**PROJECT NOTES & SPECIFICATIONS**

**GENERAL NOTES**
1. THIS CONTRACT WORKS FOR THE CONSTRUCTION AND REPAIR OF ALL EXISTING UTILITY TUNNELS AND UTILITY RACKS ENCOUNTERED IN THE COURSE OF CONSTRUCTION.
2. ALL WORK SHALL BE CONFORM TO THE M.S.U. MAINTENANCE DEPARTMENT AND THE ENGINEER FOR FURTHER REVIEW AND DIRECTION AS APPROPRIATE.
3. MATERIALS ARE TO BE SPECIFIED BY MIDWESTERN STATE UNIVERSITY. MATERIALS SUPPLIED BY CONTRACTOR SHALL BE IN CONFORMANCE WITH MANUFACTURER PRODUCT STORAGE, MATERIAL AND SUBSTRATE SURFACE PREPARATION, ENSURING THE PRESENCE OF NO HUMIDITY, DUST OR DIRT. MATERIALS SUPPLIED BY CONTRACTOR SHALL BE IN CONFORMANCE WITH MANUFACTURER PRODUCT STORAGE, MATERIAL AND SUBSTRATE SURFACE PREPARATION, ENSURING THE PRESENCE OF NO HUMIDITY, DUST OR DIRT.
4. ALL CONTRACT WORKS WILL COMPLY TO THE LATEST EDITION OF ACI 318-14.
5. CONCRETE CEMENT TO BE USED IN CONSTRUCTION SHALL BE OF TYPE I AND HAVE A 28-DAY COMpressive STRENGTH OF 3000 PSI OR GREATER. CONCRETE CEMENT TO BE USED IN CONSTRUCTION SHALL BE OF TYPE I AND HAVE A 28-DAY COMpressive STRENGTH OF 3000 PSI OR GREATER.
6. ALL WORK SHALL BE IN CONFORMANCE WITH THE M.S.U. MAINTENANCE DEPARTMENT AND THE ENGINEER FOR FURTHER REVIEW AND DIRECTION AS APPROPRIATE.

**SPECIALTY CONCRETE PRODUCTS**
1. M.C.R. CEMENT COMPANY - M.C.R. CEMENT COMPANY PROVIDES A WIDE RANGE OF CONCRETE CEMENTS, INCLUDING A 1500 PSI, 2000 PSI, AND 3000 PSI CEMENT.
2. W.S. BECK - W.S. BECK OFFERS A RANGE OF CONCRETE CEMENTS, INCLUDING A 1500 PSI, 2000 PSI, AND 3000 PSI CEMENT.
3. REDMOR - REDMOR PROVIDES A WIDE RANGE OF CONCRETE CEMENTS, INCLUDING A 1500 PSI, 2000 PSI, AND 3000 PSI CEMENT.
4. CONCRETE CEMENT COMPANY - CONCRETE CEMENT COMPANY OFFERS A RANGE OF CONCRETE CEMENTS, INCLUDING A 1500 PSI, 2000 PSI, AND 3000 PSI CEMENT.

**UTILITY TUNNEL REPAIRS TUNNEL B - EAST OF DANIEL BUILDING**

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**PROJECT NOTES & SPECIFICATIONS**

**LIST OF TUNNEL REPAIRS**

1. EXCAVATE AND INSTALL CONCRETE CAP ON DETERIORATED TUNNEL ROOF.
2. INSTALL WATERPROOFING MEMBRANE ON TOP OF TUNNEL.
3. INSTALL STRUCTURAL STEEL WALL REINFORCEMENTS WITHIN TUNNEL.
4. REPAIR AND PATCH THE INTERIOR TUNNEL WALL AND CEILING SURFACES.
5. REPAIR SIGNIFICANT DAMAGE TO "UNISTRUT" FRAMES AND FRAME"
6. REPLACE DETERIORATED CONCRETE BASE FOOTINGS OF UTILITY RACKS ON TUNNEL.
7. PROVIDE PROTECTIVE COATINGS TO ALL SIGNIFICANT RUSTING STEEL FRAMES ON TUNNEL.
8. PROVIDE SUBSTITUTE SECTION OF CONCRETE DRIVE FOR TUNNEL ROOF REPAIR ACCESS.
9. REPLACE SECTIONS OF SIDEWALLS AND CURBS DAMAGED FOR TUNNEL REPAIRS.
10. INSTALL WATERPROOFING AT ALL CRACKS IN CONCRETE CURB AND WILLS ABOVE TUNNEL AREA FROM MK 1220 TO MK 1240.

**KEY PLAN**

This is an image of a key plan indicating the location and details of the tunnel repairs. The specific details of each repair can be found in the drawings referenced in the INDEX OF DRAWINGS.

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CJ TELEPHONE

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12/7/21


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NOTE TO THE RESPONSIBLE ENGINEER:

1. FOR GENERAL PROJECT NOTES PLEASE REFER TO SHEET NO. S1

PROJECT NOTES:

1. THE PRESENCE AND EXACT LOCATION OF ALL BELOW GRADE UTILITIES IS TO BE VERIFIED WITH "MSU TEXAS" FACILITIES MAINTENANCE DEPARTMENT.

