Exhibit A - EPC Bid Package Scope of Work

West Plains Facility Upgrades

Port of Brownsville, Texas
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HDR Engineering Inc. 555 N. Carancahua, Suite 1600
Corpus Christi, TX 78401-0849 (361) 696-3300
TBPELS Firm Registration No. F-754

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1 General Requirements

1.1 The proposed upgrades to the site are broken into two different bid packages, Rail Work and Material Handling.

1.2 Bidders must provide acceptable qualifications and experience with their bids.

1.3 Bidders shall have the opportunity to bid on one or both bid packages. Owner reserves the right to award each bid package separately.

2 General Description of Scope of Work by Rail Contractor

2.1 The scope of Work includes the procurement and construction of new rail and rail drainage layout in coordination with the rest of the site upgrades at the West Plains LLC Port of Brownsville site in Port of Brownsville, TX as described in these specifications, reference drawings, and appendices.

2.2 The Contractor is responsible for the construction of rail and rail drainage engineering plans prepared by HDR and approve by OmniTRAX. These plans once approved will be delivered with approved specifications as an Issued for Construction (IFC) package.

2.3 At the completion of the project the Contractor shall provide to the Owner one (1) complete electronic set of as-built drawings in both Portable Document Format (.pdf) and AutoCAD (.dwg) format. The Owner's drawing numbering system shall be utilized on all Contractor drawings.

2.4 The Contractor shall furnish the entire scope of work in accordance with these specifications and all materials, equipment, and services required to complete the rail and rail drainage installation, except as noted in Section 1.2.

2.5 The Contractor shall assist the Owner in a timely manner to obtain permits required for rail or rail drainage installation. The Owner is responsible for permit costs. The Contractor is responsible for all support documentation, drawings, and professional seals/approvals required to obtain the permit. The Contractor and subcontractor(s) are responsible for their own construction licensing fees and any permits related to operating a construction business.

2.6 The contractor shall follow OmniTRAX Technical Specifications for Industrial Tracks.

2.7 Where guidelines for construction are not found in OmniTRAX Technical Specifications then the contractor shall follow American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering.

2.8 The Contractor shall locate and mark all existing utilities and underground structures.

2.9 The Contractor shall furnish all construction equipment.

2.10 The Contractor shall supply all materials, including fasteners, associated with installing the Owner supplied equipment.

2.11 The Contractor shall be responsible for the excavation, installation, subgrade preparation, and backfill for proposed rail alignments. Excess excavated material shall be disposed of in an area designated by the Owner, but no more than 1 mile away from the site of the excavation. If the material excavated is unsuitable for use as backfill, the Contractor shall provide suitable material for use. The Owner will determine if the excavated material is suitable for backfill.

2.12 For the purpose of bidding, the Contractor shall assume a minimum 8 inches of subballast and 8 inches of ballast under tracks, conservative bearing pressure of 2,000 psf and that no special foundation treatments will be required.

2.13 The Contractor's Proposal shall provide a schedule for completion of the construction of the rail and rail drainage.

2.14 The Contractor shall provide the Owner with foundation designs, including calculations, 30 days prior to installation for review. Delays in site development due to delays in the Contractor's submittal of the foundation designs shall be the Contractor's responsibility.

3 Rail Work Bid Items

The following bid items are to be included in the proposal (Reference Exhibit B):

3.1 Rail Work Bid Item R1, Existing Track Removal

As shown in the concept plan the Existing Track Removal shall include the equipment and labor required to remove the existing track. Removal includes: rail, ties, Other Track Material (OTM), and ballast.

3.2 Rail Work Bid Item R2, Existing Turnout Removal

As shown in the concept plan the Existing Turnout Removal shall include the equipment and labor required to remove the existing turnout. Removal includes: rail, ties, OTM, and ballast.

3.3 Rail Work Bid Item R3, Existing Track Shift

As shown in the concept plan the Shift Track will include the equipment and labor required to shift the existing track over to the new alignment.

3.4 Rail Work Bid Item R4, Furnish and Install 115# Rail

The installation of rail shall include material required to construct the rail which includes: rail, ties, OTM, ballast and subballast.

3.4.1 Rail

Rail shall be a minimum 115# defect-free American Railway Engineering and Maintenance-of-Way Association (AREMA) No. 1 relay or new. Industrial Quality Rail is acceptable. No rail shall be less than 15 feet in length (39 feet lengths preferred).

3.4.2 Ties

Ties shall be timber cross ties new, seven-inch x nine-inch x eight-foot-six-inch Industrial Grade specifications.

1. All timber crossties and timber switch ties shall be mixed hardwood timbers with minimum of selective end plating. All timber crossties and switch ties shall be creosote treated with a minimum creosote retention of 10 pounds per cubic foot.
2. Tie spacing shall be as per the Operating Railroad Specification but shall not exceed 21 inches.
3. Ties in curves exceeding Operating Railroad Specification maximum allowable curvature, or 12.5 degrees and above, shall be Grade ties, spaced at 18-inch centers.
4. Crossties shall be placed uniformly. Ties must be laid with hearth side down, square to the rails on tangent track and radially on curves.
5. Transition zones adjacent to grade crossing panels shall include a minimum of five ties matching the crossing switch tie length.
6. Transition zones adjacent to embedded track sections shall include a minimum of five switch ties of 10-foot length.

3.4.3 Other Track Material

OTM, including but not limited to track bolts, nuts, and lock washers shall be new and of the correct size to fit rail and joint bar properly.

1. Track spikes shall be new 5/8-inch x 6-inch or 5/8-inch x 6 ¼-inch installed per Operating Railroad Specifications. Spike shall be installed with a minimum of four spikes per tie in tangent track, and six

spikes per tie in curved track, with extra two spikes installed on gage side of rail. Spikes shall not be driven against the ends of joint bars.

2. Tie plates shall be at least twice the length of the base of rail. Tie plates may be single shoulder, defect-free second hand, or new. All track to be fully plated and compatible with the rail section used. Double shouldered tie plates must be utilized in curves of greater than 10 degrees and box anchored in Continuously Welded Rail (CWR) track. All switch ties will be completely box anchored.
3. Rail anchors must be new drive-on type and shall be installed as per the Operating Railroad Specification requirements. At a minimum, every fourth tie shall be box anchored in jointed track, and every second tie shall be box anchored in CWR track. All switch ties will be completely box anchored. Rail anchors shall not be installed immediately adjacent to rail joints. A minimum of 20 ties shall be fully box anchored beyond the ends of any grade crossing panels or embedded track section.
4. Track in curves exceeding Operating Railroad Specification maximum allowable curvature, or 12.5 degrees and above, shall utilize Pandrol or equivalent premium elastic fasteners and screw spikes.

3.4.4 Ballast

Ballast shall be of an approved material, with physical characteristics and gradation in accordance with the OmniTRAX Specifications. If no Operating Railroad Specifications are available, AREMA 4a ballast shall be used.

1. In the interest of bidding the contractor shall assume an 8-inch minimum ballast depth from bottom of tie to top of subballast.
2. Geotechnical report will be provided by owner following completion of design and the contractor shall meet the ballast thickness recommendation from the report.

3.4.5 Subballast

Subballast shall meet the guidelines of the Operating Railroad Specifications. Contractor shall coordinate with project geotechnical engineer for recommended subballast and ballast section thicknesses.

1. In the interest of bidding the contractor shall assume an 8-inch minimum ballast depth from bottom of tie to top of subballast.
2. Geotechnical report will be provided by Owner following completion of design and the Contractor shall meet the ballast thickness recommendation from the report.

3.5 Rail Work Bid Item R5, Furnish and Install No. 8 Turnouts

1. Turnout geometry shall comply with Operating Railroad Specification requirements.
2. No. 8 turnouts at a minimum are acceptable.
3. Turnout components shall generally follow the AREMA Manual or Operating Railroad Specifications as applicable.
4. All rail through turnouts shall be new, minimum 115#. Industrial Quality rail is acceptable except for the stock rails.
5. All turnout components shall be new and match the rail dimensions.
6. Switch points shall be double reinforced Samson switch points with adjustable braces. Stock rails shall be chamfered to match the Samson switch points.
7. Switch stands shall have an ergonomic handle-type switch stand with bi-directional target and post. Switch stand shall be new, and adjusted, lubricated, and operate smoothly, without excessive force required for operation.
8. Turnout frogs shall be Solid Manganese Self-Guarded (SMSG) with a minimum length appropriate for the size turnout per the AREMA Manual.
9. The switch ties shall be new Grade, 7-inch x 9-inch and shall conform to AREMA Manual specifications. Switch tie lengths and quantity shall be as appropriate for the specific size turnout and shall meet AREMA Manual standards.
10. The switch point slide plates shall be lubricated with a graphite based dry lubricant (EZ-Slide Graphite Based Coating or equivalent). Container must be shaken thoroughly before application. Dry lubricant shall be applied with a paint brush to all surfaces of the plates and stock rails that come into contact with the switch points, as well as the No. 1 rod where it comes into contact with the stock rail. Apply no less than three coats, allowing the lubricant to dry completely before the next application. Wet lubricants shall not be used on switches or derails.
11. Head rods shall have four holes for new transit clips. Turnouts shall include new adjustable slide plates, new adjustable braces, and new machined turnout plating (no hook twin plates).

3.6 Rail Work Bid Item R6, Furnish and Install Sliding Derail (w/ Crowder)

The Contractor shall furnish and install a Western Cullen Hays, Inc. sliding derail with crowder model HB, or approved equal. This bid item will cover all material equipment and labor to install the sliding derail (w/ crowder).

3.7 Rail Work Bid Item R7, Construct Earthen Bumpers

1. Earthen bumpers shall be provided at the ends of each stub end track in accordance with the locations defined in the concept design drawings. Earthen bumpers shall be trapezoidal in shape, fifteen feet (15') wide at the top of rail, and extend upwards, five feet (5') above the top of rail. Earthen bumpers shall be twenty feet (20') long, as measured at the top of rail, with the first five (5') feet covering the end of the track, and the remaining fifteen feet (15'), extending beyond the end of the track. Slopes shall be nominally one-to-one (1:1).
2. Prior to placing the earth, the rail, ties, and ballast shall be covered with filter fabric. Fabric shall not be torn or damaged during installation. Ballast shall not be fouled by the installation. The earth used for the bumper may be of any clean material and shall be lightly compacted on the surface to prevent erosion.

3.8 Rail Work Bid Item R8, Furnish and Install Concrete Crossing Panels

1. Contractor shall meet the requirements for concrete crossing panels per OmniTRAX guidelines.
2. This bid item will cover all material equipment and labor to furnish and install concrete crossing panels.

3.9 Rail Work Bid Item 9, Furnish and Install Bumping Post

1. Contractor to furnish a Western Cullen Hayes, Inc WD model bumping post, or approved equal. This bid item will cover all material equipment and labor to install the derail.
2. This bid item will cover all material equipment and labor to furnish and install bumping post.

3.10 Rail Work Bid Item 10, Furnish and Install Culvert Extensions

1. Contractor shall install culvert extension as called out in the final IFC plans once designed. It is anticipated that up to 2 culvert extensions will be required. Pipes shall be installed with reinforced concrete pipe (RCP) class V concrete.

2. This bid item will cover all material equipment and labor to furnish and install culvert extension.

3.11 Rail Work Bid Item 11, Earthwork

1. Contractor shall provide earthwork for the rail installation project.
2. Contractor shall follow the subgrade preparation as outlined by the geotechnical report and OmniTRAX requirements.
3. For the purposes of bidding the contractor can assume approximately three feet (3’) of cut per linear foot for all new track construction.
4. This bid item will cover all material equipment and labor to construct required earthwork.

3.12 Rail Work Bid Item 12, Furnish and Install Concrete Embedded Track (near pit)

1. Owner requests that in lieu of standard ballasted track section the Contractor shall construct concrete embedded track sections for approximately ten feet (10’) of track as it approaches the existing unloading pit, on both sides of the pit for a total of twenty feet (20’)
2. Design for this section of rail will be provided as part of the IFC drawings
3. This bid item will cover all material equipment and labor to construct the concrete embedded track section.

4 General Description of Scope of Work by Material Handling Contractor

4.1 The scope of work includes the engineering, procurement, construction, mechanical installation, and electrical installation of a facility upgrade project at West Plains Port Elevator located in the Port of Brownsville, TX as described in these specifications, reference drawings, and appendices.

4.2 The Contractor is responsible for preparation of a complete design engineering package including, but not limited to: process flow diagrams, site arrangement drawings, station and equipment arrangements, conveyor general arrangements, foundation and structural steel drawings, electrical one-line diagrams and details, bills of materials, erection drawings, start-up procedures, and operating and maintenance manuals.

4.3 At the completion of the project the Contractor shall provide to the Owner one (1) complete electronic set of as-built drawings in both Portable Document Format (.pdf) and AutoCAD (.dwg) format. This as-built set shall include the full set of drawings, including purchased and Owner-supplied equipment drawings.

4.4 The Contractor shall furnish the entire scope of work in accordance with these specifications and all materials, equipment, and services required to complete the Facility Upgrade, except those supplied by the Owner as noted.

4.5 The Contractor shall assist the Owner in a timely manner to obtain any permits for the work. The Owner is responsible for permit costs. The Contractor is responsible for all support documentation, drawings, and professional seals/approvals required to obtain the permit. The Contractor and subcontractor(s) are responsible for their own construction licensing fees and any permits related to operating a construction business.

4.6 The Contractor is responsible for all facility ground control, layout, and surveying. The Contractor shall survey all above ground and underground utilities and properly reference this information on the final as-built site plan. The information provided shall be suitable for locating the utilities in the future.

4.7 The Contractor shall locate and mark all existing utilities and underground structures.

4.8 The Contractor shall be solely responsible for dismantling, loading, transporting, unloading, and construction of the facility upgrades and, if not performed by the Contractor’s own craft personnel, shall be done by a subcontractor(s) acceptable to the Owner.

4.9 The Contractor shall furnish construction management facilities for its personnel and equipment, including but not limited to construction offices, break rooms, restroom facilities, onsite transportation, etc. The Contractor is responsible for all costs associated with tapping into existing utilities and/or the delivery of new utilities.

4.10 The Contractor shall furnish all construction equipment.

4.11 The Contractor shall supply all materials, including fasteners, anchors, grout, and sealants, associated with installing the Contractor and Owner supplied equipment.

4.12 The Contractor shall supply all bearing grease for the initial facility start-up in accordance with the manufacturer's recommendations. The Contractor shall supply and install all required gearbox oil. Contractor shall establish with the Owner or Owner's Field Engineer, a checklist to make sure this has been completed. Consumables and fuels for construction shall be supplied by the Contractor.

4.13 The Contractor shall supply and install 16-inch long pieces of galvanized 7/8-inch uni-strut on 4-foot centers along all conveyors and/or conveyor bridge support sections accessible from the conveyor walkways to support both electrical and control wiring conduits. Conveyor cross section showing typical uni-strut mounting configuration shall be reviewed and approved by the Owner.

4.14 Foundations

4.14.1 The Contractor shall be responsible for the design, excavation, installation, subgrade preparation, and backfill of all foundations, grade beams, slabs, and piers. Excess excavated material shall be disposed of in an area designated by the Owner, but no more than 1 mile from the site of the excavation. No standing water shall be allowed around footing excavations. The Owner will determine if the excavated material is suitable for backfill.

4.14.2 For the purpose of bidding foundations, the Contractor shall consult the existing geotechnical information. Additional geotech is being performed near the dock and the Ingredient Barn and will be supplied to the winning bidder.

4.14.3 The Contractor shall provide the Owner with foundation designs, including calculations, 30 days prior to installation for review. Delays in site

development due to delays in the Contractor's submittal of the foundation designs shall be the Contractor's responsibility.

4.14.4 The Contractor's proposal shall provide a schedule for completion of the design and construction of the foundations. The Proposal shall also list the total yards of concrete.

4.14.5 The Owner will perform field concrete testing via third party. The Contractor shall provide the Owner with material and mix design certifications.

4.14.6 The Contractor shall supply all concrete to meet or exceed the design specifications and drawings. Alternatives may be approved by the Owner if necessary. All concrete mix designs shall be submitted to the Owner for review and approval prior to use.

4.15 Electrical and Controls Systems

4.15.1 The Contractor shall furnish and install the electrical and controls system. The Contractor may perform electrical design and field wiring. At a minimum, however, Jake's Electric must be included to land control and sensor wires, as well as the Programmable Logic Controller (PLC). Jake's Electric's existing knowledge is critical to safe and efficient integration with the existing systems, which Jake's installed and programmed.

4.15.2 The electrical system will involve underground boring from the south side of R.L. Ostos Road, under the roadway and rail tracks, and emerging at the existing headhouse infeed and the future/new Motor Control Center (MCC) building.

4.15.3 The Contractor shall ensure that no delays are encountered due to coordination between the mechanical and electrical installation. Additionally, the MCC and Federal Grain Inspection Service (FGIS)/Control Room building foundations shall be among the first construction items the Contractor completes upon mobilization to the site.

5 Material Handling Bid Items

The following bid items are to be included in the proposal (Reference Exhibit B):

5.1 S1 Abandon & Relocate Water Line Near Dock

Bid Item S1 – The Contractor shall relocate the existing 4-inch water line near the Bulk Cargo Dock and re-route the line to where it is accessible along the front face of the Bulk Cargo Dock and accessible by moored vessels. Above grade and exposed piping shall be painted Schedule 40 ASTM A53 grade B pipe or Owner approved alternative. Underground piping may be Schedule 40 PVC or may match exposed pipe. Galvanized pipe is not allowed for ground

contact. There shall be a minimum of three (3) connection points spaced evenly along the front face of the dock, each with a ball cutoff valve and 2-inch, 90-degree twist lock coupler for rubber hoses. Piping and connection points shall not interfere with the use of the dock face fendering and mooring components. All components and materials used shall be rated for use with potable water.

Existing portions of the 4-inch line shall be filled with flowable fill and abandoned in place, provided it does not interfere with the Contractor's site grading plan or planned construction. Refer to Appendix F – 'Mechanical' for approximate locations of water lines and meters. Actual locations shall be verified in the field by the Contractor.

5.2 S2 Relocate Water Meters

Bid Item S2 – The Contractor shall relocate the existing water meter supplying dock potable water on the new line in bid item S1 (shown as meter 7483). A second existing meter (7481) shall be relocated and modified as needed to supply water to the new FGIS/Control Room building.

The other existing meters are not required to be relocated unless they require repair to correct leaks, or their locations interfere with the construction or placement of roadways, buildings, or drainage plans. The Contractor shall be responsible for relocating these meters if their current location conflicts with construction or future use of the facility upgrades.

All lines shall have an anti-siphon loop downstream of the water meter per local code constructed of painted Schedule 40 or greater ASTM A53 grade B pipe or Owner approved alternative. Galvanized pipe is not allowed for ground contact.

Refer to Appendix F – 'Brownsville Navigation District - Water Distribution Facilities Schematic Layout' for approximate locations of water lines and meters. Actual locations shall be verified in the field by the Contractor.

5.3 S3 Replace Firewater Line North of Elevator

Bid Item S3 – The Contractor shall relocate the existing firewater line outside of the envelope for the required construction, unless the design does not require relocation. Refer to Appendix F – 'Mechanical' for approximate locations of water lines and meters. Actual locations shall be verified in the field by the Contractor.

5.4 S4 Relocate Fire Hydrant

Bid Item S4 – The Contractor shall relocate the fire hydrant near the Bulk Cargo Dock to an accessible area not in conflict with the material handling

system. The new location shall be in proximity of the Bulk Cargo Dock and allow unimpeded access by fire trucks to place water on vessels and the dock itself.

Refer to Appendix F – 'Brownsville Navigation District - Water Distribution Facilities Schematic Layout' for approximate locations of water lines and meters. Actual locations shall be verified in the field by the Contractor.

5.5 S5 Route Sanitary Sewer to FGIS/Control Room Building

Bid Item S5 – The Contractor shall run new sanitary sewer service from the FGIS/Control Room building to the existing sewer line located near the water meters and the southeast corner of the exposed slab foundation of a previous dock building. All tie-ins and plumbing shall be performed in accordance with local codes and shall be constructed from PVC pipe below grade. Cleanouts shall consist of a sanitary tee with a standpipe and threaded plug of the same diameter as the main line, spaced a maximum of 30' apart, and allowing cleanout at every change of direction. The Contractor shall coordinate with the Port and local code governance (if applicable) for permitting, inspections, and approval.

5.6 S6 New Underground Electrical Service to 750kVA and 1500kVA Transformers

Bid Item S6 – The Contractor shall bring in new underground electrical service to pad-mounted transformers serving the existing facility and the new facility expansion. This underground service will replace the onsite overhead lines that supply the existing 240/480 750kVA, 240/480 501kVA, and 120/240 25kVA pole-mounted transformers serving the facility and site lighting. These new pad-mount transformers are preliminarily sized at 750kVA and 1500kVA. See Appendix D – 'Drawing Sheet 9155 R. L. Ostos Road.'

It is the responsibility of the Contractor to verify power demands and size the transformers appropriately for the final loads.

5.6.1 New Underground Electrical Service

The Contractor shall tie into the main Brownsville Public Utilities Board (BPUB) line located on the south side of R.L. Ostos Road.

Electrical service to the proposed new 750 kVA pad-mount transformer shall be bored under R.L. Ostos Road and remain underground until it emerges near the existing MCC cabinets serving the elevator head house.

A separate service shall be supplied to the proposed new 1500kVA pad-mount transformer serving the flat storage and new facility upgrades. This service shall remain below grade until reaching the transformer and shall be

bored underneath both R.L. Ostos Road and Tracks A and B before emerging at a new location between Sheds 1 and 3 and underneath the existing overhead conveyors. Hand holes shall be placed at appropriate locations to facilitate the routing of conductors.

All materials shall be provided and all work is to be performed in accordance with the National Electric Code (NEC) and BPUB requirements. The Contractor shall coordinate with BPUB, the Port of Brownsville, and local code governance (if applicable) for permitting, inspections, and approval. It is assumed that the Contractor will supply and route all necessary conduit and cable, with BPUB terminating and testing the connection to their main line. Additional coordination between the Contractor and BPUB will be required to delineate which party is responsible for terminating the primary conductors in the transformers.

Removal of existing lighting and poles is the responsibility of the Contractor, who will coordinate with BPUB and Brownville Navigation District (BND).

5.6.2 Place Transformer Pad Foundations

The Contractor shall procure materials and place new foundations for the proposed 750kVA and 150kVA transformers. Installation shall include all excavation, structural and mechanical assembly and installation, conduits, and final grading. Design shall conform with BPUB specifications and BPUB will require an inspection and approval of the foundations prior to the placement of concrete. See Appendix H– 'Brownsville Public Utilities Board Customer Checklist'. The Contractor shall coordinate with BPUB, the Port of Brownsville, and local code governance (if applicable) for permitting, inspections and approval.

5.6.3 Set Transformers

The Contractor shall set the proposed 750kVA and 1500kVA transformers on their respective pad foundations. The Contractor is responsible for coordinating transformer deliveries with the Owner and BPUB and for supplying the equipment needed for the offloading and placement of the transformers on their pad foundations. If delivered to the site prior to pad foundations being completed, the transformers shall be stored in an area protected from damage, supported on blocks or dunnage above grade (not on the ground), and stored per the manufacturer's and BPUB's requirements.

5.6.4 Feed Secondary Electrical to Main House and New MCC Building

The Contractor shall install underground secondary conduits and feed secondary power to the existing elevator head house MCC cabinets and the new MCC Building. Contractor will coordinate the location and installation of electrical meters with BPUB and install appropriate conduits and meter cans

needed for meter installation. The Contractor will be responsible for all electrical connections and wiring at the secondary lugs of both transformers.

5.7 S7 Relocate Inbound/Outbound Scales and Demo Foundations

Bid Item S7 – The Contractor will remove and relocate the existing inbound and outbound above grade truck scales. Both scales are Mettler-Toledo steel deck scales, with the inbound scale measuring 75 feet long and the outbound scale measuring 85 feet long. Both scales are believed to be 12 feet wide. The Owner shall approve of a new location for the scales.

Due to their interference with the proposed rail expansion, the new scale foundations should be a priority once the Contractor has mobilized to site. Coordination with the Rail Contractor is required for timely completion of this activity and to prevent delay of the Rail Contractor's work.

5.7.1 New Scale Foundations

New foundations shall be engineered by the Contractor in accordance with manufacturer's requirements and reviewed by Owner prior to installation. A minimum clear distance of 8 inches below the scale beams is required for cleaning purposes. Scale foundations should be open on both sides of the scale and crowned at the center to promote drainage.

Approach and exit ramps must be concrete and sloped to allow a smooth transition from horizontal to inclined without interfering with the trailer gear. Scale ramps must have minimum 10 feet long horizontal approaches at deck height at both ends of the scale or greater as required by National Type Evaluation Program (NTEP). Approach and exit ramps shall have flared side curbs that match the height and interior dimensions of the scale siderails at the ends of the scale.

5.7.2 Move and Re-Commission Scales

The Contractor shall furnish materials and components needed and relocate the existing inbound and outbound scales to their new foundations.

Inbound and outbound kiosks with intercoms to the Control Room will be required at the scale entrance and exit of both scales, with a ticket printer located on the outbound kiosk for printing bills of lading and other required documentation, and a Radio-Frequency Identification (RFID) scanner on the inbound kiosk for scanning in vehicle information.

Any replacement load cells, summing box(es), display and controllers must be NTEP certified (where applicable) and certified as legal for trade by an installer licensed by the state of Texas. Installation shall include structural and mechanical assembly and installation, electrical field wiring, and necessary safety equipment.

5.7.3 Demo Existing Scale Foundations and Finish Grade

1. Inbound and Outbound Scales

The Contractor shall demolish the existing scale foundations and perform finish grading of the site to match existing grade. If fill underneath the scale foundations does not match existing subgrade, the Contractor shall overexcavate, place a triaxial geotextile material, and backfill with crushed limestone, compacted to 98% Standard Proctor Density as per the truck turnaround and Dried Distiller's Grains (DDG) road items.

Rail Contractor will be responsible for performing additional grading as required for rail roadbeds and drainage.

2. Abandoned Pit Scale and Scale House

The Contractor shall remove the abandoned pit scale near the main entrance and demolish the abandoned concrete masonry unit scale house. The scale pit walls shall be demolished at least 24" below grade and the pit backfilled up to road subgrade and compacted in 8-inch lifts using material approved by the Owner. Subgrade will be covered with a triaxial geotextile material, and backfilled with crushed limestone, compacted to 98% Standard Proctor Density and graded as per the truck turnaround and DDG road items.

5.8 S8 Place Road Base and Grade new truck turnaround

Bid Item S8 – the Contractor shall provide a new truck turnaround and roadway for the new Auxiliary Loadout. The truck loop shall be bid both with similar construction to bid item S9 without any finished surface paving, and with optional cover with 3 inches of rolled hot-mix asphaltic concrete pavement compacted to 93% average density, with no individual test below 92% (See Appendix I – Port of Brownsville – Asphaltic Pavement & Base w/GeoGrid).

5.9 S9 Install Drainage, Place Road Base and Grade Road to DDG Scale

Bid Item S9 – the Contractor shall install drainage and construct an improved road and turnaround loop to the new DDG Scale 03-TS-01. Installation shall include all culverts, drainage pipes, curbs and markings. Contractor shall provide a layout of the proposed road and construction for approval by the Owner and the Port of Brownsville. The Port of Brownsville has an approved roadway design that is acceptable for this roadway:

5.9.1 Roadbed Preparation

Existing and fill soils as necessary shall be rough graded into a roadbed and compacted in place to 95% Standard Proctor Density as verified by a field

density test at the midpoint and the outside edge of each lane every 100 linear feet of roadbed.

5.9.2 Road Base

The prepared roadbed shall be covered with a triaxial geotextile grid material prior to placing eight (8) inches total of compacted, 1 ½-inch maximum to dust, crushed limestone road base placed in no less than two lifts and must be compacted to 98% Standard Proctor Density. An additional layer of triaxial geotextile grid is placed over the compacted road base material.

5.9.3 Topping

The road base and top triaxial geotextile material is topped with a 7-to-8-inch-thick layer of compacted ¾-inch maximum to dust crushed limestone fill, compacted to 98% Standard Proctor Density graded and crowned as required for drainage, and then covered with 3 inches of rolled hot-mix asphaltic concrete pavement compacted to 93% average density, with no individual test below 92% (See Appendix I – Port of Brownsville – Asphaltic Pavement & Base w/GeoGrid).

5.10 S10 Install Drainage and Grade Site

Bid Item S10 – the Contractor shall grade the site as needed for drainage in all areas not impacted by rail construction. This drainage and grading should integrate into the drainage and grading needed for Bid Item S9. Contractor shall submit a Stormwater Pollution Prevention Plan (SWPPP) and final grading plan for Owner review.

5.10.1 Ingredient Barn and Loadout Shed

Ingredient Barn foundations must be one foot or greater above surrounding existing grade and sloped away from the foundations to prevent pooling water. Water from gutter downspouts shall be carried to drainage features in in gravel or other means to prevent soil erosion.

The Contractor shall have the option to leave the existing retaining wall in place along Track A, or slope back the soil at a stable slope as determined by geotechnical engineer.

5.10.2 Rail Pits

Contractor shall coordinate with Rail Contractor to ensure that drainage to the east and west leading away from the rail pits is not impeded. Previous efforts by the Owner to deepen a drainage channel along Track A east of the rail pit should be expanded to ensure water is drained away from the rail pit area.

5.10.3 Shed Access Road

An access road between the Ingredient Barn and Sheds 1 and 3 shall be preserved and incorporated into the site drainage plan. This road is needed to access the Ingredient Barn as well as the east end doors of Sheds 1 and 3. Construction of this road shall be suitable for wheel loader and light truck traffic and shall be well drained to prevent material from being tracked into the barns.

5.10.4 Topsoil and Seeding

All disturbed areas not considered part of a roadway or traffic area shall be covered with a minimum of 4 inches of topsoil and seeded with a ryegrass/Bermuda seed mix. Areas prone to erosion shall be protected by erosion control blankets, filter socks, netting, mulch, or other Owner approved method.

5.11 S11 Install Rail Air Piping and Dedicated Rail Compressor

Bid Item S11 – Contractor to provide, as an option, a dedicated rail compressor and trackside air distribution system for the purposes of airing up empty railcars in preparation for assembly back into unit train lengths. Contractor shall bid this as a separate line item that can be removed from the scope, if not required by Owner.

5.11.1 Rail Air Compressor

1. Air compressor shall be a packaged unit with a minimum flow capacity of 22 cubic feet per minute (CFM) at 125 pounds per square inch (psi) pressure. Piston or scroll compressors are allowed. Packaged unit shall consist of the following:
2. Oil/Water Separator
3. Wet Air Storage Tank – 80 gallons or greater with automatic condensate drain
4. Heatless Desiccant Dryer capable of producing -40 deg F dew point air at the flow rate of compressor or greater
5. Filtration - Particulate and oil aerosol filtration as recommended by the manufacturer
6. Dry Air Storage Tank – 200 gallons or greater with inlet check valve
7. Air compressor, tanks, and equipment shall be skid-mounted or housed in a minimum 8-foot-long shipping container/conex or other Owner approved enclosure. Skid or enclosure shall be supported on concrete foundations and condensate drains shall be routed to a

drainage feature and are not allowed to discharge adjacent to roadways without side drainage ditches.

5.11.2 Rail Piping

Rail air distribution piping shall be run below grade and available at the western switch end of each ladder Track I, H, G, and F. A pair of tracks may share a valve/riser. A threaded riser consisting of 2-inch or greater Schedule 40 A53 Grade B pipe shall extend above grade with a 90-degree street ell, ball valve, and 1-inch air hose with a universal twist lock coupler, or Owner approved alternative. Riser assembly total height shall at top of rail elevation or below and have an apron of concrete around the riser piping where it emerges from below grade. Riser shall be painted safety yellow or other bright color.

Installation of rail piping shall be coordinated with Rail Contractor.

5.12 S12 FGIS/Control Room Building

Bid Item S12 – the Contractor shall provide a new FGIS/Control Room building that contains a new Control Room, offices, bathrooms, and meets all FGIS requirements. Construction shall be in accordance with International Building Code (IBC) and either Concrete Masonry Unit (CMU) block, concrete tilt wall, or prefabricated building as manufactured by Fibrebond or Owner approved equal is acceptable, subject to Owner and FGIS approval of layout.

5.12.1 Control Room

The new Control Room shall be accessed from outside the building and completely separated from the bathrooms. The control room shall have two operator workstations with flat worktops on at least two sides of the Control Room. At least 20 square feet of windstorm-rated windows shall be installed along the dock side of the Control Room for visibility onto the ship dock. Control Room shall be a minimum of 200 square feet, with a separate inspection room of 100 square feet or larger with a lockable door.

5.12.2 Restrooms

Separate men’s and women’s restrooms will be accessed from an external doorway separate from the Control Room and FGIS offices. A covered exterior porch connecting all entrances is preferred.

5.12.3 FGIS Requirements

An FGIS Room and related office space shall be proved per guidelines and provisions in Appendix E – FGIS Requirements.

5.13 Diverter Gate 01-DV-01 and Tower Modifications

Bid Item M1 – The Contractor shall procure and install the new Diverter Gate 01-DV-01 to interface with the unused flange of existing two-way “K” style offset diverter at the east end of Shed 3. Diverter shall be electrically actuated (460 VAC) and include inductive proximity sensors for all gate positions. Diverter is to interface with existing diverter feeding Shed 3 and include output chutes to 01-CV-01 & 02-CV-02 along with modifications to the existing transfer tower needed for clearance and support of diverter and chute work. Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

5.14 Transfer Conveyor 01-CV-01

Bid Item M2 – The Contractor shall procure and install the new Conveyor 01-CV-01, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.15 Transfer Tower 01-TT-01

Bid Item M3 – The Contractor shall procure and erect a new Transfer Tower 01-TT-01. Tower will support and provide access for maintenance for 01-CV-01, 01-CV-02, 01-BE-01, and 02-CV-01. Access to all platform levels from grade is to be via a stairway at least 36 inches wide without obstructions and with rest platforms spaced every 20 feet in elevation or less. Erection includes engineered foundations and concrete stair landing at grade, along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-01 should be addressed in their respective bid items.

5.16 Transfer Conveyor 01-CV-02

Bid Item M4 – The Contractor shall procure and install the new Conveyor 01-CV-02, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.17 Transfer Tower 01-TT-02

Bid Item M5 – The Contractor shall procure and erect a new Transfer Tower 01-TT-02. Tower will support and provide access for maintenance for 01-CV-02 and 01-CV-03. Access to platform levels is to be via conveyor walkways. Access between platform levels is to be via staircase. An OSHA-approved ladder to grade will be provided as a secondary means of egress. Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-02 should be addressed in their respective bid items.

5.18 Tripper Conveyor 01-CV-03 w/ Tripper 01-OT-01

Bid Item M6 – The Contractor shall procure and install the new Conveyor 01-CV-03, an overhead belt conveyor primarily supported by the structural framework of the Ingredient Barn. Open portions within the Ingredient Barn shall be an open troughed belt conveyor with a travelling tripper discharging to the non-walkway side. Should the Contractor choose to fabricate portions of the tripper conveyor, troughing and return idlers on open portions should be Conveyor Equipment Manufacturers Association (CEMA) C or greater, 45-degree troughing idlers to match the Hi-Life conveyor sections and spaced to allow proper troughing of the belt and prevent the spillage of conveyed material. The tail end outside of the Ingredient Barn shall be a fully-enclosed Hi-Life belt conveyor section as manufactured by Hi-Roller with a dust-tight seal between conveyor housing and the building envelope. Due to potential product contact, ripper conveyor and tripper gearbox(es) and bearings will require food-grade oil and grease.

Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.18.1 Tripper 01-OT-01

Tripper shall travel the length of the Ingredient Barn sufficient to maximize the stored volume of material and shall fully discharge the belt with no carryover of material. Belt plows are not allowed and are not an acceptable substitution. The Contractor shall have the option to use a direct drive unit with a festooned power cable or a cable-winch arrangement. Controls cable(s) must be festooned to transmit hazard monitoring and stockpile level information.

5.19 Ingredient Barn Flat Storage Building 01-ST-01

Bid item M7 – A steel building with concrete sidewalls will be erected as flat storage of DDG and soybean meal (the Ingredient Barn). Ingredient Barn must have a working capacity of 22,000 metric tonnes (24,245 U.S. short Tons) consisting of two separate stockpiles of DDG or similar materials at 30 pound per cubic foot and an assumed 40° angle of repose. This working capacity is based on material directly placed by the overhead Tripper Conveyor 01-CV-03 only and does not include any capacity based on relocation of additional material within the footprint of the building using wheel loaders or other equipment.

Minimum capacity of 22,000 metric tonnes is based on two separate stockpiles of differing materials which are segregated from one another at

approximately 11,000 metric tonnes each. When a single material is stored in the Ingredient Barn, the area in the center of the building should also be filled up to peak tripper height to maximize storage capacity above the 22,000 metric tonnes minimum.

Foundations and all walls shall also be designed to resist loads generated by a single grain stockpile filling the full length of the building at 45 pounds per cubic foot and a 21-degree angle of repose (in combination with other loads.)

5.19.1 Building Dimensions

Building Dimensions – Nominal 425 feet long x 180 feet wide. Eave height is to be determined by stockpile size. Additional capacity gained by stacking material above the concrete walls using mesh or fabric is subject to Owner approval. Alternate geometry will be considered by the Owner and it is up to the Contractor to determine most effective size and footprint. Flat storage capacity above the 22,000 metric tonnes minimum will be acceptable to Owner provided Contractor can demonstrate additional value.

5.19.2 Construction

1. Structural Steel – All structural steel and fasteners are to be hot dipped galvanized. Field welding of galvanized steel is allowed provided affected areas are touched up per 18.1.
2. Wood – Timber frame is only allowed with Owner approval.
3. No material contact between product and structural steel is allowed. Intermediate structural steel columns should rest on concrete pedestals above stockpile height or be encapsulated in concrete to prevent direct material contact. Posts, bents, or trusses along the perimeter of the building must be protected from direct material contact if they protrude inward from the concrete perimeter walls.
4. Span – Free spans in the stockpile area shall be maximized. No more than two clear spans are allowed per 170’ width. Internal support columns shall be protected from material and impacts by wheel loaders and must not restrict the removal of material by equipment.
5. Wall Panels – 26-Gauge Steel Purlin Bearing Rib (PBR) or similar profile constructed from G90 galvanized or AZ55 galvalume steel sheet with Kynar or fluoroethylene vinyl ether (FEVE) coating above concrete perimeter walls. Exterior wall panels shall overlap foundations/perimeter walls to prevent water intrusion from wind-driven rain. Concrete perimeter walls may extend to full eave height if desired.

6. Roof Panels – 24-Gauge Steel Purlin Bearing Rib (PBR) or similar profile constructed from G90 galvanized or AZ55 galvalume steel sheet with Kynar or FEVE coatings.
7. Gutters – Full length gutters along the bottom edge of pitched roof sections are required. The Contractor is responsible for routing rainwater from gutters away from the building foundations and drainage from the site.
8. Colors – The Contractor will supply Owner with color selection options for roof, wall panels, trim, and doors prior to ordering.
    a. Wall panels: Canyon Sand (or owner approved alternate)
    b. Gutters and Trim: Dark Green or Brown
    c. Roof: Canyon Sand (or owner approved alternate)

5.19.3 Doors and Openings

1. Overhead Doors – Two 14-feet-wide x 20-feet-tall, framed openings with overhead doors shall be placed on each end of the Ingredient Barn to allow passage of Owner's equipment to reclaim material from flat storage. Overhead doors are to be windstorm rated for the site location, constructed of 24-gauge steel panels, and actuated by automatic door openers.
2. Overhead Door building openings shall be protected inside and out with grout-filled bollards constructed from a minimum of 4-inch nominal Schedule 40 steel pipe or greater and painted safety yellow.
3. Walk-Through Doors – A single 3-feet-wide x 6-foot-8-inch-tall lockable door is required on the chain side of both overhead doors. Two additional 3-feet-wide x 6-foot-8-inch-tall lockable doors are required at the walkway level of the Tripper Conveyor 01-CV-03 (one at each end). Additional walk-through doors may be added to access both sides of the tripper conveyor.
4. Product placement within the Ingredient Barn must not be allowed to obstruct or come in contact with these doors or limit their use in any way. Doors (and reclaims) shall be placed where Owner's equipment will have access to push additional material once the live portions of the material stockpile have been reclaimed without driving over any material.
5. Framed openings for windstorm-rated louvers and exhaust fan assemblies are required near the peak on both gable ends of the building for cross ventilation when the Ingredient Barn is not being filled and to vent exhaust fumes when reclaiming. Exhaust fans shall

be activated by thermostat controllers which will be disabled with louvers closed when Ingredient Barn is being filled. All interior electrical components must be rated for use in Class II, Division 1, Group G combustible dust environments.

5.19.4 Building Foundations & Reclaim Tunnels

Original wooden pile-supported foundations and reclaim tunnel for a prior flat storage building remain at the proposed location of the Ingredient Barn. The Contractor may choose to re-use or neglect the contribution of these prior foundation elements at their own discretion. The Contractor may also elect to remove any or all of the previous building's foundation elements at their own expense.

1. Perimeter Walls and Partition Wall – Perimeter Walls shall be constructed of concrete and resist the loads generated by stockpiles and other loads in combination as determined by Contractor's engineer. They should be continuous, with openings only at the doorways, and shall prevent any contact of materials with doors and metal building components, including structural columns, bents, and purlins. Owner may wish to transfer material via wheel loader, stacker, or other means inside the building to areas beyond the footprint of the stockpile from the tripper conveyor. The perimeter walls should be of adequate height in all areas to maximize the overall effective capacity of the Ingredient Barn.
2. A Partition Wall will be required to keep stockpiles of two distinct materials separate from one another. This Partition Wall will divide the Ingredient Barn in half and will be capable of resisting the loads generated by a full material stockpile when the opposing side is empty. The Partition Wall shall have a break near the reclaim hoppers to allow the passage of equipment from one stockpile to the next inside the building.
3. Reclaim Tunnels – A total of six (6) reclaim tunnels will be required in the floor of the Ingredient Barn. Tunnels should be spaced to minimize wheel loader travel necessary to empty material from the Ingredient Barn and to readily allow access for owner's equipment once the live portions of the stockpiles have been reclaimed. Removable panels accessing the tunnels must be level or slightly recessed from the adjacent floor to prevent snagging from loader buckets and shall support all material and equipment loads. Remaining dead portions of the stockpiles must be able to be pushed to a reclaim hopper from the doorway without any special booms or equipment (other than the

Owner's existing wheel loaders) and without having to drive over any stored material.

4. Openings in floors shall accommodate the Material Reclaim Hoppers 01-RT-01 through 01-RT-06 with associated screw feeders as well as Reclaim Drag Conveyors 01-DG-01 through 01-DG-06 and allow unencumbered wheel loader operation. Tunnels shall be sloped equipped with a sump and sump pump wired to an on-demand float system. Tunnels will facilitate the cleaning, maintenance, and repair of any reclaim equipment in accordance with OSHA rules and shall have removable floor panels for access. Walk-in tunnels are not preferred due to the shallow groundwater levels at the project site.

5.19.5 Conveyor Supports

The internal portions of Tripper Conveyor 01-CV-03 shall be supported by the building structure. Clearance for the maintenance walkway (including overhead clearance) and tripper will be the responsibility of the Contractor. Contractor shall have the option to place a cupola at the peak of the building in lieu of hanging conveyor supports. Conveyor must be free-standing inside the Ingredient Barn and conveyor supports to grade are not allowed.

5.20 Material Reclaim Hoppers 01-RT-01 Thru 06 with Screw Feeders

Bid Item M8 – The Contractor shall procure and install six (6) new Material Reclaim Hoppers 01-RT-01 through 01-RT-06. Material Reclaim Hoppers will interface with Reclaim Drag Conveyors 01-DG-01 through 01-DG-06 and reclaim grain as well DDG or soybean meal materials into the material handling system from flat storage in the Ingredient Barn. Geometry of the hopper should be a minimum of 9 feet long in at least one direction to accommodate a full loader bucket of material and shall be covered with bar grating capable of supporting the wheel loads of Owner's equipment. Bar grating must be flush or lower than the finished floor elevation to allow smooth passage of a loader bucket over the hopper along the floor surface. Hopper shall cleanly self-discharge and not retain products such as DDG and soybean meal on hopper walls and valleys.

Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.20.1 Reclaim Screw Feeders 01-SF-01 Thru 01-SF-06

All reclaim hoppers will be equipped with screw feeders to consistently pull material from overhead piles to feed the reclaim drag conveyors at the appropriate volumetric rate based on the material conveyed. Feeders and grates shall allow the live portions of overhead material stockpiles to be fed

without additional loader input other than sporadic loading of material over the live portion of the feeder. Feeders shall be designed to control feed product at the appropriate volumetric rate and/or tonnage to maintain the required system throughput. The size and number of screws is at the discretion of the Contractor provided performance specifications are met. All bearings, wear parts, and maintenance items shall be accessible without removing the equipment from the reclaim hopper.

5.21 Reclaim Drag Conveyors 01-DG-01 Thru DG-06

Bid Item M9 – The Contractor shall procure and install six (6) new Reclaim Drag Conveyors 01-DG-01 through 01-DG-06 as manufactured by Tramco, Warrior, or GSI. Reclaim Drag conveyors will interface with Material Reclaim Hoppers 01-RT-01 through 01-RT-06 and reclaim grain as well as DDG or soybean meal materials into the material handling system from flat storage in the Ingredient Barn. If a separate feeder is not supplied with the Material Reclaim Hopers, Reclaim Drag Conveyors shall be designed to control feed product at the appropriate volumetric rate and/or tonnage to maintain system throughput. All bearings, wear parts, and maintenance items shall be accessible from removable panels without removing the conveyor from its respective reclaim tunnel.

Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.22 Reclaim Conveyor 01-CV-04

Bid Item M10 – The Contractor shall procure and install the new Conveyor 01-CV-02, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.23 Installation of Bucket Elevator 01-BE-01

Bid Item M11 – The contractor shall modify and install a Warrior Bucket Elevator 01-BE-01 provided by the Owner. Installation shall include all structural and mechanical assembly and installation, supports, electrical field wiring, hazard monitoring, and safety equipment. All major elevator components are believed to be in storage on-site. Contractor will remove the unassembled elevator components from storage and modify them to fit their proposed system as needed, either by modifying existing components or procuring replacements. Bucket elevator boot section must be installed above grade - no tunnel or below grade installation is allowed. An optional existing 30,000 bushel per hour Warrior L-path drag conveyor is available and can be supplied by the Owner to feed 01-BE-01 should the Contractor elect to

use it. (Optional drag conveyor is not shown in Appendix B - Conceptual Design Drawings – Material Handling, but equipment drawings are included in Appendix F - Mechanical.)

5.24 Barn Reclaim Diverter Gate 02-DV-01

Bid Item M12 – The Contractor shall procure and install the new Barn Reclaim Diverter Gate 02-DV-01, a two-way diverter. Diverter shall be electrically actuated (460 VAC) and include inductive proximity sensors for all gate positions. Installation shall include all structural and mechanical assembly and installation, chutework to connected equipment, electrical and controls field wiring, and safety equipment.

An optional existing Warrior 3-way diverter is available and can be supplied by the Owner to use in this application should the Contractor elect to use it. (Optional diverter gate is not shown in Appendix B - Conceptual Design Drawings – Material Handling, but equipment drawings are included in Appendix F - Mechanical.)

5.25 Transfer Conveyor 02-CV-01

Bid Item M13 – The Contractor shall procure and install the new Conveyor 02-CV-01, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.26 Transfer Tower 02-TT-01

Bid Item M14 – The Contractor shall procure and erect a new Transfer Tower 02-TT-01. Tower will support and provide access for maintenance for 02-CV-01 and 02-CV-02. Access to platform levels is to be via conveyor walkways. Access between platform levels (if more than one) is to be via staircase. Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-02 should be addressed in their respective bid items.

5.27 Support Tower 02-TT-02

Bid Item M15 – The Contractor shall procure and erect a new Support Tower 02-TT-02. Tower will support 02-CV-02. Erection includes engineered foundations along with anchors and baseplate grouting.

5.28 Transfer Conveyor 02-CV-02

Bid Item M16 – The Contractor shall procure and install the new Conveyor 02-CV-02, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.29 Weigh Batcher & Tower 02-WB-01

Bid Item M17 – The Contractor shall procure and install the new 02-WB-01, a weigh batcher with inlet and discharge holding hoppers as manufactured by C&A Scale Service, Inc. or CompuWeigh, and a structural support tower. Discharge hopper shall include two discharges to either 02-CV-03 and 02-CV-04, each controlled via slide gates with electric actuators. Weigh batcher and upper and lower garner hoppers must be of adequate size to hold a minimum of 50,000 pounds of DDG at 30 pounds per cubic foot and 40-degree angle of repose and shall gravity discharge and completely empty product without the use of vibration or other mechanical means. Contractor may choose to size tower structure to support 02-CV-02 in lieu of a separate support tower. There must be access from 02-CV-02 to the support tower ladders as a secondary means of egress.

All load cells, summing box(es), display and controllers must be NTEP certified (where applicable) and certified as legal for trade by an installer licensed by the state of Texas. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.29.1 Quality Control Sampler

A product sampler as manufactured by Gamet Manufacturing or Owner approved equal shall be installed in the discharge flow of 02-WB-01 to collect samples of DDG and other materials entering the weigh batcher. Sampler is to be capable of collecting a range of volumes and shall have an electric actuator drive. Samples shall be routed to the FGIS/Control Room building by re-using the existing system or a new collection system provided by the Contractor. Sampler, location, and collection system are subject to approval by FGIS and it is the responsibility of the Contractor to provide an acceptable system to FGIS.

5.29.2 Cross Cut Sampler

A cross-cut product sampler shall be installed in either the inlet chute or the discharge flow of the weigh batcher to collect samples of grain and other materials weighed in the weigh batcher. Samples shall be routed to the FGIS/Control Room building by re-using the existing system or a new

collection system provided by the Contractor. Sampler, location, and collection system are subject to approval by FGIS and it is the responsibility of the Contractor to provide an acceptable system to FGIS.

5.30 Shipping Conveyor 02-CV-03

Bid Item M18 – The Contractor shall procure and install the new Conveyor 02-CV-03, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.31 Ship Loader Pivot Tower 02-ST-01

Bid Item M19 – The Contractor shall procure and erect a new Ship Loader Pivot Tower 02-ST-01. Tower will support and provide access for maintenance for 02-CV-03 and 02-SL-01. Access to platform level is to be via conveyor walkways. Access between levels will be via staircase (if needed). Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-02 should be addressed in their respective bid items.

5.32 Shipping Conveyor 02-CV-04

Bid Item M20 – The Contractor shall procure and install the new Conveyor 02-CV-04, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.33 Shipping Waste Diverter Gate 02-DV-01

Bid Item M21 – The Contractor shall procure and install the new Shipping Waste Diverter Gate 01-DV-03, a two-way diverter. Diverter shall be electrically actuated (460 VAC) and include inductive proximity sensors for all gate positions, as well as a local control station with a Hand/Off/Auto switch, lighted emergency stop button, and manual gate selection switch. Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

5.34 Ship Loader Pivot Tower 02-ST-02

Bid Item M22 – The Contractor shall procure and erect a new Ship Loader Pivot Tower 02-ST-01. Tower will support and provide access for maintenance for 02-CV-04 and 02-SL-02. Access to platform level is to be via conveyor walkways. Access between levels will be via staircase (if

needed). Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-02 should be addressed in their respective bid items.

5.35 Masaba Ship Loaders 02-SL-01 & 02-SL-02 (or equal as approved by Owner)

Bid Item M23 – The contractor shall procure and install two (2) Masaba 195-foot x 50,000 bushel per hour Magnum Telescoping Ship Loaders.

Both ship loaders are to be identical (or mirror images of each other if so required) with the standard equipment supplied by Masaba for Corn loading applications along with the following optional equipment:

- Motorized directional discharge spoon
- Galvanized frame and catwalk
- Catwalks with pull cord E-stops, both sides of main conveyor
- Remote grease bank
- Radial travel safety switches
- Main conveyor galvanized steel covers
- Accordion-style stinger belt cover
- Air-conditioned electric panel

Installation shall include all structural and mechanical assembly and installation (including belt vulcanizing and food grade oils), electrical field wiring, hazard monitoring, and safety equipment.

5.36 Truck Scale Transfer Conveyor 03-CV-01

Bid Item M24 – The Contractor shall procure and install the new Conveyor 03-CV-01, a fully-enclosed Hi-Life belt conveyor as manufactured by Hi-Roller. Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.37 Support Tower 03-TT-01

Bid Item M25 – The Contractor shall procure and erect a new Support Tower 03-TT-01. Tower will support and provide access for maintenance for 02-CV-01 and 02-CV-02. Access to platform levels is to be via conveyor walkways. Access between platform levels (if more than one) is to be via staircase. Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 01-TT-02 should be addressed in their respective bid items.

5.38 Truck Loadout Shed 03-SB-01

Bid item M26 – A pre-engineered steel metal building shall be erected to enclose the loading of DDG into open-top trailers.

5.38.1 Building Dimensions

Building Dimensions – Truck Loadout shed shall be of sufficient length to completely enclose the truck scale and a truck- single trailer combination with all axles on the scale in both directions (provide additional clearance for vehicle/trailer overhangs past axles). The width of the truck loadout shed should allow the cleanup of spills on both sides of the truck scale using a small skid steer loader.

Eave height is to be determined by Contractor to allow clearance for overhead doors and any internal loading equipment placed inside the building.

5.38.2 Construction

Structural Steel, – Wall Panels, Roof Panels, Trim and Gutters shall match the materials used and the colors selected for the Ingredient Barn.

Posts, bents, or trusses along the perimeter of the building must rest on concrete pedestals and/or a raised perimeter stem or pony wall above the finished floor height to prevent contact from spilled material and to facilitate cleanup.

Span – Loadout shed shall be free span with no internal support columns or posts allowed except on end walls. Building shall be engineered to meet windstorm requirements with the truck scale doors open.

5.38.3 Doors and Openings

Overhead Doors – Two (2) 14 feet wide minimum framed openings with overhead doors shall be placed on each end of the Loadout Shed to allow free passage along truck scale. Overhead doors are to be the fast opening/closing type, and electrically actuated by the controls system. Door openings shall be tall enough to provide an 18-foot-tall clear opening as measured from the scale deck to accommodate over height international trucks and trailers. Door sills and closures shall provide a flat surface for the door to seal against when closed and prevent the flow of air into or out of the building.

Areas inside the building must be accessible via skid steer loader for cleanout. If no access point is provided between end of the truck scale and

end walls, additional doors wide enough to accommodate a mid-sized (70-80hp) skid steer loader on both sides of the scale are required. These doors are to be chain actuated (if overhead doors are used), windstorm rated, and shall remain closed except during cleaning.

Overhead Door openings shall be protected on the exterior with grout-filled bollards constructed from a minimum of 4-inch nominal Schedule 40 steel pipe or greater and painted safety yellow. Inside spacing of the bollards should match the inside frame rail width of the truck scale. Bollards should be short enough to allow oversized truck mirrors to clear overhead. Bollards are only required in the interior of the building if the truck scale ramp guardrails end more than 4 feet from a framed door opening.

Walk-Through Doors – A single three-feet-wide x 6-foot-8-inch-tall lockable door is required on both the inbound and exit ends of the building.

5.38.4 Building Foundations

Perimeter Walls – Perimeter curbs, pony or stem walls, etc. shall be constructed of concrete and resist the loads as determined by Contractor's engineer. They should be continuous, with openings only at the doorways, and shall prevent any contact of spilled materials with metal building components, including wall panels, structural columns, bents, and purlins.

5.38.5 Loadout Bin, Equipment Access and Supports

The Contractor may elect to place the loadout bin and/or equipment inside the envelope of the Loadout Shed. Proper structural support of equipment and access walkways and platforms (as well as adequate horizontal and vertical clearance) is the responsibility of the Contractor.

Egress from the overhead equipment to grade may be via ladder or stairs. If the egress point from the overhead equipment is located inside the building envelope, an exit must be provided via a walk-through door located a safe distance away from truck traffic.

5.38.6 Scale Room

An elevated Scale Room shall be installed inside the Loadout Shed in direct view of loading operations. Scale Room location shall be elevated where operator will have an unobstructed view of the loading trailer with access to closing gates in case of a spill. Access to the Scale Room shall be via stairs from grade in an area away from truck traffic. Scale Room shall include a lockable door, windows to view the loading process, and shall be an insulated and conditioned working space. The Contractor shall submit the proposed Scale Room layout and window elevations to Owner for approval.

5.39 Diverter Gate 03-DV-01

Bid Item M27 – The Contractor shall procure and install the new 2-way Diverter Gate 03-DV-01 to interface with the discharge flange of 03-CV-01. Diverter shall be electrically actuated (460 VAC) and include inductive proximity sensors for all gate positions. Diverter is to include an output chute to Storage Bin 03-BN-01. One output flange is to remain unused for a future 03-BN-02. Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

Access from the 03-CV-01 Loadout conveyor walkways to service the 03-DV-01 Diverter Gate must be from platform level. Primary access to this platform level must be via stairs or ramps (no ladders).

5.40 Storage Bin 03-BN-01

Bid Item M28 – The Contractor shall procure and install an overhead Storage Bin of 25 US short tons capacity (22.7 metric tonnes) to act as temporary surge capacity and storage for products such as DDG or Soybean meal when loading trucks. Bin discharge shall be designed for full mass flow – first in/first out – with no funnel flow discharge or dead pockets of material that may become compacted. Vibration is not allowed - all cones and valley angles shall discharge cleanly without the use of vibration.

The Contractor may elect to use a mechanical reclaimer to discharge from the bin in lieu of a mass flow cone. If the Contractor uses any mechanical reclaiming devices, they must use a rotating screw reclaimer as manufactured by Laidig Systems, Inc., or a fully live bottom, multi-screw feeder with completely vertical sidewalls. Screw feeders with V-shaped troughs sidewalls other than those manufactured by Laidig Systems, Inc. are not allowed.

Storage Bin shall include a combination overpressure/underpressure/access door. Additional flanges shall be installed on the bin top for level sensor installation.

5.40.1 Bin Vent 03-DC-01

Storage hopper is to be equipped with a passive bin vent to accommodate displaced air during filling. The Contractor shall design a system that will prevent dust-laden air from escaping the storage hopper when filling with DDG, soybean meal, or similar materials. Bin vent should be passive and may use clean, dry, filtered air to clean elements. Due to the nature of DDG dust, bag and shaker type filter elements may be preferred. Contractor may also elect to use a displacement bag type vent that will contract once material is discharged.

5.40.2 Slide Gate 03-SG-01 + Maintenance Gate

Hopper Discharge shall be equipped with an actuated slide gate controlled by the local control house and sized to load out a truck trailer at a minimum rate of 8 trailers per hour. Gate shall be actuated with an electric Andco actuator or Owner approved equal with a response time capable of filling trucks in a controlled fashion without overshooting the target weight. A manual maintenance gate shall be installed above 03-SG-01 and shall be readily accessible from the scale room without the use of a ladder or lift in case of a spill.

Inside the Scale Room, a single control panel shall have a Hand-Off-Auto switch, lighted pushbutton ESTOP, and momentary Open and Close lighted pushbutton switches for the gate that are illuminated when enabled for local control by the HOA switch. Panel shall also have position indicator lamps for slide gate position (Fully closed, Mid Set Point, Fully Open). Control panel shall be mounted to facilitate the loading of trucks from overhead at the platform level.

5.40.3 Discharge Chute 03-TC-01

The hopper discharge shall be equipped with a discharge chute to minimize dust while loading open top trailers. The chute may either be of a retractable, telescoping type as manufactured by Sly, DCL or equivalent, or a dust suppression hopper as manufactured by Sioux Steel Company. Chute and/or hopper shall clear oversized international trucks and trailers when they are entering and exiting the scale and shall extend and retract at a speed which allows a trailer to be loaded at a minimum rate of 8 trailers per hour. Due to the nature of DDG dust, powered cartridge type dust filtration units may clog and are not allowed during DDG loading.

5.41 DDG Truck Scale 03-TS-01

Bid Item M29 – The Contractor shall procure and install a new 03-TS-01, an above grade truck scale with concrete approach ramps and foundations.

Truck scale must be of adequate length (estimated at 140 feet) to allow a full-size, Class 8 truck w/ sleeper cab and trailer to:

- Drive fully onto the scale with the loadout spout positioned at the front of the trailer and measure a tare weight,
- Drive forward while loading with the assistance of color-coded lighted signals controlled by the scale operator (red/STOP, green/GO, yellow/SLOW, white on red/BACK UP) with labels in Spanish next to each light, and

- Remain fully on the scale at the conclusion of loading to measure the vehicle gross weight without reversing.

