECORD IN CLERK'S FILE NO. 2018149846, OFFICIAL PUBLIC RECORDS, TRAVIS COUNTY, TEXAS, DO AFFECT THE SUBJECT TRACT.

10g. TERMS AND CONDITIONS OF THAT CERTAIN EASEMENT ESTATE CREATED BY THAT CERTAIN SPECIAL WARRANTY DEED DATED DECEMBER 28, 2011, AND RECORDED IN CLERK'S FILE NO. 2011192072, TRAVIS COUNTY, TEXAS, DO AFFECT THE SUBJECT TRACT, BUT MAY HAVE BEEN TERMINATED TEN YEARS AFTER THE DATE OF EXECUTION OF THE ABOVE MENTIONED WARRANTY DEED.

10f. ALL MATTERS AS SHOWN ON THE MAP/PLAT RECORDED IN VOLUME 16, PAGE 82, MAP RECORDS, TRAVIS COUNTY, TEXAS, DO NOT AFFECT THE SUBJECT TRACT.

I hereby certify that this survey was made on the ground by BGE, Inc. under my supervision on May 12, 2022 and is true and correct to the best of my knowledge. There are no visible encroachments, except as shown hereon.

7/31/2023

DAMIAN G. FISHER
RPLS NO. 6928
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
AUSTIN, TEXAS 78728
TELEPHONE: (512) 879-0400

PARCEL PLAT SHOWING
PARCEL P00077721
7.107 ACRES
SANCTIAGO DEL VALLE GRANT
TRAVIS COUNTY, TEXAS

CSJ:
0015–13–428

RCSJ:
0015–13–435

Scale:
1"=100'
Attachment E Cabin Specifications
FACTORY MUTUAL APPROVALS

Standards
Approval standard for class 1 fire rating of building panels or interior finish materials
4880
Approval standard for class 1 exterior wall systems
4881
Approval standard for class 1 panel roofs
4471

Examination and test

<table>
<thead>
<tr>
<th>Number</th>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4880</td>
<td>4.1</td>
<td>Room Test</td>
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<tr>
<td>4880</td>
<td>4.2</td>
<td>Flammability Characterization</td>
</tr>
<tr>
<td>4880</td>
<td>4.3</td>
<td>16ft High Parallel Panel Test</td>
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<tr>
<td>4880</td>
<td>4.6</td>
<td>Density of Insulating Cores</td>
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<tr>
<td>4880</td>
<td>4.9</td>
<td>Ignition Properties</td>
</tr>
<tr>
<td>4880</td>
<td>4.10</td>
<td>Heat Content</td>
</tr>
<tr>
<td>4880</td>
<td>4.11</td>
<td>Ash Content</td>
</tr>
<tr>
<td>4881</td>
<td>4.1</td>
<td>Wind Pressure Rating</td>
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<tr>
<td>4881</td>
<td>4.3</td>
<td>Hail Resistance Rating</td>
</tr>
<tr>
<td>4471</td>
<td>4.1</td>
<td>Combustibility below the Roof Deck</td>
</tr>
<tr>
<td>4471</td>
<td>4.2</td>
<td>Combustibility above the Roof Deck</td>
</tr>
<tr>
<td>4471</td>
<td>4.3</td>
<td>Wind Uplift Resistance</td>
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<td>4471</td>
<td>4.4</td>
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<tr>
<td>4471</td>
<td>4.5</td>
<td>Hail Damage Resistance Test</td>
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</table>

Building insulations - wall and ceilings (FM approval class numbers 4411, 4651, 4880, 4881, 4882)

A U.S. ESR or Canadian ESL report can be provided on request for additional certifications
ISOCINDU FOR LEED® CERTIFICATION

Our contribution to the efficiency and sustainability of buildings

LEED BD+C V4

What is LEED®

LEED® (Leadership in Energy Environmental Design) is a certification system for the management, design and construction of buildings that are sustainable from a social, environmental and economic point of view and in terms of the wellbeing of the users. Established in the United States in 1993 by the U.S. Green Building Council (USGBC), LEED is now the most widespread building sustainability certification standard in the world. It considers every field that involves the design and management of buildings or neighbourhoods, both commercial and residential new or undergoing requalification.

IsoCindu insulating panels contribute satisfying prerequisites and credits under LEED®.