ABBREVIATION LEGEND:

MK 1350 FT

TUNNEL MAIN LOCATION

CJ

EXPANSION JOINT IN CONCRETE PAVING

EJ

CONTROL JOINT IN CONCRETE PAVING

GAS LINE

DOMESTIC WATER LINE

WASTE WATER LINE

WATER LINE VALVE

WATER FLOW METER

WASTE WATER MANHOLE

SANITARY CLEAN OUT

FIRE HYDRANT

TUNNEL DISTRESS LEGEND:

1. DETERIORATING & CRACKING CONCRETE IN CEILING OF TUNNEL

2. SPALLING CONCRETE W/ RUSTING REINF. STEEL IN TUNNEL WALL

3. EXPANSION JOINT IN CONCRETE PAVING

4. DOMESTIC WATER LINE

5. WATER FLOW METER

6. WASTE WATER MANHOLE

7. SANITARY CLEAN OUT

8. FIRE HYDRANT

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PROJECT NOTES:
1. FOR GENERAL PROJECT NOTES PLEASE REFER TO SHEET NO. S1

SECTION OF EXISTING SIDEWALK, CURB & GUTTER, & DRIVE WILL REQUIRE REMOVAL FOR TUNNEL REPAIRS

SCALE: 3/4" = 1'-0"

SLOUGHING CONCRETE, & RUSTING REBAR
SEE DETAIL 2/S4 FOR TUNNEL REINFORCING STEEL

DEPTH BELOW GRADE
APPROX. 2 FT to 3 FT

TUNNEL SECTION at DISTRESSED LOCATION
SCALE: 3/4" = 1'-0"
**General Concrete Repair Notes:**

1. **EXTENT OF CONCRETE REPAIRS:**
   - **Light Spalling and Minimal Cracking in Concrete Ceiling:** Recommended to be left alone.
   - **Isolated Cracks with 1/8" Separation or Larger:** Are recommended to be filled with concrete repair mortar.
   - **Moderate to Heavily Fractured Concrete Ceiling:** Must be removed from the ceiling and built back using concrete repair products. All loose, deteriorated, and spalled concrete shall be removed from tunnel ceiling to expose sound concrete substrate for the application and adhesion of concrete patch materials.
   - **Repair Mortar for Coating and Sealing:** The concrete ceiling is to be a one-component general-purpose structural repair mortar. The manufacturer is W.R. Meadows, Inc. This repair mortar is a one-component, no-mix, ready-to-use cementitious repair mortar.
   - **Repair Mortar for Coating and Sealing:** The concrete ceiling is to be a one-component, no-mix, ready-to-use cementitious repair mortar.
   - **For New Construction:** Repair mortars to be color-matched to the existing tunnel ceiling. The manufacturer is W.R. Meadows.

2. **Deteriorating Concrete Roof:**
   - **Exposed and Rusting Rebar:** The rebar is to be wire-brushed clean of scale and properly protected. A minimum of 1" coverage of repair mortar is to be provided.
   - **Surface Preparation:** The exposed and rusting rebar is to be wire-brushed clean of scale and properly protected. A minimum of 1" coverage of repair mortar is to be provided.
   - **Application of Repair Mortar:** The repair mortar is to be applied using a trowel or sprayer. The manufacturer is W.R. Meadows.
   - **Curing of Repair Mortar:** The repair mortar is to be cured for 28 days. The manufacturer is W.R. Meadows.
   - **Tunnel Roof Repair Details:**
     - **Deteriorating & Spalling Concrete:**
       - Use "CORELINE MFG" Model 1C Adjustable Jack Post 34,000 lbs. Lift Capacity.
       - New concrete deck has achieved 4000 PSI 28 Day Compressive Strength.
   - **Temporary Tunnel Shoring Details:**
     - **Protective Shoring Notes:**
       - A minimum of 40 feet length of shoring is to be placed at the worst area of ceiling damage from tunnel marks 1200 to 1300.
       - All shoring is to be placed and inspected by the engineer prior to any excavation or construction activity being performed.
       - Shoring to remain in place until all backfill operations have been performed and proper water seal.
       - For structural notes and construction drawings refer to the structural notes found on sheet 1.

3. **Construction Activity:**
   - **For General Project Notes:** Please refer to Sheet No. 53.

4. **Utility Tunnel Repairs:**
   - ** Morrow Tunnel - East of Daniel Building:**
     - **Tunnel Repair Sections & Details:**
       - **Protective Shoring Notes:**
         - A minimum of 40 feet length of shoring is to be placed at the worst area of ceiling damage from tunnel marks 1200 to 1300.
         - All shoring is to be placed and inspected by the engineer prior to any excavation or construction activity being performed.
         - Shoring to remain in place until all backfill operations have been performed and proper water seal.
         - For additional shoring & construction notes refer to the structural notes found on sheet 1.