Scale deck width shall be 12’ clear or greater with guardrails on each side. Contractor may select steel or concrete topping surfaces for the scale deck. Approach and exit ramps must be concrete and sloped to allow a smooth transition from horizontal to inclined without interfering with the trailer gear. Scale ramps must have minimum 10 feet long horizontal approaches at deck height at both ends of the scale or greater as required by NTEP. Approach and exit ramps shall have flared side curbs that match the height and interior dimensions of the scale siderails at the ends of the scale. Truck Scale shall be as manufactured by Rice Lake, Fairbanks, Mettler Toledo, or Owner approved equal. Inbound and outbound kiosks with intercoms to the Scale Room will be required at the scale entrance and exit, with a ticket printer located on the outbound kiosk for printing bills of lading and other required documentation. A digital scoreboard readout will be placed in view of the truck driver with another digital display in view of the operator in the scale room. A shielded/armored home run cable is required.

All load cells, summing box(es), display and controllers must be NTEP certified (where applicable) and certified as legal for trade by an installer licensed by the state of Texas. Installation shall include all foundations, paving and flatwork, structural and mechanical assembly and installation, electrical field wiring, and safety equipment.

5.42 Bin Taps & Auxiliary Loadout Gates

Bid Item M30 – The Contractor shall procure and install bin taps into existing bins and construct an alternate loadout on the southeast corner of the existing elevated storage facility.

5.42.1 Bin Taps and Maintenance Gates

The Contractor shall procure and install bin taps into existing elevated concrete bins #603 and #605 for an alternate loadout. Openings for taps shall be saw-cut through the existing bin sidewall above the cone/hopper section. Each bin tap shall be equipped with a maintenance slide gate with a handwheel actuator readily accessible from the new Auxiliary Loading Platform. Bin taps, gates and chutework shall be flashed and sealed to prevent moisture intrusion into the bins and any stored material.

Design, fabrication, and installation of the taps, gates and chutework shall include any required structural analysis of the bin opening, mechanical assembly and installation, and safety equipment.

5.42.2 04-SG-01 and 04-SG-02 Auxiliary Loadout Gates and Shared Loadout Spout

The Contractor shall procure and install two electrically actuated slide gates on the bin taps from existing Bins #603 and #605. 04-SG-01 and 04-SG-02 electric actuators shall have a fully open to fully closed actuation time of 5 seconds or less when subject to operational material flow.

At the auxiliary platform level, a single National Electrical Manufacturer (NEMA) 3R or greater control panel shall have a Hand-Off-Auto switch, lighted pushbutton ESTOP, gate selector switch, and momentary Open and Close lighted pushbutton switches for each gate that are illuminated when enabled by the gate selector switch. Panel shall also have position indicator lamps for each slide gate showing gate position (Fully closed, Mid Set Point, Fully Open). Control panel shall be mounted to facilitate the loading of trucks from overhead at the platform level.

Both 04-SG-01 and 04-SG-02 will discharge into a shared loadout spout in a Y configuration. The centerline of this discharge shall be a minimum of 12 feet to the southern boundary of the existing vertical storage to allow for a truck lane. The discharge height of the hard loadout spout shall be of sufficient height to clear domestic and international trucks and trailers and equipped with a flexible loading sock or trunk constructed from a urethane-coated fabric (Vinyl/Urethane blend by Owner approval).

Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.42.3 Auxiliary Loading Platform 04-TT-01

The Contractor shall procure and erect a new Auxiliary Loading Platform 04-TT-01. Tower will support and provide access for maintenance for 02-CV-01 and 02-CV-02. Access to and between platform levels (if more than one) is to be via staircase. Erection includes engineered foundations along with anchors and baseplate grouting.

Costs involving electrical and controls routing to other bid items associated with Tower 04-TT-01 should be addressed in their respective bid items

5.43 05-RP-01 Existing Gate Mods

Bid Item M31 – The Contractor shall procure and install new electric gearmotor actuators for quantity two (2) existing rail pit gates and quantity four (4) existing truck pit gates. Existing slide gates are of the rack and pinion gear design with a right-angle handwheel actuator (handwheel to be replaced by gearmotor actuator). Electric gearmotor actuators with gate position sensor control points (fully open, adjustable midpoint, fully closed) are to be provided. Actuator speed and torque shall be selected by the contractor to

prevent damage to the existing gates. Interface and modification of the existing gate is the responsibility of the Contractor.

Two NEMA 4 or greater local control panels shall have a Hand-Off-Auto switch, lighted pushbutton ESTOP, gate selector switch, and momentary Open and Close lighted pushbutton switches for each gate that are illuminated when enabled by the gate selector switch. Panel shall also have position indicator lamps for each slide gate showing gate position (Fully closed, Mid Set Point, Fully Open). One local control panel shall be shared by the rail gates, and another shared by the truck gates. Location of the control panels shall be approved by the Owner.

Panel enclosures, panel components, gearmotors and sensors may have special combustible environment requirements depending on mounting location.

Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

5.44 06-SM-01 Re-route Existing Product Samplers to new FGIS/Control Room building

Bid Item M32 – The Contractor shall re-route existing product samplers in the current facility to the new FGIS/Control Room building. The Contractor shall have the option to re-use the existing Inter systems components and piping or procure and install a new system. The existing overhead trusses, supports, and piping used to transport samples to the current building are to be removed.

The Contractor shall provide a new sample divider to split samples between the FGIS and Control Rooms as manufactured by Gamet or Owner approved equal.

Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

5.45 07-EL-01 New MCC Building

Bid Item M33 – The Contractor shall place foundations, install entrance and exit conduits, and procure and install a new MCC building for the combination of existing electrical loads and the planned facility expansion. MCC building will be supplied via underground secondary from the proposed 1500kVA pad-mount transformer. See Appendix D – ‘Existing MCC Loads’ and ‘Estimated HP List’ for existing MCC items to be relocated to the new building and additional loads to be handled by the new MCC.

Installation shall include all structural and mechanical assembly and installation, electrical field wiring, hazard monitoring, and safety equipment.

5.46 07-EL-03 Field Wiring – Existing Equipment & Controls

Bid Item M34 – The Contractor shall size and provide conduit, conductors, cabling and/or fiber required to transmit control signals, camera images, and data to the new Control Room located in the FGIS/Control Room building. (Wiring of new equipment shall be included under the respective equipment bid item.)

5.46.1 Existing Facility Controls

The Contractor shall allow operation of the current facility from the new Control Room. Wiring and conduit to the existing plant Programmable Logic Controllers (PLC), Remote Input/Output panels (RIO), and other devices shall be routed to the new building and integrated into the new control interfaces.

5.46.2 Hazard Monitoring of Existing Hi-Roller Conveyors

The Contractor shall procure components necessary and finish installation of CMC hazard monitoring devices on the existing facility Hi-Roller conveyors.

Installation shall include all mechanical assembly and installation, electrical and controls field wiring, and all components required including those missing or damaged.

5.46.3 Gate Actuators

The Contractor shall procure components necessary and finish installation of electric actuators for the existing 30-inch diverters feeding Shed 1 and Shed 3 (currently manual operation only.)

Installation shall include all mechanical assembly and installation, electrical and controls field wiring, and all components required including those missing or damaged.

5.46.4 Headhouse Surge Bin Level Sensors

The Contractor shall procure components necessary and install level indicators in three (3) separate headhouse surge bins. Each surge bin will utilize a non-contact radar level indicator and two rotary level indicators as described in 13.3.29.

5.46.5 Headhouse Surge Bin Gates

The Contractor shall procure components necessary and install actuated slide gates at the discharge of the four (4) headhouse spouts.

5.47 07-EL-03 Site Cameras

Bid Item M35 - The Contractor shall procure and install a series of site cameras to display the following locations to a screen in the Control Room:

1. Main Gate
2. Docked Vessel
3. Inbound and Outbound truck scales
4. DDG Scale
5. Tracks I – J
6. Rail Pit
7. Rail Pit Tunnel
8. Truck Pit Tunnel
9. Auxiliary Loadout
10. Ingredient Barn – East Bay & West Bay
11. End of both Ship Loaders

The Contractor may wish to combine several stationary camera locations into a single Pan-Tilt-Zoom (PTZ) camera. Rigid mounting and image stabilization is required for all TPZ cameras and Owner may require replacement with individual cameras if they deem the images unsatisfactory. Cameras shall be of the Power over Ethernet (PoE) type and selected for appropriate resolution and data transmission distance.

Cameras shall display tiled images on two 42-inch or larger display screens located in the control room, with the option to send feeds/images to an additional display located in the FGIS room. The control room operator shall have the option to select an individual camera and maximize that image on either display screen.

5.48 07-EL-04 Lighting

Bid Item M36 – The Contractor shall supply lighting for the facility upgrades and related work areas. All fixtures shall use LED lamps or Owner approved alternative and shall be use single phase 120-177 Volts AC power. All lighting shall meet OSHA guidelines for work area illumination levels.

Lighting shall all have local control switches as well as remote control from the Control Room.

Installation shall include all structural and mechanical assembly and installation, electrical and controls field wiring, and safety equipment.

5.48.1 General Walkways and Platforms

Lighting along conveyor walkways, stairs, ladders, platforms and other walking-working surfaces shall be provided by overhead pedestal fixtures, walkway level lighting, and flood fixtures. All lighting and mounting fixtures shall not restrict or impede access to or along equipment.

5.48.2 Ingredient Barn & Loadout Shed

High-bay overhead flood light fixtures shall be spaced to maintain a minimum light intensity of 3 lumens across the working area of the Ingredient Barn and Loadout Shed. Fixtures shall be mounted out of the way of stockpiled materials and should be shaped to prevent the accumulation of DDG dust on the housing. The Contractor may also use the same fixtures to illuminate the tripper conveyor walkways or add dedicated fixtures. All interior lighting, switchgear, and enclosures must be rated for use in Class II, Division 1, Group G combustible dust environments. No fluorescent light fixtures are allowed in product areas.

External LED wall pack flood lamps shall be spaced along the perimeter of the buildings for exterior illumination.

Loadout shed will also contain lighting illuminating the loadout spout and scale room. Color coded lights to instruct the truck driver will be placed on the outbound side of the building. The scale room interior will be conditioned space and will not subject to a combustible dust environment.

5.48.3 Auxiliary Bin Tap Loadout

Flood lights illuminating the auxiliary loadout spout and loading gates shall be mounted to the support platform or existing concrete bins (subject to Owner approval).

5.48.4 Dock Area Lighting

The Contractor shall provide dock area lighting using floodlights from the weigh batcher, shipping conveyor transfer towers, and by providing additional light poles. All standalone light poles and foundations shall be windstorm rated. All proposed lighting and mounting fixtures shall meet OSHA guidelines for work area illumination levels at the dock areas and shall not restrict or impede the operation of the ship loaders.

5.49 07-EL-05 Controls Programming

Bid Item M37 – The Contractor shall program all programmable logic controllers, human-machine interface screens, desktop computers, camera screens, and other configurable controls components to integrate the plant expansion and allow operation in conjunction with the existing facility. Where applicable, the contractor shall provide licenses of all necessary software

registered in the Owner's name. As permitted, backup copies of all programming files shall be supplied to the Owner as well as maintained by Jake's Electric.

The system shall always perform in a "fail safe" manner. Sensors and switches shall be wired and programmed in such a manner that if a signal is received out of range or contact is lost due to a malfunction or wiring short, a shutdown will occur. Upstream devices shall stop first with a shutdown cascading to downstream equipment. Contractor shall perform a cause-effect diagram for the control of all equipment to the Owner for review.

5.50 07-MISC-01 System Commissioning and Testing

Bid Item M38 – The contractor shall perform commissioning and testing of the facility upgrade as described in Section 11, Testing and Start-up and Section 2, Performance Testing.

6 General Description of Scope of Work by the Owner

6.1 Owner site grade preparation excludes any form of soil preparation or compaction for foundations. Design, excavation, installation, subgrade preparation, and backfill of all foundations, grade beams, slabs, and piers are the responsibility of the Contractor.

6.2 The Contractor shall unload or remove from storage any Owner supplied equipment at the project site. The Contractor shall incorporate the equipment into the final design. The Contractor shall comply with all Owner and Equipment Manufacture specifications during the design and installation process.

7 General Description of the Facility

7.1 The Facility will be operated according to the flow diagrams included (Appendix B - Conceptual Design Drawings – Material Handling, Sheet 00D-01).

7.2 The flow is considered ‘frozen’ and shall not be modified without approval of the Owner. The Owner is open to discuss any Contractor suggestions regarding facility flow.

7.3 The material feed for the storage and facility loadout material handling system will be the existing elevator and conveyor system to Storage Barns 1 and 3.

7.4 Flow rates for the material handling system will be given in Bushels per hour (Bu/hr) based on No. 1 yellow dent corn at 56 pounds per bushel. Equipment and transitions are to be designed to facilitate the flow of less dense materials such as DDG and soybean meal at the same volumetric flow rate (based on 1.2245 Bushels per cubic foot).

7.5 The material handling system will be sized to convey material from rail or vertical storage to either individual ship loader and/or to the Ingredient Barn at a throughput rate of 50,000 bushels per hour (Bu/hr). Equipment and transitions shall also be designed to facilitate the flow of less dense materials such as DDG and soybean meal at the same volumetric flow rate of 62,222 cubic feet per hour (cu ft/hr).

7.6 The material handling system will be sized to reclaim from the Ingredient Barn at an instantaneous throughput rate of 30,000 Bu/hr. Equipment and transitions shall be designed to facilitate the feeding and flow of less dense materials such as DDG and soybean meal at the same max volumetric flow rate of 37,333 cu ft/hr.

7.7 The facility arrangement shown on the reference drawings is the Owner's expected layout. Detailed design of the Facility is the responsibility of the Contractor, but Contractor's design must incorporate the principles contained in the drawings and specifications.

7.8 The Facility is of permanent type and shall be designed and constructed for a 40- year life span.

8 Project Schedule

Unless stated otherwise, all submittals are due before 5:00 pm Central Time on the date indicated.

8.1 Rail Work

Table 1 – Rail Work Schedule

Event	Date
EPC Bid Package – Issued for Bid (IFB)	August 16, 2022
Mandatory Virtual Pre-bid Web Meeting (9:00AM CDT)	August 24, 2022
Onsite visit for Rail Contractors (9:00AM CDT)	September 7, 2022
Contractor Bids Due	October 3, 2022
BND/ West Plains Review of Bids	October 4 – 14, 2022
Contractor Notice to Proceed	November 10, 2022
Site Available for Contractor Mobilization	January 2, 2023
Existing Rail Removed and Ready for New Work	February 1, 2023
Drainage and Rail Grading Complete	February 16, 2023
Track Work Complete	April 3, 2023
Commission Track and Demonstrate Capacity	April 14, 2023
Punch List Completion and Contractor Demobilization	May 11, 2023

8.2 Material Handling

Table 2 – Material Handling Schedule

Event	Date
EPC Bid Package – Issued for Bid (IFB)	August 16, 2022
Mandatory Virtual Pre-bid Web Meeting (9:00AM CDT)	August 24, 2022
Onsite visit for Material Handling Contractors (9:00AM CDT)	September 8, 2022

Event	Date
Contractor Bids Due	October 3, 2022
BND/ West Plains Review of Bids	October 4 – 14, 2022
Contractor Notice to Proceed	November 10, 2022
Site Available for Contractor Mobilization	January 2, 2023
Structures Completed	January 16, 2024
Automation, Electrical, and Mechanical Installation Complete	May 31, 2024
Start-up with Material	June 14, 2024
Commission Storage Facility and Loadout at Full Operation Rates	July 2, 2024
Punch List Completion and Contractor Demobilization	July 16, 2024

8.3 The Owner requests an efficient project schedule that provides the lowest cost while allowing reasonable time for engineering review, manufacture/delivery of the Facility equipment and components, high quality construction, and thorough facility check-out and start-up.

8.4 The Contractor shall submit a project schedule clearly indicating the Critical Path with the initial bid proposal. This project schedule shall show the major items of work, the time to complete each item, and the overall project completion date. Please note that the completion date is given considerable importance in awarding this Contract. The Contract will be awarded on the basis of low bid/best value and the Contractor's ability to meet the schedule. The Owner reserves the right to reject any and all bids.

8.5 All Rail Scope of Work is to be completed by May 11, 2023.

8.6 All Material Handling Scope of Work is to be completed by July 16, 2024.

8.7 LIQUIDATED DAMAGES: If the Contractor does not complete the Work by the listed completion date, the Contractor must pay Owner liquidated damages of $5,000 per calendar day per segment until all Work as outlined in this Bid Package is 100% complete.

9 Performance and Materials Testing

9.1 The following Performance Testing process shall be completed on or before the dates listed in 8.1 and 8.2:

9.1.1 All work except minor, non-operational punch list items are complete.

9.1.2 The Ship Loaders, Ingredient Barn storage, and Ingredient Barn reclaim systems have been started and operated at the stated production rate in Paragraph 7.5, 7.6, and 7.7 respectively for extended periods of time.

9.1.3 Performance testing shall consist of the following:

1. Transfer 30,000 metric tonnes from elevated storage and railcars to a vessel at the rated capacity.
2. Ingredient Barn Storage – transfer up to 20,000 metric tonnes from elevated storage and railcars to Ingredient Barn at the rated capacity. Demonstrate proper function of the tripper for the entire extent of travel.
3. Ingredient Barn Reclaim - Reclaim up to 20,000 metric tonnes from Ingredient Barn flat storage at the rated capacity. Demonstrate proper function of all drag conveyors/feeders at the specified capacity.

9.1.4 The Owner will ensure that materials required for testing will be available. Contractor is to notify Owner 45 days in Advance of anticipated performance testing date so that material can be on-hand for commissioning.

9.1.5 During the performance tests, the conveyor transfer point capacities and material flows will be monitored for compliance with these specifications and the guarantees in section 10, below.

9.1.6 The Contractor will ensure that appropriate personnel are available on-site during testing to perform corrective action if required. Electricians, millwrights, and controls personnel shall be on-site during performance testing.

9.2 The Owner will engage a third-party testing laboratory to perform any soil density testing required, as well as slump, air and cylinder testing for ready-mix concrete. The Owner will supply the Contractor with copies of the test results.

9.3 The Contractor shall be responsible for all other construction material testing and certification. For example, the Contractor shall supply all mill certs & analysis for structural and reinforcing steel.

9.4 If material testing identifies material failing to meet minimum standards, the Contractor shall remove or correct the material to the satisfaction of the Owner.

10 Contractor's Performance Guarantee and Warranty

10.1.1 This Contract is of "make-good" intent, such that in the event the Plant or any of its components do not meet the requirements of the specification, the Contractor shall furnish any design, materials, equipment, and labor required to modify the system or component at their expense as necessary to meet the specifications and guarantees.

10.1.2 The Contractor guarantees that the Plant conveyor layout and sizing will operate in accordance with the process flow diagrams.

10.1.3 The Contractor guarantees that the flow of materials between conveyors and flow to/from process equipment is correctly distributed, provides for maximum

operating efficiency, and will not result in excessive maintenance cost, i.e., wear.

10.1.4 One-year full parts and labor warranty (including in/out costs) for equipment and material furnished and installed by the Contractor shall be provided.

10.1.5 One-year field workmanship warranty (including in/out costs) for equipment and materials furnished by the Owner and installed by the Contractor shall be provided.

10.1.6 The warranty period begins upon the successful completion of the performance testing as outlined in Section 14 Testing and Start-Up.

11 Project Administration

11.1 Time is of the essence in the performance of this work. Much importance is placed on the timely completion of this work; therefore, the Owner reserves the right to award this Contract to someone other than the low bidder. If the dates stated in Section 8 are unattainable in your construction plan, your proposal should note your anticipated date of completion, along with the critical milestones identified in the plans, specifications, and bid forms.

11.2 The Owner's Project Manager or Site Representative will hold weekly progress meetings with the Contractor at the job site.

11.3 Prior to and during start-up and testing, the Contractor shall submit a daily schedule for each start-up, testing, or modification activity planned for the following day, by 3:00 pm.

11.4 All shipments shall be addressed to the Contractor at the site location. No materials shall be received, unloaded, or stored by the Owner unless agreed in advance. Contractor shall notify the Owner prior to shipping all equipment from supplier so that the Owner or Owner's Field Engineer can inspect the item.

11.5 The Contractor shall update project schedule on a timely basis. In particular, the Contractor shall submit an updated schedule within 1 week of submittal for a monthly progress payment. If the Contractor fails to comply with this request, the Owner may delay the monthly estimate payment until the updated schedule is received.

11.6 If it becomes necessary to amend the Contract or Scope of Work to satisfactorily complete this project, the Owner shall have right to add work to the Contractor's Scope or to hire a subcontractor to perform the work. Such amendment will not necessarily constitute extra work when the amendment serves to clarify or further delineate the work involved.

11.7 All amendments that materially change the Project Scope or amount of work to be done by the Contractor are to be performed only upon the execution of a written Change Order. Any additional work performed without a signed Change Order is done at the Contractor's risk. Unless the parties have agreed otherwise in writing, the Contractor agrees to do the work as directed by the Owner in the Change Orders at the unit rates for additional work included with the Contractor's original proposal.

11.8 The Owner retains the right to do any part of the Contract or any Change Order with its own forces or other contractors brought on to the site. If the Owner performs work included in the Project Scope, the Contract price shall be adjusted accordingly.

11.9 Without limiting Contractor's general environmental duties at the site, the Contractor shall control dust throughout the life of the project within the project area and other areas affected by the construction of the Plant.

11.10 All remedies set forth in this Exhibit A are in addition to any and all remedies available to Owner in the Contract, at law, or in equity.

11.11 A complete set of electronic As-built drawings are to be provided by the Contractor at project completion. The Owner will pay retainage only after receipt of the as-built drawings, and substantial completion of all required work per final drawing and specifications including performance testing.

12 Quality Assurance

12.1 Next to the Contractor's performance in providing safety of personnel and property, the ability of the Contractor to control the quality of the Work is a key factor in the award for this project as well as future invitations to bid.

12.2 The Contractor shall provide evidence that it has a Quality Control and Assurance Program and that it is in continuous operation. Evidence shall also be provided for significant subcontractors and vendors. Proposals will be evaluated taking into consideration evidence provided and the Owner's evaluation of the Contractor's focus on quality. Proposals without such evidence may be rejected.

12.3 The Owner reserves the right to make unannounced visits to the Contractor or subcontractor's facilities for the purpose of confirming that the program described in the proposal is being implemented. Access to all non-confidential records related to the Work shall be provided.

12.4 The program shall cover, as a minimum, engineering, design, procurement, storage, fabrication, assembly, and installation processes and shall be in written form.

12.5 It is expected that the Contractor shall employ a project manager with specific and sole responsibility for this Project. It is further expected that the Owner will deal directly with this representative for any and all issues relating to this Project.

13 Site-Specific Design Criteria

13.1 General

13.1.1 Items Subject to Buy American Act

Per 41 U.S. Code § 8302 - American materials required for public use, only unmanufactured articles, materials, and supplies that have been mined or produced in the United States, and only manufactured articles, materials, and supplies that have been manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured in the United States, shall be acquired for use in this project unless the head of the US Department of Transportation Maritime Administration (MARAD) determines their acquisition to be inconsistent with the public interest, their cost to be unreasonable, or that the articles, materials, or supplies of the class or kind to be used, or the articles, materials, or supplies from which they are manufactured, are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality.

13.1.2 Prevailing Wages and Davis-Bacon Act

The Davis-Bacon and Related Acts apply to contractors and subcontractors performing on federally funded or assisted contracts, in excess of $2,000 for the construction, alteration, or repair (including painting and decorating) of public buildings or public works. Davis-Bacon Act and Related Act contractors and subcontractors must pay their laborers and mechanics employed under the contract no less than the locally prevailing wages and fringe benefits for corresponding work on similar projects in the area.

13.2 Rail Work

13.2.1 The Contractor shall reference and adhere to OmniTRAX Rail Specifications and AREMA “Exhibit A” specifications for materials, construction and quality requirements.

13.3 Material Handling

13.3.1 All structural steel (including buildings) is to be hot-dipped galvanized and use galvanized ASTM rated fasteners and anchors per the structural engineer’s requirements. Field welds and touch-ups of galvanized steel are to be

cleaned per coating manufacturer's recommendations and sealed with two coats of zinc spray or a cold galvanizing compound consisting of 95% zinc or greater. Baseplates of structural steel are to be fully grouted using a nonmetallic, non-shrink grout placed and cured according to the manufacturer's recommendations.

13.3.2 All equipment vendors and equipment specifications must be approved by the Owner prior to procurement.

13.3.3 With the exception of the tripper section of 01-CV-03, all outdoor belt conveyors are to be of the fully enclosed Hi-Life type from Hi-Roller. No substitutions are allowed. The tail section of 01-CV-03 extending outside of the Ingredient Barn shall also be the fully enclosed Hi-Life type from Hi-Roller, with provisions to seal against the external siding of the building and attachment to the internal tripper conveyor frame. Idler angles of open tripper sections should match Hi-Life roller sections except as required in the transition distance near the head pulley.

13.3.4 All belt conveyors with exception to 01-CV-03 (tripper conveyor) and 01-CV-04 (reclaim conveyor) are to have maintenance walkways along both sides for the full length of the conveyor. 01-CV-03 and 01-CV-04 may have a 36-inch-wide maintenance walkway along one side with dual handrails if required. 01-CV-03 shall have maintenance walkways on both sides of head and tail sections extending far enough to service the conveyor and tripper at its maximum extent of travel. Access to equipment such as diverters and gates as well as both sides of head and tail sections of all conveyors shall be provided by maintenance or tower platforms.

13.3.5 Unless mechanical splices are required due to enclosed construction, all open conveyor belts are to have vulcanized splices, including tripper conveyor 01-CV-03 and the ship loaders.

13.3.6 Bucket elevator belt splices will use a belt splice of the appropriate belt thickness range as manufactured by Maxi-lift or Owner approved equal. Overlap splices using elevator bolts are not allowed.

13.3.7 Grease fittings not readily accessed from walkways and platforms shall have remote fill tubes routed to an accessible location or use the manufacturer's recommended remote greasing system.

13.3.8 All gearboxes shall have desiccant air breathers.

13.3.9 All inlet and discharge flanges, covers, and chutework are to be dust-tight with an exception to the portions of the 01-CV-03 tripper conveyor located inside the Ingredient Barn and the conveyor covers along the ship loaders.

13.3.10 All actuated slide gates and diverter valves shall use Andco electric actuators or Owner approved equal. Actuated slide gates will be equipped with fully open, fully closed, and adjustable midpoint position sensors.

13.3.11 All manual maintenance gates and valves shall be actuated with a hand or chain wheel and chain and must be readily accessible from grade or a maintenance platform or walkway. Manual slide maintenance gates must be capable of remaining partially open at an operator-adjusted midpoint to throttle the flow of material when either mounted horizontally, vertically, or at an incline. Hammer gates are not allowed.

13.3.12 All stair treads, platforms, and the primary walkway along each conveyor shall be a minimum of 36 inches wide with a walking working surface consisting of hot-dipped galvanized bar grating with a serrated surface. Secondary walkways along conveyors shall be a minimum of 24 inches wide. Bar grating is to be secured using manufacturer's recommended galvanized clips and clip spacing. Stair treads should have a rounded nose on the leading tread edge. Bar grating shall have a minimum bar thickness of 3/16 of an inch and minimum bar depth of 1 1/4 inches. All walking and working surfaces shall have a live load deflection of L/180 or less when subjected to a uniformly distributed live load of 100 pounds per square foot (psf) unless noted otherwise.

13.3.13 Grip Strut or similar formed grating is not allowed. Expanded metal of any kind is not allowed for any walking or working surfaces.

13.3.14 Handrail top and mid rails shall be constructed of pipe or a tubular section with a minimum Outside Diameter (OD) of 1.90 inches (nominal 1 ½ inch pipe size) with a minimum thickness of 0.145 inches (1 ½ inch Schedule 40 pipe thickness). 1.66-inch OD handrails on purchased equipment will be subject to Owner approval. Handrail top and mid rails constructed from angle profiles are not allowed. Both tubular and angle profiles of suitable strength are allowed for handrail posts. Angle profiles, flat bar and formed steel sheet are allowed for toe kicks. In addition, handrails must meet new OSHA standards for continuous, non-obstructed contact.

13.3.15 Stair rails and handrails may either be hot-dipped galvanized or painted safety yellow after a Commercial Blast (SSPC-SP6) surface preparation using

an industrial paint system such as Sherwin-Williams Kem-Flash® Prime/Fast Production Enamel or Owner approved equivalent.

13.3.16 All new walkways or platforms shall have two means of egress unless noted. There will be no dead ends allowed for walkways or platforms other than those required to accommodate the tripper on 01-CV-03. All other elevated walkways shall be accessible by a ramp or stairway on one or both ends. Ladders are to be used as a secondary means of egress only.

13.3.17 Transfer Tower 01-TT-01 will be equipped with an access stairway and will be the primary access point for maintaining the new Facility Upgrade. All stairs in the new facility expansion must meet current OSHA regulations regarding construction and stair rail geometry.

13.3.18 Weigh Batcher 02-WB-01 and Truck Loadout Building 03-SB-01 will be equipped with OSHA-approved access ladders (with required rest platforms and fall protection) as secondary means of egress. All ladders on weigh batcher and in other locations shall have spring-loaded safety gates at all platforms.

13.3.19 The Contractor shall have the option to provide ladders or stairs at the head pulley platforms of shipping Conveyors 02-CV-03 and 02-CV-04.

13.3.20 The Tripper Conveyor 01-CV-03 will have the maintenance walkway on the non-discharge side extended to the far end of the building, with a lockable walk-through exterior door at walkway level on both ends. An exterior landing is required at door level with OSHA-approved ladders and rest platforms to ground level at the east end of the building.

13.3.21 The maintenance walkway along 01-CV-03 shall have both inside and outside handrails positioned to keep occupants safely outside of the path of the tripper with an additional pull cord safety stop switch along the tripper's travel length. Pull cord should be a coated steel 3/32-inch wire rope or heavier and orange in color. Safety stop switch should be Conveyor Components Company Model RS or equivalent with NEMA 7/9 rated enclosure for use in explosive dust environments (or greater). Safety-stop-switch position is to be monitored by the controls system.

13.3.22 Should the Contractor elect to use numerous Hi-Roller fixed tripper discharge sections instead of a single travelling tripper, the conveyor sections inside the building will remain enclosed and will be of Hi-Life style construction to match outdoor sections of the conveyor. If a travelling dual discharge tripper is proposed, adequate clearance will be required to prevent accumulation of material on walkways. If the conveyor remains enclosed inside the building, conveyor walkways will be required along both sides of 01-CV-03 but no internal handrails or pull cord safety stop switches are required. A crossover

will be required to access the walkways on both sides of the conveyor without the use of ladders.

13.3.23 All belt conveyors and elevator legs shall be equipped with CMC hazard monitoring equipment monitoring head, snub (if equipped), and tail pulley bearing temperatures, pulley belt alignment (4-6 sensors total), and tail pulley speed. Hi-Roller conveyors shall be procured from the factory with either these items pre-installed or with factory provisions for their installation. All belt tripper pulleys require belt alignment monitors and bearing temperature sensors. All drag conveyors and feeders will monitor all shaft bearing temperatures, broken chain, and conveyor speeds on a non-powered shaft. All field wiring of hazard monitoring components shall be performed using CMC Field interconnect boxes. No substitution is allowed.

13.3.24 Ship loaders will require full CMC hazard monitoring on both the main and telescoping stinger conveyor sections. Masaba-supplied (or equal) plugged chute switches will also be monitored by the controls system.

13.3.25 All equipment shall be controlled via a local Hand-Off-Auto (HOA) switch allowing local control for troubleshooting and maintenance. Either a momentary pushbutton or dedicated run and stop switches must be provided for each piece of equipment for startup in the “Hand” position and they shall be of the protected pushbutton type, unless noted otherwise. Each HOA switch location must also have an Emergency Stop if equipment is not equipped with a pullcord safety stop switch.

13.3.26 Bucket elevator legs and all conveyors shall be monitored as above with the addition of boot fill/plugged chute switches of the diaphragm type rated for use in Class II, Division 1, Group G combustible dust environments such as Binmaster BM65 or Owner approved alternative. Elevator motor amps must also be monitored within the controls system as measured at the MCC.

13.3.27 All external/outdoor motors are to be of the Totally Enclosed Fan Cooled type (TEFC). All outdoor electrical enclosures shall have a minimum rating of NEMA 3R.

13.3.28 All interior motors, sensors, lighting, and electrical enclosures within the Ingredient Barn, Rail Pit, or Truck Pit shall be rated for Class II, Division 1, Group G combustible dust environments.

13.3.29 Tripper conveyor Tripper 01-OT-01, loadout Storage Bin 03-BN-01, and headhouse surge bins shall be equipped with a 78-80 GHz non-contact radar level sensor with Modbus connection including Binmaster NCR-80, Siemens Sitrans LR560, or Owner approved equal. Storage Bin 03-BN-01 and surge bins shall also be equipped with two (2) rotary emergency high level switches

indicating High Level and Emergency Shutdown High Level, Binmaster BMRX or Owner approved equal.

13.3.30 Site control voltage for control devices and sensors other than hazard monitoring is 120VAC. Remote switches and emergency stop switch positions shall be remotely monitored by the control system to identify which device has been activated. Motor/prime mover electrical disconnects for each device shall have a sensor showing disconnect position monitored by the controls system.

13.3.31 Motor Control Center (MCC) shall be of the bucket type and manufactured by Eaton, Square D, or Allen Bradley. MCC shall have at least 25% spare capacity available for expansion and have enough space to allow for the installation of an additional 36-inch-wide adjacent cabinet for future expansion.

13.3.32 Motor Starters and Variable Frequency Drives (VFD) shall be Square D or Allen Bradley. All VFDs will have amps measured at the MCC monitored by the control system.

13.3.33 All feeders and motors greater than 75 HP must be driven using either a soft starter or a VFD. Starters and VFDs are for constant torque applications and should be sized appropriately by the Contractor to handle the motor inrush current of the equipment starting under full load. It is the Contractor's responsibility to confirm motor construction and inrush currents and size all VFDs and motor starters appropriately, including those from Owner provided equipment. Amperage of equipment starting under full load to be tested during commissioning.

13.3.34 MCC Building shall be a prefabricated structure constructed of exposed aggregate precast concrete panels as manufactured by Fibrebond or Owner approved equal. The Contractor shall confirm the size and layout needed to fit electrical equipment and accommodate future expansion. Building Layout is to be submitted to the Owner 21 days prior to purchase.

13.3.35 FGIS/Dock Building shall be a prefabricated structure constructed of exposed aggregate precast concrete panels as manufactured by Fibrebond or Owner approved equal. The Contractor shall confirm the size and layout needed to accommodate FGIS operations as well as a new Control Room and external Men's and Women's restrooms. Building Layout is to be submitted to the Owner 21 days prior to purchase and is also subject to FGIS approval. See Appendix E – FGIS Requirements.

13.3.36 All new towers, buildings and scales shall be grounded with a minimum of #4AWG solid copper conductors bonded to 5/8-inch diameter 8-foot-long copper ground rods, or as otherwise dictated by NEC. Use of stranded

and/or aluminum wire for grounding is not allowed. Copper clad connectors are not allowed. All scales shall be grounded independently from other equipment or structures.

14 Testing and Start-up

14.1 The Contractor and Owner are responsible for check out and pre-commissioning of all equipment and systems.

14.1.1 Contractor shall perform all required electrical tests (including but not limited to-motor equipment ground conductor, all other ground conductors, and ground bed) using accepted methods for each test and supply Owner copies of all tests at the time of start-up. Contractor shall insure that each of the above test results is within NEC acceptable ranges for the application. A checkout form shall be prepared for each subsystem or major piece of equipment. This form shall include motor rotation, gear and bearing lubrication, coupling alignments, drive belt tensioning, and electrical and mechanical installation, dated and signed by both the Contractor and Owner.

14.1.2 A start-up coordination meeting will be held with the Owner each day during the start-up and testing period. Startup meetings shall be held prior to bumping motors, dry run of equipment, and operation with material.

14.1.3 The Contractor shall correct any vibration, overheating, alignment or other problems that occur under normal operating conditions. The Contractor shall

correct any structures that have vibrations outside of the range typically found to be acceptable to humans, or where structural damage could occur

14.1.4 The Contractor shall simulate control schemes and demonstrate the operation, no less than one week prior to dry run of the particular subsystem. All protective devices and interlocks shall be in service.

14.1.5 All equipment shall be dry test run in the field. All interlock and safety checks made both from local stations and the control house before any operation with material may occur.

14.1.6 All safety switches and similar devices shall be tested for correct operation; subsystem start/stop and emergency shutdown routines.

14.2 Contractor shall use the Owner's equipment numbering scheme and label each item with 6-inch-tall lettering visible from ground level. The label shall be located on a stationary part of the equipment and shall be installed at both the head and tail of each conveyor.

14.3 During the initial 24 hours of dry run operation, the Contractor shall operate the plant, with Owner personnel assisting followed by 24 hours of operation with the Owner operating with the Contractor's assistance.

14.4 After the above start-up period, the Performance Testing may be started.

14.5 The Contractor shall modify, maintain or adjust any equipment during the Performance Testing period described in Section 9.0.

14.6 The Contractor shall be responsible for replacing any material or equipment that is damaged due to improper installation or negligence on the part of the Contractor.

14.7 The Contractor shall deliver four (4) sets of all operation and maintenance manuals.

15 Construction Facilities and Procedures

15.1 The Contractor shall have a Construction Manager at the job site. This person shall be approved by and acceptable to the Owner.

15.2 The Electrical Contractor shall be licensed as such by the State of Texas.

15.3 The Contractor shall maintain at the site, a full set of drawings, specifications, and other technical data to which the Owner's personnel has full and open access.

15.4 The Contractor will furnish temporary offices for its personnel.

15.5 Contractor's employees are required to park in designated areas provided by the Owner.

15.6 Contractor will provide and maintain site perimeter fencing as necessary.

15.7 Construction personnel and their vehicles shall be subject to search by security personnel at their discretion.

15.8 All Contractor personnel shall have contractor identification clearly visible at all times. (Hardhat decals or ID badges).

15.9 Contractor shall provide own telephone and other site communications services and pay all costs associated therewith.

15.10 Temporary lights required by law or ordinance or necessary for protection of the public and workers or for execution and inspection of the Work shall be furnished, installed, and maintained by Contractor.

15.11 Contractor shall furnish water as required for the execution of this project. This shall include providing sanitary drinking water facilities for his employees including coolers, ice, disposable cups, and waste containers at each cooler.

15.12 Contractor shall furnish and maintain sanitary facilities for his personnel. Construction personnel will not be permitted to use the permanent plant toilet and washroom facilities.

15.13 Contractor will be required to have a random drug-testing program in place for all their employees and subcontract employees.

15.14 Contractor shall provide compressed air required for the Work.

15.15 Contractor shall provide for its first aid requirements.

15.16 Contractor shall promptly receive, unload, and place into storage all equipment, materials, and supplies for the Work, pay any and all demurrage, and maintain an inventory and record of location for all equipment and materials.

15.17 Contractor-furnished indoor storage shall consist of suitable construction trailers or equal. All materials stored on ground shall be supported on cribbing at least 6 inch off the ground surface.

15.18 Project is at an active grain terminal site with multiple contractors potentially performing work in overlapping areas and timeframes. To ensure safe movement of mobile equipment, all Contractors' mobile equipment shall be equipped with a placard to identify the Contractor responsible for the equipment. Contractor owned or leased vehicles will only be used on site. No private vehicles will be allowed past the designated parking area unless approved by Owner.

16 Construction Materials

16.1 Concrete

16.1.1 Concrete work shall comply with the recommendations of ACI 301 and ACI 318-11, unless otherwise specified.

16.1.2 Cement shall conform to ASTM C150 Type I or II cements.

16.1.3 Concrete aggregates shall conform to the requirements of ASTM C33.

16.1.4 Admixtures for concrete shall be in accordance with the manufacturer recommendations and shall conform to the requirements of ASTM C 494.

16.1.5 Mix water for concrete shall be clean, fresh, and potable.

16.1.6 Precast and cast-in-place concrete shall be afforded corrosion protection measures through the use of concrete admixtures, such as fly ash, calcium nitrite, or other approved methods as specified.

16.1.7 Cast-in-place concrete strength (*f'c*) shall be 5,000 psi minimum at 28 days.

16.1.8 Precast, non-pre-stressed concrete strength (*f'c*) shall be 5,000 psi minimum at 28 days.

16.1.9 Grout shall be non-metallic and non-shrink, with a minimum strength of 8,000 psi at 28 days, unless otherwise specified.

16.1.10 Minimum concrete cover over reinforcing bars shall be 3 inches, unless otherwise noted.

16.1.11 Chamfer all exposed external corners of concrete with 45-degree chamfers unless otherwise noted (chamfers shall be 3/4 inch, unless specified otherwise).

16.1.12 Construction joints between cast-in-place concrete shall be clean with a roughened surface of 0.25-inch amplitude and be bonded with epoxy bonding agent.

16.2 The following shall apply to all Reinforcing Steel:

16.2.1 Detailing, fabrication, and erection of reinforcing steel shall conform to the ACI Detailing Manual, ACI SP-66.

16.2.2 Reinforcing steel for cast-in-place and precast, non-prestressed concrete shall conform to ASTM A615 and ASTM A706 as applicable and will be uncoated unless noted on drawings.

16.2.3 Lifting inserts shall be provided in all precast members to facilitate lifting and supporting members during erection (additional reinforcing steel shall be

provided as necessary to prevent cracking during handling, delivery, and erection).

16.2.4 All reinforcing bar splices shall be Class “B” tension lap splices in accordance with ACI 318 Chapter 12, unless otherwise noted.

16.3 Structural Steel

16.3.1 Steel work shall be performed in accordance with ANSI/AISC 360-05, “Specification for Structural Steel Buildings”, American Institute of Steel Construction, Steel construction Manual.

16.3.2 Welding shall conform to the requirements of ANSI/AWS D1.1.

16.3.3 Structural Steel shall be hot dipped galvanized and shall conform to the requirements of ASTM A123 / A123M “Zinc Coatings on Iron and Steel Products”.

16.3.4 Anchor bolts shall be galvanized and conform to the requirements of ASTM F1554, unless otherwise noted.

16.3.5 Structural bolts shall conform to ASTM A325.

17 Safety Procedures

17.1 Contractor Requirements

17.1.1 All contractors and subcontractors must follow all OSHA regulations while on the Owner’s property.

17.1.1.1 Hardhats, safety glasses, safety toe boots, and high-visibility clothing must be worn at all times, with no exceptions.

17.1.1.2 All personnel onsite shall adhere to Owner’s Basic Safety Rules as presented in Attachment 1.

17.1.1.3 The Contractor shall adhere to all site-specific safety policies as presented in Attachment 3.

17.1.1.4 All personnel onsite shall participate in a “stand down” meeting to discuss and reinforce lock-out/tag-out procedures prior to any equipment being energized.

17.1.1.5 The following actions will result in immediate and permanent removal from the site:

17.1.1.6 Violation of Lock-out/Tag-out policies per Appendix G - West Plains Safety Requirements.

17.1.1.7 Violation of Fall Protection policies per Appendix G - West Plains Safety Requirements.

17.2 Emergency Contacts

17.2.1 In the event of a medical emergency, the Contractor shall immediately notify the Owner's onsite contact(s) listed below:

Blake Ducote – (225) 439-8173

17.2.2 The local West Plains safety contact is: Blake Ducote – (225) 439-8173

17.2.3 Port of Brownsville Harbor Master Office (Port Police) Dispatch – (956) 831-8256

17.2.4 The nearest hospital to the Jobsite is:

Valley Regional Medical Center

100 E. Alton Goor Blvd.

Brownsville, Texas 78526

(965)-350-7000

18 Design Codes and References

The equipment and related work supplied shall be in accordance with the applicable codes, standards and reference specifications listed in this specification. If two or more standards provide conflicting information, the most stringent shall apply or the Supplier shall obtain clarification for the Owner before proceeding with the work.

18.1 Design Codes

The Supplier's work shall comply with all applicable federal, state, and municipal codes and regulations.

- *AGMA American Gear Manufacturers Association*
- *AISC American Institute of Steel Construction*
- *ANSI American National Standards Institute*
    - C84.1 Electric Power Systems and Equipment - Voltage Ratings (60 Hertz)
    - C37.2Standard Electrical Power System Device Function Numbers, Acronyms, and Contact Designations.
- *AISC Steel Construction Manual, 14th Edition, 2011*
- *AISC 360-10 Specification for Structural Steel Buildings*
- *AISC 341-10 Seismic Provisions for Structural Steel Buildings*
- *ASCE*

- 7-16 Minimum Design Loads for Buildings and Other Structures

- *ASTM* *American Society for Testing and Materials*
  - A1023 / A1023M Stranded Carbon Steel Wire Ropes for General Purpose
  - A123 / A123M Zinc Coatings on Iron and Steel Products
  - A307 Standard Specification for Structural Bolts and Studs
  - F3125 Standard Specification for Structural Bolts
  - A529 / A529M High-Strength Carbon-Manganese Steel of Structural Quality
  - A53 Standard Specification for Pipe, Steel, Black and Hot Dipped
- *ASME* *American Society of Mechanical Engineers*
  - B20.1 Safety Standard for Conveyors and Related Equipment
  - B31.3 Process Piping
- *AWS* *American Welding Society*
  - A5.C Arc Welding Electrodes and Fluxes
  - D1.1 Structural Welding – Steel
- *CEMA* *Conveyor Equipment Manufacturers Association*
  - Belt Conveyors for Bulk Materials
  - 502 Bulk Material Belt Conveyor Troughing and Return Idlers
- *ICC* *International Building Code (IBC) 2018*
- *IEEE* *Institute of Electrical and Electronic Engineers*
  - 43 IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery
  - 141 Recommended Practice for Electric Power Distribution for Industrial Plants (Red Book).
  - 142 Grounding of Industrial and Commercial Power Systems.
  - 242 Protection and Coordination of Industrial and Commercial Power Systems.
    - 493 Industrial Power System Design (Gold Book)
    - 841 IEEE Standard for Petroleum and Chemical Industry Premium-Efficiency, Severe-Duty, Totally Enclosed Fan-Cooled (TEFC)

Squirrel Cage Induction Motors--Up to and Including 370 kW (500 HP).

- 3003.2 IEEE Recommended Practice for Equipment Grounding and Bonding in Industrial and Commercial

- *ISA* *International Society of Automation*
- *ISO* *International Organization for Standardization*
  - R773/4 Recommendations for Keys and Key Seats
  - 5049 Mobile Equipment for Continuous Handling of Bulk Materials
- *MPTA* *Mechanical Power Transmission Association*
- *NEMA* *National Electrical Manufacturers Association*
- *NESC* *National Electrical Safety Code*
- *NFPA* *National Fire Protection Association*
  - 70 National Electric Code (NEC)
  - 70E Standard for Electrical Safety in the Workplace.
  - 780 Standard for the Installation of Lightning Protection Systems.
- *OSHA* *Occupational Safety and Health Administration*
- *SAE* *Society of Automotive Engineers*
- *SSPC* *Steel Structures Painting Council – Painting Manual Standards Vol. I & II*
- *UL* *Underwriters Laboratories*

Appendix A

Conceptual Design Drawings - Rail

CONCEPT RAIL LAYOUT - FOR BID ESTIMATE OF QUANTITIES
POB - West Plains - Rail Layout - 07-06-2022

Bid Item	Description	Estimated Quantity	Units	
	Track Work			
1	Existing Track Removal	1,040	TF	
2	Existing Turnout Removal	3	EA	
3	Existing Track Shift	500	TF	
4	Furnish and Install 115# Rail (see note 3)	6,500	TF	
5	Furnish and Install No 8 Turnout	10	EA	
6	Furnish and Install Sliding Derail (w/ Crowder)	1	EA	
7	Earthen Bumper	5	EA	
8	Furnish and Install Concrete Crossing Panels (Other Panel Types can be considered)	136	LF	
9	Furnish and Install Bumping Post	1	LF	
10	Furnish and Install Culvert Extensions	50	LF	
11	Earthwork	800	LF	
12	Furnish and Install Concrete Embedded Track	20	TF	

ASSUMPTIONS

1. Quantities Identified are for preliminary bidding purposes only
2. Quantities will be finalized when final IFC drawings are approved
3. See project scope for bid item specifications
4. Furnish and install track, ties and ballast includes; Max 115lb Rail, Wood Ties, OTM, 8" Ballast, 8" Subballast, Walkways.
5. Environmental, cultural, wetland and permitting excluded from these quantities.
6. Earthwork based on proposed track with an estimated 3' of cut required to build rail
7. Existing Track Removal has option to reuse existing material if in acceptable condition
8. Existing Turnouts can be reused if they are in acceptable condition and operating railroad allows for reuse of smaller turnouts
9. Shift Track was assumed to be 500 track feet. IFC drawings will verify this length
10.

Disclaimer

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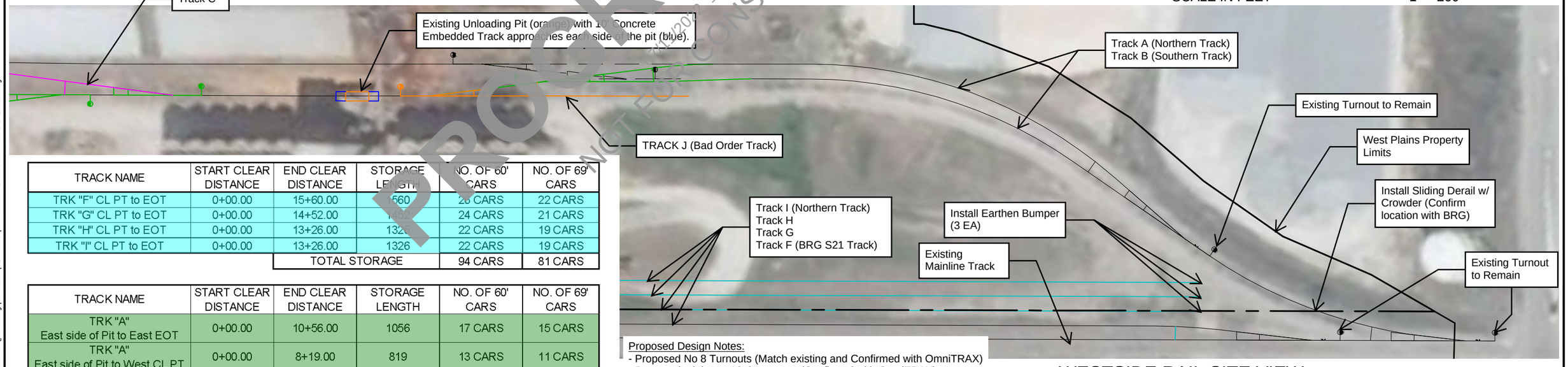
Right-of-Way lines are approximate and are depicted from aerial imagery.

OVERALL RAIL SITE VIEW

200 0 200 400
SCALE IN FEET 1" = 200'



TRACK NAME	START CLEAR DISTANCE	END CLEAR DISTANCE	STORAGE LENGTH	NO. OF 60' CARS	NO. OF 69' CARS
TRK "F" CL PT to EOT	0+00.00	15+60.00	1560	26 CARS	22 CARS
TRK "G" CL PT to EOT	0+00.00	14+52.00	1452	24 CARS	21 CARS
TRK "H" CL PT to EOT	0+00.00	13+26.00	1326	22 CARS	19 CARS
TRK "I" CL PT to EOT	0+00.00	13+26.00	1326	22 CARS	19 CARS
		TOTAL STORAGE		94 CARS	81 CARS

TRACK NAME	START CLEAR DISTANCE	END CLEAR DISTANCE	STORAGE LENGTH	NO. OF 60' CARS	NO. OF 69' CARS
TRK "A" East side of Pit to East EOT	0+00.00	10+56.00	1056	17 CARS	15 CARS
TRK "A" East side of Pit to West CL PT	0+00.00	8+19.00	819	13 CARS	11 CARS
TRK "J" Optional Bad Order Track	0+00.00	1+40.00	140	2 CARS	2 CARS
TRK "B" CL PT to EOT	0+00.00	8+08.00	808	13 CARS	11 CARS
TRK "C" CL PT to CL PT	0+00.00	5+36.00	536	8 CARS	7 CARS
TRK "D" East side of Pit to West CL PT	0+00.00	8+67.00	867	14 CARS	12 CARS
TRK "E" (+LOCO)	0+00.00	8+60.00	800.00	13 CARS	11 CARS

Proposed Design Notes:
- Proposed No 8 Turnouts (Match existing and Confirmed with OmniTRAX)
- Proposed minimum 12 deg curves (Confirmed with OmniTRAX)
- 14' Clear Points
- Cyan Track used as BRG car pick up/drop off car storage
- Green/Blue Tracks used for Unloading Operations
- Pink Track to be used as Bad Order Track and Locomotive Storage

100 0 100 200
SCALE IN FEET 1" = 100'

WESTSIDE RAIL SITE VIEW

BROWNSVILLE - WEST PLAINS
RAIL EXHIBIT

SHEET 1 OF 2

July 6, 2022

Disclaimer

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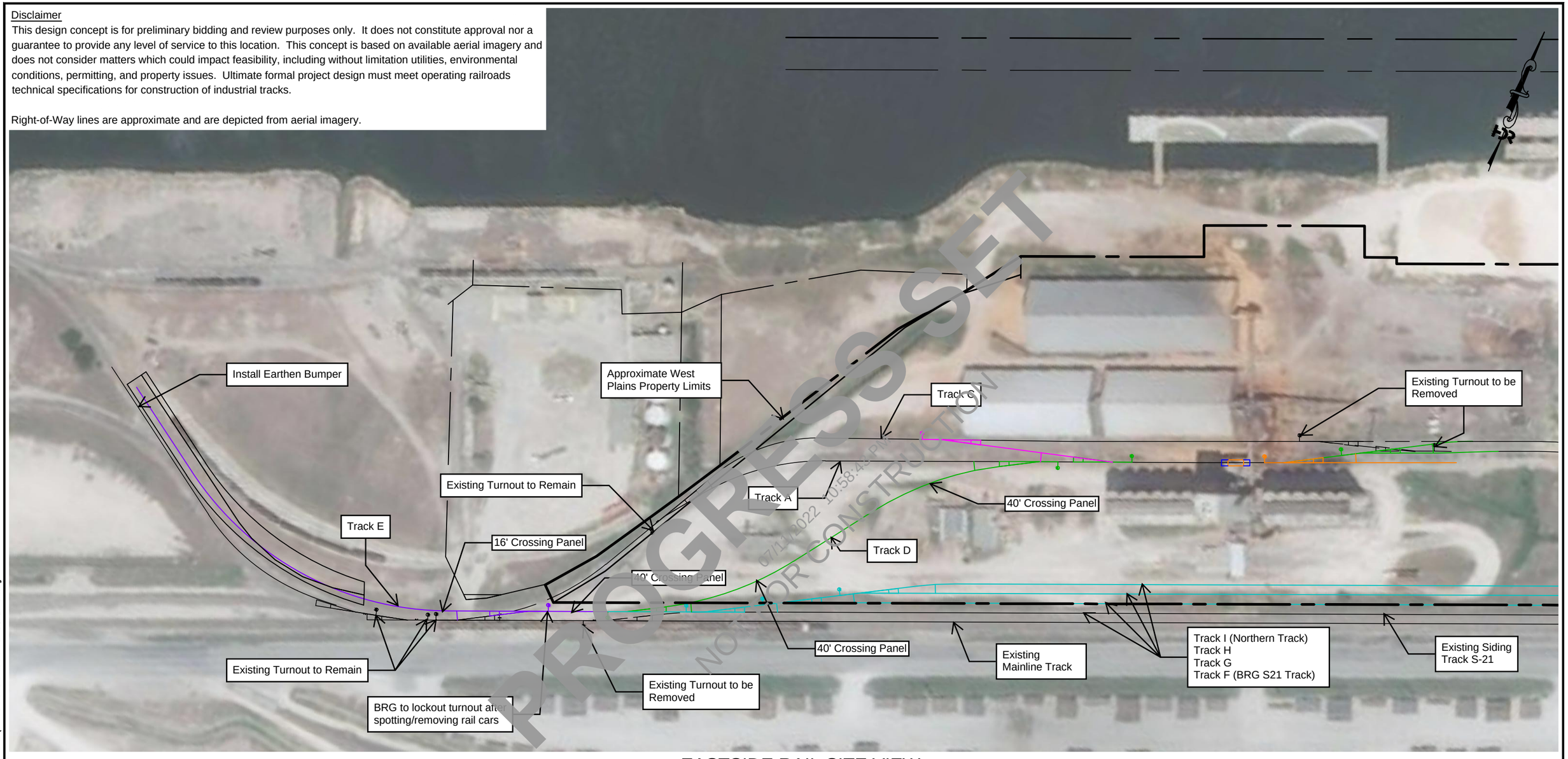
Right-of-Way lines are approximate and are depicted from aerial imagery.