Energy efficiency and savings are the guiding concepts to Isopan production management as well as our commitment to the research and development of innovative solutions. Our insulating panels for roofs or walls contribute toward satisfying prerequisites and credits under LEED BD+C (Building Design and Construction) V4 in the following areas:

**INTEGRATIVE PROCESS**
Integrated process

**SUSTAINABLE SITES**
Sustainable sites

**ENERGY AND ATMOSPHERE**
Energy and atmosphere

**MATERIALS AND RESOURCES**
Materials and resources

**INDOOR ENVIRONMENTAL QUALITY**
Indoor environmental quality
LEAF TECHNOLOGY

LEAF is the most advanced technology that summarizes all of the IsoCindu approach as a whole.

LEAF is the IsoCindu technology applied to insulation formulas and provides important properties to wall and roofing panels, while contributing towards obtaining credits for the LEED (Leadership in Energy and Environmental Design) certifications.

+20% THERMAL INSULATION

The LEAF solution improves the thermal performance of the isolating material, in particular by reducing the thermal conductivity value of the polyurethane foam. With the same thickness, it is possible to obtain lower thermal transmittance compared to a standard product.

B-S1, D0 CERTIFICATION

LEAF technology has obtained the maximum reaction to fire certification in Europe for polyurethane panels, called B-s1,d0.

The achievement of the “s1” performance is particularly meaningful and important for polyurethane panels, since it attests the absence of fumes originating from exposure of foam to fire.

HALOGEN-FREE COMPONENTS

The flame retardants commonly used to improve the fire resistance of material are made from halogenated compounds, which are potentially harmful to the environment. With LEAF technology, IsoCindu ensures high performance in terms of fire behaviour without using halogenated flame retardants. Moreover, the excellent performance of LEAF insulation materials allow for lower energy consumption with the resulting reduction of CO2 emissions.
WALL PANELS
It is a double-steel sheet wall panel and insulated with polyisocyanurate rigid foam. The tongue-and-grove joint is completed by exposed fasteners and saddle clip. External face available in Mesa, Striated, and Flat profiles. The internal face is standard with the box profile (contact us for other options).

**EXCLUSIVE VAPOR BARRIER GASKET**
Typical panel length is 8' up to a maximum of 56' (Subject to transportation limitations)

**FOAM DENSITY**
2.25 LB/FT³

**THERMAL INSULATION**

<table>
<thead>
<tr>
<th>15°F</th>
<th>20°F</th>
<th>21°F</th>
<th>30°F</th>
<th>40°F</th>
<th>50°F</th>
<th>60°F</th>
<th>80°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.01</td>
<td>2.48</td>
<td>3.10</td>
<td>3.72</td>
<td>4.96</td>
<td>6.20</td>
<td>7.44</td>
<td>9.92</td>
</tr>
<tr>
<td>R m²K/W</td>
<td>H·Ft²-Btu</td>
<td>R m²K/W</td>
<td>H·Ft²-Btu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.44</td>
<td>14.08</td>
<td>17.61</td>
<td>21.13</td>
<td>28.17</td>
<td>35.21</td>
<td>42.25</td>
<td>56.34</td>
</tr>
</tbody>
</table>

These Span & Load Charts were converted from Metric to Imperial Units. The performance criteria was developed from years of products testing used in ISOPAN Europe / ISOCINDU Central & South America. Actual Load Calculation Requirements are Project specific and must be determined by the Design Team and/or the Structural Engineer of Record. Manni Green Tech will provide assistance, as may be required, to determine the best system for the specific Project Design Requirements. These Charts are for base reference use only.
It is a double-steel sheet wall panel, insulated with polyisocyanurate rigid foam. The tongue-and-groove joint completed by concealed fasteners and saddle clip. External faces are available in Mesa, Striated, and Flat profiles. The internal face is standard with the box profile (contact us for other options).
### STEEL SHEETS 26/26 (GA) - BEARING 4 5/8"