5. **Midwestern State University:**
   - **Utility Tunnel Repairs:**
     - **Tunnel East of Daniel Building:**
       - **Tunnel Repairs Sections & Details:**
         - **Protective Shoring Notes:**
           - A minimum of 40 feet length of shoring is to be placed at the worst area of ceiling damage from tunnel marks 1200 to 1300.
           - All shoring is to be placed and inspected by the engineer prior to any excavation or construction activity being performed.
           - Shoring to remain in place until all backfill operations have been performed and proper water seal.
           - For additional shoring & construction notes refer to the structural notes found on sheet 1.

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TYPICAL PERMANENT WALL SHORING DETAIL

1. SCALE: 1" = 1'-0"

UNISTRUT RACKS

SEE DETAIL 1 & 2 ON SHEET S5 FOR TUNNEL ROOF REPAIR SLAB

NEW PERMANENT WALL SHORING

HSS6x4x3/8" AT 3'-0" O.C.

TYP.

8'-0" (VERIFY)

3'-2"

2'-10"

3'-2"

MEASURE CEILING HEIGHT IN TUNNEL TO OBTAIN ACCURATE SHORING POST HEIGHT

7'-10" (VERIFY)

2 FT TO 3 FT DEPTH VARIES

IT IS RECOGNIZED THAT INSTALLATION OF THESE WALL BRACES BEHIND THE EXISTING UTILITY LINES AND RACKS WILL BE DIFFICULT. CONSULT WITH THE ENGINEER FOR APPROVAL OF ANY MODIFICATIONS TO THE DETAIL AS SHOWN.

PROJECT NOTES:

1. FOR GENERAL PROJECT NOTES PLEASE REFER TO SHEET NO. S1

2. FOR PROJECT NOTES USE ALL-THREAD RODS & HEX HEAD NUTS

3. DRILL & EPOXY 4" INTO EXISTING TUNNEL CEILING

SHIM & GROUT BELOW BASE PLATE

WALL ANCHORS SEE DETAIL 4/S6

TYPICAL WALL SHORING ATTACHMENT SECTION

INSTALL AT LOCATIONS NOTED ON SHEET S3

TUNNEL WALL

BASE & CAP PLATE SHORING DETAIL

INSTALL AT LOCATIONS NOTED ON SHEET S3

TYPICAL PERMANENT WALL SHORING DETAIL

INSTALL AT LOCATIONS NOTED ON SHEET S3

TUNNEL WALL

TYPICAL PERMANENT WALL SHORING DETAIL

INSTALL AT LOCATIONS NOTED ON SHEET S3

TUNNEL WALL

TYPICAL PERMANENT WALL SHORING DETAIL

INSTALL AT LOCATIONS NOTED ON SHEET S3

TUNNEL WALL

TYPICAL PERMANENT WALL SHORING DETAIL

INSTALL AT LOCATIONS NOTED ON SHEET S3

TUNNEL WALL
1. All replacement structural framing shapes used in the rebuilding of utility racks are to be preformed hot dip galvanized steel sections as manufactured by either "Power-Strut" or "Unistrut" companies.
2. Strut sections are to be either "Power-Strut" P.S. 200 series or "Unistrut" 1/2" series. All members are to be a minimum of 1/2" x 1/2" x 12 gauge galvanized steel.
3. Bolted base plateattachments to new pre-formed hot dip galvanized post base "Power-Strut" # PS 200 or "Unistrut" # P2072ASQ-EG. Utilizing 5/8" base plate and 1/2" anchor bolts.
4. Where spacing of 0" to 3" exists, post section is required to replace a section of deteriorated post. A bolt splice connection may be utilized in conformance with "Unistrut" standard practices.
5. Any surface damaged sections, weld scars or abrasions to the galvanized "Unistrut" sections is to be touch-up coated with two coats of zinc-rich cold galvanizing by "Rust-Oleum."
6. For additional structural framing notes dealing with "Unistrut" style constructed utility racks, please refer to the general notes of sheet S-1.

Utility Rack "Unistrut" Framing Notes

Where Unistrut Post is found to be severely deteriorated, remove lower section of deteriorated post and provide bolted splice to remaining post section utilizing standard manufacturer's splice details.

Clean all rust & scale from "Unistrut" post and apply two coats of zinc-rich cold galvanizing by "Rust-Oleum."

Where steel support base is deteriorated: Provide new pre-formed hot dip galvanized post base "Power-Strut" # PS 200 or "Unistrut" # P2072ASQ-EG. Utilizing 5/8" base bolts. Alternative: utilize 1/2" base plate, with 3/4" bolt and provide protective coatings.

Encase deteriorated concrete pedestals in new concrete base. Use self-leveling, non-shrink, water tight grout. Provide 3" high 6" Ø or 8" Ø PVC pipe sleeve form to be left in place where only anchor is missing. Provide 3/4" 0.25" threaded rod adhesive anchor, drill & bored 4" into existing slab.

For additional structural framing notes dealing with Unistrut style constructed utility racks, please refer to the general notes of sheet S-1.