MARCS REMOTE COMMUNICATIONS TOWER
REQUEST FOR QUOTE
FOR DEPARTMENT OF ADMINISTRATIVE SERVICES
MULTI-AGENCY RADIO COMMUNICATION SYSTEM
REMOTE COMMUNICATIONS TOWER
KEENE-COSHOCTON (WHITE EYES), COSHOCTON COUNTY, OHIO

The State of Ohio, Department of Administrative Services, Office of Information Technology, Multi-Agency Radio Communication System Program ("MARCS") is requesting quotes ("RFQ") for pre-construction, construction and post construction activities for a remote communications tower site ("the Project") to be located on South of Township Road 188, Keene-Coshocton (White Eyes), Ohio, approximately ½ mile South of Township Road 188, Coshocton County (the "Site").

Background

This Project will consist of erecting a turnkey, remote communications tower including materials, antennae and line connection, equipment, labor, shelter house, site preparation, utility connections, generator and all foundation and grounding. The State will provide a Geotechnical Report and Site Plans containing Specifications and a Site Survey to vendors submitting a quote ("Quote").

The selected Vendor will have 75 consecutive days to complete the project from receipt of the purchase order and notice to proceed.

Total costs for this Project cannot exceed Four Hundred and Forty Five Thousand and No Cents ($445,000.00). The State reserves the right to accept or reject any bid in excess of this fixed not to exceed cost.

Evaluation and Award

The Vendor must have experience in project management for at least five (5) public safety communication tower construction projects, and must provide references for these projects.

The Vendor must submit a Project Schedule, inclusive of payable deliverables set forth in this RFQ. The Vendor must also include the name of the Project Manager assigned to this Project.

The Vendor must provide a not to exceed fixed price quote for this Project as set forth in this RFQ.

The Vendor must submit a list of all known subcontractors that will be working on this project on the attached spreadsheet. The subcontractors address and percentage of work must be included.

The State will award the Contract to the selected Vendor based upon the Vendor's qualifications and experience, response of References of Vendor's conduct and performance on previous contracts, the submitted Project Schedule, Vendor's ability to execute the contract properly, and the Vendor's not to exceed fixed price submitted.

Final acceptance of the selected Vendor's Quote is subject to the Controlling Board and the MARCS Steering Committee approval. The selected Vendor cannot begin work until a purchase order and notice to proceed are issued.
The selected Vendor must sign and return the attached Contract Terms and Conditions within five (5) days after notification that the Vendor has been selected to do the work.

It is the Vendor's sole responsibility to submit all portions of the requested documentation no later than the deadline provided below for opening of the Quotes. Failure to do so may be grounds for immediate disqualification of the Vendor's quote with no further consideration for evaluation or award of this RFQ.

Schedule of Events

The Project will advertise from August 22 until September 2, 2011
Questions will be accepted until August 31, 2011 at 8:00 am.
Bid opening will be September 6, 2011 at 1:00 pm.
Notice of Acceptance will be on September 9, 2011
Project must be completed by December 9, 2011.

Quotes will be accepted no later than 1:00 pm on Tuesday, September 6, 2011, by the Department of Administrative Services, Office of Information Technology, Business Office at 30 E. Broad Street, 39th Floor, Columbus, Ohio 43215. When submitting a quote, the vendor must clearly mark the envelope with the Project name, due date, and to the attention of Ted Hampton, Procurement Manager. Vendors must submit three hard copies and one electronic copy on CD-ROM, DVD, USB or Flash Drive in Microsoft Office, Microsoft Project, and Adobe Acrobat format, as appropriate. If there is a discrepancy between the hard copy and the electronic copy of the Quote, the hard copy will control, and the State will base its evaluation of the Vendor's quote on the hard copy.

The selected Vendor must sign and return the Contract Terms and Conditions within five (5) days of award of this RFQ. The State will not sign the Contract until authorization to create a valid purchase order has been given.

The State will pay this contract on completion of the deliverables set forth below.

This is a not to exceed fixed price quote.

All labor costs will be at the State Prevailing Wage Rates.

Inquiries

Vendors may make inquiries regarding this RFQ any time during the inquiry period listed on the RFQ cover sheet. The State may not respond to any improperly formatted inquiries. The State will try to respond to all inquiries within 24 hours, excluding weekends and State holidays. The State will not respond to any inquiries received after 8:00 am. on the inquiry period end date. The State may extend the proposal due date.

To make an inquiry, vendors must use the process outlined below.

- Access the State Procurement Web site at http://procure.ohio.gov/.
- From the Navigation Bar on the left, select "Find It Fast".
- Select "Doc/Bid/Schedule #" as the Type.
- Enter the RFQ number found on the first page of this RFQ (the RFQ number begins with "DAS").
- Click the "Find It Fast" button.
- On the document information page, click the "Submit Inquiry" button.
- On the document inquiry page, complete the required "Personal Information" section by providing:
    - First and last name of the prospective vendor's representative who is responsible for the inquiry;
    - Name of the prospective vendor;
    - Representative's business phone number, and
    - Representative's e-mail address.
- Type the inquiry in the space provided, including:
    - A reference to the relevant part of this RFQ;
    - The heading for the provision under question, and
    - The page number of the RFQ where the provision can be found.
    - Click the "Submit" button.

A vendor submitting an inquiry will receive an immediate acknowledgement that the State has received the inquiry as well as an e-mail acknowledging receipt. The vendor will not receive a personalized response to the question nor notification when the State has answered the question.

Vendors may view inquiries and responses on the State's Procurement Web site by using the "Find It Fast" feature described above and by clicking the "View Q & A" button on the document information page.

All questions must be submitted by 8:00 am on Wednesday, August 31, 2011. Questions submitted after this time will not receive a response from the state.

Quotation Submittal

Each Vendor must submit three (3) complete, sealed and signed copies of its quotation, each quotation must be clearly marked with the Project name, due date, and to the attention of Ted Hampton, Procurement Manager.

A single electronic copy of the complete quotation must also be submitted with the printed quotations. Electronic submissions should be on a CD, DVD or USB memory stick.

Each proposal should include.

- Quote (see below)
- Project Schedule
- Project Managers Name
- References
- CD, DVD, USB, or Flash Drive copy of quote
- 3 hard copies
- W9 and OSS Vendor Information Form (if applicable)

Miscellaneous

The State may reject any Quote if the Vendor fails to meet a deadline in the submission or objects to the dates for performance of the Work or the terms and conditions in this RFQ.

By submitting a Quote, the Vendor acknowledges that it has read this RFQ, understands it, and agrees to be bound by its requirements. The State is not responsible for the accuracy of any information regarding this RFQ that was gathered through a source other than the inquiry process described in the RFQ.

The State may reject any Quote if the Vendor takes exception to the terms and conditions of this RFQ, including unacceptable assumptions or conditions in its Quote, fails to comply with the procedure for participating in the RFQ process, or fails to meet any requirement of this RFQ. The State may also reject any Quote that it believes is not in its interest to accept and may decide not to award a contract to any or all of the Vendors responding to this RFQ.

All Quotes and other material that Vendors submit will become the property of the State and may be returned only at the State's option. Vendors should not include any confidential information in a Quote or other material submitted as part of the response. All Quotes will be open to the public after the State has awarded the Contract.

The State will retain the Quotes, or a copy of them, as part of the Contract file for at least three years. After the three year retention period, the State may return, destroy, or otherwise dispose of the Quotes and any copies of them.

Selected Vendor Responsibilities

The selected Vendor must construct a 250' mono-pole communications tower that will be located on South of Township Road 188, Keene-Coshocton (White Eyes), Ohio, approximately ½ mile South of Township Road 188, Coshocton County (the "Site"). Also included in the vendors responsibilities will be the site preparation, shelter house, back-up generator, antenna and lines, and utility connections per the plans and specifications provided within the attached construction documents.

The selected Vendor will be responsible for all utility coordination, installation and any fees and permits, if required.

The State seeks a complete Project, and the Vendor must provide any incidental items omitted in the RFQ as part of the Vendor's not-to-exceed fixed price.

The selected Vendor must include a $2,000.00 allowance to be paid to the design engineer of record to provide as-built drawings. The selected Vendor will be responsible for the red lines that will be used for the creation of the as-built drawings.

The selected Vendor will be responsible for weekly updates to the MARCS office on the site management, and construction status. MARCS personnel will periodically conduct site inspections, for verification of deliverable progress and completion. Prior to final payment, MARCS will conduct an inspection to ensure all deliverables have been completed.

The selected Vendor must have any and/or all staff working or visiting the Site to have State Highway Patrol background checks (coordinated through MARCS). All rules, regulations and laws are to be complied with inclusive of no weapon/drug zones.

Pre-Construction Phase- *Deliverable 1*

Pre-Construction Meeting
The selected Vendor will be required to attend a pre-construction meeting to be hosted by the design engineer of record and located at the Site. The selected Vendor must take meeting minutes that include the date of the meeting, the attendees, the official start date of the Project, and any other substantive information discussed at the meeting. The selected Vendor must provide the meeting minutes to MARCS within one week after the pre-construction meeting.

Construction Phase- *Deliverable 2*

Preparation of Site, As Per Plans
Construction of 250' Mono-Pole-Material and Installation, As Per Plans
Installation of 12'x20' Shelter House and All to be Included Within, As Per Plans
Construction of Foundation – All Associated Anchoring, Grounding, Etc., As Per Plans
Construction of Ice Bridge – As Per Plans
Installation and Connection of All Antenna and Lines, As Per Plan
Connection of all utilities, As Per Plan

At the completion of construction, MARCS will conduct a walk-thru with the Project Manager to ensure all work is completed. At this time a "short" or "punch-out" list will be completed of any and all outstanding items. This list is to be documented on site and signed off by both parties.

Vendor will provide a hard copy of this mutually approved list and an updated completion schedule to MARCS two (2) days following this meeting.

All labor activities must be completed in accordance with prevailing wage rates. The selected Vendor is responsible for all required compliance regarding prevailing wages as directed by the Department of Commerce. The prevailing wage rates are available at the Ohio Department of Commerce's web site: http://www.com.state.oh.us.

Post-Construction Phase- *Deliverables 3 & 4*

Final Site Acceptance- *Deliverable 3*
This phase will include final acceptance of the MARCS Remote Communications Site. Upon notification of completion of identified outstanding items, MARCS and the Project Manager will perform a final inspection to ensure that all items specified in the final plans for construction have been successfully completed and the State is in receipt of a turnkey remote communications tower site.

Site Completion Documentation- *Deliverable 4*
The selected Vendor must provide to MARCS two (2) hard copy sets and two (2) CD sets of final Site Completion Documents inclusive of but not limited to; original and as-built plans and drawings, environmental and tower studies conducted and their results, associated warranty documentation, testing reports for equipment, permits and/or legal documents, product

documentation, product and service provider contact information, additional vendor warranties and/or documentation associated with this Project.

All labor costs will be at the State Prevailing Wage Rates.

The undersigned proposes to provide all required materials and perform all services for this Project, for the following sum(s):

Quote

Pre-Construction Phase

- **Pre-Construction Meeting/Meeting Minutes** ***(Deliverable 1)*** **N/A**

Construction Phase

- **Site Development** ***(Deliverable 2)***
    - **Preparation of Site, As Per Plans**
    - **Construction of 250' Mono-Pole**
    - **Material and Installation, As Per Plans**
    - **12'x20' Shelter House and All to be Included Within, As Per Plans**
    - **Construction of Foundation –**
        - **All Associated Anchoring, Grounding, Etc., As Per Plans**
    - **Construction of Ice Bridge – As Per Plans**
    - **Installation and Connection of All Antenna and Lines, As Per Plan**
    - **Connection of all Utilities, As Per Plan**
- **Completion of Short-List/Punch-List** ***(Deliverable Payout)***

Total Construction Phase **$_____**

Post-Construction Phase

- **Site Final Acceptance** ***(Deliverable 3)***
- **Site Completion Documentation** ***(Deliverable 4)***
  All Original and As-Built Plans and Drawings **+$3,000 (See *Note)**

  All Studies Conducted
  All Associated Warranty Details
  All Documentation Paid for by State of Ohio
  All Testing for any Equipment
  All Permits and/or Legal Documentation
  All Product and Service Provider Contact Information
  Any Additional Documentation Associated with this Project

Total Not To Exceed Fixed Price: $_____

*NOTE-The State will withhold a total of $3,000.00 ($2000.00 of which is the allowance to be paid to the engineer of record for the original and as-built plans and drawings) until delivery of Site Completion Documentation – Deliverable 4 of the Post-Construction Phase.

The Vendor acknowledges that by signing this Request for Quote, the Vendor understands and agrees to abide by its Quote, and all terms of the RFQ, including the Contract Terms and Conditions. Signatures must be ORIGINAL in blue ink and signed by an authorized representative of the Vendor. Failure to provide a valid signature will render this Quote non compliant and the Vendor will not be considered for this Project.

VENDOR SIGNATURE AND INFORMATION

Authorized Signature: _____

Printed Name/Title of Authorized Signator _____

Company Name: _____

Mailing Address: _____

Telephone: _____ Facsimile Number: _____

E-Mail Address: _____ Where Incorporated: _____

Federal Tax ID#: _____ OAKS Vendor ID# _____

Date enrolled in an OBWC-approved DFSP (month/date/year): _____ / _____ / _____

Contact person for Contract processing: _____

Telephone: _____ Facsimile Number: _____

President or Chief Executive Officer's Name/Title: _____

Telephone: _____ Facsimile Number: _____

E-Mail Address: _____

Is this a MBE Certified Vendor_____ Certification ID#_____

Is this an Edge Certified Vendor_____ Certification ID#_____

This Complete Project Request for Quote contains the following documents:
MARCS Remote Site Tower Construction Request for Quote
Supplemental Information
Subcontractor(s) name and address list
MARCS Terms and Conditions Contract (inclusive of addendums)
Site Survey/Legal Description
Geotechnical services/reports
Design Plans
W9 and OSS Vendor Information Form (if applicable)

Supplemental Information

1. Provide the following employee information for your company:

	Nationwide	Ohio
Total Number of Employees		
Percentage of Women		
Percentage of Minorities		

2. What percent of the work will be done by Subcontractors? _____%

If more than 50%, provide the same information for each subcontractor as requested in number 1 above for the contractor.

	Nationwide	Ohio
Subcontract Name:		
Total Number of Employees		
Percentage of Women		
Percentage of Minorities		

Subcontractor(s) List

1. If work is being subcontracted please provided the following:

Name of Subcontractor	Address of Subcontractor	% of Total

The "% of total" represents the total payment that will be made to the subcontractor in relationship to the total amount of this quote.

CONTRACT BETWEEN THE DEPARTMENT OF ADMINSTRATIVE SERVICES MULTI-AGENCY RADIO COMMUNICATION AND _____ FOR KEENE-COSHOCTON (WHITE EYES), COSHOCTON COUNTY, OHIO

THIS CONTRACT ("Contract") entered into by and between the state of Ohio Department of Administrative Services Multi-Agency Radio Communication System ("MARCS" or "the State") and _____ ("the Contractor") sets forth the terms and conditions under which the Contractor agrees to perform work in order to construct a tower site ("the Work") at Keene-Coshocton (White Eyes), Coshocton County, ("the Site").

In consideration of the mutual promises and obligations contained in this Contract, the parties agree to the following:

I. CONTRACT TERM PROVISIONS:

A. **APPROPRIATION OF FUNDS.** The state of Ohio's funds are contingent upon the availability of lawful appropriations by the Ohio General Assembly. If the General Assembly fails at any time to continue funding for the payments or any other obligations due by the State under this Contract, the State will be released from its obligations on the date funding expires.

The current General Assembly cannot commit a future General Assembly to an expenditure. Therefore, this Contract will automatically expire at the end of a current biennium. The State may renew this Contract in the next biennium by issuing written notice to the Contractor or by actions of the State of the decision to do so.

B. **CERTIFICATION OF FUNDS/PURCHASE ORDER REQUIREMENTS.** None of the duties or obligations in this Contract is binding on the State, and the Contractor will not begin performance on this Contract, until all of the following conditions are met:

1. **Certification of Funds**

   a. All statutory provisions under the Ohio Revised Code, including Section §126.07, have been met.

   b. All necessary funds are made available by the appropriate state agencies.

   c. If the State is relying on Federal or third-party funds for this Contract, the State certifies, by written notice, that such funds are available.

2. **Purchase Order**

   The Contractor holds an official state of Ohio Purchase Order (P.O.) from the appropriate state agency.

3. **Controlling Board**

   If required, the Controlling Board of Ohio approves this Contract.

4. **Notice to Proceed**

   Subparagraphs 1 through 3 above constitute Contractor's Notice to Proceed.

C. **TERMINATION / SUSPENSION.**

1. **Termination for Convenience.** The State may terminate this Contract for its convenience after issuing written notice to the Contractor. If the termination is for the convenience of the State, the Contractor will be entitled to compensation for any Work that the Contractor has performed before the termination. Such compensation will be the Contractor's exclusive remedy in the case of termination for convenience and is available to the Contractor only after the Contractor has submitted a proper invoice for such, with the invoice reflecting the amount determined by the State to be owing to the Contractor.

2. **Contract Termination.** If the Contractor fails to perform any one of its obligations under this Contract, Contractor will be in default and the State may terminate this Contract in accordance with this section. The termination will be effective on the date delineated by the State.

a. **Termination for Default.** If the Contractor's default is unable to be cured in a reasonable time, the State may terminate the Contract by written notice to the Contractor.

b. **Termination for Defaults not Remedied**. If Contractor's default may be cured within a reasonable time, the State will provide written notice to Contractor specifying the default and the time within which Contractor must correct the default. If Contractor fails to cure the specified default within the time required, the State may terminate the Contract. If DAS does not give timely notice of default to the Contractor, the State has not waived any of the State's rights or remedies concerning the default.

c. **Termination for Endangered Performance**. The State may terminate this Contract by written notice to the Contractor if the State determines that the performance of the Contract is endangered through no fault of the state of Ohio.

d. **Termination for Financial Instability**. The State may terminate this Contract by written notice to the Contractor if a petition in bankruptcy or similar proceeding has been filed by or against the Contractor.

e. **Termination for Delinquency, Violation of Law**. The State may terminate this Contract by written notice if the State determines that the Contractor is delinquent in its payment of federal, state or local taxes, workers' compensation, insurance premiums, unemployment compensation contributions, child support, court costs or any other obligation owed to a state agency or political subdivision. The State also may cancel this Contract if the State determines that the Contractor has violated any law during the performance of the Contract. However, the State may not terminate this Contract if the Contractor has entered into a repayment agreement with which the Contractor is current.

f. **Termination for Subcontractor Default.** The State may terminate this Contract for the default of the Contractor or any of its subcontractors. The Contractor will be solely responsible for satisfying any claims of its subcontractors for any suspension or termination and will indemnify the State for any liability to them. Subcontractors will hold the State harmless for any damage caused to them from a suspension or termination. The subcontractors will look solely to the Contractor for any compensation to which they may be entitled.

g. **Termination, Effectiveness, Contractor Responsibilities.** The notice of termination whether for cause or without cause will be effective as soon as the Contractor receives the notice. Upon receipt of the notice of termination, the Contractor must immediately cease all Work, if applicable, and take all steps necessary to minimize the costs the Contractor will incur related to this Contract.

3. Contract Suspension.

a. If the Contractor fails to perform any one of the Contractor's obligations under this Contract, the Contractor will be in default and the State may suspend rather than terminate this Contract where the State believes that doing so would better serve the State's interest.

b. In the case of a suspension for the State's convenience, the amount of compensation due to the Contractor for work performed before the suspension will be determined in the same manner as provided in this section for termination for the State's convenience or the Contractor may be entitled to compensation for work performed before the suspension

c. The notice of suspension whether, with or without cause, will be effective immediately, on the Contractor's receipt of the notice. The Contractor must immediately prepare a report and deliver such report to the State as is required in the case of termination.

The Contractor is liable to the state of Ohio for all actual and direct damages caused by the Contractor's default. If actual and direct damages are uncertain or difficult to determine, the State may recover liquidated damages in the amount of 1% of the value of the Contract for every day that the default is not cured by the Contractor. The State may deduct all or any part of the damages

resulting from the Contractor's default from any part of the Contractor compensation still due on the Contract.

II. PAYMENT PROVISIONS:

A. INVOICE REQUIREMENTS. The Contractor (or authorized dealer for those State Term Schedules where the Contractor has authorized its dealer(s) to submit invoices) must submit an original invoice to the office designated in the purchase order as the "bill to" address. To be a proper invoice, the invoice must include the following information:

1. The purchase order number authorizing the delivery of products or services.

2. Site Name

3. Agency Name

4. Agency Billing Address

5. Site Location

6. Vendor Name

7. Vendor Address

8. Vendor's Unique Invoice Number

9. Date that services were provided or that items were delivered

10. Goods or services provided, including cost

11. Clear statement of total payment expected.

12. For leases, the Contractor or Authorized Dealer must also include the payment number (e.g., 1 of 36) on the invoice.

B. PAYMENT DUE DATE. Payments under this Contract will be due on the 30th calendar day after the date of actual receipt of a proper invoice in the office designated to receive the invoice. The date payment is issued in will be considered the date payment is made.

The Contractor must receive payment from approved vouchers by electronic fund transfer (EFT). The Contractor will provide the necessary information to effectuate this process.

III. CONTRACTOR WARRANTY AND LIABILITY PROVISIONS:

A. CONTRACTOR'S WARRANTY AGAINST AN UNRESOLVED FINDING FOR RECOVERY. The Contractor warrants that the Contractor is not subject to an unresolved finding for recovery under ORC §9.24. If the warranty is false on the date the parties signed this Contract, the Contract is void *ab initio*.

B. GENERAL REPRESENTATIONS AND WARRANTIES.

1. The Contractor shall require each subcontractor and material supplier to fully warrant and guarantee, for the benefit of the State, the effectiveness, fitness for the purpose intended, quality, and merchantability of any Work performed or item provided or installed by the subcontractor or material supplier.

2. The Contractor warrants to the State that all materials and equipment furnished under the Contract shall be new and of good quality unless otherwise required or permitted by the Contract Documents, that the Work shall be free from defects not inherent in the quality required or permitted, and that the Work shall conform to the requirements of the Contract Documents. Work not conforming to those requirements, including substitutions not properly approved and authorized, may be considered defective Work. If required by the State, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3. Contractor warrants and guarantees to the State that all Work will be in accordance with the Contract Documents and will not be defective. If within one year after the date of completion of the Work, any Work is found to be defective, or if the repair of any damages to the land or areas made available for the Contractor's use is found to be defective, Contractor shall promptly, at its cost, repair such defective land, areas, or defective Work.

4. The Contractor's warranty and guarantee hereunder excludes defects or damage caused by abuse, modification, or improper maintenance or operation by persons other than the contractor, subcontractors, or any other individual or entity for whom the contractor is responsible; or normal wear and tear under normal usage.

C. INDEMNITY. The Contractor must indemnify the State for any and all claims, damages, lawsuits, costs, judgments, expenses, and any other liabilities resulting from bodily injury to any person (including injury resulting in death) or damage to property that may arise out of or are related to Contractor's performance under this Contract, providing such bodily injury or property damage is due to the negligence of the Contractor, the Contractor's employees, agents, or subcontractors.

IV. GENERAL PROVISIONS:

A. ACCEPTANCE OF THE WORK. The Contractor agrees to allow the State access to the tower construction site and the Work for observation, inspecting, and testing, Upon Contractor's completion of the Work, the Contractor will notify the State that the Work has been completed and is ready for a final inspection. The State will inspect the tower to determine if there are any items that need to be shortlisted and require further repair, changes or additional work completion prior to final acceptance of the site. The State may then accept, reject, or request correction to the Work.

If the State determines that the Work meets the Contract Document requirements, the State will accept the Work and the Contractor may then invoice the State for payment.

If the State determines that the Work does not meet the Contract Documents requirements, the State will notify the Contractor that the Work is either defective or that the State is rejecting the Work. The State may, at the Contractor's cost, require special inspection or testing of the Work to determine if the Work can be corrected. If the Work can be corrected, the Contractor will correct such Work at its cost.

If the Contractor does not promptly correct the Work as required by the State, or in an emergency where delay would cause serious risk of loss or damage, the State may have the defective Work corrected or repaired or may have the defective Work removed and replaced. The State may deduct from the Contractor's payment, or invoice the Contractor, for the amount incurred by the State for the Work to be corrected.

If at any time during performance of the Work, the State finds that the Work is defective. or the Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, the State, in its sole discretion, may order the Contractor to stop the Work until the cause for such order has been eliminated.

B. AMENDMENT. There can be no change to a term or condition in this Contract unless both parties agree to amend such term or condition. The State must reduce all Amendments to writing and both parties must sign the Amendment that reflects the change in the Contract.

C. AUDITS. The Contractor must keep all financial records in a manner consistent with generally accepted accounting principles. Additionally, the Contractor must keep separate business records for this project, including records of disbursements and obligations incurred that must be supported by contracts, invoices, vouchers and other data as appropriate.

During the period covered by this Contract and until the expiration of three (3) years after final payment under this Contract, the Contractor agrees to provide the State, its duly authorized representatives or any person, agency or instrumentality providing financial support to the work undertaken hereunder,

with access to and the right to examine any books, documents, papers and records of the Contractor involving transactions related to this Contract.

The Contractor must, for each subcontract in excess of two thousand five hundred dollars ($2,500), require its subcontractors to agree to the same provisions of this Article. The Contractor may not artificially divide contracts with its subcontractors to avoid requiring subcontractors to agree to this provision. This provision does not apply to contracts where federal funds are used and the federal government requires audits of all subcontracts regardless of the amount of the contract.

The Contractor must provide access to the requested records no later than (5) five business days after the request by the State or any party with audit rights. If an audit reveals any material deviation from the Contract requirements, and misrepresentations or any overcharge to the State or any other provider of funds for the Contract, the State or other party will be entitled to recover damages, as well as the cost of the audit.

D. **BACKGROUND CHECKS**. The State may initiate investigations into the backgrounds of the Contractor, its employees or subcontractors, or any other individuals or entities related to the Contractor as deemed appropriate. Such background investigations may include fingerprint identification by the Ohio State Highway Patrol, the Federal Bureau of Investigation or any other agency designated by the State, and shall require the provision of information, as requested by the investigators. The costs associated with such background investigations will be charged to the Contractor. The State may reject a proposal or terminate any Contract awarded hereunder based upon the results of these background checks.

E. **BINDING EFFECT**. Subject to the limitations on assignment provided elsewhere in this Contract, this Contract will be binding upon and inure to the benefit of the respective successors and assigns of the State and the Contractor.

F. **CHANGE ORDERS.** The State or the Contractor may, from time to time, request additions, deletions, or revisions to the Work by issuing a Change Order. Upon receipt of a Change Order, the Contractor shall promptly proceed with the additions, deletions, or revisions to the Work. The Contractor shall provide a written justification of the increased or decreased costs resulting from the changes to the Work. Any modifications to cost are subject to review and approval by the State. .

G. **COMPLIANCE WITH LAW.** The Contractor must comply with all applicable federal, state, and local laws while performing under this Contract.

H. **CONFLICT OF INTEREST.** No Contractor or the personnel of the contractor shall act in any manner that conflict with the Contractor's responsibilities under this Contract. Such prohibited actions shall include, but are not limited to the following:

1. Voluntarily acquiring any personal interest that conflicts with the Contractor's responsibilities under the Contract
2. Knowingly permit any Ohio public official or public who has any responsibility in any manner related to this Contract, acquire any interest or any entity under the Contractor's control

The Contractor, upon obtaining knowledge that any person described above has acquired an impermissible or conflicting personal interest related to this Contract, shall do the following in a forthwith manner:

1. Disclose such information to the State; and
2. Take immediate steps to ensure that the person does not participate in any action affecting the work under this Contract, unless the State determines that in light of the expeditious disclosure, such person's participation is not contrary to the public interest.

I. **CONTRACT CONSTRUCTION.** This Contract will be construed in accordance with the plain meaning of its language and neither for nor against the drafting party.

J. DECLARATION OF MATERIAL ASSISTANCE ("DMA"). The Contractor represents and warrants that is has not provided any material assistance, as that term is defined in ORC Section 2909.33(C), to an organization that is identified by, and included on, the United States Department of State Terrorist Exclusion List and that it has truthfully answered "no" to every question on the DMA form. The Contractor further represents and warrants that it has provided or shall provide the DMA form through the Ohio Business Gateway at http://business.ohio.gov/efiling/ prior to execution of this Contract. If these representations and warranties are found to be false, this Contract shall be void and the Contractor shall immediately repay to the State any funds paid under this Contract

K. DRUG FREE WORKPLACE. The Contractor agrees to comply with all applicable state and federal laws regarding drug-free workplace and shall make a good faith effort to ensure that all Contractor employees, while working on state property, will not purchase, transfer, use or possess illegal drugs or alcohol or abuse prescription drugs in any way.

L. ELECTIONS LAW. The Contractor, by signature affixed on this document, hereby certifies that all applicable parties listed in Division (I) or (J) of O.R.C. Section 3517.13 are in full compliance with Divisions (I) and (J) of O.R.C. Section 3517.13.

If the Contractor accepts a Contract and/or purchase order issued under the Contract without proper certification, the Department of Administrative Services shall deem the Contractor in breach and the Contractor will be subject to all legal remedies available to the Department of Administrative Services up to and including debarment from doing business with the state of Ohio.

Additional information regarding Contribution Restrictions is available on the Office of Budget & Management's website at: www.obm.ohio.gov.

M. ENTIRE CONTRACT. This Contract is composed of the following Contract Documents: 1) Request for Quote including all attachments; and 2) Selected Vendor's proposal including all plans and specifications ("Plans and Specifications") as approved by the State. If there are any conflicts between the documents, the order of precedence follows the order provided in this provision.

N. EQUAL EMPLOYMENT OPPORTUNITY. The Contractor will comply with all state and federal laws regarding equal employment opportunity and fair labor and employment practices, including Ohio Revised Code Section 125.111 and all related Executive Orders.

Before a contract can be awarded or renewed, an Affirmative Action Program Verification Form must be submitted to the Department of Administrative Services Equal Opportunity Division to comply with the affirmative action requirements. Affirmative Action Verification Forms and approved Affirmative Action Plans can be found by going to the Ohio Business Gateway at http://business.ohio.gov/efiling/

O. ETHICS. The Contractor certifies that the Contractor is currently in compliance and will continue to adhere to the requirements of Ohio ethics laws.

P. FORCE MAJEURE (EXCUSABLE DELAY). Neither the State nor the Contractor will be liable for any delay in the performance of their contractual obligations provided all of the following are applicable:

1. The delay is a result of a cause(s) beyond the control of the party asserting or invoking excusable delay,
2. The delay or cause of the delay is not a result of the asserting party's negligence or fault, and
3. The asserting party could not have reasonably foreseen the delay or cause of the delay by exercising ordinary care.