EASTSIDE RAIL SITE VIEW

Proposed Design Notes:
- Proposed No 8 Turnouts (Match existing, Confirmed with OmniTRAX)
- Proposed minimum 12 deg curves (Confirmed with OmniTRAX)
- 14' Clear Points
- Cyan Track used as BRG car pick up/drop off car storage
- Green/Blue Track used for Unloading Operations
- Pink Track to be used as Bad Order Track and Locomotive Storage
- Purple Track to be used as an Operations Tail Track

150 0 150 300
SCALE IN FEET 1" = 150'

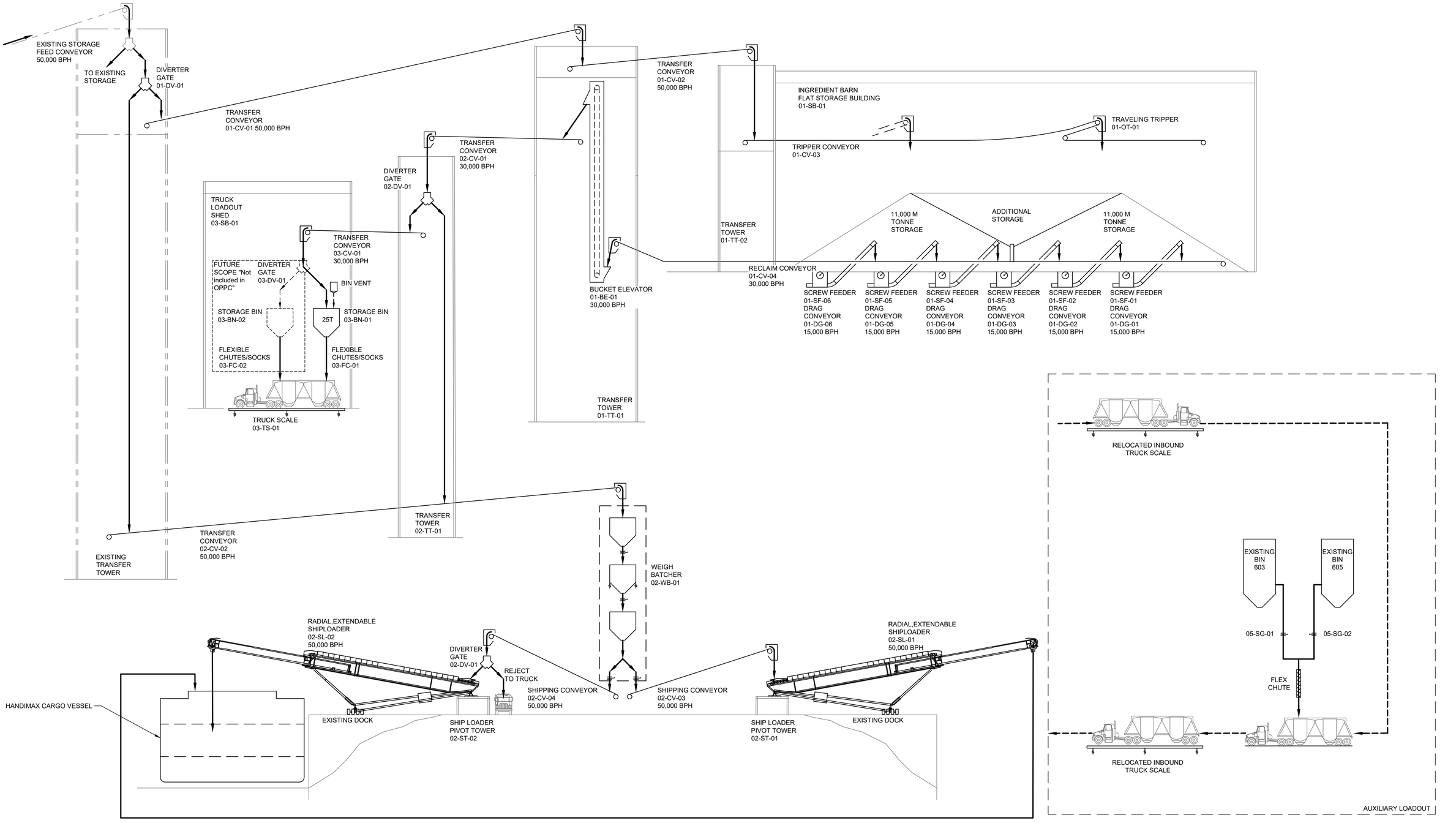
BROWNSVILLE - WEST PLAINS
RAIL EXHIBIT

SHEET 2 OF 2

July 6, 2022

Appendix B

Conceptual Design Drawings - Material Handling



ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT MANAGER	ART CONTI
MECHANICAL	KYLE WUNDT
	KARA DAHLGREN
PROJECT NUMBER	10287181

WEST PLAINS LLC
PORT OF BROWNSVILLE TEXAS
BROWNSVILLE, TEXAS

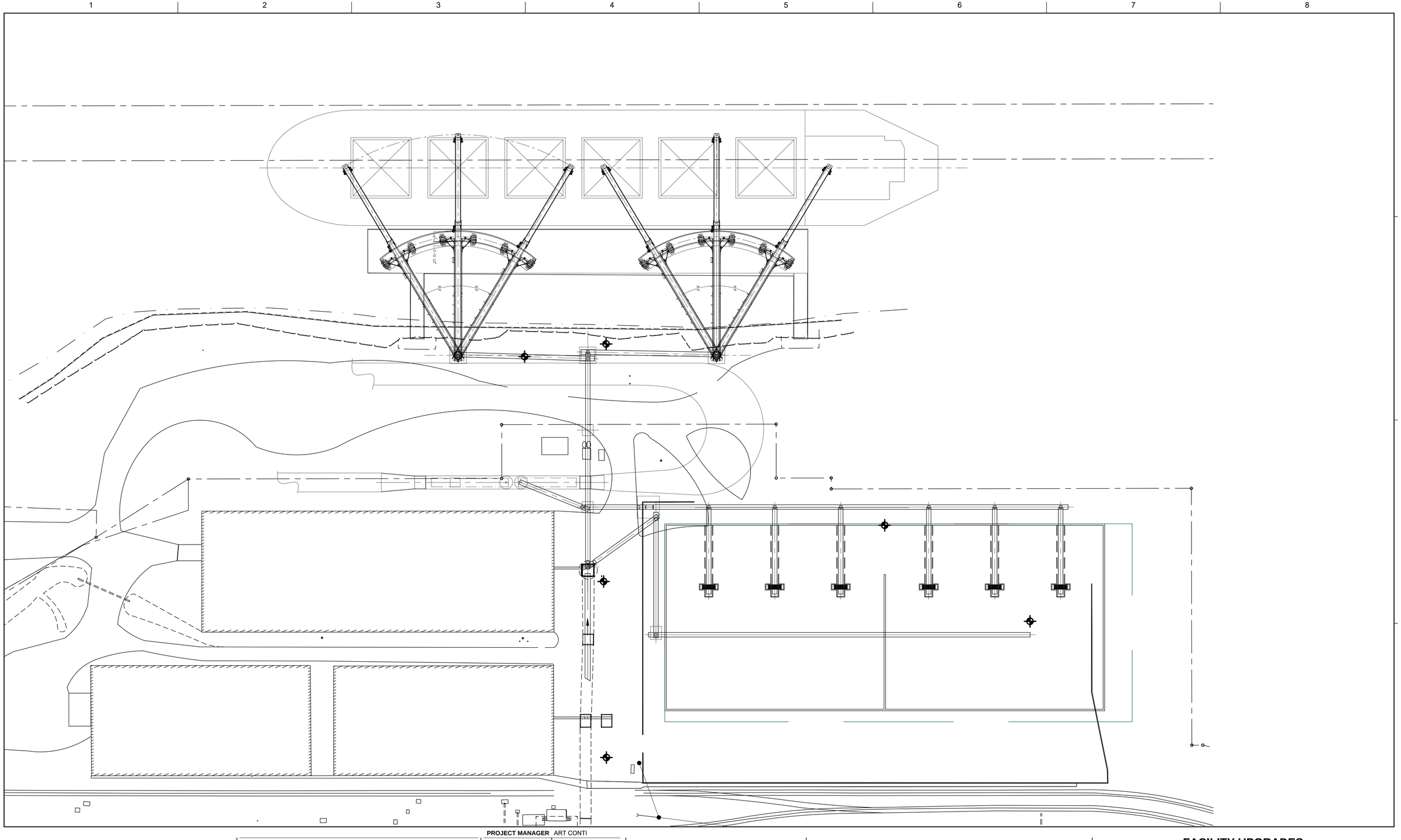
FACILITY UPGRADES
PROCESS FLOW DIAGRAM

0 1" 2"

FILENAME 00D-01.DWG

SCALE -

SHEET **00D-01**



PROJECT MANAGER	ART CONTI
MECHANICAL	KYLE WUNDT

ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT NUMBER 10287181

WEST PLAINS LLC
PORT OF BROWNSVILLE TEXAS
BROWNSVILLE, TEXAS

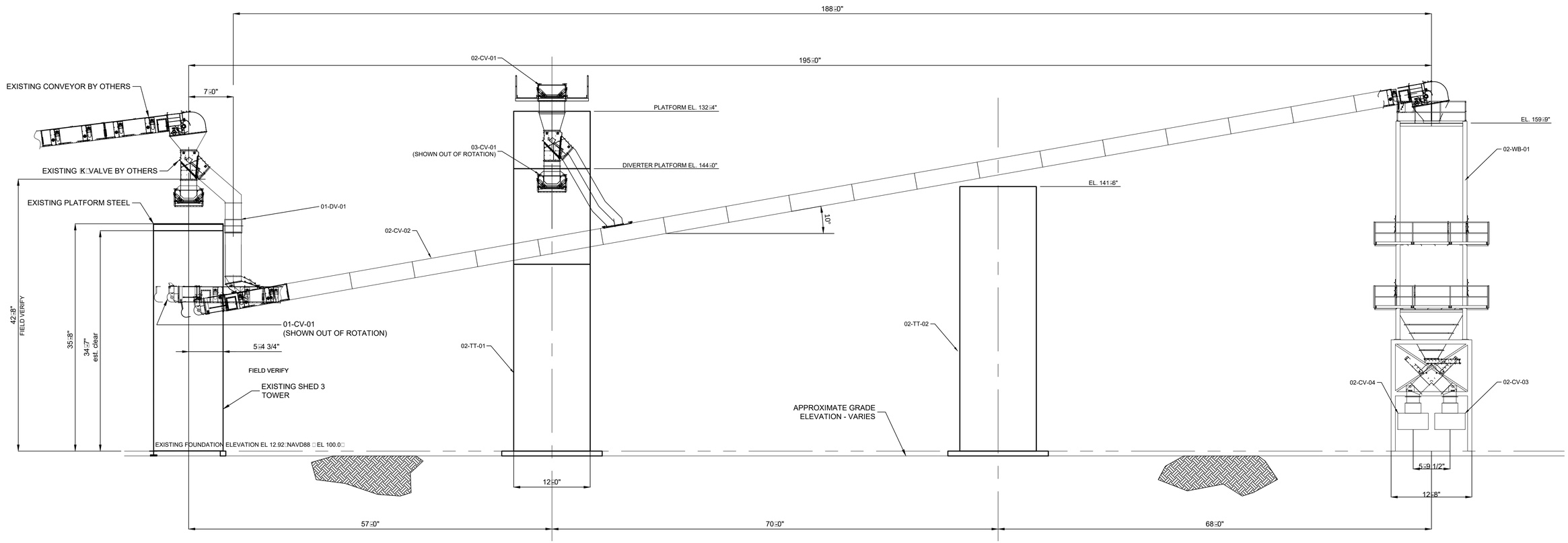
FACILITY UPGRADES
CONCEPTUAL PLAN
SHIP LOADING AND INGREDIENT BARN

0 1" 2"

FILENAME 00D-02.DWG

SCALE -

SHEET **00D-02**



NOTES:

1. CONTRACTOR TO FIELD VERIFY ALL MEASUREMENTS
2. DIMENSIONS OF EQUIPMENT ARE AS SHOWN. FINISHED DIMENSIONS ARE TO BE DETERMINED BY THE CONTRACTOR.
3. PROJECT EL 100'-IS BASED ON THE AVERAGE HEIGHT OF THE EXISTING TOWER FOUNDATION AT SHED 3 AND IS EQUAL TO EL. 12.92'-NAVD88.

ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT MANAGER ART CONTI

MECHANICAL	KYLE WUNDT

PROJECT NUMBER 10287181

WEST PLAINS LLC
PORT OF BROWNSVILLE TEXAS
BROWNSVILLE, TEXAS

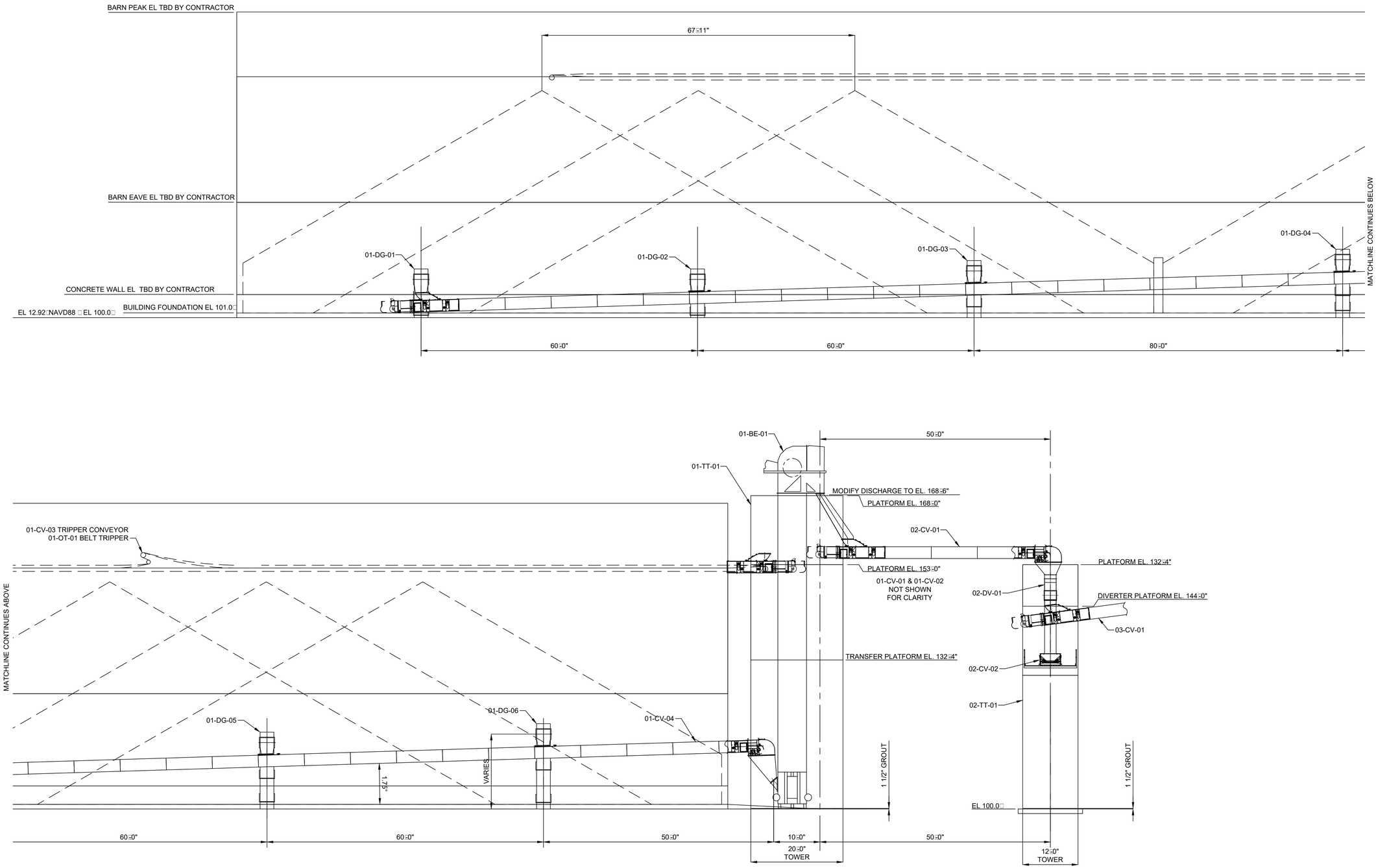
SHIPPING CONVEYOR AND WEIGH BATCHER EAST ELEVATION

0 1" 2"

FILENAME -

SCALE 1/8" = 1'-0"

SHEET 00M-01



ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT MANAGER	ART CONTI
MECHANICAL	KYLE WUNDT
PROJECT NUMBER	10287181

WEST PLAINS LLC
PORT OF BROWNSVILLE TEXAS
BROWNSVILLE, TEXAS

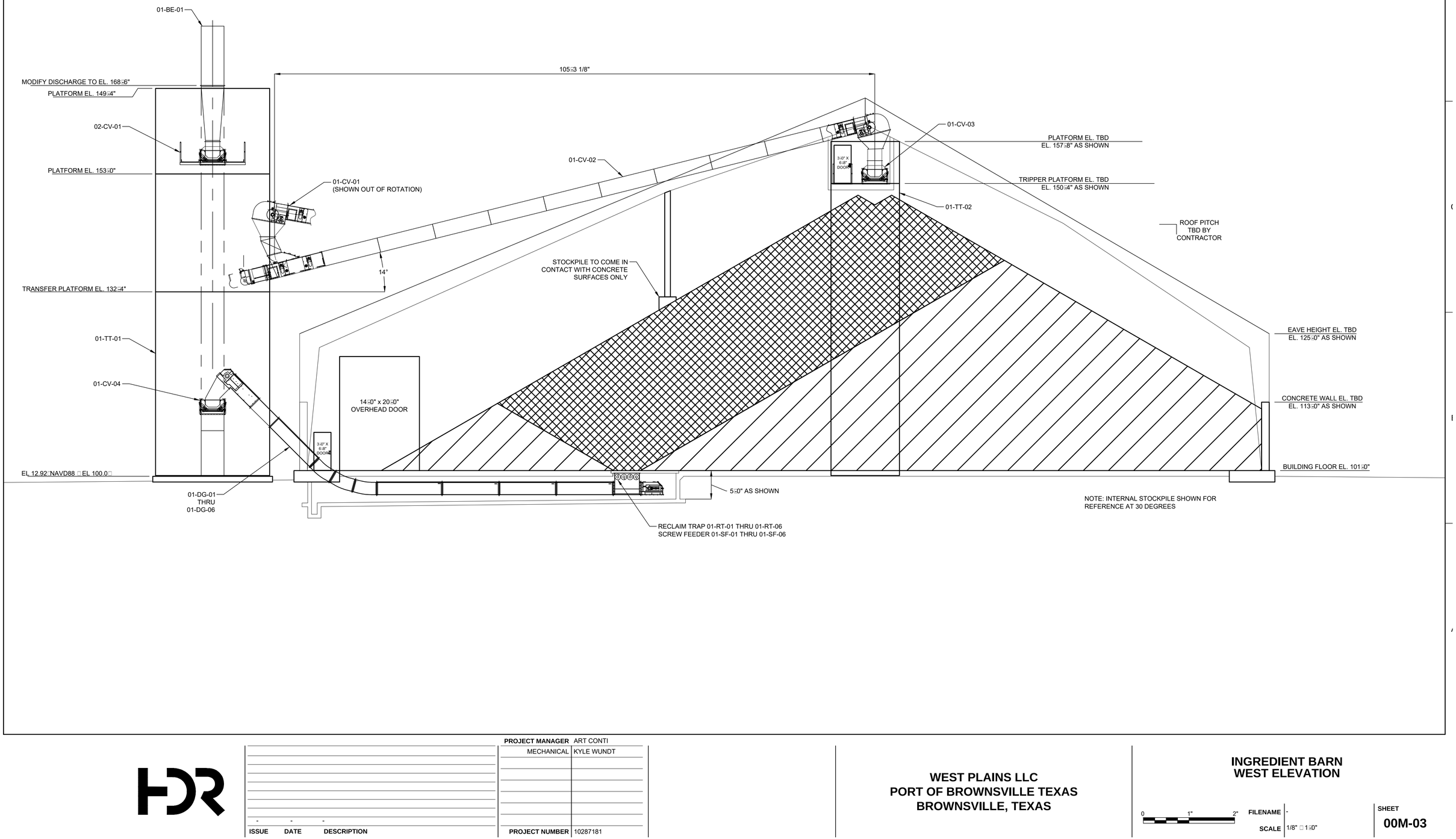
INGREDIENT BARN AND RECLAIM SYSTEM
NORTH ELEVATON

0 1" 2"

FILENAME -

SCALE 3/32" □ 1□0"

SHEET **00M-02**



ISSUE	DATE	DESCRIPTION
-	-	-

PROJECT MANAGER	ART CONTI
MECHANICAL	KYLE WUNDT
PROJECT NUMBER	10287181

WEST PLAINS LLC
PORT OF BROWNSVILLE TEXAS
BROWNSVILLE, TEXAS

INGREDIENT BARN
WEST ELEVATION

0 1" 2"

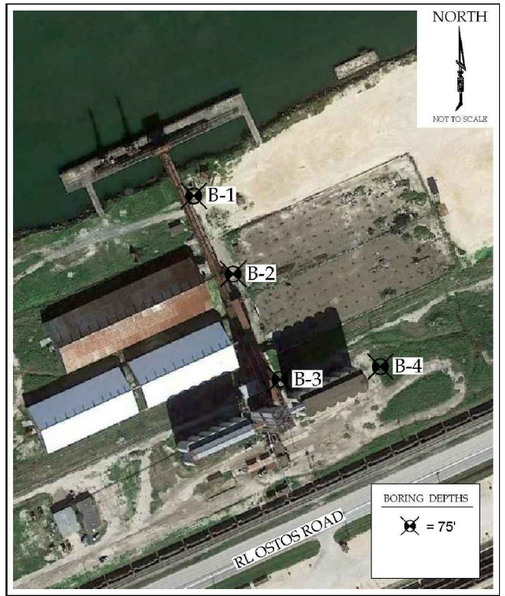
FILENAME -

SCALE 1/8" □ 1'-0"

SHEET
00M-03

Appendix C

Site Data and Reports



BORING LOCATION PLAN

PROPOSED GRAIN ELEVATOR
AT RL OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5614 N. CUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL: 956-702-8506
FAX: 956-702-8149

BORING LAYOUT

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled: **November 11, 2015**	Logged By: **J.P. Palma**	Checked By: **R. Palma**
Drilling Method: **straight flight / rotary wash**	Drill Bit Size/Type: **4 in. soil bit**	Total Depth of Borehole: **75 feet bgs**
Drill Rig Type: **CME 45**	Drilling Contractor: **Jedi Drilling**	Approximate Surface Elevation: **5 Feet Natural Ground (assumed)**
Groundwater Level and Date Measured: **10 feet ATD**	Sampling Method(s): **2 in. Split Spoon, Tube**	Hammer Data: **140 lb., 30 in. drop, Automatic**
Borehole Backfill: **Subgrade Cuttings**	Location: **See Boring Location Map**	

Elevation, feet	Depth, feet	Sample Type	Sample Number	Recovery, Penetration Resistance, Blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
0	0		1	11		CH		lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff	8						
-5	5		2	5					17			28	12	PP=1.0	
-10	10		3	6					25					PP=0.25	
-15	15		4	12					33			31	9	PP=0.5	
-20	20		5	6				(ATD) ▽	23						
-25	25		6	12					18			34	16		
-30	30		7	8					19						
-35	35		8	9					24			54	29		
-40	40		9	21		SC-CL		clayey SAND to sandy lean CLAY, brown, wet, stiff	26						
-45	45		10	14					26			15			
-50	50		11	25					23						
-55	55		12	13					23			56			
-60	60		13	19		CH-CH		lean CLAY w/ sand to fat CLAY, brown, moist to wet, med. stiff to stiff	21			88			
-65	65		14	20					21						
-70	70		15	23					24						
-75	75		16	14					27			31	13		
-80	80		17	40		CL		sandy lean CLAY, brown, moist to wet, stiff to hard	66			32			
			18	43					23						
								Bottom of Boring at 75 feet bgs							

Figure

BORING B–1

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Key to Log of Boring

Sheet 1 of 1

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16]

COLUMN DESCRIPTIONS

1. **Elevation, feet:** Elevation (MSL, feet)
2. **Depth, feet:** Depth in feet below the ground surface.
3. **Sample Type:** Type of soil sample collected at the depth interval shown.
4. **Sample Number:** Sample identification number.
5. **Sampling Resistance, blows/foot:** Number of blows to advance driven sampler foot or distance shown) beyond seating interval using the hammer identified on the boring log.
6. **Relative Consistency:** Relative consistency of the subsurface material.
7. **USCS Symbol:** USCS symbol of the subsurface material.
8. **Graphic Log:** Graphic depiction of the subsurface material encountered.
9. **MATERIAL DESCRIPTION:** Description of material encountered. May include consistency, moisture, color, and other descriptive text.
10. **Moisture Content, %:** Water content of the soil sample, expressed as percentage of dry weight of sample.
11. **Dry Unit Weight, pcf:** Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.
12. **Percent Fines:** The percent fines (soil passing the No. 200 Sieve) in the sample. WA indicates a Wash Sieve, SA indicates a Sieve Analysis.
13. **LL, %:** Liquid Limit, expressed as a water content.
14. **PI, %:** Plasticity Index, expressed as a water content.
15. **Shear Strength (tsf):** Unconfined Compressive Strength.
16. **REMARKS AND OTHER TESTS:** Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity.
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

TYPICAL MATERIAL GRAPHIC SYMBOLS

TYPICAL SAMPLER GRAPHIC SYMBOLS

OTHER GRAPHIC SYMBOLS

- Water level (at time of drilling, ATD)
- Water level (after waiting a given time.)
- Minor change in material properties within a stratum
- Inferred or gradational contact between strata
- ? — Queried contact between strata

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

May 07, 2018
ISSUED FOR BID

PRELIMINARY
NOT FOR PERMIT, CONSTRUCTION OR FINAL RELEASE
DAVID R. KOSLOSKI, P.E.
TX. LICENSE NO. 111211

NO.	BY	REVISION	CHK'D	APP'D	DATE
B	CMZ	ISSUED FOR BID	MDP	DRK	05/07/18
A	CRD	FOR CLIENT REVIEW	MDP	DRK	01/31/18

CLIENT		
PROJECT		
CHECK		
DRAFT	CRD	01/19/18

PORT OF BROWNSVILLE
the port that works

WESTPLAINS

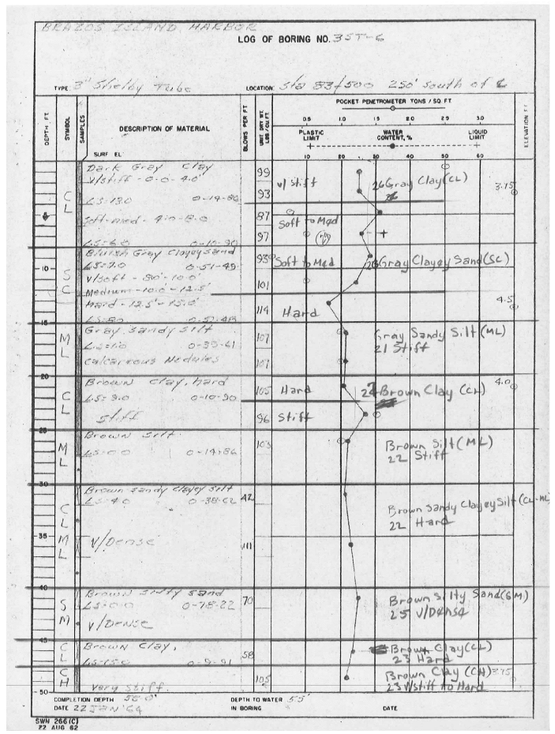
BROWNSVILLE NAVIGATION DISTRICT
BULK CARGO DOCK IMPROVEMENTS

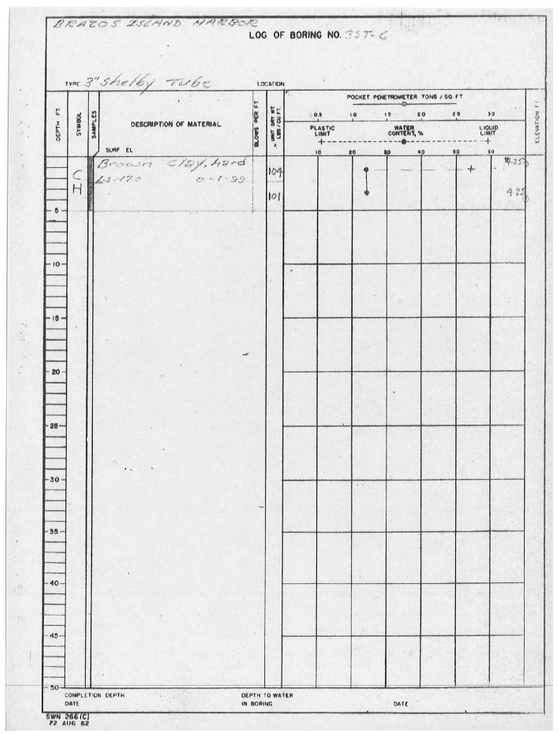
GENERAL NOTES – BORING LOGS

JOB NO. 6966.003 | DWG. NO. 6966-GN-003 | B

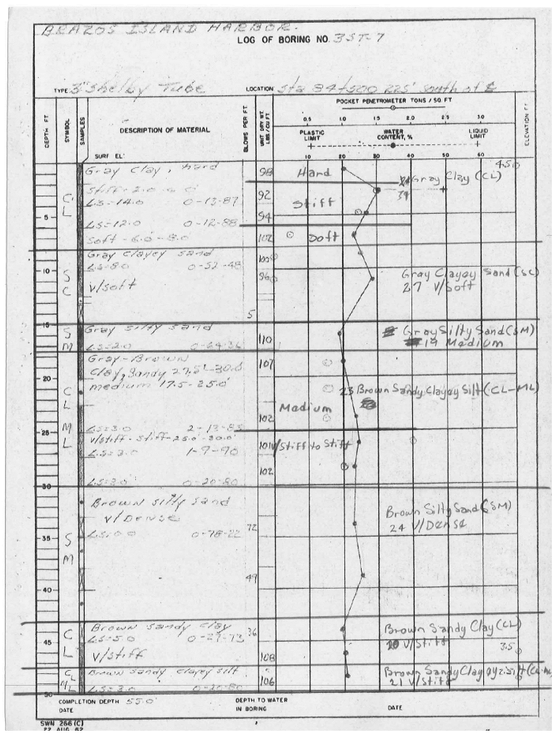
24x36

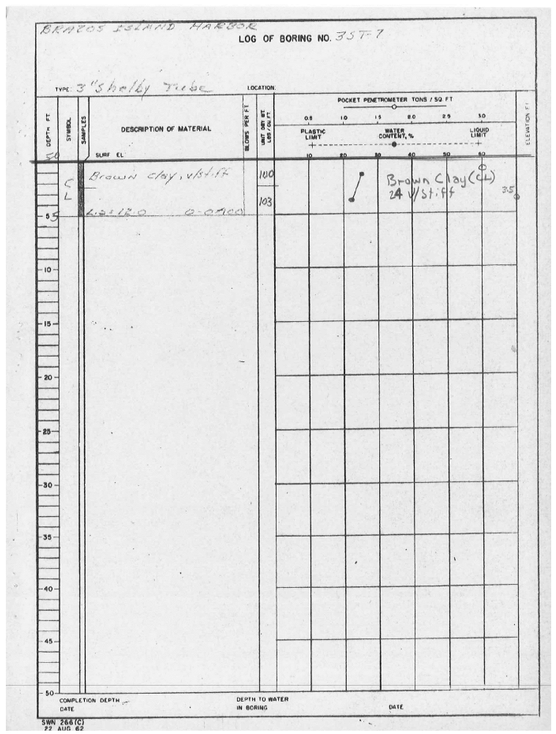
BORING LAYOUT





BORING 2513ST–6





BORING 2513ST–7

May 07, 2018
ISSUED FOR BID

PRELIMINARY
NOT FOR PERMIT, CONSTRUCTION OR FINAL RELEASE
DAVID R. KOSLOSKI, P.E.
TX. LICENSE NO. 111211

NO.	BY	REVISION	CHK'D	APP'D	DATE
B	CMZ	ISSUED FOR BID	MDP	DRK	05/07/18
A	CRD	FOR CLIENT REVIEW	MDP	DRK	01/31/18

EDG

CLIENT		
PROJECT		
CHECK		
DRAFT	CRD	01/19/18

PORT OF BROWNSVILLE
the port that *works*

WESTPLAINS

BROWNSVILLE NAVIGATION DISTRICT
BULK CARGO DOCK IMPROVEMENTS

GENERAL NOTES – BORING LOGS

JOB NO. 6966.003 | DWG. NO. 6966-GN-004 | B

24x36

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

BROWNSVILLE SHIP CHANNEL

50.0'

ORIGINAL CENTERLINE OF BROWNSVILLE SHIP CHANNEL

RELOCATED CENTERLINE OF BROWNSVILLE SHIP CHANNEL

N68°10'03"E

350.0'

STA. SOUTH 4+00 O.R.L.

N68°10'03"E

U.S.E.D. STA. 81+00 N21°49'57"W

COMMENCING POINT 18.05 ACRE TRACT

MATCHLINE "A"

MERIDIAN OF NORTH AMERICAN DATUM OF 1983 2011 ADJUSTMENT TEXAS COORDINATE SYSTEM SOUTH ZONE

VULCAN CONSTRUCTION MATERIALS, LP ESPIRITU SANTO GRANT, SHARE 32, BUILDING ON LEASE LAND, LEASE 3991

FLOOD ZONE:
SURVEYED PROPERTY IS LOCATED WITHIN AN AREA HAVING A ZONE DESIGNATION "AE" (ELEV. 11) AND "AE" (ELEV. 12) AS SHOWN, BY THE SECRETARY OF HOUSING AND URBAN DEVELOPMENT, ON FLOOD INSURANCE RATE MAP PANEL NO. 0585 F, WITH A DATE OF IDENTIFICATION OF FEBRUARY 16, 2018, FOR COMMUNITY NUMBER 480101, IN CAMERON COUNTY, STATE OF TEXAS, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID SURVEYED PROPERTY IS SITUATED.

LAND AREA:
- 18.334 ACRES (798,659 SQ. FT.)

ZONING INFORMATION:
- PORT OF BROWNSVILLE, BROWNSVILLE NAVAGATION DISTRICT

BUILDING AREA:
- THE AREA OF BUILDINGS ON THIS PROPERTY ARE AS SHOWN.

BUILDING HEIGHT:
- THE HEIGHT OF BUILDINGS ON THIS PROPERTY ARE AS SHOWN.

GROSS AREA OF EXTERIOR FOOTPRINT OF BUILDING:
- THE SQUARE FOOTAGE OF BUILDINGS ON THIS PROPERTY ARE AS SHOWN.

MARKED PARKING:
THERE ARE 00 REGULAR PARKING SPACES.
THERE ARE 00 HANDICAP PARKING SPACES.
THERE ARE 0 MOTORCYCLE PARKING SPACES.
THERE ARE 00 TOTAL PARKING SPACES.

EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
- MINOR GRADING ON THIS SITE AND SAND AND/OR CALICHE STORAGE ON VULCAN SITE

CHANGES IN STREET RIGHT-OF-WAY LINES EITHER COMPLETED OR PROPOSED, OBSERVABLE EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS:
- NONE

ENCROACHMENTS:
THE IMPROVEMENTS LIE WHOLLY WITHIN THE BOUNDARIES OF THE PROPERTY. (EXCEPT AS SHOWN ON SURVEY.)

THE BUILDING IMPROVEMENTS ARE WHOLLY WITHIN BUILDING RESTRICTIONS ESTABLISHED BY PORT OF BROWNSVILLE OR BROWNSVILLE NAVAGATION DISTRICT.

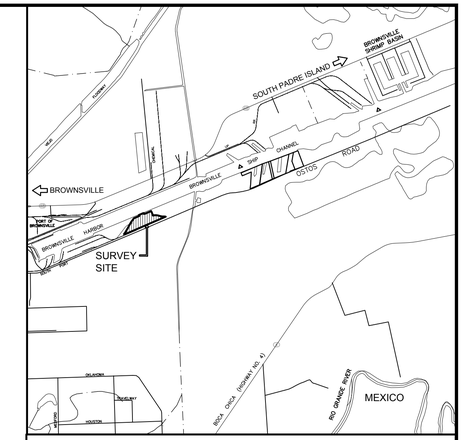
ACCESS:
THIS PROPERTY HAS DIRECT ACCESS TO R. L. OSTOS ROAD.

WETLANDS:
NO WETLANDS MARKERS WERE FOUND ON SUBJECT TRACT.

MONUMENTATION:
MONUMENTATION FOUND ALONG THE NORTH RIGHT-OF-WAY LINE OF R. L. OSTOS ROAD WAS USED AS THE BASIS OF BEARING.

LEGEND

- POWER POLE
- LIGHT POLE
- MAILBOX
- SIGN
- CLEAN OUT
- 1/2" IRON PIN
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- GAS METER
- LIGHT POLE
- MANHOLE
- CHAIN LINK FENCE
- BOARD FENCE
- OVERHEAD POWER LINE
- OVERHEAD TV CABLE
- U.G. SEWER LINE
- U.G. WATER LINE
- U.G. GAS LINE



VICINITY MAP
(NOT TO SCALE)

18.045 ACRES

T.B.M.
BOLT ON FIRE HYDRANT
ELEV. = 9.42 (N.A.V.D. 1988)

POINT OF BEGINNING
SET 1/2" IRON PIN WITH A YELLOW PLASTIC CAP STAMPED "M&R INC"

N21°49'22"W 49.00'
N68°10'03"E 249.60'
S21°49'22"E 49.04'
N68°10'03"E 50.00'
S21°49'57"E 10.00'
N68°10'03"E 327.46'
S21°49'57"E 233.60'
N68°10'03"E 10.00'
N81°31'55"E 37.50'
N88°47'13"E 100.00'
S79°57'08"E 100.00'
S71°04'44"E 100.00'
S77°08'00"E 100.00'
S88°33'43"E 100.00'
S81°55'56"E 76.93'
N81°55'56"W 24.07'
N20°29'20"W 65.22'
S68°16'57"W 1910.76'
S21°45'04"E 748.50'
285.00'
320.2'
200.2'
2178.25'

CONCRETE BASE
A=49.02
B=48.96
C=47.20
D=47.22
STEEL FRAME FLANGE DETAIL FOR FOUR INSIDE WORKPOINTS

1- STORY METAL SIDING BUILDING
BUILDING HEIGHT = 64.59'
BUILDING AREA = 35,094 SQ. FT.
BUILDING F.F.=10.74'

1- STORY METAL SIDING BUILDING
BUILDING HEIGHT = 58.60'
BUILDING AREA = 19,960 SQ. FT.
BUILDING F.F.=10.89'

BUILDING HEIGHT = 124.75'
BUILDING F.F.=8.08'

BUILDING HEIGHT = 124.75'
BUILDING F.F.=10.89'

BUILDING AREA 997 SQ. FT.
2 - STORY METAL BUILDING
BUILDING HEIGHT = 23.90'

ALTA/NSPS LAND TITLE SURVEY OF

18.334 ACRE TRACT BEING A 0.289 ACRE TRACT AND A 18.045 ACRE TRACT, LOCATED ON THE SOUTH SIDE OF THE BROWNSVILLE SHIP CHANNEL, PORT OF BROWNSVILLE, CAMERON COUNTY, TEXAS.

SCALE: 1"= 50'
PREPARED FOR:
WEST PLAINS, LLC
9155 R L OSTOS ROAD, BROWNSVILLE, TEXAS
SEPTEMBER 1, 2021

SHEET 2 OF 2
Mejia & Rose, Incorporated
Engineering Surveying
T.B.P.E. Reg. No. F-002670
T.B.P.L.S Reg. No. 10023900
1643 West Price Road (956) 544-3022
P.O. Box 3761 Brownsville, Texas 78520
Fax (956) 544-3068
email: mandrinc@cngmail.com

G.F. NO. N/A

JOB NO. 21522
S.TROWBRIDGE

MEG GEOTECHNICAL ENGINEERING REPORT

PROPOSED
GRAIN ELEVATOR AT RL OSTOS ROAD
PORT OF BROWNSVILLE

BROWNSVILLE, CAMERON COUNTY, TEXAS

Millennium Engineers Group
MEG ENGINEERS
Consultants - Geotechnical - Testing

2001 MILLENNIUM ENGINEERS GROUP, INC 10th ANNIVERSARY 2011 EDINBURG, TX

Geotechnical Engineering
Construction Materials Testing
Consulting Engineering
Forensics

GEOTECHNICAL ENGINEERING STUDY
FOUNDATION RECOMMENDATIONS
PROPOSED GRAIN ELEVATOR AT RL OSTOS ROAD
PORT OF BROWNSVILLE
BROWNSVILLE, CAMERON COUNTY, TEXAS

Prepared For
Mr. Ariel Chavez II, P.E. / R.P.L.S.
Brownsville Navigation District

MEG Report No. 01-15-29209

December 30, 2015

MILLENNIUM ENGINEERS GROUP, INC.
TBPE FIRM NO. F-3913
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL:956-702-8500
FAX:956-702-8140

December 30, 2015

Mr. Ariel Chavez II, P.E. / R.P.L.S.
Director of Engineering Services
Brownsville Navigation District
1000 Foust Road
Brownsville, Texas 78521
achavez@portofbrownsville.com

Subject: **Geotechnical Engineering Study**
MEG Report No. 01-15-29209
Foundation Recommendations
Proposed Grain Elevator at RL Ostos Road
Port of Brownsville
Brownsville, Cameron County, Texas

Dear Mr. Chavez:

Millennium Engineers Group, Inc. is pleased to submit the enclosed geotechnical engineering report that was prepared for the above subject project. This report addresses the procedures and findings of our geotechnical engineering study. Our recommendations should be incorporated into the design and construction documents for the proposed development. Please consult with us, as needed, during the design and construction process.

We want to emphasize that our firm be retained to ensure that actual field conditions are those described in our geotechnical report. We cannot over emphasize the importance that all our recommendations presented in this report and/or addendums to this report be followed. We look forward to continuing our involvement in the project by providing construction monitoring in accordance with the report recommendations and materials testing services during construction. We strongly recommend that we be a part of the preconstruction meeting to address any specific issues that are pertinent to this project.

Thank you for the opportunity to be of service to you in this phase of the project and we would like the opportunity to assist you in the upcoming phases of the project. If you have any questions, please contact our office at the address, telephone, fax or electronic address listed below.

STATE OF TEXAS
RAUL PALMA
65656
LICENSED
PROFESSIONAL ENGINEER
12/30/15

Cordially,
Millennium Engineers Group, Inc.
TBPE Firm No. F-3913

Raul Palma, P.E.
President

Cc: 2 Originals and PDF Document

TABLE OF CONTENTS

APPENDIX

1.0 INTRODUCTION

Millennium Engineers Group, Inc. (MEG) has completed and is pleased to submit this document that presents our findings as a result of a geotechnical engineering study of this project to our client. The project site is located at the Port of Brownsville, more precisely at the Grain Elevator facility near RL Ostos Road in Brownsville, Cameron County, Texas. The project location is shown on the Project Location Map, found in the Appendix section of this report. This report briefly describes the procedures utilized during this study and presents our findings along with our recommendation, for foundation design and construction considerations.

Our scope of services for the project was outlined in MEG proposal No. 01-15-248G, dated October 16, 2015.

2.0 PROJECT DESCRIPTION

It is our understanding that the proposed site will accommodate the re-construction of an existing grain elevator. The site construction for the proposed structure are anticipated to be on a shallow footing foundation or a cap supported by drilled piers provided expansive, soil-related movements will not impair the performance of the structure.

3.0 SCOPE AND LIMITATIONS OF STUDY

This engineering report has been prepared in accordance with accepted geotechnical engineering practices currently exercised by geotechnical engineers in this area. No warranty, expressed or implied, is made or intended. This report is intended for the exclusive use by the client and client's authorized project team for use in preparing design and construction documents for this project only. This report may only be reproduced in its entirety for inclusion in construction documents. This report in its entirety shall not be reproduced or used for any other purposes without the written consent of our firm. This report may not contain sufficient information for purposes of other parties or other uses and is not intended for use in determining construction means and methods.

The recommendations presented in this report are based on data obtained from the soil borings drilled at this site during the reference subsurface exploration and our understanding of the project information provided to us by our client and other project team members, and the assumption that site grading will result in only minor changes in the existing topography. Subsurface soil conditions have been observed and interpreted only at the specific boring locations, times and to the depths penetrated.

This report may not reflect the actual variations of the subsurface conditions across the subject site. It is important to understand that variations may occur due to real geologic conditions or previous uses of the site. The validity of the recommendations is based in part on assumptions about the soil stratigraphy made by the Geotechnical Engineer.

The nature and extent of variations across the subject site may not become evident until specific design locations are identified and/or construction commences. The construction process itself may also alter subsurface conditions. Such assumptions may be confirmed only during earthwork and foundation installation. If variations appear evident at the time during the design phase and/or construction phase, we must be notified immediately to determine if our opinions, conclusions and recommendations need to be reevaluated. It may be necessary to perform additional field and laboratory tests and engineering analyses to establish the engineering impact of such variations. These services are additional and are not a part of our project scope.

The engineering report was conducted for the proposed project site described in this report. The conclusions and recommendations contained in this report are not valid for any other project sites. If the project information described in this report is incorrect, is altered, or if new information becomes available, we should be retained to review, modify or verify our recommendations and should be done in writing by **MEG**. These services are additional and are not a part of our project scope. **MEG** is not responsible for any claims, damage or liability associated with interpretation or reuse of the subsurface data or engineering analyses without the expressed written authorization of **MEG.**

Our scope of services was limited to the proposed work described in this report, and did not address other items or areas. The scope of our geotechnical engineering study does not include environmental assessment of the air, soil, rock or water conditions on or adjacent to the site. No environmental opinions are presented in this report. If the client is concerned with environmental risk at this project site, the client should perform an environmental site assessment.

If final grade elevations are significantly different from existing grades at the time of our field activities (more than plus or minus one (1) foot), our office should be informed about these changes. If desired, we will reexamine our analyses and make supplemental recommendations.

4.0 FIELD EXPLORATION AND LABORATORY PROCEDURES

Subsurface conditions at the subject site were evaluated by one (1) 145 foot soil boring and one (1) 170 foot soil boring depth from the surface of the east and west existing wooden docks as the truck mounted drill rig advanced the soil borings from that location and elevations as indicated in the locations shown on the Borings Location Map, found in the Appendix section of this report. This location is approximate and distances were measured using a measuring wheel, tape, angles, and/or pacing from existing references. The structural soil borings were drilled in general accordance with American Society of Testing Materials (ASTM) D 420 procedures.

As part of our sampling procedures, the samples were collected in general conformance with ASTM D 1586 procedures. Representative portions of the samples were sealed in containers to reduce moisture loss, identified, packaged, and transported to our laboratory for subsequent testing. In the laboratory, each sample was evaluated and

visually classified by a member of our Geotechnical Engineering staff. The geotechnical engineering properties of the strata were evaluated by a series of laboratory tests. The results of the laboratory and field-testing are tabulated on the boring logs and Summary of Soil Sample Analyses which are found in the Attachments section of this report.

Standard penetration test results are noted on the boring logs as blows per 12 inches of penetration. Two 6 inch increments are performed for each standard penetration test. The sum of the blows for the two 6 inch increments is considered the "standard penetration resistance value" or "N-value." Where hard or very dense materials were encountered, the tests are terminated as follows: (1) when a total of 50 blows have been applied in any of the 6 inch increments, or (2) when a total of 100 blows have been applied, or (3) when there is no observed advance of the sampler in the application of 10 successive blows. The boring logs in the case of hard or very dense materials will be noted as follows: 50/3", where 50 is the number of blows applied in 3 inches of penetration, or 100/7½" where 100 is the number of blows applied in a total of 7 ½ inches of penetration, or 10/0", where 10 is the number of blows applied in 0 inches of penetration.

4.1 Laboratory Testing

A laboratory testing program was conducted on selected samples to assist in classification of the soils encountered in the borings, and to evaluate the engineering properties of the soils pertinent to the deep foundation design parameters for this project.

4.2 Soil Classification Tests

All samples obtained during the field program were visually classified in the laboratory according to procedures outlined in ASTM D 2488. In addition, tests for natural moisture content, Atterberg Limits, and particle size analysis were conducted on selected samples obtained from the borings. These laboratory test results were used to classify the soils encountered in general accordance with the Unified Soil Classification System (ASTM D 2487). Results of the classification tests are presented on the Boring Logs and/or Summary of Soil Sample Analysis in the Appendix of this report.

4.3 Soil Strength Tests

The approximate undrained shear strength of selected samples of cohesive soils obtained in the borings are determined by performing pocket penetrometer (PP) tests, unconfined compression (UC) tests, unconsolidated undrained (UU) triaxial tests and multi-stage consolidated undrained (CU) triaxial testing. Natural moisture content and dry unit weight was determined for samples tested for shear strength. Results of the shear strength tests are presented on Boring Logs and/or Summary of Soil Sample Analysis in the Appendix of this report.

4.4 Laboratory Procedures

Laboratory tests were performed in general accordance with ASTM Standards to measure physical and engineering properties of the soil samples obtained for this project. The types of laboratory tests performed for this project are presented in Table 4-1.

Table 4-1 Laboratory Testing Program

Type of Test	Testing Method
Natural Water(Moisture) Content	ASTM D 2216
Atterberg Limits	ASTM D 4318
Material Finer than Sieve No. 200	ASTM D 1140
Classification of Soils	ASTM D 2487
Dry Unit Weight	ASTM D 2937
Unconfined Compressive Strength	ASTM D 2166
Pocket Penetrometer Test	ASTM WK 27337

The tests results are shown on the Boring Logs and/or Summary of Soil Sample Analysis in the Appendix of this report.

Samples will be retained in our laboratory for 30 days after submittal of this report. Other arrangements may be provided at the request of the Client.

5.0 GENERAL SITE CONDITIONS

5.1 Site Description

The project site is located at the Port of Brownsville, more precisely at the Grain Elevator facility near RL Ostos Road in Brownsville, Cameron County, Texas. The project location is shown on the Project Location Map, found in the Appendix section of this report. At the time of our field operations, the subject site can be described as a developed tract of land. The existing improvements consist of an existing grain elevator. The general topography of the site is relatively flat sloping down to the north with a visually estimated vertical relief of more than 5 feet. Surface drainage is visually estimated to be fair

5.2 Site Geology

According to the Soil Survey of Cameron County, Texas, published by the United States Department of Agriculture – Soil Conservation Service, the project site appears to be located within the Lomalta-Urban Land Complex soil association.

- The Lomalta series consist of deep, poorly drained, calcareous, saline clays that are level to slightly depressional. These soils are in semimarsh areas adjacent to the Gulf of Mexico only a few feet above tide water. The corresponding soil symbol is LO, Lomalta-Urban land complex. This mapping unit is in the buil-up areas of cities and towns. Most of the acreage is in the industrial areas of port of Brownsville. Slopes are less than 0.5 percent.

5.3 Subsurface Conditions

On the basis of our borings, four (4) generalized strata that possess similar physical and engineering characteristics can describe the subsurface stratigraphy at this site. Table 1 summarizes the approximate strata range in our boring logs. These were prepared by visual classification and were aided by laboratory analyses of selected soil samples. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual details for each of the borings can be found on the boring logs in the appendix of this report.

Table 1. Approximate Subsurface Stratigraphy Depths.

Stratum	Range in Depth, ft[1]	Stratum Description[1]
I	0 – 25	lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff
II	25 – 47	clayey SAND to sandy lean CLAY, brown, wet, stiff
III	47 – 67	lean CLAY w/ sand to fat CLAY, brown, wet, med. stiff to stiff
IV	67 – 75	sandy lean CLAY, brown, wet, stiff to hard

Note 1: The stratum thickness and depths to strata interfaces are approximate. Our measurements are rounded off to the nearest foot increment and are referenced from ground surface at the time of our drilling activities. Subsurface conditions may vary between the boring locations.

5.4 Groundwater Conditions

The dry auger drilling technique was used to complete the soil borings in an attempt to observe the presence of subsurface water. During our drilling operations we encountered the groundwater table at an approximate elevation of ten (10) feet below natural ground elevation for short term conditions. Table 2 summarizes the approximate groundwater and cave in depths measured in our explorations. It should be noted that the groundwater level measurements recorded are accurate only for the specific dates on which measurement were obtained and does not show fluctuations throughout the year.

Fluctuations in Groundwater levels are influenced by variations in rainfall and surface water run-off from season to season. The construction process itself may also cause variations in the groundwater level. If the subsurface water elevation is critical to the

construction process the contractor should check the subsurface water conditions just prior to construction excavation activities.

Table 2. Approximate Groundwater and Cave-in Depths.

Boring No.	Depth to Subsurface Water, Ft	Depth to Cave-In, Ft	Subsurface Water Observation Period, Hrs
B-1	10	N/A	24
B-2	12	N/A	24
B-3	10	N/A	24
B-3	10	N/A	24

Note 1: Subsurface water levels and cave-in depths have been rounded to the nearest foot.
Note 2: Subsurface water levels and cave-in depths recorded after the completion of bore holes.
Note 3: Items marked N/A were not encountered during drilling operations.

Based on the findings in our borings and on our experience in this region, we believe that groundwater seepage is likely to be encountered during site earthwork activities. If groundwater seepage is encountered during site earthwork activities it may be controlled using temporary earthen berms and/or conventional sump-and-pump dewatering methods.

6.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

6.1 General

The analysis and recommendations presented in this report are applicable specifically to the proposed foundation structure. The data gathered from both the field and laboratory testing programs on soil samples obtained from the borings was utilized to establish geotechnical engineering parameters to develop recommendations for the proposed structure. The foundation system(s) considered in this report to provide support for the proposed structure must meet two independent criteria. One of the criteria is that the movement below the foundation structure due to compression (consolidation) or expansion (swell) of the underlying soils must be within tolerable limits. This criterion is addressed in the Soil Related Movements section of this report. The other criterion is that the dead and live loads must be distributed appropriately and the foundation structure designed with an acceptable factor of safety to minimize the potential for bearing capacity failure of the underlying soils.

Geotechnical and structural engineers in this general area consider soil movements or Potential Vertical Rise (PVR) of approximately one (1) inch or less to be within acceptable structural design tolerances for most structures but may be different depending on structure use and the desired performance of the foundation. Therefore, movements of the underlying soils are not eliminated and thus one should expect a slab foundation structure to exhibit differential vertical movements. However, structural engineers design slab foundations for the expected magnitude of soil movements without failure of the structure. More stringent soil movement criteria may be

established but the owner should consider the exponential increase in cost required to design and construct a structure for such soil movements. Data obtained in this study indicate that the soils at this site have strength characteristics capable of supporting the foundation and structure if designed appropriately. Stratum I is composed of lean clay with sand to fat clay and has a moderate to high potential to exhibit volumetric changes (contraction and expansion). Stratum II is composed of clayey sand to sandy lean clay and has a low to moderate potential to exhibit volumetric changes. Stratum III is composed of lean clay with sand to fat clay and has a moderate to high potential to exhibit volumetric changes. Stratum IV is composed of sandy lean clay and has a moderate potential to exhibit volumetric changes. The potential for soil volumetric changes is dependent on variations in moisture contents of the underlying soils. Based on this data, this site is suitable for a slab foundation provided the subgrade is modified in accordance with the recommendations established in this report to reduce the potential for these soil volumetric changes.

6.2 Soil-Related Movements

The anticipated ground movements due to swelling of the underlying soils at this site were estimated for slab foundation construction using the Texas Department of Transportation (TxDOT) procedures of test method TEX-124-E for determining Potential Vertical Rise (PVR). A PVR value of one and three quarters (1 3/4) inches to two (2) inches was estimated for the stratigraphic conditions encountered in our subsurface borings. A surcharge of 1 pound per square inch for the concrete foundation, an active zone of 10 feet, and dry subsurface moisture conditions were assumed in estimating the above PVR values.

The following methods are generally acceptable for use in modifying the subgrade to reduce the potential for soil movements and volumetric changes below the foundation structure.

Excavate expansive clay soils and replace with select fill.
Chemical injection of expansive clay soils.
A combination of methods 1 and 2.

The method to be used is dependent on specific site conditions. At this site the grade will most likely need to be raised to obtain the proposed Finished Floor Elevation (FFE). As of the date of this report the CLIENT/OWNER has not provided the proposed FFE. We recommend that the project civil engineer evaluate the proposed FFE with our recommendations to ensure that the subgrade modifications presented in the report are not diminished or compromised. Adding select fill is generally the most cost effective method for reducing the potential for soil related movements. Therefore, we only discuss this method in this report but we can provide details for the other methods if requested.

Based on the data obtained, the proposed FFE, information provided by our client and our analysis of the site, we recommend the following modification (Table 3a and 3b. Subgrade Modifications) of the subgrade at this area to accomplished finish floor

elevation of the subgrade at this site. This method will maintain the potential for soil related movements to an approximate PVR value of less than one (1) inch, which is generally desired for projects of this type.

Table 3a. Subgrade Modifications (Option No. 1)

Item	Description
1	See and adhere to the Site Preparation Recommendations section of this report.
2	Excavate existing soils to a depth of two (2) feet below natural ground elevation in accordance with the Site Preparation Recommendations section of this report.
3	Condition and compact twelve (12) inches of subgrade below excavated soils in accordance with the Site Preparation Recommendations section of this report.
4	Place **select fill,** (a minimum of one (1) foot above natural ground) condition and compact up to the proposed FFE in accordance with the Select Fill Recommendations section of this report.

Table 3b. Subgrade Modifications (Option No. 2)

Item	Description
1	See and adhere to the Site Preparation Recommendations section of this report.
2	Excavate existing soils to a depth of eight (8) feet below natural ground elevation in accordance with the Site Preparation Recommendations section of this report.
3	Condition and compact six (6) inches of subgrade below excavated soils in accordance with the Site Preparation Recommendations section of this report.
4	Place **select fill,** (a minimum of one (1) foot above natural ground) condition and compact up to the proposed FFE in accordance with the Select Fill Recommendations section of this report.

The PVR method of estimating expansive, soil-related movements is based on empirical correlations utilizing the measured plasticity indices and assuming typical seasonal fluctuations in moisture content. If desired, other methods of estimating expansive, soil-related movements are available, such as estimations based on swell tests and/or soil-suction analyses. However, the performance of these tests and the detailed analyses of expansive, soil-related movements were beyond the scope of the current study. It should also be noted that actual movements can exceed the calculated PVR values as

a result of isolated changes in moisture content (such as leaks, landscape watering, etc.) or if water seeps into the soils to greater depths than the assumed active zone depth due to deep trenching and/or excavations.

6.3 Conventional Shallow Foundation Design Criteria

As indicated previously a shallow foundation may be used at this site in conjunction with the subgrade modifications listed under the Soils Related Movements section. We recommend the following soil bearing pressures, and dimensional criteria for the shallow foundations. These recommendations ensure proper utilization of soil bearing capacity for the shallow footing foundation and reduce the potential of water migration from the outside to beneath the foundation. Soil bearing pressures and dimensional criteria are as follows:

Table 4. Bearing Criteria (Option No. 1)

Spread Footing (rectangular)	
Minimum depth below finished grade:	24 inches
Maximum depth below finished grade:	36 inches
Maximum width:	5 feet
Maximum Length:	10 feet
Maximum allowable bearing pressure:	850 psf
Spread Footings (square)	
Minimum depth below finished grade:	24 inches
Maximum depth below finished grade:	36 inches
Maximum width:	5 feet
Maximum allowable bearing pressure:	1,000 psf

Table 4. Bearing Criteria (Option No. 2)

Spread Footing (rectangular)	
Minimum depth below finished grade:	24 inches
Maximum depth below finished grade:	36 inches
Maximum width:	5 feet
Maximum Length:	10 feet
Maximum allowable bearing pressure:	1,750 psf
Spread Footings (square)	
Minimum depth below finished grade:	24 inches
Maximum depth below finished grade:	36 inches
Maximum width:	5 feet
Maximum allowable bearing pressure:	2,000 psf

The above-presented maximum allowable bearing pressures will provide a factor of safety of 3 with respect to the design soil strengths. For a shallow foundation structure designed and constructed in accordance with the recommendations of this report, it is anticipated that total settlements will be in the order of one (1) to one and one half (1 1/2) inches for Option No. 1 and one (1) inch for Option No. 2. If lower anticipated total settlements are required for this project further mitigation may be required and MEG must be consulted for further recommendations.

Furthermore, the above design parameters are contingent upon the fill materials (if utilized) being selected and placed in accordance with the recommendations presented in the Select Fill Recommendations section of this report. Should select fill selection and placement differ from the recommendations presented herein, MEG should be informed of the deviations in order to reevaluate our recommendations and design criteria.

Excavations for spread footing foundations should be performed relatively clean and with an undisturbed bearing area. The bottom 6 inches of the excavation should be performed using a flat plate excavation bucket. The excavations should be neatly excavated. No foreign debris or undisturbed soil should be left in the footing bottom. Should there be any abundance of foreign debris or disturbed soil found, it may be necessary to re-assess the fill site of its bearing capacity suitability. If the bearing area is found to be disturbed, the bearing area will require preparation and compaction for the entire depth of the disturbance in accordance with the Site Preparation and/or the Select Fill sections of this report.

The bearing surface of the spread footings should be evaluated after excavation and immediately prior to concrete placement. We recommend that footing inspections be performed by a representative of MEG. The required inspections shall include inspecting for clean, dry (The moisture content should be within limits specified by the appropriate section in this report.) and undisturbed footing bottom, depth of footing, clearances from sides and size and spacing of reinforcing steel. Test results shall comply with the recommendations of this geotechnical report and shall be verified by an on-site representative of MEG.

Over excavation, if necessary, for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of over excavation depth below footing base elevation. The over excavation should then be backfilled up to the footing base elevation select fill placed in lifts of 8 inches or less in loose thickness and prepared and compacted in accordance with the Site Preparation and/or the Select Fill sections of this report. Equipment should not be operated and materials should not be placed or stockpiled within a horizontal distance equal to the excavation depth from the edge of the excavation. Excavations should not be placed next to existing structures or buried utilities/structures closer than a horizontal distance equal to the excavation depth unless some form of protection for the facilities is provided.

Water should not be allowed to accumulate at the bottom of the foundation excavation. Proper barriers such as berms or swales should be placed to divert any surface runoff away from excavations. To reduce the potential for groundwater seepage into the excavations and to minimize disturbance to the bearing area, we recommend that steel and concrete be placed as soon as possible after the excavations are completed, properly prepared and cleaned. Excavations should not be left open overnight.

6.4 IBC Site Classification and Seismic Design Coefficients

Section 1613 of the International Building Code (2009) requires that every structure be designed and constructed to resist the effects of earthquake motions, with the seismic design category to be determined in accordance with Section 1613 or ASCE 7. Site classification according to the International Building Code (2009) is based on the soil profile encountered to 100 foot depth. The stratigraphy at the site location was explored to a maximum of 75 foot depth.

On the basis of the site class definitions included in Table 1613.5.2 and 1613.5.5 of the 2009 Code and the encountered generalized stratigraphy, we characterize the site as Site Class E.

Seismic design coefficients were determined using the on-line software, Seismic Hazard Curves and Uniform Response Spectra, version 5.1.0, dated February 10, 2011 accessed at (http://earthquake.usgs.gov/designmaps/us/application.php). Analyses were performed considering the 2009 International Building Code. Input included zip code 78526 and Site Class E. Seismic design parameters for the site are summarized in the following table:

Table 5. IBC Site Classification and Seismic Design Coefficients

Site Classification	F_a	F_v	S_s	S_1
E	2.5	3.5	0.035g	0.013g

Where:

F_a = Site coefficient
F_v = Site coefficient
S_s = Mapped spectral response acceleration for short periods
S_1 = Mapped spectral response acceleration for a 1-second period

7.0 PIER FOUNDATION RECOMMENDATIONS

7.1 Straight Sided Concrete Piers

Items influencing the type of foundation selected for the proposed structures include the design axial and lateral foundation loads, the presence of clays, sands and the presence of groundwater. More specifically, the final pier dimensions, particularly to include the required length of pier, will be determined based on the foundation design loads, the depth of the active zone, the potential uplift force imposed by the soils within

the active zone and the available side friction capacity and end bearing capacity allotted to the subsurface stratigraphy. Straight-sided piers bearing at a minimum elevation of 15 feet below natural ground may support vertical loads for the proposed structure. The water table elevation at this site may require that the concrete piers be placed with casing or the slurry displacement method to prevent collapse of the shaft boring walls. Based on our depth of exploration at an elevation of approximately 75 feet below natural ground and the type of structures, pier depths should not exceed a depth of 65 feet below natural ground. The allowable capacities are provided in an attachment in the Appendix section of this report, titled *Allowable Axial Capacity*. For straight sided piers, the contribution of the soils for the top 5 feet of soil embedment and for a length equal to at least 1 pier diameter from the bottom of the shaft should be neglected in the determination of friction capacity. The recommended design parameters include a factor of safety of 2 for skin friction and of 3 for end bearing. The minimum embedment depth was selected to locate the pier base within a specified desired bearing stratumn. If the piers are subject to water action, scour may occur. If this is the case, the pier length should be referenced from the level of the maximum scour depth. Likewise, the LPILE analysis should neglect the contribution of soils down to the maximum scour depth.