<table>
<thead>
<tr>
<th>PANEL NOMINAL THICKNESS</th>
<th>PSF</th>
<th>MAX SPANS ft-in</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 5/8&quot;</td>
<td>10.24</td>
<td>10' 5 5/8&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
<td>12.29</td>
<td>12' 5 5/8&quot;</td>
</tr>
<tr>
<td>2&quot; 1/2&quot;</td>
<td>16.38</td>
<td>15' 3/4&quot;</td>
</tr>
<tr>
<td>3&quot;</td>
<td>20.48</td>
<td>14' 3 3/4&quot;</td>
</tr>
<tr>
<td>4&quot;</td>
<td>24.57</td>
<td>13' 2 3/8&quot;</td>
</tr>
<tr>
<td>5&quot;</td>
<td>28.67</td>
<td>12' 11/8&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>32.77</td>
<td>11' 10 1/8&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>36.86</td>
<td>10' 9 1/8&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>40.96</td>
<td>9' 8 1/4&quot;</td>
</tr>
</tbody>
</table>

### DIMENSIONAL TOLERANCE

**DEVIAITION**

- **Length**: L ≤ 9'10" ± 1/8", L > 9'10" ± 3/8"  
- **Working length**: D ≤ 4" ± 1/16", D > 4" ± 2%  
- **Perpendicularity deviation**: 1/4"  
- **Misalignment of the internal metal surfaces**: ± 1/8"  
- **Bottom sheet coupling**: F = 1 + 1/8"  

**L** = working length, **D** = panel thickness, **F** = sheet coupling

### THERMAL INSULATION

<table>
<thead>
<tr>
<th>PANEL NOMINAL THICKNESS</th>
<th>75 °F Mean Temp (23.9°C)</th>
<th>35 °F Mean Temp (1.67°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 5/8&quot;</td>
<td>R = m²K/W H·ft²·F/Btu</td>
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<td>3&quot;</td>
<td>3.10</td>
<td>3.46</td>
</tr>
<tr>
<td>4&quot;</td>
<td>3.72</td>
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<td>5.54</td>
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<tr>
<td>6&quot;</td>
<td>6.20</td>
<td>6.93</td>
</tr>
<tr>
<td>8&quot;</td>
<td>7.44</td>
<td>8.32</td>
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ROOF PANELS
This system is our isocop panel inverted to allow application of a PVC or TPO roofing system. The addition of being able to apply a single PLY membrane system to our polyiso panel is ideal for flat to very low roof slopes. Further providing a waterproofed and aesthetically pleasing system in any location. The system is ideal for commercial and industrial applications.

**Benefits**

- High resistance to atmospheric agents and U.V. rays.
- High mechanical strength
- High puncture resistance
- High water intrusion resistance
- High resistance to moderate chemical degradation
### ISODECK PVSTEEL

#### OVERLOAD WHEELBASE

<table>
<thead>
<tr>
<th>UNIFORMLY DISTRIBUTED LOAD</th>
<th>STEEL SHEETS 26/20 (GA) - BEARING 4 5/8”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PANEL THICKNESS</strong></td>
<td><strong>PANEL THICKNESS</strong></td>
</tr>
<tr>
<td>in</td>
<td>2”</td>
</tr>
<tr>
<td>PSF</td>
<td>12.29</td>
</tr>
<tr>
<td>MAX SPANS ft.in</td>
<td>15’ 3/8”</td>
</tr>
</tbody>
</table>

#### PANEL WEIGHT

<table>
<thead>
<tr>
<th>STEEL THICKNESS GA</th>
<th>PANEL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>26/26</td>
<td>2”</td>
</tr>
<tr>
<td></td>
<td>PSF</td>
</tr>
<tr>
<td>24/26</td>
<td>2.51</td>
</tr>
<tr>
<td>24/24</td>
<td>2.85</td>
</tr>
<tr>
<td>22/26</td>
<td>2.70</td>
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#### DIMENSIONAL TOLERANCE

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<td><strong>Length</strong></td>
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<td>± 1/8”</td>
</tr>
<tr>
<td>L &gt; 9’10”</td>
</tr>
<tr>
<td>± 3/8”</td>
</tr>
<tr>
<td><strong>Working length</strong></td>
</tr>
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<tr>
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<tr>
<td><strong>Misalignment of the internal metal surfaces</strong></td>
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<tr>
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<tr>
<td><strong>Bottom sheet coupling</strong></td>
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<td>2”</td>
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<tr>
<td>2 1/2”</td>
<td>2 1/2”</td>
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<td>3”</td>
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<td>5”</td>
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<td>8”</td>
<td>8”</td>
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<td>11.09</td>
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A Double steel roof panel assembly insulated with polyisocyanurate rigid foam. This design caters to “low sloped” pitched roofs. Sheets have (4) trapezoidal rows on each panel to enhance static and dynamic forces. Panels are fastened with an exposed fastening system that includes saddle clips at each anchoring point. Systems applicable in design to incorporate within a multitude of roofing sub structure assemblies.