In those cases where all of the above are applicable, the asserting party must provide all of the following in writing, prior to any impending delivery date or performance under the Contract:

1. Documentation describing the cause of the delay
2. Steps the asserting party will take to remove or overcome the cause of the delay, and
3. Reasonable time frame in which to resume delivery or performance pursuant to the Contract

If the asserting party provides acceptable documentation as described above, the parties will agree that the date of the affected delivery or performance be extended for a period equal to the time lost because of the excusable delay or the time in which the asserted party provided in the documentation mentioned above, whichever is the earlier date.

For purposes of this section, the State deems that items controllable by a contractor's subcontractors are controllable by the Contractor.

Q. GOVERNING LAW. This Contract shall be governed by the laws of the state of Ohio, and the venue for any disputes will be exclusively with the appropriate court in Franklin County, Ohio.

R. HAZARDOUS MATERIALS. Contractor shall remain responsible for all suits, costs (including attorney's fees, expenses and court costs), claims, expenses, liabilities and judgments of every kind and description, with respect to the presence of hazardous materials.

(a) Except as otherwise expressly permitted in this Agreement, Contractor shall not use, create, store or allow any hazardous materials on the site. Fuel stored in a motor vehicle for the exclusive use in such vehicle is exempted. Additionally, Contractor has permission and shall install a back-up generator and store fuel for such generator at the Site. In no case shall Contractor cause or allow the deposit or disposal of any hazardous materials on the Site. The State, or its agents or contractors, shall at all times have the right to go upon and inspect the Site and the operations thereon to assure compliance with the requirements herein stated. This inspection may include taking samples of substances and materials present for testing, and/or the testing or soils or underground tanks on the Site.

(b) Accumulation, storage, treatment, or disposal of any waste material is prohibited; excepting only temporary storage, not to exceed fourteen (14) days, or nonhazardous solid refuse produced from activities on the Premises for pick up by municipal or commercial refuse service, and lawful use of sanitary sewers (if any) for domestic sewage.

(c) Manufacturing; maintenance of equipment (excluding communications equipment and back-up power sources such as batteries and generators operated pursuant to the Contract) or vehicles, or use, installation or construction of vessels, tanks, (stationary or mobile), dikes, sumps, or ponds; or any activity for which a license or permit is required from any government agency for (1) transportation, storage, treatment, or disposal of any waste, (2) discharge of any pollutant including but not limited to discharge to air, water, or a sewer system is prohibited.

(d) Any spill caused by Contractor or from Contractor's equipment resulting in a release of a hazardous material to the air, soil, surface water, or groundwater in violation of applicable law shall be immediately reported to Contractor as well as to appropriate government agencies and shall be promptly and fully cleaned up and the Premises (including soils, surface water, and groundwater) restored to its condition existing immediately prior to such spill or release, all in accordance with and as may be required by applicable law. Should Contractor desire to use pesticides on the Site or Premises (either herbicides, rodenticides, or insecticides) all applicable Environmental Protection Agency (EPA) standards must be met and prior approval must be received from Contractor and not all EPA approved pesticides will be permitted. Contractor will fill out form FG-880 and submit it to the State at least seven (7) days prior to application of pesticides. Contractor reserves the right to disapprove the use of any pesticide. Contractor shall obtain all county, state or federal permits required, including restricted pesticide use and burning permits and comply with all conditions of those permits. Contractor shall submit to the area manager a copy of all permits.

(e) In the event Contractor breaches any of the provisions of this Contract the Contract may be terminated immediately by Contractor and be of no further force or effect. It is the intent of the parties hereto that Contractor shall be responsible for and bear the entire cost of removal and disposal of hazardous materials introduced to the Site by Contractor during Contractor's period of use and possession as Contractor of the Site.

(f) Contractor shall also be responsible for any clean up and decontamination on or off the Site necessitated by the introduction of such hazardous materials on the Site. Contractor shall not be

responsible for or bear the cost of removal or disposal of hazardous materials introduced to the Site by any party other than Contractor during any period prior to commencement of Contractor's period of use and possession of the Site as Contractor.

S. **HEADINGS.** The headings in this Contract are for convenience only and will not affect the interpretation of any of the Contract terms and conditions.

T. **INDEPENDENT STATUS OF THE CONTRACTOR.** The parties are independent of one another, and the Contractor's personnel may act only in the capacity of representatives of the Contractor and not as representatives of the State. Further, the State will not deem Contractor's personnel, for any purpose, to be employees, representatives, or agents of the State. The Contractor assumes full responsibility for the actions of the Contractor's personnel while they are performing under this Contract and will be solely responsible for paying the Contractor's personnel (including withholding, paying income taxes and social security, workers' compensation, disability benefits and the like.) The Contractor may not commit, and is not authorized to commit, the State in any manner. The Contractor's subcontractors will be considered the agents of the Contractor for purposes of this Contract.

U. **INJUNCTIVE RELIEF.** Nothing in this Contract is intended to limit the State's right to injunctive relieve, if such is necessary to protect its interests or to keep it whole.

V. **INSURANCE/WORKERS' COMPENSATION**: The Contractor must provide and maintain the following insurance coverage at Contractor's own expense throughout the term of this Contract:

1. Workers' compensation insurance, as required by Ohio law, and if some of the Work will be done outside Ohio, the laws of the appropriate state(s) where any portion of the Work will be done.
2. Commercial General Liability (CGL) insurance and, if necessary, commercial umbrella insurance, with a limit of not less than $1,000,000 for each occurrence. The CGL shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal and advertising injury.
3. Commercial auto liability insurance and, if necessary, commercial umbrella insurance, with a limit of not less than $500,000 for each accident.

The Contractor must include the State as an additional insured under the CGL, commercial auto liability, and commercial umbrella (if any) policies. The insurance must apply as primary over any other insurance or self-insurance programs afforded to the Contractor.

Contractor waives all rights against the State for damages to the extent these damages are covered by the CGL, commercial auto, or commercial umbrella liability insurance maintained pursuant to this Contract.

The certificate(s) must be in a form that is reasonably satisfactory to the State as to the contents of the policies and the quality of the insurance carriers. All carriers must have at least an "A-" rating by A.M. Best & Co. The certificate must include the applicable Contract number.

The Contractor must, for each policy required by this Contract provide the Contracting Authority with thirty (30) day prior written notice of cancellation, or non-renewal, except a ten (10) days notice for non-payment of premium. Any failure to comply with this reporting provision will constitute a material breach of Contract and may be grounds for immediate termination of this Contract.

W. **NOTICES.** For any notice under this Contract to be effective the notice must be made in writing and sent to the address of the appropriate contact provided in the Contract.

X. **PERFORMANCE BOND**. The Contractor shall submit a performance bond in the form attached to this Contract (Exhibit 3) within seven (7) days of signature of this Contract by the State.

Under this Performance and Payment Bond Agreement, the Principal and Surety shall be responsible for the following:

1. The Principal shall faithfully perform the above referenced Contract, which is incorporated herein by reference and shall pay all indebtedness for labor and materials furnished or performed under the Contract.

2. In the event that the Principal fails to perform the Contract, the Principal and the Surety, jointly and severally, shall indemnify and save harmless the State from all cost and damage which the State may suffer by reason of Principal's failure to perform the Contract. Said indemnification shall include, but not be limited to, full reimbursement and repayment to the State for all outlays and expenses which the State may incur in making good any such default or failure to perform the Contract by the Principal.

3. Principal shall pay all persons all indebtedness for labor or material furnished or performed under the Contract and in doing so this obligation shall be null and void. In the event that Principal fails to pay for such indebtedness, such persons shall have a direct right of action against the Principal and Surety, jointly and severally, under this obligation, subject to the State's priority.

4. Principal shall guarantee the faithful performance of the prevailing hourly wage clause as provided in the Contract.

Y. PREVAILING WAGE RATES

1. Prevailing Wage Rate

a. The Contractor shall pay the prevailing wage rates of the Work locality, as issued by the Ohio Department of Commerce, Wage and Hour Bureau to laborers performing the Work.
b. The Contractor shall comply with the provisions, duties, obligations, and is subject to the remedies and penalties of Ohio Revised Code ("O.R.C.") Chapter 4115.
c. If the Contractor or its subcontractors fail to comply with O.R.C. Chapter 4115, the State may withhold payment. The Contractor is liable for violations committed by the Contractor or its subcontractors.
d. The Contractor shall submit all payroll reports in compliance with the requirements of paragraph 4 for all of the employees of the Contractor and of the Contractor's subcontractors.
e. By executing a Contract, the Contractor certifies that it based its Quote upon the prevailing rates of wages as ascertained by the Ohio Department of Commerce, Wage and Hour Bureau for the Work as provided in O.R.C. Sections 4115.03 through 4115.14.

2. Prevailing Wage Rate Revisions

a. The State shall, within 7 business days after receipt of a notice of a change in the prevailing wage rates, notify the Contractor of the change. The prevailing wage rates are available at the Ohio Department of Commerce's web site: http://www.com.state.oh.us.
b. The Contractor shall pay any revised wage rates issued during the term of the Contract.

3. Payroll Schedule

a. Within 10 days of the date of the Notice to Proceed, the Contractor shall provide the State's Prevailing Wage Coordinator a schedule of dates during the term of the Contract on which wages shall be paid to employees for the Work.

4. Payroll Reports

a. The Contractor shall submit payroll reports with each invoice, which reports shall be certified by the Contractor that the payroll is correct and complete and the wage rates shown are not less than those required by the Contract. The Contractor is responsible for submitting all payroll reports of its subcontractors.
b. Each payroll report shall indicate the period covered and include a list containing the name, address and social security number of each employee of the Contractor and its subcontractors paid for the Work.

c. Each payroll report shall list the number of hours each employee worked each day on the Work during the reporting period, the total hours each week on the Work, the employee's hourly rate of pay, job classification, hourly rate of fringe benefits, and all deductions from wages and net pay.
d. Each payroll report shall list each fringe benefit and state if it is paid as cash to the employee or to a named plan.
e. For each employee, each payroll report shall list the employee's gender and ethnicity, classified as Black, Hispanic, Asian Pacific Islanders, American Indians/Alaskan Native or non-minority.
f. The Contractor and its subcontractors shall submit apprenticeship agreements for all apprentices utilized on the Project.

Z. PUBLICITY. The Contractor shall not do the following without prior, written consent from the State:

1. Advertise that the Contractor is doing business with the State; and
2. Use this Contract as a marketing or sales tool.

AA. RELATED WORK. The Contractor agrees that the State may require other contractors to complete work on the tower construction site during the time when the Contractor is constructing the tower. The Contractor agrees that it will coordinate its Work and share property for storage of materials and equipment with such other contractors to the extent possible. If, however, the other contractors work interferes with or causes delays or deficiencies in the Contractor's Work, the Contractor shall immediately notify the State of such interference, delay or deficiency.

BB. SAFETY AND PROTECTION. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the tower construction site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein whether in storage on or off the Site;
3. other property at the tower construction site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal relocation, or replacement in the course of tower construction.

The Contractor shall comply with all applicable laws and regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of underground facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

CC. SCOPE OF WORK. The scope of work (the "Project") is described in the Request for Quote dated August 22, 2011.

DD. SEVERABILITY. If any provision of the Contract or the application of any provision is held by that court to be contrary to law, the remaining provisions of the Contract will remain in full force and effect.

EE. STRICT PERFORMANCE. If at any time either party fails at any time to demand strict performance by the other party of any of the terms of this Contract, such failure will not be construed as a waiver of any such term, and either party may at any time demand strict and complete performance by the other party.

FF. SUBCONTRACTORS. The State recognizes that it may be necessary for the Contractor to use a subcontractor to perform a portion of the work under the Contract. In those circumstances, the Contractor shall submit a list identifying Contractor's subcontractors performing portions of the work under the Contract. If any changes occur during the term of the Contract, the Contractor shall supplement its list of subcontractors. The State reserves the right to reject any subcontractor submitted by the Contractor.

All subcontracts will be at the sole expense of the Contractor and the Contractor will be solely responsible for payment of its subcontractors. The Contractor assumes responsibility for all sub-contracting work performed under the Contract. In addition, all subcontractors agree to be bound by all of the Terms and Conditions and specifications of the Contract. The Contractor will be the sole point of contact with regard to all contractual matters.

GG. SUPERVISION AND SUPERINTENDENCE. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction of the tower. At all times during the progress of the Work, Contractor shall assign a competent project superintendent who shall not be replaced without written notice to the State except under extraordinary circumstances. The superintendent will be Contractor's representative at the tower construction site and shall have authority to act on behalf of the Contractor. All communications given to or received from the superintendent shall be binding on the Contractor.

HH. TAXES. The State is exempt from all taxes and does not agree to pay any taxes.

II. TERM. The Term of this Contract begins upon the commencement date identified in the Notice to Proceed and shall end no later than seventy five (75) consecutive days after the commencement date.

JJ. USE OF MBE AND EDGE VENDORS. The State encourages Contractor to purchase goods and services from Minority Business Enterprises (MBE) and Encouraging Diversity, Growth and Equity (EDGE) vendors.

KK. USE OF TOWER CONSTRUCTION SITE AND OTHER AREAS. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the tower construction site and other areas, and shall not unreasonably encumber the tower construction site and other areas with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

During the progress of the Work, Contractor shall keep the tower construction site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable laws and regulations.

Prior to completion of the Work, Contractor shall clean the tower construction site and the Work and make it ready for utilization by the State. At the completion of the Work, Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore ot original condition all property not designated for alteration by the Contract Documents.

IN WITNESS WHEREOF, the parties have executed this Agreement.

CONTRACTOR	STATE OF OHIO, DEPARTMENT OF ADMINISTRATIVE SERVICES
By: _____	By: _____

CONTRACT BETWEEN THE DEPARTMENT OF ADMINSTRATIVE SERVICES
MULTI-AGENCY RADIO COMMUNICATION
AND _____
FOR KEENE-COSHOCTON (WHITE EYES), COSHOCTON COUNTY, OHIO

Title: _____ Title: _____

Date: _____ Date: _____

CONTRACT BETWEEN THE DEPARTMENT OF ADMINSTRATIVE SERVICES MULTI-AGENCY RADIO COMMUNICATION
AND _____
FOR KEENE-COSHOCTON (WHITE EYES), COSHOCTON COUNTY, OHIO

EXHIBIT 1

Performance and Payment Bond Form

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned, as Principal, at _____ (Address) and _____ as Surety, are hereby held and firmly bound unto the State of Ohio, as Obligee, in the penal sum of _____ dollars (this amount must not be less than the full amount of the Contract, in dollars and cents; a percentage is not acceptable), for the payment of which well and truly to be made, we jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns to undertake the Project known as:

Project Name: _____.

SIGNED AND SEALED this _____ day of _____, _____.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above-named Principal did on the _____ day of _____, _____, enter into a Contract with the State of Ohio, which said Contract is made a part of this Bond the same as though set forth herein;

NOW, THEREFORE, if the above-named Principal shall well and faithfully do and perform the things agreed by the Obligee to be done and performed according to the terms of said Contract; and shall pay all lawful claims of subcontractors, material suppliers, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said Contract; we agreeing and assenting that this undertaking shall be for the benefit of any subcontractor, material supplier or laborer having a just claim as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

Under this Performance and Payment Bond Agreement, the Principal and Surety shall be responsible for the following:

1. The Principal shall faithfully perform the above referenced Contract, which is incorporated herein by reference and shall pay all indebtedness for labor and materials furnished or performed under the Contract.

2. In the event that the Principal fails to perform the Contract, the Principal and the Surety, jointly and severally, shall indemnify and save harmless the State from all cost and damage which the State may suffer by reason of Principal's failure to perform the Contract. Said indemnification shall include, but not be limited to, full reimbursement and repayment to the State for all outlays and expenses which the State may incur in making good any such default or failure to perform the Contract by the Principal.

3. Principal shall pay all persons all indebtedness for labor or material furnished or performed under the Contract and in doing so this obligation shall be null and void. In the event that Principal fails to pay for such indebtedness, such persons shall have a direct right of action against the Principal and Surety, jointly and severally, under this obligation, subject to the State's priority.

4. Principal shall guarantee the faithful performance of the prevailing hourly wage clause as provided in the Contract.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said Contract or in or to the Plans and Specifications therefore shall in any way affect the obligations of said Surety on its bond, and it does hereby waive notice of any such modifications, omissions or additions in or to the terms of the Contract, the Work or the Contract Documents, including without limitation the Plans and Specifications.

CONTRACT BETWEEN THE DEPARTMENT OF ADMINSTRATIVE SERVICES
MULTI-AGENCY RADIO COMMUNICATION
AND _____
FOR KEENE-COSHOCTON (WHITE EYES), COSHOCTON COUNTY, OHIO

PRINCIPAL:

x_____

By: __ _____

Title: _____

SURETY:

x_____

By: _____
Attorney-in-Fact

SURETY INFORMATION:

_____
Street

_____
City State Zip

_____
Telephone Number

SURETY AGENT'S INFORMATION:

_____
Agency Name

_____
Street

_____
City State Zip

_____
Telephone Number

Prepared For

M.A.R.C.S.

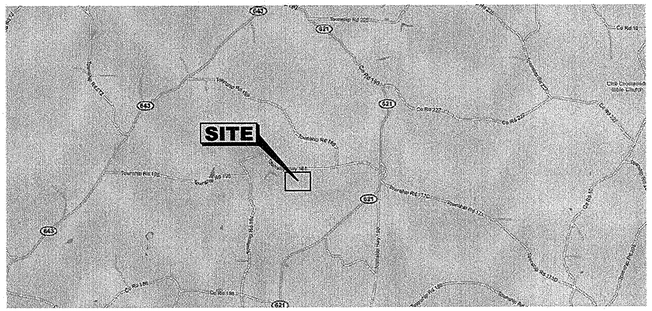
MULTI AGENCY RADIO COMMUNICATION SYSTEM

KEENE–COSHOCTON TOWER SITE

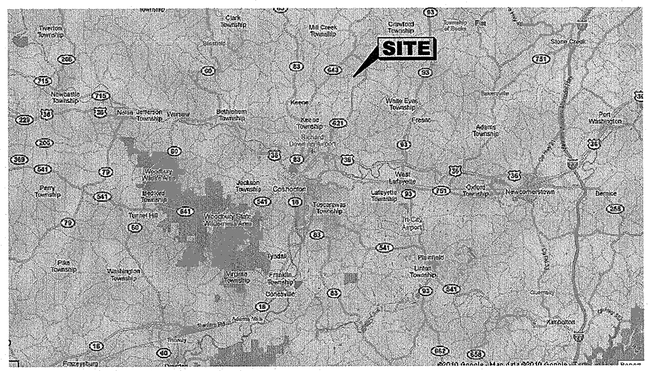
3/16/2011

SITE INFORMATION

OWNER:	*OHIO MARCS* *RHODES STATE OFFICE TOWER* *30 E. BROAD STREET* *COLUMBUS OH, 43215* *PH: (614) 995-0060*
APPLICANT:	*OHIO MARCS* *RHODES STATE OFFICE TOWER* *30 E. BROAD STREET* *COLUMBUS OH, 43215* *PH: (614) 995-0060*
SITE ADDRESS:	*TOWNSHIP ROAD 188*
COUNTY:	*COSCHOCTON*
LATITUDE:	*40° 22′ 13″ N*
LONGITUDE:	*81° 48′ 25″ W*
BENCH MARKS:	*CONTROL POINT IP #1* *OHIO STATE PLANE - OHIO NORTH ZONE* *NAD83, NAVD88 GEO09* *N=257310.06* *E=2162037.46* *ELEV.=1197.30* *CONTROL POINT IP #2* *OHIO STATE PLANE - OHIO NORTH ZONE* *NAD83, NAVD88 GEO09* *N=257303.61* *E=2162238.83* *ELEV.=1209.17*
ZONING CLASIFICATION:	*COUNTY OWNED EXEMPT PROPERTY*
ZONING JURISDICTION:	*COSHOCTON COUNTY*
POWER COMPANY:	*FRONTIER POWER COMPANY*
TELCO PROVIDER:	*AT&T OHIO*
ENGINEER & SURVEYOR:	*JOBES HENDERSON & ASSOCIATES* *59 GRANT STREET* *NEWARK OH, 43055* *PH: (740) 344-5451*
CONCRETE & SOIL TESTING:	*P.S.I. INC.* *5555 CANAL ROAD* *CLEVELAND OH, 44125* *PH: (216) 447-1335*



LOCATION MAP
(NOT TO SCALE)



VICINITY MAP
(NOT TO SCALE)

NTS

INDEX OF SHEETS:

UNDERGROUND UTILITIES

CONTACT BOTH SERVICES
CALL TWO WORKING DAYS
BEFORE YOU DIG

CALL
1-800-362-2764
(TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

OIL & GAS PRODUCERS PROTECTIVE
SERVICE CALL: **1-800-925-0988**

CERTIFICATION

I HEREBY CERTIFY THAT I DID SUPERVISE THE PREPARATION OF THESE PLANS THIS 14th DAY OF MARCH 20 11.

KENNETH B. STEWART P.E. 67698

STATE OF OHIO
KENNETH B. STEWART
E-67698
REGISTERED
PROFESSIONAL ENGINEER

CALCULATED JJR
CHECKED KBS

TITLE SHEET

KEENE-COSHOCTON TOWER SITE

1
53

P:\014-05\dgn or dwg\sheets\Keene\(1) 01405 Title Sheet.dgn 3/16/2011 4:49:11 PM jrognon

NOTE:
BEARINGS HEREIN ARE BAS ON THE OHIO STATE PLANE COORDINATE SYSTEM - NORTH ZONE.

LOCATION MAP
(NOT TO SCALE)

N.W. CORNER OF SECTION 5

S01°49'05"W
985.91'

S87°57'43"E
300.32'

℄

TOWNSHIP ROAD 188

OVERHEAD

GRAVEL ROAD

OHIO STATE PLANE - OHIO NORTH ZONE
NAD83, NAV088 GEO09
N:257310.06
E:2162037.46
ELEV.=1197.30

P.O.B.
UTILITY EASEMENT

L1

S87°32'36"E
20.00'

3.01'

121.35'

UTILITY EASEMENT
0.033 ACRES

59.59'
N03°31'07"E

S03°31'07"W
85.38'

P.O.B.
LEASE AREA

32.34'

N55°19'12"E
100.00'

S34°40'48"E
100.00'

N34°40'48"W
100.00'

S55°19'12"W
(63.00')

LEASE AREA
0.230 ACRES

L2

N34°40'48"W
42.78'

P.O.B.
INGRESS/EGRESS
EASEMENT

S89°16'57"E
41.28'

26.07'

BM #2
RAILROAD SPIKE IN POWER POLE
ELEV=1211.25
NAVD88 GEO09

105.15'
N40°37'33"E

S40°37'33"W
120.17'

FIELD DRIVE

88.05'
N30°50'10"E

S30°50'10"W
117.42'

USSCRM CONC. MONUMENT
OHIO STATE PLANE - OHIO NORTH ZC
NAD83, NAV088 GEO09
N=257272.45
E=2162274.87
ELEV.=1212.86

ABANDONED WELLS

INGRESS/EGRESS
EASEMENT
0.111 ACRES

FIELD DRIVE

BOARD OF COUNTY COMMISSIONERS
OF COSHOCTON COUNTY, OHIO
D.B. 161, PG. 217, 219 & 220
314.195 AC.
PAR. 0421020000100

SECTION 1, KEENE TOWNSHIP
SECTION 5, WHITE EYES TOWNSHIP

BOARD OF COUNTY COMMISSIONERS
OF COSHOCTON COUNTY, OHIO
D.B. 161, PG. 217, 219 & 220
314.195 AC.
PAR. 0421020000100

LINE TABLE		
NO.	BEARING	DISTANCE
L1	S 87°32'36" E	20.00'
L2	N 55°19'12" E	20.00'
L3	S 34°40'48" E	11.69'

LEGEND

- : FIRE HYDRANT
- : WATER SHUTOFF VALVE
- : WATER VALVE
- :GAS VALVE
- G : GASLINE MARKER
- : POWER POLE
- : ANCHOR
- : RAILROAD SPIKE FOUND
- I.P.F. : IRON PIN FOUND
- P.K.F. : PK NAIL FOUND
- I.P.S. : IRON PIN SET (5/8" REBAR WITH RED ID CAP STAMPED "JHA 8283")
- : ANGLE POINT

JEREMY L. VAN OSTRAN P.S. 8283

HORIZONTAL SCALE IN FEET
0 20 40 80
ORIGINAL SHEET SIZE: 22"x34"

NO.	REVISION	DATE

MJM | CHECKED: | REVIEWED: | DATE: 01/25/11

Jobes Henderson & ASSOCIATES
Breaking Ground | Breaking Boundaries
Tel: 740.344.5451
Fax: 740.344.5746
59 Grant Street
Newark, Ohio 43055
www.jobeshenderson.com

TOWER SITE
KEANE-WHITE EYES TWP.
COSHOCTON COUNTY, OHIO

DRAWING NAME:
KEANE

JOB NUMBER:
014-05

NOTICE TO GENERAL CONTRACTOR

1. THE GENERAL CONTRACTOR'S SCOPE OF WORK INCLUDES ALL WORK, LABOR, MATERIALS AND EQUIPMENT REQUIRED TO PERFORM AND INSTALL THE WORK SHOWN ON THESE DRAWINGS.
2. THE GENERATOR, TOWER AND SHELTER SHALL BE PART OF THE GENERAL CONTRACTOR'S SCOPE OF WORK.
3. START UP OF GENERATOR AND SHELTER TRANE HVAC UNIT SHALL BE PART OF THE GENERAL CONTRACTOR'S SCOPE OF WORK AND SHALL BE PERFORMED BY A TRANE LICENSED AND CERTIFIED AUTHORIZED SUPPLIER AND INSTALLER.
4. THE GENERAL CONTRACTOR IS TO PROVIDE TEMPORARY SANITARY FACILITIES THROUGHOUT THE DURATION OF THE PROJECT.

GENERAL NOTES

1. CONTRACTOR TO FURNISH AND INSTALL THE FOLLOWING:
   A. BTS EQUIPMENT FRAME PLATFORM AND ICE SHELTER (GROUND BUILD CO-LOCATE ONLY)
   B. A/C & TELCO INTERFACE BOX (PPC CABINETS)
   C. MONOPOLE TOWER
   D. TOWER LIGHTING
   E. GENERATORS
   F. ANTENNA STANDARD BRACKETS, FRAMES, AND PIPES FOR MOUNTING (AS INCLUDED BY TOWER MANUFACTURER).
   G. ANTENNAS (INSTALLED BY OTHERS)
   H. TRANSMISSION LINE
   I. TRANSMISSION LINE JUMPERS
   J. TRANSMISSION LINE CONNECTORS WITH WEATHERPROOFING KITS
   K. TRANSMISSION LINE GROUND KITS
   L. BTS EQUIPMENT
   M. BTS BATTERY CABINET

   THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL OTHER MATERIALS FOR THE COMPLETE INSTALLATION OF THE SITE INCLUDING, BUT NOT LIMITED TO, SUCH MATERIALS AS FENCING, STRUCTURAL STEEL SUPPORTING SUB-FRAME FOR PLATFORM, ROOFING LABOR AND MATERIALS, GROUNDING RINGS, GROUNDING WIRES, COPPER-CLAD OR XIT CHEMICAL GROUND ROD(S), BUSS BARS, TRANSFERS AND DISCONNECT SWITCHES WHERE APPLICABLE, ELECTRICAL FEEDER WIRE, CONDUIT, LANDSCAPING COMPOUND STONE, CRANES, CORE, DRILLING, SLEEPERS AND RUBBER MATTING, REBAR, CONCRETE CAISSONS, PADS AND/OR AUGER MOUNTS, MISCELLANEOUS FASTENERS, CABLE TRAYS, NONSTANDARD ANTENNA FRAMES AND ALL OTHER MATERIAL AND LABOR REQUIRED TO COMPLETE THE JOB ACCORDING TO THE DRAWINGS AND SPECIFICATIONS. IT IS THE POSITION OF THE STATE OF OHIO TO APPLY FOR PERMITTING. THE CONTRACTOR IS RESPONSIBLE FOR PICKUP AND PAYMENT OF REQUIRED PERMITS. THE COST OF THE BUILDING PERMIT WILL BE ADDED TO THE LUMP SUM BID PRIOR TO AWARDING THE CONTRACT.
2. ALL EQUIPMENT FURNISHED AND WORK PERFORMED UNDER THE CONTRACT DOCUMENTS SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE, UNLESS NOTED OTHERWISE. ANY FAILURE OF EQUIPMENT OR WORK DUE TO DEFECTS IN MATERIALS OR WORKMANSHIP SHALL BE CORRECTED BY THE CONTRACTOR AT NO COST TO THE OWNER.
3. ALL WORK, MATERIAL AND EQUIPMENT SHALL COMPLY WITH ALL REQUIREMENTS OF THE LATEST EDITIONS AND INTERIM AMENDMENTS OF THE NATIONAL ELECTRICAL CODE (N.E.C.) NATIONAL ELECTRICAL SAFETY CODE, OSHA AND ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCES. ALL ELECTRICAL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL BE NEW (EXCEPT WHERE OTHERWISE NOTED) AND SHALL COMPLY WITH THE REQUIREMENTS OF THE UNDERWRITER'S LABORATORIES AND BEAR THE U.L. LABEL.
5. THE STATE OF OHIO OR IT'S ARCHITECT/ENGINEER RESERVE THE RIGHT TO REJECT ANY EQUIPMENT OR MATERIALS WHICH IN THEIR OPINION ARE NOT IN COMPLIANCE WITH THE CONTRACT DOCUMENTS. EITHER BEFORE OR AFTER INSTALLATION AND THE EQUIPMENT SHALL BE REPLACED WITH EQUIPMENT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS BY THE CONTRACTOR AT NO COST TO THE OWNER OR HIS ARCHITECT/ENGINEER.
6. THE CONTRACTOR SHALL SUPPORT, BRACE AND SECURE EXISTING STRUCTURES AS REQUIRED. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PROTECTION OF ANY EXISTING STRUCTURES DURING CONSTRUCTION. FIELD VERIFY ALL EXISTING DIMENSIONS WHICH AFFECT THE NEW CONSTRUCTION.
7. THE CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY OF THE WORK TO BE COVERED UP OR ENCLOSED UNTIL IT HAS BEEN INSPECTED BY THE GOVERNING AUTHORITIES. ANY WORK THAT IS ENCLOSED OR COVERED UP BEFORE SUCH INSPECTION AND TEST SHALL BE COVERED AT THE CONTRACTOR'S EXPENSE. AFTER IT HAS BEEN INSPECTED, THE CONTRACTOR SHALL RESTORE THE WORK TO ITS ORIGINAL CONDITION AT HIS OWN EXPENSE.
8. ALL EXISTING UTILITIES, FACILITIES, CONDITIONS AND THEIR DIMENSIONS SHOWN ON PLANS HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THE ARCHITECT/ENGINEER AND OWNER (MARCS) ASSUME NO RESPONSIBILITY AS TO THE SUFFICIENCY OR ACCURACY OF THE INFORMATION SHOWN ON THE PLANS OR THE MANNER OF THEIR REMOVAL OR ADJUSTMENT. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL SAID UTILITIES AND FACILITIES PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL ALSO OBTAIN FROM EACH UTILITY COMPANY DETAILED INFORMATION RELATIVE TO WORKING SCHEDULES AND METHODS OF REMOVING OR ADJUSTING AFFECTED UTILITIES.
9. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES OR DOUBTS AS TO THE INTERPRETATION OF PLANS SHALL BE IMMEDIATELY REPORTED TO THE PROJECT MANAGER FOR RESOLUTION AND INSTRUCTION AND NO FURTHER WORK SHALL BE PERFORMED UNTIL THE DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INSTRUCTION MEANS CONTRACTOR WILL HAVE WORKED AT HIS OWN RISK AND EXPENSE.
10. CONTRACTORS SHALL CLEAN ENTIRE SITE AFTER CONSTRUCTION SUCH THAT NO PAPERS, TRASH, DEBRIS, WEEDS, BRUSH OR ANY OTHER DEPOSITS REMAIN. ALL MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE PROPERLY DISPOSED OF OFF-SITE BY THE CONTRACTOR.
11. ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY THE CONTRACTOR WITH LOCAL GAS, ELECTRIC, TELEPHONE AND ANY OTHER UTILITY COMPANIES HAVING JURISDICTION OVER THIS LOCATION.
12. DURING CONSTRUCTION, THE CONTRACTOR SHALL, AT ALL TIMES, MAINTAIN THE UTILITIES OF THE BUILDINGS/SITE WITHOUT INTERRUPTION. SHOULD IT BE NECESSARY TO INTERRUPT ANY SERVICE OR UTILITY, THE CONTRACTOR SHALL SECURE PERMISSION IN WRITING FROM THE BUILDING/PROPERTY OWNER FOR SUCH INTERRUPTION, AT LEAST 72 HOURS IN ADVANCE. ANY INTERRUPTION SHALL BE MADE WITH A MINIMUM AMOUNT OF INCONVENIENCE TO THE BUILDING/PROPERTY OWNER AND ANY SUCH SHUTDOWN TIME SHALL BE COORDINATED WITH THE BUILDING/PROPERTY OWNER.
13. CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT ONE (1) COMPLETE SET OF ELECTRONIC MEDIA COPY AS-BUILT DRAWINGS TO THE MARCS REPRESENTATIVE.
14. CONTRACTOR SHALL PROVIDE ALL TEMPORARY WIRING FOR ALL TRADES FOR CONSTRUCTION EQUIPMENT (I.E. HAND TOOLS, WELDERS, PIPE BENDERS, ETC.) & CONSTRUCTION LIGHTING PER THE LATEST OSHA STANDARDS. INCLUDE ALL COSTS IN THE BASE BID THIS CONTRACTOR SHALL ESTABLISH SAFE WORKING PROCEDURES FOR THE PROTECTION OF THE WORKMEN IN ALL PHASES OF WORK, COMPLYING WITH THE APPLICABLE PROVISIONS OF ALL CITY, STATE, AND FEDERAL SAFETY LAWS (OSHA).
15. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE PLANS AND SHALL VERIFY EXISTING SITE CONDITIONS AT THE JOB SITE BEFORE SUBMITTING BID. FAILURE TO RECOGNIZE WORK REQUIRED SHALL BE AT THE EXPENSE OF THE CONTRACTOR. NO CONSIDERATION SHALL BE GIVEN FOR ADDITIONAL COMPENSATION AFTER THE LETTING OF BIDS.
16. ENTIRE INSTALLATION SHALL BE PERFORMED IN A FIRST CLASS WORKMAN LIKE MANNER AND SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES. THE COMPLETED SYSTEMS SHALL BE FULLY OPERATIONAL. ACCEPTANCE BY THE OWNER SHALL BE A CONDITION OF THE CONTRACT. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES IN ORDER TO AVOID INTERFERENCE'S PRESERVING MAXIMUM HEADROOM AND AVOID OMISSIONS. ALL MATERIAL'S WORKMANSHIP AND EQUIPMENT SHALL BE GUARANTEED FOR ONE (1) YEAR AFTER SYSTEM ACCEPTANCE.
17. ALL MATERIALS USED SHALL BE NEW AND BEAR THE U/L LABEL AND BE OF THE APPROPRIATE NEMA STANDARD.
18. CONTRACTOR SHALL INCLUDE ALL MISCELLANEOUS ITEMS REQUIRED TO COMPLETE THE WORK.
19. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND REQUIRED INSPECTION FEES.
21. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE AND REVIEW THE ELECTRICAL CHARACTERISTICS, AMPACITY AND OTHER REQUIREMENTS OF ALL EQUIPMENT PRIOR TO INSTALLATION.
22. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO COORDINATE THE LOCATIONS OF THE CONDUIT ROUTING, EQUIPMENT, LIGHTING, ETC. WITH ALL OTHER TRADES IN THE FIELD PRIOR TO INSTALLATION.
23. FOR CLARITY OF ALL PLANS, SOME EQUIPMENT CONDUIT AND WIRE HAS NOT BEEN SHOWN. IT IS THE RESPONSIBILITY OF THIS CONTRACTOR TO FURNISH AND INSTALL COMPLETE AND OPERATING SYSTEMS INCLUDING ALL CONDUIT AND WIRING.
24. THE CONTRACTOR SHALL MAINTAIN THE FIRE RATED INTEGRITY OF ALL FLOORS, CEILINGS, AND WALLS. ALL PENETRATIONS THROUGH FIRE RATED BUILDINGS ELEMENTS SHALL BE EFFECTIVELY SEALED USING APPROVED MATERIALS AND METHODS. ALL LIGHTING FIXTURES MOUNTED IN FIRE RATED CEILINGS SHALL MAINTAIN THE INTEGRITY OF THE FIRE RATING CEILINGS USING APPROVED MATERIALS AND METHODS. REFER TO ARCHITECTURAL DRAWINGS FOR THE FIRE RATINGS.
25. THE CONTRACTOR SHALL INSPECT THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS TO DETERMINE THE ENTIRE SCOPE OF WORK. THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS AND EXTENT OF DEMOLITION AND NEW WORK FOR THE PROJECT PRIOR TO SUBMITTING A BID.

    THE ELECTRICAL INSTALLATION IS TO BE IN STRICT ACCORDANCE WITH THE APPLICABLE RULES AND REGULATIONS OF ALL LOCAL, STATE AND FEDERAL ELECTRICAL CODES AND THE LOCAL UTILITY COMPANY REQUIREMENTS OR ANY OTHER AUTHORITIES HAVING LAWFUL JURISDICTION.

SITE WORK

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE PROJECT MANAGER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES: CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:

A. FALL PROTECTION
B. CONFINED SPACE
C. ELECTRICAL SAFETY
D. TRENCHING AND EXCAVATION
E. DURING OR AFTER CONSTRUCTION OF SITE TOWER; CONTRACTOR SHALL SUSPEND ALL WORK DURING ELECTRICAL STORMS AND MOVE ALL SITE CONSTRUCTION PERSONNEL SAFELY OFF THE CONSTRUCTION SITE UNTIL THE STORM HAS SAFELY PASSED.

2. REMOVE FROM SITE/OWNER'S PROPERTY ALL WASTE MATERIALS, UNUSED EXCAVATED MATERIAL, INCLUDING MATERIAL CLASSIFIED UNSATISFACTORY, CONTAMINATED OR DANGEROUS TRASH AND DEBRIS AND DISPOSE OF IN A LEGAL MANNER (AS REQUIRED).
3. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF ENGINEERING.
4. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE BUILDING OR DRIVEWAY SHALL BE GRADED TO A UNIFORM SLOPE, FERTILIZED, SEEDED, AND COVERED WITH MULCH AS SPECIFIED IN THE SPECIFICATION GRADING, LANDSCAPING, EROSION AND SEDIMENT CONTROL PLANS (AS REQUIRED).
5. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL AND 1996 BOCA STANDARD GUIDELINES FOR EROSION AND SEDIMENT CONTROL AND THE EROSION AND SEDIMENT CONTROL PLANS.
6. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT SHELTER OR PLATFORM LAYOUT AND CONSTRUCTION STAKING. CONTRACTOR SHALL ESTABLISH GRADE AND LINE STAKES PRIOR TO CONSTRUCTION.

CONCRETE

1. MINIMUM ALLOWABLE CONCRETE COMPRESSIVE STRENGTH SHALL BE A PSI AS NOTED ON PLANS AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH THE AMERICAN SOCIETY FOR TESTING AND MATERIALS METHODS STANDARDS ASTM C172, ASTM C31 UNLESS OTHERWISE NOTED.
2. CONCRETE FOR ALL FOUNDATIONS, 540 LBS PER CUBIC YARD OF CONCRETE MINIMUM CEMENT CONTENT FOR 1-INCH MAXIMUM SIZE AGGREGATE, SLUMP RANGE 3 INCHES TO 5 INCHES. TOTAL AIR CONTENT 4 PERCENT TO 7 PERCENT BY VOLUME, AIR ENTRAINING ADMIXTURE REQUIRED TO CONTROL TOTAL AIR CONTENT, WATER REDUCING ADMIXTURE PERMITTED TO OBTAIN SLUMP OVER THREE INCHES..
3. ALL CONCRETE CONSTRUCTION SHALL MEET THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN CONCRETE INSTITUTE (ACI 318) BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE AND (ACI 301) STANDARD SPECIFICATION FOR STRUCTURAL CONCRETE.
4. REBARS SHALL BE ASTM A-615 DEFORMED TYPE WITH MINIMUM YIELD STRENGTH OF 60,000 PSI (40,000 PSI GRADE MAY BE USED FOR TIES & STIRRUPS). WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185.
5. DETAILING SHALL BE IN ACCORDANCE WITH MANUAL STANDARD PRACTICE OF DETAILING REINFORCED CONCRETE STRUCTURES (ACI STD-315 LATEST EDITION).
6. CHAMFER ALL EXPOSED EDGES OF CONCRETE
7. REINFORCING STEEL SHALL BE ACCURATELY PLACED AND ADEQUATELY SECURED IN POSITION. LOCATION OF REINFORCEMENT SHALL BE INDICATED ON THE DRAWINGS. THE FOLLOWING MINIMUM COVER (IN INCHES) FOR REINFORCEMENT SHALL BE PROVIDED, EXCEPT AS NOTED ON DWGS.

   MINIMUM COVER (IN INCHES)

   CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH – 3"

   EXPOSED TO EARTH OR WEATHER:

   #6 THROUGH #18 – 2"

   #5 BAR AND SMALLER – 1-1/2"

8. TESTS

   CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY A QUALIFIED REGIONAL TESTING AGENCY AS THE WORK PROGRESSES. FAILURE TO DETECT ANY DEFECTIVE WORK OR MATERIAL SHALL NOT IN ANY WAY PREVENT LATER REJECTION WHEN SUCH DEFECT IS DISCOVERED NOR SHALL IT OBLIGATE THE ENGINEER FOR FINAL ACCEPTANCE.

9. PLACING CONCRETE

A. A MARCS REPESENTATIVE SHALL BE NOTIFIED NOT LESS THAN 24 HOURS IN ADVANCE OF CONCRETE PLACEMENT, UNLESS INSPECTION IS WAVED IN EACH CASE. PLACING OF CONCRETE SHALL BE PERFORMED ONLY IN THE PRESENCE OR WITH THE APPROVAL OF THE PROJECT MANAGER. CONCRETE SHALL NOT BE PLACED UNTIL ALL FORMWORK, EMBEDDED PARTS, STEEL REINFORCEMENT, FOUNDATION SURFACES AND JOINTS INVOLVED IN THE PLACING HAVE BEEN APPROVED, AND UNTIL FACILITIES ACCEPTABLE TO THE MARCS REPRESENTATIVE HAVE BEEN PROVIDED AND MADE READY FOR ACCOMPLISHMENT OF THE WORK AS SPECIFIED. CONCRETE MAY NOT BE ORDER FOR PLACEMENT UNTIL ALL ITEMS HAVE BEEN APPROVED AND MARCS HAS PERFORMED A FINAL INSPECTION AND GIVEN APPROVAL TO START PLACEMENT IN WRITING.

B. PLACEMENT OF CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301.

10. PROTECTION

A. IMMEDIATELY AFTER PLACEMENT, THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING. EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY, FINISHED WORK SHALL BE PROTECTED.

B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT A RELATIVELY CONSTANT TEMPERATURE FOR A PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.

C. ALL CONCRETE SHALL BE WATER CURED BY CONTINUOUS (NOT PERIODIC) FINE MIST SPRAYING OR SPRINKLING ALL EXPOSED SURFACES. WATER SHALL BE CLEAN AND FREE FROM ACID, ALKALI, SALTS, OIL SEDIMENT AND ORGANIC MATTER. SUCCESSFUL CURING SHALL BE OBTAINED BY USE OF AN AMPLE WATER SUPPLY UNDER PRESSURE IN PIPES WITH ALL NECESSARY APPLIANCES OF SPRINKLERS, ALL SPRAYING DEVICES.

STRUCTURAL STEEL

1. DETAIL, FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH THE LATEST AISC MANUAL OF STEEL CONSTRUCTION, AWS D1.1 AND THE STRUCTURAL STEEL SHALL BE AS FOLLOWS:
   A. ASTM A36, GRADE 36 ROLLED STEEL, RODS, PLATES, U-BOLTS AND ANCHOR BOLTS.
   B. ASTM A325 BOLTS BEARING TYPE
   C. ALL STEEL SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.
2. THE CONTRACTOR SHALL PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE REQUIRED DURING CONSTRUCTION UNTIL ALL CONNECTIONS ARE COMPLETE.
3. ANY FIELD CHANGES OR SUBSTITUTIONS SHALL HAVE PRIOR APPROVAL FROM THE ENGINEER AND OWNER.
4. TIGHTEN HIGH STRENGTH BOLTS TO A SNUG TIGHT CONDITION WHERE ALL PLIES IN A JOINT ARE IN FIRM CONTACT WITH EACH OTHER.
   A. A FEW IMPACTS OF AN IMPACT WRENCH
   B. THE FULL EFFORT OF A PERSON USING A SPUD WRENCH
5. WELDING
   A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS; CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEERS AND/OR OWNERS REVIEW IF REQUESTED.
   B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM A-233 E70 SERIES, BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERSED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATION.
   E. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.
6. PROTECTION
   A. UPON COMPLETION OF ERECTION INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS, OR GALVANIZED BREAKS WITH ZINC BASED PAINT (GALVANOX, DRY GALV OR ZINC IT). COLOR TO MATCH THE GALVANIZING PROCESS.

QUALITY ASSURANCE

1. ALL MATERIALS AND EQUIPMENT SPECIFIED ON THE PROJECT SHALL BE NEW AND UNUSED, OF CURRENT MANUFACTURE AND OF THE HIGHEST GRADE.
2. ALL EQUIPMENT, MATERIAL AND THE INSTALLATION METHODS SPECIFIED ON THE PROJECT DRAWINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS, AND APPROPRIATE INDUSTRIAL CONSENSUS STANDARDS AND CODES INCLUDING ANSI, IEEE, NEMA, NFPA AND UL. ALL REVISED AS OF THE DATE OF THIS WORK PACKAGE.
3. ALL ELECTRICAL ITEMS BOTH CONTRACTOR AND OWNER FURNISHED SHALL BE CHECKED FOR AGREEMENT WITH THE PROJECT DRAWINGS AND SPECIFICATIONS AND SHALL BE VISUALLY INSPECTED TO ENSURE THAT EQUIPMENT IS UNDAMAGED AND IS IN PROPER ALIGNMENT. INSTALLED PER MANUFACTURER'S INSTRUCTIONS, ELECTRICAL CONNECTIONS ARE TIGHT AND PROPERLY INSULATED WHERE REQUIRED. FUSES ARE OF THE PROPER TYPE AND SIZE AND ELECTRICAL ENCLOSURES ARE OF THE PROPER NEMA TYPE.
4. NOTIFY MARCS REPRESENTATIVE IN WRITING OF ALL DISCREPANCIES BETWEEN DRAWINGS/SPECIFICATIONS AND FIELD INSTALLATIONS, OR IF THE VISUAL INSPECTIONS SHOW DAMAGE OR IMPROPER INSTALLATION.
5. GENERAL: DURING AND UPON COMPLETION OF THE WORK, ARRANGE AND PAY ALL ASSOCIATED INSPECTIONS OF ALL ELECTRICAL WORK INSTALLED UNDER THIS CONTRACT, IN ACCORDANCE WITH THE CONDITIONS OF THE CONTRACT.
6. INSPECTIONS REQUIRED: AS PER THE LAW AND REGULATIONS OF THE LOCAL AND/OR STATE AGENCIES HAVING JURISDICTION AT THE PROJECT SITE.
7. INSPECTION AGENCY: ALL COGNIZENT LOCAL AND/OR STATE AGENCIES HAVING JURISDICTION AT THE PROJECT SITE.

GENERAL

ALL ELECTRICAL SITE WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE DATED 2010.

1. THE EQUIPMENT AND MATERIAL SHALL BE FURNISHED AND INSTALLED TO OPERATE SAFELY AND CONTINUOUSLY OUTDOORS WITH NO PROTECTION FROM THE WEATHER.
2. ELECTRICAL WORK REPRESENTED ON THE PROJECT DRAWINGS IS SHOWN DIAGRAMMATICALLY. EXACT LOCATIONS AND ELEVATIONS OF ELECTRICAL EQUIPMENT SHALL BE DETERMINED IN THE FIELD AND VERIFIED WITH THE MARCS REPRESENTATIVE.
3. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF TEMPORARY, IF REQUIRED, AND PERMANENT POWER WITH THE LOCAL UTILITY COMPANY. THE TEMPORARY POWER AND ALL HOOKUP COSTS ARE TO BE PAID BY THE CONTRACTOR.
4. PROVIDE MOLDED CASE BOLT-ON, THERMAL MAGNETIC TRIP, SINGLE, TWO OR THREE POLE CIRCUIT BREAKERS, MULTIPLE POLE CIRCUIT BREAKERS SHALL BE SINGLE HANDLE COMMON TRIP, SHORT CIRCUIT INTERRUPTING RATING SHALL BE AS REQUIRED FOR AVAILABLE FAULT CURRENTS. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE A SHORT CIRCUIT INTERRUPTING RATING EQUAL TO OR GREATER THAN THAT SHOWN ON PROJECT DRAWINGS.
5. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENTLY ENGRAVED LAMINATED PHENOLIC NAME PLATES WITH WHITE ON BLUE BACKGROUND (MINIMUM LETTER HEIGHT SHALL BE 1/2 INCH). NAMEPLATE SHALL BE FASTENED WITH STAINLESS STEEL SCREWS.
6. CONTRACTOR SHALL PERFORM ALL EXCAVATION, TRENCHING, BACKFILLING, AND REMOVAL OF DEBRIS IN CONNECTION WITH THE ELECTRICAL WORK IN ACCORDANCE WITH THE PROJECT DRAWINGS. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF UNDERGROUND UTILITIES AND GROUNDING WITH THE FOUNDATION INSTALLATION.
7. CONTRACTOR SHALL PROVIDE ALL NECESSARY SUPPORTS FOR EQUIPMENT INSTALLED AS PART OF THIS PROJECT. SUPPORTS SHALL CONSIST OF GALVANIZED STEEL FRAMES, PLATES, BRACKETS, RACKS AND OTHER SHAPES OF ADEQUATE SIZE AND FASTENED WITH BOLTS, SCREWS OR BY WELDING TO PROVIDE RIGID SUPPORT.
8. CONTRACTOR SHALL CALL THE APPROPRIATE UTILITIES PROTECTION SERVICE BEFORE ANY UNDERGROUND WORK IS PERFORMED, SUCH AS TRENCHING, EXCAVATING, AND DRIVING GROUND RODS.
9. CONTRACTOR SHALL SEAL AROUND ELECTRICAL PENETRATIONS THROUGH FIRE-RATED WALLS/FLOORS USING APPROVED FIRE STOP MATERIALS TO MAINTAIN THE FIRE RESISTANCE RATING.
10. SHORT CIRCUIT RATINGS: PROVIDE EQUIPMENT W/HIGHER FAULT CURRENT RATINGS AS NEEDED TO MATCH UTILITY COMPANY AVAILABLE FAULT CURRENT.

SPECIAL CONSTRUCTION/ANTENNA INSTALLATION

1. WORK INCLUDED:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND SPECIFICATIONS.
B. INSTALL GALVANIZED STEEL, ANTENNA MOUNTS AS INDICATED ON DRAWINGS.
C. INSTALL FURNISHED GALVANIZED STEEL AND/OR TOWER WAVE GUIDE AND PROVIDE PRINTOUT OF THAT TEST.
D. CONTRACTOR SHALL PROVIDE FOUR (4) SETS OF SWEEP TESTS USING HEWLETT-PACKARD 87138 RF SCALER NETWORK ANALYZER. SUBMIT FREQUENCY DOMAIN REDFLECTOMETER (FOR) TESTS RESULTS TO THE MARCS REPRESENTATIVE. SWEEP TEST SHALL BE AS PER ATTACHED ANDREW MINIMUM FIELD TESTING. RECOMMENDED FOR ANTENNA AND HELIX COAXIAL CABLE SYSTEM'S DATED 10/5/93. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND BE BOUND AND SUBMITTED WITHIN ONE WEEK OF WORK COMPLETION. CONTRACTOR MAY USE ALTERNATIVE MEANS OF SWEEP TESTING AS APPROVED MARCS.
E. INSTALL COAXIAL CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURE'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTIONS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURE'S REQUIREMENTS. TERMINATE ALL COAXIAL CABLE THREE (3) FEET IN EXCESS OF ENTRY PORT LOCATION UNLESS OTHERWISE STATED.
F. ANTENNA AND COAXIAL CABLE GROUNDING:

1. ALL EXTERIOR GROUND WIRE AND CONNECTIONS ARE TO BE PER THE PLANS. ANDREWS CONNECTOR SPLICE WEATHERPROOFING KIT #221213 OR EQUAL.
2. ALL COAXIAL CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL CABLE (NOT WITHIN BENDS).

CALCULATED JJR CHECKED KBS

GENERAL NOTES

KEENE-COSHOCTON TOWER SITE

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GENERAL NOTES

RACEWAYS

1. CONDUIT AND CONDUIT FITTINGS SHALL MEET ANSI AND NEC STANDARDS FOR MATERIAL AND WORKMANSHIP AND SHALL BE UL LISTED.
   A. RIGID STEEL CONDUIT (FOR ALL ABOVE GRADE WORK) SHALL CONFORM TO ANSI C80–1 AND THE REQUIREMENTS OF NEC PARAGRAPH 346 AND BE STANDARD WEIGHT, MILD RIGID STEEL, HOT DIP GALVANIZED WITH INSIDE AND OUTSIDE FINISH WITH A PROTECTIVE ZINC COATING. COUPLING, ELBOWS AND BENDS SHALL MEET THESE SAME REQUIREMENTS. FITTINGS SHALL BE OF THE GALVANIZED IRON OR STEEL THREADED TYPE.
   B. PVC CONDUIT (FOR UNDERGROUND WORK) SHALL CONFORM TO UL STANDARD 651–89 AND THE REQUIREMENTS OF NEC, PARAGRAPH 358. CONDUIT SHALL BE HEAVY WALL TYPE, SCHEDULE 80, AND SUNLIGHT RESISTANT. FITTING SHALL BE OF THE UNTHREADED SOLVENT CEMENT TYPE.
   C. EMT CONDUIT (FOR USE BEHIND WALLS OR ABOVE SUSPENDED CEILINGS ONLY) ELECTRIC METALLIC TUBING SHALL CONFORM TO ANSI C80.3 AND THE REQUIREMENTS OF NEC, PARAGRAPH 378 AND BE PROTECTED ON EXTERIOR WITH A ZINC COATING AND ON INTERIOR SURFACES WITH EITHER A ZINC COATING OR LACQUER ENAMEL. FITTINGS SHALL BE ZINC COATED STEEL.
2. MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH FOR SIZES NOT SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE NEC.
3. ALL SPARE CONDUITS SHALL HAVE A METALLIC OR MULL TAPE PULL WIRE.
4. CONDUIT SUPPORTS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AND IN ACCORDANCE WITH THE NEC.
5. UNDERGROUND CONDUITS & ENCLOSURES.
   A. INSTALL A WARNING TAPE TWELVE INCHES ABOVE EACH CONDUIT OR SET OF CONDUITS.
   B. IDENTIFY EACH CONDUIT AT BOTH ENDS.
   C. INSTALL A MINIMUM OF 36 INCHES BELOW THE FINISHED GRADE, OR DEEPER IF NOTED ON PLAN DRAWINGS
   D. SLOPE A MINIMUM OF 4 INCHES PER 100 FEET TO DRAIN AWAY FROM BUILDINGS AND EQUIPMENT
   E. USE. MANUFACTURED ELECTRICAL PPC ELBOWS AND FITTINGS FOR BELOW GRADE BENDS.
   F. MAKE JOINTS AND FITTINGS WATERTIGHT ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
   G. INSTALL A COUPLING BEFORE EACH WALL PENETRATION
   H. RESTORE SURFACE FEATURES DISTURBED BY EXCAVATION (AND TRENCHING) IN ALL AREAS.
   I ENCLOSURES IN DRY LOCATION SHALL BE NEMA 1
   J. ENCLOSURES IN WET LOCATIONS OR OUTDOOR SHALL BE NEMA 5.

CABLE TRAYS

1. ALL CABLE TRAYS AND FITTINGS SHALL BE DESIGNED, MANUFACTURED AND TESTED IN CONFORMANCE WITH NEMA VE 1
2. CABLE TRAYS SHALL BE LADDER TYPE WITH 9–INCH SPACING
3. CABLE TRAYS SHALL SE CAPABLE OF SUPPORTING 75 LBS/LINEAR FOOT.
4. CABLE TRAYS AND FITTINGS SHALL BE MANUFACTURED OF GALVANIZED STEEL.
5. CABLE TRAYS SHALL BE FURNISHED WITH COVERS WHERE SHOWN ON THE PROJECT DRAWINGS.
6. ALL DISCONTINUOUS SECTIONS OF CABLE TRAY SHALL BE BONDED ACROSS JOINTS.