7.2 Uplift Forces

Within the active zone the concrete piers may be subjected to potential uplift forces. Alternate drying and wetting conditions of the expansive soils surrounding the concrete pier create these uplift forces. The uplift force acting on the piers may be estimated by the following relationship:

Uplift force (tons) = 5.0 x shaft diameter (feet) (With Option 1 Subgrade Modifications)
Uplift force (tons) = 12.0 x shaft diameter (feet) (Without Subgrade Modifications)

Other uplift forces due to other factors may need to be taken into consideration.

7.3 Allowable Uplift Resistance

The potential uplift forces that may be created by the swelling soils may be resisted by the dead load of the concrete pier plus the allowable uplift resistance provided by the friction between the soil and pier interface. The allowable uplift resistance are provided in an attachment in the Appendix section of this report, titled *Allowable Uplift Resistance*. These values have been estimated with a factor of safety of two (2). Design requirements for reinforcing and for pier penetration derived from compression or uplift loading for the structure is usually sufficient to overcome any effects of expansive soils. However, we recommend that the cross sectional area of the reinforcing steel should not be less than one (1) percent of the gross cross sectional area of the drilled pier shaft. The reinforcing steel should extend from the top to the bottom of the shaft to resist axial tension forces. The final reinforcing requirements should be determined by the project structural engineer.

7.4 Pier Lateral Criteria

Lateral pile analysis including capacity, maximum shear, and maximum bending moment should be evaluated by the project structural engineer using LPILE or similar software. In the following table, MEG presents geotechnical input parameters for the encountered soils. Please note that the depths to the top and bottom of each layer were interpreted using the data at the explored boring locations and layer boundaries as shown on the boring logs:

Table 7. Drilled Pier Geotechnical Input Parameters for LPILE Analysis

Depth	Material	Y_e	C_u	Φ	K (static loading)	e_{50}
0 to 5	Lean CLAY w/ sand to fat CLAY (CL - CH)	Neglect contribution				
5 to 10	Lean CLAY w/ sand to fat CLAY (CL - CH)	110	500	-	Ks=100	0.01
10 –to 27	Lean CLAY w/ sand to fat CLAY (CL - CH)	50	500	-	Ks=100	0.01
27 to 47	clayey SAND to sandy lean CLAY (SC – CL)	60	-	35	K=60	-
47 to 67	lean CLAY to fat CLAY (CL – CH)	50	2000	-	Ks=1000 Kc=400	0.007
67 to 75	sandy lean CLAY (CL)	50	2000	-	Ks=1000 Kc=400	0.007

Where:

Y_e = Effective Soil Unit Weight, pcf
C_u = Undrained Soil Shear Strength, psf
Φ = Undrained angle of internal friction, degrees
e_{50} = 50% strain value
K = Modulus of subgrade reaction, pci
Ks= Modulus of subgrade reaction (static loading), pci
Kc= Modulus of subgrade reaction (cyclic loading), pci

7.5 Lateral Earth Pressures

Presented below are at-rest, active and passive earth pressure coefficients for various backfill types adjacent to below-grade walls or site retaining walls. At-rest earth pressures are recommended in cases where little wall yield is expected (such as structural below-grade walls). Active earth pressures may be utilized in cases where

the walls can exhibit a certain degree of horizontal movements (such as cantilevered retaining walls).

Table 8. Earth Pressures

Backfill Type	Estimated Total Unit Weight (pcf)	Angle of Internal Friction Ø, deg	Active Condition		Passive Condition		At rest Condition	
			Earth Pressure Coefficient K_a	Equivalent Fluid Density (pcf)	Earth Pressure Coefficient K_p	Equivalent Fluid Density (pcf)	Earth Pressure Coefficient K_o	Equivalent Fluid Density (pcf)
Washed Gravel	135	33	0.29	40	3.39	460	0.45	60
Crushed Limestone	145	38	0.24	35	4.20	610	0.38	55
Clean Sand	120	30	0.33	40	3.00	360	0.50	60
Pit Run Clayey Gravels or Sands	135	31	0.32	45	3.12	425	0.48	65
On-Site Clays	120	25	0.41	50	2.46	295	0.58	70
Compacted On-Site Clays	125	30	0.33	42	3.00	375	0.50	63

The above values do not include a hydrostatic or ground-level surcharge component. To prevent hydrostatic pressure build-up, retaining walls should incorporate functional drainage (via free-draining aggregate or manufactured drainage mats) within the backfill zone. The effect of surcharge loads, where applicable, should be incorporated into wall pressure diagrams by adding a uniform horizontal pressure component equal to the applicable lateral earth pressure coefficient times the surcharge load, applied to the full height of the wall. The structure walls should be designed for hydrostatic pressures if drainage cannot be provided. Ports/weepholes for release of hydrostatic pressure need to be provided during construction. The ports/weepholes should be filled with filter cloth to reduce the loss of soil fines.

The compactive effort should be controlled during backfill operations adjacent to walls. Overcompaction can produced lateral earth pressures in excess of at-rest magnitudes. Compaction levels adjacent to walls should be maintained between 95 and 100 percent of standard proctor (ASTM D 698) maximum dry density.

A wall drain (consisting of freely-drained aggregate or manufactured drainage mat, along with outlet piping) is recommended for collection and removal of surface water percolation behind the walls. Proper control of surface water percolation will help to prevent buildup of higher wall pressures. In unpaved areas, the final 12 inches of backfill should preferably consist of clayey soils to help reduced percolation of subsurface water in to the backfill.

7.6 Spacing for Concrete Piers

Concrete pier spacing should be at least three (3) shaft diameters from edge to edge to eliminate any reduction in load carrying capacity of the individual piers.

When utilizing a pier group and the pier spacing is less than three (3) times the pier diameter from edge to edge, the following reduction factors for bearing capacity and skink friction shall apply:

- The minimum recommended pier spacing shall be one and a half (1.5) times the pier diameter from edge to edge. The reduction factor for this spacing is 0.5.
- The reduction factor for pier spacing less than three (3) times the pier diameter but more than one and a half (1.5) times the pier diameter from edge to edge shall be linearly interpolated from the reduction factor values provided herein.

For straight-sided concrete piers, the total settlements based on the bearing pressures are estimated to generally be in the order of one (1) inch or less for properly designed and constructed drilled piers. At this site, the underlain soils exhibit low shear strengths and potential settlements can best be estimated when site grading, foundation dimensions and loads have been established. Most of the settlement beneath each individual pier should occur during the construction phase. Differential settlement between piers can be expected and should be in the order of 50 to 75 percent of the total pier settlement. For properly designed and constructed piers we estimate the differential settlement between adjacent piers to be in the order of three-fourths (¾) of an inch. A detailed estimate of settlement is outside the scope of this service report. The quality of construction will affect the settlement process of drilled piers more than the soil-structure interaction. Poor drilled pier construction could result in settlements significantly higher than what we have estimated in this report. Utilizing soil-bearing pressures higher than the allowable values presented in this report can also produce significantly higher settlements at individual piers and differential settlement between adjacent piers.

8.0 CONSIDERATIONS DURING CONSTRUCTION

8.1 Site Grading Recommendations

Site grading plans can result in changes in almost all aspects of foundation recommendations. We have prepared the foundation recommendations based on the existing ground surface; there is a one (1) foot surcharge addition for the stratigraphic conditions encountered at the time of our study. If site grading plans differ from existing grades by more than plus or minus 1 foot, we must be retained to review the site grading plans prior to bidding the project for construction. This will enable us to provide input for any changes in our original recommendations that may be required as a result of site grading operations or other considerations.

8.2 Site Drainage Recommendations

Drainage is one of the most important aspects to be addressed to ensure the successful performance of any foundation. Positive surface drainage should be implemented prior to, during and maintained after construction to prevent water ponding at or adjacent to the building facilities. It is recommended that the building and site design include rain gutters, downspouts and concrete gutters to channel runoff to paving or storm drains.

8.3 Site Preparation Recommendations

Building areas and all area to support select fill should be stripped of all vegetation and organic topsoil up to a minimum of 5 feet (for subgrade modifications Option No. 1) and 8 feet (for subgrade modification Option No. 2) beyond the foundation perimeters. After stripping, remove at least six (6) inches of on-site soil as measured from existing grade when excavation of existing subgrade is not recommended in other sections of this report. The excavated material, if free of organic and/or deleterious material, may be stockpiled for use in the non-structural areas of the site. Where excavation of the subgrade is recommended in this report, the bottom of the excavation will extend at least five (5) feet (for subgrade modifications Option No. 1) and 8 feet (for subgrade modification Option No. 2) beyond the limits of the planned foundation perimeter. Exposed subgrades should be thoroughly proof rolled in order to locate and compact any weak, compressible and soft spots. Proof rolling shall be in accordance with TxDOT 2014 Specification Item 216. Proof rolling operations should be observed by the Geotechnical Engineer or his representative to document subgrade condition and preparation. Weak or soft areas identified during proof rolling or areas where large tree roots have been removed within the limits of excavation should be removed and replaced with a suitable, compacted select fill in accordance with the recommendations presented under the Select Fill Recommendations section of this report. Proof rolling operations and any excavation/backfill activities should be observed by **MEG** representatives to document subgrade preparation.

Prior to fill placement, the exposed subgrade shall be prepared based on what option is selected from the foundation recommendations. The exposed subgrade should be prepared, moisture-conditioned by scarifying to a minimum depth as recommended in the foundation recommendations and recompacting to a minimum 95 percent of the maximum dry density as determined in accordance with ASTM D 698, moisture-density relationship. The moisture content of the subgrade should be maintained within the range of minus two (-2) percentage points below optimum to plus two (+2) percentage points above the optimum moisture content until the fill is permanently covered. The soil should be properly compacted in accordance with these recommendations and tested by **MEG** personnel for compaction as specified.

8.4 Select Fill Recommendations

Materials used for select fill shall meet the following requirements:

1. Material shall conform to TxDOT 2014 Specification Item 247, Flexible Base; Type A, Grades 1 through 3.
2. Material shall conform to TxDOT 2014 Specification Item 247, Flexible Base, Types B or C, Grades 1 through 5 with a minimum plasticity index of 7.
3. Material shall conform to TxDOT 2014 Specification Item 247, Flexible Base, Type E, Grade 4 with a plasticity index between and inclusive of 7 and 15. Type E material shall be defined as Caliche (argillaceous limestone, calcareous or calcareous clay particles) and may contain stone, conglomerate, gravel, sand or granular materials when these materials are in situ with the caliche. Flexible Base (Type E, Grade 4) shall conform to the following requirements:

Table 6. Type D, Grade 6 Requirements

Retained on Sq. Sieve	Percent Retained
2”	0
½”	20-60
No. 4	40-75
No. 40	70-90
Max. PI:	15
Max. Wet Ball PI:	15
Wet Ball Mill Max Amount:	50
Wet Ball Increase, Max Passing No. 40 sieve	20

1. Soils classified according to USCS as SM, SC, GM, GC, CL, ML and combinations of these soils. The soils shall be relatively free of organic matter. In addition to the USCS classification, select materials shall have a liquid limit of less than 40 and a plasticity index between and inclusive of 10 and 17.
2. Soils classified, as CH, MH, OH, OL and PT, under the USCS are not considered suitable for use as select fill materials at this site.

Select fill shall be placed in loose lifts not to exceed 8 inches (6 inches compacted) and compacted to a minimum 95 percent of the maximum dry density as determined in accordance with ASTM D 698. The moisture content of the fill shall be maintained within the range of minus two (-2) percentage points below optimum to plus two (+2) percentage points above the optimum moisture content until the fill is permanently covered. The select fill should be properly compacted in accordance with these recommendations and tested by **MEG** personnel for compaction as specified.

8.5 Site Fill Recommendations

Site fill shall be placed in loose lifts not to exceed 8 inches (6 inches compacted) and compacted to a minimum 95 percent of the maximum dry density as determined in accordance with ASTM D 698. The moisture content of the fill shall be maintained within the range of minus two (-2) percentage points below optimum to plus two (+2)

percentage points above the optimum moisture content until the fill is permanently covered. The site fill should be properly compacted in accordance with these recommendations and tested by **MEG** personnel for compaction as specified.

8.6 Back Fill Recommendations

Back fill shall be placed in loose lifts not to exceed 8 inches (6 inches compacted) and compacted to a minimum 95 percent of the maximum dry density as determined in accordance with ASTM D 698. The moisture content of the fill shall be maintained within the range of minus two (-2) percentage points below optimum to plus two (+2) percentage points above the optimum moisture content until the fill is permanently covered. The back fill should be properly compacted in accordance with these recommendations and tested by **MEG** personnel for compaction as specified.

8.7 Utility Considerations

Utilities that project through the slab-on-grade, slab-on-fill, floating floor slabs, or any other rigid unit should be designed with some degree of flexibility or with sleeves. Such features will help reduce the risk of damage to utility facilities from soil movements related to shrinkage and expansion.

8.8 Utility Trench Recommendations

Bedding and initial backfill are buried around utility lines to support and protect the utility. The secondary backfill above the initial backfill also helps protect and support the foundation and/or pavement above. To ensure that settlement is not excessive in this secondary backfill we recommend the following:

1) If possible trench and install utilities prior to work such as lime treatment and/or compaction of subgrade or placement of other fills or bases.
2) Place, moisture condition and compact the secondary backfill in accordance with the pertinent project requirements. Within the footprint of a building pad the secondary backfill should meet the same compaction requirements for select fill. Within the footprint of a pavement structure the secondary backfill should meet the same compaction requirements for the subgrade. When compaction of the subgrade is not specified it should meet the same compaction level of the adjacent natural ground. An alternative to compaction of secondary backfill is the use of flowable fill where secondary backfill is to be placed. If properly designed, the flowable fill can be excavated easily at a later date if necessary. No compaction and no testing is required when properly designed flowable fill is used.

8.9 Excavation, Sloping and Benching Considerations

If trenches are to extend to or below a depth of five (5) ft., the contractor or persons doing the trenching should adhere to the current Occupational Health and Safety Administration (OSHA) guidelines on trench excavation safety and protection measures.

Other industry standards may be applicable. The collection of specific geotechnical data and development of a plan for trench safety, sloping, benching or various types of temporary shoring, is beyond the scope of the this study.

8.10 Shallow Foundation Excavation Considerations

The Geotechnical Engineer or his representative prior to the placement of reinforcing steel and concrete should observe shallow foundation excavations. This is necessary to verify that the bearing soils at the bottom of the excavations are similar to those encountered during the subsurface soil exploration phase and that excessive loose materials and water are not present in the excavations. If soft pockets of soil are encountered in the foundation excavations, they should be removed and replaced with a compacted non-expansive fill material or lean concrete up to the design foundation bearing elevation.

8.11 Pier Excavation Considerations

The following general considerations are important to ensure that the drilled piers are properly constructed. Pier excavations should be augured and constructed in a continuous process from beginning to end. Steel and concrete are to be placed in the pier excavation immediately after drilling and evaluation for proper bearing, embedment and cleanliness. Under no circumstances should a pier excavation remain open overnight. We recommend monitoring of installation by a representative of **MEG.**

We recommend that the foundation contractor verify the subsurface water level prior to beginning pier excavation. We recommend that he be prepared to control water intrusion and sloughing of soils into the pier excavation should these conditions occur. Typically the methods available to control these conditions are the casing method, slurry displacement method or a combination of the two. We recommend that the foundation contractor submit a plan for approval by the designer for the construction of concrete piers outlining and including proposed methods of excavation, preparations for dealing with ground water and sloughing, slurry methods and type (mineral or polymer), methods of cleaning excavation, methods for concrete placement and other procedures or materials important to the successful construction and performance of a drilled pier.

If water is encountered during the drilling operations in excess of 6 inches it should be pumped out prior to steel and concrete placement. If the water is left, a closed end tremie should be used to place the concrete completely to the bottom of the pier excavation in a controlled manner to properly displace the water. If water is not present, the concrete should be placed with a tremie if the free fall distance exceeds five (5) feet. The concrete should not be placed in a manner that causes the concrete to hit the excavated pier walls or reinforcing steel. Removal of casing should be done with extreme care and with proper supervision. Rapid removal of the casing can cause mixing of surrounding soil with the fresh concrete and/or develop a suction that will cause soil to intrude into the concrete pier and thus reduce its effective diameter and/or expose its reinforcement. An insufficient head of concrete in the casing during withdrawal could also cause the same conditions.

For this project we recommend that the concrete should be designed to achieve a minimum 28-day compressive strength of 3600 psi when placed at a seven (7) inch slump with a plus or minus one (1) inch tolerance. The concrete should be designed to meet the requirements of Texas Department of Transportation 1993 Standard Specification Item 421, Class C or SS concrete or American Concrete Institute (ACI) 318-99 – Building Code Requirements for Structural Concrete. If a high range water-reducing admixture is used to achieve the slump requirements, a span of slump retention should be thoroughly investigated for the concrete design to be used. Compatibility with other concrete admixtures should also be considered. We recommend that a technical representative of the admixture supplier be consulted with the use of these admixtures.

The concrete pier design and construction should be performed as discussed in this report and as described in the publications entitled: ACI 336.1 – 98 Standard Specification for the Construction of Drilled Piers, ACI 336.3R-93 Suggested Design and Construction Procedures for Pier Foundations, Drilled Shafts: Construction Procedures and Design Methods by Michael W. O'Neill and Lymon C. Reese, Publication No. FHWA-IF-99-025, August 1999 and Texas Department of Transportation 1993 Standard Specification Item 416 for Dilled Shaft Foundations. Concrete pier construction should be carefully monitored to ensure that the construction activities comply with the project specifications. The following items in particular among others need to be considered during the concrete pier construction process.

1. Proper drilling rig with proper equipment (including augers, casing, slurry holding tanks with appurtenances);
2. Pier locations, vertical alignment, competent bearing;
3. Reinforcing steel cages tied to meet project specifications;
4. Proper scheduling and ordering of concrete;
5. Concrete properties and placement, steel placement;
6. Proper casing seal for subsurface water control, proper slurry properties and proper casing removal; and
7. Monitoring of installation by a representative of **MEG.**

8.12 Landscaping Considerations

Even though landscaping is a vital aesthetic component of any project, the owner, client and design team should be aware that placing trees or large bushes adjacent to any structure may distress the structure in the future. It is recommended that if any landscaping is to be placed adjacent to the structure in this project, it should be limited to small plants and shrubs. Trees and large bushes should be placed at a distance such that at their mature height, their canopy or "drip line" does not extend over the structures. The owner, client and design team should also be aware that if any watering is to be done in connection with the landscaping for this project it should be controlled, consistent and timely. Excessive or prolonged watering is not recommended. If watering is part of the landscaping plan, termination of watering for any extended period

of time may also be detrimental to the structure. It is important that the moisture level in the subsurface soils remain constant so that shrinking and swelling of soils may be mitigated.

8.13 Perimeter Foundation Cap

We recommend that a cap of impervious fill be placed around the perimeter of the foundation to mitigate the intrusion of moisture into the soils surrounding the foundation. The top eighteen inches of fill around the foundation structure should be a low permeance clay cap to keep surface water away from the foundation. The low permeance clay cap should be sloped away from the foundation at a minimum slope of 2% and the surrounding areas should have positive drainage. The low permeance clay shall meet the USCS classification of CH or CL with a minimum Plasticity Index of 20 and a minimum of 50% by weight passing the No. 200 sieve. The low permeance clay shall be compacted to minimum of 95 percent of the maximum dry density as determined in accordance with ASTM D 698. The moisture content of the subgrade should be maintained within the range of optimum to four (4) percentage points above the optimum moisture. If plantings are intended, add 4 to 6 inches of loam on top of the clay cap.

9.0 PROJECT REVIEW AND QUALITY CONTROL

Each project site is unique and it is important that the appropriate design data, construction drawings, specifications, change orders and related documents be reviewed by the respective design and construction professionals participating in this project. The performance of foundations, construction building pads and/or parking areas for this project will depend on correct interpretation of our geotechnical engineering report and proper compliance of and adherence to our geotechnical recommendations and to the construction drawings and specifications.

It is important that **MEG** be provided the opportunity to review the final design and construction documents to check that our geotechnical recommendations are properly interpreted and incorporated in the design and construction documents. We cannot be responsible for misinterpretations of our geotechnical recommendations if we have not had the opportunity to review these documents. This review is an additional service and not part of our project scope.

MEG should be retained to provide construction materials testing and observation services during all phases of the construction process of this project. As the Geotechnical Engineer of Record, it is important to let our technical personnel provide these services to make certain that our recommendations are interpreted properly and to ensure that actual field conditions are those described in our geotechnical report. Since our personnel are familiar with this project, **MEG**'s participation during the construction phase of this project would help mitigate any problems resulting from variations or anomalies in subsurface conditions, which are among the most prevalent on construction projects and often lead to delays, changes, costs overruns, and disputes. If the client does not follow all of our recommendations presented in this

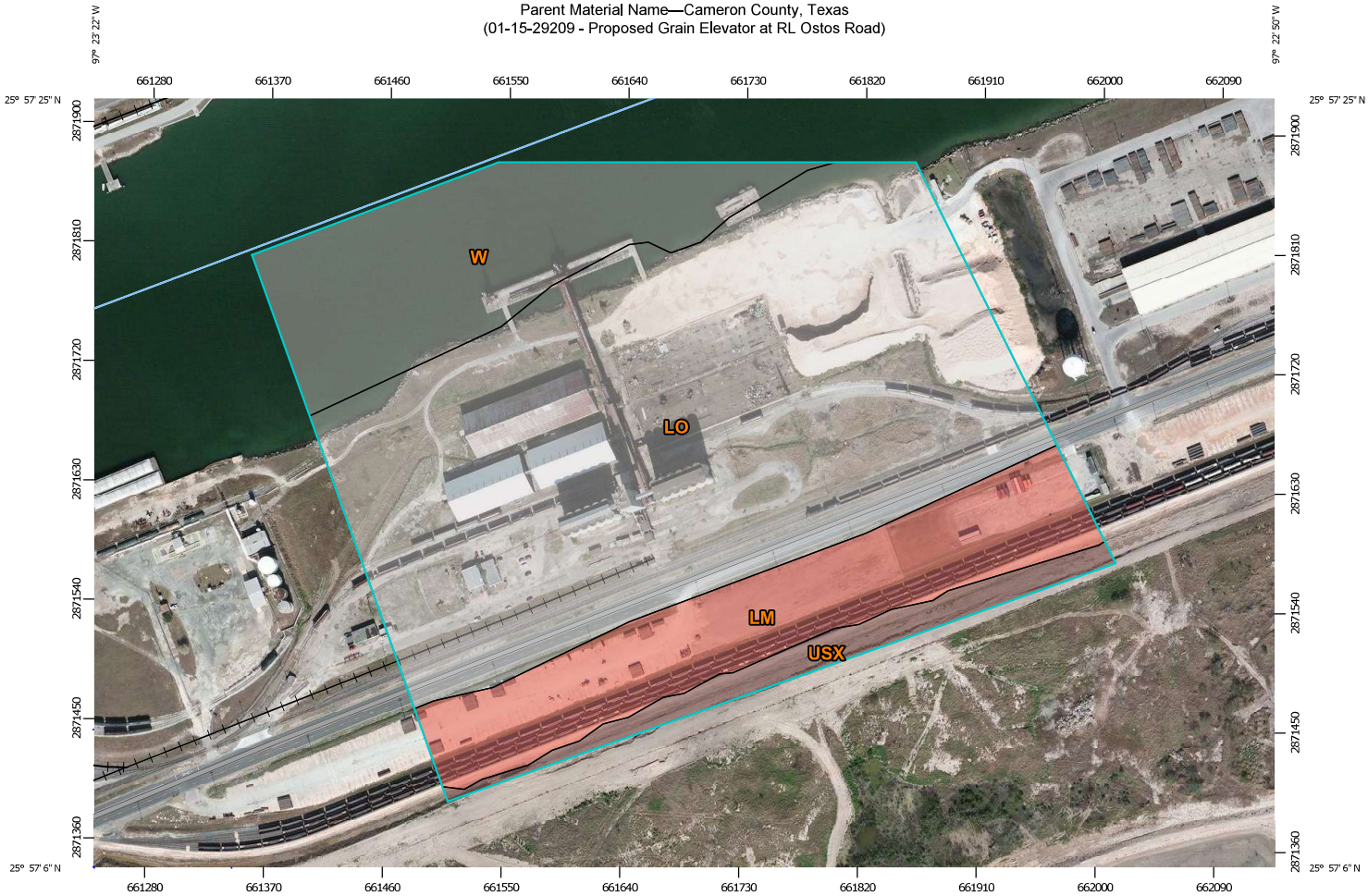
report and/or addendums to this report, the client assumes the responsibility and liability of such actions and will hold our firm harmless and without responsibility and liability for client's actions.

A construction testing frequency plan and budget needs to be developed for the required construction materials engineering and testing services for this project. Before construction, we recommend that **MEG**, the project design team members and the project general contractor meet and jointly develop the testing plan and budget, as well as review the testing specifications as it pertains to this project. **A failure to implement a complete testing plan will negate the recommendations provided in this report.**

MEG looks forward to the opportunity to provide continued support on this project.

APPENDIX

Parent Material Name—Cameron County, Texas
(01-15-29209 - Proposed Grain Elevator at RL Ostos Road)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- clayey alluvium of Holocene age
- sandy dredge spoils and/ or loamy dredge spoils
- Not rated or not available

Soil Rating Lines
- clayey alluvium of Holocene age
- sandy dredge spoils and/ or loamy dredge spoils
- Not rated or not available

Soil Rating Points
- clayey alluvium of Holocene age
- sandy dredge spoils and/ or loamy dredge spoils
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cameron County, Texas
Survey Area Data: Version 11, Sep 22, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 10, 2010—Jan 25, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Parent Material Name

Parent Material Name— Summary by Map Unit — Cameron County, Texas (TX061)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LM	Lomalta clay	clayey alluvium of Holocene age	8.6	16.6%
LO	Lomalta-Urban land complex		32.0	61.5%
USX	Twinpalms-Yarborough complex, 0 to 3 percent slopes, frequently flooded	sandy dredge spoils and/ or loamy dredge spoils	2.3	4.4%
W	Water		9.1	17.5%
Totals for Area of Interest			**52.0**	**100.0%**

Description

Parent material name is a term for the general physical, chemical, and mineralogical composition of the unconsolidated material, mineral or organic, in which the soil forms. Mode of deposition and/or weathering may be implied by the name.

The soil surveyor uses parent material to develop a model used for soil mapping. Soil scientists and specialists in other disciplines use parent material to help interpret soil boundaries and project performance of the material below the soil. Many soil properties relate to parent material. Among these properties are proportions of sand, silt, and clay; chemical content; bulk density; structure; and the kinds and amounts of rock fragments. These properties affect interpretations and may be criteria used to separate soil series. Soil properties and landscape information may imply the kind of parent material.

For each soil in the database, one or more parent materials may be identified. One is marked as the representative or most commonly occurring. The representative parent material name is presented here.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

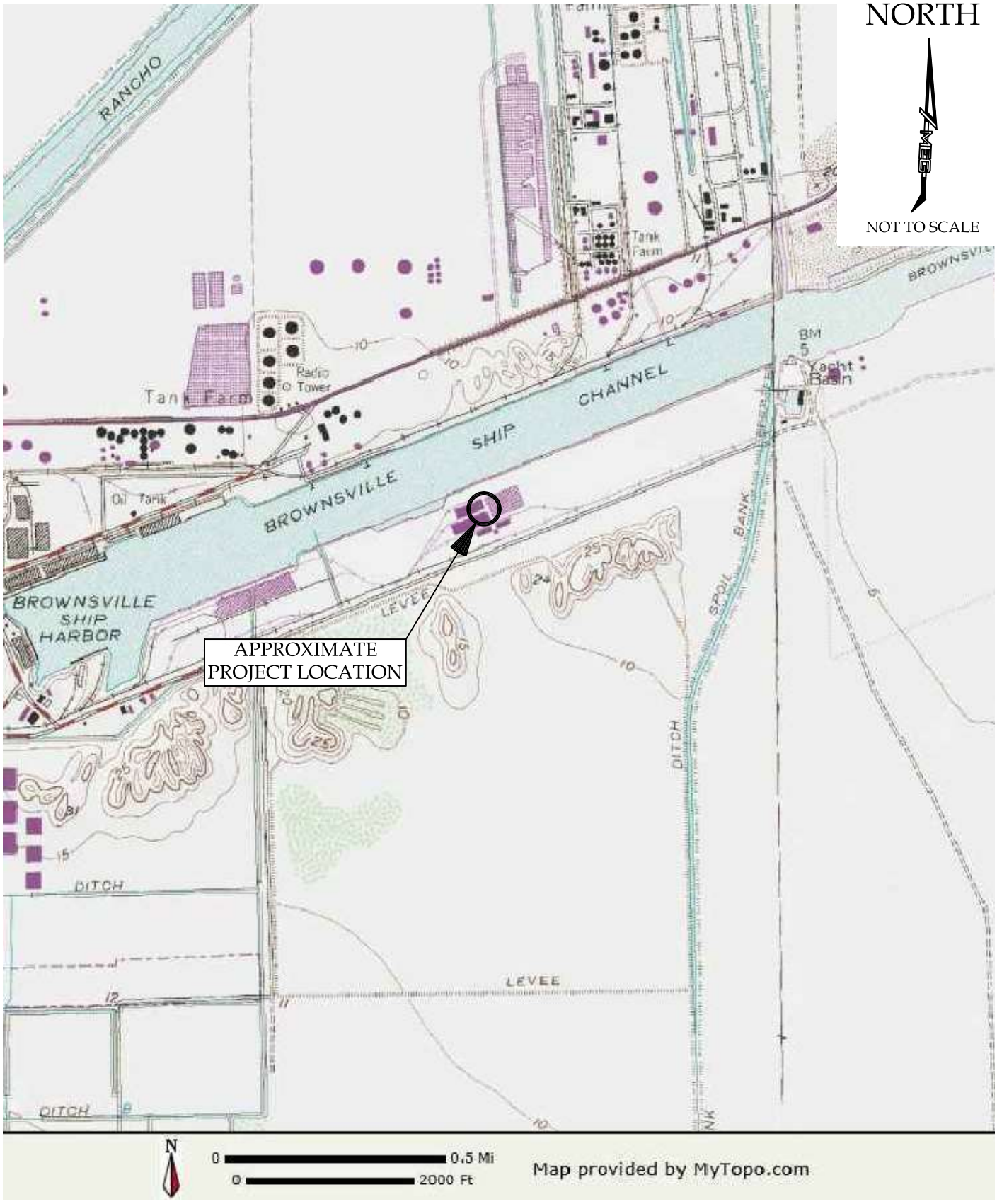
Tie-break Rule: Lower

PROJECT SITE LOCATION MAP

PROPOSED GRAIN ELEVATOR
AT RL. OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL: 956-702-8500
FAX: 956-702-8140



PROJECT TOPOGRAPHIC MAP

PROPOSED GRAIN ELEVATOR
AT RL. OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
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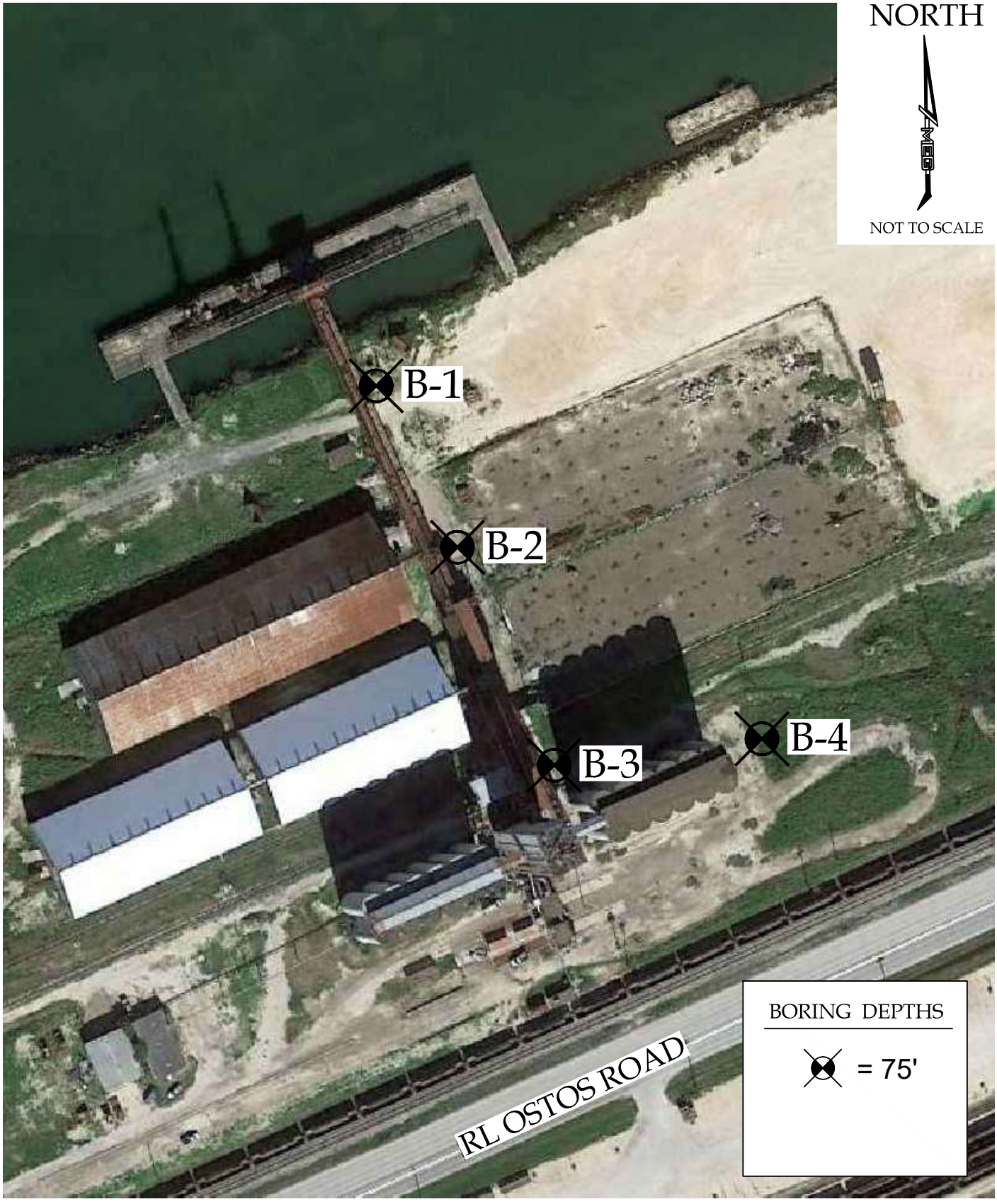

BORING LOCATION PLAN

PROPOSED GRAIN ELEVATOR
AT RL. OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
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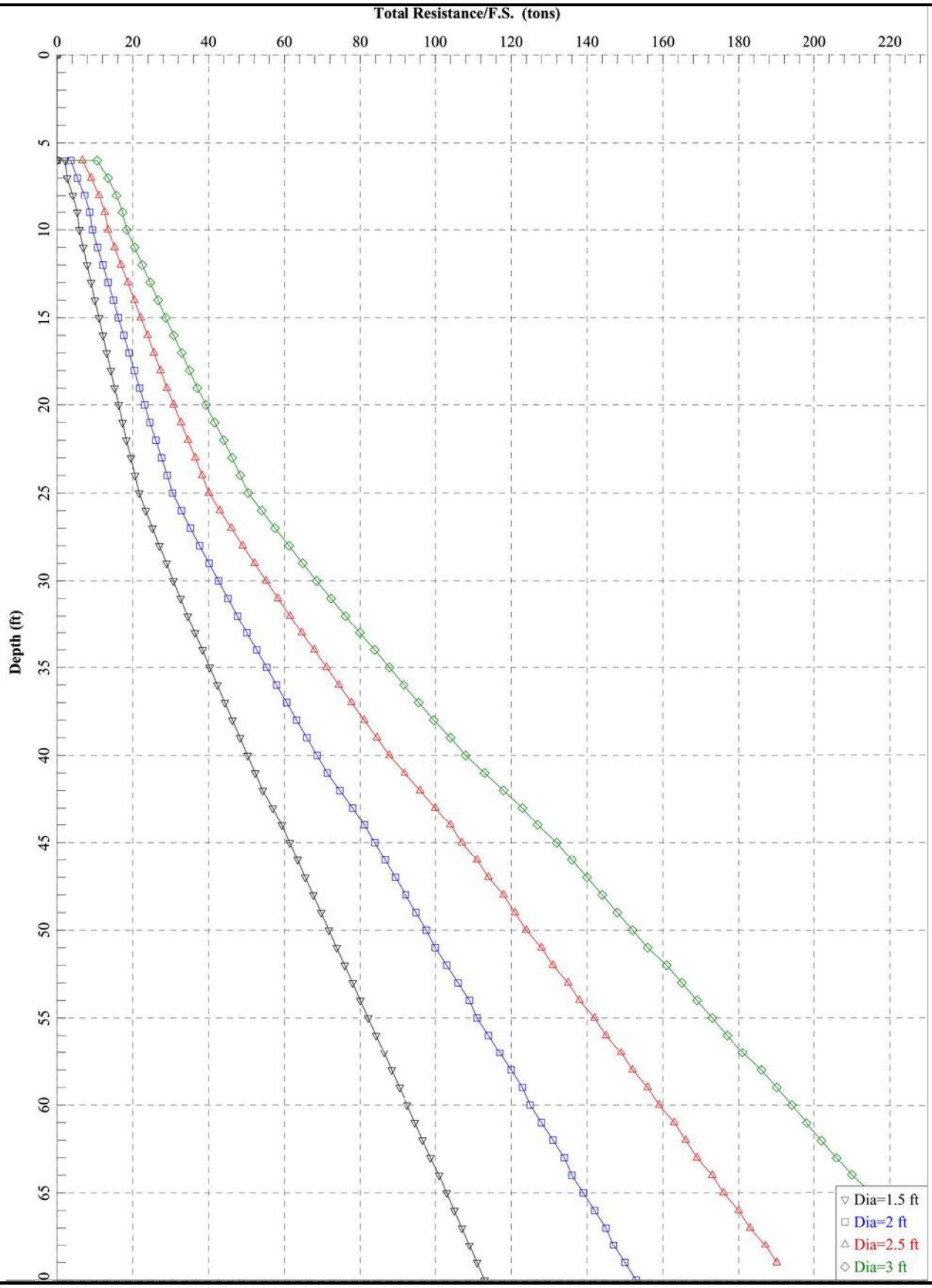
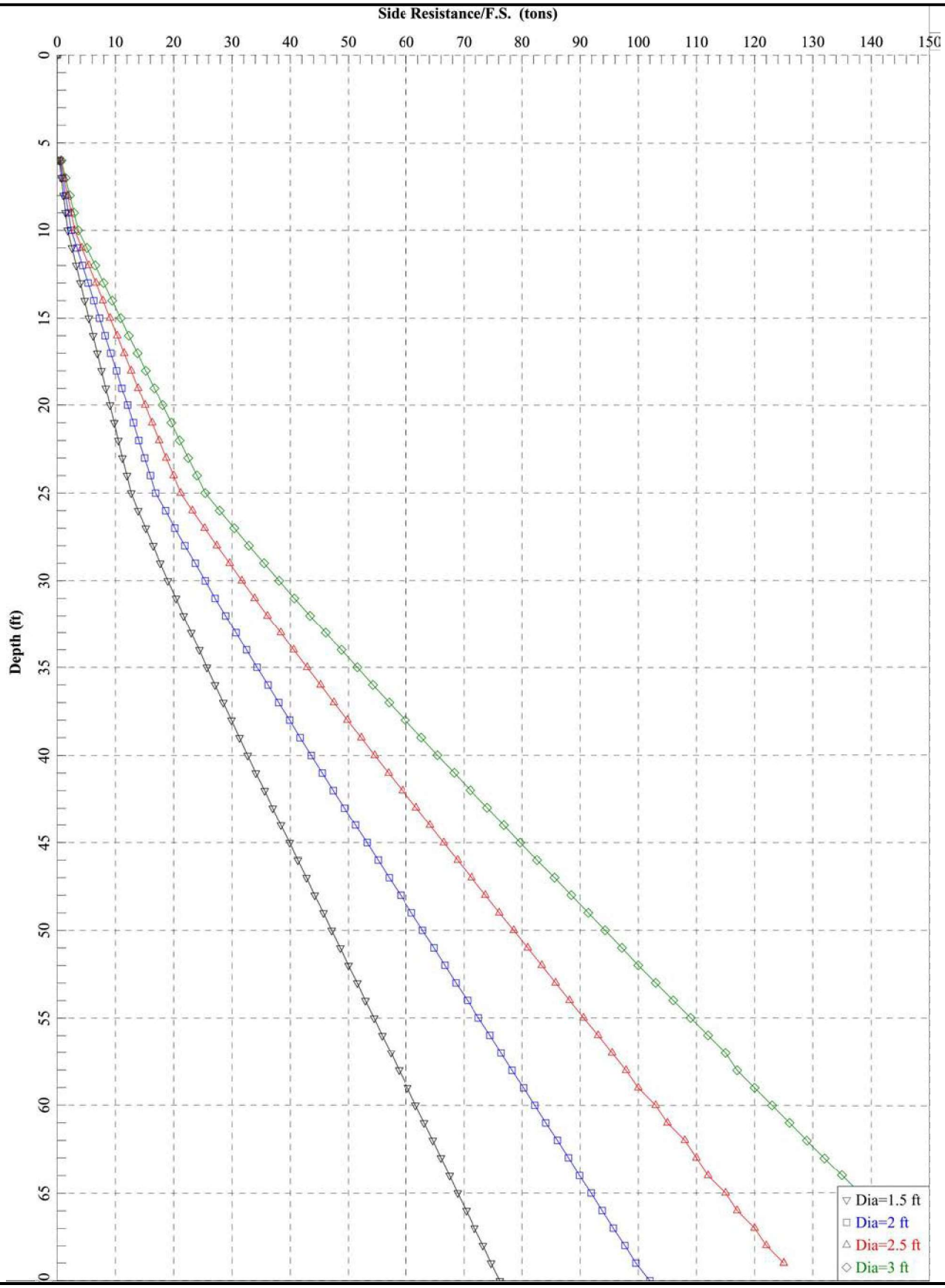


ALLOWABLE AXIAL CAPACITY

PROPOSED GRAIN ELEVATOR AT
RL OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL: 956-702-8500
FAX: 956-702-4180



ALLOWABLE UPLIFT CAPACITY

PROPOSED GRAIN ELEVATOR AT
RL OSTOS ROAD

BROWNSVILLE, CAMERON COUNTY, TEXAS

MILLENNIUM ENGINEERS GROUP, INC.
5804 N. GUMWOOD AVENUE
PHARR, TEXAS 78577
WWW.MEGENGINEERS.COM
TEL: 956-702-8500
FAX: 956-702-4180

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled **November 11, 2015**	Logged By **J.P. Palma**	Checked By **R. Palma**
Drilling Method **straight flight / rotary wash**	Drill Bit Size/Type **4 in. soil bit**	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME 45**	Drilling Contractor **Jedi Drilling**	Approximate Surface Elevation **5 feet Natural Ground (assumed)**
Groundwater Level and Date Measured **10 feet ATD**	Sampling Method(s) **2 in. Split Spoon, Tube**	Hammer Data **140 lb., 30 in. drop, Automatic**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation, feet	Depth, feet	Sample Type	Sample Number	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
5	0		1	11		CL-CH		lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff	8						
			2						17			28	13	PP=1.0	
0	5		3						25					PP=0.25	
			4						33			31	9	PP=0.5	
-5	10		5	5				(ATD) ▽	23						
-10	15		6	12					19			34	16		
-15	20		7	9					19						
-20	25		8	9					24			54	29		
						SC-CL		clayey SAND to sandy lean CLAY, brown, wet, stiff							
-25	30		9	21					26						
-30	35		10	14					26		15				
-35	40		11	25					23						
-40	45		12	13					23		56				
						CL-CH		lean CLAY w/ sand to fat CLAY, brown, moist to wet, med. stiff to stiff							
-45	50		13	19					21		98				
-50	55		14	20					21						
-55	60		15	23					24						
-60	65		16	14					27			31	13		
						CL		sandy lean CLAY, brown, moist to wet, stiff to hard							
-65	70		17	40					56		32				
-70	75		18	43					23						
-75	80							Bottom of Boring at 75 feet bgs							

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MEG ENGINEERS

Figure

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Log of Boring B-2

Sheet 1 of 1

Date(s) Drilled **November 11, 2015**	Logged By **J.P. Palma**	Checked By **R. Palma**
Drilling Method **straight flight / rotary wash**	Drill Bit Size/Type **4 in. soil bit**	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME 45**	Drilling Contractor **Jedi Drilling**	Approximate Surface Elevation **5 feet Natural Ground (assumed)**
Groundwater Level and Date Measured **10 feet ATD**	Sampling Method(s) **2 in. Split Spoon, Tube**	Hammer Data **140 lb., 30 in. drop, Automatic**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation, feet	Depth, feet	Sample Type	Sample Number	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
5	0		1	19		CL-CH		lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff	21			48	29		
			2	9					23		86				
0	5		3	11					25			63	41		
			4	5					27						
-5	10		5	3				(ATD) ▽	32			44	24		
			6						21					PP=0.5	
-10	15														
-15	20		7	8					16			33	8		
-20	25		8	12					19						
						SC-CL		clayey SAND to sandy lean CLAY, brown, wet, stiff							
-25	30		9	11					26						
-30	35		10	11					29		53				
-35	40		11	13					30						
-40	45		12	34					23		16				
-45	50		13	14		CL-CH		lean CLAY w/ sand to fat CLAY, brown, moist to wet, med. stiff to stiff	22			36	19		
-50	55		14						26					PP=1.0	
-55	60		15	19					23						
-60	65		16						29					PP+2.0	
-65	70		17	14		CL		sandy lean CLAY, brown, moist to wet, stiff to hard	30						
-70	75		18	23					26		98				
-75	80							Bottom of Boring at 75 feet bgs							

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Figure

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Log of Boring B-3

Sheet 1 of 1

Date(s) Drilled **November 11, 2015**	Logged By **J.P. Palma**	Checked By **R. Palma**
Drilling Method **straight flight / rotary wash**	Drill Bit Size/Type **4 in. soil bit**	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME 45**	Drilling Contractor **Jedi Drilling**	Approximate Surface Elevation **5 feet Natural Ground (assumed)**
Groundwater Level and Date Measured **10 feet ATD**	Sampling Method(s) **2 in. Split Spoon, Tube**	Hammer Data **140 lb., 30 in. drop, Automatic**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation, feet	Depth, feet	Sample Type	Sample Number	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
5	0		1	12		CL-CH		lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff	16						
			2						19			23	3		
0	5		3						29					PP=1.5	
			4						33			62	39	PP=1.0	
-5	10		5	4				(ATD) ▽	30						
-10	15		6	4					23		84				
-15	20		7						23					PP=1.0	
-20	25		8						22			36	15	PP=2.0	
						SC-CL		clayey SAND to sandy lean CLAY, brown, wet, stiff							
-25	30		9	5					39		63				
-30	35		10	9					27						
-35	40		11	33					26						
-40	45		12	28					26		18				
						CL-CH		lean CLAY w/ sand to fat CLAY, brown, moist to wet, med. stiff to stiff							
-45	50		13	11					21						
-50	55		14						25			56	31	PP=0.75	
-55	60		15	15					28						
-60	65		16	22					23			43	20		
						CL		sandy lean CLAY, brown, moist to wet, stiff to hard							
-65	70		17	40					24		54				
-70	75		18	36					26						
-75	80							Bottom of Boring at 75 feet bgs							

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MEG ENGINEERS

Figure

Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Log of Boring B-4

Sheet 1 of 1

Date(s) Drilled **November 11, 2015**	Logged By **J.P. Palma**	Checked By **R. Palma**
Drilling Method **straight flight / rotary wash**	Drill Bit Size/Type **4 in. soil bit**	Total Depth of Borehole **75 feet bgs**
Drill Rig Type **CME 45**	Drilling Contractor **Jedi Drilling**	Approximate Surface Elevation **5 feet Natural Ground (assumed)**
Groundwater Level and Date Measured **10 feet ATD**	Sampling Method(s) **2 in. Split Spoon, Tube**	Hammer Data **140 lb., 30 in. drop, Automatic**
Borehole Backfill **Subgrade Cuttings**	Location **See Boring Location Map**	

Elevation, feet	Depth, feet	Sample Type	Sample Number	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
5	0		1	15		CL-CH		lean CLAY w/ sand to fat CLAY, dk. brown to brown, moist to wet, med. stiff to stiff	14			35	21		
			2						35					PP=0.25	
0	5		3						32			56	35	PP=0.5	
			4						38		89			PP=0.25	
-5	10		5	3				(ATD) ▽	26			28	12		
-10	15		6	8					17						
-15	20		7	14					23						
-20	25		8	33					18		64				
						SC-CL		clayey SAND to sandy lean CLAY, brown, wet, stiff							
-25	30		9	16					26						
-30	35		10	58					25		18				
-35	40		11	27					24						
-40	45		12	15					22		73				
-45	50		13	23		CL-CH		lean CLAY w/ sand to fat CLAY, brown, moist to wet, med. stiff to stiff	21			58	36		
-50	55		14	13					24						
-55	60		15						30			61	44	PP=3.0	
-60	65		16	13					25						
						CL		sandy lean CLAY, brown, moist to wet, stiff to hard							
-65	70		17	64					20						
-70	75		18	45					22						
-75	80							Bottom of Boring at 75 feet bgs							

Figure

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Project: Proposed Grain Elevator at RL Ostos Road
Project Location: Brownsville, Cameron County, Texas
Project Number: 01-15-29209

Key to Log of Boring

Sheet 1 of 1

Elevation, feet	Depth, feet	Sample Type	Sample Number	Sampling Resistance, blows/foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	Moisture Content, %	Dry Unit Weight, pcf	Percent Fines	LL, %	PI, %	Shear Strength (tsf)	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

COLUMN DESCRIPTIONS

1 **Elevation, feet:** Elevation (MSL, feet)

2 **Depth, feet:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at the depth interval shown.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance, blows/foot:** Number of blows to advance driven sampler foot (or distance shown) beyond seating interval using the hammer identified on the boring log.

6 **Relative Consistency:** Relative consistency of the subsurface material.

7 **USCS Symbol:** USCS symbol of the subsurface material.

8 **Graphic Log:** Graphic depiction of the subsurface material encountered.

9 **MATERIAL DESCRIPTION:** Description of material encountered. May include consistency, moisture, color, and other descriptive text.

10 **Moisture Content, %:** Water content of the soil sample, expressed as percentage of dry weight of sample.

11 **Dry Unit Weight, pcf:** Dry weight per unit volume of soil sample measured in laboratory, in pounds per cubic foot.

12 **Percent Fines:** The percent fines (soil passing the No. 200 Sieve) in the sample. WA indicates a Wash Sieve, SA indicates a Sieve Analysis.

13 **LL, %:** Liquid Limit, expressed as a water content

14 **PI, %:** Plasticity Index, expressed as a water content

15 **Shear Strength (tsf):** Unconfined Compressive Strength

16 **REMARKS AND OTHER TESTS:** Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)

TYPICAL MATERIAL GRAPHIC SYMBOLS

- Well graded GRAVEL (GW)
- Well graded GRAVEL with Silt (GW-GM)
- Poorly graded GRAVEL with Silt (GP-GM)
- Silty GRAVEL (GM)
- Clayey GRAVEL (GC)
- Well graded SAND (SW)
- Poorly graded SAND (SP)
- Well graded SAND with Silt (SW-SM)
- Well graded SAND with Clay (SW-SC)
- Poorly graded SAND with Silt (SP-SM)
- Poorly graded SAND with Clay (SP-SC)
- Silty SAND (SM)
- Clayey SAND (SC)
- SILT, SILT w/SAND, SANDY SILT (ML)
- SILT, SILT w/SAND, SANDY SILT (MH)
- Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)
- SILT, SILT with SAND, SANDY SILT (ML-MH)
- CLAY to Fat CLAY w// SAND (CL-CH)
- SILTY CLAY (CL-ML)
- Lean CLAY/PEAT (CL-OL)
- Fat CLAY/SILT (CH-MH)
- Silty SAND to Sandy SILT (SM-ML)
- Silty SAND to Sandy SILT (SM-MH)
- Clayey SAND to Sandy CLAY (SC-CL)
- Clayey SAND to Sandy CLAY (SC-CH)
- Silty to Clayey SAND (SM-SC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

- 2 in. Split Spoon
- 2.5-inch-OD Modified California w/ brass liners
- 3-inch-OD California w/ brass rings
- Shelby Tube (Thin-walled, fixed head)
- Grab Sample
- Bulk Sample
- Pitcher Sample
- Other sampler now modified

OTHER GRAPHIC SYMBOLS

- Water level (at time of drilling, ATD)
- Water level (after waiting a given time)
- Minor change in material properties within a stratum
- Inferred or gradational contact between strata
- Queried contact between strata

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

MEG ENGINEERS

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Summary of Soil Sample Analyses

Project Name: Proposed Grain Elevator at RL Ostos Road

Boring No.	Sample Depth (Ft)	Blows per ft	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	-200% Sieve	Shear Strength (tsf)	Dry Unit Weight (pcf)	USCS
B-1	.5 - 2	11	8							
	2.5 - 4		17	28	16	13		PP=1.0		CL
	4.5 - 6		25					PP=0.25		
	6.5 - 8		33	31	21	9		PP=0.5		CL
	8.5 - 10	5	23							
	13.5 - 15	12	18	34	18	16				CL
	18.5 - 20	9	19							
	23.5 - 25	9	24	54	25	29				CH
	28.5 - 30	21	26							
	33.5 - 35	14	26				15			
	38.5 - 40	25	23							
	43.5 - 45	13	23				56			
	48.5 - 50	19	21				98			
	53.5 - 55	20	21							
	58.5 - 60	23	24							
	63.5 - 65	14	27	31	16	13				CL
	68.5 - 70	40	26				62			
	73.5 - 75	73	23							
B-2	.5 - 2	19	21	48	19	29				CL
	2.5 - 4	9	23				86			
	4.5 - 6	11	25	63	23	41				CH
	6.5 - 8	5	27							
	8.5 - 10	3	32	44	20	24				CL
	13.5 - 15		31					PP=0.5		
	18.5 - 20	8	16	33	25	8				CL
	23.5 - 25	12	19							
	28.5 - 30	11	26							
	33.5 - 35	11	29				53			
	38.5 - 40	13	30							
	43.5 - 45	34	23				16			
	48.5 - 50	14	22	36	17	19				CL
	53.5 - 55		26					PP=1.0		
	58.5 - 60	19	23							
	63.5 - 65		29					PP=2.0		
	68.5 - 70	14	30							
	73.5 - 75	23	26				98			

Summary of Soil Sample Analyses

Project Name: Proposed Grain Elevator at RL Ostos Road

Boring No.	Sample Depth (Ft)	Blows per ft	Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index	-200% Sieve	Shear Strength (tsf)	Dry Unit Weight (pcf)	USCS
B-3	.5 - 2	12	16							
	2.5 - 4		19	23	20	3				CL
	4.5 - 6		29					PP=1.5		
	6.5 - 8		33	62	23	39		PP=1.0		CH
	8.5 - 10	4	30							
	13.5 - 15	4	23				84			
	18.5 - 20		23					PP=1.0		
	23.5 - 25		22	36	21	15		PP=2.0		CL
	28.5 - 30	5	39				63			
	33.5 - 35	9	27							
	38.5 - 40	33	26							
	43.5 - 45	28	26				18			
	48.5 - 50	11	21							
	53.5 - 55		25	56	26	31		PP=0.75		CH
	58.5 - 60	15	28							
	63.5 - 65	22	23	43	23	20				CL
	68.5 - 70	40	24				54			
	73.5 - 75	36	26							
B-4	.5 - 2	15	14	35	14	21				CL
	2.5 - 4		35					PP=0.25		
	4.5 - 6		32	56	21	35		PP=0.50		CH
	6.5 - 8		38				89	PP=0.25		
	8.5 - 10	3	26	28	16	12				CL
	13.5 - 15	8	17							
	18.5 - 20	14	23							
	23.5 - 25	33	18				64			
	28.5 - 30	16	26							
	33.5 - 35	58	25				18			
	38.5 - 40	27	24							
	43.5 - 45	15	22				73			
	48.5 - 50	23	21	58	22	36				CH
	53.5 - 55	13	24							
	58.5 - 60		30	61	17	44		PP=3.0		CH
	63.5 - 65	13	25							
	68.5 - 70	64	20							
	73.5 - 75	45	22							

Summary of Unconfined Compression Tests

Project Name: Proposed Grain Elevator at RL Ostos Road

Borehole No.	Depth (Ft)	Unconfined Strength (tsf)
B-1	6.5 to 8	0.4
B-2	13.5 to 15	0.4
B-3	4.5 to 6	1.8
	23.5 to 25	0.4
B-4	4.5 to 6	0.4

Laboratory and Field Test Procedures

Soil Classification Per ASTM D2487-93:

This soil-testing standard was used for classifying soils according to the Unified Soil Classification System. The soil classifications of the earth materials encountered are as noted in the attached boring logs.

Soil Water Content Per ASTM D2216-92:

This test determines the water content of soil or rock expressed as a percentage of the solid mass of the soil. The test results are listed under **MC** in the attached boring logs.

Soil Liquid Limit Per ASTM D4318-93:

The soil Liquid Limit identifies the upper limit soil water content at which the soil changes from a moldable (plastic) physical state to a liquid state. The Liquid Limit water content is expressed as a percentage of the solid mass of the soil. The test results are listed under **LL** in the attached boring logs.

Soil Plastic Limit Per ASTM D4318-93:

The soil Plastic Limit identifies lower limit soil water content at which the soil changes from a moldable (plastic) physical state to a non-moldable (semi-solid) physical state. The Plastic Limit water content is expressed as a percentage of the solid mass of the soil. The test results are listed under **PL** in the attached boring logs.

Plasticity Index Per ASTM D4318-93:

This is the numeric difference between the Liquid Limit and Plastic Limit. This index also defines the range of water content over which the soil-water system acts as a moldable (plastic) material. Higher Plasticity Index (PI) values indicate that the soil has a greater ability to change in soil volume or shrink and swell with lower or higher water contents, respectively. The test results are listed under **PI** in the attached boring logs.

Standard Penetration Test (SPT) and Split Spoon Sampler (SS) per ASTM D 1586:

This is the standard test method for both the penetration test and split-barrel (spoon) sampling of soils. This sampling method is used for soils or rock too hard for sampling using Shelby Tubes. The method involves penetration of a split spoon sampler into the soil or rock through successive blows of a 140-pound hammer in a prescribed manner.

Blow Counts (N) per ASTM D 1586:

This is the number of blows required to drive a Split Spoon Sampler by means of a 140 pound hammer for a distance of 12 inches in accordance with the variables stated in the test procedures.

Shelby Tube (ST) per ASTM D 1587:

This procedure is for using a thin-walled metal tube to recover relatively undisturbed soil samples suitable for laboratory tests of physical properties.

Dry Density (DD) per ASTM D 2937:

This procedure is for the determination of in-place density of soil. The test results are measured in pounds per cubic foot, pcf.

Unconfined Compression Test (Uc) per ASTM D 2166:

This test method covers the determination of the unconfined compressive strength of cohesive soil in the undisturbed, remolded, or compacted condition, using strain-controlled application of the axial load.

Minus No. 200 Sieve per ASTM D 1140:

This test method covers determination of the amount of material finer than a Number 200 sieve by washing. The results are stated as a percent of the total dry weight of the sample.

Pocket Penetrometer (PP):

This test method is an accepted modification of ASTM D 1558 test method for establishing the moisture-penetration resistance relationships of fine-grained soils. The test results are measured in tons per square foot, tsf. The strength values provided by this method should be considered qualitatively.

Rock Quality Designation (RQD):

The measure of the quality of a rock mass defined by adding intact rock core pieces greater than four inches in length by the total length of core advance.

Recovery Ratio (REC):

The Recovery Ratio is equal to the total length of core recovered divided by the total length of core advance.

Boring Logs:

This is a summary of the above-described information at each boring location.