Joint system detail and base tolerances
5” 2 1/2” 1 1/2” 6” 8”

1.86
10.56
20.2 1/8” 80.0

10.14
19.32
31.50
51.98

2.48
17.61
80.0

3.72
28.17
12.13
35.21
42.25
56.34

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SELECTING THE PRE-PAINTED PRODUCT

A pre-lacquered steel product is composed of zinc base coat with subsequent primer and finish coats. See layer buildout section below.

Coating Selection
The end user either on their own or with help from a designer, will need to consider all factors prior to selection.

External and internal faces
The Architect or Design Manager must consider that the two faces of the panel will be in contact with two significantly different environments. The External face will be in contact with the pollutants present in the atmosphere, sun and solar spectrum UV rays. In addition to, raising the temperature of the external metal face, it will cause a physical-chemical reaction on the organic coating. Internal faces will have a temperature significantly lower due to insulation of the panel. The internal environment and the potential pollutants of production lines and chemical agents used in those processes, all need to be considered for the internal panel face selection.

The choice of panel should be done based on required durability relative to the environments where the product will be installed, the aesthetic aspect and economic value. IsoCindu provides a wide range of metal.

Face Options:
1) Hot zinc steels, zinc-aluminized steel, pre-lacquered steel.
2) Natural aluminum or pre-lacquered, copper and stainless steel.

Pre-painted panel laminates
Pre-painted panel laminates contribute immensely to the panel structural features, thanks to the quality of the steel products used, they guarantee the longevity of insulating mass protection. Providing the panel and the building with unique aesthetic characteristics and value over time.
## Finish and Colors

### Finish

- Smooth Finish
- Embossed Finish 9002 / 9010
- Stainless Steel Finish

### Standard Polyester

The colors listed below represent the IsoCindu standard.

- **RAL 9010**
  - Pure White
- **RAL 9002**
  - White Grey

### Siliconized Modify Polyester

The colors listed below consult availability and delivery time.

- **SIMIL RAL 9010**
  - Pure White
- **SIMIL RAL 9002**
  - White Grey
- **SIMIL RAL 9001**
  - Cream

### Solid PVDF Colors – Kynar 500® / Hylar 5000

Coatings are durable polyvinylidene coating system containing 70% Kynar or Hylar resins, ceramic and other inorganic pigments. This system provides a powerful chemical bond, superior resistance to ultraviolet radiation resulting in exceptional color retention, resistance to chalking and chemical degradation. **20 years warranty**

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
</table>
| **RAL 9010**
  - Pure White
| **SIMIL RAL 9006**
  - Silver Grey
| **SIMIL RAL 5010**
  - Genecian Blue
| **RAL 9002**
  - White Grey
| **SIMIL RAL 1013**
  - Pearl White
| **SIMIL RAL 6028**
  - Pine Green
| **SIMIL RAL 9001**
  - Cream
| **SIMIL RAL 1015**
  - Light Ivory
| **SIMIL RAL 7016**
  - Anthracite Grey
| **SIMIL RAL 8004**
  - Cooper Brown

0.8 mil Color Coat
0.2 mil Primer
Steel

**IMPORTANT:** For stock availability, thickness, supports, non-standard colors and guarantees, contact Manni Green Tech USA / IsoCindu. Colors may vary depending on the batch of numeric codes that correspond to the most similar RAL code.  
*Custom colors will be an up charged*
WE INVEST IN TECHNOLOGY

In the face of great challenges and market variables, IsoCindu offers products that meet the most stringent specifications in terms of controlled environments for the agricultural / food industry, medical, healthcare, schools and various private industries as they require. Panels with special characteristics and technical properties that give our customers the best alternatives to their requirements.

Panels with special application for:

- Food manufacturing
- Cold storage and packaging
- Clean rooms and data centers
- Pharmaceutical Industry
- Medical facilities

Main characteristics:

- Suitable for the food industry
- Non toxic
- Chemically inert
- Ant-static
- Flexibility