CONDUCTORS

1. ALL POWER. CONTROL AND COMMUNICATIONS WIRING SHALL MEET REQUIRED NEMA–RATINGS. ASTM, UL AND NEC STANDARDS FOR MATERIAL AND WORKMANSHIP UNLESS OTHERWISE SPECIFIED.
   A. SERVICE ENTRANCE CONDUCTORS SHALL BE COPPER, 600 VOLT, SUNLIGHT RESISTANT SUITABLE FOR WET LOCATIONS, TYPE USE–2. THE GROUNDED NEUTRAL CONDUCTOR SHALL BE IDENTIFIED WITH A WHITE MARKING AT EACH TERMINATION.
   B. CONDUCTORS FOR FEEDER AND BRANCH CIRCUITS SHALL BE COPPER 600 VOLT, TYPE THHN/THWN WITH A MINIMUM SIZE OF #12 AWG.
2. ALL CONDUCTOR ACCESSORIES INCLUDING CONNECTORS, TERMINATIONS, INSULATING MATERIALS, SUPPORT GRIPS, MARKER AND CABLE TIES SHALL BE FURNISHED AND INSTALLED. SUPPLIER'S INSTALLATION INSTRUCTIONS SHALL BE OBTAINED FOR CABLE ACCESSORIES. THESE INSTRUCTIONS SHALL BE IN THE POSSESSION OF THE CRAFTSMAN WHILE INSTALLING THE ACCESSORIES AND SHALL BE AVAILABLE TO THE PROJECT MANAGER AND MARCS REPRESENTATIVE.
3. WHERE POSSIBLE. NO. 6 AWE AND SMALLER WIRE SHALL BE COLOR CODED BY THE COLOR OF THE INSULATION COVERING. COLOR CODING OF WIRE LARGER THAN NO. 6 AWG MAY BE BY MEANS OF SELF–ADHESIVE WRAP–AROUND TYPE MARKERS, PER NEC.
4. TERMINAL CONNECTORS FOR CONDUCTORS SMALLER THAN 8 AWG SHALL BE. COMPRESSION TYPE CONNECTORS SIZED FOR THE CONDUCTOR AND THE TERMINAL. THE CONNECTORS SHALL BE CONSTRUCTED OF FINE GRADE HIGH CONDUCTIVITY COPPER IN ACCORDANCE WITH OO–C–576 AND SHALL BE TIN–PLATED IN ACCORDANCE WITH .MIL–T–10727. THE INTERIOR SURFACE OF THE CONNECTOR WIRE BARREL SHALL BE SERRATED, AND THE EXTERIOR SURFACE OF THE CONNECTOR WIRE BARREL SHALL BE PROVIDED WITH CRIMP GUIDES.
5. TERMINAL CONNECTORS FOR CONDUCTORS 8 AWG AND LARGER SHALL BE PRESSURE OR BOLTED CLAMP TYPE, BURNDY QUICKLUG VARILUG OR ACCEPTABLE EQUAL; OR COMPRESSION TYPE: BURNDY TYPE YAV OFR YA (LONG BARREL), PANDUIT TYPE LCA OR LCC. OR ACCEPTABLE EQUAL, ACCEPTABLE CONNECTORS INCLUDED WITH COMPANY–FURNISHED EQUIPMENT MAY BE USED.
6. TERMINATION PROVISIONS OF EQUIPMENT FOR CIRCUITS RATED 100 AMPERES OR LESS, OR MARKED FOR NOS. 14 THROUGH 1 CONDUCTORS. SHALL BE USED ONLY FOR CONDUCTORS RATED 60 DEG. C (140 DEG F). CONDUCTORS WITH HIGHER TEMPERATURE RATINGS SHALL BE PERMITTED, PROVIDED THE AMPACITY OF EACH CONDUCTOR IS DETERMINED BASED ON THE 60 DEG.C (140 DEG.F) AMPACITY OF THE CONDUCTOR SIZE USED.
7. TERMINATION PROVISIONS OF EQUIPMENT FOR CIRCUITS RATED OVER 100 AMPERES, OR MARKED FOR CONDUCTORS LARGER THAN NO. 1 SHALL BE USED ONLY FOR CONDUCTORS RATED 75 DEG.C (167 DEG F). CONDUCTORS WITH HIGH TEMPERATURE RATINGS SHALL BE PERMITTED, PROVIDED THE AMPACITY OF EACH CONDUCTOR IS DETERMINED BASE ON THE 75 DEG. C (167 DEC.F) AMPACITY OF THE CONDUCTOR SIZE USED.
8. ALL 600 VOLT OR LESS WIRING, WHERE COMPRESSION TYPE CONNECTORS ARE USED, SHALL BE INSULATED WITH AT LEAST ONE TURN OF "SCOTCHFILL" 200 AMP ELECTRICAL INSULATING PUTTY AND THEN COVERED WITH TWO HALF TURNS OF TAPE SIMILAR TO 3M COMPANY'S "33 PLUS" (33+) PLASTIC TAPE OR 88 OUTDOOR.
9. THE ELECTRICAL SERVICE TO THE SITE SHALL BE GROUNDED AT THE SERVICE DISCONNECTING MEANS REQUIRED IN ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE, IN ACCORDANCE WITH ANY LOCAL CODE.
10. ALL EXTERIOR GROUNDING CONNECTIONS, BELOW OR ABOVE GRADE, SHALL BE EXOTHERMIC WELDED.
11. TOWER RING GROUND AND SHELTER GROUND RING SHALL BE #1/0 BARE, TINNED STRANDED COPPER. TOWER AND SHELTER GROUND SHALL BE # 1/0 BARE, TINNED STRANDED COPPER. FENCE AND ICE BRIDGE GROUND SHALL BE # 2/0 BARE, TINNED SOLID COPPER.
12. ALL HARDWARE, BOLTS, NUTS, WASHERS AND LOCKS SHALL BE 18–8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT–FLAT WASHER–BUSS–LUG–FLAT WASHER–LOCK WASHER–NUT IN THAT EXACT ORDER, WITH NUT FACING OUTWARD, BACK–TO–BACK LUGGING, BOLT–FLAT WASHER–LUG–FLATWASHER–LUG–BUSS–FLAT WASHER–LOCK WASHER–NUT, IN THAT EXACT ORDER IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR, STACKING OG LUGS, BUSS–LUG–LUG, IS NOT ACCEPTABLE.
13. THE COMPRESSION GROUND LUG FOR #2 AWG BARE SOLID GROUNDING CONDUCTOR SHALL BE BURNDY TYPE YA3C–2TC.
14. THE DEPTH OF THE GROUND RING WHEN SPECIFIED, SHALL BE EITHER 4'–0' BELOW FINAL GRADE OR IT SHALL BE INSTALLED TO THE MINIMUM DEPTH REQUIRED BY LOCALLY ENFORCED CODES, REGULATIONS AND ORDINANCES, WHICHEVER IS DEEPER.
15. THE GROUND RING, WHEN SPECIFIED, SHALL BE WITHIN 18 TO 36 INCHES OF THE EQUIPMENT PLATFORM.
16. GROUND RODS, WHEN SPECIFIED, SHALL BE 3/4 INCH STEEL. CLAD WITH A PURE COPPER JACKET OF NOT LESS THAN 0.0012 INCHES THICK 10 FEET LONG, GROUND RODS SHALL BE DRIVEN IN THE QUANTITY AND LOCATION AS SHOWN ON THE DRAWINGS TO THE FULL VERTICAL LENGTH IN UNDISTURBED EARTH.
17. XIT RODS.
    WHEN SPECIFIED ON THE PROJECT DRAWINGS. ALL XIT RODS SHALL BE 2–1/8" O.D. TYPE K COPPER WITH A WALL THICKNESS OF 0.083' AND SHALL HAVE A LENGTH AS SPECIFIED ON THE SITE SPECIFIC DESIGN DRAWINGS. THE XIT COPPER PIPE/ROD SHALL BE FILLED WITH NON–HAZARDOUS CALSOLYTE. THE BACKFILL MATERIAL SHALL BE NATURAL CLAY LYNCONITE, THE COVER SHALL BE INDUSTRIAL POLYPLASTIC LYNCOLE MODEL XB–11 FOR NON–TRAFFIC AREAS AND CONCRETE. LYNCOLE MODEL XB–I2 FOR TRAFFIC OR PAVED AREAS.
18. PPC BONDING, PPC UNITS ARE SHIPPED WITH A NEUTRAL–GROUND BONDING. JUMPER INSTALLED (BECAUSE THEY ARE SERVICE ENTRANCE–RATED EQUIPMENT). AT SITES WHERE THE PPC IS NOT SERVICE EQUIPMENT (AS DEFINED BY THE NATIONAL ELECTRICAL CODE), THIS BONDING JUMPER SHALL BE REMOVED. NOTE: AT SITES WHERE THE PPC IS NOT SERVICE EQUIPMENT, THE CONTRACTOR SHALL VERIFY THAT THE SERVICE ENTRANCE NEUTRAL IS GROUNDED PRIOR TO REMOVAL OF THE BONDING JUMPER IN THE PPC.
19. THE ANTENNA CABLES SHALL BE GROUNDED AT THE TOP AND BOTTOM OF THE VERTICAL RUN. THE ANTENNA CABLE SHIELD SHALL BE BONDED TO A COPPER GROUND BUS AT THE LOWEST POINT OF VERTICAL RUN. THE ANTENNA CABLE SHIELD SHALL BE GROUNDED JUST BEFORE ENTERING THE BTS, GROUNDING KITS ON COAX CABLE SHALL HAVE A MINIMUM BEND OF 6" AND SHALL BE KEPT AS CLOSE TO VERTICAL AS POSSIBLE, FLAT WASHER SENT WITH GROUND KITS MUST BE REPLACED WITH SMALLER STAINLESS FLAT WASHERS, WASHERS MUST REMAIN FLAT AGAINST GROUND BAR. ALL FASTENERS MUST BE STAINLESS STEEL AND KOPR–SHIELD MUST BE USED ON BOTH SIDES OF GROUND BAR.

TELEPHONE SERVICES

1. GENERAL INSTRUCTIONS SHALL BE IN ACCORDANCE WITH TELEPHONE UTILITY COMPANY'S RULES AND REGULATIONS.

LIGHTING PROTECTION

1. LIGHTNING PROTECTION MATERIAL SHALL BE IN ACCORDANCE WITH THE PLANS.

GROUND SYSTEM TESTING

1. SEE GROUND TEST PROCEDURE DIAGRAM ON SHEET 16.
2. A RESISTANCE–TO–GROUND OF 5 OHMS OR LESS IS THE OBJECTIVE OF THE EXTERNAL GROUND SYSTEM AS INDICATED AND SPECIFIED. THE CONTRACTOR SHALL PERFORM TESTS AS SPECIFIED IN SPRING STANDARD SSEO 3.018 10.002 – SITE RESISTANCE TO EARTH TESTING TO DETERMINE RESISTANCE–TO–GROUND OF THE COMPLETED EXTERNAL GROUND SYSTEM PRIOR TO BACKFILLING IN TRENCHES. THE CONTRACTOR SHALL EMPLOY THE SERVICES OF AN EXPERIENCED TESTING LABORATORY OR ENGINEERING FIRM FAMILIAR WITH THE SPECIFIED TEST METHOD. IF RESISTANCE OF THE ENTIRE SYSTEM EXCEEDS 5 OHMS NOTIFY THE OWNER'S REPRESENTATIVE FOR FURTHER DIRECTIVE.
3. GROUND RESISTANCE SHALL BE MEASURED FOR EACH PIECE OF EQUIPMENT TO THE GROUND ELECTRODE.
4. GROUNDING RESISTANCE TEST REPORT: A GROUNDING RESISTANCE TEST REPORT SHALL BE PREPARED UPON COMPLETION OF THE TESTING FOR EACH SITE. THE TEST REPORT SHALL CONTAIN THE COMPLETE FORMS IN 96104 AND SHOW THE RESISTANCE IN OHMS AT 62% SPACING AND WITH AUXILIARY POTENTIAL ELECTRODES AND READINGS AT 10% INTERVALS WITH A TOTAL DISTANCE OF AT LEAST 500 FEET OR UNTIL THE AVERAGE RESISTANCE STARTS INCREASING. IT SHALL CONTAIN 10 TO 15 PHOTOGRAPHS TAKEN DURING CONSTRUCTION TO PROVIDE PROOF THAT THE ENTIRE EXTERNAL GROUND RING SYSTEM WAS COMPLETE BEFORE BACKFILLING. THE CONTRACTOR SHALL ALSO NOTIFY MARCS NO LESS THAN 48 HOURS IN ADVANCE OF BACKFILL. TESTING SHALL BE COMPETED BY THE CONTRACTOR AND TWO (2) COPIES OF THE GROUNDING RESISTANCE TEST REPORT ARE TO BE BOND AND SUBMITTED WITHIN ONE WEEK OF TEST COMPLETION FOR EACH SITE.
5. ALL GROUND WIRES SHALL BE 6" BELOW FROST LEVEL.
6. PROVIDE COLOR WARNING TAPE 1'–0" BELOW FINISHED GRADE.

HANGERS & SUPPORT

1. MATERIALS. ALL HANGERS, SUPPORTS FASTENERS AND HARDWARE SHALL BE ZINC COATED OR EQUIVALENT CORROSION RESISTANCE BY TREATMENT OR INHERENT PROPERTY AND SHALL BE MANUFACTURED' PRODUCTS DESIGNED FOR THE APPLICATION. PRODUCTS FOR OUTDOOR USE SHALL BE HOT DIP GALVANIZED.
2. INSTALLATION, RIGIDLY SUPPORT AND SECURE ALL MATERIALS, RACEWAY AND EQUIPMENT BUILDING STRUCTURE USING HANGERS, SUPPORTS AND FASTENERS SUITABLE FOR THE USE. MATERIALS AND LOADS ENCOUNTERED. PROVIDE ALL NECESSARY HARDWARE. PROVIDE CONDUIT SUPPORTS AT MAXIMUM 6 FT. O.C.
3. OVERHEAD MOUNTING. ATTACH OVERHEAD MOUNTED EQUIPMENT TO STRUCTURAL FRAMEWORK OR SUPPORTING METAL FRAMEWORK.
4. EXTERIOR WALLS. MOUNT ALL EQUIPMENT LOCATED ON THE INTERIOR OF EXTERIOR BUILDING WALLS AT LEAST ONE INCH AWAY FROM WALL SURFACE. USING SUITABLE SPACERS.
5. STRUCTURAL MEMBERS. DO NOT CUT, DRILL OR WELD ANY STRUCTURAL MEMBER EXCEPT SPECIFICALLY APPROVED BY THE PROJECT STRUCTURAL ENGINEER.
6. INDEPENDENT SUPPORT, DO NOT SUPPORT MATERIALS OR EQUIPMENT FROM OTHER EQUIPMENT, PIPING, DUCTWORK OR SUPPORTS FOR SAME.
7. RACEWAY SUPPORTS. RIGIDLY SUPPORT ALL RACEWAY WITH MAXIMUM SPACINGS PER NEC AND SO AS TO PREVENT DISTORTION OF ALIGNMENT DURING PULLING OPERATION. USE APPROVED HANGERS, CLAMPS AND STRAPS FOR INDIVIDUAL RUNS. DO NOT USE PERFORATED STRAPS OR TIE WIRES. WHERE MULTIPLE PARALLEL RACEWAYS ARE TO RUN TOGETHER. USE TRAPEZE TYPE HANGER ARRANGEMENT MADE FROM U–CHANNEL AND ACCESSORIES. SUSPENDED FOR FUTURE INSTALLATION OF ADDITIONAL RACEWAYS. RIGIDLY ANCHOR VERTICAL CONDUITS SERVING FLOOR MOUNTED OR "ISLAND" TYPE EQUIPMENT MOUNTED AWAY FROM WALLS WITH METAL BRACKET OR RIGID STEEL CONDUIT EXTENSION SECURED TO FLOOR.
8. MISCELLANEOUS SUPPORTS. PROVIDE ANY ADDITIONAL STRUCTURAL SUPPORT STEEL BRACKETS, ANGLES, FASTENERS AND HARDWARE AS REQUIRED TO ADEQUATELY SUPPORT ALL ELECTRICAL MATERIALS AND EQUIPMENT.
9. ONE HOLE STRAPS SHALL NOT BE USED FOR CONDUITS LARGER THAN 3/4 INCH.

CUTTING & PATCHING

1. GENERAL: PROVIDE ALL CUTTING, DRILLING, CHASING, FITTING AND PATCHING NECESSARY FOR ACCOMPLISHING THE WORK. THIS INCLUDES ANY AND ALL WORK NECESSARY TO UNCOVER WORK TO PROVIDE FOR INSTALLATION OF ILL TIME'S WORK. REMOVE AND REPLACE DEFECTIVE WORK AND WORK NOT CONFORMING TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. INSTALL EQUIPMENT AND MATERIALS IN EXISTING STRUCTURES IN ADDITION TO THAT REQUIRED DURING THE NORMAL COURSE OF CONSTRUCTION.
2. REPAIRS: REPAIR ANY AND ALL DAMAGE TO WORK OF OTHER TRADES CAUSED BY CUTTING AND PATCHING OPERATIONS. USING SKILLED MECHANICS OF THE TRADES INVOLVED.

CHECKOUT, TESTING & ADJUSTING

1. CORRECTION/REPLACEMENT: AFTER TESTING BY CONTRACTOR, MARCS REPRESENTATIVE, OR ENGINEER. CORRECT ANY DEFICIENCIES. AND REPLACE MATERIALS AND EQUIPMENT SHOWN TO BE DEFECTIVE OR UNABLE TO PERFORM AT DESIGN OR RATED CAPACITY.
2. POWER CONDUCTORS, CONTRACTOR SHALL CONDUCT A CONTINUITY AND INSULATION TEST ON CONDUCTORS BETWEEN SERVICE DISCONNECT SWITCH AND POWER CABINET.
3. WHEN SITE POWER IS DERIVED FROM 3 PHASE SOURCE. LOAD READINGS WILL BE TAKEN AND RECORDED TO MAINTAIN A BALANCE LOAD AT THE PRIMARY SOURCE. RECORDS SHALL TURNED IN TO THE OTHER'S REPRESENTATIVE. ENGINEER.

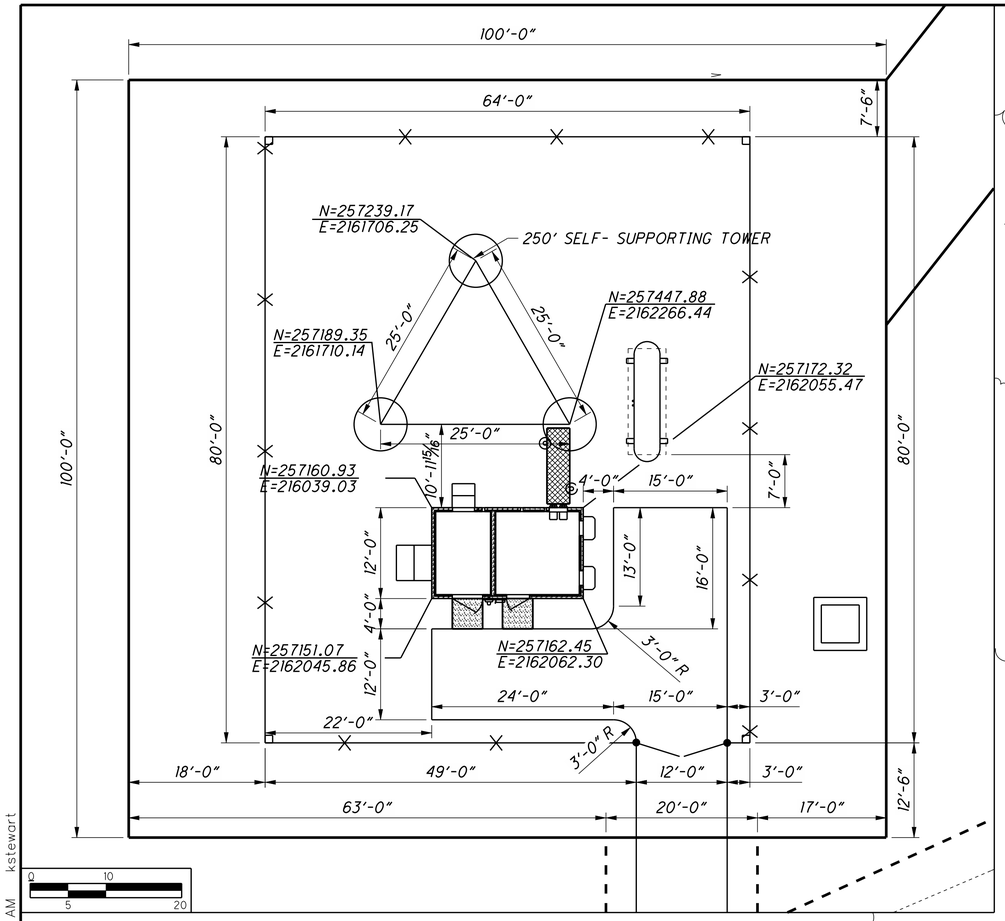
HOLES, SLEEVES & OPENINGS

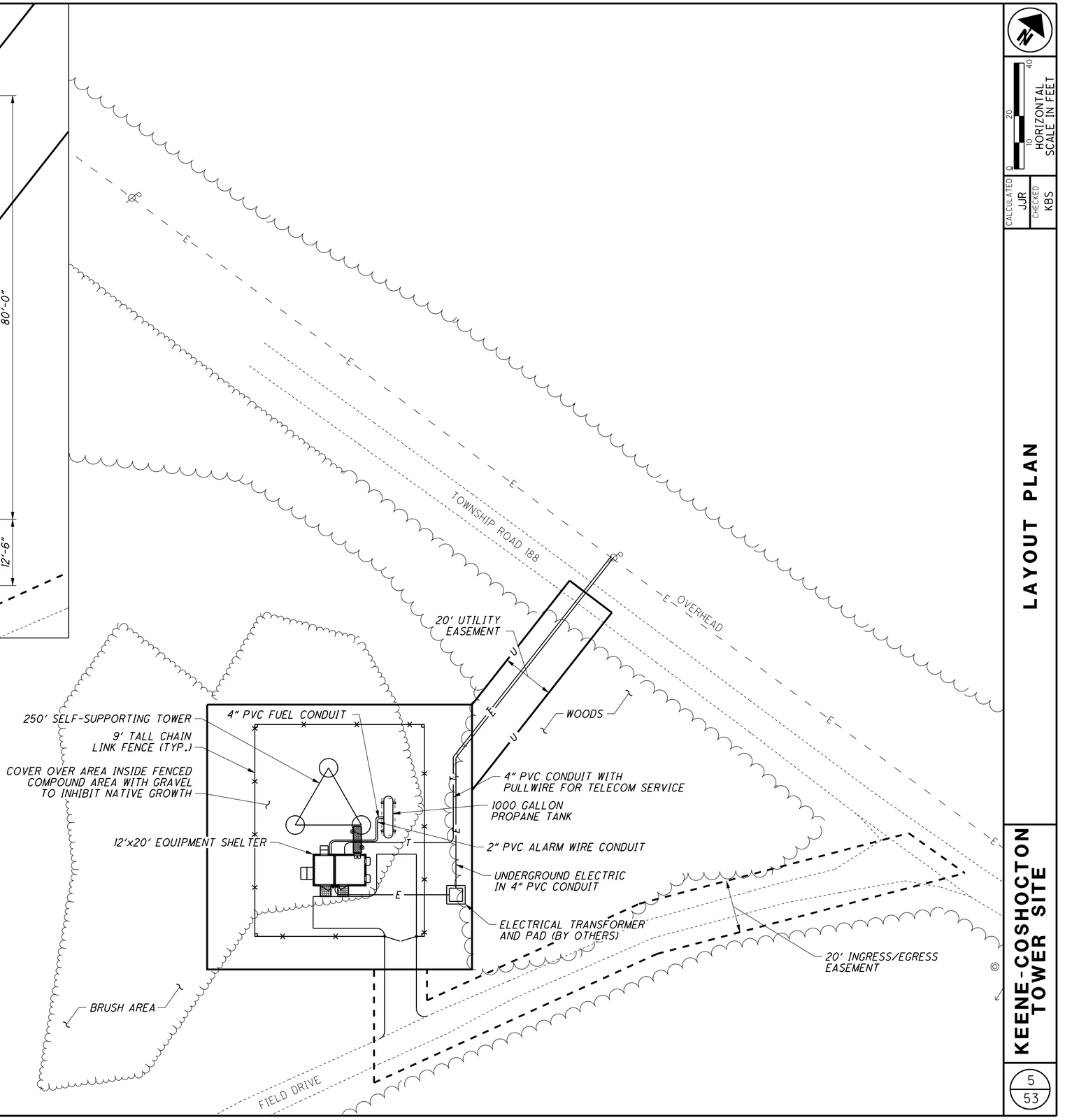
1. GENERAL: PROVIDE ALL HOLES, SLEEVES, AND OPENINGS REQUIRED FOR THE COMPLETION OF WORK AND RESTORE ALL SURFACES DAMAGED TO MATCH SURROUNDING SURFACES. MAINTAIN INTEGRITY OF ALL FIRE AND SMOKE RATED BARRIERS USING APPROVED FIRE–STOPPING SYSTEMS. WHEN CUTTING HOLES OR OPENINGS, OR INSTALLING SLEEVES. DO NOT CUT. DAMAGE OR DISTURB STRUCTURAL ELEMENTS OR REINFORCING STEEL UNLESS APPROVED IN WRITING, BY THE PROJECT STRUCTURAL ENGINEER.
2. CONDUIT PENETRATIONS: SIZE CORE DRILLING HOLES SO THAT AN ANNULAR. SPACE OF NOT LESS THAN ¼ INCH AND NOT MORE 1 INCH IS LEFT AROUND THE CONDUIT. PIPE ETC WHEN OPENINGS ARE CUT IN LIEU OF CORE DRILLED, PROVIDE SLEEVE IN ROUGH OPENING. SIZE SLEEVES TO PROVIDE AN ANNULAR SPACE OF NOT LESS THAN ¼ INCH AND NOT MORE THAN 1 INCH AROUND THE CONDUIT, PIPE. ETC. PATCH AROUND THE SLEEVE TO MATCH SURROUNDING SURFACES

LIST OF ABBREVIATIONS

@ – AT
AASHTO – AMERICAN ASSOCIATION OF STATE AND HIGHWAY TRANSPORTATION OFFICE
ACI – AMERICAN CONCRETE INSTITUTE
AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AN – ANGLE
ANSI – AMERICAN NATIONAL STANDARD INSTITUTE
ASTM – AMERICAN STANDARDS FOR TESTING AND MATERIALS
AWG – AMERICAN WIRING GAGE
BCW – BRAIDED COPPER WIRE
BM – BENCHMARK
BOCA – BUILDING OFFICERS AND CODE ADMINISTRATOR
CC – CENTRAL TO CENTRAL
CNPT – CORNER POINT
COAX – COAXIL
CONC – CONCRETE
DIA – DIAMETER
EC – ELECTRICAL CONTRACTOR
ELEV – ELEVATION
EPA – ENVIRONMENTAL PROTECTION AGENCY
EX – EXISTING
FND – FOUND
FT – FEET
GA – GAUGE
GC – GRADING CONTRACTOR
GND – GROUND
HORIZ – HORIZONTAL
HPR – HIGH POWERED RIFFLE
HVAC – HEATHING VENTALATION AND AIR CONDITIONING
IN – INCHES
IPF – IRON PIPE FOUND
L – LENGTH
LBS – POUNDS (WEIGHT)
MAG – MAGNATIZED
MFG – MANUFACTURER
MIN – MINIMUM
MM – MILLIMETER
MPH – MILES PER HOUR
NRP – NON REMOVEABLE PIN
NTS – NOT TO SCALE
O/C – ON CENTER
OD – OUTSIDE DIAMETER
ODOT – OHIO DEPARTMENT OF TRANSPORTATION
OSB – ORIENTED STANDUP BOARD
OUPS – OHIO UTILITIES PROTECTION SERVICES
POC – POINT OF CURVATURE
PREFAB – PREFABRICATED
PROPCORN – PROPERTY CORNER
PSI – POUND PER SQUARE INCH
PT –POINT
PVC – POLYVYNAL CHLORIDE (PLASTIC PIPE)
QTY – QUANTITY
SCH – SCHEDULE
STD – STANDARD
TBD – TO BE DETERMINED
TIA – TELECOMMUNICATIONS INDUSTRY
TYP – TYPICAL
UL – UNDERWRITTERS LABORATORY
W – WIDTH
W/ – WITH
WWF – WOVEN WIRE FABRIC

KEENE-COSHOCTON TOWER SITE





HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JJR
CHECKED KBS

LAYOUT PLAN

KEENE-COSHOCTON TOWER SITE

5
53

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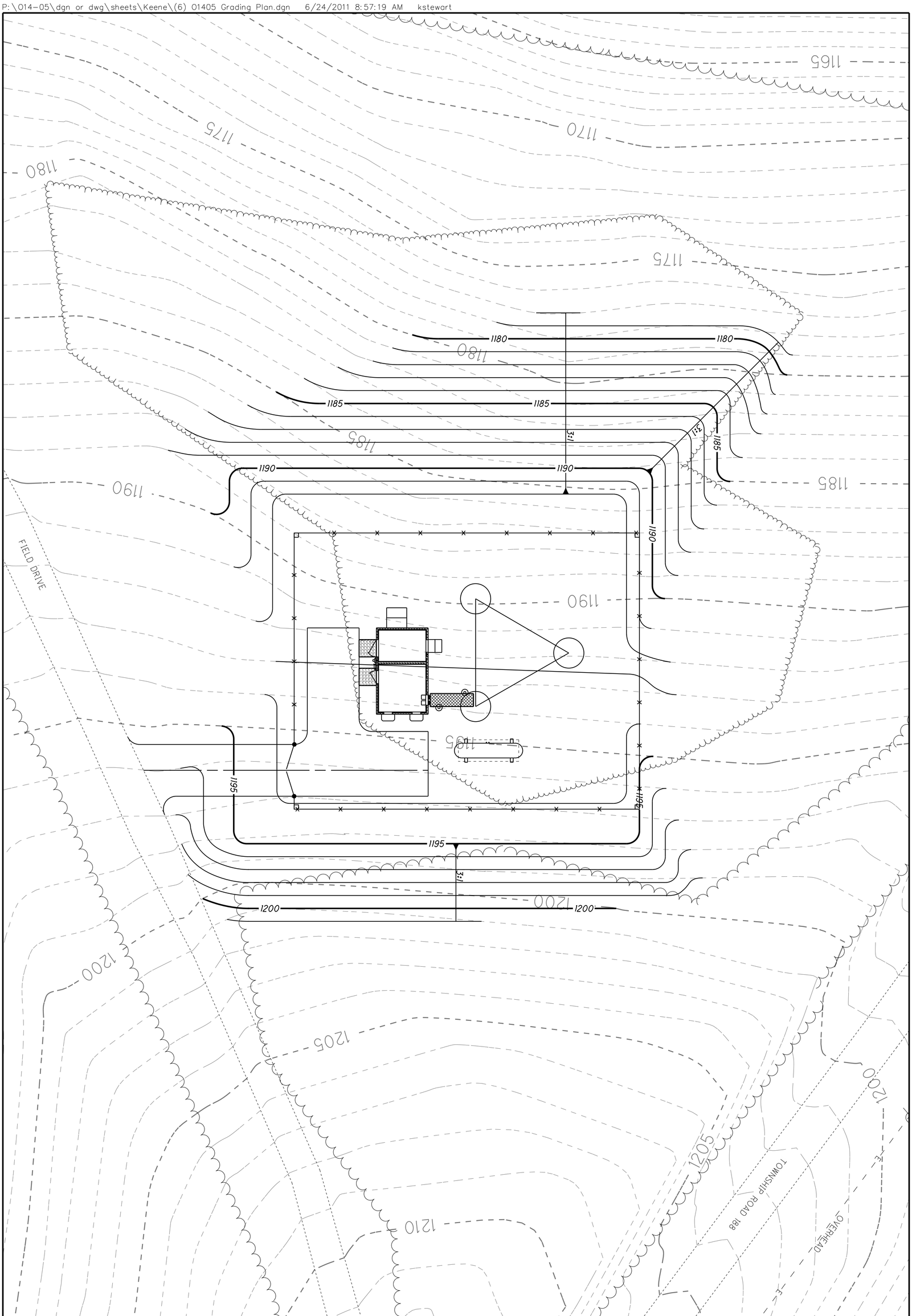
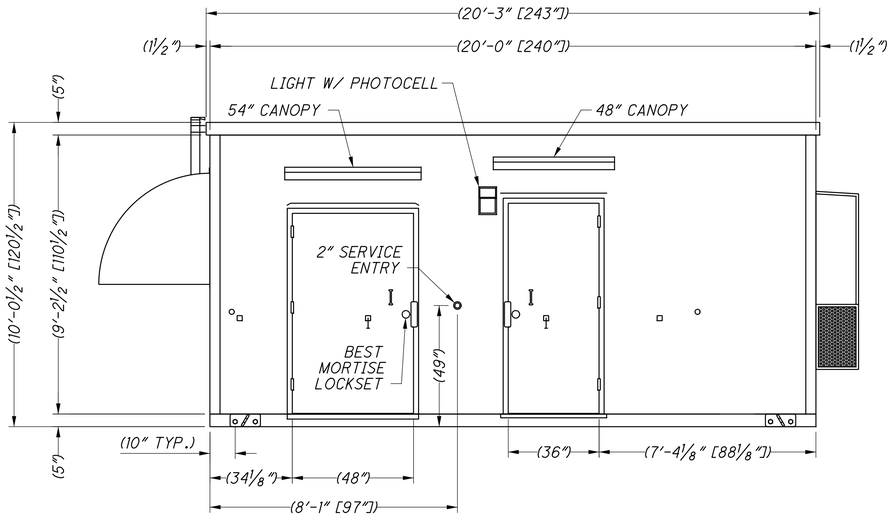
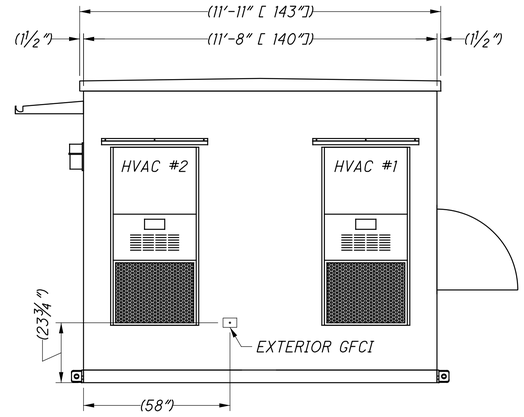


6 / 53	KEENE-COSHOCTON TOWER SITE	GRADING PLAN	CALCULATED JJR / CHECKED KBS	0 5 10 20 HORIZONTAL SCALE IN FEET



SOUTH BUILDING ELEVATION
N.T.S.