Appendix D

Electrical

EXISTING MCC LOADS - RELOCATE TO NEW MCC

FACILITY EXPANSION 8/15/2022

WEST PLAINS LLC - BROWNSVILLE, TX Rev 00

DESCRIPTION	HP	AMPS
EXISTING MAIN CABINET[1]		
MAIN CIRCUIT BREAKER		
FLAT HOUSE #2 & #1	75	250[2]
CONNECTION BELT FLAT HOUSE #1 & #2	75	250[2]
BIN DRAG 14	75	250[2]
CONNECTION BELT #3	75	250[2]
ADDITIONAL CABINET		
3 – 50 HP breakers	150	270[3]
4 – 30 HP breakers	120	200[3]
4 – 15 HP breakers	60	120[3]
1 – transformer	-	
1 breaker panel	-	
Estimated Existing Loads [4]	630	1590

NOTES:

1. See photo of existing conveyor cabinet attached
2. Loads are based on photos of equipment - Contractor to verfiy.
3. Loads are estimated by assumed motor FLA at 460V - Contractor to verify
4. Estimated total - Contractor is repsonsible for determining final loads

ESTIMATED EQUIPMENT HORSEPOWER

FACILITY EXPANSION 8/15/2022

WEST PLAINS LLC - BROWNSVILLE, TX Rev 00

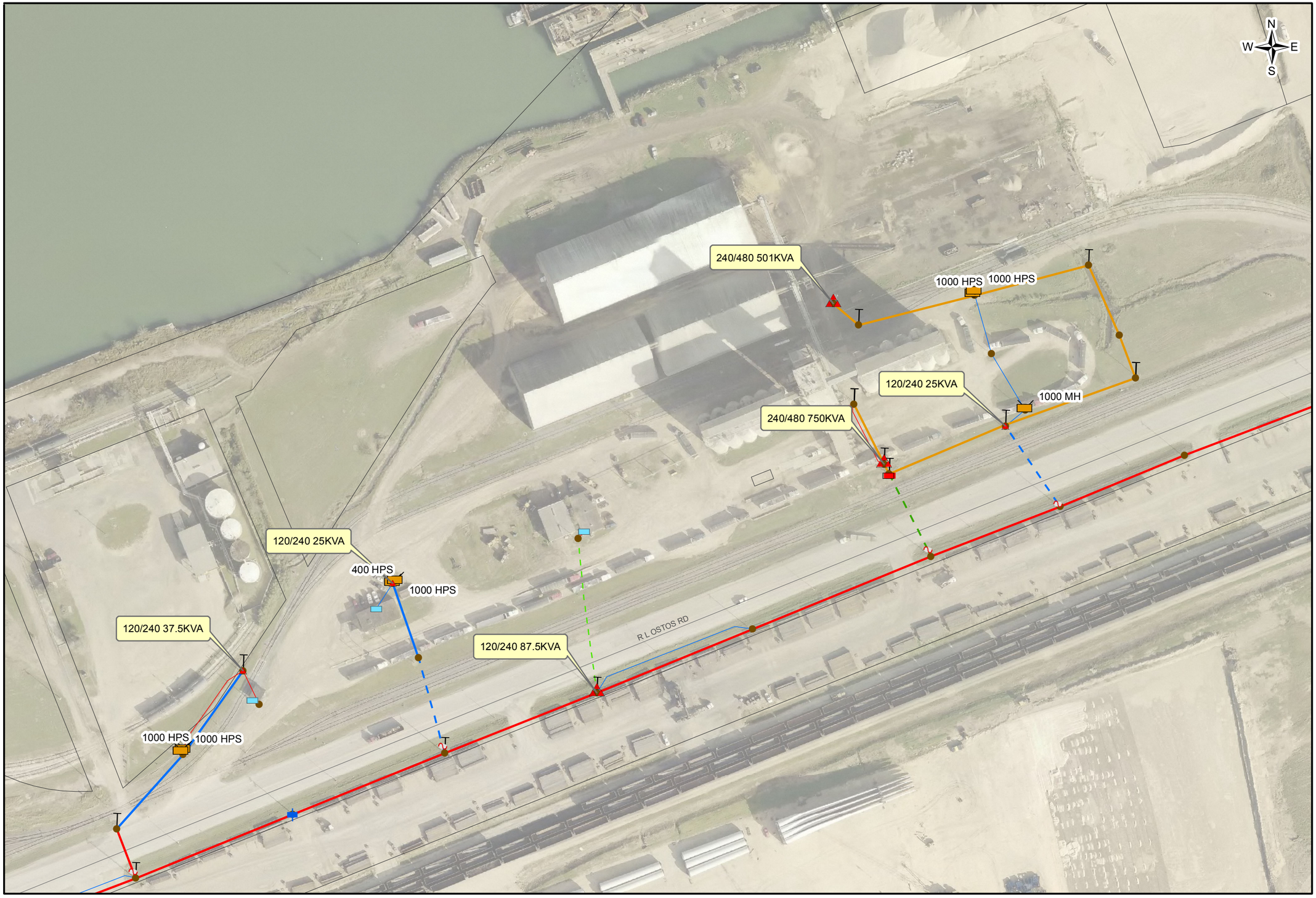
TAG	TYPE	SIZE	CAPACITY[1]	EST. LENGTH[2]	INCLINE ANGLE	EST HP
01-CV-01	HI ROLLER HL	48	50,000 BPH	77'-10"	13°	60
01-CV-02	HI ROLLER HL	48	50,000 BPH	106'-0"	14°	100
01-CV-03	HI ROLLER HL/OPEN BELT	48	50,000 BPH	350'-0"	-	100
01-OT-01	TRIPPER	-	50,000 BPH	-	-	10
01-CV-04	HI ROLLER HL	36	30,000 BPH	370'-0"	1.75°	75
01-BE-01	BUCKET ELEVATOR	2x20	30,000 BPH	49'-4 1/2" [3]	-	100
01-SF-01	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-SF-02	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-SF-03	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-SF-04	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-SF-05	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-SF-06	LIVE BOTTOM SCREW FEEDER	4X12	15,000 BPH	12'-0"	-	100
01-DG-01	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
01-DG-02	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
01-DG-03	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
01-DG-04	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
01-DG-05	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
01-DG-06	L PATH DRAG CONVEYOR	32x32	15,000 BPH	70'-10" [4]	45°	40
02-CV-01	HI ROLLER HL	36	30,0000 BPH	44'-0"	-	40
02-CV-02	HI ROLLER HL	48	50,000 BPH	188'-0"	10°	125
02-CV-03	HI ROLLER HL	48	50,000 BPH	106'-0"	9.5°	75
02-SL-01	SHIP LOADER	48	50,000 BPH	195'-0"	VARIES	
	MAIN DRIVE (2 X 40)					80
	STINGER DRIVE (2 X 30)					60
	HYDRAULIC POWER UNIT					10
02-CV-04	HI ROLLER HL	48	50,000 BPH	126'-6"	8.5°	75
02-SL-02	SHIP LOADER	48	50,000 BPH	195'-0"	VARIES	
	MAIN DRIVE (2 X 40)					80
	STINGER DRIVE (2 X 30)					60
	HYDRAULIC POWER UNIT					10
03-CV-01	HI ROLLER HL	36	30,000 BPH	60'-0"	15°	75

∑ Estimated Horsepower[5] [6] 1975

NOTES:

1. Bushel per hour flow rates shown are based on No. 1 yellow dent corn at 56 lbs. per bushel.
2. Estimated lengths are from the centerline of inlet to the centerline of discharge.
3. Discharge Height from baseplates of unit not including 1 1/2" thick grout.
4. Bottom of discharge is a 14'-9" rise above inlet elevation.
5. Estimated HP does not include loads from actuators, gate openers, or other minor loads.
6. Sizes and HPs are approximate and may change as dictated by final design.

9155 R L OSTOS RD



BROWNSVILLE
PUBLIC UTILITIES BOARD

Legend

TRANSFORMER
- SinglePhaseTransformer
- TwoPhaseTransformer
- ThreePhaseTransformer
- UGSinglePhaseTransformer
- UGThreePhaseTransformer
- StepTransformer
- GangSwitch
- KnifeSwitch
- LoadBreakSwitch
- DisconnectSwitch

SWITCH
- ATS Automatic Transfer Switch

FUSE
- CLOSED
- OPEN

METER
- PRIMARY
- SECONDARY

LIGHT
- EXISTING Flood Security Light
- EXISTING, Area AlleyLight
- EXISTING Area Security Light
- EXISTING Area Street Light

ELECTRIC STRUCTURE
- POLE
- ANCHOR_GUY

OH PRIMARY
- OHSinglePhasePrimary
- OHTwoPhasePrimary
- OHThreePhasePrimary
- PrivateOHSinglePhasePrimary
- PrivateOHTwoPhasePrimary
- PrivateOHThreePhasePrimary

UG PRIMARY
- UGSinglePhasePrimary
- UGThreePhasePrimary
- PrivateUGSinglePhasePrimary
- PrivateUGThreePhasePrimary

OH SECONDARY
- OHSinglePhaseConductor
- OHThreePhaseConductor

UG SECONDARY
- UGSinglePhaseConductor
- UGThreePhaseConductor

Date:	2/26/2020
Work Order No.:	
Prepared by:	DAVID TOVAR
Approved by:	
Completed by:	DAVID TOVAR

Appendix E

FGIS Requirements

United States Department of Agriculture

Marketing and Regulatory Programs

Agricultural Marketing Service

Federal Grain Inspection Service

Washington, D.C.

April 2017

Mechanical Sampling Systems Handbook

United States Department of Agriculture
Grain Inspection, Packers and Stockyards Administration
Federal Grain Inspection Service

Program Handbook

April 18, 2017

Mechanical Sampling Systems Handbook

Foreword

This handbook sets forth the policies and procedures regarding the equipment requirements, installation, authorization, examination, and testing of mechanical sampling systems used for official inspection purposes.

TABLE OF CONTENTS

CHAPTER 1
GENERAL INFORMATION

Contents

1.1 PURPOSE

This handbook sets forth the policies and procedures regarding the equipment requirements, installation, authorization, examination, and testing of mechanical sampling systems used for official inspection purposes.

1.2 POLICY

Mechanical sampling systems must be examined, tested, approved, and authorized for official sampling purposes in accordance with the procedures stated in this handbook.

Mechanical sampling systems are composed of one or more automatic sampling devices. The most common system configurations consist of a primary diverter sampler with a powered secondary sampler. These systems capture representative samples of commodities in a variety of applications. To ensure the accuracy and integrity of official inspections, mechanical sampling systems used for official sampling purposes, including obtaining warehouseman's sample-lot inspection samples, shall meet the following criteria:

a. The major components of the system must be of a model and type approved by FGIS.

b. Installation of an official sampling system must be authorized by FGIS.

c. The sampling system must be maintained and, if necessary, repaired or modified to maintain accuracy and integrity in accordance with established procedures.

d. The system must operate at the prescribed interval and, after any repairs or modifications are completed, the system must be tested, examined, and certified to operate within established tolerances.

e. The system, when operating in an official sampling capacity, must be under the supervision of official personnel in accordance with the instructions for obtaining official samples.

1.3 AUTHORITIES

This handbook is issued pursuant to Section 16(a) of the United States Grain Standards Act, as amended and the Agricultural Marketing Act of 1946, as amended.

1.4 DEFINITIONS

a. Alterations-Modifications. Any changes made to a sampling system from the point in time the system was last approved for official use. This includes changes to the sampler position, parts, speed, wiring, dust collection, etc. It also includes changes to the grain handling system that affect the sampler, such as: increase in grain flow, change in belt speed, use of new shipping bins, etc.

b. Authorization. The Federal Grain Inspection Service, Field Management Division representative, or designated Field Office Manager authorizes use of the mechanical sampler by signing a FGIS-980, “Authorization to Use Mechanical Sampler for Sampling.” Without this authorization, the sampler may not be used officially.

c. Cancellation. The current authorization is permanently withdrawn (revoked). If the facility wishes to obtain a new authorization, they must begin the approval process again, as if it were a new installation. This would include submitting a new authorization package, including a system checktest requiring five lots of grain.

d. Commodities. Grain, rice, beans, peas, lentils, and processed grain products.

e. Controls.

(1) Auxiliary Controls. Any device that either duplicates or bypasses the operating controls. Also an override, a delay switch, dump counter, or a programmable controller that may interrupt your exclusive use of the sampling device.

(2) Operating Controls. Used by the sampling attendant for normal operation of the sampling system. The control panel includes an on/off switch, timer, indicator lights, and other switches controlling excess sample return, pneumatic sample delivery, etc.

(3) Lockout Controls. A lockout switch is a device that will disconnect the main power supply and bring the D/T sampler to a zero energy state for the purposes of condition examination. The lockout switch is the only power supply override both required and allowed.

f. Examination. An examination of the sampler is conducted by official personnel using FGIS-936, “Sampler Condition Report,” as a checklist and record.

The examination is a visual check that requires opening the sampler inspection access panels and examining the condition and operation of the sampler.

(1) Initial Examination. The first examination before the sampler can be used officially.

(2) Periodic Examination. On a regular schedule, such as every 6 months.

(3) Supplemental Examinations. Extra examinations required after repairs/ modifications have been made or anytime the accuracy or integrity of the sampling system is in question.

g. Monthly Sampler Checks. Sampler system condition checks done at export port locations by official personnel. Results are kept in a log book; FGIS-936 is not required.

h. Primary Sampler. The main sampler, normally a diverter-type sampler.

i. Secondary Sampler. A powered divider to reduce or split an officially obtained sample received from the primary sampler, while maintaining its representativeness. A Boerner cargo divider may be used also.

j. Suspension. A letter from an official agency or Field Office to temporarily withdraw an authorization. Records are kept on file, so the sampler can be easily reauthorized if requested. Suspension of the authorization can also be the first step in permanent cancellation of the authorization. A formal suspension is not always required if the sampler problems can be corrected immediately or before the sampler is used officially.

k. Check test. A test conducted by Official personnel to determine sampling system accuracy and integrity with the use of five lots of grain. Mechanical truck probes are tested using 20 trucks. Initial, supplemental, and periodic check tests have the same meanings as in item f, when they are used to describe a test.

CHAPTER 2
SPECIFICATIONS

Contents

2.1 DIVERTER-TYPE MECHANICAL SAMPLERS

a. General Requirements.

(1) The design, construction, and location of the sampling system and related equipment must suit the intended official use of the sampling system.

(2) FGIS must approve the model and type of primary (Figure 1) and secondary sampler used in the system prior to the systems approval.

(3) The FGIS Field Management Division (FMD), or designated Field Office manager, must authorize the system for official use based on the satisfactory results of a system examination and a system performance check test specified in Chapters 4 and 5.

(4) Official personnel shall maintain an accurate and up-to-date sampling system documentation package, including site drawings regarding system design, installation, and approved modifications. (in their official files).

(5) The sampling system must have adequate access for a full and safe visual examination.

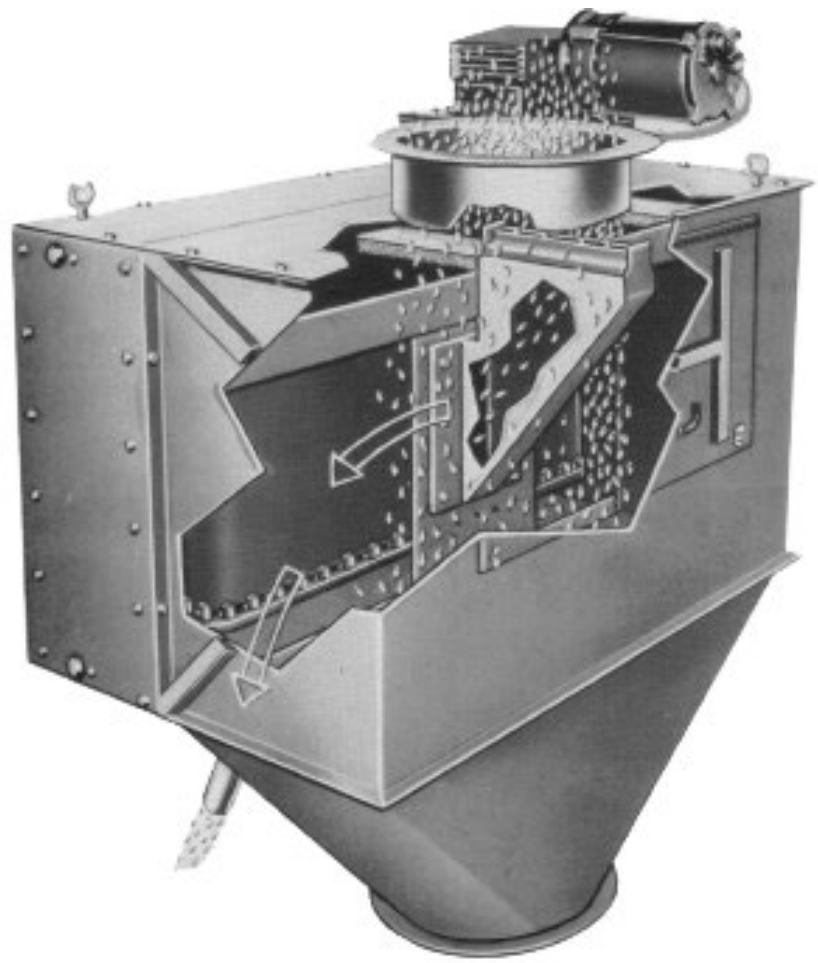


Figure 1. Diverter-Type Sampler (Primary)

b. Equipment Requirements.

(1) Overall dimensions of the primary sampler must be adequate for the volume and flowrate of the commodities being sampled. Primary samplers must:

(a) Allow all of the commodity presented for sampling to be accepted by the pelican as the pelican traverses through the commodity stream.

(b) Deliver all of the sampled commodity to the secondary sampler.

(2) The design, construction, materials, and quality of the equipment must be such that it can withstand normal use without loss of accuracy or reliability. Under normal operating conditions, operating parts will remain fully operable without the need for adjustment.

(3) The primary and secondary mechanical sampler manufacturer identification plates shall be permanently and conspicuously displayed to show their manufacturer, model designation, and serial number. Facility management must arrange for the manufacturer to supply (if needed) new I.D. plates for old, unmarked samplers, or in the event a sampling system identification marker becomes lost or damaged.

(4) The pelican (See Figure 1.) must traverse at an even speed, as close as possible to ½ meter (20 inches) per second.

(5) Power sources, valves, and switches must conform with the following requirements:

(a) Air supply for air-operated primary samplers must be uniform and maintain specified operating pressure. If scale operations or other air uses cause a loss of effective working pressure, a separate air supply system must be installed.

(b) Constant line voltage must be maintained to ensure correct operation of electrically-operated primary and secondary samplers.

(c) Valves, switches, solenoids, cylinders, motors, or other activating or operating mechanisms must be high quality, positive action devices that meet all OSHA and FGIS safety requirements and appropriate local codes.

c. Controls.

(1) Sampling system controls must be under the direct secured access or supervision of the assigned official inspection personnel or warehouseman sampler. Also, any auxiliary controls must be under the exclusive control of official personnel.

(2) For auxiliary control, any modification of a sampling system used for official purposes shall not compromise the representativeness of the sample. If a grain elevator elects to modify a D/T sampling system to control grain choke conditions, the following requirements must be met:

(a) Grain flow into the sampler must stop whenever the sampler is stopped.

(b) If already in motion, the D/T pelican must complete the traverse and come to the normal rest position.

(c) If the sampler is stopped the timer shall not reset. The timer may continue running with the pelican traverse disabled, or it may halt until the plugged condition is cleared. When the plugged condition has cleared, normal timer operation shall resume with the time that remained when the timer halted.

(d) The plug of grain that caused stoppage of the D/T must be cleared from the sampler before the sampler is restarted. Additionally, the D/T must be restarted before grain begins to flow into the sampler.

(e) An audible alarm must be activated whenever the D/T sampler is stopped by an auxiliary control.

(f) Auxiliary controls for D/T samplers must be under the full control of FGIS. The controls that stop the grain flow may be part of the plant control system. However, the controls that stop the D/T sampler and which activate the alarm must be independent of the plant control system and secured with seals or locks.

(g) Sampling systems that are modified with auxiliary controls after the issuance of this handbook must have the modifications approved by FGIS/Official Agency before they can be used for official purposes.

NOTE: A lockout switch is not considered an auxiliary control. Refer to Page 2-7 for information on lockout controls.

(3) Controls for mechanical samplers and related sample handling systems, including but not limited to push buttons and switches, and shall be conspicuously identified as to the equipment or activity controlled by the push button or switch.

d. Access.

(1) An inspection access panel with the ability to be locked or sealed by official personnel must be installed on each primary and secondary sampler to allow quick and easy examination of all moving parts. Access panels should be hinged and be equipped with sealable hasp. Official personnel should not have to use tools to remove the access panel.

(2) Access panels should be positioned to allow viewing of the entire length of the pelicans sampling stroke, and directly into the pelican opening, and also allow a complete view of the system's dust seals.

(3) Older, previously approved sampler installations must have inspection plates upgraded to meet the above requirements when repairs, modifications, or major maintenance is completed.

(4) Access to the sampling system and inspection panel must be free of hazards, with safe ingress and egress.

(5) Access panels are not required on rotary-type secondary samplers constructed of cast metal. This does not eliminate the need to open and examine the secondary during a condition examination.

e. Physical Requirements.

(1) Secondary samplers used for the reduction of the official samples obtained by the primary sampler must be appropriate for the type of facility and application in which they are installed:

(a) Facilities with a maximum flow rate of 10,000 bushels per hour or less (passing the sampling site either through a spout or carried on a belt) may use a powered secondary sampler or a gravity feed.

(b) Cargo divider. For cargo-types, sample feed must be directed to the center of the divider. If it plugs, clogs, or creates other problems, it must be replaced with a powered secondary sampler.

(c) Facilities with a maximum flow rate in excess of 10,000 bushels per hour (passing the sampling site either through a spout or carried on a belt) must use a powered secondary sampler.

(2) The entire diverter pelican opening must be at least ¾ inch (1.9 cm) but less than ⅞ inch (2.2 cm) wide. If required for structural strength, the manufacturer (or owner, if according to the manufacturer's drawings) may install small braces in the pelican opening.

(3) Secondary samplers must be large enough to reduce the quantity of sample delivered by the primary sampler without backing up. All secondary samplers, including those that use adjustable slot openings (ratio adjustment plate), must be set so the slots are not narrower than ¾ inch (1.9 cm). Any slot adjustment plates must be secured or sealed in position for testing and use.

(4) Sample return mechanisms must be designed to return excess sample to the lot from which the sample was taken from.

(5) Sample delivery tubing, flexible or rigid, must be physically secured (clamps, sealants, security seals, etc.) at all junctions that may allow the representativeness of the sample to be easily altered by adding or removing material.

(6) Air intake vents on pneumatic delivery systems must have a suitable screen or cover with the ability to be fixed in place and sealed to prevent the introduction of material into the official sample.

(7) All sample inspection access panels, operating controls, timers, air intake vents, and sample collection boxes must have the ability to be secured, locked, or sealed closed when official personnel are not located in the official inspection laboratory and/or are not continuously monitored by official inspection personnel or the warehouseman sampler.

(8) In the event the primary sampling system access panel security seals need to be broken by unofficial personnel, notice must be provided to the official service provider before the system is opened or tampered with. The official service provider must visually examine the sampling system and if the official service provider is satisfied that the integrity of the system has not been compromised, replace all broken seals and document seal numbers. If notice or a suitable explanation is not given as to why the sampler seals were found broken, the system may need to be reexamined (condition examination). The testing office may also require that the system to be check tested if the official service provider suspects the system's integrity may be in question.

(9) When application of security seals to a primary or secondary sampler will not provide an increased level of security, they are not required. For example, where access through the belt opening in the sampler hood cannot be eliminated (belt-end diverter sampler).

(10) The entire sampling system must be self-cleaning to prevent contamination of a commodity from one lot to another.

f. Installation and Site Requirements.

(1) Installation will be at a site approved by FGIS, and all sampling equipment will be installed according to the manufacturer's suggested installation instructions, so that neither the operation nor the performance of the equipment or system will be adversely affected by the foundation, supports, or any other characteristic of the installation.

(2) Primary samplers must be installed in such a location as to ensure the representativeness of the samples obtained.

(a) "Out" movement samplers. Primary samplers must be installed after the final elevation of the commodity, as close as physically practicable to the end of the loading spout. Final elevation is defined as the last elevation by bucket elevator, pneumatic sucker, drag, paddle, screw conveyor, or other devices. Inclined belts are not considered an elevation, since they will not cause grain breakage.

1 Primary samplers must not be installed in vertical spouts with long drops or sharp-angled turns.

2 The sampler must be located so that all of the grain sampled will be delivered to the carrier. This can be a problem when grain has been sampled, but then a small part of it will not fit in the carrier and is returned to the house or put in a different carrier. This renders the sample non-representative.

a For example, the sampler must not be located above an upper scale garner when loading rail cars. If so, it could result in some grain sampled (the grain in the garner) actually going to the next car in line.

b At barge loading sites the amount of grain retained in a garner or on a section of belt that is sampled but does not get loaded aboard the barge will need to be calculated. If significant, special procedures will need to be developed to clear the system or it cannot be approved.

c For ship sublots, the garner amount effect on the sample is usually insignificant.

(b) “In” movement samplers. Primary samplers should be installed before or immediately after the initial elevation of the commodity. Initial elevation is defined as the first elevation by bucket elevator, pneumatic sucker, drag, paddle, screw conveyor, or other devices. Elevation by marine leg at barge unloading sites is also considered an initial elevation.

(3) If screw or drag conveyors, swivel loaders, belt-type throwers, or air-blast throwers are used to propel the commodity after sampling for outbound inspection or before sampling for inbound inspection, the facility operator shall furnish evidence based on comparison testing that their use does not alter the condition of the commodity.

(4) The secondary sampler must be mounted in a vertical, reasonably-level position and be located as close to the primary sampler as possible. In facilities where this is not practical or in facilities where man lift would be the only means of transporting samples and personnel to and from the sampler, The secondary sampler may be installed at ground level. This does not eliminate the need for a safe means of access to the primary sampler for examination purposes.

(5) The facility primary and secondary sampler location must be free of hazards that may jeopardize the safety of official inspection personnel.

(6) Adequate floor space, as defined by official personnel, must be provided at the proposed sites.

(7) Protection and guards must be provided for floor and bin openings, low beams, spouts, moving belts, and chains.

(8) The sites must be kept clean and free of excessive dust, spilled commodities and refuse. Regular cleaning must be a part of the facility’s maintenance program.

(9) Lighting at the primary sampler installation site must be a minimum intensity of 30 foot-candles to allow thorough examinations of the primary sampler. Where artificial lighting is used, it should be permanently installed rather than portable.

(10) Safe access to the primary sampler site and the sampler shall be provided by passenger elevators, stairs, or approved ladders. Stairs and ladders must meet safety standards (29 CFR 1910.24, .27, etc.) Consult with the Field Office collateral duty safety and health officer (CDSHO) for assistance in applying these standards.

(11) Approved lockout switches must be installed within close physical proximity and visual line of sight to the primary sampling system, and approved lockout procedures shall be used to ensure the safety of personnel examining the primary and secondary sampling systems. Further information can be found in 29 CFR 1910.147, “The control of hazardous energy (lockout).”

(12) The lockout switch must be under the exclusive control of the person examining the equipme nt being locked out. The lockout device such as a padlock must have the ability to totally immobilize the power supply switch, bringing it to a zero energy state. This includes all mechanical, electrical, hydraulic, and pneumatic equipment that may cause the D/T to operate. (Lockout procedures are specified in Chapter 4)

g. Timer Requirements.

(1) Timers may be analog or digital. (Automated systems having timers that reside in programmable controller logic require special evaluation and approval from FGIS headquarters.)

(2) For official use, analog timers do not need and should not have a maximum dial setting greater than 5 minutes, since all required settings are 3 minutes or less. Timers with large maximum settings may have less accuracy in lower ranges.

(3) Precision timing is not required. However, a properly functioning timer must be accurate to approximately ± 1 division; e.g., an Eagle timer of 60 seconds maximum dial setting, marked in 1-second divisions must be accurate ± 1 second at any setting. If not, it must be repaired or replaced.

(4) When the commodity flow rate is 4,000 bushels or less per hour, set the timer at not more than 3 minutes.

(5) When the flow rate is more than 4,000 bushels per hour, set the timer so that the pelican traverses the sampling area each 200 bushels, unless the flow rate lends itself to a larger sampling interval as decided by the inspector in charge, using TableI 1.

(6) Actual flow rate past the sampler is not always equal to the facility estimated load out rate. Use the flow rate of the facility’s predominant grain to figure out the timer setting.

Example: *An elevator has one D/T sampler located under Scale No.1 used to load out hopper cars of corn. The scale holds about 170 bushels, and the discharge takes 15 seconds. This equals 40,000 bushels per hour (bu/hr) going past the sampler. The scale will take another 15 seconds to fill each scale draft, lessening the facility's load out rate to 20,000 bu/hr or less. If the facility is inefficient at moving cars, etc., it may not even load as fast as 20,000 bu/hr, but the timer setting would still be based on 40,000 bu/hr. Referring to Table 1, the timer setting could be either 18, 31 or 45 seconds.*

(7) If the recommended timer setting yields a larger than required, or an insufficient amount of sample in the sample collection box, it may be an indication that the secondary sampler does not offer the appropriate reduction. It may be necessary to repair, replace, or adjust the secondary in this situation.

(8) If needed, the timer can be set to take cuts more frequently than shown in the table, but this is not recommended. Turning up the timer may cause the secondary sampler to back up. Verify by examination that the secondary clears before the next pelican cut delivers more grain. Document the examination and the new timer settings in the file.

(9) Use one timer setting for both testing and official sampling. The system should be used "as tested" unless item (8) applies.

(10) Do not change timer settings for different grains or carriers except as approved and noted on FGIS-998.

(11) Do not change timer settings during official sampling. For example, if 5,000 grams represent the sample from one bin, another similar bin should be represented by 5,000 grams, too. When timer settings are changed, this proportional relationship is lost.

(12) Scale dump counters are not allowed on or in lieu of the timer circuit, due to the fact that a dump counter will not allow cuts to be taken randomly throughout the sampling of a lot.

(13) Energy to the timer circuit should not be interrupted by counters, gate interlocks, or programmable controllers, since the timer will reset to zero and the statistical randomness of sampler cuts will be lost. (Safety lockout switches must disconnect timer circuits and also sampler motor circuits.) Headquarters may grant an exception when circuit interrupts for the sampler motor are needed, if properly justified.

Table 1, Sampler Timer Settings

Flow Rate Past Sampler (bu/hr)	Sampling Rate (Seconds) One cut each:		
	200 bu	350 bu	500 bu
10,000	72		
15,000	48		
20,000	36		
25,000	28	**50**	
30,000	24	**42**	**60**
35,000	20	**36**	**51**
40,000	18	31	**45**
45,000	16	28	**40**
50,000	14	25	36
55,000	13	22	32
60,000	12	21	30
65,000		19	27
70,000		18	25
75,000		16	24
100,000			18
125,000			14
150,000			12
3,600 (s/hr) * 200 (bu) sampling rate / max flow (bu/hr) = timer setting (s)			

h. Mixing and Blending Requirements.

(1) Mixing and blending of the commodity to be sampled must be completed before the commodity reaches the primary sampler. If multiple samplers (more than one conveyor belt or spout) are used, the feed to each must be uniform in kind and quality.

(2) If a sample grade commodity is placed in the shipping bin, a procedure must be developed to ensure that the entire quantity of the sample grade commodity is returned to the facility. A multi-bottomed or windowed shipping bin may cause segregation of the commodity. Therefore, when a sample grade commodity has been loaded into one section, all of the commodity in the sections joined by windows must be returned to the facility.

(3) Lot Integrity Requirements. There must be no provision for adding material (except insecticides) or removing material from the commodity after it has passed the primary sampler. If there are feeders or diversion points between the sampler and the carrier, the points must be closed securely by using locks, seals, or electronic security measures that are under the complete control of the sampling attendant. When security measures include visual monitoring, the monitoring must be continuous-not intermittent.

2.2 POINT-TYPE MECHANICAL SAMPLING SYSTEMS

Point-type mechanical sampling systems are approved only for Group 3 powdered commodities. These commodities are more homogeneous than the other groups and have less particle segregation. They do not use a pelican to completely cross cut the stream of commodity through a spout. Instead, they often use a tube with a hole or slot and an auger delivery system. Specifications for point-type samplers are identical to those for diverter-type samplers except for pelican design and timer settings, which are not applicable.

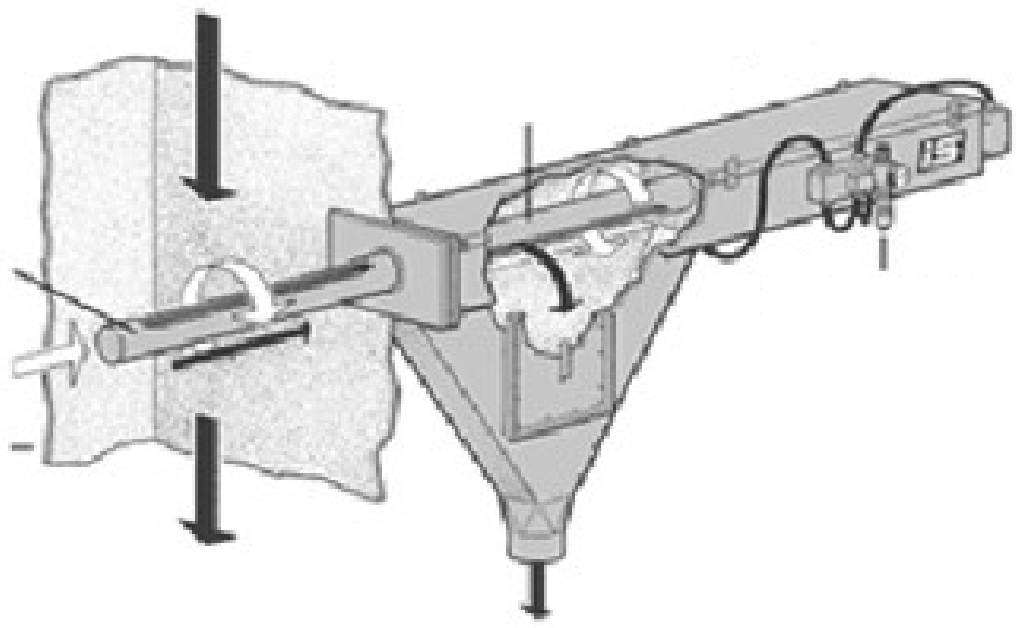


Figure 2. Point-Type Sampler

2.3 PROBE-TYPE MECHANICAL SAMPLERS (TRUCK PROBES)

a. General Requirements.

(1) The model and type of probe-type mechanical sampler must be approved by FGIS. Figure 3 shows the current designs, of which two are approved. In-load suction probes may not be tested or approved. They draw air through the load of grain and vacuum excessive amounts of fine foreign material into the sample.

(2) The system must be authorized for official use based on the tests and examinations specified in Chapter 5.

b. Installation and Site Requirements.

(1) The facility must be free of hazards that jeopardize the safety of official inspection personnel.

(2) The site must be kept clean and free of excessive dust, spilled commodities, and refuse.

(3) The reach of the probe must enable the operator to follow the standard probing patterns and procedures. Normally a truck would not need to be moved more than once to reach all areas of the load.

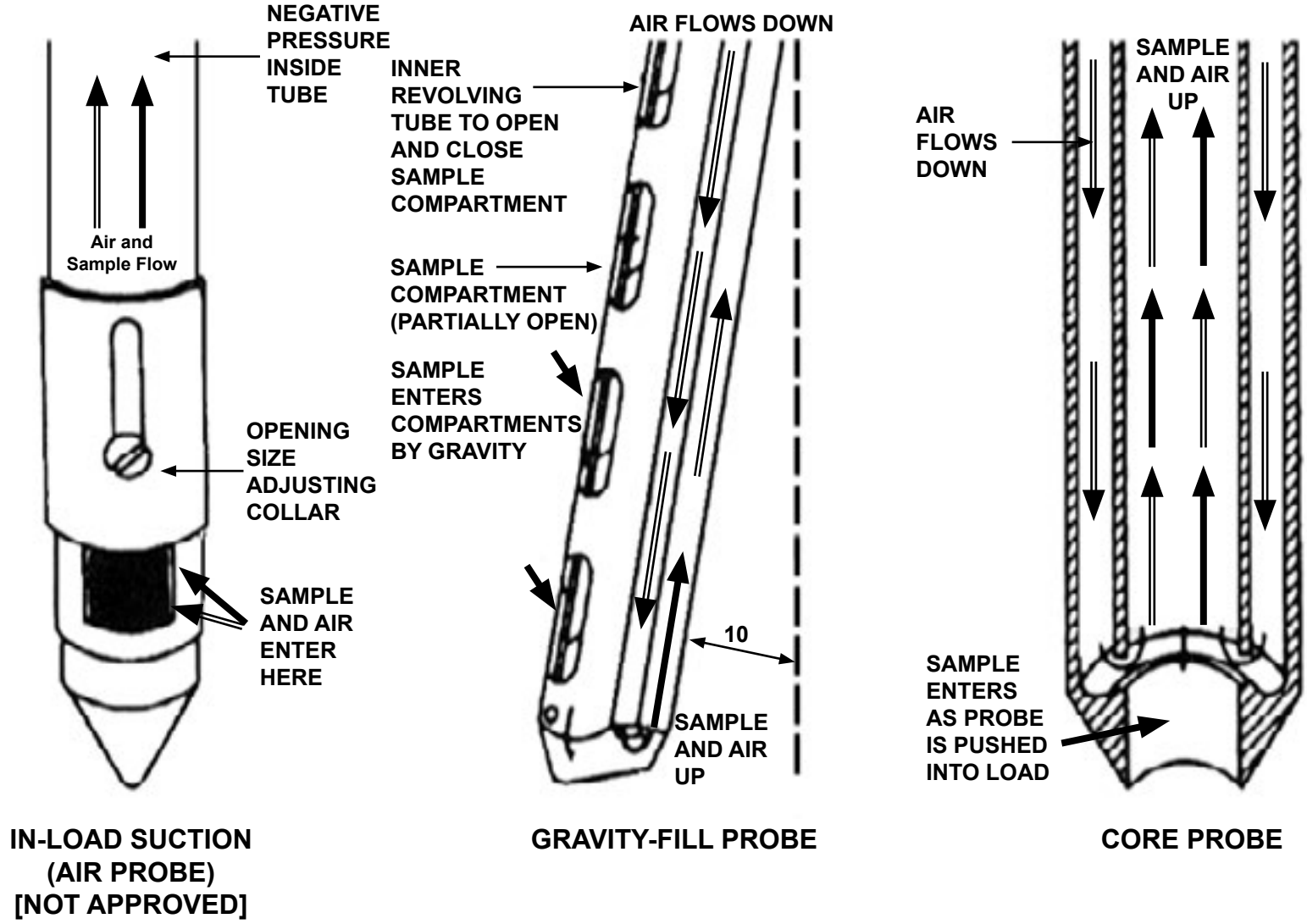


Figure 3. Probe-Type Samplers

(4) The length of the probe should enable the operator to reach the bottom of truck loads that are sampled.

(5) Lockout switches and/or devices must be installed.

c. Installation Procedures. Probe-type mechanical sampling systems must be installed according to the manufacturer's specifications. After testing, secure all adjustable components that affect air flow by use of covers, seals, locks, or electronic security measures.

CHAPTER 3
AUTHORIZATION

Contents

TABLES

FIGURES

3.1 RESPONSIBILITIES

a. Facility Management. The operator of the facility that owns, leases, or operates the mechanical sampling system shall:

(1) Submit a written request letter for authorization of the system.

(2) Prepare and submit all applicable drawings for the proposed site needed for the authorization, photographs may also be accepted. (Figure 4).

(3) Install approved equipment in the correct manner as prescribed by the manufacturer.

(4) Cooperate in examining and testing the system.

(5) Maintain the system in the proper environment and in the proper manner.

(6) Repair the system, when needed.

(7) Sign the authorization indicating agreement with its requirements.

(8) Notify the testing office, in writing, (official agency or FGIS Field Office, as applicable) when:

(a) Any physical changes in equipment or facility operations (such as flow rate, added dust collection) occur that may affect the flow to, through, or after the sampling system.

(b) Alterations to the system are planned (any type).

(c) The system will no longer be used for official inspection work.

(d) The facility will not be operational for more than 6 months.

b. Testing Office. The official agency or FGIS Field Office that will use the mechanical sampling system for official inspection service must ensure that the system provides a representative sample. This is an essential function. These offices shall:

(1) Examine the proposed site and determine whether it conforms with the requirements for installation and use of the sampling system. Document problem areas and review them with the facility management.

(2) Complete FGIS-998, “Questionnaire for Proposed Diverter-Type Mechanical Sampler” (Figure 5) or provide a complete questionnaire on the proposed site and system including usage information, location, loading or unloading rate, name of owner, material to be sampled, etc.

(3) Review the site and installation drawings for accuracy. Sign and date the drawings if they accurately represent the system as installed.

(4) At export port locations, do monthly sampler checks (minimum frequency). See Chapter 4.

(5) Perform initial, periodic (minimum every 6 months), and supplemental examinations of the site and sampling system.

(6) Perform initial, periodic, and supplemental testing, as necessary, to determine system accuracy, when first installed or modified.

(7) Notify the FGIS Field Office of any condition that may warrant formal suspension of an authorization.

(8) Perform the following record keeping for each system:

(a) Prepare FGIS-936, “Sampler Condition Report” for each series of examinations and tests performed according to items 5 and 6, above.

(b) Forward the original copy of the written request, drawing, FGIS-998, and a copy of the FGIS-936 to the supervising FGIS Feld Office (when an FGIS Field Office is the testing office, this material shall be maintained in a permanent file.)

(c) Maintain the following records:

1 A copy of the request for authorization, drawings of the site and installation drawings provided by the manufacturer showing necessary dimensions, flow rates, belt speeds, etc.

2 A copy of the completed FGIS-998 for proposed diverter-type, probe-type, or point-type mechanical sampler installation.

3 A copy of the completed FGIS-980, “Authorization to Use Mechanical Sampler for Sampling.”

4 The original copy of all FGIS-936’s issued within the last 5 years.

c. FGIS Field Office. The FGIS Field Office that supervises the testing office (or sometimes is the testing office) shall:

(1) Provide supervision and assistance to the testing office.

(2) Provide data for the national database.

(3) Prepare and execute (or finalize) FGIS-980 after the initial, successful test of the sampler has been completed.

(4) Prepare and execute (or finalize) revised FGIS-980 for changes in ownership, equipment, agency, etc.

(5) Formally suspend or cancel authorizations, in writing, when warranted.

(6) Maintain the following records on each sampler in the Field Office's circuit:

(a) The original copy of the request for authorization, drawings of the site and installation drawings provided by the manufacturer showing necessary dimensions, flow rates, belt speeds, etc.

(b) The original copy of the completed FGIS-998 for proposed diverter-type, probe-type or point-type mechanical sampler installation.

(c) The original of the completed FGIS-980.

d. FGIS Headquarters or the designated Field Office in charge of the mechanical sampler testing program shall:

(1) Evaluate and grant or deny approval of prototype mechanical sampling equipment and systems.

(2) Provide technical support to FGIS Field Offices.

(3) Maintain a national database updated annually, showing basic information for each official mechanical sampling system, such as: SAMPLER MODEL IDENTIFICATION, ELEVATOR, LOCATION, AGENCY, FIELD OFFICE.

e. FGIS Technology and Science Division. The Technology and Science Division shall provide statistical analysis of mechanical truck probe testing data.

3.2 REQUEST FOR INFORMATION

Facility operators interested in installing a new, or updating/modifying an existing mechanical sampling system being used for official inspection purposes must contact the local FGIS Field Office for information and assistance. Inquiries should be made through the official agency when the area is served by an official agency.

3.3 REQUEST FOR AUTHORIZATION

a. Preparation of Request. The operator of the facility should request authorization of a proposed mechanical sampling system in writing and include a copy of the installation drawing(s) provided by the manufacturer and a complete description, by model and type of equipment, of the sampling system including a drawing or sketch of the proposed system. The drawing must show the proposed sampling system (See Figure 4.) in relation to the following items, as applicable (distances to be shown in feet or meters):

(1) Scales, scale hoppers and surge bins.

(2) Dump pits.

(3) Elevating legs and conveyors.

(4) Cleaning and shipping bins.

(5) Loading and/or receiving spouts and belts.

(6) Official inspection laboratory and/or sample collection box location.

(7) Dust collection near the sampler.

(8) Sampler access and lockout switch.

b. Distribution of Request. The facility must send the request, with drawings, to the official agency or FGIS Field Office that provides original inspection service to the specified service point in which the facility is located (the testing office).

c. Response to Request.

(1) Upon receipt of the request, the testing office shall promptly examine the site proposal for the sampling system to determine if the site and the arrangement of the sampling equipment conforms with the basic requirements for the installation of mechanical sampling systems. If they do not, the testing office must document and review the problem areas with the facility operator.

(2) Promptly after that, the testing office shall complete FGIS-998. Then, the testing office shall send to the FGIS Field Office manager, the written request, drawings and installation data, and the completed FGIS-998 showing needed changes. The testing office shall end a copy of the completed form to the facility operator.

(3) After reviewing the written request, the drawing and the completed FGIS-998, the FGIS Field Office in charge of the specified service point at which the sampling system is located shall determine if the system meets all requirements (See Chapter 2.) If so, FGIS shall direct the testing office to do an examination and test. When the system does not comply with all authorization requirements, the testing office will be instructed to review the problem areas with the facility management.

3.4 ISSUANCE OF AUTHORIZATION

a. Granting of Authorization. Upon completion of a successful check test, the FGIS Field Office shall prepare and issue (or finalize) FGIS-980, “Authorization to Use Mechanical Sampler for Sampling” (Figure 6).

(1) The authorization is an agreement among representatives of the facility where the sampling system is installed, the testing office, the FGIS Field Office, and any other persons or firms that may be directly involved.

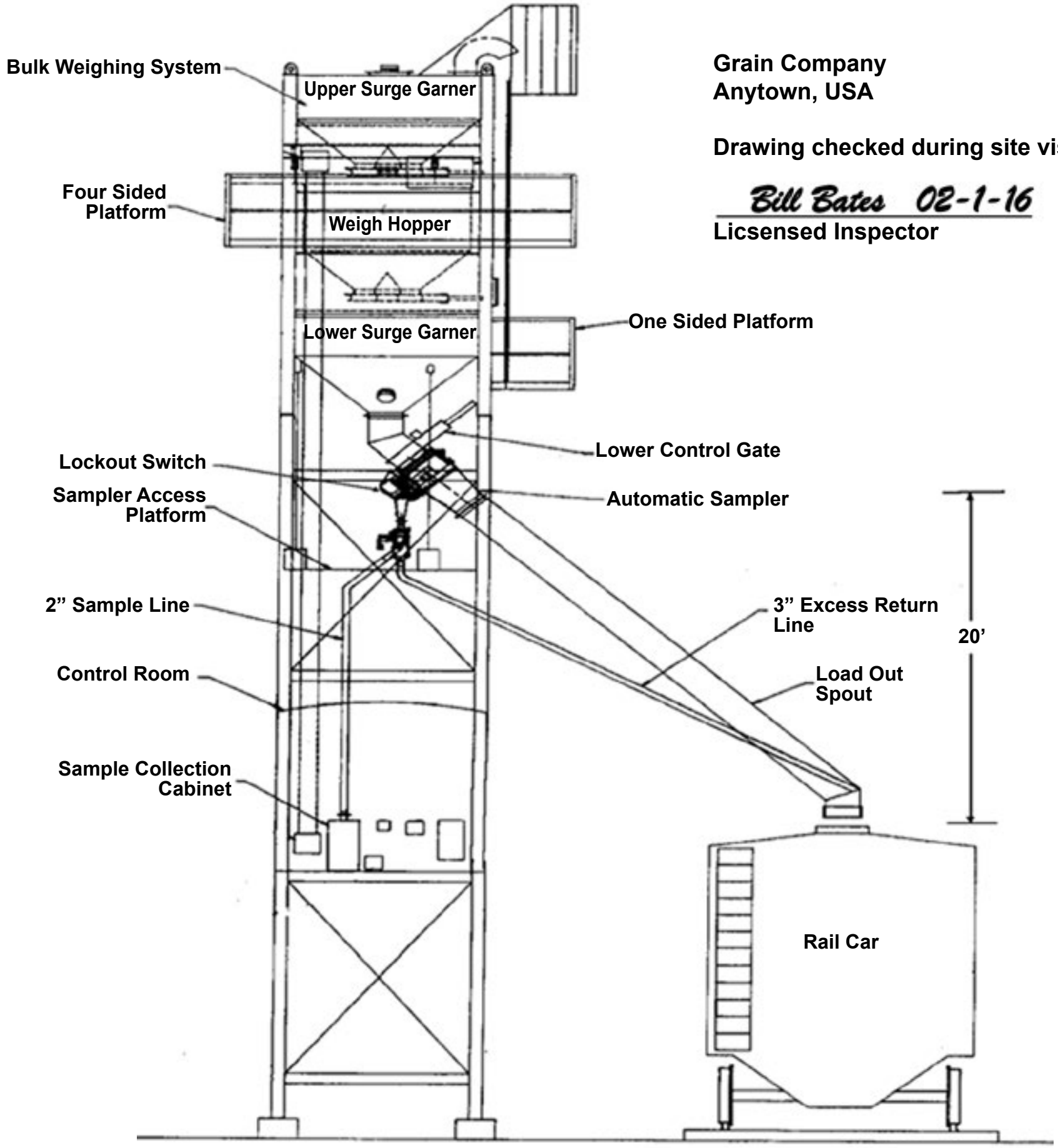
(2) The agreement says that the sampler shall be installed, serviced, operated, and maintained following existing regulations.

NOTE: D/T power supply lockout switch compliance requirements for sampling system authorization.

Within the official system there are D/T samplers authorized for use that do not meet the D/T sampler power supply lockout requirement of being within close physical proximity and visual line of site to the primary sampling system. FGIS will require elevators with those D/T samplers make the necessary modifications to be compliant.

FGIS realizes that elevators must be given an adequate amount of time to come into compliance. Accordingly, FGIS is requiring all D/T samplers within the official system to be compliant on or before January 1, 2020.

To verify compliance, official agency personnel will verify the accuracy of elevator sampling system site diagrams and verify the existence and the location of the power supply lockout device during the periodic examination of D/T samplers within their respective areas. If a D/T sampler is determined to be non-compliant the official agency will inform the elevator manager in writing. The elevator must ensure compliance by January 1, 2020. If not, FGIS will suspend authorization of the non-compliant D/T sampler.



Grain Company
Anytown, USA

Drawing checked during site visit

Bill Bates 02-1-16
Licsensed Inspector

FIGURE 3.1 - DIVERTER-TYPE SAMPLER SITE DRAWING

U.S. Department of Agriculture

Grain Inspection, Packers and Stockyards Administration

QUESTIONNAIRE FOR PROPOSED DIVERTER-TYPE MECHANICAL SAMPLER

OMB APPROVED NO. 0580-0013

Public reporting burden for this collection of information is estimated to average 1hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing the burden, to Department of Agriculture, Clearance Officer, OIRM, AG Box 7630, Washington, DC 20250; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20250-7630.

Facility Name, City, State 1

Field Office 2

Kind of Elevator ☐ Country ☐ Terminal 3 ☐ Export

Capacity 4

Authorization Code - Circle Appropriate Numbers

D Diverter N Non-diverter P Probe 0 All Grains 1 Small Grains 2 Coarse Grains - Nut Corn 5

3 In 4 Out 5 Cargo 6 Barges 7 Hopper Cars 8 Carlots 9 Trucks

D/T Make and Model 6	S/N 7	☐ Spout 8 ☐ Belt	Spout / Belt Size 9
General Location 10	Spout / Belt Name 11	Spout / Belt Angle 12	Belt Speed 13
Power: ☐ Air 14 ☐ Electric	Body Dimensions 15	Pelican Stroke 16	Pelican Opening L x W 17
Grain Drop Before Sampler 18 (ft)	Grain Drop After Sampler 19 (ft)	Access Safe ☐ Yes 20 ☐ No	Inspection Door OK? ☐ Yes 21 ☐ No
Verified No Auxiliary Controls ☐ Yes 22 ☐ No	Location of Lockout OK? ☐ Yes 23 ☐ No	Lights OK for Exams? ☐ Yes 24 ☐ No	
Is Pelican Movement Steady? ☐ Yes 25 ☐ No	Does Pressure Return Promptly? ☐ Yes 26 ☐ No	Air Pressure at Rest PSI 27	
Timer Make and Model 28	Grain Flow Rate Past Sampler 29	Calculated Timer Setting 30 (s)	
Secondary Make and Model 31	S/N 32	Delivery System ☐ Gravity 33 ☐ Pneumatic	Grams per Sample 34
Total No. of Samples 35	Quantity Adjustment Sealed? ☐ Yes 36 ☐ No	Delivery and Collection Box Secur ☐ Yes 37 ☐ No	Excess Returned to Lot? ☐ Yes 38 ☐ No

Dust Control Locations 39

Weights: ☐ GIPSA Class X 40 ☐ GIPSA Class Y ☐ Certified ☐ Other _____

Number of Shipping Bins: 41	Depth 42 (ft)	Graded ☐ Before or ☐ After Release? 43	Procedures to Stop Breakage: 44

Carrier I.D. by: 45 ☐ Radio ☐ Visual ☐ Other _____

Remarks/special restrictions when used to sample officially: 46

Signature of Official Personnel: 47 Date: 48

FORM FGIS-998 (11/94) *Previous Editions Obsolete*

Figure 3.2 - FGIS 998, 'QUESTIONNAIRE FOR PROPOSED DIVERTER-TYPE MECHANICAL SAMPLER"

DIRECTIONS FOR COMPLETING QUESTIONNAIRE

1. Facility name, city, and state.
2. Name of FGIS Field Office.
3. Check the box indicating kind of elevator.
4. Storage capacity of elevator.
5. Authorization Code-circle the numbers that apply to the intended sampler use.
6. Sampler Make & Model; e.g., Gamet 6800S.
7. Sampler Serial Number.
8. Is the sampler in a spout or on a belt end? For spout samplers-diameter or length x width cross sectional measurements.
9. Belt Size-width and depth of grain carried.
10. General location of sampler; e.g., Headhouse 6th Floor; or Gallery.
11. Spout/belt name; e.g., Scale #1 lower garner.
12. Spout angle-90_ is vertical. Belt Angle-0_ is horizontal. Show normal angle and max/min limits of travel, if angle can be varied.
13. Belt speed-measure with belt loaded.
14. Check the box showing type of power.
15. Body dimensions for the sampler.
16. Pelican stroke is the distance traveled from one side to the other.
17. Length and width of the pelican opening.
18. Distance in feet from release point.
19. Distance grain falls is used to estimate impact and breakage. For example, measure from sampler to bin bottom.
20. Is access to the sampler by approved ladder or stairs, and does the platform have an approved railing?
21. Are the inspection doors properly located on the sampler? Do they have appropriate seal hasps and hinges?
22. Check verified after you determine that the system controls have no bypasses, dump counters, timer interrupts, or programmable controllers.
23. Location of lockout ok-does the lockout provided meet FGIS requirements?
24. Light for examinations-can all exterior examination checks be made with lighting supplied?
25. For pneumatic/hydraulic samplers-is pressure sufficient to move the pelican across the stream of grain evenly, without lagging or slowing down.
26. For pneumatic/hydraulic samplers-pressure returns to maximum before next cut is initiated.
27. For pneumatic samplers-gauge pressure at rest. Maximum reached when no cuts are initiated.
28. Timer Make & Model; e.g., Eagle HP5 Model 9.
29. Flow past sampler should be figured out by timing a known amount, such as one scale draft, as it passes the sampler.
30. Calculate the timer setting in seconds based on grain flow rate past sampler. Also show whether this is based on a 200, 350, or 500 bushel sampling rate.
31. Secondary Sampler (divider) Make & Model; e.g., InterSystems MD300.
32. Secondary Sampler Serial Number.
33. Check box indicating type of sample delivery system.

34. Weight in grams received for the official sample.
35. Total number of samples needed for all interested parties.
36. Are the quantity adjustment features on secondary sampler fixed or sealed in place?
37. Is the sample delivery system secure from the air inlet to the collection box?
38. Is excess grain automatically returned from the secondary to the lot from which the sample was taken?
39. Location of dust collection ducts-are they located where they can affect the sample constituents? The measurements will serve as a record of approved duct work.
40. Weights-are weights official; i.e., supervised under the USGSA as Class X or Y-are weights “Certified”; i.e., supervised unofficially by a local organization-or are weights unofficial and not supervised, or not provided?
41. Shipping bins-number used.
42. Shipping bin depth(s).
43. Grading-will bin be held for grade or factor results before being released?
44. Procedures to stop breakage-will the bins require use of cushion level indicators, grain ladders, or baffles to reduce impact of grain and resulting breakage?
45. Carrier identification or stowage locations.
46. Special restrictions-any special procedural restrictions; e.g., weighback belt must be sealed, turnhead must be locked in position, cushion must be maintained in shipping bin, etc.
47. Name or signature of the official personnel who filled out the questionnaire.
48. Date information obtained.

b. Distribution of FGIS-980.

The FGIS Field Office will distribute copies of the FGIS-980 to each person who has signed the authorization. A certificate is not issued for the authorization of a sampling system.

TABLE 3.1 - SUMMARY OF DISTRIBUTION AND RECORD KEEPING

Office	Prepares	Files Original	Files Copy
Facility	Approval Request Letter and Site Drawings		
Testing Office[1]	FGIS–998 FGIS–936	FGIS–936 (except initial)	Request Letter Site Drawings FGIS–998 FGIS–936 (initial) FGIS–980
Field Office	FGIS–980	Request Letter Site Drawings FGIS–998 FGIS–936 (initial) FGIS–980	Final Approval
Headquarters			

[1] When the Field Office is also the testing office, retain all original records.

3.5 SUSPENSION OF AUTHORIZATION

a. Causes for Suspension. The sampling attendant or testing office must stop use of the mechanical sampling system when there are causes for suspension. If the causes are not corrected in a timely manner, notify the FGIS Field Office in charge so FGIS can suspend the authorization in writing. Suspend the authorization if the sampling system is:

(1) Out of repair;

(2) Found with security seals broken or locks removed without explanation[2];

(3) Altered, without being granted prior approval for the alteration;

(4) Not maintained according to the established procedures;

(5) Not able to be examined or tested when due;

[2] Unauthorized seal breakage or lock removal can cause increased cost to industry. A controlled point caution label or tag may be used on sampler inspection doors, but do not use the label itself as a sealing device. Use the caution label/tag only in conjunction with a metal seal or lock. See Figure 7 for examples of approved designs for "Controlled Point Caution Labels and Tags."

(6) Examined and found to have one or more unsatisfactory items;

(7) Tested and found out of tolerance; or

(8) Of questionable accuracy or representativeness for any reason, such as deficiencies noted by the sampling attendant.

b. Procedure for Suspending an Authorization. To suspend an authorization, FGIS notifies facility management in writing that their authorization is suspended (See Figure 8.) and prepares a written report of the action, including all pertinent facts. File and maintain the documentation with the system's FGIS-980.

c. Cause for Cancellation and Procedure for Canceling an Authorization. At the discretion of the FGIS Field Office in charge, an authorization may be canceled if the system has been suspended for more than 6 months. To cancel an authorization, FGIS notifies facility management in writing that their authorization is canceled and prepares a written report of the action, including all pertinent facts. File and maintain the report with the system's FGIS-980.

d. Reinstatement. FGIS shall reinstate suspended sampling systems upon satisfactory completion of all necessary repairs or reactivation of the facility and a satisfactory examination (or test) of the system by the testing office. The completed FGIS-936 will serve as a record of the reinstatement.

United States Department of Agriculture
Federal Grain Inspection Service

AUTHORIZATION TO USE MECHANICAL SAMPLER FOR SAMPLING

Installed in: (Name of facility)	Mechanical Sampler Make & Model	Serial Number
City and State	Secondary Sampler (Divider) Make & Model	Serial Number

Commodity to be sampled:

All Grains ☐ (Groups 1 & 2) Coarse Grains ☐ Except Corn Small Grains ☐ (Group 1) Powders ☐ (Group 3)

Subject to the conditions listed below, authorization is issued to official inspection personnel to use the mechanical sampler for the official sampling of the commodities as indicated above. All interested parties shall be notified by FGIS when the authorization has been suspended or cancelled.

1. Facility management shall service and maintain the mechanical samplers in accordance with existing regulations and instructions under the U.S. Grain Standards Act and the Agricultural Marketing Act of 1946.

2. Official personnel shall make daily or more frequent spot checks, when the samplers are in use for official sampling, to determine that the mechanical samplers are being serviced, operated, and maintained in an approved manner.

3. The mechanical samplers shall be secured or constantly manned by official personnel when they are used for official sampling.

4. All quantities in excess of the amounts required for the official inspection shall be returned to the carrier or the stream of grain or other commodity being sampled.

5. No changes in structure, accessories, location or operation of the mechanical samplers shall be made without specific written authorization from the FGIS Field Office Manager.