EAST BUILDING ELEVATION
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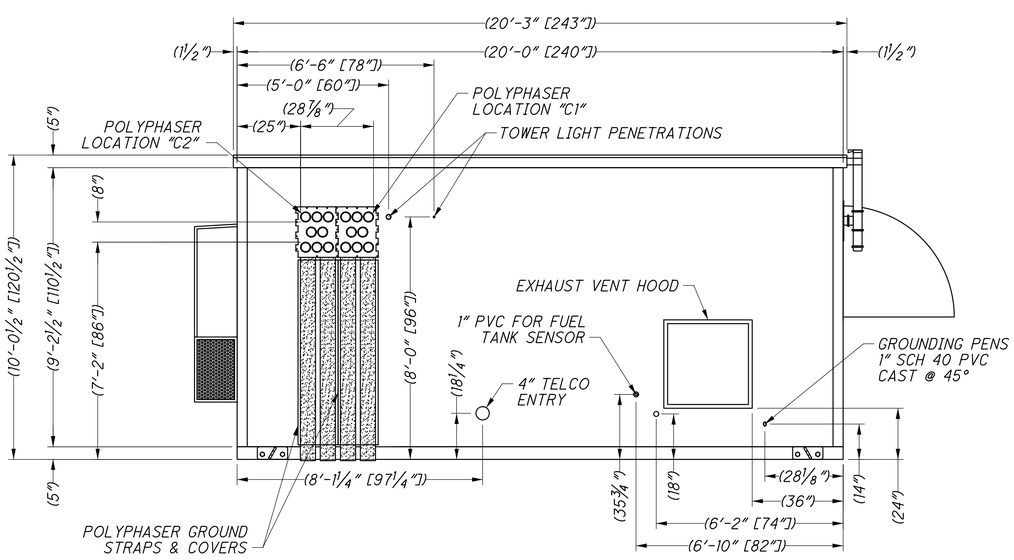

NORTH BUILDING ELEVATION
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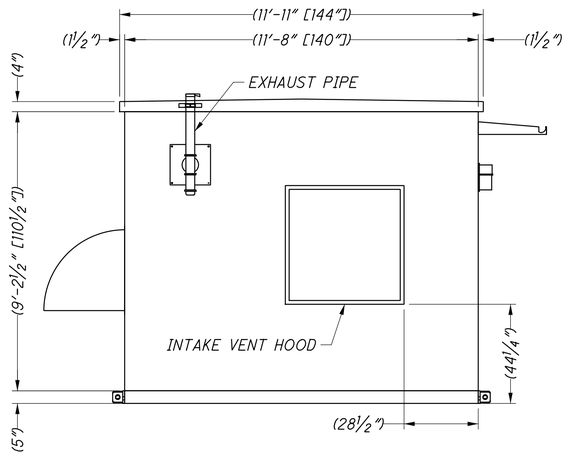


WEST BUILDING ELEVATION
N.T.S.

NOTE: SEE SHEETS 20-53 FOR DETAILED EQUIPMENT SHELTER INFORMATION

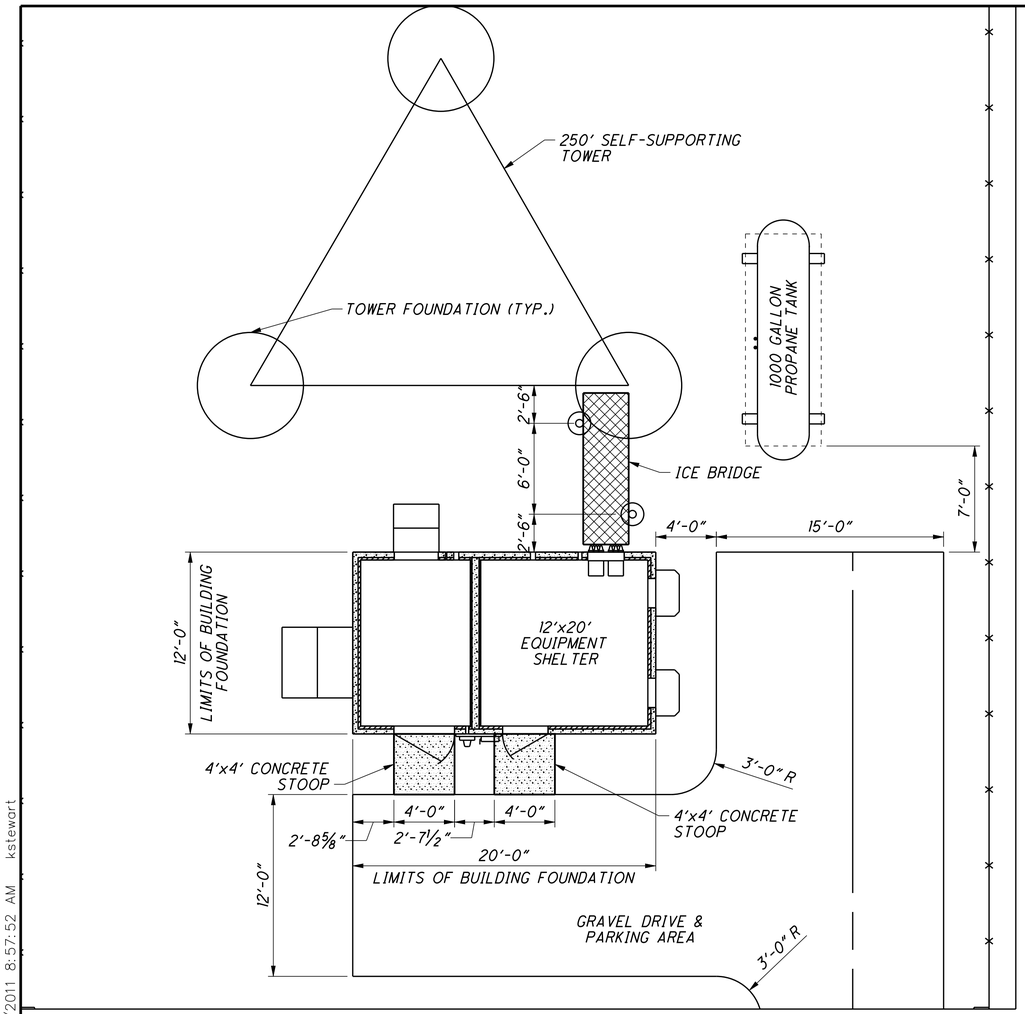
CALCULATED JJR
CHECKED KBS

BUILDING ELEVATIONS

KEENE-COSHOCTON TOWER SITE

7
53

P:\014-05\dgn or dwg\sheets\Keene\(7) 01405 Building Elevations.dgn 3/17/2011 10:07:56 AM jrognon



OHIO MARCS
GENERAL SPECIFICATION FOR PRECAST CONCRETE COMMUNICATIONS SHELTER
12' x 20'

Design Loading:
1. Floor Load: 208 psf
2. Roof Load: 100 psf
3. Impact (Roof): 50lbs falling from 250ft
4. Walls: 150 mph

Building Size:
1. Exterior: 20'L x11'-8"W x10'-3" H
2. Interior: 18'-11"L x10'-7"W x 8'11"H
3. Estimated Weight: 55,000 lbs

Construction Type:
1. Floor: 5 3/4" Concrete, waffle-type construction
2. Walls: 4" Solid concrete; 2 - Hour Fire-rated Construction Per UBC
3. Roof: Solid concrete, 4" at eaves and 5" at ridge
4. Step-Joint design
5. 5000 psi lightweight concrete
6. Reinforcing steel #4 & #6 bars; 60,000 psi (Grade 60 ASTM-615)
7. 2-hour fire rated structure
8. Ballistics tested for U.L. 752 Level IV (hpr-30.06-Point Blank Range)

Exterior Finish:
1. Walls: Washed aggregate and sealed
2. Roof: Troweled surface and sealed.

Interior Finish:
1. Walls:White Nu-Poly Interior Finish over 3/8" OSB
2. Floor: Epoxy Coated with 4" vinyl base cove-epoxy color TBD
3. Ceiling: White Nu-Poly Interior Finish over 3/8" OSB
4. Partition Wall: 2hr Fire Rated

Insulation:
1. Walls: R-16
2. Ceiling: R-22

Entry:
1. One (1) 4'-0"x6'-8" and one (1) 3'-0"x7'-0", 18-GA, Insulated, Primed & Painted, Steel Doors
2. 16-GA Steel Door Frames
3. Best Mortise Lockset with removable core
4. Pick Guards
5. Hydraulic Closers - Sargent #1104
6. Door Sweep
7. Weather-stripping
8. Threshold
9. NRP Hinges
10. Drip Caps
11. Door Canopies

Electrical: (assumes a single phase service)
1. Service: 120/240V 200Amp 1phase
2. Loadcenter: Square D, 200Amp,120/240V 1phase 30 space - 00130M200
3. Breakers: as required
4. Surge Arrestor: Liebert Type 1A - #SS550120FNSP
5. Surge Arrestor: Liebert Type 2 - #SS500120FNSP
6. Surge Arrestor (Type 2) Disconnect: 60 Amp
7. Automatic Transfer Switch: Generac 200Amp #GTS020W
8. Six (6) Quad Receptacles - Wall Mount
9. Two (2) 60 Amp 120/240V UPS (Power) Drops
10. One (1) Exterior GFI Receptacle between HVAC units
11. Conduit, j-boxes, wiring, raceway as required

Lighting:
1. Five (5) 4' Dual-Bulb, Fluorescent Lights, 40-Watt Bulbs with Wraparound Lens
2. Three (3) Light Switches
3. One (1) 100Watt Exterior Light w/PhotoCell

Grounding:
1. Perimeter Halo Ground - #1/0 Tinned Stranded Copper. Aluminum wall support brackets.
2. Bonding: #6 Green Insulated Copper equipment grounds
3. Ground Buss on Cable Rack: #2 Green stranded copper
4. Four (4) #2AWG green stranded copper drops with 5ft extra wire at each corner.
5. Schedule 40 PVC Sleeves 1", installed at 45 degrees through wall for ground exits.

HVAC:
1. Two (2) 3-Ton BTU Wall-Mounted HVAC Unit with 5kw Heat Strip
2. Bard # W36AI-A05XPXXXJ (R410A refrigerant)
3. Bard Lead Lag Controller - MC3000B
4. High and Low Temperature Controls
5. Grilles

Safety/Miscellaneous:
1. Two (2) Fire Extinguishers, 10# CO2
2. One (1) 4'x8'x 3/4" Telco Board
3. Two (2) Wall Pocket Tray for Files - one in each room
4. Four (4) cast-in Lifting Points
5. Shelter Tie Down Plates with attaching hardware
6. P. E. Stamped Drawings
7. Building will meet all Federal, State and Local Codes

Alarms:
1. One (1) Platech Alarm Board DIN-37D-01
2. Mount Platech Alarm Board inside a 12x12x6 hinged cover box, notch box to receive cable
1. Commercial Power Failure
2. Two (2) Intrusion Alarms
3. Two (2) Smoke Detector - Photoelectric - AC
4. HVAC Compressor Fail
5. Surge Arrestor
6. ATS Transfer Complete, ATS not in Auto, (4) Generator Alarms
7. One (1) LPG Stationary Tank Monitor P/N 94442A-LPG
8. (12) to (15) LF Alarm Cable, D-37 male connectors on each end (black box)

Cable Entry & Cable Ladder:
1. Two (2) #8PBM Polyphaser Earth Entry Ports with boots, ground straps, mounting hardware and exterior ground strap covers
2. Two (2) Hidden Cutouts for Future Use
3. Thirty (30) L.F. of 12"x2" Cable Ladder, gold chromate, with Hardware
4. One (1) 4" Telco Entry Conduit

Generator Room:
1. Provide and install one (1) 35KW Generac #SG0035 Generator - LP Vapor
2. On-Site Startup in OH is included
3. Two year standard manufacturer warranty
4. Critical muffler mounted inside shelter.
5. Insulated muffler wrap from wall to engine manifold.
6. One (1) Intake Louver, Motor Operated, Removable Bug Screen, Filtered
7. One (1) Exhaust Louver, fixed with insect screen
8. Exterior Vent Hoods (screened) for Intake and Exhaust Openings
9. One (1) Baseboard Heater
10. Fuel piping from generator extending 2" through wall with cap
11. Does not include fuel connection or electrical connection on site

Generator
1. 35KW Generac Generator

NOTES

1. FOUNDATION SYSTEM:

THE CONTRACTOR SHALL EXERCISE GREAT CARE DURING EXCAVATION. THE CONTRACTOR SHALL PREDETERMINE UTILITY LOCATIONS AND NOTIFY THE ENGINEER IMMEDIATELY IF A DEVIATION FROM THE PLANS EXIST.

A. RECOMMENDED MAXIMUM ALLOWABLE DOWNWARD SOIL BEARING PRESSURE:

EQUIPMENT BUILDING	3000 PSF
TOWER CAISSON	10,000 PSF
TOWER MAT FOUNDATION	4,000 PSF

B. ALL REINFORCING STEEL TO BE FORMED INTO A CAGE PRIOR TO SETTING INTO POSITION IN THE CAISSON.

C. PROVISIONS SHALL BE MADE FOR DEWATERING OF EXCAVATIONS.

2. CONCRETE WORK:

SPECIFICATIONS	- LATEST EDITION OF ACI-318	: fc' = 4000 PSI
MATERIALS	- REINFORCING	ASTM A615, GRADE 60
REINFORCING COVERS	- FOOTINGS	
	TOP/SIDES	3"
	BOTTOM	3"

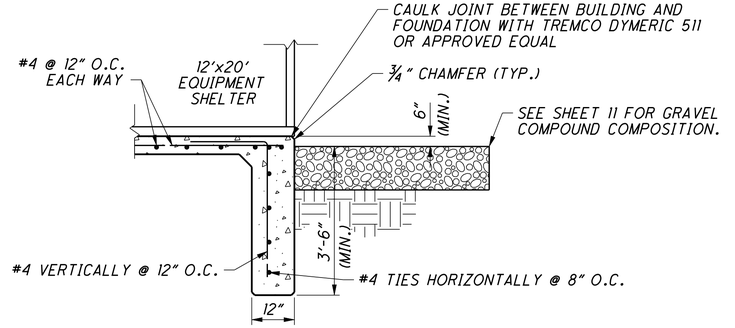
CHAMFER TOP CORNERS OF ALL FOUNDATIONS (3/4")

3. OHIO UTILITY PROTECTION SERVICE

CONTACT OUPS (1-800-362-2764) PRIOR TO ANY DIGGING OR DRILLING.

BASIS OF BUILDING DESIGN IS FROM CELLXION, A DIVISION OF SABER, INDUSTRIES

NOTE: SEE BUILDING PLANS, SHEETS 20-53 FOR MORE DETAIL



BUILDING FOUNDATION DETAIL
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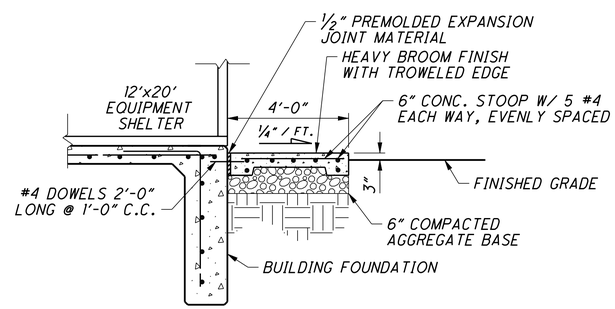

CONCRETE STOOP DETAIL
N.T.S

HORIZONTAL SCALE IN FEET
0 5 10

CALCULATED JJR CHECKED KBS

BUILDING SPECIFICATIONS, FOUNDATION PLAN & DETAILS

KEENE-COSHOCTON TOWER SITE

8
53

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Sabre™ Towers & Poles

A Division of Sabre Industries, Inc.

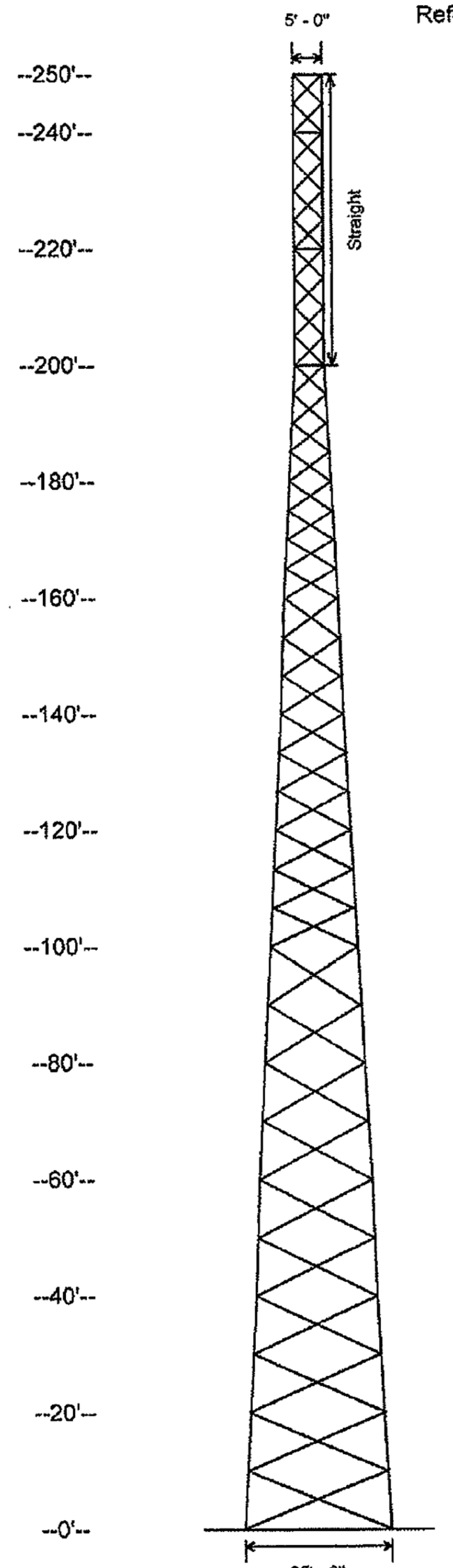
TOWER PROFILE - REVISION G

Prepared for:
JOBES HENDERSON & ASSOCIATES, INC
59 Grant Street
Newark, OH 43055

Proposal No.: 11-6790-TJH-R1
Date: 06/06/2011
Reference: 250' S3TL / Coshocton, OH

SIZES ARE PRELIMINARY AND MAY CHANGE UPON FINAL DESIGN

Legs	F	8.625 OD X .322			E	5.563 OD X .375		D	C	B	A	2.375 OD X .154	
Diagonals	L 4 X 4 X 1/4		L 3 1/2 X 3 1/2 X 1/4		L 3 1/2 X 3 X 1/4 (SLV)			H	L 2 X 2 X 1/8		L 2 X 2 X 1/8	L 2 X 2 X 1/8	G
Horizontals	NONE									NONE / G	NONE / G	NONE / G	I / G
Internals	NONE										NONE	NONE	NONE
Sub-Diagonals	NONE										NONE	NONE	NONE
Sub-Horizontals	NONE										NONE	NONE	NONE
Sub-Internals	NONE										NONE	NONE	NONE
Section Weight	5202.87	4089.54	3728.74	3610.18	3230.61	2967.24	2785.28	1641.64	1349.36	1110.61	842.91	575.22	J



Material List

A	2.875 OD X .276
B	3.500 OD X .300
C	4.000 OD X .318
D	4.500 OD X .337
E	5.563 OD X .500
F	8.625 OD X .500
G	L 2 X 2 X 1/8
H	L 2 X 2 X 3/16
I	NONE
J	332.12

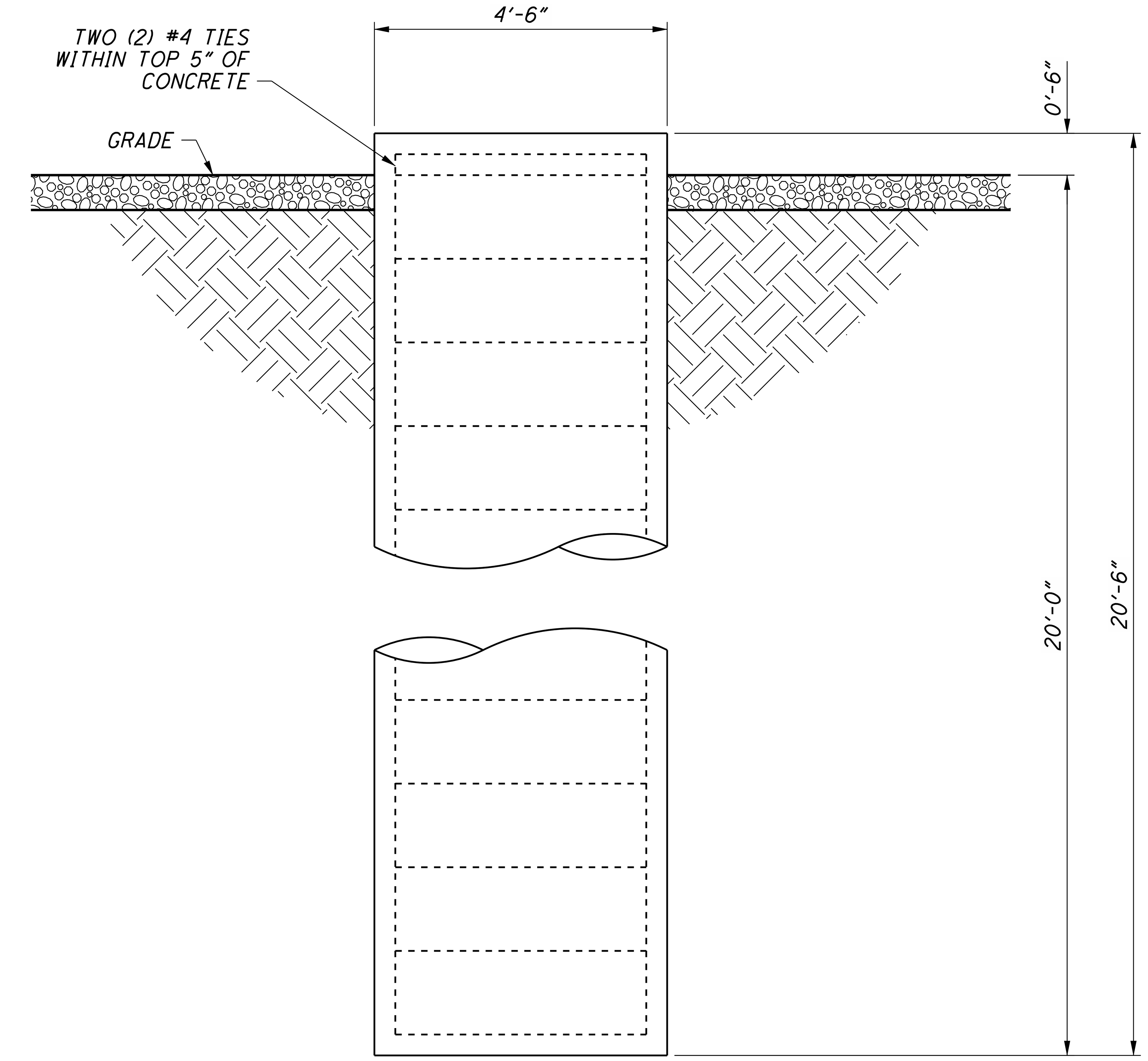
NOTES

1. All legs are 50 ksi
2. All braces are 36 ksi
3. All bolts except anchor bolts are A325-X
4. Anchor bolts are F1554

BASE REACTIONS

Axial Load (kips): 137.89
Shear Per Leg (kips): 35.84
Total Shear (kips): 59.52
Uplift Per Leg (kips): 314
Comp. Per Leg (kips): 361
O.T. Moment (ft-kips): 7464
Torsion (ft-kips): -25.02

2101 Murray Street - P.O. Box 658 - Sioux City, IA 51102-0658 - Phone 712.258.6690 - Fax 712.258.8250



FOUNDATION ELEVATION VIEW

(12.08 Cu. Yds Each)
(3 Required; Not to Scale)

Notes:

1). Concrete shall have a minimum 28-day compressive strength of 4000 PSI, in accordance with ACI 318-05

2). Rebars to conform to ASTM specification A615 Grade 60

3). All rebar to have a minimum of 3" concrete cover.

4). All exposed concrete corners to be chamfered ¾"

5). The foundation design is based on the geotechnical report by PSI project no. 0142402, dated: 2/4/11

6). See the geotechnical report for drilled pier installation requirements, if specified.

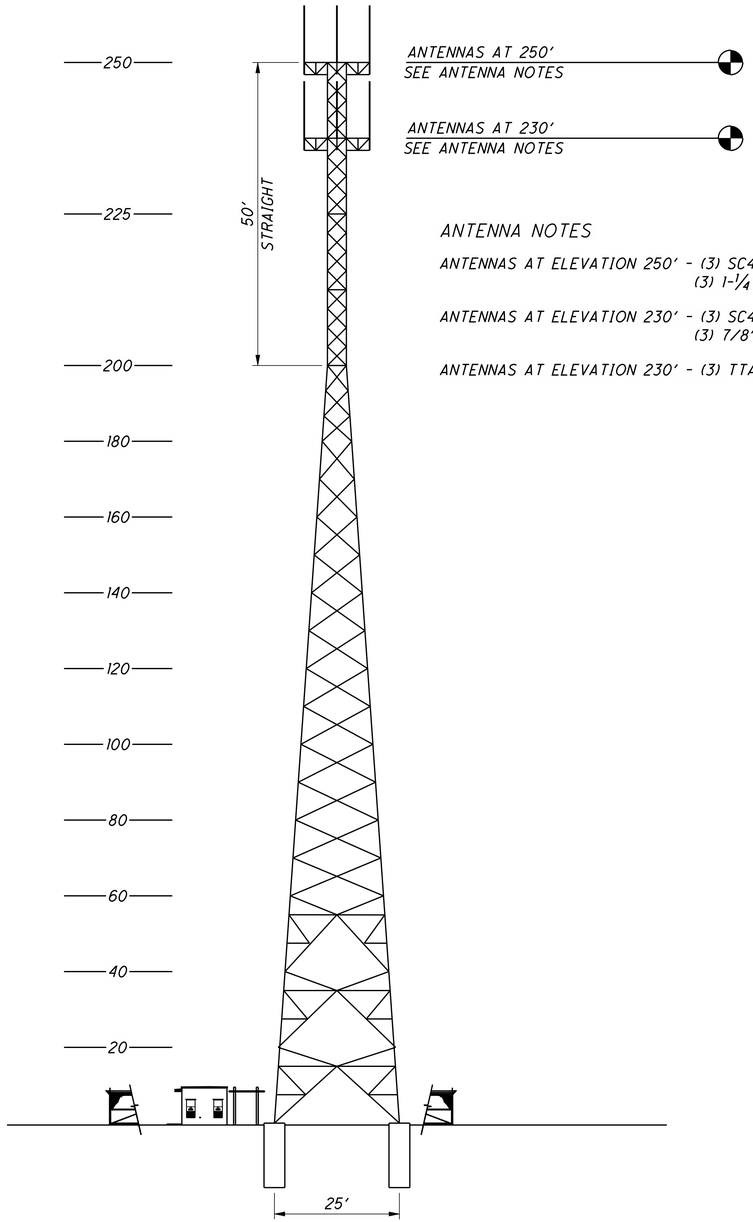
7). The foundation is based on the following factored loads:
Factored uplift (kips) = 314.29
Factored download (kips) = 361.43
Factored shear (kips) = 35.84

Rebar Schedule per Pier	
Pier	(20) #7 vertical rebar w/ #4 ties, two (2) within top 5" of pier then 12" C/C

CALCULATED JJR
CHECKED KBS

TOWER SPECIFICATIONS

KEENE-COSHOCTON TOWER SITE



ANTENNA NOTES

ANTENNAS AT ELEVATION 250' - (3) SC479-HF1LDF(E5765), (3) SIX FOOT SIDE ARMS, (3) 1-¼" TRANSMISSION LINE

ANTENNAS AT ELEVATION 230' - (3) SC479-HF1LDF(E5765), (3) SIX FOOT SIDE ARMS, (3) 7/8" TRANSMISSION LINE

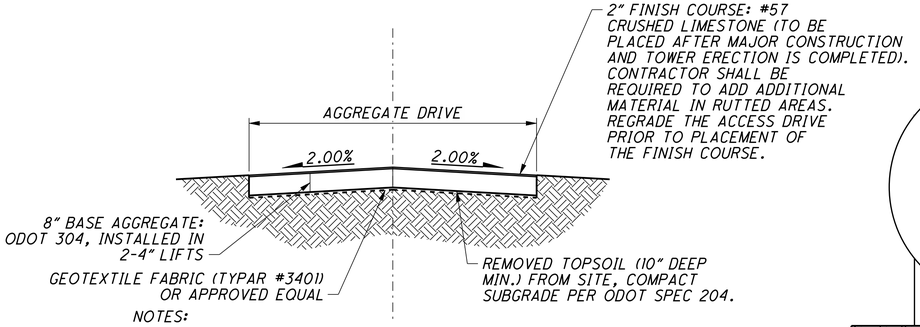
ANTENNAS AT ELEVATION 230' - (3) TTA, (3) ⅜" TRANSMISSION LINE

CALCULATED JJR
CHECKED KBS

TOWER ELEVATION

KEENE-COSHOCTON
TOWER SITE

10
53



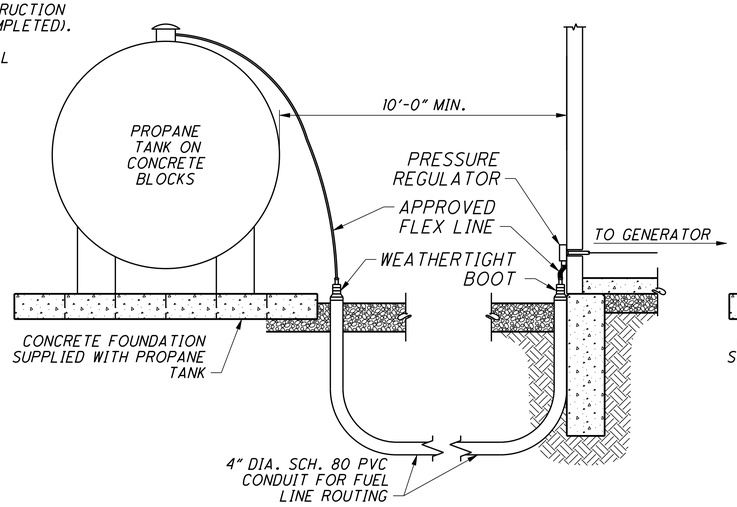
NOTES:

1. CONTRACTOR SHALL BLEND THE DEPTH OF DRIVE CONSTRUCTION TO GRADE AT THE APPROACH TO THE EXISTING DRIVE/ROADWAY OVER A DISTANCE NOT TO EXCEED TWO (2) FEET.
2. THE PAVEMENT SECTION IS THE SAME FOR THE ON-SITE PARKING AREAS. SEE THE GRADING PLAN FOR THE ON-SITE SLOPES AND ELEVATIONS.
3. COMPACT ANY FILL IN 6" LIFTS TO A MINIMUM OF 95% OF MAXIMUM DRY DENSITY PER ASTM STANDARD D-1557, MODIFIED PROCTER METHOD.