6. No manipulation of the commodities to be sampled or other efforts shall be made which would result in the above mechanical samplers failing to obtain and deliver a correct and representative sample.

7. The elevator manager acknowledges personal responsibility for the correct installation of the mechanical samplers.

8. This shall be signed by the manager or superintendent of the facility on behalf or the company that operates the elevator or plant in which the mechanical samplers are installed, and by the Agency or Field Office Manager whose personnel will attend the sampler.

9. The authorization shall be automatically suspended for noncompliance with any of the above conditions; but may be reinstated when corrective action has been taken and approved by the Field Office Manager.

_____ _____
Name of Facility Facility Manager Signature

_____ _____
Date Location

_____ _____
Official Agency Agency Manager Signature

_____ _____
Date Location Authorization Approved - USDA

_____ _____ _____
Date Field Office Location Field Office Manager Signature

Form FGIS-980 (4-94) Authorization Code: _____

FIGURE 3.3 - FGIS-980

FIGURE 3.4 - CONTROLLED POINT CAUTION LABEL AND TAG

United States
Department of
Agriculture

Grain Inspection,
Packers and Stockyards
Administration

104 Campus Drive, Suite 200
P.O. Box 640
Destrehan, LA 70047

March 1, 2016

Grain Company
Anytown, USA

Dear Sir:

According to information which this office recently received, your diverter-type mechanical sampler, serial № G-7335 was not examined on schedule by the official agency in your area, due to your facility being temporarily closed for maintenance.

Therefore, as of this date, the authorization to use the mechanical sampler identified above for official inspection purposes is suspended. If you need the authorization reinstated at a future date, please contact the official agency.

Sincerely,

Field Office Manager

cc: Official Agency

FIGURE 3.5 - EXAMPLE OF SUSPENSION LETTER

CHAPTER 4
EXAMINATIONS

Contents

4.1 MONTHLY CHECKS AT EXPORT PORT LOCATIONS

Once a month (at a minimum) Licensed or authorized personnel must do a general condition and security check of all diverter-type samplers at export locations.

a. Examine the site for unauthorized modifications, such as unauthorized diversion points or alterations to the dust collection equipment.

b. Stop the sampler with the pelican positioned so it can be inspected and gauged. This may be mid-spout or parked at the side, depending on the location of the inspection door.

c. Follow lockout procedures on Page 4-4.

d. Record seal or lock identification numbers. Open the primary and secondary sampler inspection doors.

e. Examine the pelican for damage. Use the go-no-go gauge to check for the correct pelican opening (¾ to ⅞ inch.) using all applicable safety protocols.

f. Check that the dust seals are undamaged.

g. Check for objects stuck in the pelican opening or body.

h. Check the secondary sampler and delivery tube for plugs and check the secondary sampler feed adjustment plates for any sign of tampering.

i. Release the equipment from lockout using procedures on Page 4-4.

j. Using the panel controls, energize the sampler to allow the pelican to come to rest under the left dust seal. Turn off power. Open the inspection door. Do not place your hands or any tools into the sampler.

k. Visually find out if the pelican fits against the dust seal. Repeat for the right dust seal.

l. Reseal or lock the inspection plates, record the seal or lock identification numbers. Record the results of the monthly check in a logbook; include the date and your name or initials. When a 6-month condition examination is performed instead of the monthly check, write, “See 6-month condition examination file for (month) check results.” in the logbook. Maintain the log book at the work site, under control of official personnel.

m. If physical or mechanical problems (e.g., torn dust seals, bent pelican) are observed, do not use the sampler until the problems have been corrected. Inform your supervisor and elevator management. Document the problem, repairs, and all subsequent activities.

4.2 INITIAL EXAMINATION

Immediately before the first test, thoroughly examine the sampling system and its immediate area and record the condition on the front page of FGIS-936, “Sampler Condition Report.” The examination shall encompass all items listed on the FGIS-936 and any other items deemed necessary by the testing office. Sampling systems found to have one or more unsatisfactory items shall not be authorized.

4.3 PERIODIC EXAMINATION

a. Periodically, examine the sampling system and its immediate area thoroughly and record the condition on FGIS-936. The examination shall encompass all items listed on the FGIS-936 and any other items deemed necessary by the testing office. A sampling system that fails a periodic examination may also be required to be retested before its authorization is reinstated. If a mechanical sampling system is not being used when it is due for examination or testing, it may be delayed until the system is again being used. Unless the facility is seasonal, a formal suspension may be required if necessary to ensure the system is not used officially.

b. Reexamine diverter-type, probe-type and point-type sampling systems at least once every 6 months, regardless of the type of facility where located. Calculate the period starting from the first day of the next calendar month after the examination.

4.4 SUPPLEMENTAL EXAMINATION

a. When official inspection personnel find auxiliary samples or other information that shows the sampling system to be of questionable accuracy, the testing office must examine and test the system (for example, noticeable variations between the quality of the grain and the sample, significant differences between samples of the same lot drawn at the same time by different primary samplers, or inexplicable variations between origin and destination inspections). When performing the test and the first test lot is found within tolerance, no additional tests are required. If the first test lot is not within tolerance, test four additional lots and average the results of the five test lots to learn if the system is in tolerance. When origin and destination are involved in grade differences that suggest sampling problems, headquarters must arrange to test both samplers.

b. If repairs are made, the testing office must examine the system and decide whether a test is necessary to ensure that the system’s accuracy has not been affected. A simple replacement of parts with equivalent pieces of equipment may require only an examination; a major repair or replacement of the primary or secondary sampler requires testing with five test lots.

c. After a system has been altered by addition, deletion, or relocation of primary samplers, secondary samplers, and/or sample delivery equipment, the testing office must test the system using five test lots.

d. Diverter-type sampling systems are designed to function at the maximum flow rate specified by the facility at the time of installation. Facilities increasing commodity flow rates, by changing the handling equipment, may exceed the capacity of the sampling system. When sampling systems are being used in locations where commodity flow rates have been increased after installation and original authorization, the testing office must examine and test the system using one test lot.

e. If a commodity handling system is upgraded by either the addition of dust collection units or by operating the existing dust collection units with increased airflow (on or near the mechanical sampler), the testing office must examine and test the system (one test lot).

4.5 LOCKOUT PROCEDURES

Each office must develop, document and utilize specific written lockout procedures for each mechanical sampler. The procedures should be based upon the requirements contained in 29 CFR 1910.147, the control of hazardous energy sources (lockout), and the following example.

NOTE: The lockout controls must be in close physical proximity and visual reference from the primary sampling system access panel. The lockout switch must also have the ability to be locked by official personnel when examining the system.

This procedure establishes minimum requirements for lockout of mechanical samplers before employees perform any inspection or maintenance activities where the unexpected energization, start-up, or release of stored energy could cause injury. Types and magnitudes of energy are mechanical movement of pelican, movement of grain, electricity-120/240 volts, and air pressure-100 psi.

Procedural Steps.

1. Notify facility management. Determine the types of energy to be controlled and their sources. Most primary samplers have a timer circuit and a separate motor circuit. Pneumatic or hydraulic sources may need to be disconnected.

2. Shutdown. Shut the system down using its operating controls. These are the controls we use on a daily basis such as the on-off switches located on the front panels, etc.

3. Isolation. Operate the energy isolating devices so that the equipment is isolated from its energy sources.

4. Lockout. Apply lock(s) and properly filled out tag.

5. Stored energy. Remove stored energy from the equipment. This may require bleeding down air pressure, blocking, or bracing parts, and closing gates.

6. Verification. Make sure that everyone is clear of the equipment. Try using the operating controls (on-off switch) to verify that the equipment has been successfully de-energized and locked out. Return the controls to "off."

Figure 9. Example of a Lockout Procedure

4.6 REMOVING LOCKOUT

a. Make sure the sampling equipment is in a safe operating condition.

b. Notify and make sure everyone is clear of the equipment.

c. Except in the case of an emergency, only the person who applied a lockout is authorized to remove it.

d. Follow the local facility safety protocols regarding the return of locks and tags.

OMB NO.: 0580-0013

U.S. DEPARTMENT OF AGRICULTURE (See reverse)
GRAIN INSPECTION, PACKERS AND STOCKYARDS ADMINISTRATION
FEDERAL GRAIN INSPECTION SERVICE

SAMPLER CONDITION REPORT

NAME OF ELEVATOR, CITY, AND STATE 1	DATE EXAMINED 2	FIELD OFFICE 3
	NAME OF OFFICIAL AGENCY 4	

*INSTRUCTIONS TO EXAMINER: For a six month examination fill out the front of this form. For a complete grain test, including initial sampler test, fill out both sides of this form and send the original to the FGIS Field Office. Explain "FAIL" items in detail. If the sampler is not being used, indicate that fact under "Remarks" and prepare a report before the sampler is put into use.

PRIMARY SAMPLER		SECONDARY SAMPLERS	
BRAND/MODEL 5	SERIAL NO. 6	BRAND/MODEL 7	SERIAL NO. 8
GRAIN FLOW RATE (Pneu. Samplers) 9	SAMPLING INTERVAL (Cycle Time) 10	BRAND/MODEL	SERIAL NO.

SAMPLER CODE: ☐ D - Diverter ☐ P - Probe ☐ 0 - All Grains ☐ 1 - Small Grains ☐ 2 - Coarse Grains-not corn ☐ 3 - IN Inspections
☐ 4 - OUT Inspections 11 ☐ 5 - Cargolets ☐ 6 - Bargelets ☐ 7 - Hopper Cabins ☐ 8 - Cabins ☐ 9 - Trucklets

SECTION 1 — ALL SAMPLERS			SECTION 2 — DVT SAMPLERS		
ITEMS EXAMINED	PASS	FAIL	ITEMS EXAMINED	PASS	FAIL
Lighting around sampler 12	☐	☐	Pelican speed approx. 0.5 m/s 27	☐	☐
Safe access to areas 13	☐	☐	Pelican dust seals (interior) 28	☐	☐
Safe access to inside of devices 14	☐	☐	Pelican go-no-go gauge 29	☐	☐
Lockouts (safety switches) 15	☐	☐	Pelican cuts entire grain stream 30	☐	☐
Cleanliness of area 16	☐	☐	Condition of excess sample return leg / belt 31	☐	☐
Cleanliness of device 17	☐	☐	Timer set correctly 32	☐	☐
Lubrication (if required) 18	☐	☐	SECTION 3 — TRUCK PROBES		
Panel board indicator lights 19	☐	☐	ITEMS EXAMINED	PASS	FAIL
Air or hydraulic pressure 20	☐	☐	Tip not bent/damaged 33	☐	☐
Delivery tube secure 21	☐	☐	Tip vacuum check with paper 34	☐	☐
Delivery tube air inlet secure 22	☐	☐	Hydraulic oil level OK 35	☐	☐
Collection box secure 23	☐	☐	Vacuum adjustments sealed 36	☐	☐
Collection box screen clean 24	☐	☐	Sample size 37	☐	☐
Sampler not modified or repaired 25	☐	☐	Collection box seal 38	☐	☐
Seals/padlocks in place 26	☐	☐	Delivery tube condition 39	☐	☐
Inspected By: (LI or ACC) 41			Vacuum pressure if known: 40		
Reviewed By: (ACG) 42					

Form FGIS-936 (5-03) Previous editions are obsolete.

Figure 10. FGIS-936, "Sampler Condition Report," (Front)

INSTRUCTIONS FOR COMPLETING FGIS-936 "SAMPLER CONDITION REPORT", (Front)[3]

1. Name of the elevator, city, and state.
2. Date examination was done.
3. Name of FGIS Field Office in charge of the circuit.
4. Name of the official agency that does original inspections at the facility.
5. Brand name and type of primary (diverter-type sampler) or probe-type sampler being examined and tested. Are they of a type approved by FGIS?
6. Serial number of primary diverter-type or probe-type sampler.
7. Brand name of secondary sampler.
8. Serial number of secondary sampler.
9. Calculate the maximum flow of spout or belt on which the sampler is installed.
10. Sampling Interval-Read from the timer.
11. Type of carriers or lots the system will sample.

Section 1 – All Samplers

12. Lighting should be approximately 30 footcandle power (general task lighting).
13. Safe access includes approved stairs, fixed ladders, platforms, and railings.
14. Safe access to the inside of the housing or hood without endangering the examiner.
15. Lockout switches must be present and meet requirements.
16. Cleanliness of the area-overhead, floor, stairs.
17. Cleanliness/condition of primary-check for plugs, leaks, dust, sprouted grain, broken hasps/hinges, wiring.
18. Lubrication-Grease or oil leaks.
19. Panel lights-Use radio or phone (if needed) to ensure that the power and traverse lights work properly. Have any changes been made in the wiring?
20. Air or hydraulic pressure-Is there enough? Record the gage pressure, if available.
21. Delivery tube must be secure from loss or introduction of material.
22. Delivery tube-Pneumatic systems must have a guard over the air supply inlet.
23. Collection box-If not continuously attended, must be secure at inlet and outlet.
24. Collection boxes that have a screen must be maintained in a clean condition.
25. Sampler not Modified-For this check, good installation records are essential.
26. Seals-Were the security seals on inspection doors found intact? Was the delivery tube found secure?

[3] **The reverse of FGIS-936 is used for performing a test (grain test). Instructions for completing the reverseare contained in Chapter 5, Tests.**

Section 2 – D/T Samplers

27. Pelican speed must be consistent and without hesitation (Speed can be estimated).
28. Pelican dust seals-Must be present, without damage, and must completely seal-the opening of the pelican, without the presence of any air gaps.
29. Pelican Go-no-go Gauge-Use it to ensure the opening is between 3/4 and 7/8 inch wide along its entire length.
30. Pelican must cut through the entire grain stream-If practical, observe a cut to see that the pelican is sampling the entire stream, and that it does not back up from excess grain.
31. Condition of excess sample return-Check if it is leaking, infested, or backing up.
32. Timer-Does the timer setting match the documented setting (required). Use a stopwatch or read the timer; do not rely on posted signs or old records.

Section 3 – Truck Probes

33. Probe tip must be in good condition.
34. For core-type probes, a small piece of paper is placed over the tip to check the air supply/vacuum balance. The paper should not fall off or be sucked into the tip.
35. Check levels if possible.
36. After adjustment, air supply/vacuum balance should not be changed. If it is possible to seal them or record settings, this provides assurance that they remain correctly adjusted.
37. Is the sample size adequate? Has it changed?
38. If the collection box has a gasket, is it in good condition with no air leaks.
39. Is the delivery tube in good condition.
40. If an air pressure gage reading is available, it can indicate leaks or the need for adjustment.

Name of Inspector

41. Show the name of the inspector who completed the examination. If any item is unsatisfactory, the sampler is not acceptable. Keep the not acceptable FGIS-936 as a record. Even if the facility brings the sampler into compliance immediately, complete another form.
42. An ACG should review the forms for accuracy when possible. Any questionable information or remarks must be verified to be accurate.

CHAPTER 5
TESTS

Contents

TABLES

FIGURES

5.1 DIVERTER-TYPE SAMPLER TESTS

a. General. Examine[4] and test[5] a new diverter-type sampling system before issuing an authorization for official use. Thereafter, test all systems after any major repairs and alterations, and before an authorization suspended more than 6 months for non-use is reinstated. Perform all tests and examinations according to the procedures established in this chapter.

b. Test Theory. We assume a mechanical sampler examined visually and functioning properly will obtain a representative sample. Therefore, the test is not an accuracy test for the sampler, but a performance test of the entire mechanical sampling system together with the material handling system. The test shows:

(1) Is there grain breakage after the sampler location, as it passes through scales, garners, or bins?

(2) What is the quantity of sample obtained?

(3) Does the sampler cut the entire grain stream?

(4) Is the grain flow past the sampler smooth?

(5) Does the secondary back up at the required timer setting?

(6) Is pressure venting adequate for spouting?

(7) Is dust collection needed and is air flow properly balanced?

c. Initial Test. Examine and test the sampling system before issuing FGIS-980, “Authorization to Use Mechanical Sampler for Sampling.” Sample five test lots of the commodity(ies) using the sampling system and using the standard sampling method. When possible, test systems as used. Evaluate the different flow rates, belt angles, belt speeds, bins, and other variable features of the grain handling system and, if necessary, do grain comparison tests to ensure that the system is accurate when various features are used.

[4] By visually checking the condition of various aspects of the system.

[5] By comparing samples drawn by the mechanical sampling system to samples drawn from the same lot(s) by a “standard” system.

(1) Group 1 and 2 Approval.

(a) Unlimited Approval. The sampling system may be authorized for all commodities in groups 1 and 2 (See Table III) without further testing, if satisfactory results are obtained by testing the system with corn. Use corn containing a maximum 15.5 percent moisture and from 2.0 to 5.0 percent broken corn and foreign material (BCFM) for testing purposes. FGIS Field Office managers have the authority to allow more or less BCFM in the test lots, for good reason only, documented on the test form.

(b) Limited Approval. If unlimited approval is not needed, the system may be authorized for either group 1 and/or group 2 commodities, except corn, by obtaining satisfactory results with one grain in each group:

1 Use a commodity containing a machine-separable factor such as, thin kernels, shrunken and broken kernels, broken kernels (milled rice or brown rice for processing), foreign material, or dockage in quantities more than 0.5 for testing the system.

2 If, at a later date, corn becomes available and will be offered for inspection, test the sampling system using corn before it is authorized to sample corn.

(2) Group 3 approvals will be handled on a case-by-case basis, but normally do not require check testing of the sampling system, only a visual examination.

TABLE 5.1 COMMODITY GROUPS

Group 1 Small Commodities		Group 2 Coarse Commodities	Group 3 Powders
Barley	Wheat	Soybeans	Flour
Flaxseed	Rice	Corn	Corn Meal
Rye	Lentils	Peas	Soybean Meal
Sorghum	Bulgur	Edible Beans	Other Meals
Oats	Rolled Oats	Sunflower Seed	Powdered Milk
Canola	Minor Oilseeds		Corn Soy Blend

d. Periodic Tests. There is no requirement to test samplers with grain on a periodic basis.

e. Supplemental Tests. Supplemental tests are required based on the same criteria for questioning system accuracy as in Chapter 4 instructions covering supplemental examinations, page 4-3.

f. Test Procedures-Diverter-Type Samplers.

(1) Outbound Movement Systems.

(a) All facilities.

Test sampling systems used for securing official samples of outbound commodities with a pelican sampler at the end of the loading spout. At the discretion of the testing office, use a loading spout other than the normal spout if the additional routing does not increase or decrease breakage and is more feasible. The testing office may also consider using an alternative sampling method other than the pelican at the end of the loading spout if a representative sample cannot be obtained with the pelican or the use of the pelican causes a safety concern. Consider the testing option alternatives listed below:

1 Use of a “standard” diverter-type (primary) sampler.

Except as noted on the authorization, use this standard only to test other diverter-type systems.

2 Drop sample test option.

To ensure the drop sample test is completed in a safe and accurate manner FGIS and official agency personnel will enlist the services of elevator facility personnel for activities such as transporting samples, providing safe access to sampling systems, moving grain to and from the location of the secondary sampler and the inspection lab, etc.

(b) Operational Verification. This step is designed to clear the system of contaminants, to determine if there may be a leak in the sampling delivery system, and also to determine the size of the Drop Sample needed to yield a minimum Test unit of 1250 grams in the delivery sample collection box.

1 Introduce 25 lbs. (weighed by approved scale) of clean corn into the secondary sampling system.

2 Collect and account for all grain introduced into the system (both the collection box and the grain return line).

3 Reweigh the recovered grain and enter the weight in the Operational Verification (Weight Out box). Calculate the percent loss, if any, and report a loss greater than 0.5% (excluding spilled grain) to the manager. Place results in the “remarks” of FGIS-936 in and specify if the operational verification Tolerance results were IN/OUT?

NOTE: To calculate the size in pounds of the Drop Sample to be prepared, divide 1250 by the number of grams recovered in the collection box, and multiply that value by 25.

(c) Standard Unit. This step is designed to prepare the Drop Sample and determine the percent of Broken Corn and Foreign Material (BCFM) in the Drop Sample. After calculating the size of the Drop Sample (from the Operational Verification Step):

1 Evenly distribute naturally occurring machine separable foreign material, in an amount sufficient to yield 2.5-5.0 percent BCFM, into the drop sample containers.

2 Thoroughly mix the drop test samples using approved equipment identified in Figure 10 (Test Sample Mixing Diagram). Cut the sample down to 1000-1050 grams using an approved Boerner/ Gamet Divider. Weigh the sample and record the weight on the FGIS 936 in the 1000 grams column next to Std. Unit.

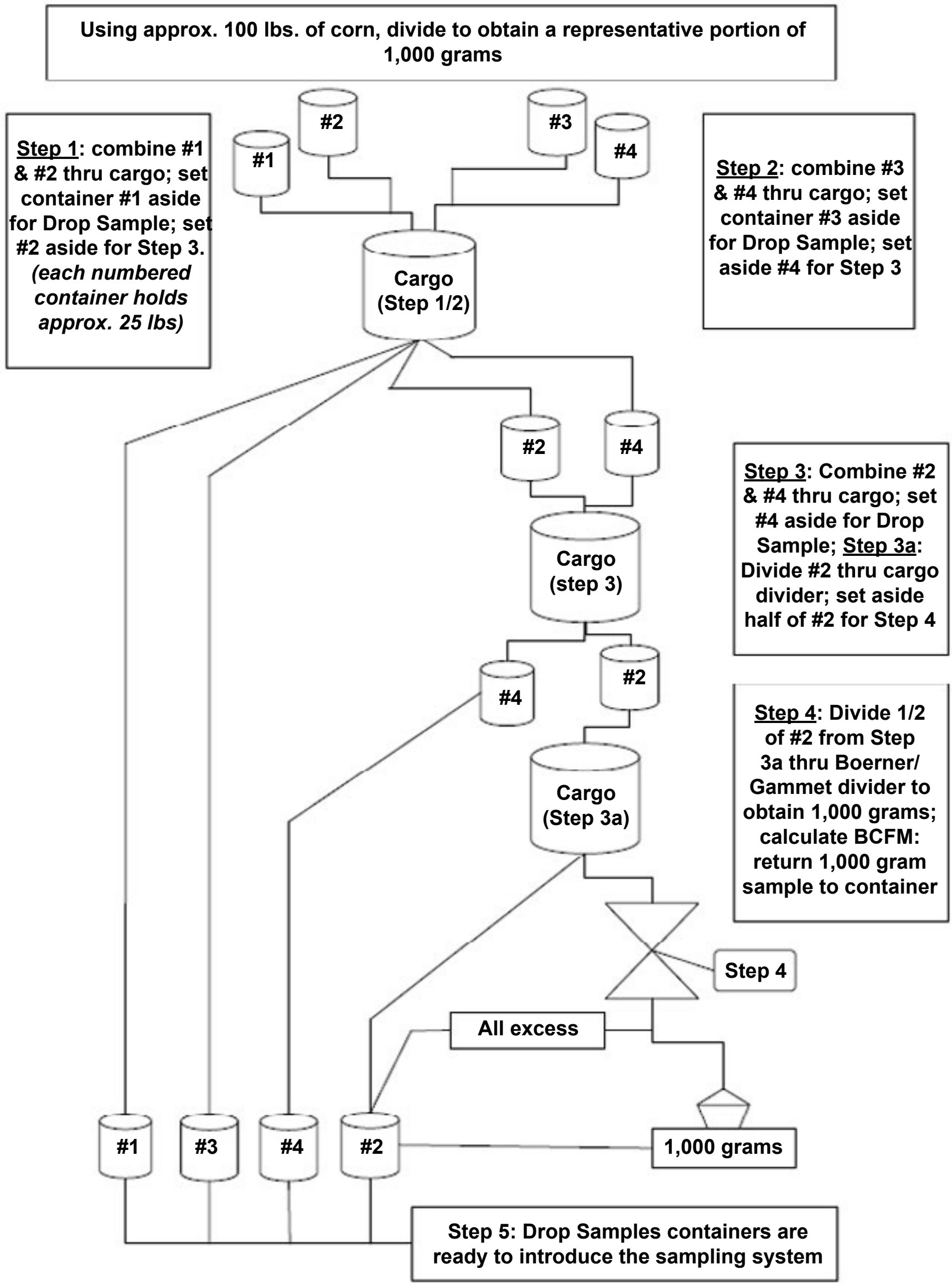
3 To obtain the Standard Value of BCFM for the Drop Sample, use an approved Carter-Day dockage tester equipped with a 12/64, #3 machine sieve to separate the sample. Record the weight of machine separable material from the bottom pan on FGIS 936 next to the Std. Unit row in the BCFM column. Calculate the percent BCFM and record the percent to the nearest tenth of a percent in the percent BCFM column.

4 After the BCFM result for the Standard unit sample is calculated and recorded combine the 1000-1050 gram Standard Value Sample back with the Drop Sample.

(d) Drop Testing. Introduce the entire Drop Sample prepared (per figure 10) into the highest exit point of the primary sampler leading into the secondary sampler as possible and in a manner that will not result in loss or spillage of the sample.

Typically, a large funnel with tubing/piping is used to deliver the sample with minimal spillage.

FIGURE 5.1 - TEST SAMPLE MIXING DIAGRAM



(e) Test Unit. Once the entire Drop Sample is introduced into the system, and the Test Unit portion has been delivered to the collection box, retrieve and weigh the Test Unit portion to verify the drop sample yielded at least 1,000-1,050 grams at the collection box.

1 If you receive greater than 1,050 grams, divide the sample down to 1,000-1,050 grams (with approved Boerner/Gamet Divider). Record the Test Unit weight on FGIS- 936 in the Test Unit row (1000 grams column).

2 Machine separate the Test Unit portion using an approved Carter-Day dockage tester (preferably the same dockage tester used to determine the Standard Unit BCFM value). Record the weight of machine separable material in the bottom pan on FGIS-936 in the Test Unit row of the BCFM column. Calculate the percent BCFM and record the percent to the nearest tenth of a percent in the percent BCFM column.

3 Calculate the difference between the Standard Unit percent BCFM and the Test Unit percent BCFM and record the calculation in the difference row of the percent BCFM column.

4 If the first drop test yields a result within the specified tolerance the sampling system passes, if the first drop test does not yield a result within the specified tolerance, a second drop test must be performed. Repeat sections (c), (d), and (e) above. If the second drop test does not yield results within the specified tolerance, then the DT sampling system fails. If the second drop test does yield a result within the specified tolerance, a third drop test must be performed by repeating the steps in sections (c), (d), and (e) above.

The DT sampling system passes provided the second, and third drop sample yield results that are within the specified tolerance, and the test average of the first, second, and third drop test results are within the specified tolerance of ± 10 percent of the standard unit average.

Example of Modified Drop Sample Testing Method:

1 1st Drop Test (within tolerance) = System Passes

2 1st Drop Test (outside tolerance) + 2nd Drop Test (outside tolerance) = System Fails

3 1st Drop Test (outside tolerance) + 2nd Drop Test (inside tolerance) + 3rd Drop Test (inside tolerance) = System Passes provided the test average results of the 1st, 2nd and 3rd drop tests average within the specified tolerance of ± 10 percent of the standard unit average.

EQUIPMENT & MATERIALS

- 100-600 lbs. of Corn (weight may vary depending on your ability to recapture the entire Drop Sample)
- Any necessary equipment to introduce samples into system (funnel, tubing, piping etc.)
- Any necessary equipment to transport and collect samples (buckets, bags etc.)
- Approved Carter-Day dockage tester (12/64, #3 machine sieve)
- Approved calibrated laboratory scale
- Approved dividers – Cargo and Boerner/Gamet

(3) Probe Sampling.

Only railcar probe samples will be permitted for diverter type sampler authorizations, and will also is applicable to domestic railcar loading facilities which include the following types of domestic sampler installations: new diverter type sampling systems, existing sampling systems that have undergone major repairs or alterations, and systems that have had their authorization suspended for more than 6 months without use.

NOTE: Refer to Grain inspection Handbook, Book I, Chapter 2, Probe sampling, subchapter 2.4, c. Sampling Patterns for Hopper Cars.

(a) Procedure.

When standard samples are obtained by probing railcars, each test lot shall consist of a completely filled railcar.

In order for the D/T system to pass, the average difference obtained by subtracting the standard results from the railcar test results must be within an allowable tolerance of +10 percent to -15 percent of the standard result mean.

The larger negative tolerance is to correct for a historical tendency of probe derived samples yielding higher estimates of machine separable factors such as broken corn and foreign material.

On the test FGIS-936, record both of the + and – tolerances (e.g., if the average standard result is 0.8, record the tolerance as +0.08/-0.12). The allowable tolerance remains ±10 percent when standard samples are obtained by other methods.

(b) Shipping Bin Houses.

Physically verify the shipping bins are clean before and after testing. Run the test lot(s) into a closed shipping bin(s) at the facility's normal loading rate. When the entire test lot is in the shipping bin, open the bin slide to provide a maximum flow of 15,000 bushels per hour. Take the standard sample after the grain has left the bin. A test lot should consist of a complete bin. At the discretion of the testing office, a test lot may be composed of a part bin of one normal component sample; however, the reasons for the variance shall be substantial and must be documented on the test form.

(c) Direct Load Houses.

1 Facilities not using shipping bins must discharge the test lots at a maximum flow rate of 15,000 bushels per hour so the sample may be obtained at the end of the loading spout with the pelican sampler. When reduced flow rates are required to accomplish the testing, observe the system during operation at the facility's normal flow rate to see if it is accepting all the commodity.

2 A test lot should be at least equal to one sublot, but may, at the discretion of the testing office, be equal to one component sample; however, the reasons for the variance shall be substantial and must be documented on the test form.

3 At facilities where the commodity is loaded directly through bins without holding for grading, the commodity sometimes breaks up, causing the mechanical sampling system results to disagree with the standard results. If this occurs, a cushion of sufficient depth shall be maintained whenever the system is tested or being used. (Note this fact on the FGIS-980 and the sample collection container). In order for official inspection personnel to ensure that the cushion is present during loading, facilities shall install a continuous bin depth indicator system where inspection personnel are located.

(4) Inbound Movement Systems.

(a) Test sampling systems installed to secure official samples of inbound commodities using the pelican or Ellis cup samplers. Obtain test samples before the initial elevation or immediately afterward, if necessary.

(b) Facility management must control the flow rate of the test lots to ease pelican or Ellis cup sampling. Where reduced flow rates are required to accomplish the testing, observe the sampler at the facility's normal flow rate to see if the sampler is accepting all the commodity.

(c) Analyzing Test Results and Completing the Test Form for Diverter-Type Samplers.

1 Determination of Factor Results.

a Analyze the test samples for the appropriate machine-separable factor but do not hand adjust for cobs, for pieces of foreign material, etc. Record the factor results on the reverse of FGIS-936, “Sampler Condition Report” (Figure 11) and compare the factor results or averages. Percentages should be rounded to 2 decimal places.

b When evaluating a sampler based on broken kernels in rice, offices may eliminate hand adjusting. This can save a considerable amount of time, and may improve consistency of results. However, this procedure is acceptable only if all samples are being run at the same office, on the same shaker, the same plate, and the same sieve. This “side-by-side” test is required because not all of the rice sizers, plates and sieves have been comparison tested.

2 Determine whether the system is within the allowable tolerance of ± 10 percent of the standard result mean and notify the facility management of the test results. If the sampling system appears to be causing an unjustifiable deterioration to the sample or sample components on being delivered through the system, do not issue an approval.

3 For out-of-tolerance equipment, document all pertinent facts and action taken on the FGIS-936. This includes adjustments, retests, and follow-up action.

4 File the original FGIS-936 after all tests are completed and the results recorded. Do not send copies of the form to FGIS Headquarters.

5 If testing is completed by an official agency for initial authorization of the system send the FGIS-936 to the FGIS Field Office for review. The FGIS Field Office will review the testing results acceptable limits, authorize the sampling system for use in obtaining official samples.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0580-0013. The time required to complete this information collection is estimated to average 45 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

GRAIN TEST DATA

SAMPLING METHOD USED FOR STANDARD: ☐ PELICAN 1 ☐ CUP ☐ OTHER _____

COMMODITY: ☐ SMALL GRAIN 2 ☐ COARSE GRAIN ☐ OTHER _____

REMARKS:

3

Date	Sample No.	Type	DKG	BCFM	
4	1	Test Unit		5	
		Standard			
Difference 6					
Tolerance 7					
Result - One test lot 8			☐ IN ☐ OUT	☐ IN ☐ OUT	☐ IN ☐ OUT

9

Date	Sample No.	Type	DKG	BCFM	
	2	Test Unit			
		Standard			
	3	Test Unit			
		Standard			
	4	Test Unit			
		Standard			
	5	Test Unit			
		Standard			
Test Unit MDS*					
Tolerance					
Result - Five test lots			☐ IN ☐ OUT	☐ IN ☐ OUT	☐ IN ☐ OUT

*Mean Deviation from Standard

10

for Mechanical Truck Probes only

Date	Sample No.	Type	DKG	BCFM	
	6	Test Unit			
		Standard			
		HP			
	7	Test Unit			
		Standard			
		HP			
	8	Test Unit			
		Standard			
		HP			
	9	Test Unit			
		Standard			
		HP			
	10	Test Unit			
		Standard			
		HP			
	11	Test Unit			
		Standard			
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	12	Test Unit			
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	16	Test Unit			
		Standard			
		HP			
	17	Test Unit			
		Standard			
		HP			
	18	Test Unit			
		Standard			
		HP			
	19	Test Unit			
		Standard			
		HP			
	20	Test Unit			
		Standard			
		HP			
Test Unit MDS*					
Hand Probe MDS*					
Regression or T-test 11			☐ IN ☐ OUT	☐ IN ☐ OUT	☐ IN ☐ OUT

Form FGIS-936 (5-03) Previous editions are obsolete.

FIGURE 5.2 - FGIS-936, "SAMPLER CONDITION REPORT," (REVERSE)

INSTRUCTIONS FOR COMPLETING
FGIS-936, “SAMPLER CONDITION REPORT,”
(REVERSE)

Use the reverse of FGIS-936 for testing (grain test). Always precede a test with an examination, documented on the front of the form. If the examination and the test are not recorded on the same sheet, properly identify the test by filling in the Name of Elevator, etc., Items 1 through 11, 41 and 42 on the front as described in Chapter 4, Examinations.

1. Method of testing. If a special location or alternative testing procedure was used, explain in remarks.

2. Specify grain.

3. Remarks-Summary of important observations on the sampling system and testing information. Was the test run at normal load-out speed, air pressure, belt depth, etc.? Was dust collection turned on? Shipping bins checked?

4. Enter date sampled.

5. One factor is required, but additional factors may be tested. If necessary, the Field Office manager shall decide the appropriate factors. Test weight is not to be used as the only factor. Report percentages to 2 decimal places.

6. Mathematical average of the mechanical sampler results, average of the standard results, average of other results. Round percentages to 2 places.

7. Tolerance or allowable deviation = 0.10 x (standard average).

8. Mark the appropriate box for each factor tested. If more than one factor was tested, each of them must be within tolerance for a pass. A factor is considered within tolerance when the mean deviation from the standard is less than or equal to the allowable deviation for the applicable factor.

9. If 5 test lots are to be evaluated, continue entering sample data.

10. If testing a mechanical truck probe, continue entering sample data for 20 test lots.

11. Truck probe performance is evaluated against a standard and a hand probe, using either a regression or a T-test. The Technology and Science Division provides support for the analysis.

5.2 PROBE-TYPE SAMPLER TESTS

a. A probe-type sampling system (mechanical truck probe) test requires the sampling of 20 bobtail (farm) or other trucks by:

(1) Hand probe (trier).

(2) Mechanical truck probe.

(3) Pelican sampler.

b. Examine a mechanical truck probe at least each 6 months (visual). Calculate the period starting from the first day of the next calendar month after the examination or test.

c. The pelican sampler results serve as the standard results for the approval. In the event that a representative pelican sample cannot be obtained, the testing office may use an Ellis cup or a diverter-type sampler. The basis for the decision should be documented on the FGIS-936.

d. The probe may be authorized for all commodities in groups 1 and 2 without further testing if satisfactory results are obtained by testing the probe with corn. If unlimited approval is not needed, the probe may be authorized for either group 1 and/or group 2 commodities, except corn, by obtaining satisfactory results with one grain in each group. Make every effort to select test lots of corn with a wide range of test weight per bushel (TW) and broken corn and foreign material (BCFM) from the truck lots available at the testing site. For other grains, use TW and a machine-separable factor such as:

(1) Flaxseed -Dockage.

(2) Sorghum -Broken kernels and foreign material.

(3) Soybeans -Foreign material.

(4) Sunflower seed -Machine separated FM.

(5) Rough rice -Total rice or whole kernels or dockage, no TW.

e. For either outbound or inbound truck lots, use a hand trier of approximately the same length as the mechanical probe and in the same sampling pattern normally used for official sampling to draw the trier sample. Usually this will be the 7-probe truck pattern.

f. Pelican sampling will employ tailgate sampling of the grain while the grain is being discharged into the truck pit. Any type of truck is acceptable, as long as the flow of grain can be controlled so a representative cut can be taken with the pelican. Exercise care in pelican sampling to ensure that the pelican does not fill and overflow before the grain stream is traversed. This can best be accomplished by restricting the flow of the grain from each truck. Restrict grain flow so a minimum of 10 pelican samples can be drawn, at regular intervals, from each load before the truck empties.

g. Officially inspect all samples for the necessary factors, retaining file samples until the approval process is completed. For corn BCFM, combine machine and handpicked portions.

h. Analyzing Test Results and Completing the Test Form for Probe Systems.

(1) Factor Results. Record the factor results on the reverse of FGIS-936, “Sampler Condition Report,” but do not compare the factor averages directly. Instead, test to see that the mechanical probe does not deviate from the pelican to a greater extent (absolute value) than the hand trier deviates from the pelican. To accomplish this, TSD analyzes the data using a T-test or regression analysis.

(2) Out-of-Tolerance Equipment. For out-of-tolerance equipment, document all pertinent facts and action taken on the FGIS-936. This includes adjustments, retests, and follow-up action.

5.3 TEST OR EXAMINATION FAILURE

a. General. The best time to test a sampler is as use during normal loading or unloading operations. To encourage as used testing at export locations, the following procedures assure facilities that there will be no unwarranted qualifying statements on the official certificate.

b. Export Grain Loading Situation. If a mechanical sampling system fails a test and/or examination during the sampling of an export cargo grain shipment and there is no alternate diverter-type sampling system available, sample the remainder of the shipment using either a pelican or Ellis cup sampler. Use the sample obtained by the alternate method for official purposes, not the sample obtained by the failed system.

(1) The FGIS Field Office will suspend authorization of the sampler, in writing, if the problem is not corrected immediately.

(2) Whatever the amount of grain to be loaded or the time it takes to complete loading, do not show a special statement on the inspection certificate of the shipment being loaded at the time of the failure.

c. On all future shipments until the diverter-type mechanical sampler passes a test, show the type of sampling method actually used.

d. Domestic Grain Loading Situation. If a diverter-type mechanical sampling system fails a test or examination during the sampling of a domestic lot of grain, stop using the sampler and implement an alternate sampling method. Show the actual sampling method(s) used on the inspection certificate regardless of the amount of time or volume of grain loaded using the alternate method. No special statement is required.

5.4 REINSTATEMENT

To reinstate the authorization of a sampling system that fails an examination or test, the applicant must furnish data or make adjustments that suggest the system will pass a succeeding examination and test. If the system fails a test, the succeeding test(s) must consist of five test lots preceded by a complete examination, the same as required for an initial authorization. If the system fails an examination, the system must be completely reexamined and, at the discretion of the testing office, the system may be retested with either one or five test lots.

CHAPTER 6
MAINTENANCE, REPAIR, AND ALTERATION

Contents

6.1 MAINTENANCE

a. General. The facility management shall install and maintain each mechanical sampling system according to the guidelines established by FGIS and the manufacturer of the equipment used in the system.

b. Official personnel are not responsible for preventive maintenance inspections.

c. Facility personnel must perform preventive maintenance inspections and service on mechanical sampling systems regularly.

d. Repeated incidence of failure to perform maintenance of the mechanical sampling system or the material load-out system will result in an increased frequency of supplemental examinations and supplemental tests.

6.2 REPAIR

a. General. Mechanical sampling systems must be repaired as necessary in a timely manner and according to the manufacturer's guidelines.

b. Suspension of Authorization. FGIS will suspend authorization of sampling systems that do not or cannot function properly until appropriate repairs are made and the accuracy of the sampler is confirmed by the testing office. If the testing office decides the repairs are sufficiently extensive, the sampling system must be tested on five test lots before the authorization is released. Replacing a component of the sampling system with a new, or updated version of the previous component will usually only require an examination of the system. If the new component is of a different size or is otherwise different, or changes the delivery system, the repair may alter the way the sampling system delivers the commodity being sampled, possibly causing a condition issue. In this case, the testing office is required to checktest the system before releasing authorization.

(1) Export Grain Loading Situation (Diverter-Type Sampling System Only).

(a) If a diverter-type sampling system breaks down during the sampling of an export cargo grain shipment and there is no alternate diverter-type sampling system available, sample the remainder of the shipment using either a pelican or Ellis cup sampler. Show the actual sampling method(s) used on the inspection certificate.

(b) However, the method may be indicated as diverter sampler if:

1 At least 50 percent of the entire lot was sampled by the diverter-type sampling system; and

2 The loading of the lot is completed within 8 working hours using the alternate sampling method.

(2) Domestic Grain Loading Situation. If a diverter-type sampling system breaks during the sampling of a domestic lot of grain, show the actual sampling method(s) used on the inspection certificate regardless of time used or volume of grain loaded under the alternate method. No special statement is required, under any circumstances.

6.3 ALTERATION

a. General. When alteration work begins, immediately suspend the authorization of the affected sampling system until the alteration is completed, and the system can be check tested and approved for use, using an approved check test method. A minor alteration usually requires only an examination before reinstating the authorization.

b. Temporary Pelican Modification (Diverter-Type Sampling System Only). The primary sampler's pelican may be temporarily modified to sample meal without affecting the authorization of the sampler, if one of the following methods is used and the pelican is returned to its proper configuration before being used to sample whole kernel commodities. The approved modification methods are:

(1) Inserting a block of wood or similar material in the opening of the pelican;

(2) Adjusting the air pressure or speed control valve; and

(3) Adjusting the cutting edge of the pelican.

c. An auxiliary sampler control can be installed that uses a "plugged-flow switch" in the spout to trigger the D/T system to stop in a safe state, and to control the flow of grain. However, these auxiliary controls can also affect the representativeness of the sample if they reset the D/T timer or stop the sampler while grain is still flowing.

(1) Auxiliary control modifications apply to new installations; to existing sampling systems modified after their approval. The D/T sampler authorization submitted by the grain facility must address auxiliary controls included in any new installation. Sampling systems that are modified with auxiliary controls must have the modifications approved by official service providers before using them for official purposes.

(2) Any modification of a sampling system used for official purposes must not compromise the representativeness of the sample. A grain elevator must conform to the following requirements if the grain elevator elects to modify a D/T sampling system to control grain choke conditions:

a. Grain flow into the sampler must stop whenever the sampler is stopped.

b. An audible alarm must activate whenever the D/T sampler is stopped by an auxiliary control.

c. If already in motion, the D/T pelican must complete the traverse and come to the normal rest position.

d. If the sampler is stopped the timer shall not reset. The timer may continue running with the pelican traverse disabled, or it may halt until the plugged condition is cleared. When the plugged condition has cleared, normal timer operation shall resume with the time that remained when the timer halted.

e. The plug of grain that caused stoppage of the D/T must be cleared from the sampler before the sampler is restarted. Additionally, the D/T must be restarted before grain begins to flow into the sampler.

f. Official inspection personnel must maintain full control of auxiliary controls for D/T samplers. The facility control system may stop the grain flow. However, the controls that stop the D/T sampler and which activate the alarm must remain independent of the plant control system and utilize seals or locks to assure security of the controls.

CHAPTER 7
REVISION HISTORY

Contents

Change No: 4 April 18, 2017

Chapter 3, page 3-6 Added language confirming requirements for D-T sampling system authorization

Chapter 5, page 5-7 Revised the drop sample testing method

Change No: 3 September 13, 2016

Revisions weremade to include the following Program Notices:

Chapter 2, Equipment Requirements, Controls
Chapter 6, Maintenance, Repair, and Alteration

FGIS-PN-08-05 Requirements For Auxiliary Control Modifications Of Diverter Type Mechanical Sampling Systems

Chapter 5, Outbound Movement Systems

FGIS PN-08-09 Use Of Probe Samples As An Alternate Standard Reference For Testing Diverter Type Sampling Systems

FGIS PN-12-02 Check Testing Of Diverter-Type (D/T) Samplers-Drop Sample Test Option

Chapter 5, section 5.2

Revisions were also made to the language regarding sampling system inspection safety, specifically pertaining to a primary sampling systems power supply cutoff switches and the coinciding physical distance and visual reference of the cutoff switch to the primary sampler.

Change No: 2 November 7, 2003

The Mechanical Sampling Systems Handbook has been revised to reflect a change in the FGIS-936, Sampler Condition Report. The form now includes appropriate sections for testing mechanical truck probes. Editorial and policy memorandum changes from prior years are incorporated.

United States Department of Agriculture
Agricultural Marketing Service
Federal Grain Inspection Service

Directive

9160.5 March 19, 2012

OFFICIAL INSPECTION LABORATORY LOCATION, DESIGN AND MAINTENANCE REQUIREMENTS

Contents

1. PURPOSE

This directive establishes requirements for the physical location, design and maintenance of space provided to the Federal Grain Inspection Service (FGIS) by facilities for the performance of requested official inspection and weighing related service. Additionally, this directive establishes the requirement for facility owners to relocate or improve existing equipment or handling equipment (e.g., scale monitors and printers, diverter-type mechanical sampler delivery systems) to an FGIS laboratory or other FGIS acceptable location that is a minimum of 100 feet from an elevator's head house or other physical structures (e.g., storage bins). This action is necessitated by FGIS's initiative to remove FGIS personnel from working in, or in close proximity to facilities that are susceptible to potential dust explosions.

2. REPLACEMENT HIGHLIGHTS

This directive is revised to specify types of structures that are deemed not permissible for laboratory space and to update contact information. This directive supersedes FGIS Program Directive 9160.5 dated 3/29/10.

3. BACKGROUND

According to the Regulations (§ 800.46, (b) (2) under the United States Grain Standards Act (USGSA), and the Regulations (§ 868.21(g)) under the Agricultural Marketing Act of 1946 (AMA), as amended, when official services are performed at a grain elevator or commodity plant, the applicant for service must provide adequate and separate work space for the performance of the requested official service and related monitoring and supervision activities. FGIS considers work space "adequate" if it meets the space, location, and safety requirements specified in this directive and other instructions (e.g., Equipment Handbook, Mycotoxin Handbooks, Safety and Health Handbook, and the Occupational Safety and Health Administration (OSHA) guidelines, etc.).

"Adequate" inspection laboratories (work spaces) vary by locations depending on the laboratory's operation. Laboratories vary in size, layout, number of official personnel occupants, and hours of use per day. Some laboratories must meet specific requirements for work space where official personnel perform chemical analysis using hazardous materials (e.g., flammable liquids).

A laboratory designed for an export facility may be different from a laboratory designed to meet the needs of an inland elevator, a commodity plant, or a floating elevator rig. However, all laboratories provide FGIS with space to conduct analyses and they all house some of the same inspection related instruments, but beyond this similarity the laboratories may differ in purpose and, therefore, must differ in specific design. A good laboratory design and maintenance program will support the efforts of official laboratory staff to perform analytical assignments and will accommodate flexibility to address specific needs at a given location.

Additionally, inspection laboratories are often visited by various foreign and domestic groups and are often the first impression these groups have of the official inspection system. It is imperative that maintenance levels are such that the laboratory is constantly maintained in a "state of good repair." This condition is achieved when the infrastructure components of the space provided by the facility owner for official service is properly maintained and replaced with components of the same or improved type upon failure, or on a schedule consistent with their life expectancy.

It is FGIS policy to develop and implement a comprehensive safety and health program that identifies and strives to eliminate employee exposure to existing and potentially hazardous working conditions and/or situations that are causing or likely to cause death or serious physical harm. A grain elevator or grain mill explosion is a serious concern for FGIS and its employees who are performing official duties (e.g., sampling, weighing, or inspection) within the head house, at the base of a head house, in or near any tall structures of these facilities. This concern also extends to areas in or near railcar dump pits, truck dump pits, and tunnels. For this reason facility owners must relocate or improve existing equipment or handling equipment (e.g., scale monitors and printers, diverter-type mechanical sampler delivery systems) to an FGIS laboratory or other FGIS acceptable location that is a minimum of 100 feet from these areas of concern. This action will enable FGIS personnel to perform their official duty away from these areas of concerns thereby eliminating their exposure to potentially hazardous working conditions and/or situations that could cause death or serious physical harm.

4. GENERAL RESPONSIBILITIES

a. Facility Owners. Owners of facilities where official personnel provide service are responsible for overall upkeep and maintenance of inspection laboratories, including, but not limited to temporary portable and mobile buildings and dedicated work space in plants or on floating elevator rigs. Responsibilities include general maintenance and upgrades related to:

(1) Appearance of laboratory interior and exterior.

(2) Air, heating, dust collecting, and grain return systems.

(3) Voice and telecommunications systems linking FGIS laboratory personnel to facility operators.

(4) Renovations to accommodate changes in workload or additional personnel.

(5) Renovations to accommodate new technologies and testing processes.

(6) Electrical and lighting systems.

(7) Maintaining laminate surfaces (see equipment handbook for countertop specifications).

(8) Pest management program (e.g., rodent and insect control) to aid in the prevention of contamination.

(9) Janitorial services scheduled at intervals to maintain the laboratory in a condition deemed suitable by official personnel to perform official activities.

b. Official Personnel. Official personnel will respect the work space provided by the facility owner. They will clean and maintain their work areas in a manner that facilitates the performance of assigned duties and will not inflict harm or damage to facility property. FGIS will provide and maintain:

(1) Chairs for official personnel.

(2) A desk and furniture for the supervisor's office.

(3) Computer equipment.

(4) External telephone and internet connections.

(5) Daily laboratory supplies (e.g., paper towels, soap, etc).

5. BASIC REQUIREMENTS

Facility owners must provide FGIS with offices and laboratory space to perform requested official inspection and weighing related services at least 100 feet from the base of the head house, and where possible, 100 feet from the base of other tall structures, railcar and truck dump pits, and tunnels. FGIS has an expectation that new office and laboratory spaces will be permanent type structures. Trailers and retro-fitted containers are not allowed.

Laboratory layout and size must support the minimal requirements and features necessary for FGIS to carry out the service requests of its applicants. FGIS, in conjunction with facility representatives, will determine the size of the laboratory based on conditions such as the quantity and variety of work performed, speed of operation, occupancy levels, equipment needs, hours of work, and file sample storage requirements. Facility owners must provide the following in a permanent type building (e.g., brick block, wood frame):

a. Grading Area. Must comfortably accommodate the furniture, computer hardware, grading equipment, and any other items needed by official personal to perform their duties. Facilities may use automated weighing systems or sample delivery systems, or related apparatus so that FGIS personnel can safely monitor activities.

b. Sampling Area. Must comfortably accommodate all sampling and testing equipment, have ample storage and counter space, an adequate dust collection/ removal system, an adequate electrical supply, and will be separated from the grading area in order to contain the airborne dust not removed by the dust system in the sampling area.

Mechanical Sampling systems must deliver samples directly into an approved hopper located within the sampling area.

c. Security. Official personnel must have control of all physical access points (including designated entry/exit points) to the laboratory's facilities, including the area containing the laboratory's Information systems.

d. Private Supervisor's Office Space. Must accommodate an office size desk, desk chair, second chair, bookshelf, computer and printer. The space must have a door with a lock for privacy to allow for supervisory counseling of employees when needed.

e. Break Room. Must accommodate a small table, microwave and refrigerator; and is separated from other rooms in the laboratory with a door, and must contain a sink with hot and cold running water.

f. Restrooms. Must have separate restrooms for both male and female employees with a properly functioning exhaust fan, and must provide reasonable accommodations for persons with disabilities. Fixtures must be commercial grade.

g. File Sample Storage Area. Must accommodate the number of file samples generated by the facility, based on the sample file retention period, and must meet the following requirements:

(1) Walls, ceilings, and floors completely finished; cracks, crevices, missing molding, or other conditions which harbor dust and infestation must be avoided.

(2) Shelving will be commercial quality and able to support the weight of the file samples without sagging.

(3) Grated steel shelving is recommended, as it will not collect dust or harbor infestation.

(4) Wood shelving painted with a high quality paint to facilitate cleaning is acceptable.

Cold storage for file sample retention is recommended but not required.

Long term changes in workload may require an addition to existing file sample storage space.

h. Wet Laboratory. In addition to the requirements of the Safety and Health Handbook, Mycotoxin Handbooks, Notices, and this Directive, laboratories used for mycotoxin testing must be in a separate room of sufficient size to accommodate the various testing protocols expected at the facility and large enough to accommodate the expected workload.

i. Electrical. Power supply must be adequate for all testing activities conducted in each laboratory area and must meet the standards in Chapter 3 of the Equipment Handbook.

j. Heating, Ventilation, and Air Conditioning (HVAC). Proper HVAC is necessary to protect assets, particularly electronic assets such as computers, protein analyzers, and moisture meters. Facility representatives will ensure laboratory has sufficient cooling and heating. FGIS must have control of thermostats to maintain proper temperature/humidity for sensitive instrumentation and testing equipment.

6. LABORATORY INTERIOR APPEARANCE

a. Flooring. Industrial strength (high traffic resistant), light color flooring will be installed in the laboratory.

b. Paint. Wall paint will be maintained to provide a clean, professional appearance throughout the laboratory. Rooms will be finished with a nonreflecting paint (light gray or green preferred). A flat white paint or an off-white acoustical tile may be used on ceilings, providing the white color does not extend below the level of the artificial lighting.

c. Surfaces. Floors, walls, ceilings, and other surfaces will be smooth to reduce dust collection and facilitate cleaning. Missing molding, holes in walls or ceilings or other conditions that produce cracks, holes and crevices will be corrected by facility owners in a timely manner.

7. OTHER REQUIREMENTS

a. Networking Closet. A dedicated area for network connectivity related equipment will be provided.

(1) Network closet will preferably be located inside the laboratory, but the existing building configuration may require placement outside the laboratory (e.g., in a public hallway leading to the laboratory).

(2) Network closet will contain all wires, cables, and equipment (e.g., routers, hubs, patch panel) pertaining to computer network connectivity and telephony.

(3) Area will be secure and accessible only to authorized personnel.

(4) New laboratories will be completely wired for network connectivity.

b. Technology. Video, computer equipment and other hardware provided to FGIS by a facility must be of the same quality and maintained to the same degree as facility equipment of the same nature. Upgrades to hardware supplied to FGIS must coincide with facility upgrades (i.e., automated weight system monitors, computers, CCTV monitors, etc.).

c. Emergency Lighting. The laboratory must employ and maintain an automatic emergency lighting system that activates in the event of a power outage or disruption and includes emergency exits and evacuation routes. Emergency alarm systems which warn personnel of a need to evacuate must be audible to personnel in the laboratory; if not, a separate alarming device must be installed in the laboratory proper.

d. Pest Management Program. All efforts must be made to assure that the laboratory is free and remains free from insects, rodents, rodent excreta, extreme temperature conditions, and any other factors which may contaminate samples or pose a safety or health risk to official personnel.

8. COMPLIANCE WITH WORK SPACE REQUIREMENTS

Facility owners must provide FGIS with work space complying with the general requirements of this directive and the specific requirements outlined in FGIS' Equipment Handbook, Aflatoxin and DON (Vomitoxin) Handbook, Safety and Health Handbook and other related instructions.

a. New Construction. Plans for construction of new laboratory space are subject to review and approval by FGIS Management prior to construction. The Safety and Health Office, Policies, Procedures, and Market Analysis Branch, and field office manager will review proposed plans and suggest ways to comply with the requirements contained in this directive and other instructions.

b. Existing Laboratory. FGIS Management will inspect laboratories currently in operation within 60 days of the issuance date of this directive. FGIS will issue a report of compliance/non-compliance to the facility owner. Facility owner must immediately correct deficiencies that pose a safety or health risk to official personnel, minor deficiencies must be corrected in a timely manner; major deficiencies corrected within 18 months. This will allow for budget adjustments by the facility owner to complete major projects needed to bring the laboratory in compliance with this Directive.

c. Periodic Laboratory Inspections. FGIS management will perform a thorough inspection of officially occupied facility-owned laboratory space at least once a year. These inspections will include a safety inspection performed by FGIS' Safety and Health Office or its designee. FGIS will report identified deficiencies in the quality, quantity, and functionality of the space to the facility operator for corrective action.

The FGIS field office manager responsible for providing service to a facility will determine when that facility does not meet the work space and safety requirements, whether the facility must expand the work space because of additional service requirements, and when work space conditions fail to meet requirements due to lack of proper maintenance.

d. Facility Owners Unable to Meet Requirements. Any facility unable to meet all requirements of this directive and within the time frame indicated above in section "7b. Existing Laboratory" must contact FGIS' Deputy Administrator in writing explaining its inability to meet the requirements or the time frame specified in this directive.

9. CONDITIONAL WITHHOLDING OF SERVICE

Section 800.49 of the US GSA, and section 868.24 of the AMA regulations states that FGIS will conditionally withhold requests for official services when an applicant fails to meet the requirements prescribed in§ 800.46, and § 868.21, respectively, which includes providing adequate working space.

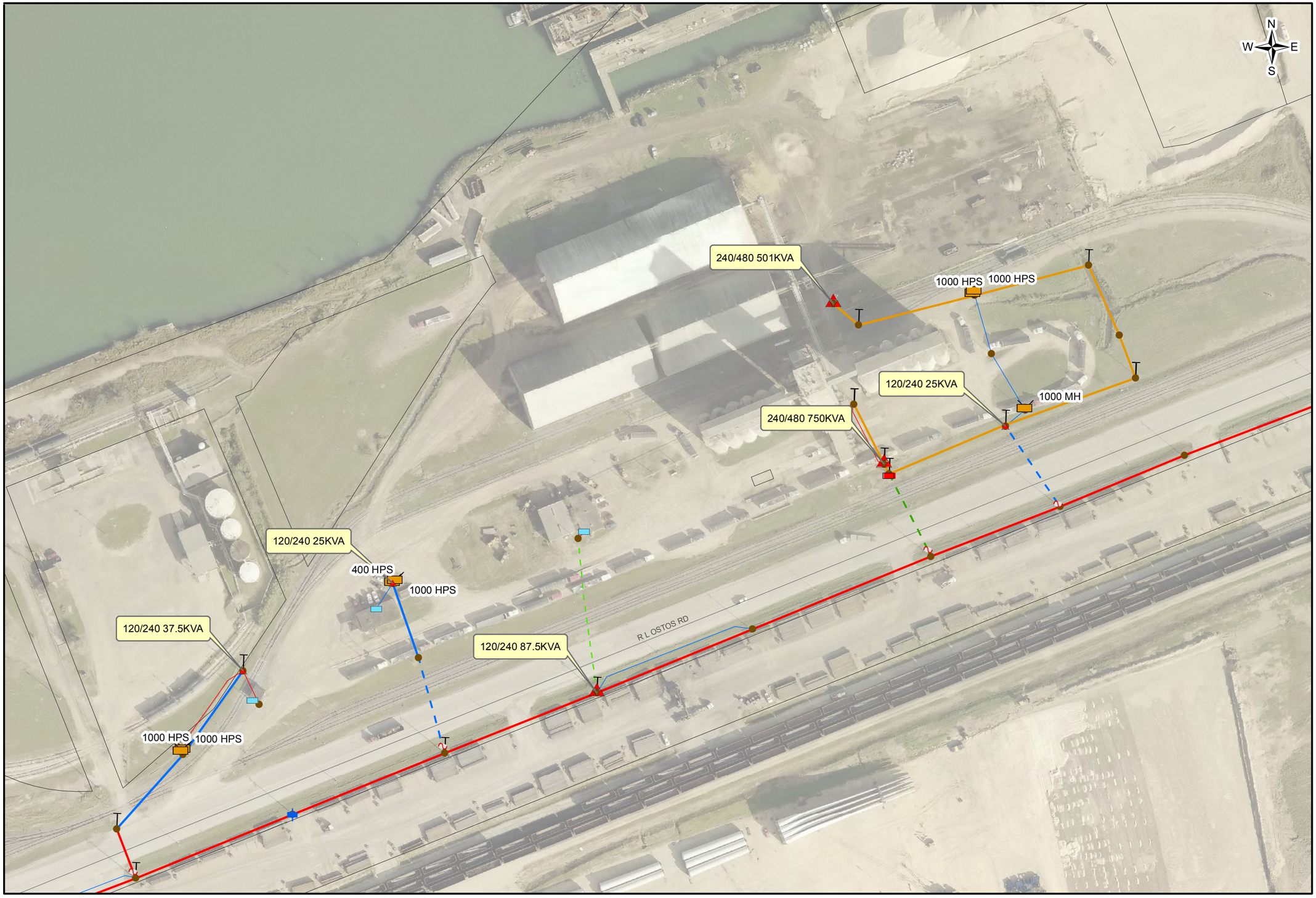
10. QUESTIONS

Direct any questions concerning this directive to the Policies, Procedures, and Market Analysis Branch (PPMAB) at (202) 720-0228.

Appendix F

Mechanical

9155 R L OSTOS RD



BROWNSVILLE
PUBLIC UTILITIES BOARD

Legend

TRANSFORMER
- SinglePhaseTransformer
- TwoPhaseTransformer
- ThreePhaseTransformer
- UGSinglePhaseTransformer
- UGThreePhaseTransformer
- StepTransformer
- GangSwitch
- KnifeSwitch
- LoadBreakSwitch
- DisconnectSwitch

SWITCH
- ATS Automatic Transfer Switch

FUSE
- CLOSED
- OPEN

METER
- PRIMARY
- SECONDARY

LIGHT
- EXISTING Flood Security Light
- EXISTING, Area AlleyLight
- EXISTING Area Security Light
- EXISTING Area Street Light

ELECTRIC STRUCTURE
- POLE
- ANCHOR_GUY

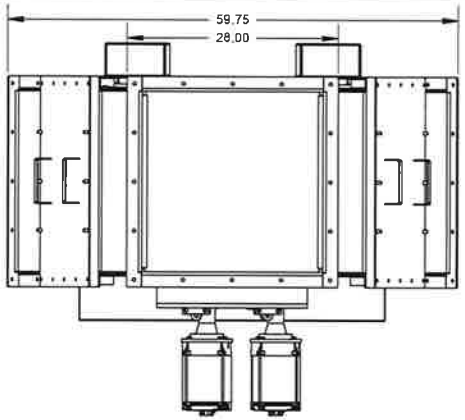
OH PRIMARY
- OHSinglePhasePrimary
- OHTwoPhasePrimary
- OHThreePhasePrimary
- PrivateOHSinglePhasePrimary
- PrivateOHTwoPhasePrimary
- PrivateOHThreePhasePrimary

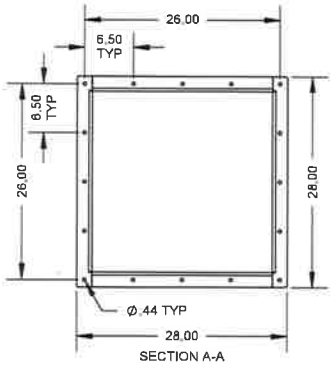
UG PRIMARY
- UGSinglePhasePrimary
- UGThreePhasePrimary
- PrivateUGSinglePhasePrimary
- PrivateUGThreePhasePrimary

OH SECONDARY
- OHSinglePhaseConductor
- OHThreePhaseConductor

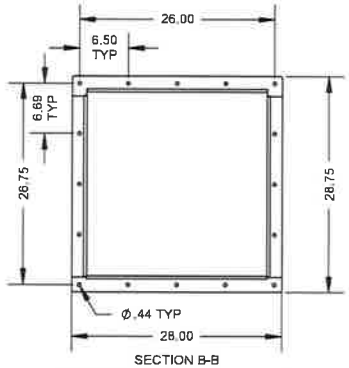
UG SECONDARY
- UGSinglePhaseConductor
- UGThreePhaseConductor

Date:	2/26/2020
Work Order No.:	
Prepared by:	DAVID TOVAR
Approved by:	
Completed by:	DAVID TOVAR

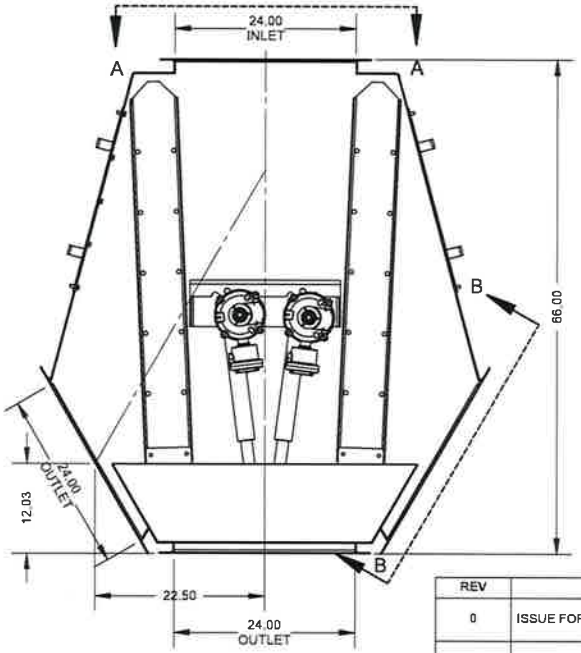


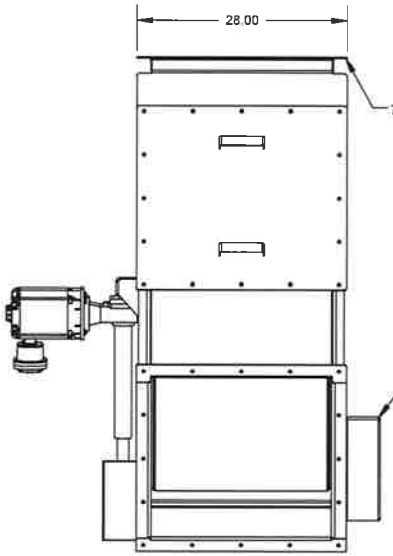


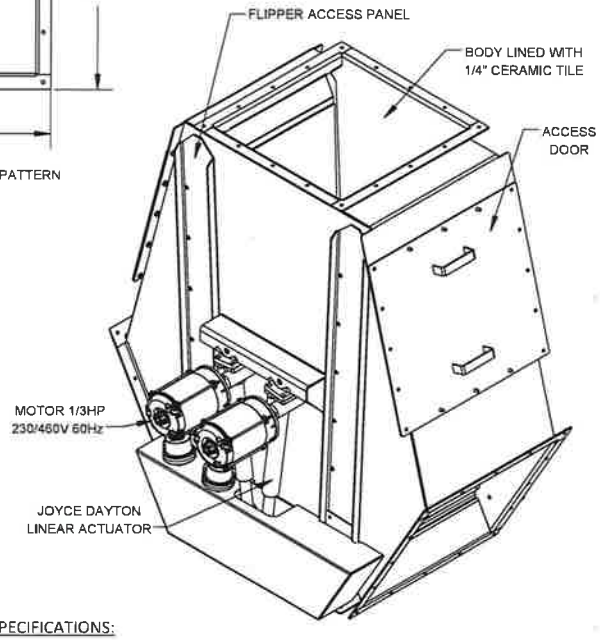
SECTION A-A
24 SQ FLANGE PATTERN



SECTION B-B
24 SQ FLANGE 60° DISCH PATTERN







SPECIFICATIONS:

* PROJECT REF: WESTPLAINS, (BROWNSVILL, TX) ITEM REF: 3-WAY ELECTRIC VALVE
* (2) DPDT LIMIT SWITCHES
* (2) JOYCE DAYTON LINEAR DRIVES WITH 230/460 1/3HP MOTORS
* 1/4" CERAMIC TILE LINED W/REMOVABLE PANELS

4-17-20

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR APPROVAL	LJN	4/6/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ± .03
3 PLACE ± .015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084038	GALVANIZED	0

DESCRIPTION: 24" 60DEG 3-WAY VALVE - BROWNSVILLE, TX

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:16	1419.15 LBS	LJN	TMR	1 OF 1

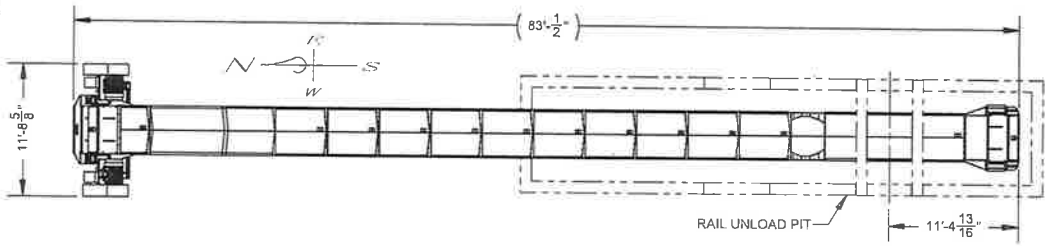
DRIVE PACKAGE - WARRIOR #TBD	
COMPONENT	DESCRIPTION
DRIVER SHEAVE	TBD
DRIVER BUSHING	TBD
DRIVEN SHEAVE	TBD
DRIVEN BUSHING	TBD
BELTS (QTY TBD)	TBD
TENSIONING INFORMATION	
CENTER-CENTER DISTANCE (NOM.)	TBD"
BELT DEFLECTION DISTANCE	TBD"
BELT DEFLECTION FORCE	TBD-TBD LBS

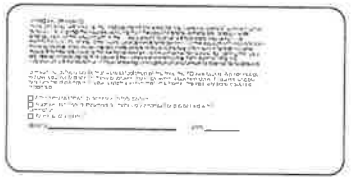
WEIGHTS	
HEAD WEIGHT (LESS DRIVE):	3700 LBS (APROX.)
DRIVE WEIGHT:	2400 LBS (APROX.)
MOTOR WEIGHT:	880 LBS (APROX.)
RDCR WEIGHT:	1065 LBS (APROX.)
TAIL WEIGHT:	2000 LBS (APROX.)
WEIGHT/FT EMPTY:	250 LBS (APROX.)
WEIGHT/FT LOADED:	437 LBS (APROX.)
WEIGHT/FT PLUGGED:	450 LBS (APROX.)
PRIMARY INLET WEIGHT:	2000 LBS (APROX.)

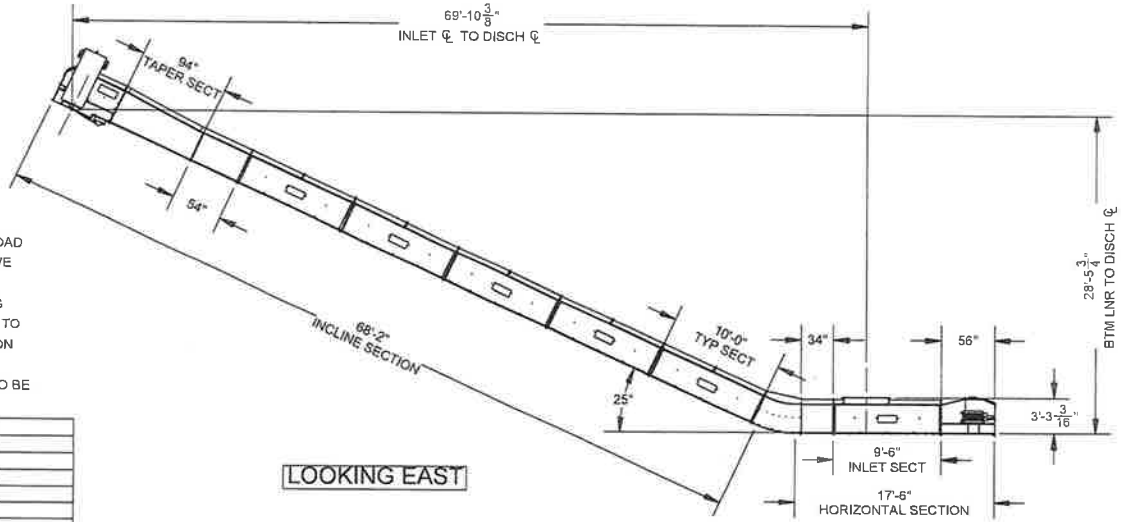
SENSOR SPECS

TYPE	MODEL	QUANTITY	SUPPLIED BY
SHAFT SPEED:	-	-	-
BEARING TEMP:	-	-	-
SLACK CHAIN LIMIT:	-	-	-
LIMIT SWITCH:	-	-	-
PLUG SWITCH:	BINMASTER BM65	1	WARRIOR

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	522042	HEAD 4838 RPXT DL WH132 7PLB 5507DL	1
2	522068	TAIL TPR 4832-38 WH132 3-7/2T GV	1
3	521953	SECT 4832 RP 114L 1/4 3/8 HIP MET	1
4	521872	SECT 4832 RPXT STD 1/4 3/8 NL 8GA	5
5	521879	LID 48 GV HIP	10
6	522065	SECT TPR 4832-38 RPXT STD 1/4 3/8 H	1
7	521872-05400	SECT 4832 RP 54L 3/8 1/4 DC HIP	1
8	521872-03400	SECT 4832 RP 34L 3/8 1/4 DC HIP	1
9	521883	CHAIN ASSY 24 WH132 XTF FRM BACK	34
10	521899	KNEE 4832LP 25D WHX132 1/4 3/8A2 HP	1
11	521963	INLET 48 48L HIP GV	1
12	44399	MTR 60HP 365T TEFC 230/460V TOSH	2
13	42995	RDCR FALK 5507 JR25A W/O BACKSTOP	2
14	43007	BUSHING ASSY FALK 5507 S-7	2
15	44408	MOTOR MOUNT FALK MM5507J-3	2
16	522080	GUARD BELT FALK 5507 42.5 CL	2
17	44417	TORQ ARM ROD ASSY FALK 5507	2
18	521989	TORQUE CHANNEL 48 DUAL 5507	1







LOOKING EAST

LOOKING NORTH

GENERAL NOTES:

(1) CONVEYOR DESIGN BASED ON RECEIVING A CONTROLLED,CONTINUOUS AND UNIFORMLY FED LOAD
(2) WARRIOR TO SUPPLY DRIVE PACKAGE (DIRECT DRIVE REDUCER, TORQUE ARM, BUSHING ASSY, MOTOR)
(3) CONVEYOR TO HAVE SECONDARY SHAFT GUARDING
(4) ALL COMPONENTS LISTED IN THE BILL OF MATERIAL TO SHIP LOOSE FOR FIELD ASSEMBLY AND INSTALLATION
(5) CONVEYOR TO BE GALVANIZED
(6) ANY ITEM NOT LISTED IN THE BILL OF MATERIAL IS TO BE PROVIDED BY OTHERS

SPECIFICATIONS	
CUSTOMER:	WESTPLAINS
PROJECT REF:	RAIL UNLOAD
CAPACITY:	30,000 BPH
MATERIAL:	DDG @ 40 LB/FT³
MATERIAL DEPTH:	15.06
CHAIN SPEED:	134 FPM
CHAIN & FLIGHT:	DUAL WH132, EXTRA RAISED PAN, 1/2" UHMW EXTRA-TALL FLIGHT ANGLE BAR 7GA BKNG PL
HEAD SHAFT RPM:	22 RPM
HEAD CONSTRUCTION:	1/4" GALV
HEAD SHAFT:	Ø7" THRU Ø7" REXNORD PLB BEARINGS
TAIL CONSTRUCTION:	1/4" GALV
TAIL SHAFT:	Ø3-7/16" THRU Ø3-7/16" REXNORD ZT BEARINGS
LINER MAT'L/THICKNESS:	1/4" AR200 SIDES, 3/8" AR200 BOTTOM
MOTOR:	TOSH 60HP 1750 RPM 60HZ
REDUCER:	FALK 5507JR25A

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR CUSTOMER APPROVAL	DJB	4/2/2020
1	EXTENDED INCLINE SECTION 4'-6", MADE INLET 2' LONGER, ADDED DIRECTIONAL NOTES	DJB	4/8/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084037	AS NOTED	1

DESCRIPTION: EMC 4832 DUAL CHAIN WESTPLAINS BROWNSVILLE, TX

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:128	- LBS	DJB	TMR	1 OF 4

Andy Acord 4-17-20

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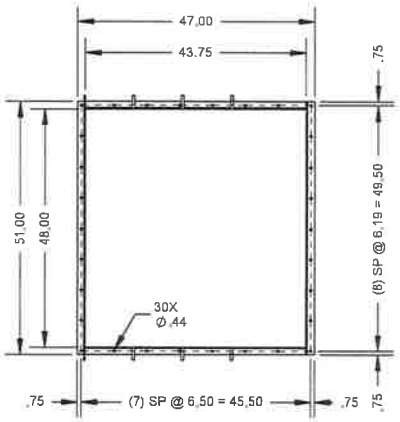
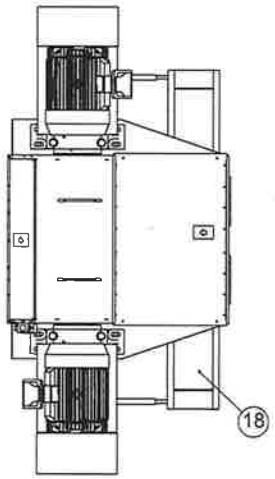
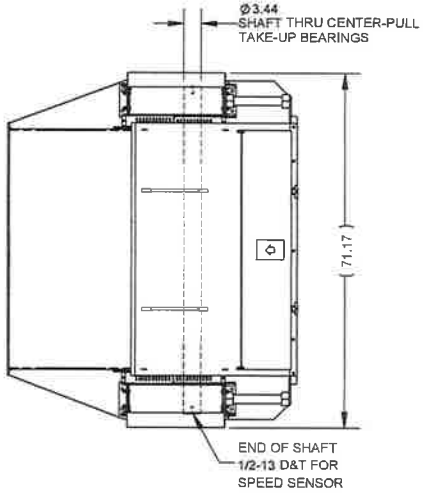
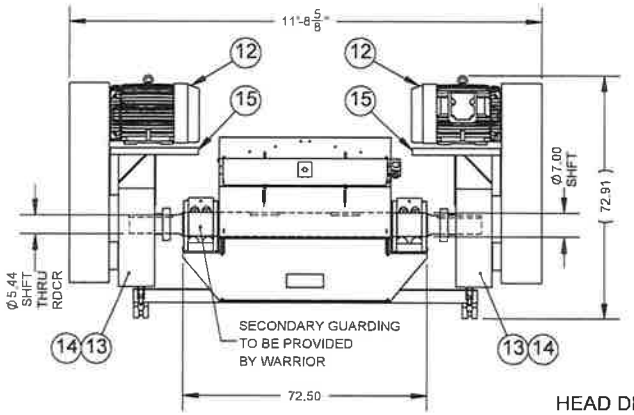
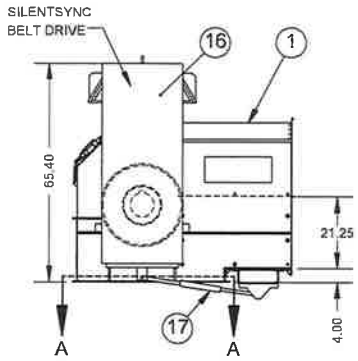


SECTION A-A
SCALE: 1 : 24

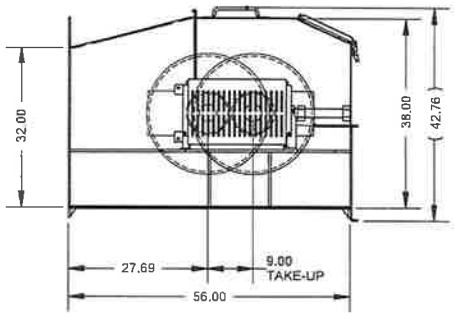








HEAD DETAIL



TAIL DETAIL

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR FABRICATION	DJB	4/2/2020
1	EXTENDED INCLINE SECTION 4'-6", MADE INLET 2' LONGER, ADDED DIRECTIONAL NOTES	DJB	4/8/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084037	AS NOTED	1

DESCRIPTION: EMC 4832 DUAL CHAIN WESTPLAINS BROWNSVILLE, TX

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:36	- LBS	DJB	TMR	2 OF 4

Andy Beamer 4-17-20

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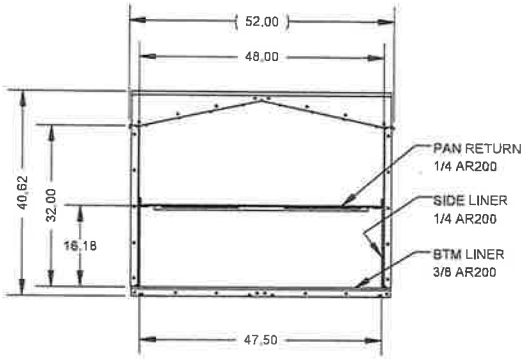

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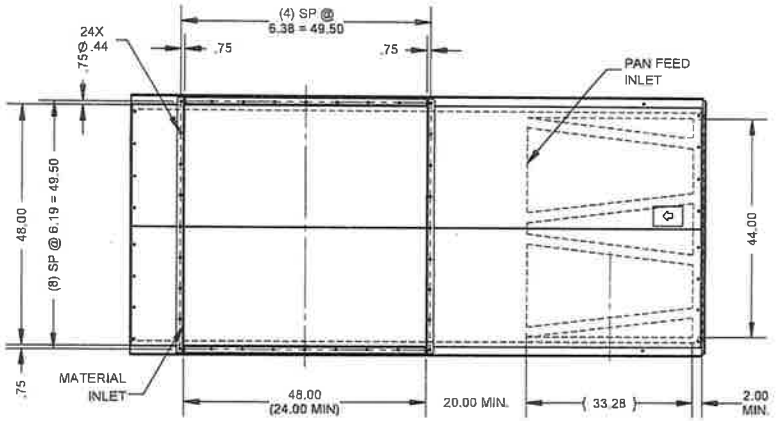
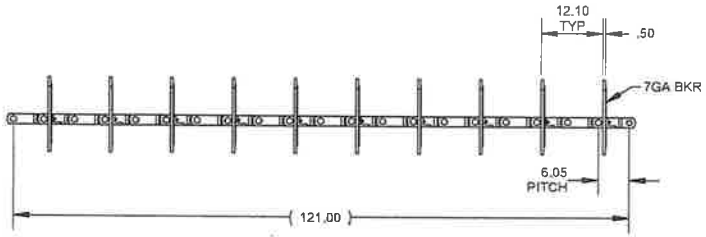
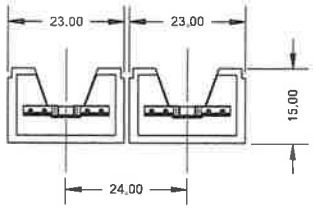
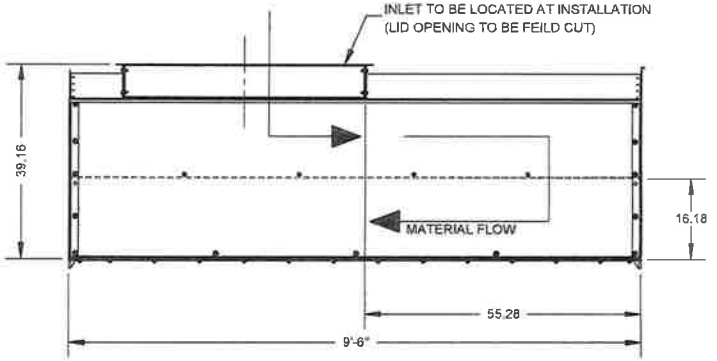






CHAIN DETAIL



Andy Acomb 4-17-20

INLET SECTION DETAIL

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR FABRICATION	DJB	4/2/2020
1	EXTENDED INCLINE SECTION 4'-6", MADE INLET 2' LONGER, ADDED DIRECTIONAL NOTES	DJB	4/8/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084037	AS NOTED	1

DESCRIPTION: EMC 4832 DUAL CHAIN WESTPLAINS BROWNSVILLE, TX

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:24	- LBS	DJB	TMR	3 OF 4

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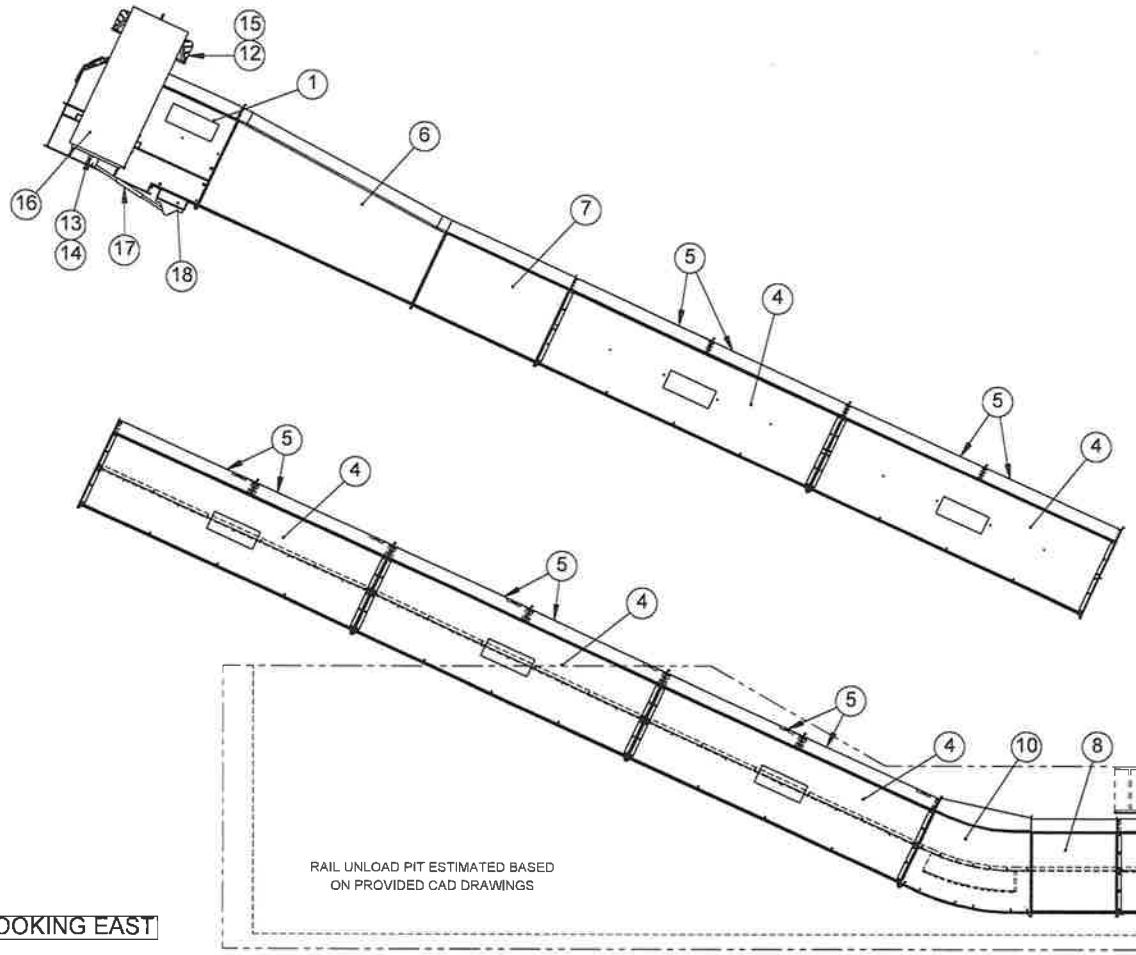


RAIL UNLOAD PIT ESTIMATED BASED ON PROVIDED CAD DRAWINGS

LOOKING EAST

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	522042	HEAD 4838 RPXT DL WH132 7PLB 5507DL	1
2	522068	TAIL TPR 4832-38 WH132 3-7ZT GV	1
3	521953	SECT 4832 RP 114L 1/4 3/8 HIP MET	1
4	521872	SECT 4832 RPXT STD 1/4 3/8 NL 8GA	5
5	521879	LID 48 GV HIP	10
6	522065	SECT TPR 4832-38 RPXT STD 1/4 3/8 H	1
7	521872-05400	SECT 4832 RP 54L 3/8 1/4 DC HIP	1
8	521872-03400	SECT 4832 RP 34L 3/8 1/4 DC HIP	1
9	521883	CHAIN ASSY 24 WH132 XTF FRM BACK	34
10	521899	KNEE 4832LP 25D WHX132 1/4 3/8A2 HP	1
11	521963	INLET 48 48L HIP GV	1
12	44399	MTR 60HP 365T TEFC 230/460V TOSH	2
13	42995	RDCR FALK 5507 JR25A W/O BACKSTOP	2
14	43007	BUSHING ASSY FALK 5507 S-7	2
15	44408	MOTOR MOUNT FALK MM5507J-3	2
16	522080	GUARD BELT FALK 5507 42.5 CL	2
17	44417	TORQ ARM ROD ASSY FALK 5507	2
18	521989	TORQUE CHANNEL 48 DUAL 5507	1

Andy Acomb 4-17-20

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR FABRICATION	DJB	4/2/2020
1	EXTENDED INCLINE SECTION 4'-6", MADE INLET 2' LONGER, ADDED DIRECTIONAL NOTES	DJB	4/8/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084037	AS NOTED	1

DESCRIPTION: EMC 4832 DUAL CHAIN WESTPLAINS BROWNSVILLE, TX

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:48	- LBS	DJB	TMR	4 OF 4

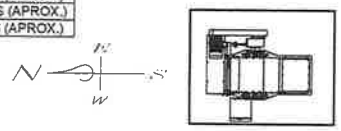
C:\WARRIOR_VAULT\omaha\ORDERS\084036-084038-WESTPLAINS-BROWNSVILLE,TX\084037 - RAIL UNLOAD\084037

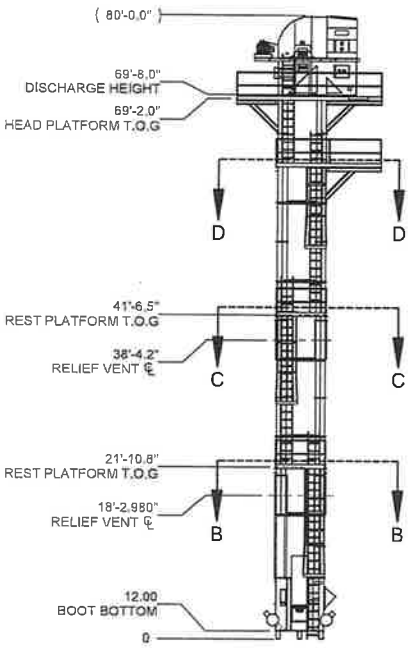
DRIVE PACKAGE - WARRIOR #TBD	
COMPONENT	DESCRIPTION
DRIVER SHEAVE	TBD
DRIVER BUSHING	TBD
DRIVEN SHEAVE	TBD
DRIVEN BUSHING	TBD
BELTS (QTY TBD)	TBD
TENSIONING INFORMATION	
CENTER-CENTER DISTANCE (NOM.)	TBD"
BELT DEFLECTION DISTANCE	TBD"
BELT DEFLECTION FORCE	TBD-TBD LBS

WEIGHTS	
HEAD WEIGHT (LESS DRIVE):	6,000 LBS (APROX.)
DRIVE WEIGHT:	TBD LBS (APROX.)
MOTOR WEIGHT:	1,388 LBS (APROX.)
RDCR WEIGHT:	1,600 LBS (APROX.)
BELT + EMPTY CUP WEIGHT:	3,220 LBS (APROX.)
BOOT WEIGHT:	3,600 LBS (APROX.)
TOTAL EMPTY WEIGHT:	TBD LBS (APROX.)
MATERIAL WEIGHT @CAP.	3,110 LBS (APROX.)
TOTAL WEIGHT @CAPACITY:	TBD LBS (APROX.)

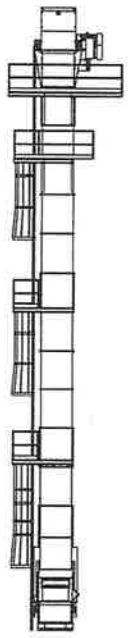
SENSOR SPECS

TYPE	MODEL	QUANTITY	SUPPLIED BY
SHAFT SPEED:	-	-	OTHERS
BEARING TEMP:	-	-	OTHERS
BELT ALIGNMENT:	-	-	OTHERS
PLUG SWITCH:	-	-	OTHERS





LOOKING EAST



LOOKING NORTH

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	522083	HEAD 4848 GV 5-7ZLF LH 5608 1/4TL	1
2	522089	HOOD ASSY 4848 GV 1/4TL	1
3	521992	BOOT 4848 3-7 40W CHV RP TL GT	1
4	503580	INSP SECT ASSY 42-4848 1/4 96 GV	1
5	518956	TRNK SECT 4848 10GA 60 GV	10
6	518956-048	TRNK SECT 4848 10GA 48 GV	2
7	518956-046	TRNK SECT 4848 10GA 46 GV	2
8	518959	TRNK SECT RVSA 4848 10GA 60 GV	4
9	522092	TRNK SECT 4848 10GA 60 GV PLAT	6
10	-	PLAT HEAD 4848 4-SIDE	1
11	-	PLT PKG RH STEP-OFF BE 4848	1
12	-	PLT PKG LH STEP-OFF BE 4848	1
13	518998	TIE ANG TRNK 48 XL GV	10
14	522148	RISER BOOT XX48 WIDE 6 X 12	3
15	43000	RDCR FALK 5608JR25A W/ BACKSTOP CW	1
16	43013	TORQ ARM ROD ASSY FALK 5415 - 5608	1
17	43211	BUSHING ASSY FALK 5608 5-7	1
18	522090	TORQ CHNL XX48 5608 GV	1
19	522091	MTR MT BE XX48 7S-125HP GV	1
20	44396	MTR 100HP 405T TEFC 230/460V TOSH	1
21	43035	FAN COOLING ASSY SHAFT FALK 5608	1
22	43136	HDW PKG RDCR 5415-5608 1/2 PLT MAX	1
23	43126	HDW PKG MTR 4041-447T 3/4" PLT MAX	1
24	44422	BELT RBR 4-440 42W 146 20X8 9.5"	1
25	44392	BUCKET CC-HD POLY 20X8 #4V	362
26	44395	HDW PKG BE 5/16 NRWY LOCK 2300	1
27	40174	PKG BOLT HH 3/8-16 X 1-1/2 G5 Z 100	6
28	40176	PKG NUT WHIZ 3/8-16 G5 ZINC 100	6
29	-	PLAT HEAD 4848 DISTRIB	1
30	-	LADDER PKG - DB4036	1
31	-	BELT GUARD BE 48 75HP TAB 64.81CL	1

GENERAL NOTES:

(1) ELEVATOR DESIGN BASED ON RECEIVING A CONTROLLED, CONTINUOUS AND UNIFORMLY FED LOAD
(2) BUCKET CAPACITY BASED ON WATER LEVEL +5.5%
(3) WARRIOR TO SUPPLY DRIVE PACKAGE (REDUCER, TORQUE ARM, BUSHING ASSY, MOTOR, SILENT SYNC DRIVE, BELT GUARD)
(4) ELEVATOR TO HAVE SECONDARY SHAFT GUARDING
(5) ALL COMPONENTS LISTED IN THE BILL OF MATERIAL TO SHIP LOOSE FOR FIELD ASSEMBLY AND INSTALLATION
(6) ELEVATOR TO BE GALVANIZED
(7) ANY ITEM NOT LISTED IN THE BILL OF MATERIAL IS TO BE PROVIDED BY OTHERS
(8) LADDER COMPONENTS TO BE FIELD FIT AND CUT TO LENGTH AS NEEDED

SPECIFICATIONS	
CUSTOMER:	WESTPLAINS
PROJECT:	62' D.H. BUCKET ELEVATOR
CAPACITY:	30,000 BPH
MATERIAL:	DDG @ 40LB/FT³
HEAD PULLEY RPM:	49
BELT SPEED:	629 FPM
CONSTRUCTION MATERIAL:	GALVANIZED
HARDWARE FINISH:	GALVANIZED
TRUNKING CONSTRUCTION:	10 GA
HEAD/HOOD CONSTRUCTION:	7 GA HEAD; 10 GA HOOD
HEAD SHAFT:	Ø5-7/16" THRU Ø5-7/16" REXNORD ZLF BEARINGS
HEAD PULLEY:	Ø48" 46" FACEWIDTH HD SLIDE LAGGED DRUM XT060 BUSHINGS
BOOT CONSTRUCTION:	1/4"
BOOT SHAFT:	Ø3-7/16" THRU Ø3-7/16" REXNORD ZA BEARINGS
BOOT PULLEY:	Ø48" 46" FACEWIDTH CHEVRON XT050 BUSHINGS
LINER MAT'L/THICKNESS:	1/4" CERAMIC TILE
BELT:	42" WIDE, 146' LG RUBBER SQR-SC-FR 4-440
BUCKETS:	TAPCO CC-HD 20X8 #4 VENT
BUCKET HARDWARE:	NORWAY TYPE BOLT W/ FLAT,LOCK WASHER & HEX NUTS
MOTOR:	TOSHIBA 100HP 1750 RPM 60HZ
REDUCER:	FALK QUADRIVE 5608JR25A
INCLUDED OPTIONS:	GRAVITY TAKEUP
	(2) RACK & PINION BOOT CLEANOUT
	PLATFORMS AND LADDERS

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR CUSTOMER APPROVAL	MDB	4/3/2020
1	HEIGHT WAS 62'-8", SWITCHED DRIVE & LADDER/CAGE SIDES, ADDED DIST. PLATFORM	MPH	4/8/2020
2	EXTENDED DISTRIBUTOR PLATFORM	TMR	4/15/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

4-17-20

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084036	AS NOTED	2

DESCRIPTION: BE 4848 69'-8" WEST PLAINS

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:184	TBD LBS	MDB	TMR	1 OF 5

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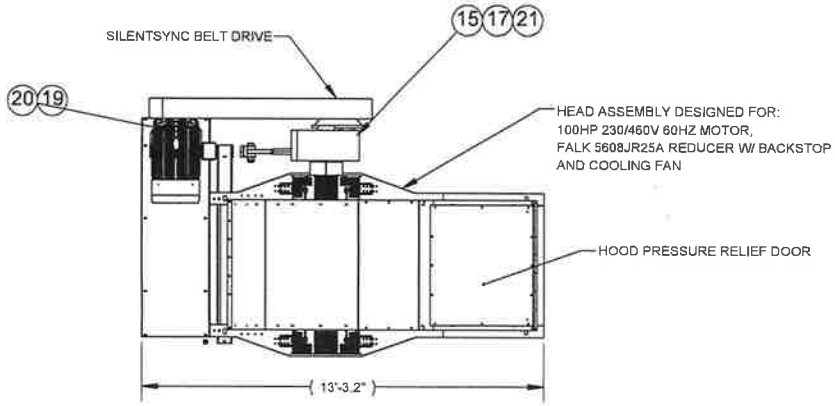
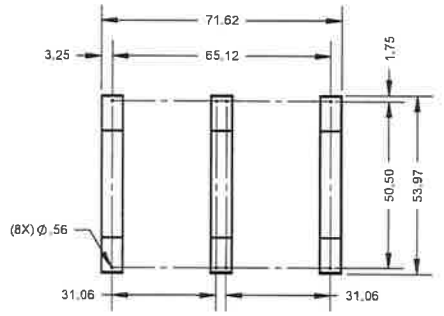
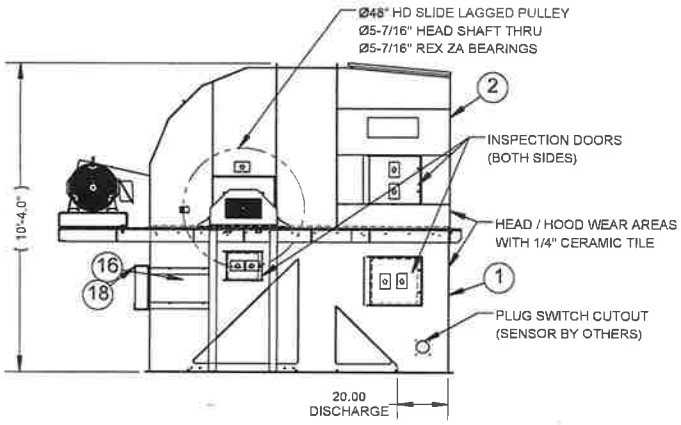
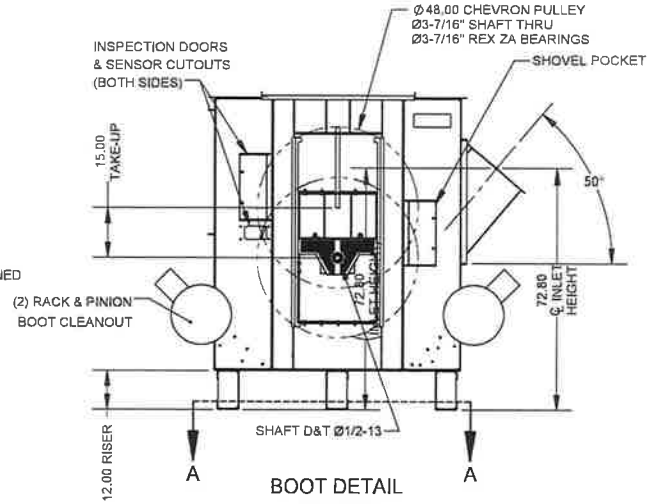




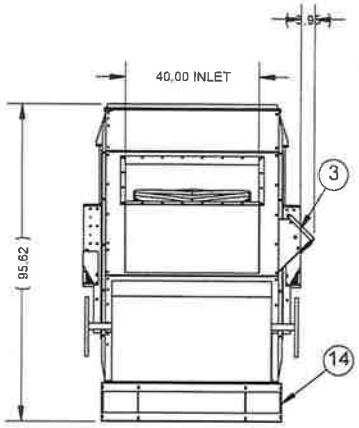
SECTION A-A
BOOT ANCHOR DETAIL
SCALE: 1 : 36



HEAD DETAIL



BOOT DETAIL
SCALE: 1:36



Andy Ascot 4-17-20

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR CUSTOMER APPROVAL	MDB	4/3/2020
1	HEIGHT WAS 62'-8", SWITCHED DRIVE & LADDER/CAGE SIDES, ADDED DIST. PLATFORM	MPH	4/8/2020
2	EXTENDED DISTRIBUTOR PLATFORM	TMR	4/15/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

WARRIOR MFG
14242 C Circle Suite B
Omaha, NE 68144
Phone: (402) 810-9630
Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084036	AS NOTED	2

DESCRIPTION: BE 4848 69'-8" WEST PLAINS

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:48	TBD LBS	MDB	TMR	2 OF 5

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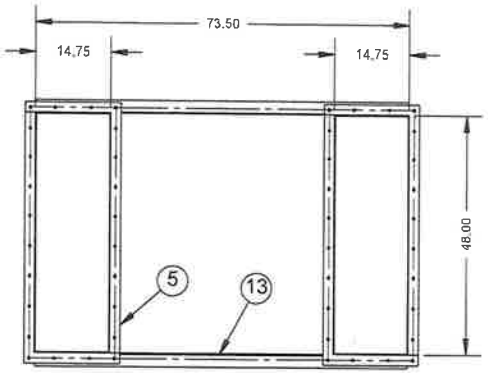
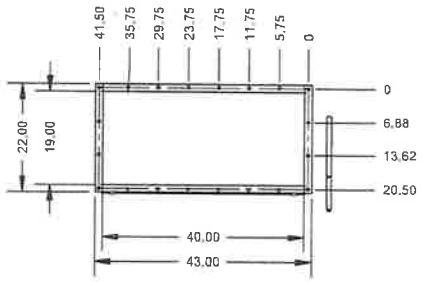
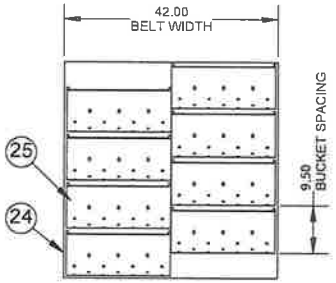


TRUNKING CONNECTION DETAIL



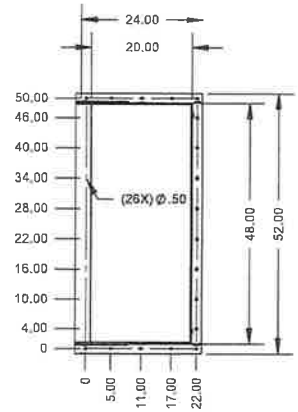
BOOT INLET DETAIL



BELT DETAIL

3-BUCKET LAP SPLICE

TAPCO CC-HD 20X8 #4 VENT



HEAD DISCHARGE DETAIL

Andy Beard 4-17-20

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR CUSTOMER APPROVAL	MDB	4/3/2020
1	HEIGHT WAS 62'-8", SWITCHED DRIVE & LADDER/CAGE SIDES, ADDED DIST. PLATFORM	MPH	4/8/2020
2	EXTENDED DISTRIBUTOR PLATFORM	TMR	4/15/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

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Omaha, NE 68144
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Fax: (402) 934-5050

PART NUMBER	MATERIAL	REV.
084036	AS NOTED	2

DESCRIPTION: BE 4848 69'-8" WEST PLAINS

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:24	TBD LBS	MDB	TMR	3 OF 5

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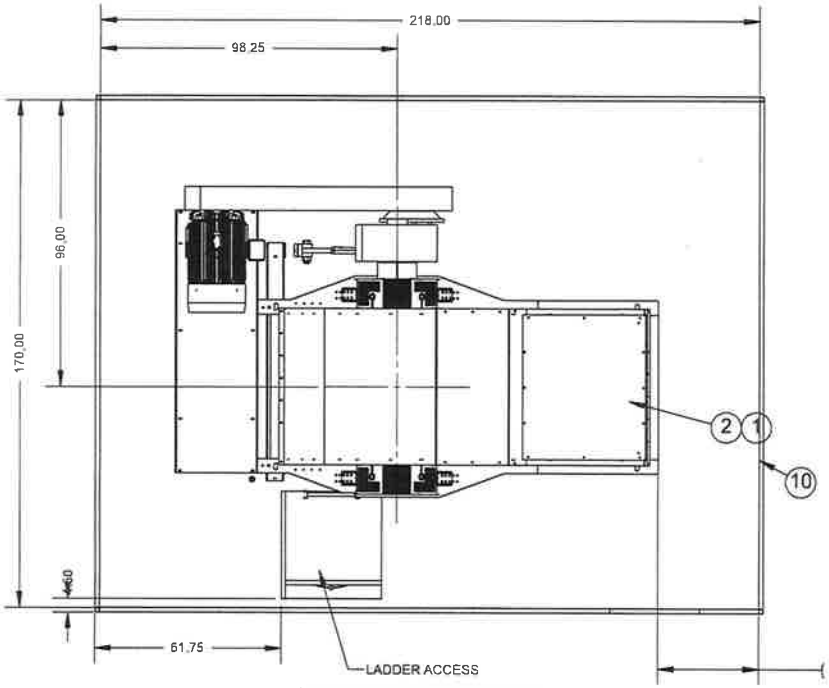
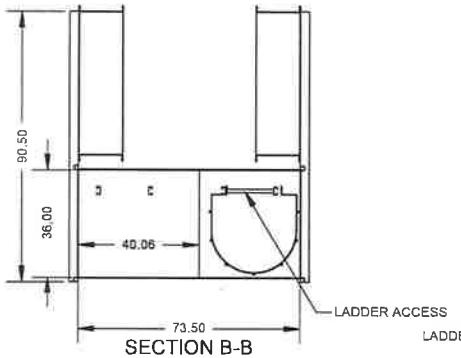


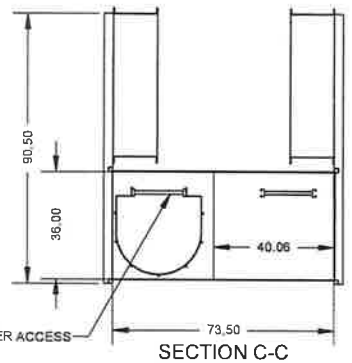
HEAD PLATFORM DETAIL

SCALE: 1:96



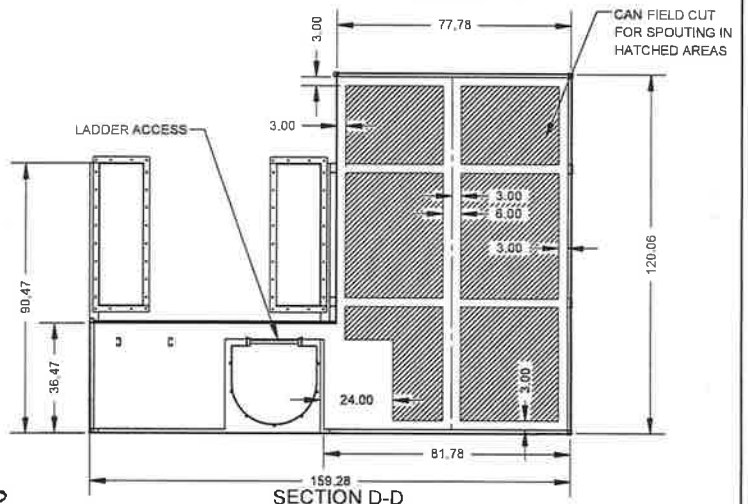
SECTION B-B

SCALE: 1 : 40



SECTION C-C

SCALE: 1 : 40



SECTION D-D

SCALE: 1 : 40

Andy Beard 4-17-20

REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR FABRICATION	MDB	4/3/2020
1	HEIGHT WAS 62'-8", SWITCHED DRIVE & LADDER/CAGE SIDES, ADDED DIST. PLATFORM	MPH	4/8/2020
2	EXTENDED DISTRIBUTOR PLATFORM	TMR	4/15/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ±.03
3 PLACE ±.015
ANGLE ±0°30'

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Omaha, NE 68144
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Fax: (402) 934-6050

PART NUMBER	MATERIAL	REV.
084036	AS NOTED	2

DESCRIPTION: BE 4848 69'-8" WEST PLAINS

SCALE	WEIGHT	DRAWN	CHECKED	SHEET NUMBER
1:184	TBD LBS	MDB	TMR	4 OF 5

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	522083	HEAD 4848 GV 5-7TLF LH 5608 1/4TL	1
2	522089	HOOD ASSY 4848 GV 1/4TL	1
3	521992	BOOT 4848 3-7 40W CHV RP TL GT	1
4	503580	INSP SECT ASSY 42-4848 1/4 96 GV	1
5	518956	TRNK SECT 4848 10GA 60 GV	10
6	518956-048	TRNK SECT 4848 10GA 48 GV	2
7	518956-046	TRNK SECT 4848 10GA 46 GV	2
8	518959	TRNK SECT RVSA 4848 10GA 60 GV	4
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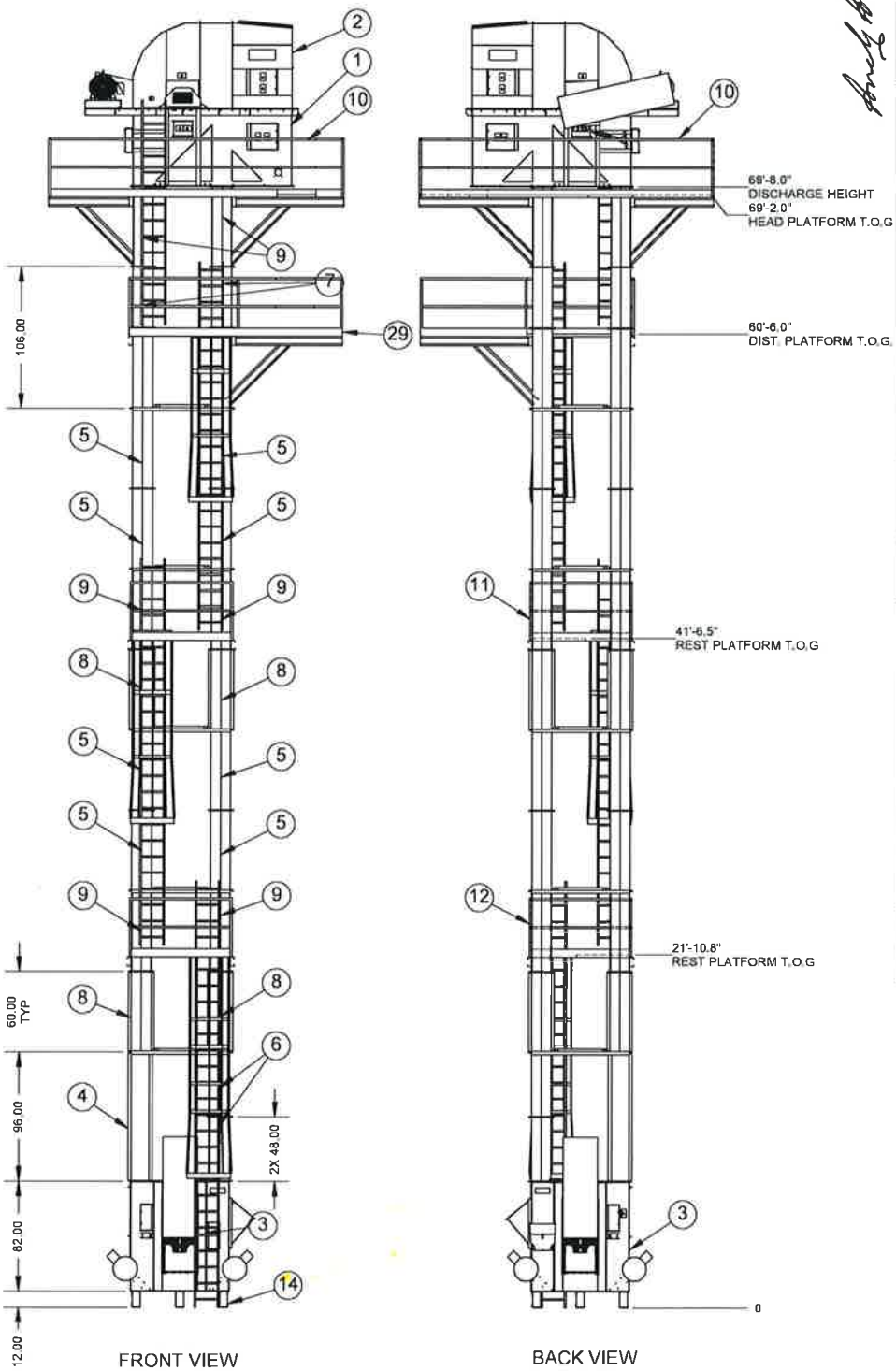
10	-	PLAT HEAD 4848 4-SIDE	1
11	-	PLT PKG RH STEP-OFF BE 4848	1
12	-	PLT PKG LH STEP-OFF BE 4848	1
13	518998	TIE ANG TRNK 48 XL GV	10
14	522148	RISER BOOT XX48 WIDE 6 X 12	3
15	43000	RDCR FALK 5608JR25A W/ BACKSTOP CW	1
16	43013	TORQ ARM ROD ASSY FALK 5415 - 5608	1
17	43211	BUSHING ASSY FALK 5608 5-7	1
18	522090	TORQ CHNL XX48 5608 GV	1
19	522091	MTR MT BE XX48 75-125HP GV	1
20	44396	MTR 100HP 405T TEFC 230/460V TOSH	1
21	43035	FAN COOLING ASSY SHAFT FALK 5608	1
22	43136	HDW PKG RDCR 5415-5608 1/2 PLT MAX	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
23	43126	HDW PKG MTR 404T-447T 3/4 PLT MAX	1
24	44422	BELT RBR 4-440 42W 146' 20X8 9.5"	1
25	44392	BUCKET CC-HD POLY 20X8 #4V	362
26	44395	HDW PKG BE 5/16 NRWY LOCK 2300	1
27	40174	PKG BOLT HH 3/8-16 X 1-1/2 G5 Z 100	6
28	40176	PKG NUT WHIZ 3/8-16 G5 ZINC 100	6
29	[illegible]	PLAT HEAD 4848 DISTRIB	1
30	[illegible]	LADDER PKG - 084036	1
31	[illegible] BE 48 75HP TA8 64.81CL 084036	BELT GUARD BE 48 75HP TA8 64.81CL	1

Approved 4-17-20



REV	REVISION DESCRIPTION	BY	DATE
0	ISSUE FOR CUSTOMER APPROVAL	MDB	4/3/2020
1	HEIGHT WAS 67'-8" SWITCHED DRIVE & LADDER/CAGE SIDES, ADDED DIST. PLATFORM	MPH	4/8/2020
2	EXTENDED DISTRIBUTOR PLATFORM	TMR	4/15/2020

TOLERANCES UNLESS NOTED OTHERWISE
FRACTIONAL ± 1/32"
DECIMAL 2 PLACE ± .03
3 PLACE ± .015
ANGLE ±0°30'

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PART NUMBER	084036
DESCRIPTION	BE 4848 69'-8" WEST PLAINS
SCALE	1:84
WEIGHT	TBD LBS
MATERIAL	AS NOTED
DRAWN	MDB
CHECKED	TMR
REV.	2
SHEET NUMBER	5 OF 5

Appendix G

West Plains Safety Requirements

Contractor Safety Guidelines

1. All Contractor personnel will follow the Company safety regulations, procedures, and guidelines. These will be reviewed with you prior to starting any work in or around the complex, including specific PPE requirements.
2. The Contractor and his employees will be shown the Emergency Action Plan, which includes all emergency evacuation routes and procedures. The Contractor will notify the Company Manager of any employee changes and the new employees will be shown the Emergency Action Plan prior to starting work.
3. Contractor will designate a Foreman or Supervisor that is responsible for maintaining a high degree of safety for contractor employees throughout their presence on company property.
4. Absolutely **NO SMOKING** is permitted in or around the property except in posted, designated areas.
5. The Contractor's work schedule will be fully coordinated with the Company's work schedule each day. Contractor personnel are **NOT** permitted in any part of the property beyond their designated work area(s) without the proper authorization from the Company Manager.
6. Contractor employees that are performing tasks at elevated levels higher than ground level or work floor must be protected from falls by guarded work platforms, walking/working surfaces with handrails or fall arrest systems. Only **Full Body Harnesses** are allowed as part of a fall arrest system.
7. Welding, cutting, or other hot work is NOT permitted in the facility except under special circumstances. In those cases, the Contractor **MUST** obtain a Hot Work Permit signed by the Company Manager.
8. All electrical equipment (and tools) used must be appropriate for the job, and be U.L., F.M. or OSHA listed for the location in which they are used.
9. The Contractor **MUST** have approval to use and/or store Hazardous Materials, including solvents and other flammable materials. The Contractor must also provide the Company Manager with appropriate Safety Data Sheets (SDS), for any such Hazardous Materials brought onto the premises.
10. **ALL DEBRIS CONNECTED WITH THE WORK BEING PERFORMED MUST BE CLEANED UP AND REMOVED DAILY, OR ON ANOTHER SCHEDULE AS AGREED TO BY COMPANY MANAGEMENT.**
11. Company Lockout/Tagout procedures must be followed by the Contractor at all times. All guards and covers removed from any machinery being worked on must be replaced **IMMEDIATELY** upon completion of work.
12. **ALL** tools, equipment, ladders, and vehicles belonging to the Contractor must be stored in a safe manner (Or location) at the end of each work day. The Contractor **WILL** inspect the work area(s) to be sure it remains in a safe condition. **NO EXCEPTIONS**.
13. The Contractor must sign the Visitor/Contractor Log and provide Company with a complete list of contractor's workers daily.

I have been informed of the above safety information and understand what I have read and signed.

Contractor Name _____

Contractor Representative: _____ **Signature:** _____

Company Representative: _____ **Signature:** _____

Location: _____ **Insurance Certificate (Y / N)** **Date:** _____

Location: West Plains LLC - Brownsville, TX

West Plains LLC

9155 RL Ostos Rd.

Brownsville, TX 78520

Contractor Safety Program

Purpose

The Contractor Safety Program is designed to protect West Plains LLC and contractor employees, equipment and facilities from injury, accident or loss. Contractors are persons not directly employed by West Plains LLC who provide specific labor or services.

Examples of Contractor Employers are:

- Construction & Millwright Companies
- Utility Service or Repair Companies
- Pest Control Services
- Grain Inspection Personnel
- Transportation & Shipping Services

As a condition of doing business with West Plains LLC, all contractors must comply with applicable local, state, federal regulatory requirements and West Plains LLC safety policies and procedures. Specific compliance is required in the following:

Responsibilities

Management

- Ensure contracts for bids contain appropriate information concerning the Contractor Safety Program including all requirements.
- Provide contractors with specific Contractor Safety Guidelines prior to commencement of work.
- Provide access to SDS material upon request of contractors.
- Ensure the area in which the contractor employees are working are maintained safe and free of hazards.
- Monitor all contractor activity at their location. Unless approved in advance by either the Regional Manager, the Corporate Safety Director, or the Vice-President of Operations, a company representative is required to be on-site each day that contractor work is being conducted.

Contractors

- Review and sign Contractor Safety Guidelines provided by local management.
- Sign the Visitor/Contractor Log and provide West Plains LLC with complete list of contractor workers daily.
- Conduct daily safety inspections of all assigned areas.
- Identify and correct hazards.

- Provide contractor employees with required Personal Protective Equipment.
- Ensure contractor employees have the proper training for assigned tasks.
- Coordinate with [[179:1125]] for any safety related issues.
- Maintain required insurance coverage.
- Establish and maintain an effective Safety and Health Program.
- Establish and maintain an effective Housekeeping Program.