ACCESS DRIVE TYPICAL SECTION

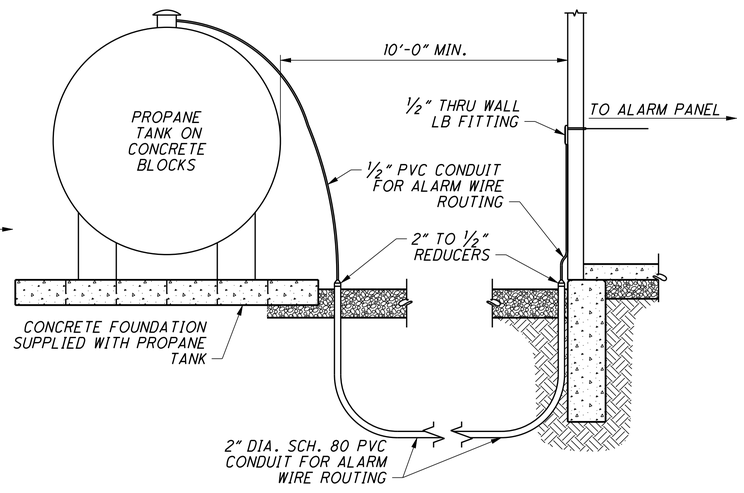
N.T.S.

NOTE: NO PRINTING ON TANK



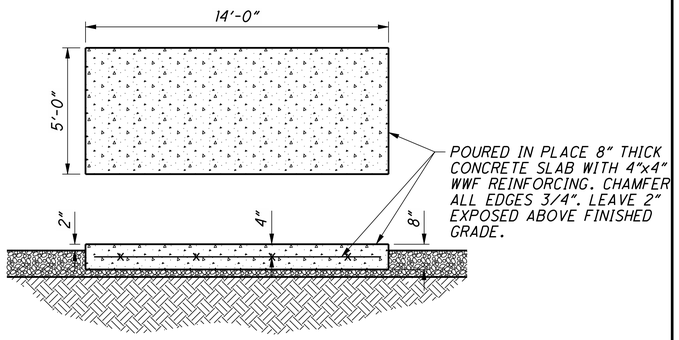
FUEL LINE ROUTING DETAIL

N.T.S.



LOW FUEL ALARM ROUTING DETAIL

N.T.S.



CONCRETE FUEL TANK FOUNDATION

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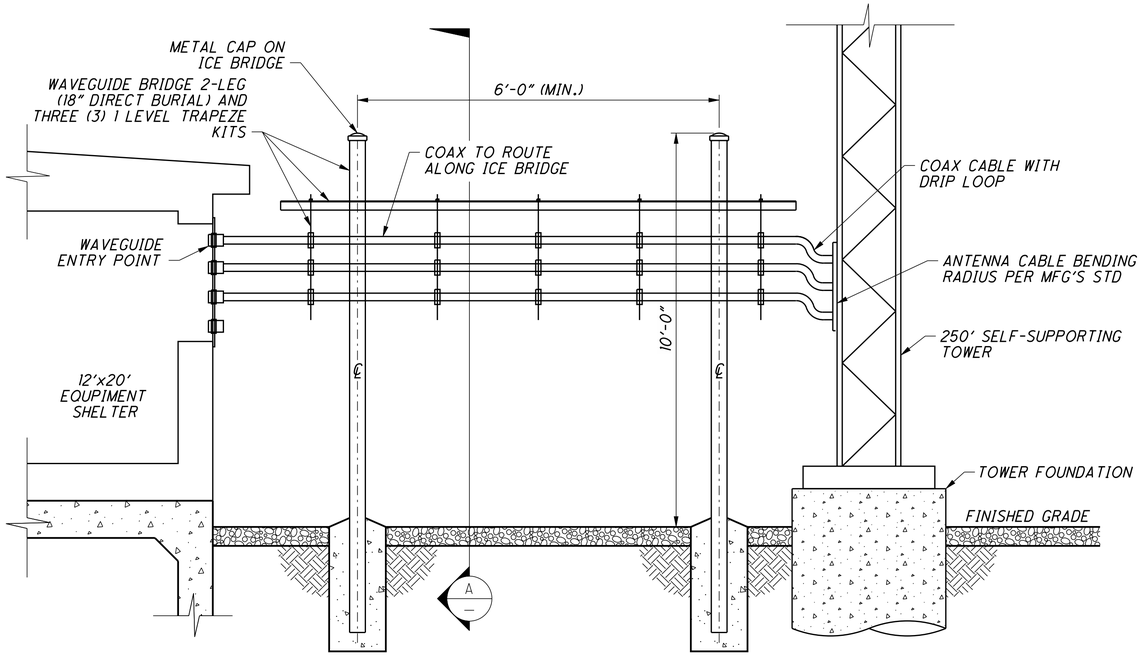
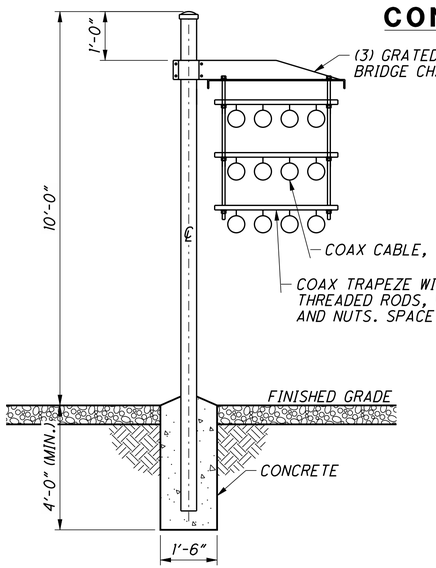


BUILDING TO ICE BRIDGE TO TOWER RISER

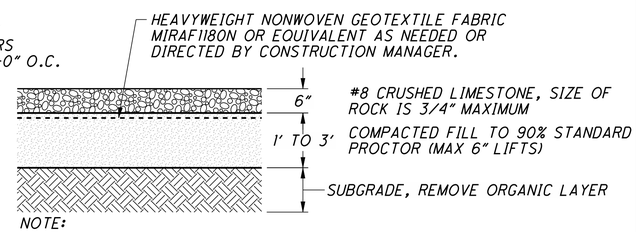
N.T.S.



ICE BRIDGE SECTION

A

N.T.S.



NOTE:
SEE THE GRADING PLAN FOR THE ON-SITE SLOPES AND ELEVATIONS.

GRAVEL COMPOUND SECTION

N.T.S.

CALCULATED JJR CHECKED KBS

ICE BRIDGE AND PROPANE TANK DETIALS

KEENE-COSHOCTON TOWER SITE

ICE BRIDGE

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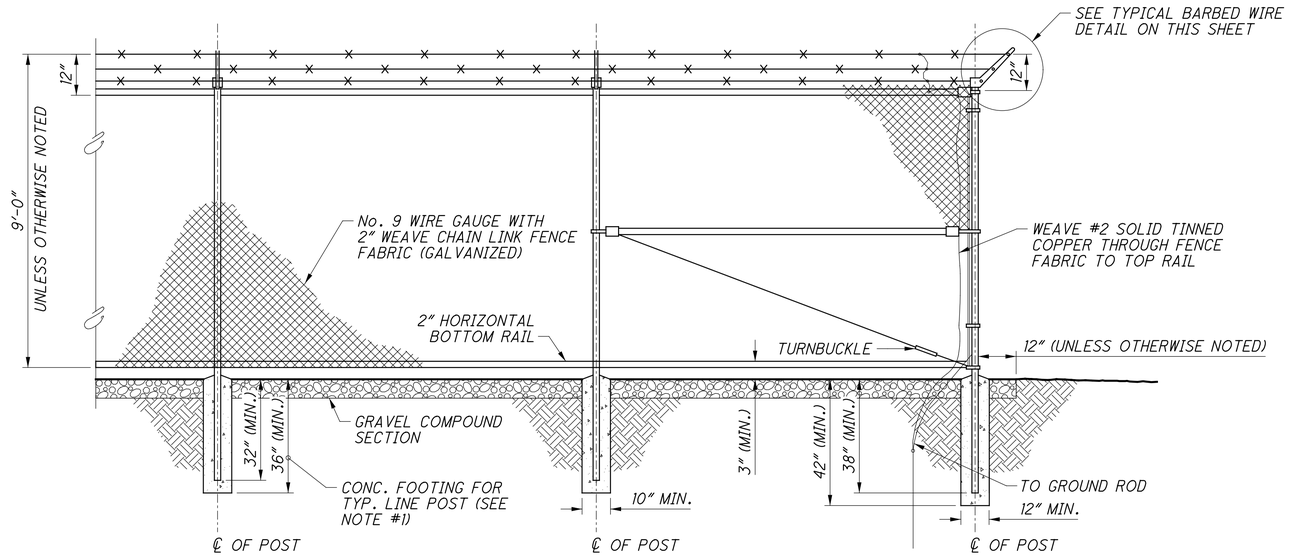
53

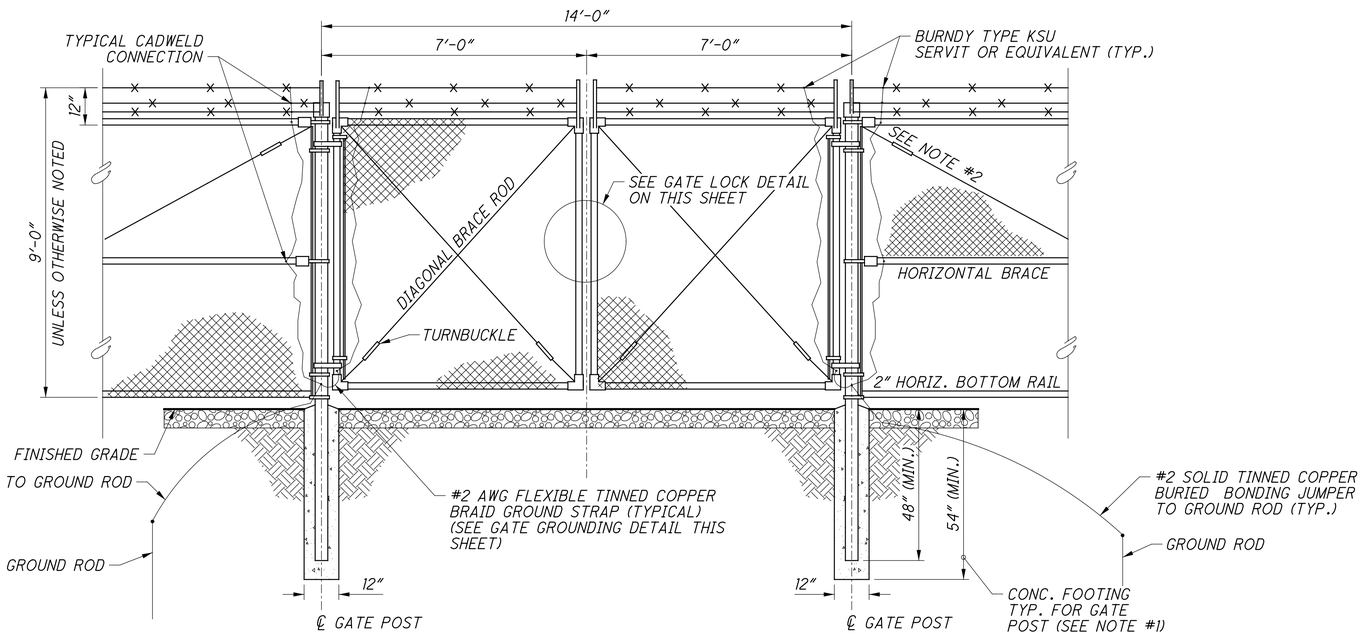
P:\014-05\dgn or dwg\sheets\Keene\(11) 01405 Ice Bridge and Details.dgn 6/24/2011 8:59:23 AM kstewart



CHAIN LINK FENCE & POST DETAIL

N.T.S.

NOTE:
CONTRACTORS SHALL MAKE SURE ALL POSTS ARE PLUMB

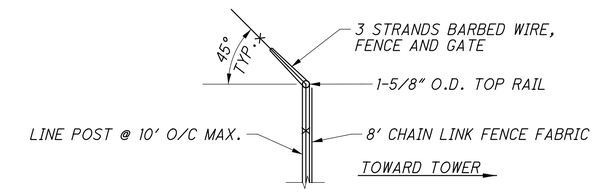


DOUBLE SWING GATE DETAIL

N.T.S.

GENERAL FENCING NOTES

1. BOTTOM OF CONCRETE BASE SHALL BE SET BELOW FROST LINE (SEE LOCAL CODE). CONCRETE BASE IS RECOMMENDED MINIMUM AND SHOULD BE REDESIGNED FOR CONDITIONS WHERE SOIL IS POOR. PROVIDE CONCRETE WITH A 28 DAY STRENGTH OF 3000 PSI (MIN.)
2. PROVIDE A DIAGONAL BRACE ROD AND TURNBUCKLE, AS SHOWN, ON BOTH SIDES OF THE GATE.
3. ALL FENCE AND FABRIC SHALL BE HOT DIPPED GALVANIZED WITH A MINIMUM OF 2 OZ. PER SQUARE FOOT, 9 GAUGE WIRE (MIN BREAKING STRENGTH OF 1,290 LBS) WITH 2" MESH. ALL BARBED WIRE SHALL BE ALUMINUM OR COATED PER NOTE #8.
4. BOTTOM EDGE OF FENCE FABRIC SHALL BE 3" MAX. ABOVE FINISHED GRADE, AND SHALL HAVE A 2" HORIZONTAL BOTTOM RAIL.
5. ALL PIPE SHALL BE SCHEDULE 40, AND ALL FENCE POSTS SHALL BE H COLUMN 2 OZ. GALVANIZED COATED. (PIPE POSTS ARE NOT ACCEPTABLE)
6. SITE FENCE SHALL BE 8'-0" FABRIC W/ 3 STRAND BARBED WIRE FOR TOTAL HEIGHT OF 9'-0".
7. FABRIC TO HAVE 2.0 OZ. ZINC PER SQ. FT.
8. BARBED WIRE SHALL MEET ASTM A 121, CLASS 3 GALV. OR ASTM a 585, TYPE I, CLASS 2 COATING (NOT LESS THAN 0.8 OZ. PER SQ. FT.) AND SHALL BE TWO STRAND 12.5 GAGE W/ 4 POINT BARBS AT 5" O/C.
9. THE LOCKING MECHANISM SHALL BE MANUFACTURED SUCH THAT THERE EXISTS THE CAPACITY FOR A CHAIN TO BE USED AS THE LOCKING MECHANISM, AND LOCKS CAN BE DAISY CHAINED TO PROVIDE MULTIPLE ACCESS TO THE SITE. THE CONTRACTOR SHALL PROVIDE A TWO (2) FOOT LENGTH OF ANADIZED CHAIN TO SERVE AS THE LOCKING MECHANISM.
10. FENCES AROUND ANCHORS FOR GUYED TOWERS (WHERE APPLICABLE) SHALL EXTEND A MINIMUM OF FOUR FEET (4') FROM THE ANCHOR. THE FENCE ON THE GUY WIRE SIDE SHALL EXTEND OUT FAR ENOUGH TO ALLOW THE LOWEST GUY WIRE TO CLEAR THE FENCE (BARBED WIRE) BY TWO FEET (2'). A 3' WIDE WALK-THROUGH GATE WITH PADLOCK SHALL BE INSTALLED AT EACH ANCHOR ON THE SIDE OF THE FENCE FACING THE TOWER.
11. FENCE SHOULD BE 8'.
12. LINE POST ARE TO BE "H" TYPE.



TYPICAL BARBED WIRE DETAIL

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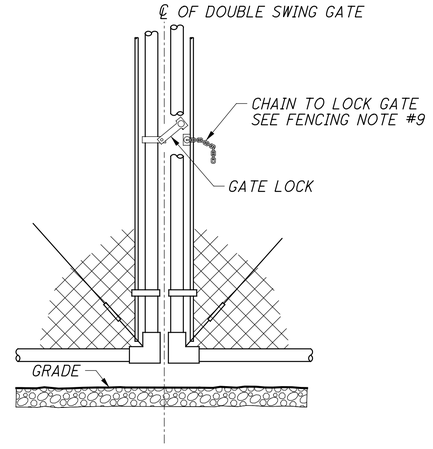


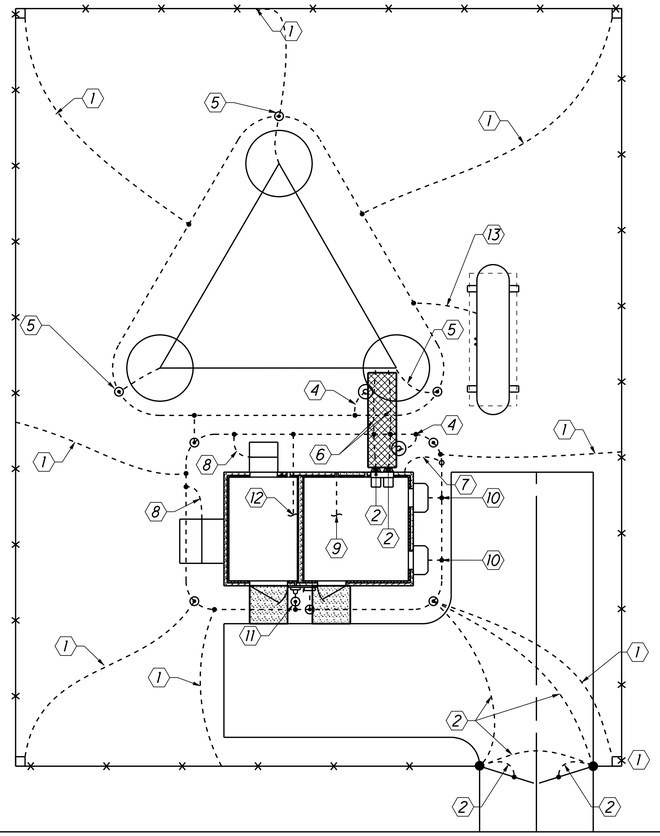
GATE LOCK DETAIL

N.T.S.

CALCULATED JJR CHECKED KBS

FENCE DETAILS

KEENE-COSHOCTON TOWER SITE



LEGEND

- GROUND ROD (TYPICAL)
- CADWELD (TYPICAL)
- CLAMP CONNECTION (TYPICAL)

NOTE:

ALL #2 AWG BTC CONDUCTORS SHALL BE CADWELDED TO BUS BARS ON BUILDING AND TOWER. COMPRESSION LUGS ARE NOT ACCEPTABLE ON SOLID CONDUCTORS.

PERFORM GROUND TESTING PER THE DETAIL ON SHEET 9

CONSTRUCTION NOTES

1. FENCE GROUND, SEE DETAILS ON SHEET 15
2. GATE GROUND, SEE DETAILS ON SHEET 15
3. COAX ENTRY GROUND LEAD SEE DETAILS ON SHEET 14
4. ICE BRIDGE SUPPORT GROUND LEAD, SEE DETAILS ON SHEET 14
5. TOWER GROUND LEAD, SEE DETAIL ON SHEET 14
6. GROUND LEADS TO TOWER BUS BAR COIL 12' @ TOWER BASE, SEE DETAIL ON SHEET 14
7. "PolyPhaser CORP" COPPER STRAP FROM BUILDING ENTRANCE PANEL TO EXTERIOR BUILDING GROUND RING, SEE DETAIL ON SHEET 14
8. VENT HOOD GROUND LEAD
9. TELECOM COMPANY GROUND LEAD TO HALO RING INSIDE BUILDING
10. GROUND LEAD TO FRAME AND HVAC HOOD
11. METER ASSEMBLY GROUND LEAD, PER DETAIL ON SHEET 17
12. GENERATOR GROUND LEAD
13. FUEL TANK GROUND LEAD

GENERAL NOTES - ELECTRIC WORK

A. WORK INCLUDED

THIS SPECIFICATION AND ACCOMPANYING DRAWING CONTEMPLATE THE PROVISIONS AND INSTALLATION, BY THE ELECTRICAL CONTRACTOR OF ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED TO INSTALL THE ELECTRICAL WORK COMPLETE IN CONNECTION WITH THIS SITE AND SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

1. THE PROVISIONS, INSTALLATION AND CONNECTION OF A GROUNDING ELECTRODE SYSTEM COMPLETE WITH A BUILDING AND SECONDARY GROUNDING, TOWER GROUNDING AND CONNECTIONS TO THE INCOMING ELECTRICAL DISTRIBUTION EQUIPMENT.
2. THE PROVISIONS AND INSTALLATION OF AN ELECTRICAL SERVICE AND ALL ASSOCIATED WIRE AND CONDUIT AS REQUIRED AND/OR INDICATED ON PLANS.
3. ALL UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. (UNLESS OTHERWISE NOTED)
4. ALL SPARE CONDUITS (WHERE APPLICABLE) SHOULD BE LEFT WITH PULL WIRE FOR FUTURE USE. STUB BOTH ENDS OF SPARE CONDUIT UP AT 12" ABOVE FINISHED GRADE. INSTALL PLUGS AT BOTH ENDS OF SPARE CONDUITS.
5. THE CONTRACTOR SHALL FURNISH AND INSTALL THE ELECTRICAL SERVICE ENTRANCE CONDUCTORS AND CONDUIT AND MAKE THE CONNECTION TO THE SERVICE EQUIPMENT WITHIN THE BUILDING.
6. HE CONTRACTOR SHALL FURNISH AND INSTALL 200# TEST PULL LINE IN ALL CONDUIT.
7. TWO (2) DAYS PRIOR TO TRENCHING CONTACT:

   OHIO UTILITIES PROTECTION SERVICE
   PHONE #: 800-362-2764
8. ABOVE GRADE RISER CONDUIT SHALL BE GALVANIZED STEEL WITH MATCHING FITTINGS, UNLESS OTHERWISE NOTED.
9. THE CONTRACTOR SHALL PERFORM ALL WORK SHOWN ON THE BUILDING DRAWINGS NOTED "FIELD WORK" OR OTHERWISE NOTED AS WIRING TO BE COMPLETED IN THE FIELD.
10. ALL WIRE SHALL BE (COPPER, 600V THHN, 90°C) UNLESS NOTED OTHERWISE.

B. CODES, PERMITS AND FEES

1. ALL REQUIRED PERMITS, LICENSES, INSPECTIONS AND APPROVALS SHALL BE SECURED AND ALL FEES FOR SAME PAID BY CONTRACTOR.
2. THE INSTALLATION SHALL COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES: STATE, LOCAL AND NATIONAL, AND THE DESIGN, PERFORMANCE CHARACTERISTICS AND METHODS OF CONSTRUCTION OF ALL ITEMS AND EQUIPMENT, SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF THE VARIOUS APPLICABLE STANDARD SPECIFICATIONS OF THE FOLLOWING RECOGNIZED AUTHORITIES:

   A.N.C.I. AMERICAN NATIONAL STANDARDS INSTITUTE
   I.E.E.E. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
   N.E.C. NATIONAL ELECTRIC CODE
   N.E.M.A. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
   N.F.P.A. NATIONAL FIRE PROTECTION ASSOCIATION
   U.L. UNDERWRITERS LABORATORIES, INC.
3. THE CONTRACTOR SHALL BE LICENSED TO PERFORM WORK IN THE STATE, CITY OR COUNTY OF THE PROJECT SITE AS REQUIRED.

C. GROUNDING ELECTRODE SYSTEM

1. CONNECTIONS:
   ALL GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELDED PROCESS (CADWELD OR APPROVED EQUAL), UNLESS OTHERWISE SHOWN. CONNECTIONS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, TEE'S, X'S, ETC. ALL CABLE TO GROUND RODS, GROUND ROD SPLICES AND LIGHTNING PROTECTION SYSTEM SHALL BE CONNECTED AS INDICATED. ALL MATERIALS USED (MOLDS, WELDING METAL, TOOLS, ETC.) SHALL BE BY "CADWELD" AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND PROCEDURES.
2. GROUND RODS:
   ALL GROUND RODS SHALL BE 5/8" DIAMETER x 8'-0" LONG (MIN.) COPPER CLAD STEEL "COPPERWELD" OR APPROVED EQUAL OF THE NUMBER AND AT LOCATIONS INDICATED: GROUND RODS SHALL BE DRIVEN FULL LENGTH VERTICAL IN UNDISTURBED EARTH SO THAT THE TOP IS 42" BELOW FINISHED GRADE. ALL GROUND RODS SHALL BE AT LEAST 10' APART UNLESS OTHERWISE NOTED.
3. GROUNDING LEADS:
   ALL GROUND LEADS FROM BUSS BARS TO GROUND RING AND TOWER STEEL TO GROUND RING SHALL BE #1/0 STRANDED BARE TINNED COPPER. ALL OTHER GROUND LEADS TO BURIED GROUND RINGS SHALL BE #2 AWG TINNED SOLID COPPER. COIL 6' OF #2 AWG TINNED SOLID COPPER AT BUILDING GROUND LOCATION, COAX ENTRY GROUND BAR, PIPE BRIDGE SUPPORT FOUNDATIONS AND TOWER FOUNDATIONS (WHERE APPLICABLE) FOR TERMINATION BY ELECTRICAL CONTRACTOR. AFTER BUILDING INSTALLATION, ELECTRICAL CONTRACTOR SHALL SPLICE GROUND RING LEAD TO #1 AWG INSULATED STRANDED COPPER WIRE SUPPLIED WITH BUILDING. SPLICE SHALL BE MADE INSIDE BUILDING.
4. GROUND RING:
   THE GROUND RING ENCIRCLING NEW BUILDING AND TOWER FOUNDATIONS (WHERE APPLICABLE) SHALL BE #1/0 STRANDED BARE TINNED COPPER CABLE IN DIRECT CONTACT WITH THE EARTH AT A DEPTH OF NOT LESS THAN 42". CONDUCTOR BENDS SHALL HAVE A MINIMUM RADIUS OF 12". MAINTAIN 2' CLEAR OF FOUNDATIONS.
5. BACKFILL:
   NON-CORROSIVE, LOW RESISTIVITY MATERIAL FREE OF STONE, DEBRIS, ETC. AND TAMPED DOWN THOROUGHLY IN LAYERS NOT EXCEEDING SIX (6) INCHES IN DEPTH, TO AT LEAST 95% OF ORIGINAL DENSITY BEFORE EXCAVATION.
6. BY THE EXOTHERMIC WELDED PROCESS (CADWELD OR APPROVED EQUAL), AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND PROCEDURES. ALL MECHANICAL FASTENERS CONNECTIONS TO ALL GROUND BARS SHALL BE LUBRICATED WITH A CORROSION INHIBITER THOMAS AND BETTS KOPR - SHIELD
7. UTILITY COMPANY COORDINATION:
   ELECTRICAL CONTRACTOR SHALL COMPLETE ALL WORK IN ACCORDANCE WITH THE RULES OF THE LOCAL UTILITY COMPANY. BEFORE SUBMITTING THE BID, THE CONTRACTOR SHALL CHECK WITH THE UTILITY COMPANIES SUPPLYING SERVICE TO THIS PROJECT AND SHALL DETERMINE FROM THEM ALL EQUIPMENT AND CHARGES WHICH THEY WILL REQUIRE AND SHALL INCLUDE THE COST IN THE BID WHENEVER POSSIBLE.
8. GROUND TEST:
   GROUND TESTS SHALL BE PERFORMED UTILIZING A BIDDLE GROUND OHMER OR THE METHOD OF USING TWO AUXILIARY GROUND RODS (AS DESCRIBED IN I.E.E.E. STANDARD No. 550, PARAGRAPH 3.42) MAY BE USED. THE I.E.E.E. METHOD REQUIRES THE USE OF AN A.C. TEST CURRENT. THE AUXILIARY TEST RODS MUST BE SUFFICIENTLY FAR AWAY FROM THE ROD UNDER TEST SO THAT THE REGIONS IN WHICH THEIR RESISTANCE IS LOCATED, DO NOT OVERLAP.

C. TESTING

1. ALL TEST SHALL BE PERFORMED BY AUTHORIZED AND QUALIFIED PERSONNEL.
2. CONTRACTOR SHALL CONDUCT GROUND RESISTANCE TEST IN THE FORMAT AS FOLLOWS: PERFORM TEST WITH THE GROUND RODS CONNECTED, WITH DRY SOIL AND WHEN NO STANDING WATER HAS BEEN PRESENT FOR THE PAST TEN DAYS.
3. UPON COMPLETION OF THE GROUNDING SYSTEM, THE ELECTRICAL CONTRACTOR SHALL MEGGER TEST THE GROUNDING SYSTEM. THE MAXIMUM RESISTANCE LEVEL IS 5 OHMS. A COMPLETE WRITTEN REPORT SHALL BE SUBMITTED STATING ACTUAL RESISTANCE READING, LOCATION, DATE, TIME AND WEATHER CONDITIONS AND SOIL MOISTURE CONTENT. THE TEST EQUIPMENT USED SHALL BE IDENTIFIED BY MANUFACTURE, MODEL AND SERIAL NUMBERS.

D. ELECTRICAL LOADS

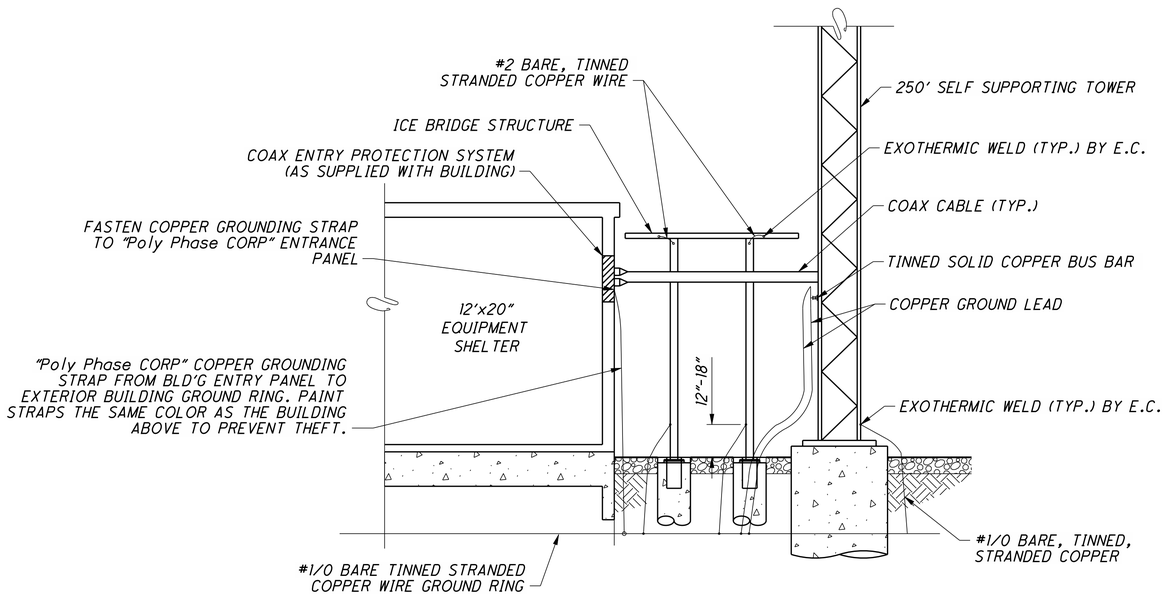
1. THE EQUIPMENT SHELTER IS SET UP FOR A 200 AMP, 120/240 VOLT, SINGLE PHASE, THREE WIRE ELECTRICAL SERVICE. SEE MILLER BUILDING DRAWINGS FOR PANEL SCHEDULE AND CONNECTED AND DIVERSIFIED LOADS.

HORIZONTAL SCALE IN FEET
0 4 8 16

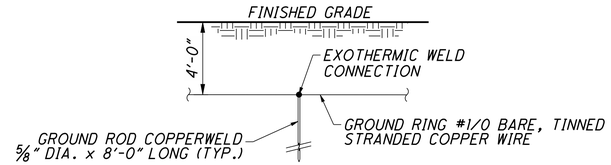
CALCULATED JJR
CHECKED KBS

GROUNDING PLAN DETAILS AND NOTES

KEENE-COSHOCTON TOWER SITE



INTERIOR/EXTERIOR GROUND BAR DETAIL
N.T.S.



GROUND ROD DETAIL
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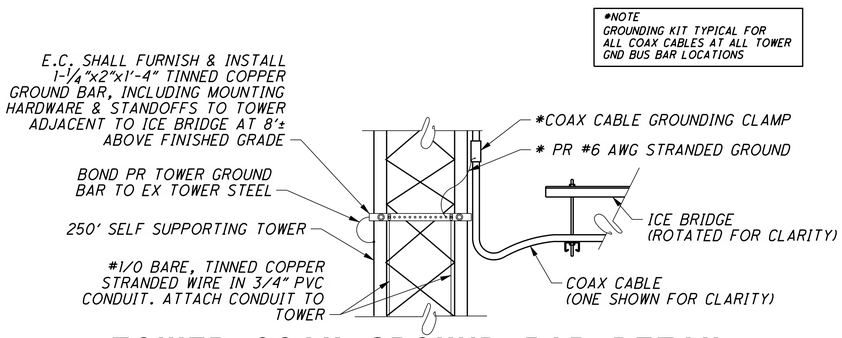
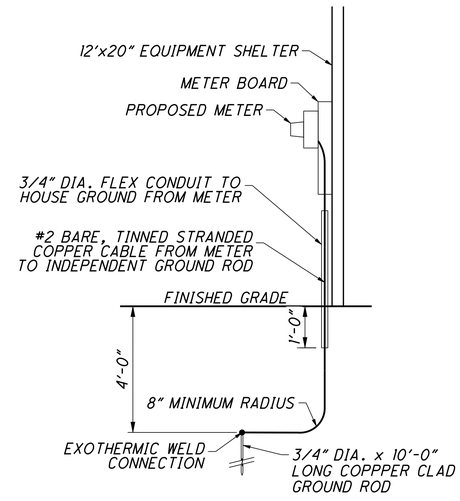


TOWER COAX GROUND BAR DETAIL
N.T.S.



METER GROUNDING DETAIL
N.T.S.

CALCULATED JJR CHECKED KBS

GPS ANTENNA AND GROUNDING DETIALS

KEENE-COSHOCTON TOWER SITE

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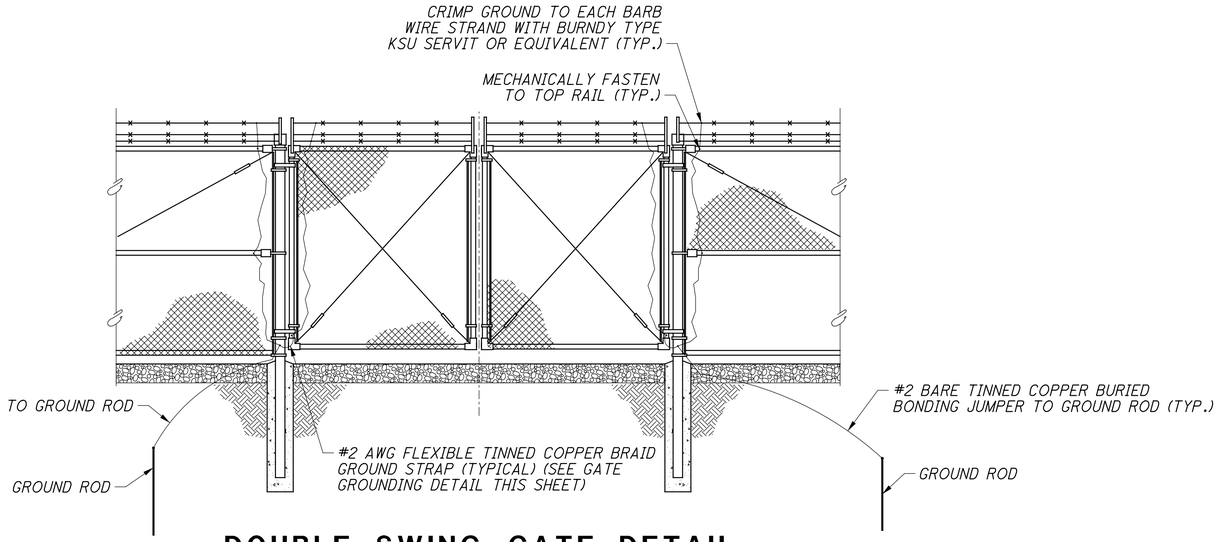

DOUBLE SWING GATE DETAIL
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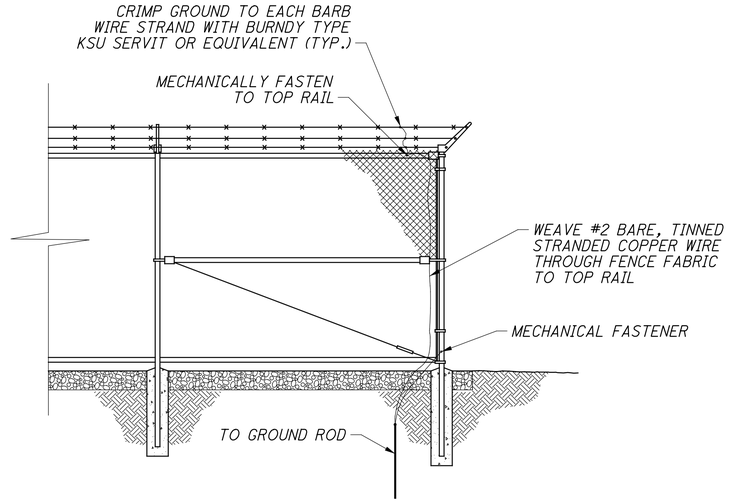
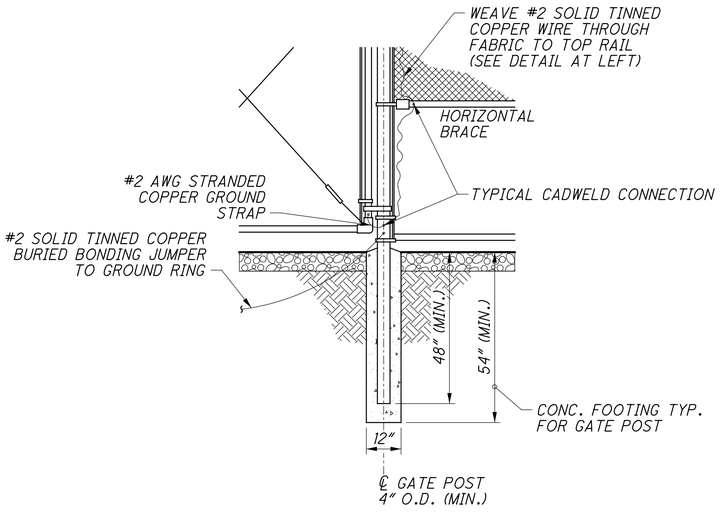


CHAIN LINK FENCE & POST DETAIL
N.T.S.



GATE GROUNDING DETAIL
N.T.S.

CALCULATED JJR
CHECKED KBS

FENCE GROUNDING DETAILS

KEENE-COSHOCTON TOWER SITE

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INTERIOR/EXTERIOR GROUND BAR DETAIL

TEST PASS/FAIL CRITERIA

THE RESISTANCE-TO-GROUND OF THE MARCS FACILITY EARTH ELECTRODE SUBSYSTEM SHALL BE LESS THAN 10 OHMS.

TEST PROCEDURE

THIS TEST SHALL BE EXECUTED USING THE "FALL-OF-POTENTIAL" METHOD, AS ILLUSTRATED IN THE GROUND TEST DETAIL ON THIS SHEET. THE "SIMPLIFIED FALL OF POTENTIAL METHOD" WHICH USES THE AVERAGE OF THREE RESISTANCE READINGS IS NOT ACCEPTABLE.

1. PROBE C SHALL BE PLACED AT A DISTANCE OF D FEET FROM THE GROUND POINT UNDER TEST.

2. REFERENCE PROBE P SHALL BE DRIVEN IN AT A NUMBER OF POINTS ROUGHLY ON A STRAIGHT LINE BETWEEN THE GROUND POINT UNDER TEST AND PROBE C.

3. RESISTANCE READINGS SHALL BE LOGGED AT EACH LOCATION OF PROBE P AT A DISTANCE X FROM THE GROUND POINT UNDER TEST. A KNOWN CURRENT SHALL BE INJECTED BETWEEN THE GROUND POINT UNDER TEST AND THE CURRENT PROBE C, LOCATED AT THE FIXEDDISTANCE D FROM THE GROUND POINT UNDER TEST. THE RESULTANT VOLTAGE DROP BETWEEN THE POTENTIAL PROBE P AT DISTANCE X AND THE GROUND POINT UNDER TEST IS THEN MEASURED, FROM WHICH THE RESISTANCE AT PROBE P IS COMPUTED.

4. SUFFICIENT PROBE P RESISTANCE READINGS SHALL BE TAKEN TO CONSTRUCT A RESISTANCE VS. DISTANCE CURVE. SEVERAL MEASUREMENTS SHALL BE REQUIRED BY VARYING THE DISTANCE X OVER THE RANGE OF APPROXIMATELY 20 TO 90 PERCENT OF D. THE TRUE RESISTANCE-TO-GROUND OF THE GROUND POINT UNDER TEST OCCURS AT A DISTANCE X = 0.62D. THE VALUE OF RESISTANCE IN THIS REGION OF THE RESISTANCE-VERSUS-DISTANCE CURVE SHOULD BE RELATIVELY CONSTANT (I.E, APPROXIMATELY ZERO SLOPE). INDICATING THAT THE RESULTS ARE VALID. IF NOT, THE PROBE SPACING IS INSUFFICIENT, AS INDICATED BELOW, AND THE TEST SHALL BE REPEATED USING A LARGER VALUE.

5. D SHALL BE AT LEAST 5 TIMES THE DIAGONAL DISTANCE OF THE COMPOUND FENCE OR 5 TIMES THE DIAGONAL DISTANCE OF THE EXTERNAL GROUND RING, WHICHEVER IS GREATER. THIS WILL TYPICALLY ENTAIL A 350 FOOT DISTANCE FOR D. THE DIRECTION THAT THE RADIAL D TAKES FROM THE ELECTRODE UNDER TEST SHALL AVOID, AS MUCH AS POSSIBLE, OTHER BURIED METAIL SUCH AS WATER PIPES OR POWER LINES.

6. PERFORM TEST WITH THE GROUND RODS CONNECTED WITH DRY SOIL AND WHEN NO STANDING WATER HAS BEEN PRESENT FOR THE PAST TEN DAYS.

7. THE PORTABLE TEST EQUIPMENT REQUIRED TO PERFORM THE GROUND RESISTANCE MEASUREMENTS CONSISTS OF A "MEGGER" TYPE OF INSTRUMENT, WHICH CONTAINS THE VOLTAGE SOURCE AND THE VOLTAGE AND CURRENT METERS IN A SINGLE PACKAGE (AND WHICH IS CALIBRATED TO PROVIDE A DIRECT READ-OUT OF THE RESISTANCE). TOGETHER WITH THE NECESSARY GROUND STAKES (TYPICALLY 12 INCHES IN LENGTH) AND THE PROVISIONS FOR DRIVING THEM. SUFFICIENT INSULATED WIRE (E.G., 16 AWG) SHALL ALSO BE AVAILABLE TO EXTEND OUT TO THE REQUIRED DISTANCE FROM THE ELECTRODE UNDER TEST.

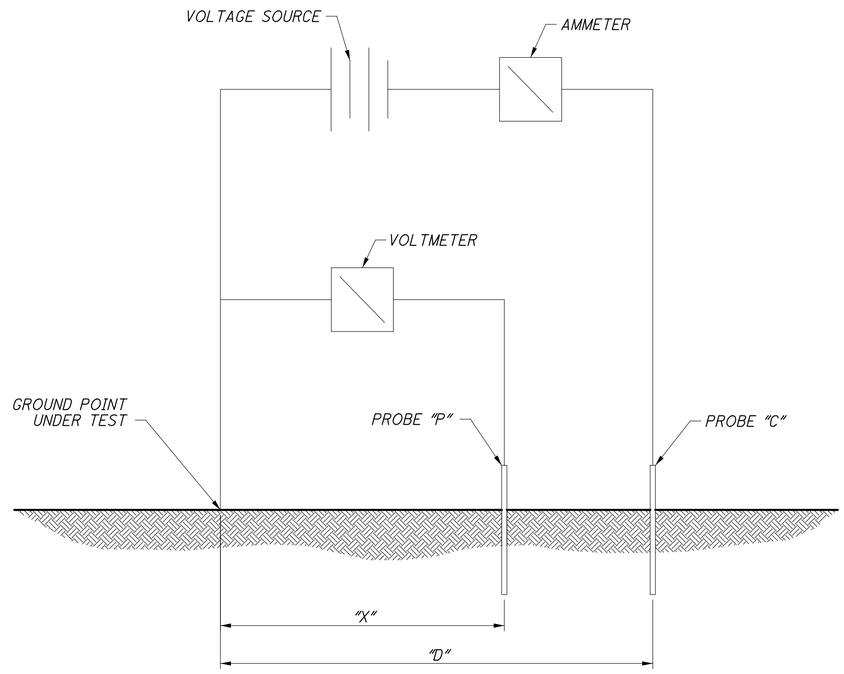
TEST DATA

1. PROBE P RESISTANCE AT 0.62D FEET.

2. RESISTANCE VERSUS DISTANCE CURVE SHOWING A RELATIVELY CONSTANT SLOPE AT 0.26D

3. LOCATION, DATE AND TIME OF THE TEST, AND APPROXIMATE WEATHER CONDITIONS AND QUALITATIVE SOIL MOISTER CONTENT.

4. TEST EQUIPMENT INFORMATION: MANUFACTURER, MODEL, AND SERIAL NUMBER.



GROUND TEST DETAIL

N.T.S.

CALCULATED JJR
CHECKED KBS

GROUND TEST PROCEDURE DETAIL

KEENE-COSHOCTON TOWER SITE

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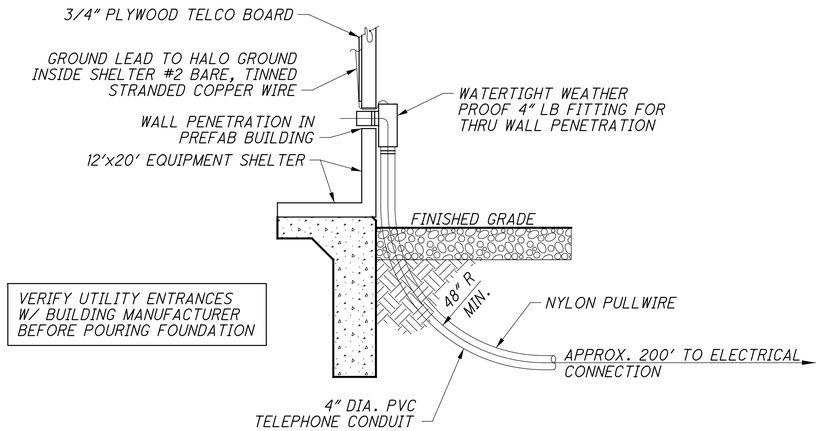
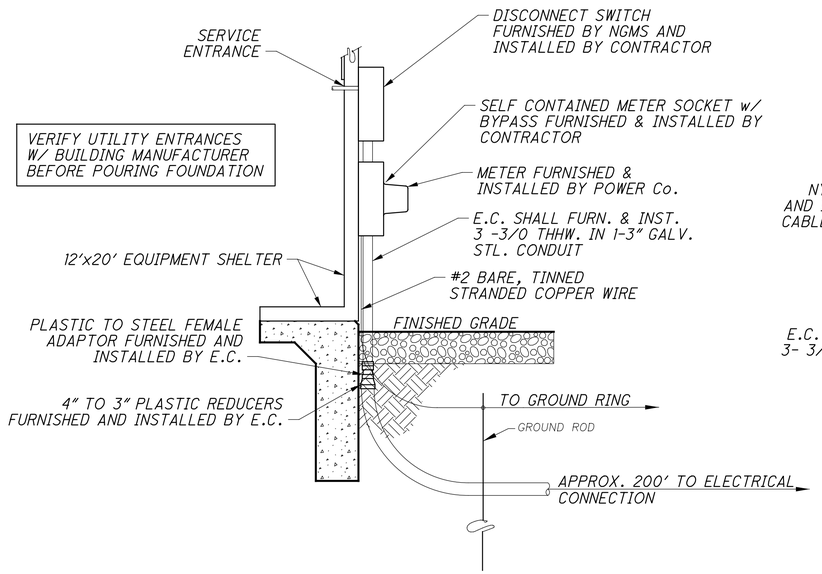
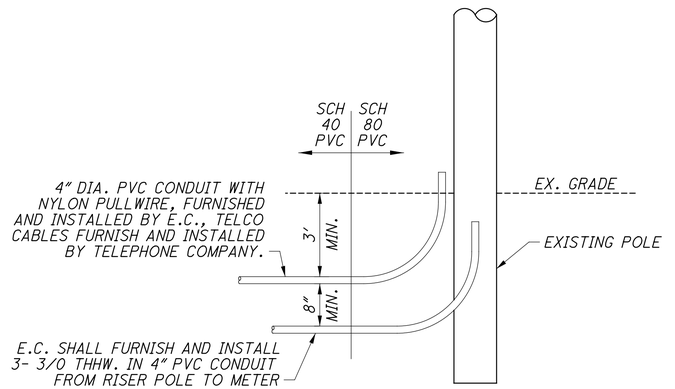


TELEPHONE CONDUIT ENTRANCE DETAIL
N.T.S.



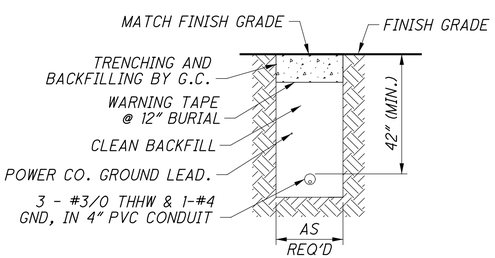
METERING RISER ASSEMBLY DETAIL
N.T.S.

CONTRACTOR SHALL FURN. & INST. EVERYTHING

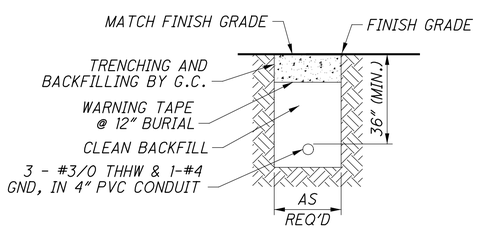


RISER POLE DETAIL
N.T.S.

NOTE: THIS CONNECTION WILL ON BE MADE IF A RISER POLE IS USED. IF THE SERVICE IS BROUGHT TO THE R/W VIA BURIED CONDUIT CONNECTION TO BE MADE INTO BURIED CONDUIT.



ELECTRICAL CONDUIT TRENCH SECTION
N.T.S.



TELECOM CONDUIT TRENCH SECTION
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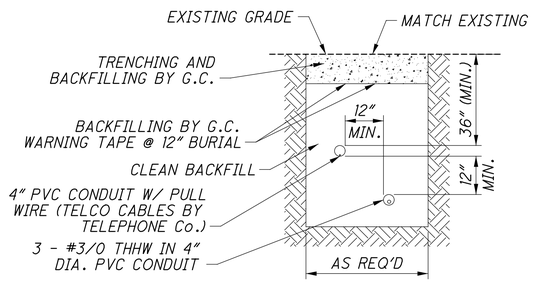
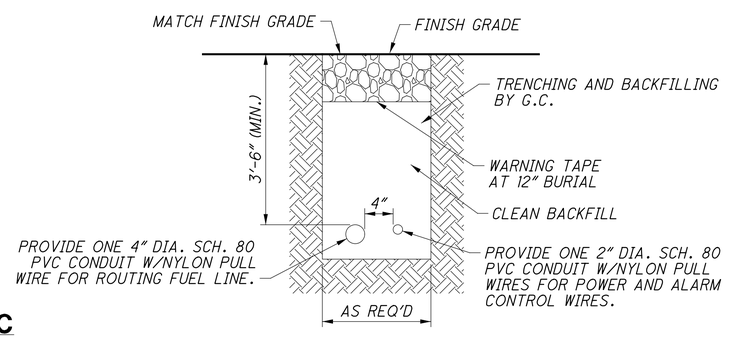


TELEPHONE & ELECTRIC TRENCH SECTION
N.T.S.



FUEL LINE AND ALARM CONDUIT TRENCH SECTION
N.T.S.

NOTE: GAS COMPANY MAY REQUIRE ALTERNATE TRENCHING OTHER THAN THIS DETAIL. CONTRACTOR TO VERIFY BEFORE BACKFILLING TRENCH.

CALCULATED JJR
CHECKED KBS

GROUNDING AND TRENCH DETAILS

KEENE-COSHOCTON TOWER SITE

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LEGEND

- SF - SILT FENCE
- PS - PERMANENT SEEDING
- CE - CONSTRUCTION ENTRANCE & CONCRETE WASHOUT AREA-INCLUDE SIGNAGE FOR WASHOUT AREA. SEE SHEET 19 FOR WASHOUT DETAIL.
- LIMITS OF PERMANENT SEEDING
- DRAINAGE FLOW
- FLOOD ROUTING

TOWNSHIP ROAD 188

E OVERHEAD

FIELD DRIVE

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JJR
CHECKED KBS

EROSION AND SEDIMENT CONTROL PLAN

KEENE-COSHOCTON TOWER SITE

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P:\2014-05\dgn or dwg\sheets\Keene\(18) Erosion Control Plan.dgn 3/17/2011 10:08:24 AM jrognon

EROSION CONTROL NOTES

1. DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE PROPER SOIL EROSION MEASURES FOR PROTECTION OF ALL ADJOINING ROADS, LANDS AND STREAMS. REFER TO S.C.S. MANUAL "RAINWATER AND LAND DEVELOPMENT" AND ODOT "HANDBOOK FOR SEDIMENT AND EROSION CONTROL" FOR REQUIREMENTS.
2. THE CONTRACTOR SHALL PROVIDE SEDIMENT CONTROL AT ALL POINTS WHERE STORM WATER LEAVES THE LIMITS OF THE PROJECT, ALL POINTS WHERE STORM WATER ENTERS A STREAM THAT TRAVERSES THE PROJECT AND ALL POINTS WHERE STORM WATER ENTERS PORTIONS OF COMPLETED UNDERGROUND PIPING.
3. INACTIVE CLEARED AND GRUBBED AREAS THAT ARE SCHEDULED TO REMAIN IDLE FOR MORE THAN 45 DAYS SHALL BE STABILIZED WITH VEGETATION (I.E. TEMPORARY SEED AND MULCH) WITHIN 7 DAYS FOLLOWING THE CLEARING AND GRUBBING OPERATIONS. IF AN AREA IS WITHIN 50 FEET OF ANY WATER BODY (I.E. STREAM, RIVER, POND, ETC.), THEN IT SHALL BE VEGETATED WITHIN 2 DAYS FOLLOWING THE CLEARING AND GRUBBING OPERATIONS. ALL DISTURBED AREAS, ON ANY PORTION OF THE SITE, THAT ARE BROUGHT TO FINAL GRADE, SHALL BE STABILIZED WITHIN 7 DAYS.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PLACED PRIOR TO OR AS THE FIRST STEP IN GRADING.
5. ALL STORM SEWER, SANITARY SEWER AND WATER MAIN TRENCHES SHALL BE MULCHED AND SEEDED WITHIN 21 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET OF TRENCH WILL BE OPEN AT ANY ONE TIME.
6. ELECTRIC POWER, TELEPHONE, CATV AND GAS SUPPLY TRENCHES SHALL BE COMPACTED, SEEDED AND MULCHED WITHIN 14 DAYS AFTER BACKFILL.
7. ALL TEMPORARY EARTH BERMS, DIVERSIONS, SEDIMENT TRAP EMBANKMENTS AND EARTH STOCKPILES SHALL BE SEEDED AND MULCHED FOR TEMPORARY VEGETATIVE COVER WITHIN 7 DAYS AFTER GRADING. STRAW OR HAY MULCH OR EQUIVALENT IS REQUIRED.
8. ALL STORM SEWER INLETS SHALL BE PROTECTED BY SEDIMENT TRAPS WHICH WILL BE MAINTAINED AND MODIFIED AS REQUIRED AS CONSTRUCTION PROGRESSES.
9. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH RAINFALL OR WHEN THE LEVEL OF DEPOSIT REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
10. ANY DISTURBED AREA NOT STABILIZED WITH SEEDING, SODDING, PAVING OR BUILT UPON BY NOVEMBER 1ST, OR AREAS DISTURBED AFTER THAT DATE, SHALL BE MULCHED IMMEDIATELY WITH HAY OR STRAW AT THE RATE OF 3 TONS PER ACRE AND OVER-SEEDED BY APRIL 15TH.
11. AT THE COMPLETION OF CONSTRUCTION, ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ALL DENUDED AREAS SHALL BE STABILIZED. SEDIMENT DEPOSITS SHALL BE REGRADED AND SEEDED.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN OHIO EPA PERMIT FOR TEMPORARY EROSION AND SEDIMENT CONTROL ON THE CONSTRUCTION SITE. THE DESIGN OF EROSION AND SEDIMENT CONTROL SYSTEMS SHALL FOLLOW THE REQUIREMENTS OF OHIO EPA, ITEMS 870 & 877 OF ODOT STANDARD SPECIFICATIONS AND THE REQUIREMENTS OF THE LOCAL JURISDICTION.

REFER TO ODOT STANDARD CONSTRUCTION DRAWINGS DM-4.4 AND DM-4.2M.

MAINTENANCE NOTES

SILT FENCE:

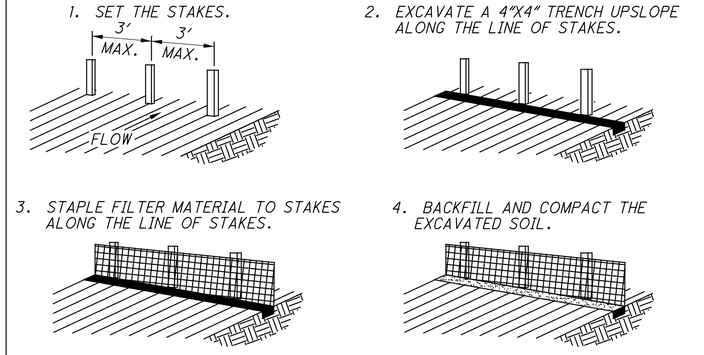
SILT FENCE AND FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SHOULD THE FABRIC OF A SILT FENCE OR FILTER BARRIER DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER IS STILL NECESSARY, THE FABRIC SHALL BE REPLACED IMMEDIATELY. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE.

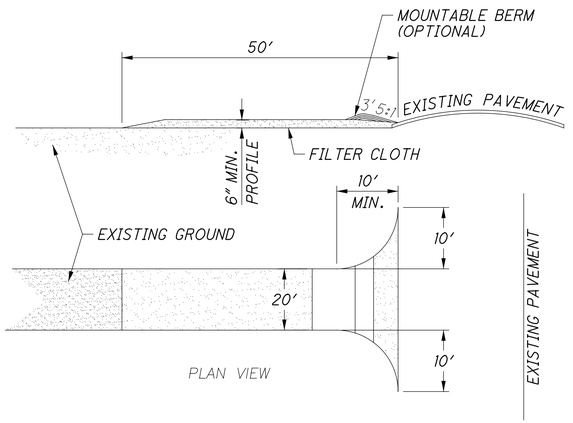
CONSTRUCTION ENTRANCE:

INSPECT THE MEASURE ON A REGULAR BASIS AND AFTER THERE HAS BEEN A HIGH VOLUME OF TRAFFIC OR A STORM EVENT. APPLY ADDITIONAL STONE PERIODICALLY AND WHEN REPAIR IS REQUIRED. IMMEDIATELY REMOVE SEDIMENT OR OTHER MATERIALS TRACKED ONTO THE PUBLIC ROADWAY. ENSURE THAT ASSOCIATED SEDIMENT CONTROL MEASURES ARE IN GOOD WORKING ORDER.

TREE PRESERVATION: THE CONTRACTOR SHALL PROTECT THE TREE AREAS SHOWN ON THE EROSION CONTROL PLAN BY ERECTING SNOW FENCE AROUND THEM.