Minimum Insurance Requirements

Contractors and Vendors are required to meet minimum Insurance Requirements according to the following schedule:

Coverage Minimum per Occurrence Limits

- Automobile Liability $ 1,000,000
- General Liability $ 1,000,000
- Products Liability $ 1,000,000
- Completed Operations Liability $ 1,000,000
- Workmen's Compensation $ 1,000,000

Certificates of Insurance

Contractors must provide West Plains LLC a Certificate of Insurance. The Certificate must list West Plains LLC, its Divisions and Subsidiaries as a Certificate Holder with notification of cancellation or non-renewal. Without the Certificate, West Plains LLC may have to assume the liabilities and responsibilities for the Contractor.

Training

Information and training is to be made available to contractors in the form of copies of written safety programs. Written programs from the Required Training List, based on hazard exposure are to be presented to contractors.

Required Training for Contractor Employees:

- General Safety Rules, including reporting of unsafe conditions.
- Hazard Communications & Chemical Safety
- Lockout/Tagout
- Electrical Safety
- Evacuation Routes, Alarms and Procedures
- Hot Work Program
- Confined Space Program
- Person Protective Equipment
- Fall Prevention
- Bin Entry

Safety Reviews

A comprehensive pre-work safety review conference will be conducted for all contractor work that involves:

- construction & renovation
- equipment installation & repair
- utility modifications
- electrical & plumbing work
- work at elevated locations
- confined space entry
- use of toxic substances
- hot work or welding
- bin entry

Safety review participants will consist of company and contractor safety representatives. All task specific safety concerns shall be addressed and resolved prior to commencement of work by the contractor.

Hazardous Chemical/Substance Notification

Contractor must follow the OSHA Hazard Communication Standard requirements including use of safe handling and storage of chemicals. Contractors are required to inform West Plains LLC of all hazardous substances which may be brought on to West Plains LLC property, including providing the most current Safety Data Sheet for each substance. All spills and leaks of hazardous chemicals must be immediately reported to [[179:1125]].

Confined Space Entry

Contractor employees are not authorized to enter any confined spaces on all West Plains LLC property unless specifically required by the service or construction contract.

Work at Elevated Locations

Required fall protection equipment shall be used by all contractor employees when working at elevated locations.

Other Policies and Procedures

All contractor employees shall adhere to all other West Plains LLC Policies, including but not limited to: access to company facilities or company equipment; use of controlled substances; firearm & explosive restrictions; harassment of other persons; traffic and parking regulations.

Attached Files

Contractor Safety Guidelines BU-WP-HM.docx
Uploaded: 10/21/2019

Appendix H

Brownsville Public Utilities Board Customer Checklist

BROWNSVILLE PUBLIC UTILITIES BOARD
ELECTRICAL ENGINEERING DEPARTMENT

Date: _____

CUSTOMER CONTACT INFORMATION

Name: _____
Address: _____
_____
Phone: _____
Fax: _____

Signed: _____

PROPERTY OWNER INFORMATON

Name: _____
Address: _____
_____
Phone: _____
Fax: _____

Signed: _____

PROPERTY INFORMATION

Street Address: _____

Legal Description: _____ Lot _____ Block _____ Subdivision

Construction Type: ☐ New Construction ☐ Addition

POWER REQUIREMENTS (Connecting Loads)

Voltage: ☐ 120/240 1-Phase ☐ 120/240 3-Phase ☐ 240/480 1-Phase ☐ 240/480 3-Phase
☐ 120/208 3-Phase ☐ 277/480 3-Phase ☐ 7200/12470 3-Phase

Current: ☐ 100 AMP ☐ 200 AMP ☐ 400 AMP ☐ _____ AMP *

* Services above 400 AMP will require current transformers (CT).

Load:		1-Phase	3-Phase
	Lighting	_____ KW	_____ KW
	Receptacles	_____ KW	_____ KW
	HVAC	_____ KW	_____ KW
	Motors/Machines	_____ HP	_____ HP
	Others	_____ KW	_____ KW

Total Estimated KW Demand _____

TEMPORARY POWER NEEDED Month_____ Day_____ Year_____

PERMANENT POWER NEEDED Month_____ Day_____ Year_____

IMPORTANT TELEPHONE NUMBERS

BPUB Electrical Engineering..... (956) 983-6201
BPUB Customer Service..... (956) 983-6121
City of Brownsville Permitting/Inspections..... (956) 550-5345
Cameron County Permitting/Inspections..... (956) 548-9553

NOTE: ALUMINUM METER SOCKETS REQUIRED (EFFECTIVE 7/1/07)

Fax to BPUB Electrical Engineering Department (956) 983-6220 or E-mail to nvasquez@brownsville-pub.com

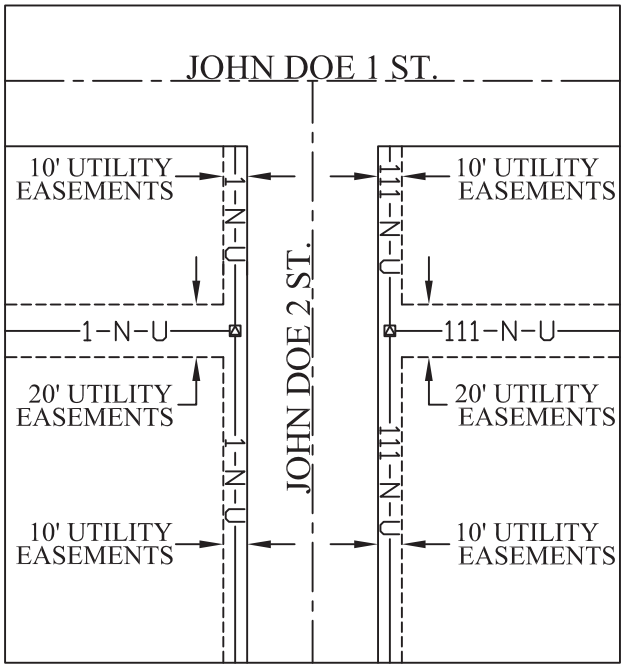
Procedures For Commercial Developments

1. Customer must bring copy of the loads and site plan to the Electrical Engineering Department.
2. Customer needs to provide required easements for electrical service.
3. Customer must apply for power in the Customer Service Department and pay for a deposit. The amount of the deposit depends on the KVA's being installed to serve electrical needs.
4. Customer must pass the City of Brownsville electrical inspection before getting connected. The City of Brownsville will require a licensed electrician to apply for a permit and inspection.
5. Customer must provide required conduit work and concrete pad as per BPUB specifications when the electrical service is underground. The Electrical Engineering Department needs to approve the trench and conduit before covering the trench. The concrete pad needs to be inspected before pouring the concrete.
6. The Electrical Engineering Department will determine the location of the meter and will decided OH or URD service will be decided by Electrical Engineering.
7. No gutters boxes will be allowed by the Brownsville Public Utilities Board.
8. Metering needs to be approved by the Electrical Department before buying or installing any metering equipment.
9. The Brownsville Public Utilities Board will install transformers and electrical metering equipment after all the above mentioned procedures is fulfilled. A time frame of 5-15 days is required after customer has completed all of the above procedures.
10. BPUB can refuse to connect power if any of the conditions above are not done correctly.

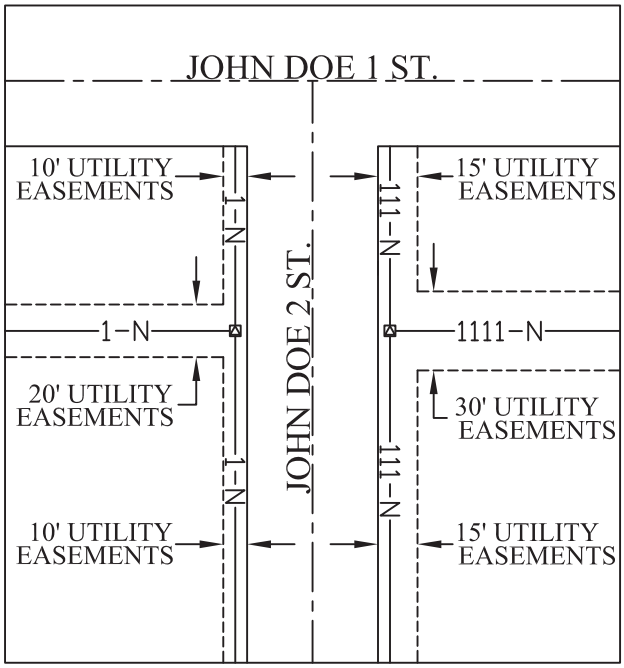
BROWNSVILLE PUBLIC UTILITIES BOARD
ELECTRICAL ENGINEERING DEPARTMENT

LINE / EQUIPMENT DESCRIPTION	OVER OPEN LAND (FEET)	ALONG STREETS (FEET)
THREE PHASE OVERHEAD TRANSMISSION LINES (69,000-138,000 VOLTS)	50	25
THREE PHASE OVERHEAD TRANSMISSION LINES (15,000 VOLTS)	30	15
SINGLE PHASE OVERHEAD DISTRIBUTION LINES (72,00 VOLTS)	20	10
UNDERGROUND DISTRIBUTION LINES (7,200 OF 15,000 VOLTS)	20	10
SERVICE LINES (120 - 480 VOLTS)	10	5
PAD MOUNTED TRANSFORMERS	20 X 20	10 X 20
PAD MOUNTED SWITCHGEAR	20 X 30	10 X 30

EXAMPLE #1
UNDERGROUND



EXAMPLE #2
OVERHEAD



NOTE:
1. ADDITIONAL EASEMENTS MAY BE NEEDED.
2. ANY PROPOSED STRUCTURE (FENCE, SIDEWALK, ETC.) WITHING THE EASEMENT IS SUBJECT TO REVIEW AND APPROVAL BY BPUB.

BROWNSVILLE
PUBLIC UTILITIES BOARD

ELECTRICAL EASEMENT REQUIREMENTS

DEVELOPED BY:	STANDARDS COMMITTEE
APPROVED:	OCT 2019
DRAWING NUMBER	**ENG-2**

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER

Meter Sockets for Self Contained Meters

100 Amp, 4-Terminal, Ringless, Aluminum, OH/UG.

Milbank: UAP7487-RL-TG
Landis & Gyr: UAT131-XGF
Square D: UAT-RS101C-SQD

100 Amp, 5-Terminal (9:00 or 6:00 Position), Ringless, Aluminum, OH/UG.

Milbank: Kit 5T8K2 - 5th Terminal field mounted
Landis & Gyr: Kit 659-0121-5th Terminal field mounted
Square D: Kit A5J - 5th Terminal field mounted

200 Amp, 4-Terminal, Ringless, Bypass Lever, Aluminum, OH/UG.

Milbank: UAP9801-RRL
Landis & Gyr: 41404-015F
Square D: UAT-H4213C-SQD
Cutler-Hammer: UAT-4213U-FLCH

320 Amp, 4-Terminal, Ringless, Bypass Lever, Aluminum, OH/UG.

Milbank: UAP2448-X
Landis & Gyr: 41704-01
Square D: UAT-H4330U-SQD

200 Amp, 5-Terminal (6:00 position), Ringless, Bypass Lever, Aluminum, OH/UG.

Milbank: UAP9551-RRL
Landis & Gyr: 41405-025F
Square D: UAT-H5213C-SQD

320 Amp, 5-Terminal (6:00 Position), Ringless, Bypass Lever, Aluminum, OH/UG.

Milbank: UAP2448-X with Kit K3865
5th Terminal field mounted
Landis & Gyr: 49105-02FL
Square D: UAT-H5330U-SQD

200 Amp, 7-Terminal, Ringless, Bypass Lever, Aluminum, OH/UG.

Milbank: UAP9701-RRL
Landis & Gyr: 41407-025F
Square D: UAT-H7213C-SQD

320 Amp, 7-Terminal, Ringless, Bypass Lever, Side Wireway, Aluminum, OH/UG.

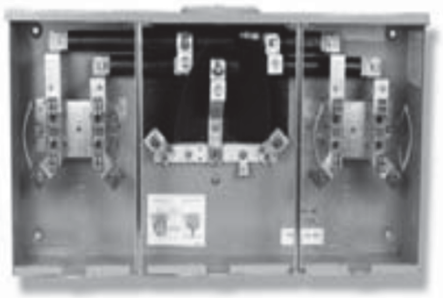
Milbank: UAP2594-X
Landis & Gyr: 49107-02FL
Square D: UAT-H7330U-SQD

Note: 1. - All Meter Sockets provided and installed by customer at site approved by BPUB.
2. - All Meter Sockets are to be new stock and UL listed.
3. - Meter and Service installations must also meet City of Brownsville inspection requirements.
4. - Meter cans less than 100 Amps need BPUB Engineering approval in advance.

BROWNSVILLE PUBLIC UTILITIES BOARD	**METER SOCKETS**	DEVELOPED BY:	STANDARDS COMMITTEE
		APPROVED:	Oct 2019
		DRAWING NUMBER	**ENG - 6**

STATE OF TEXAS ELI ALVAREZ 100959 LICENSED PROFESSIONAL ENGINEER

Meter - Pack for Self Contained Meters **



** A main disconnect switch is required for over 6 meters served by a single service.

100 Amp, 4-Terminal, OH/UG, Ringless, Aluminum

2 - Sockets

Landis & Gyr: UA2331-OG
Square D: UAT-2R1121C-SQD
Cutler-Hammer: UATZ2R1121C-FLCH

3 - Sockets

Landis & Gyr: UA3331-OG
Square D: UAT-3R1121C-SQD
Cutler-Hammer: UATZ3R1121C-FLCH

4 - Sockets

Landis & Gyr: UA4331-OG
Square D: UAT-4R1121C-SQD
Cutler-Hammer: UATZ4R1121C-FLCH

5 - Sockets

Square D: UAT-5R1121C-SQD
Cutler-Hammer: UATZ5R1121C-FLCH

6 - Sockets

Square D: UAT-6R1131C-SQD
Cutler-Hammer: UATZ6R1131C-FLCH

200 Amp, 4-Terminal, OH/UG, Ringless, Aluminum

2 - Sockets

Milbank: UAP1252-X-HSP
Landis & Gyr: UA2736-ZGF
Square D: UAT-2R2332U-SQD
Cutler-Hammer: UAT2R2332U-FLCH

3 - Sockets

Milbank: UAP1253-X-HSP
Landis & Gyr: UA3737-ZGF
Square D: UAT-3R2332U-SQD
Cutler-Hammer: UAT3R2332U-FLCH

4 - Sockets

Milbank: UAP1254-X-HSP
Landis & Gyr: UA4739-ZGF
Square D: UAT-4R2352U-SQD
Cutler-Hammer: UAT4R2352U-FLCH

5 - Sockets

Milbank: UAP1255-X-HSP
Landis & Gyr: UA5739-MGF
Square D: UAT-5R2392UU-SQD
Cutler-Hammer: UAT5R2392UU-FLCH

6 - Sockets

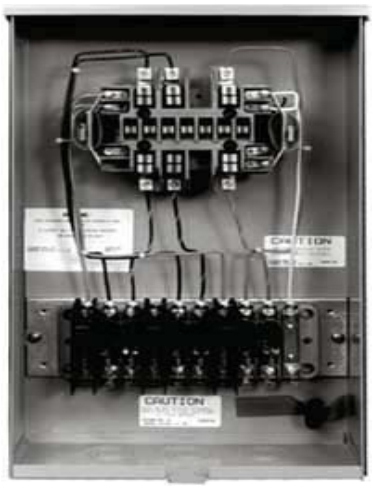
Milbank: UAP1256-X-HSP
Landis & Gyr: UA6739-MGF
Square D: UAT-6R2392UU-SQD
Cutler-Hammer: UAT6R2392UU-FLCH

Notes:

1. - All Meter Sockets provided and installed by customer at site approved by BPUB.
2. - All Meter Sockets are to be new stock and UL listed.
3. - Meter and Service installations must also meet City of Brownsville or Cameron County inspection requirements.
4. - 7-Terminal Steel Meter-Packs must be UL listed or have a Texas Professional Engineer's Seal on the specifications.

BROWNSVILLE PUBLIC UTILITIES BOARD	METER - PACK	DEVELOPED BY:	STANDARDS COMMITTEE	STATE OF TEXAS ELI ALVAREZ 100959 LICENSED PROFESSIONAL ENGINEER
		APPROVED	Oct 2019	
		DRAWING NUMBER	ENG - 6A	

20 Amp CT/PT Meter Sockets, Aluminum, Ringless, Terminal Block and Test Switch Provision **

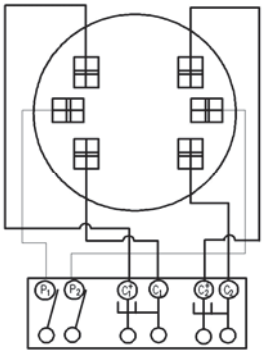


** Must have integrated prewired switches per BPUB's specifications for all CT and PT connections:
- Voltages: Use RED/BLACK, BROWN, ORANGE.
- Currents: Use RED, BLUE, YELLOW.
- Neutral: Use BLACK.

** Wire must be Copper, Gage 10, THHN, Stranded.

** For Single phase: 120 / 240 volts 3-wire use Wiring Form 4S.
** For Three phase: 120 / 208 volts Wye 4-wire use Wiring Form 9S.
277 / 480 volts Wye 4-wire use Wiring Form 9S.
120 / 240 volts Delta 4-wire use Wiring Form 9S.
240 / 480 volts Delta 4-wire use Wiring Form 9S.
240 / 480 volts Delta 3-wire use Wiring Form 5S.

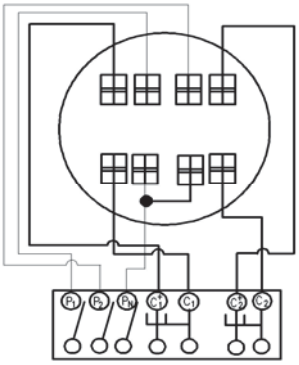
Form 4S



6 - Terminals

Milbank: UAPC7478-XL
Landis & Gyr: 9837-8200
Square D: USTS6-1C224-SQD

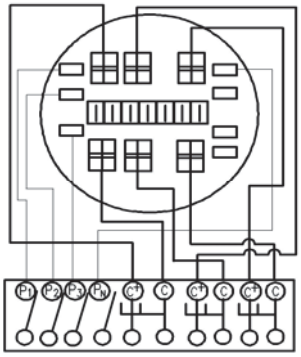
Form 5S



8 - Terminals

Milbank: UAPC7444-XL
Landis & Gyr: 9837-8400
Square D: USTS8-1C225-SQD

Form 9S



13 - Terminals

Milbank: UAPC7445-XL
Landis & Gyr: 9837-8500
Square D: USTS13-1C226-SQD

Note: 1. - All Meter Sockets provided and installed by customer at site approved by BPUB.
2. - All Meter Sockets are to be new stock and UL listed.
3. - Meter and Service installations must also meet City of Brownsville inspection requirements.

BROWNSVILLE PUBLIC UTILITIES BOARD	CT/PT METER SOCKETS	DEVELOPED BY:	STANDARDS COMMITTEE	STATE OF TEXAS ELI ALVAREZ 100959 LICENSED PROFESSIONAL ENGINEER
		APPROVED:	Oct 2019	
		DRAWING NUMBER	ENG - 6B	

Current Transformer (CT) Cabinets, NEMA 3R
Aluminum (at least 0.08 thick)

Overhead / Pole Mounted Transformer Cabinets

Manufacture:	Barfield	Milbank	Meter Devices Co.
Catalog #:	BATCW7818NSGRC	1887-CT3RXA-SP1	558-5127 TCWM Alum

Underground / Wall Mounted Transformer Cabinets

Manufacture:	Milbank	Meter Devices Co.	Durham
Catalog #:	363612-CT3RXA-SP2	561U3815G TC-3 Alum	A-363612-RDR A-363612-SFR A-363612-DDR
Max Cond:	8 - 500MCM	8 - 500MCM	8 - 500MCM

Notes: 1. All CT cabinets provided and installed by customer at site approved by BPUB.
2. All CT Cabinets are to be new stock.
3. BPUB Engineering may approve a non-standard CT cabinet on a case by case basis. Please provide cut sheets and allow an extra two weeks for Engineering review and approval.

BROWNSVILLE PUBLIC UTILITIES BOARD	CURRENT TRANSFORMER ENCLOSURES	DEVELOPED BY:	STANDARDS COMMITTEE
		APPROVED:	SEP 2020
		DRAWING NUMBER	ENG-12

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER

BROWNSVILLE PUBLIC UTILITIES BOARD
ELECTRICAL ENGINEERING DEPARTMENT

1. **All concrete pad locations, pad construction such as dimensions, materials, grade compaction and any requested modifications such as retaining walls, bollards, integrated drainage, etc. are to be approved by the BPUB Electrical Engineering Department before the construction of the concrete pad.**

2. **If bollards are required, the BPUB Electrical Engineering will design and inspect bollard locations prior to permanent placement.**

3. **All concrete pads shall have a 10 feet unobstructed clearance to the front of the cabinet side, and a 5 feet unobstructed clearance from the remaining sides.**

4. **There must be truck access to the concrete pad location.**

5. **Customer will verify and supply all the needed conduits prior to the construction of the concrete pad.**

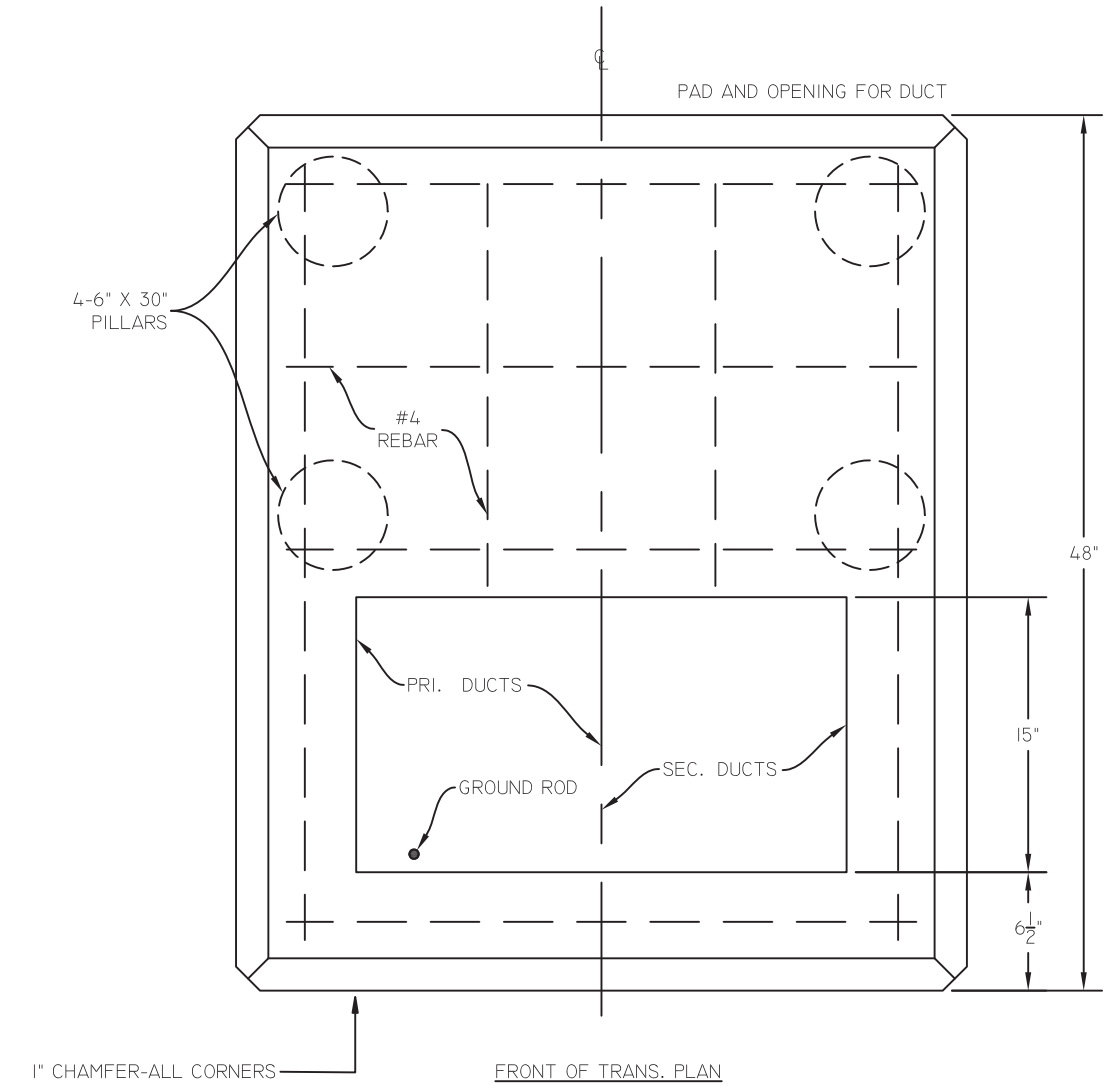
6. **The Transformer and Switchgear concrete pads top surface is to be at least 6 inches above finish grade, and Sectionalizer concrete pad top surface is to be at least 4 inches above finish grade.**

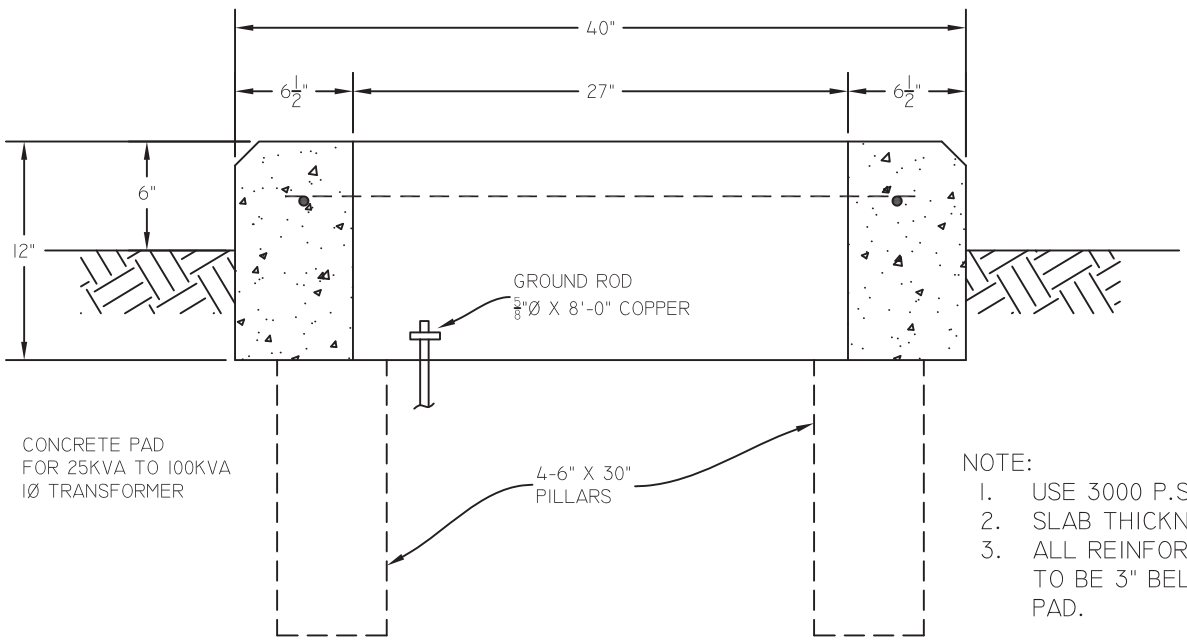
7. **Concrete is to be 3000 psi cured for a minimum of 3 calendar days before BPUB sets transformer.**

8. **Customer must supply to BPUB any required easement prior to the construction of the concrete pad.**

9. **The Transformer primary conduits should be separated at least 2 feet from the secondary conduits.**

BROWNSVILLE PUBLIC UTILITIES BOARD	**CUSTOMER RESPONSIBILITIES FOR CONCRETE PADS CONSTRUCTION**	DEVELOPED BY:	STANDARDS COMMITTEE	STATE OF TEXAS ELI ALVAREZ 100959 LICENSED PROFESSIONAL ENGINEER
		APPROVED:	1-Sep-19	
		DRAWING NUMBER	**ENG - 8**	





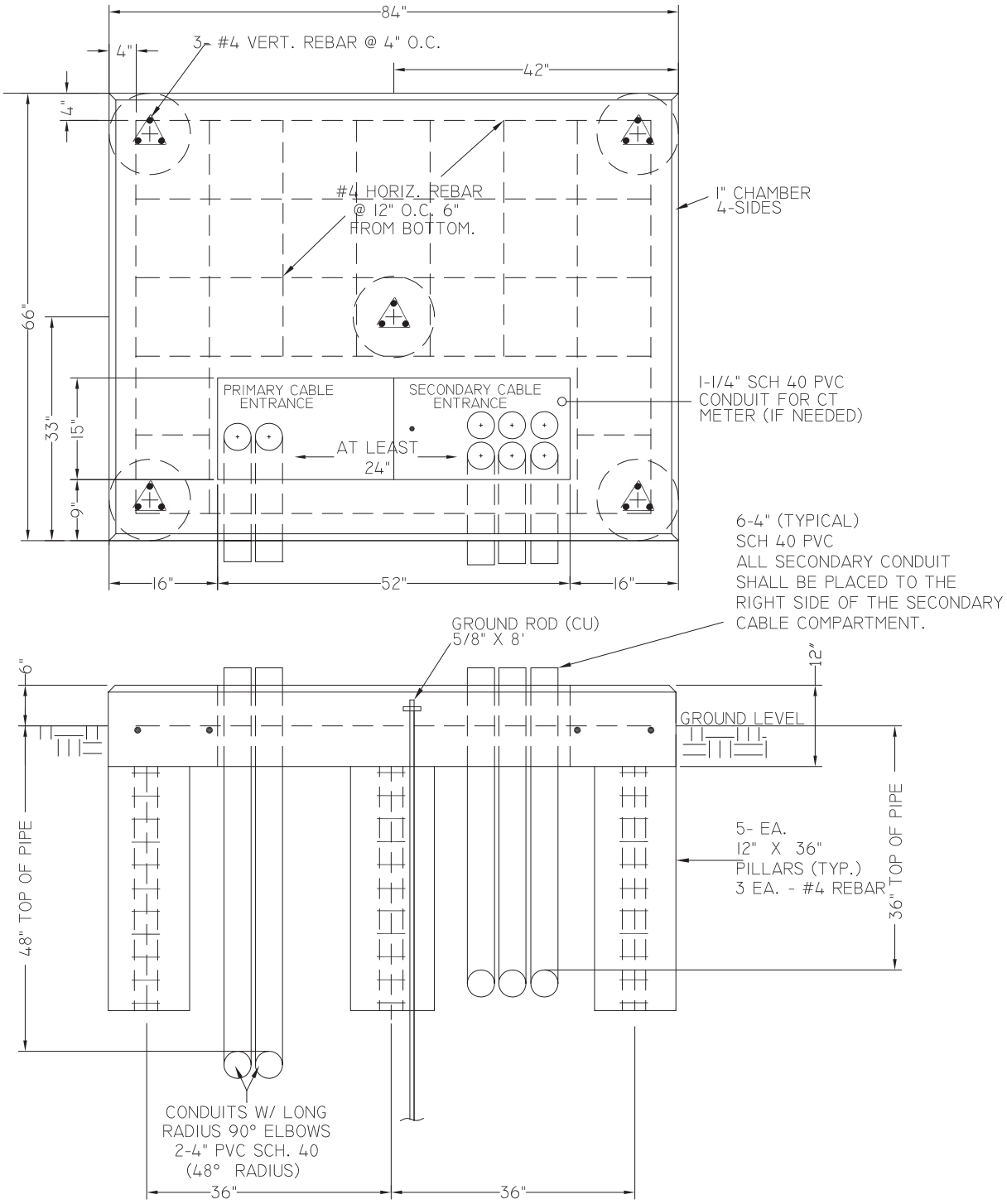
NOTE:
1. USE 3000 P.S.I. CONCRETE.
2. SLAB THICKNESS TO BE 12".
3. ALL REINFORCING STEEL TO BE 3" BELOW TOP OF PAD.

BROWNSVILLE
PUBLIC UTILITIES BOARD

TYPICAL STEEL REINFORCED CONCRETE PAD FOR SINGLE-PHASE PAD-MOUNTED TRANSFORMER

DEVELOPED BY:	STANDARDS COMMITTEE
APPROVED:	SEP 2019
DRAWING NUMBER	UD-14

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER



NOTES:

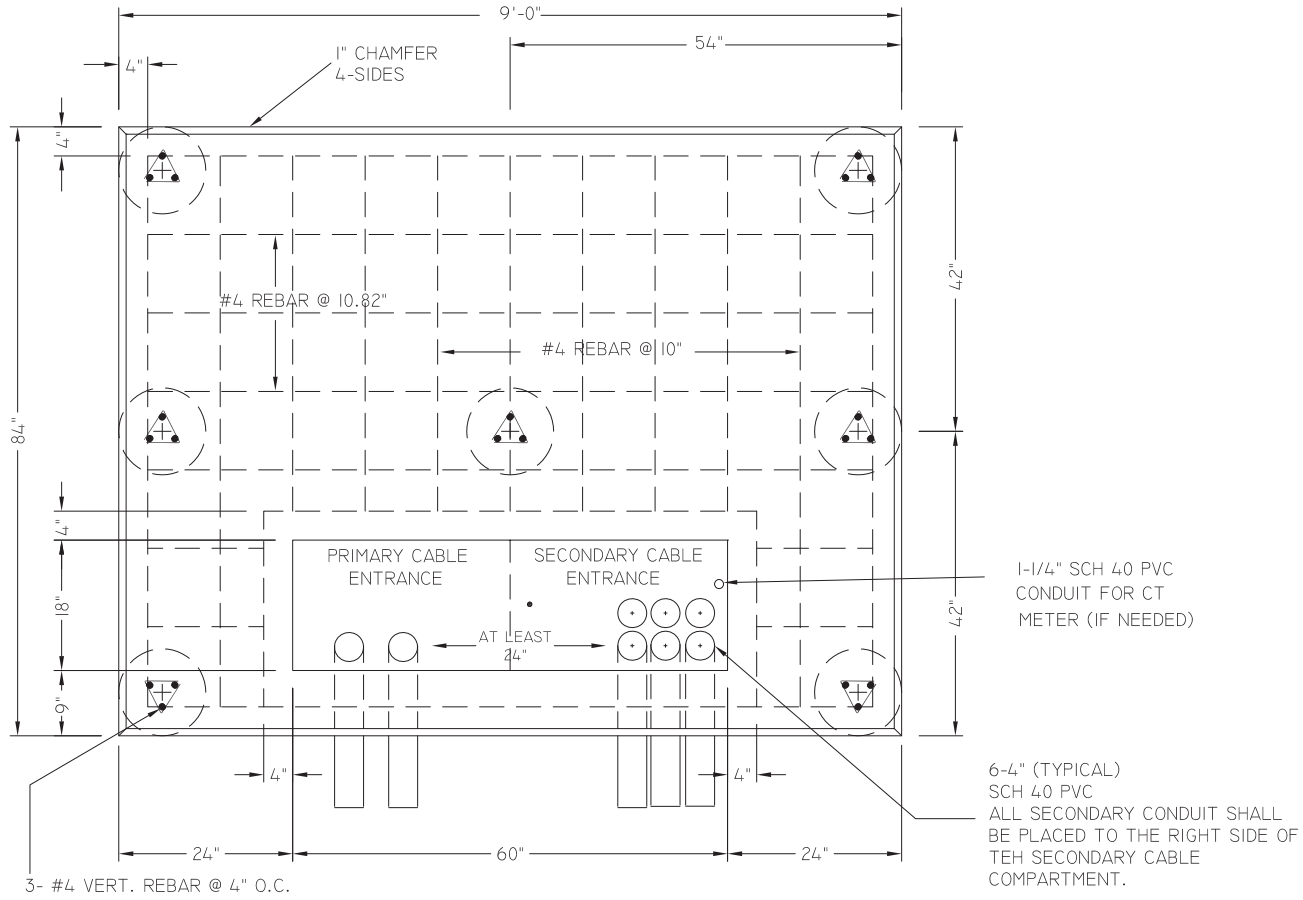
1. USE 3000 P.S.I. CONCRETE.
2. SLAB THICKNESS TO BE 12" MINIMUM.
3. ALL REINFORCING STEEL TO BE 6" BELOW TOP OF PAD.
4. 1 1/4" MIN PVC CONDUIT FOR CT'S WIRES @ SEC. CABLE ENTRANCE TO METER LOCATION.
5. COMPACT SOIL 95% BEFORE INSTALLING CONCRETE PAD.
6. ALL MATERIALS PROVIDED AND INSTALLED BY THE COSTUMER.
7. MUST MEET ALL REQUIREMENTS OF BPUB STANDARD DRAWING ENG-8.

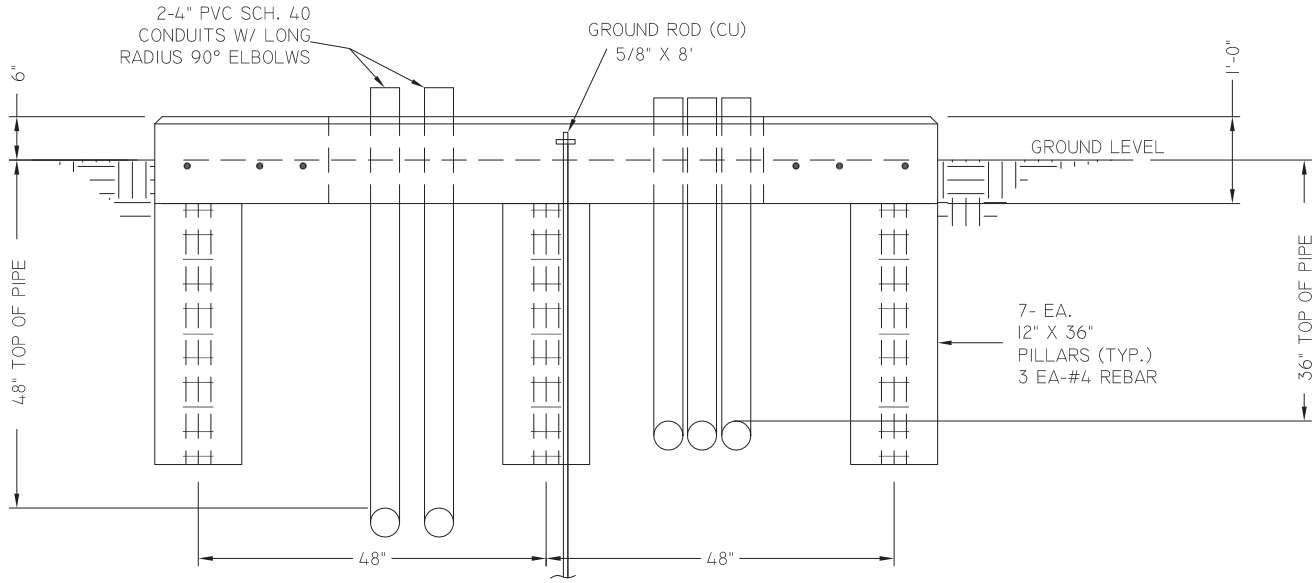
BROWNSVILLE
PUBLIC UTILITIES BOARD

TYPICAL CONCRETE PAD FOR 45 TO 500 KVA 3 PHASE PAD-MOUNTED TRANSFORMER

DEVELOPED BY:	STANDARDS COMMITTEE
APPROVED:	SEP 2019
DRAWING NUMBER	UD-16

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER





NOTES:

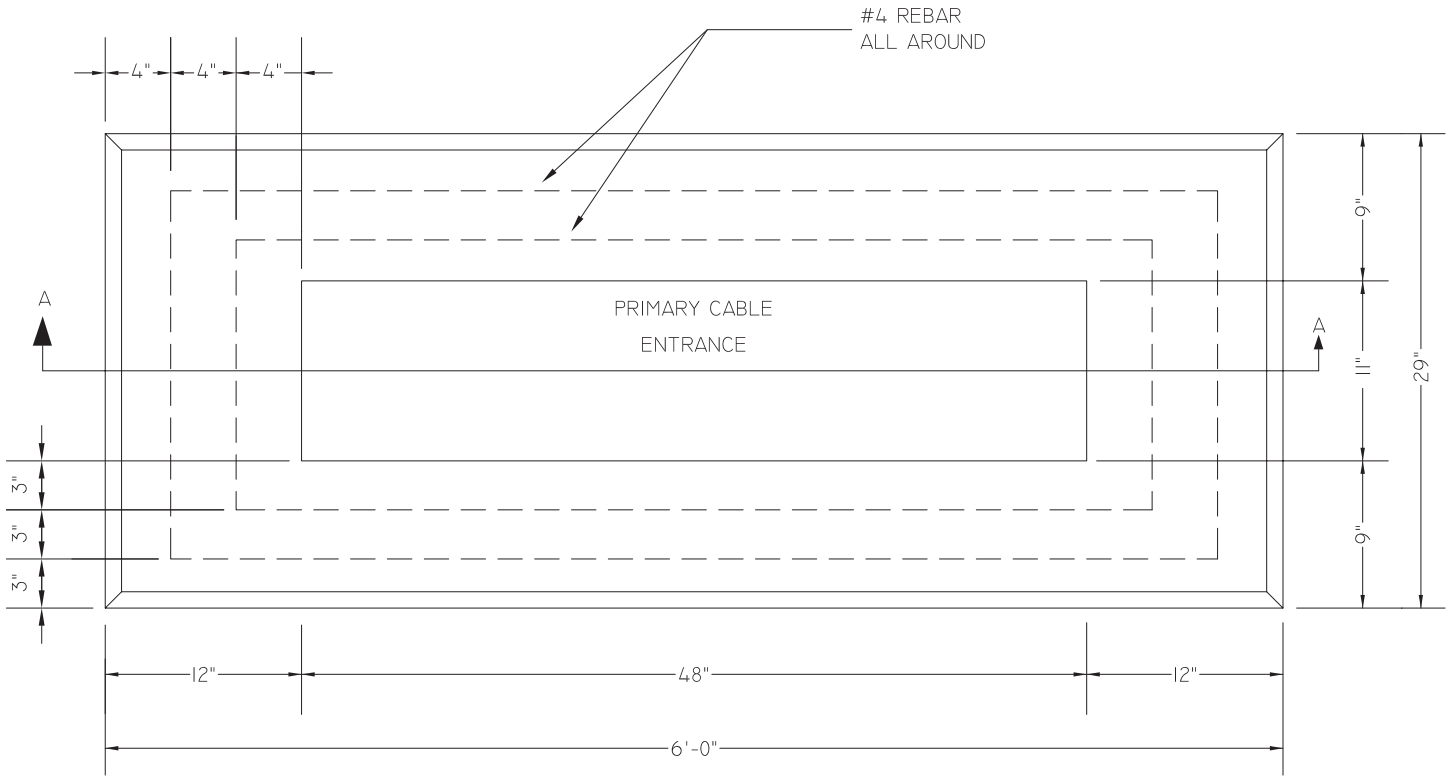
1. USE 3000 P.S.I. CONCRETE.
2. SLAB THICKNESS TO BE 12" MINIMUM.
3. ALL REINFORCING STEEL TO BE 6" BELOW TOP OF PAD.
4. I 1/4" MIN PVC CONDUIT FOR CT'S WIRES @ SEC. CABLE ENTRANCE TO METER LOCATION.
5. COMPACT SOIL 95% BEFORE INSTALLING CONCRETE PAD.
6. ALL MATERIALS PROVIDED AND INSTALLED BY THE COSTUMER.
7. MUST MEET ALL REQUIREMENTS OF BPUB STANDARD DRAWING ENG-8.

BROWNSVILLE
PUBLIC UTILITIES BOARD

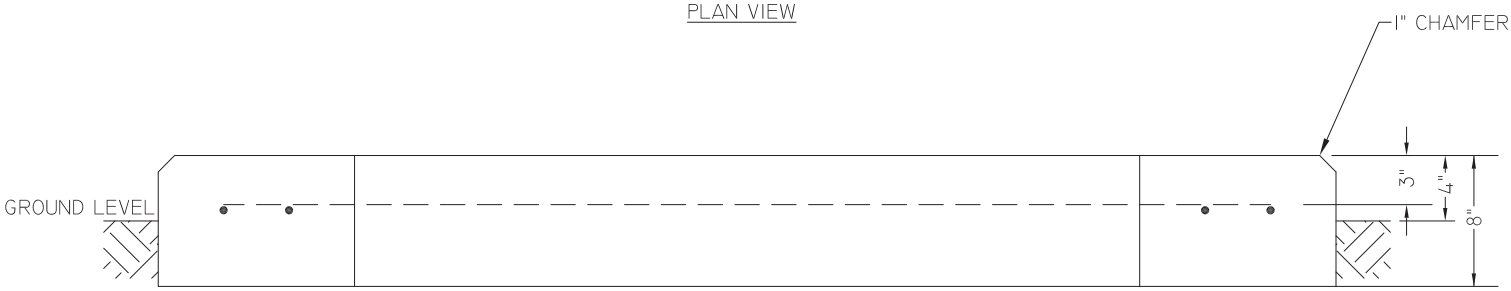
TYPICAL CONCRETE PAD FOR 750 TO 2500 KVA 3 PHASE PAD-MOUNTED TRANSFORMER

DEVELOPED BY:	STANDARDS COMMITTEE
APPROVED:	SEP 2019
DRAWING NUMBER	UD-17

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER



PLAN VIEW



SECTION A-A

NOTES:

1. USE 3000 P.S.I. CONCRETE.
2. SLAB THICKNESS TO BE 8" MINIMUM.
3. ALL REINFORCING STEEL TO BE 3" BELOW TOP OF PAD.
4. COMPACT SOIL 95% BEFORE INSTALLING CONCRETE PAD.
5. ALL MATERIALS PROVIDED AND INSTALLED BY THE COSTUMER.
6. ANCHOR BOLTS INSTALLED BY BPUB.
7. MUST MEET ALL REQUIREMENTS OF BPUB STANDARD DRAWING ENG-8.

BROWNSVILLE
PUBLIC UTILITIES BOARD

THREE-PHASE SECTIONALIZER CONCRETE PAD

DEVELOPED BY:	STANDARDS COMMITTEE
APPROVED:	SEP 2019
DRAWING NUMBER	UD-18A

STATE OF TEXAS
ELI ALVAREZ
100959
LICENSED
PROFESSIONAL ENGINEER

Appendix I

Port of Brownsville

Asphaltic Pavement & Base w/GeoGrid

1. **SEQUENCE OF WORK**: The Contractor shall plan the work to expeditiously accomplish the pavement improvements and other appurtenant work. It is not the intent of the Owner to destroy or in any way invade the locations of utilities in place. If any difficulties are encountered, the Contractor shall be responsible to bring it to the attention of the Engineer immediately. Surplus dirt removed from excavation necessary to the construction shall be disposed of by the Contractor. However, where instructed by the Engineer or the Owner, the Contractor shall dispose of surplus dirt as desired by the landowner.

2. **DESCRIPTION**. This item shall consist of the placing, treatment and compacting of the Limestone flexible base, and placing of a surface course of hot mix asphaltic concrete as herein specified and in conformance with typical sections, lines and grades shown on the plans and defined by the Engineer.

Subgrade Preparation is described in the specification for “Subgrade Preparation”, pages SP - 1 through SP - 3.

3. **MATERIALS**.

3.1. **Limestone Base**. The material for the Base Course shall be Crushed Limestone, crushed as needed to meet the requirements hereinafter specified, and shall consist of durable coarse aggregate mixed with an approved proportion of Binder Material. The limestone shall conform to the requirements of Type “A” State Grade Crushed Limestone, as specified by “Item 247 – Flexible Base”, of the Texas State Department of Highways and Public Transportation, 1982 Standard Specification for Construction of Streets and Bridges, and shall meet the physical requirements as follows:

3.1.1. Strength: A minimum strength of 50 CBR shall be achieved on the Crushed Limestone Base.

3.1.2. Gradation.

Retained on 1-3/4" square sieve	0%
Retained on 7/8" square sieve	10% to 35%
Retained on 3/8" square sieve	30% to 50%
Retained on #4 sieve	45% to 65%
Retained on #40 sieve	70% to 85%

3.1.3. Material Passing the #40 sieve shall be known as “Binder Material”, and shall meet the following requirements:

Maximum Liquid Limit (L.L.)	35%
Maximum Plasticity Index (P.I.)	10%

3.2. **TX5 Triaxial GeoGrid Mechanical Stabilization**. Each Limestone Base material layer shall be combined with one layer of polymeric TX5 Triaxial GeoGrid grid structure comprised of a regular network of integrally connected, multidirectional tensile elements of appropriate orientation, size and shape with triangular apertures of the size specified to allow

interlocking with the unbound Limestone Base materials. The combination of the two materials shall create an improved or modified composite layer with significantly improved properties and performance capabilities.

3.2.1. Limestone Base Mechanical Stabilizer: GeoGrid. The Limestone Base Mechanical Stabilizer, or Structural Base Material Reinforcement, shall be TriAxial TX5 GeoGrid. The grid shall be integrally formed and produced from a punched sheet of polypropylene which is oriented in three substantially equilateral directions so that the resulting ribs have a high degree of molecular orientation, which continues at least in part through the mass of the integral node.

3.2.2. The GeoGrid structure shall have apertures that are triangular in shape, and shall have ribs with depth-to-width ratios greater than 1.0.

3.2.3. The geogrid shall have the typical characteristics shown in the table below, and shall be certified in writing by the manufacturer to be TX5 or approved equivalent:

TX5 GeoGrid Characteristics

Properties	Longitudinal	Diagonal	Transverse	General
Rib pitch, mm (in)	40 (1.60)	40 (1.60)	-	
Mid-rib depth, mm (in)	-	1.4 (0.06)	1.2 (0.05)	
Mid-rib width, mm (in)	-	1.0 (0.04)	1.1 (0.04)	
Rib shape				rectangular
Aperture shape				triangular

3.3. **Hot Mix Asphaltic Concrete**. The hot mix asphaltic concrete shall conform to the requirements of the Texas State Department of Highways and Public Transportation 1982 Specifications, Item 340. The paving mixture to be used shall be the type designated on the plans. The Contractor shall provide appropriate documentation from the producer and a commercial laboratory that the hot mix asphaltic concrete used meets these requirements. The asphalt to be used shall be AC-20, 5% to 8% by weight, with a minimum Hveem Stability of 30. Aggregate retained on No. 4 sieve shall be 100% crushed limestone.

4. **CONSTRUCTION METHODS**:

4.1. **Limestone Base**. Construction methods for the Limestone base shall conform to T.H.D. Spec. #249 “Flexible Base (Delivered)”. The Contractor shall not place Limestone on the roadbed until the Engineer has accepted the shaped and compacted subgrade.

The Contractor shall maintain the roadbed free of holes, ruts and depressions and in conditions to receive the Limestone. The Limestone base shall be compacted to at least 98% of Standard Proctor density to the full required thickness.

The first density and depth test at a specific location shall be made by a commercial testing laboratory designated by the Owner and said tests shall be paid for by the Owner. If the test fails, all other tests at that location shall be paid for by the Contractor.

4.2. **TX5 Triaxial GeoGrid**.

4.2.1. The Contractor shall inspect the GeoGrid upon delivery to confirm that the proper material has been received. The Contractor shall make sure that the GeoGrid is free of flaws or damage that may have occurred during manufacturing, shipping, or handling.

4.2.2. The Subgrade Soil or previous Limestone Base layer shall be prepared as indicated on the construction drawings or as directed by the Engineer. The GeoGrid shall be placed after the previous soil or base layer has been shaped to grade as required in the construction documents, and density and surface texture has been approved by the Engineer or the inspector. The GeoGrid shall be placed longitudinally on the roadway subgrade or base. Each GeoGrid strip shall overlap no less than 6" with the adjacent GeoGrid strip. No material shall be placed on top of a GeoGrid layer until approved by the Engineer or the inspector.

4.2.3. The GeoGrid shall be installed in accordance with the plans and specifications and any installation guidelines provided by the manufacturer or as directed by the Engineer.

4.2.4. The GeoGrid may be temporarily secured in place with ties, staples, pins, sand bags or backfill as required by fill properties, fill placement procedures or weather conditions or as directed by the Engineer.

4.2.5. A minimum loose fill thickness of 6 inches is required prior to operation of tracked vehicles over the GeoGrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and damaging the GeoGrid. When underlying substrata is trafficable with minimal rutting, rubber-tired equipment may pass over the GeoGrid reinforcement at slow speeds (less than 5 mph). Sudden braking and sharp turning movements shall be avoided.

4.3. **Hot Mix Asphaltic Concrete**. The prime coat, tack coat or the asphaltic mixture when placed with a spreading and finishing machine, shall not be placed when the air temperature is below 50 deg F and is falling, but it may be placed when the air temperature is above 50 deg F and is rising. The air temperature shall be taken in the shade away from artificial heat. It is further provided that the prime coat, tack coat, or asphaltic mixture shall be placed only when the humidity, general weather conditions, and temperature and moisture condition of the base, in the opinion of the Engineer, are suitable. If the temperature of the asphaltic mixture of a load or any part of a load becomes less than 225 deg F. or more than 350 deg F after being dumped from the mixer and prior to passing through the lay-down machine, all or any part of the load may be rejected.

4.3.1. Prime Coat. After the Limestone base has been laid to grade, and is approved by the Engineer or the Inspector, a prime coat shall be applied at the rate shown on the plans. The asphaltic material shall be as specified in the plans. The application temperature shall be as provided above. The tack coat for asphaltic concrete specified below shall not be applied on a previously primed flexible base until the primed base has completely cured to the satisfaction of the Engineer.

4.3.2. Tack Coat. Before the asphaltic mixture is laid, the surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The surface shall be given a uniform application of tack coat using asphaltic materials specified in the plans. This tack coat shall be applied, as directed by the Engineer, with an approved

sprayer at a rate not less than 0.05 (not to exceed 0.15) gallons per square yard of surface. All contact surfaces of inlet structures and all joints shall be painted with a thin uniform coat of the asphaltic material meeting the requirements for tack coat. The tack coat shall be rolled with a pneumatic tire roller when directed by the Engineer.

4.3.3. Transporting Asphaltic Concrete. The asphaltic mixture, prepared as specified above, shall be hauled to the work in tight vehicles previously cleaned of all foreign material. The dispatching of the vehicles shall be arranged so that all material delivered may be placed, and all rolling shall be completed during daylight hours. In cool weather or for long hauls, canvas covers and insulating of the truck bodies may be required. The inside of the truck body may be given a light coating of oil, lime slurry or other material satisfactory to the Engineer, if necessary, to prevent mixture from adhering to the body.

4.3.4. Placing.

4.3.4.1. Generally, the asphaltic mixture shall be dumped and spread on the approved prepared surface with specified spreading and finishing machine, in such manner that when properly compacted the finished pavement shall be smooth, of uniform density and shall meet the requirements of the typical cross sections and the surface tests. During the application of asphaltic material, care shall be taken to prevent splattering of adjacent pavement, and structures.

4.3.4.2. When the asphaltic mixture is placed in a narrow strip along the edge of an existing pavement, or used to level up small areas of an existing pavement or placed in small irregular areas where the use of a finishing machine is not practical, the finishing machine may be eliminated when authorized by the Engineer, provided a satisfactory surface can be obtained by other approved methods.

4.3.4.3. Flush Structures. Adjacent to flush structures, the surface shall be finished uniformly high so that when compacted it shall be slightly above the edge of the flush structure.

4.3.5. Compacting.

4.3.5.1. Rolling with the three wheel and tandem rollers shall start longitudinally at the sides and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the rear wheel unless otherwise directed by the Engineer. Rolling with pneumatic-tire roller shall be done as needed. Rolling shall be continued until no further compression can be obtained and all roller marks are eliminated. One tandem roller, one pneumatic-tire roller, and at least one three wheel roller, as specified above shall be provided for each job. If the Contractor elects, he may substitute the three axle tandem roller and/or the three wheel roller; but in no case shall less than three rollers be in use on each job. Additional rollers shall be provided if needed. The motion of the roller shall be slow enough at all times to avoid displacement of the mixture. If any displacement occurs, it shall be corrected at once by the use of rakes and of fresh mixtures where required. The roller shall not be allowed to stand on pavement which has not been fully compacted. To prevent adhesion of the surface mixture to the roller, the wheels shall be kept thoroughly moistened with water, but an excess of water will not be permitted. All rollers must be in good mechanical condition. Necessary precautions shall be taken to prevent the

dropping of gasoline, oil, grease or other foreign matter on the pavement, either when the rollers are in operation or when standing.

In lieu of the rolling equipment specified, the Contractor may, upon written permission from the Engineer, operate other compacting equipment that will produce equivalent relative compaction as the specified equipment. If the substituted compaction equipment fails to produce the desired compaction as would be expected of the specified equipment, as determined by the Engineer, its use shall be discontinued.

4.3.6. Opening to Traffic. The pavement shall be opened to traffic when directed by the Engineer. If the surface ravels, it shall be the Contractor's responsibility to correct this condition at his expense.

4.3.7. Density Testing - Acceptance, Sampling and Testing of Hot Mix Asphaltic Concrete (Compaction). Hot Mix Asphaltic Concrete will be accepted for density on a lot basis. A lot shall consist of one day's production or 1,200 tons, whichever is less and shall be divided into four equal sublots. One test shall be made for each sublot.

Each lot of pavement will be accepted, with respect to density, when the average field density is equal to or greater than 92% of the average maximum theoretical density as determined in accordance with ASTM D2041, and when no individual determination is less than 91.0% of the average maximum theoretical density. Four field density determinations shall be made for each lot. Cores or sawed samples taken from the pavement shall be used to determine the field density. The density of the cored or sawed samples shall be determined in accordance with ASTM D2726.

The same specimen shall be used for determining both the maximum theoretical density and field density. Specimens used for field density determination shall be carefully crumbled, using heat if necessary, and maximum theoretical density determined in accordance with ASTM D2041. If heating is necessary, the specimen shall be heated to the lowest temperatures required for proper preparation of the sample.

The use of nuclear field density determination shall not be used as the basis for acceptance with respect to density.

4.3.8. Surface Tests. Tests for conformity with the specified crown and grade shall be made by the Contractor immediately after final rolling. Any variation exceeding the specified tolerances shall immediately be corrected by removing the defective work and replacing with new material, as directed by the Engineer. Any correction required shall be at the sole expense of the Contractor.

For surface course, the finished surface shall not vary more than 1/4 inch (6.35 mm) when tested with a 16 ft. straightedge applied parallel with, or at right angles to, the centerline.

The finished surfaces of hot mix asphaltic concrete shall not vary from the grade line, elevations and cross sections shown on the plans by more than 1/2 inch (12.7 mm). The Contractor shall correct pavement areas varying in excess of this amount by removing and replacing the defective work. Skin patching shall not be permitted for correction of low areas nor shall planing be permitted for correction of high areas.

4.3.9. Sampling Pavement. Samples for determination of thickness and density of completed asphaltic pavement surface shall be obtained by the testing laboratory. The size, number and locations of the samples will be as directed by the Engineer. Samples shall be neatly cut with a saw, core drill or other approved equipment. The Contractor shall, after coring the pavement, provide all labor and materials for patching the core holes as soon as practicable. The owner will cover the costs of initial testing. However, the costs for any retesting due to failed tests shall be borne by the Contractor.

All tests necessary to determine conformance with the specified requirements will be performed without cost to the Contractor. However, any required retests due to failed tests shall be paid for by the Contractor.

5. **MEASUREMENT**:

5.1. Measurement of "Subgrade Preparation" shall be by the subgrade area actually completed, of each thickness as specified on the construction drawings and in the Bid Proposal. Unit shall be in square yards.

5.2. Measurement of "Limestone Base w/TX5 GeoGrid" shall be by the base area actually completed, of each thickness as specified on the construction drawings and in the Bid Proposal. Unit shall be in square yards.

5.3. Measurement of "Limestone Base" shall be by the base area actually completed, of each thickness as specified on the construction drawings and in the Bid Proposal. Unit shall be in square yards.

5.4. Measurement of "H.M.A.C. Pavement" (Hot Mix Asphaltic Concrete Pavement) shall be by the paved area actually completed, of the thickness specified on the construction drawings and in the Bid Proposal. Unit shall be in square yards.

6. **PAYMENT**:

6.1. The work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for at the unit price bid per square yard of "Subgrade Preparation", of "Limestone Base w/TX5 GeoGrid", of "Limestone Base", and of "Hot Mix Asphaltic Pavement", of each of the thicknesses specified in the Construction Drawings and in the Bid Proposal.

6.2. The unit bid price shall be full compensation for furnishing all material, subgrade preparation, Limestone, Tri-Axial TX5 GeoGrid fabric, freight, heating, mixing, hauling, cleansing of the existing subgrade course, base course or pavement, tack coat, placing asphaltic concrete mixture, rolling and finishing, and for all manipulation, labor, tools, equipment, and incidentals necessary to complete the work to the thicknesses and compaction levels indicated in the drawings, and in conformance with all the provisions of these specifications.