SPECIFICATIONS FOR SEEDING AND MULCHING			
SEED TYPE	SEEDING DATES	PER 1000 SQ.FT.	PER ACRE
TALL FESCUE AND ANNUAL RYEGRASS	MARCH 1 TO SEPTEMBER 15	2 POUNDS AND ½ POUND	80 POUNDS AND 20 POUNDS
SMALL GRAIN STRAW MULCH		100 POUNDS OR 2 TO 3 BALES	2 TONS OR 50 BALES
FERTILIZER		25 POUNDS OF 12-12-12 OR THE EQUIVALENT	1000 POUNDS OF 12-12-12 OR THE EQUIVALENT
TEMPORARY SEEDING			
KV30 AND ANNUAL RYEGRASS	MARCH 1 TO SEPTEMBER 15	1 POUND	40 POUNDS
RYE OR WHEAT	SEPTEMBER 15 TO OCTOBER 30	3 POUNDS	2 BUSHELS
SOIL PROTECTION			
SMALL GRAIN STRAW MULCH	OCTOBER 30 TO MARCH 1	2 TO 3 BALES	3 TONS





STABILIZED CONSTRUCTION ENTRANCE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH AS REQUIRED.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCE SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAYS. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

CALCULATED JJR CHECKED KBS

EROSION CONTROL AND SEDIMENT CONTROL DETAILS

KEENE-COSHOCTON TOWER SITE

CODE SUMMARY

1994	UNIFORM BUILDING CODE
1998	BOCA NATIONAL BUILDING CODE
1997	INTERNATIONAL BUILDING CODE
1997	STANDARD BUILDING CODE
1997	UNIFORM BUILDING CODE
2000	INTERNATIONAL BUILDING CODE
2000	STANDARD BUILDING CODE
2003	INTERNATIONAL BUILDING CODE
2006	INTERNATIONAL BUILDING CODE
1994	UNIFORM MECHANICAL CODE
1998	BOCA MECHANICAL CODE
1997	INTERNATIONAL MECHANICAL CODE
1997	STANDARD MECHANICAL CODE
1997	UNIFORM MECHANICAL CODE
2000	INTERNATIONAL MECHANICAL CODE
2000	STANDARD MECHANICAL CODE
2003	INTERNATIONAL MECHANICAL CODE
2006	INTERNATIONAL MECHANICAL CODE
2007	CALIFORNIA BUILDING CODE
2002	BUILDING CODE OF NEW YORK STATE
2002	ELECTRICAL CODE OF NEW YORK STATE
2002	MECHANICAL CODE OF NEW YORK STATE
2009	NORTH CAROLINA BUILDING CODE
2008	NORTH CAROLINA ELECTRICAL CODE
2009	NORTH CAROLINA MECHANICAL CODE
2009	NORTH CAROLINA ENERGY CONSERVATION CODE
	NORTH DAKOTA ELECTRICAL WIRING STANDARDS
2006	MICHIGAN BUILDING CODE
2006	MICHIGAN MECHANICAL CODE
2000	MINNESOTA STATE ENERGY CODE
2007	MINNESOTA STATE MECHANICAL CODE (CH. 1346-2000 IMC & 2000 IFGC W/ AMEND.)
2007	MINNESOTA STATE BUILDING CODE
2006	NEW MEXICO COMMERCIAL BUILDING CODE
2008	NEW MEXICO ELECTRICAL CODE
2006	NEW MEXICO MECHANICAL CODE
2004	CHICAGO BUILDING CODE
2007	FLORIDA BUILDING CODE WITH 2009 SUPPLEMENT
2005	MASSACHUSETTS ELECTRICAL CODE
2008	MASSACHUSETTS ELECTRICAL CODE
7th	MASSACHUSETTS STATE BUILDING CODE
2007	OHIO BUILDING CODE
2007	OHIO MECHANICAL CODE
	CALIFORNIA TITLE 25
2007	OREGON STRUCTURAL SPECIALITY CODE
2007	OREGON MECHANICAL SPECIALITY CODE
2007	KENTUCKY BUILDING CODE
1996-2008	NATIONAL ELECTRICAL CODE
1989,1999,2001,2004	ASHRAE 90.1
2000,2003,2006	INTERNATIONAL ENERGY CONSERVATION CODE
2000,2003,2005,2006	NFPA 101 LIFE SAFETY CODE
2002	ARKANSAS FIRE PREVENTION CODE
2009	NORTH CAROLINA FIRE PREVENTION CODE

NOTES

1. LISTED CODES INCLUDE LATEST STATE ADOPTED AMENDMENTS.
2. THIS SHELTER NOT INTENDED FOR HUMAN HABITATION.
3. APPROVED MODEL MAY BE MIRROR IMAGE.
4. OCCUPANT LOAD = 0, OHIO = 2
5. SPECIAL CONDITIONS AND PERMISSIBLE TYPES OF GASES: N/A
6. SHELTER HAS NO COUNTY PLACEMENT RESTRICTION IN THE STATE OF MARYLAND.
7. STATE INSIGNIA LABEL/DECAL IS LOCATED NEAR MAIN ELECTRICAL SERVICE PANEL.
8. DOOR MUST BE MINIMUM 90 MINUTE FIRE RATED IF USED IN 2 HOUR FIRE RATED SHELTER AND MINIMUM 45 MINUTE FIRE RATED IF USED IN 1 HOUR FIRE RATED SHELTER.
9. ENERGY CODE EVALUATION BASED ON COMCHECK-EZ AND ENERGY GAUGE FLACOM SOFTWARE.
10. NOT SUBJECT TO FLORIDA FIRE SAFETY CODE, COMPLIANCE IS THE RESPONSIBILITY OF THE LOCAL JURISDICTION CODE OFFICIAL.
11. ACCESS TO SHELTER SHALL COMPLY WITH MARYLAND ACCESSIBILITY CODE COMAR .05.02.02.07/ADAAG SECTION 4.1.2.
12. ALL WELDS SHALL BE VERIFIED BY SPECIAL INSPECTION SHOWING CONFORMANCE TO THE DESIGN DRAWINGS AND SPECIFICATIONS.
13. BUILDING CATEGORY II. 1609.1.1 ALLOWS CHAPTER 6 OF ASCE 7; PER SEC 6.5.5, USE TABLE 1-1.
14. APPLICABLE INTERNAL PRESSURE COEFFICIENT (NOT APPLICABLE) - THESE SHELTERS CONFORM TO THE REQUIREMENTS OF SECTION 1609.1.1 WHICH ALLOWS CHAPTER 6 OF ASCE 7; USE SEC 6.4; METHOD I SIMPLIFIED PROCEDURE.
15. WIND IMPORTANCE FACTOR - IW = 1.00
16. THIS SHELTER IS AN "ENCLOSED STRUCTURE".
17. THESE PLANS ARE DESIGNED TO BE USED FOR THE CONSTRUCTION OF COMMERCIAL MODULAR UNITS, IN ACCORDANCE WITH CA HEALTH AND SAFETY CODE SECTION 18028, 1991 UBC, 1993 NEC, ANSI A117.1-1986.
18. THE 2005 NEC IS MORE STRINGENT THAN THE 2002 NEC.
19. HVAC UNITS ARE SIZED PER CUSTOMER REQUIREMENTS.
20. EXTERNAL GROUNDING BY OTHERS.
21. SHELTER CONSTRUCTED IN ACCORDANCE WITH 9B 72 FAC.
22. FLORIDA SHELTERS WITH LOUVERS HAVE THEM PROTECTED WITH A VENT HOOD & COMPLY WITH THE HVHZ REQUIREMENTS.
23. THIS BUILDING DOES NOT CONTAIN PLUMBING FACILITIES.

EXTERIOR COMPONENTS AND CLADDING POSITIVE AND NEGATIVE PRESSURES IN TERMS OF PSF			
ZONE	2000 IBC, 120 MPH WIND SPEED	2003 IBC, 2006 IBC, 120 MPH WIND SPEED	2000,2003,2006 IBC, 2004 FBC, 150 MPH WIND SPEED
ROOF ZONE 1 (100 SF EFFECTIVE WIND AREA)	+12.1/-28.7	+10.0/-28.7	+15.7/-44.8
ROOF ZONE 2 (20 SF EFFECTIVE WIND AREA)	+12.1/-46.9	+12.0/-46.9	+18.6/-73.4
ROOF ZONE 3 (10 SF EFFECTIVE WIND AREA)	+12.7/-79.1	+12.7/-79.1	+20.0/-123.7
WALL ZONE 4 (200 SF EFFECTIVE WIND AREA)	+25.8/-28.4	+25.8/-28.4	+39.6/-43.4
WALL ZONE 5 (30 SF EFFECTIVE WIND AREA)	+29.3/-38.0	+29.3/-38.0	+45.9/-59.2

INDEX OF SHEETS

DESIGN PARAMETERS

USE GROUP: B (BOCA, MASBC)
S-2 (FBC, IBC, SBC, UBC)
U (OBC)

CONSTRUCTION TYPE: 5B (BOCA, MASBC)
IV-UNP (SBC)
V-B (IBC, FBC)
V-N (UBC)

ROOF LIVE LOAD: 105 PSF
FLOOR LIVE LOAD: 196 PSF
GROUND SNOW LOAD: 115 PSF (N/A FOR FBC 2007)

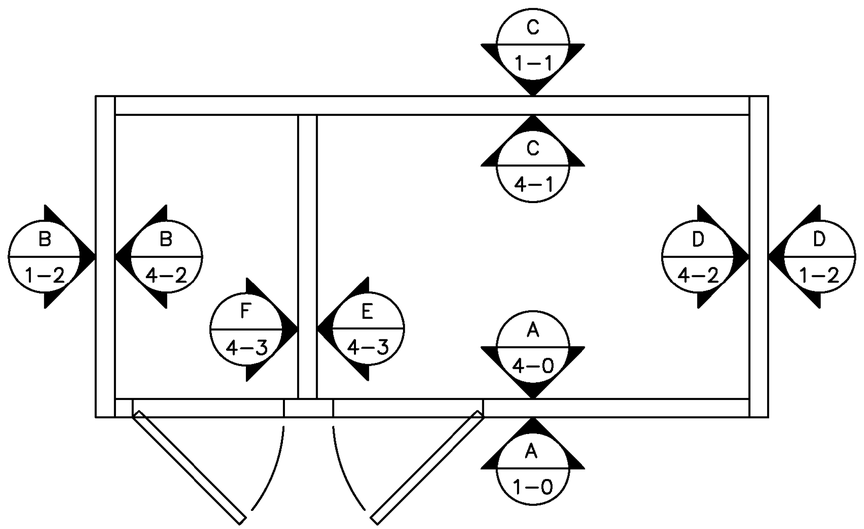
WIND SPEED: 150 MPH/EXPOSURE C

SEISMIC ZONE FOR SBC & UBC: 4
SEISMIC DESIGN CATEGORY FOR IBC: E (IBC)
USE GROUP-III (OBC)
SITE CLASS-D (OBC)

CONCRETE f'c: 5000 PSI AT 28 DAYS
CONCRETE UNIT WEIGHT: 110 PCF
FIRE RATING: 2 HOUR WALL AND ROOF (LIMITATIONS MAY APPLY DUE TO OPENINGS AND PROXIMITY ON SITE)

PHYSICAL PROPERTIES

SHELTER DIMENSIONS: 11'-8"W X 20'-0"L
SHIPPING DIMENSIONS: 11'-11"W X 20'-6 3/8"L X 10'-0 1/2"H
SHELTER WEIGHT: 52,000 # (SHELTER ONLY)



ELEVATION KEY

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	UPDATED INDEX OF SHEETS	BDB	1/26/10
A	CWW	12/2/09	ADDED SHEETS 3-2 AND 5-3 TO THE INDEX OF SHEETS	BDB	12/2/09

CUSTOMER: OHMARCS

PROJECT: 11'-8" X 20'-0" CONCRETE SHELTER COVER SHEET

FILENAME: OHM/SOHM02	
SCALE: N.T.S.	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO.: SHEET 20/53	
DRAWING NO.: SOHM02	F

PARTS LIST

ITEM	QTY	U/M	P/N	DESCRIPTION
1	4.0000	EA.	900097	SURGE ARRESTOR,TRANS,OP820B (INSTALL)
2	1.0000	EA.	350023	TELCO BOARD,4'X8"X3/4",PAINTED BLK
3	1.0000	EA.	168283	BUSHING,PLASTIC,1/2",SNAP-IN,HEYCO
4	1.0000	EA.	170111	PIPE CAP,PLASTIC,NPT,NIAGARA #204
5	1.0000	EA.	170113	PIPE CAP,PLASTIC,NPT,NIAGARA #205
6	1.0000	EA.	170116	PIPE CAP,PLASTIC,NPT,NIAGRA #207
7	1.0000	EA.	170118	PIPE CAP,PLASTIC,NPT,NIAGRA #342
8	1.0000	EA.	170122	PIPE CAP,PLASTIC,NPT,NIAGARA #188
9	1.0000	EA.	170124	PIPE CAP,PLASTIC,NPT,NIAGARA #340
10	1.0000	EA.	170125	PIPE CAP,PLASTIC,NPT,NIAGARA #257
11	1.0000	EA.	410075	BUSHING,EMT,1/2",PLASTIC
12	1.0000	EA.	410076	BUSHING,EMT,3/4",PLASTIC
13	1.0000	EA.	410080	BUSHING,EMT,2",PLASTIC
14	2.0000	EA.	410140	NIPPLE,RIGID,2",CLOSE
15	2.0000	EA.	410181	NIPPLE,RIGID,2"X8 1/2"
16	4.0000	EA.	410182	NIPPLE,RIGID,3/4"X8 1/2"
17	3.0000	EA.	410183	NIPPLE,RIGID,3/4"X7 1/2"
18	3.0000	EA.	410207	NIPPLE,RIGID,1/2"X8"
19	1.0000	EA.	410239	BUSHING,EMT,4",PLASTIC
20	1.0000	EA.	410298	NIPPLE,RIGID,4"X8 1/2"
21	1.0000	EA.	410347	NIPPLE,RIGID,1"X4 1/2"
22	2.0000	EA.	430003	BOX,JUNCT,4 OCT X1 1/2,3/4&1/2KO
23	27.0000	EA.	430005	BOX,JUNCT,4"X4",2-1/8D,1/2"-3/4KO
24	1.0000	EA.	430008	BOX,6X6X4,SCREW COVER,NEMA 1,0-KO
25	1.0000	EA.	430029	BOX,JUNCT,4-11/16"X4-11/16"D-2 1/8"
26	1.0000	EA.	430030	BOX,JUNCT,2X4,WP,(3) 1/2"HOLES
27	2.0000	EA.	430048	WIREWAY,GALV,4"X4"X60",W/O KO'S
28	3.0000	EA.	430049	WIREWAY,GALV,4"X4",CLOSURE PLATE,NO
29	12.0000	EA.	430050	WIREWAY,GALV,4"X4",U-CONNECTOR
30	2.0000	EA.	430061	WIREWAY,GALV,4"X4",90D ELBOW
31	1.0000	EA.	430067	LOADCENTER,SQD,200A,30P,Q0130M200
32	1.0000	EA.	430074	BOX,ENCLOSURE,12X12,H COVER,NEMA 1
33	2.0000	EA.	430215	WIREWAY,GALV,4"X4",TEE
34	1.0000	EA.	430252	WIREWAY,GALV,4"X4"X18",W/O KO'S
35	2.0000	EA.	430267	WIREWAY,GALV,4"X4"X24",W/O KO'S
36	2.0000	EA.	430268	WIREWAY,GALV,4"X4"X48",W/O KO'S
37	1.0000	EA.	430304	SWITCH,ATS,2P200A,GENERAC,GTS020W,1
38	1.0000	EA.	430319	WIREWAY,GALV,4"X4"X36",W/O KO'S
39	1.0000	EA.	430336	WIREWAY,GALV,4"X4"X12",W/O KO'S
40	2.0000	EA.	430482	LOADCENTER,SQD,100A,32P,Q0132M100
41	1.0000	EA.	430514	SURGE SUPPRESSION,LIEBERT TYPE 1A
42	1.0000	EA.	430526	SURGE SUPPRESSION,LIEBERT TYPE 2
43	1.0000	EA.	430581	ALARM BOARD,PLOTECH,DIN-37D-01
44	1.0000	EA.	430679	LOADCENTER,SQD,Q024L70S
45	1.0000	EA.	460122	CONTROLLER,LEAD LAG,BARD,MC3000-B
46	1.0000	EA.	470005	LIGHT FIXTURE,70W,EXTERIOR,WALL
47	5.0000	EA.	470057	LIGHT FIXTURE,32W,2 BULB,4FT,WR,T-8
48	4.0000	EA.	510079	UNISTRUT,1 5/8"CHANNEL,GOLDGALV,15"
49	22.0000	EA.	510115	UNISTRUT,1 5/8"CHANNEL,GOLDGALV,6"
50	4.0000	EA.	400077	BREAKER,SQD,2P 60A,PLUG IN,QO260
51	37.0000	EA.	400080	BREAKER,SQD,1P 20A,PLUG IN,QO120
52	2.0000	EA.	400102	BREAKER,SQD,2P 35A,PLUG IN,QO235
53	1.0000	EA.	400181	BREAKER,SQD,1P 15A,PLUG IN,QO115
54	2.0000	EA.	400530	FUSE,HOLDER,IN-LINE,HLR2
55	2.0000	EA.	400533	FUSE,1 AMP,SMALL DIN BUSS,GLR1
56	1.0000	EA.	400536	RELAY,COIL,8-PIN,240VAC,DPDT,10 AMP
57	1.0000	EA.	400537	RELAY,BASE,8-PIN OCT,10A,SNGLE TIER
	71.0000	FT.	410111	CONDUIT,LFMC,3/4",SEALTITE
60	24.0000	EA.	410128	CONNECTOR,LFMC,3/4",45D,SEALTITE
61	1.0000	EA.	420006	LABEL,BLK,ELECT,"GFCI"
62	1.0000	EA.	420007	LABEL,BLK,ELECT,"ALARM BLOCK"
63	2.0000	EA.	420009	LABEL,BLK,ELECT,"INTERIOR LIGHT"
64	1.0000	EA.	420010	LABEL,BLK,ELECT,"AC PANEL"
65	1.0000	EA.	420011	LABEL,BLK,ELECT,"LOW TEMP"
66	1.0000	EA.	420015	LABEL,BLK,ELECT,"HIGH TEMP"
67	1.0000	EA.	420016	LABEL,BLK,ELECT,"LEAD-LAG CONTROLL"
68	1.0000	EA.	420017	LABEL,BLK,ELECT,"HVAC #2"
69	1.0000	EA.	420018	LABEL,BLK,ELECT,"HVAC #1"
70	2.0000	EA.	420024	LABEL,BLK,ELECT,"EXTERIOR LIGHT"
71	32.0000	EA.	420033	LABEL, SELF TRANSFER, PANDUIT TTSL2
72	1.0000	EA.	420041	LABEL,"ARC FLASH AND SHOCK WARNING"
73	1.0000	EA.	420143	LABEL,RED, ELECT.BONDING TAG
74	5.0000	EA.	430010	COVER,RECPT PLATE,4X4,4 RECPT
75	19.0000	EA.	430012	COVER,BLANK PLATE,4X4
76	1.0000	EA.	430014	COVER,BLANK PLATE,4 11/16
77	1.0000	EA.	430025	COVER,RECPT PLATE,4X4,2R
78	1.0000	EA.	430033	RECEPTACLE,GFCI,120V,20A,IVORY
79	11.0000	EA.	430034	RECEPTACLE,DUPLEX,125V,20A,IVORY
80	1.0000	EA.	430068	LOADCENTER,SQD,COVER,QOC30US
81	2.0000	EA.	430072	COVER,SWITCH PLATE,4X4,2 SWITCH
82	2.0000	EA.	430084	SWITCH,SPST,20A,120V,IVORY
83	2.0000	EA.	430162	SWITCH,3-WAY,20A,120V,IVORY
84	1.0000	EA.	430384	COVER,GFCI,2 REC,HORZ,WTSG15A-C
85	2.0000	EA.	430481	LOADCENTER,SQD,COVER,QOC32UF
86	5.0000	EA.	470047	LIGHT FIXTURE,LENS,2-BULB T-8
87	10.0000	EA.	470058	LIGHT BULB,F32 T-8 MED BIPIN
88	2.0000	EA.	490000	ALARM,MAGNETIC DOOR CONTACT
89	2.0000	EA.	490039	DETECTOR,SMOKE,120V,9V BU,GENTEX
90	2.0000	EA.	540105	G-BAR KIT,SQUARE D,PK18GTA
91	1.0000	EA.	540311	G-BAR KIT,SQUARE D,PK4GTA
92	0.0000	EA.	400021	C-TAP,BROWN,54720
93	1.0000	EA.	400028	C-TAP,PURPLE,54745
94	24.5000	FT.	400030	WIRE,#6 THHN,STRAND,GRN
95	9.0000	FT.	400050	WIRE,#2 THHN,STRAND,GRN
96	11.0000	EA.	400051	C-TAP,ORANGE,54740
97	4.0000	EA.	400150	LUG,2H,1/0,PINK,3/8" HOLES,1"CC
98	14.0000	EA.	400371	LUG,2H,#6,BLU,1/4"BOLT,3/4"C/C,LBFW
99	47.0000	FT.	400541	WIRE,1/0 STRAND COPPER,BARE,TINNED
100	52.0000	EA.	410277	WIRE STANDOFF,ALUMINUM,8"X1 1/2"
101	14.0000	EA.	410396	BUSHING,INSULATING,CEILING BRACKET
102	10.0000	EA.	410397	BUSHING,INSULATING,WALL MOUNT BRACK
103	1.0000	EA.	480005	CELLXION BRASS GREEN SERIAL NO.PLAT
	6.0000	EA.	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI
109	10.0000	EA.	510074	CABLE LADDER,FLOOR BRKT,3.5"X1.5"
110	14.0000	EA.	510151	CABLE LADDER,TRAY HANGER,11"
111	2.0000	EA.	521-TBD	COVER, GROUNDING, 16"X6'0"X1 1/2"
112	2.0000	EA.	521000	HVAC,GRILL,SUPPLY,8"X28",710807
113	2.0000	EA.	521100	HVAC,GRILL,RETURN,14"X28",710820
114	2.0000	EA.	522001-00003	HVAC,SLEEVE,8"X28"X6"
115	2.0000	EA.	522001-00009	HVAC,SLEEVE,14"X28"X6"
116	2.0000	EA.	540099	POLYPHASER,8PB-M,ENTRY PANEL
117	4.0000	EA.	540214	GROUND STRAP ASSY,#6 WELD,6" LONG
118	7.0000	EA.	540218	GROUND STRAP ASSY,#6 THHN,14 1/2"
119	1.0000	EA.	500005	DOOR,3070,CURRIES,LH,18G,MORTIS
120	1.0000	EA.	500073	DOOR,4070,CURRIES,RH,18G,MORTISE
121	6.0000	EA.	504000	DOOR,HINGES,STAINLESS STEEL 32D
122	2.0000	EA.	504100	DOOR,CLOSER,SARGENT 1104,ALUM
123	2.0000	EA.	504102	DOOR,BUMPER,SS RUBBER STOP,BLACK
124	2.0000	EA.	504113	DOOR,HOLD OPEN,T-LATCH,6" SS
125	2.0000	EA.	504300	DOOR,LOCKGUARD,10" 32D
126	1.0000	EA.	504400	DOOR,DRIP CAP,NGF16A-48"
127	1.0000	EA.	504405	DOOR,DRIP CAP,NGF16A-54"
128	1.0000	EA.	504406	DOOR,THRESHOLD 54"X4.75",.090 ALUM
129	1.0000	EA.	504409	DOOR,THRESHOLD 42"X4.75",.090 ALUM
130	1.0000	EA.	504436	DOOR,THRESHOLD 54"X6.25",.090 ALUM
131	1.0000	EA.	504437	DOOR,THRESHOLD 42"X6.25",.090 ALUM
132	2.0000	EA.	504501	CORE,LOCKSET,BEST,CONSTRUCT,GREEN
133	1.0000	EA.	504538	LOCKSET,MORTISE,35H7EW15J-626-LHRB
134	1.0000	EA.	504539	LOCKSET,MORTISE,35H7EW4J-626-RHRB
135	2.0000	EA.	504555	DOOR,STRIKER PLATE,STANDARD
136	1.0000	EA.	540213	GROUND STRAP ASSY,#6 WELD,30" LONG
137	2.0000	EA.	570005	DOOR,CANOPY,48",MOUNTING BRACKET
138	2.0000	EA.	146514-005	DRIP CAP,48"X3",HVAC
139	2.0000	EA.	520251	HVAC,WALL,3T 5KW,BARD,TAN,RH
140	1.0000	EA.	146514-001	THIMBLE COVER PLATE, .063 X 24" X 24"

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
B	GWJ	12/09/09	UPDATED PARTS LIST AS REQUIRED	BDB	12/09/09
A	CWW	12/2/09	UPDATED PARTS LIST AS REQUIRED	BDB	12/2/09

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER PARTS LIST

FILENAME: OHM/SOHM02	
SCALE: N.T.S.	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO.: SHEET 21/53	
DRAWING NO.: SOHM02	F

PARTS LIST

ITEM	QTY	U/M	P/N	DESCRIPTION
141	1.0000	EA.	170123	PIPE CAP,PLASTIC,NPT,NIAGARA #2046
142	1.0000	EA.	400420	T-TAP,250-1/0MAIN,1/0-14,GP-250-OWC
143	1.0000	EA.	400530	FUSE,HOLDER,IN-LINE,HLR2
144	1.0000	EA.	400595	FUSE,10 AMP,SMALL DIN BUSS,GLR10
	12.5000	FT.	410112	CONDUIT,LFMC,1/2",SEALTITE
147	3.0000	EA.	410146	CONNECTOR,LFMC,1/2",45D,SEALTITE
148	1.0000	EA.	410160	BUSHING,EMT,3",PLASTIC
149	10.0000	FT.	410232	CONDUIT,LFMC,2",SEALTIGHT
150	2.0000	EA.	410252	CONNECTOR,LFMC,2",45
151	16.0000	EA.	470030	FILTER, 10" X 10" X 1"
152	1.0000	EA.	470101	LOUVER,42",INTAKE,DAYTON,3C311,ALUM
153	1.0000	EA.	470102	SHUTTER,MOTOR,2C832
154	1.0000	EA.	470105	LOUVER,30",EXHAUST,DAYTON,3C309,ALM
155	1.0000	EA.	470137	FILTER FRAME, 42", P&S SHEETMETAL
156	1.0000	EA.	470204	LOUVER,30",EXTENSION
157	2.0000	EA.	470252-00001	LOUVER,6"STANDOFF FRAME,3'9 1/4"X3'
158	1.0000	EA.	550005	GENERATOR,35KW,LPG,GENERAC,SG-035
159	1.0000	FT.	550042-002	GENERATOR, EXHAUST TAIL PIPE KIT (REMOVE FOR SHIPPING)
160	1.0000	EA.	550069	MONITOR,TANK,LPG STATIONARY,94442A
161	1.0000	EA.	550108	EXHAUST THIMBLE, 8" OD, 3" PIPE, ASSEMBLY
162	1.0000	EA.	550114	MUFFLER,WRAP,P&S
163	1.0000	EA.	420048	LABEL,DATA,STANDARD SHELTER
164	1.0000	EA.	480001	PLATE,DATA,ALUM,8"X12",GRAY
	7.0000	FT.	504216	DOOR,WEATHERSTRIP,SPONGE NEOPRENE
167	1.0000	EA.	504222	DOOR,WEATHERSTRIPPING,303-TF-3670
168	1.0000	EA.	504223	DOOR,WEATHERSTRIPPING,303-TF-4068
169	2.0000	EA.	390001	FIRE EXTINGUISHER, 10# CO2 FIRE, BADGER
170	1.0000	EA.	400531	CABLE,ALARM,W/DB37 MALE/MALE CONN. (PACKING LIST ITEM)
171	1.0000	EA.	470119	VENT HOOD,32",90D,P&S SHEETMETAL (PACKING LIST ITEM)
172	1.0000	EA.	470120	VENT HOOD,44",90D,P&S SHEETMETAL (PACKING LIST ITEM)
173	2.0000	EA.	480000	TRAY,WALL FILE PLASTIC,LR-SMOKE (PACKING LIST ITEM)
174	1.0000	EA.	480087-01	PACKING KIT,TYPICAL EVERY SHELTER (PACKING LIST ITEM)
175	1.0000	EA.	480147	PACKING KIT,GENERATOR ROOM PARTS (PACKING LIST ITEM)
176	1.0000	EA.	570000	DOOR,CANOPY,48",METAL (PACKING LIST ITEM)
177	1.0000	EA.	570018	DOOR,CANOPY,54",METAL (PACKING LIST ITEM)

CUT LIST

ITEM	P/N	DESCRIPTION	CUT	PCS
27	430048	WIREWAY,GALV,4"X4"X60",W/O KO'S	60"	2
34	430252	WIREWAY,GALV,4"X4"X18",W/O KO'S	18"	1
35	430267	WIREWAY,GALV,4"X4"X24",W/O KO'S	24"	2
36	430268	WIREWAY,GALV,4"X4"X48",W/O KO'S	48"	2
58	410111	CONDUIT,LFMC,3/4",SEALTITE	24"	8
59	410111	CONDUIT,LFMC,3/4",SEALTITE	132"	5
94	400030	WIRE,#6 THHN,STRAND,GRN	294"	1
95	400050	WIRE,#2 THHN,STRAND,GRN	108"	1
99	400541	WIRE,1/0 STRAND COPPER,BARE,TINNED	564"	1
104	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	88 1/2"	2
105	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	24"	1
106	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	54 1/2"	3
107	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	63 3/4"	0
108	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	30 3/8"	2
126	504400	DOOR,DRIP CAP,NGF16A-48"	40"	1
127	504405	DOOR,DRIP CAP,NGF16A-54"	52"	1
145	410112	CONDUIT,LFMC,1/2",SEALTITE	120"	1
146	410112	CONDUIT,LFMC,1/2",SEALTITE	30"	1
149	410232	CONDUIT,LFMC,2",SEALTIGHT	120"	1
165	504216	DOOR,WEATHERSTRIP,SPONGE NEOPRENE	36"	1
166	504216	DOOR,WEATHERSTRIP,SPONGE NEOPRENE	48"	1

SHOP DETAILS

DWG NO.	DESCRIPTION
30-002	BOX TO BOX PENETRATION DETAIL
30-004	BOX TO GFCI PENETRATION DETAIL
30-009	CONDUIT TO WIREWAY CONNECTION
30-011	PLASTIC CAPS INSTALLATION
30-012	RIGID, NIPPLE, CLOSE & CHASE APPLICATION
30-013	PANEL TO WIREWAY CONNECTION
40-004	UNISTRUT INSTALLATION
40-008	GROUND BOND DETAIL
50-006	GROUNDING DETAILS T-JUNCTION
50-008	GROUNDING DETAILS SPLICE JUNCTION
50-012	HALO GROUND TO PANEL & 6X6 BOX
50-013	HALO GROUND TO DOORFRAME
50-020	BONDING AT CONDUIT DETAIL
50-026	Y DROP INSTALLATION-#6 WIRE
50-034	HVAC GRILL GROUNDING DETAIL
50-035	THRU WALL PENETRATION 45° PVC PIPE
50-042	STAND-OFF BRACKET INSTALLATION
51-003	2 PC THRESHOLD INSTALLATION
51-005	WEATHERSTRIP INSTALLATION
51-007	DOOR LOCKGUARD INSTALLATION
51-009	DOOR HOLD OPEN INSTALLATION
51-010	DOOR CLOSER DETAIL
51-012	DOOR CANOPY INSTALLATION
51-017	GROUND STRAP TO DOOR FRAME
51-029	MAGNETIC DOOR ALARM INSTALLATION
52-003	STRAIGHT CLAMP INSTALLATION
52-004	CORNER CLAMP INSTALLATION
52-009	WALL MOUNT INSTALLATION
52-016	WALL BRACKET INSTALLATION
52-018	HANGER BAR CONNECTION
52-021	HANGER BRACKET 1-LAYER INSTALLATION
52-022	UNISTRUT INSTALL 1-LAYER CEILING
53-001	WAVEGUIDE ENTRY INSTALLATION
55-006	HVAC INSTALLATION AND CONNECTIONS
55-010	HVAC DRIP CAP INSTALLATION

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
B	GWJ	12/09/09	UPDATED PARTS/CUT LIST & ADDED SHOP DETAIL 40-008	BDB	12/09/09
A	CWW	12/2/09	UPDATED PARTS LIST & CUT LIST AS REQUIRED	BDB	12/2/09

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER PARTS LIST CONT'D/ CUT LIST/SHOP DETAILS

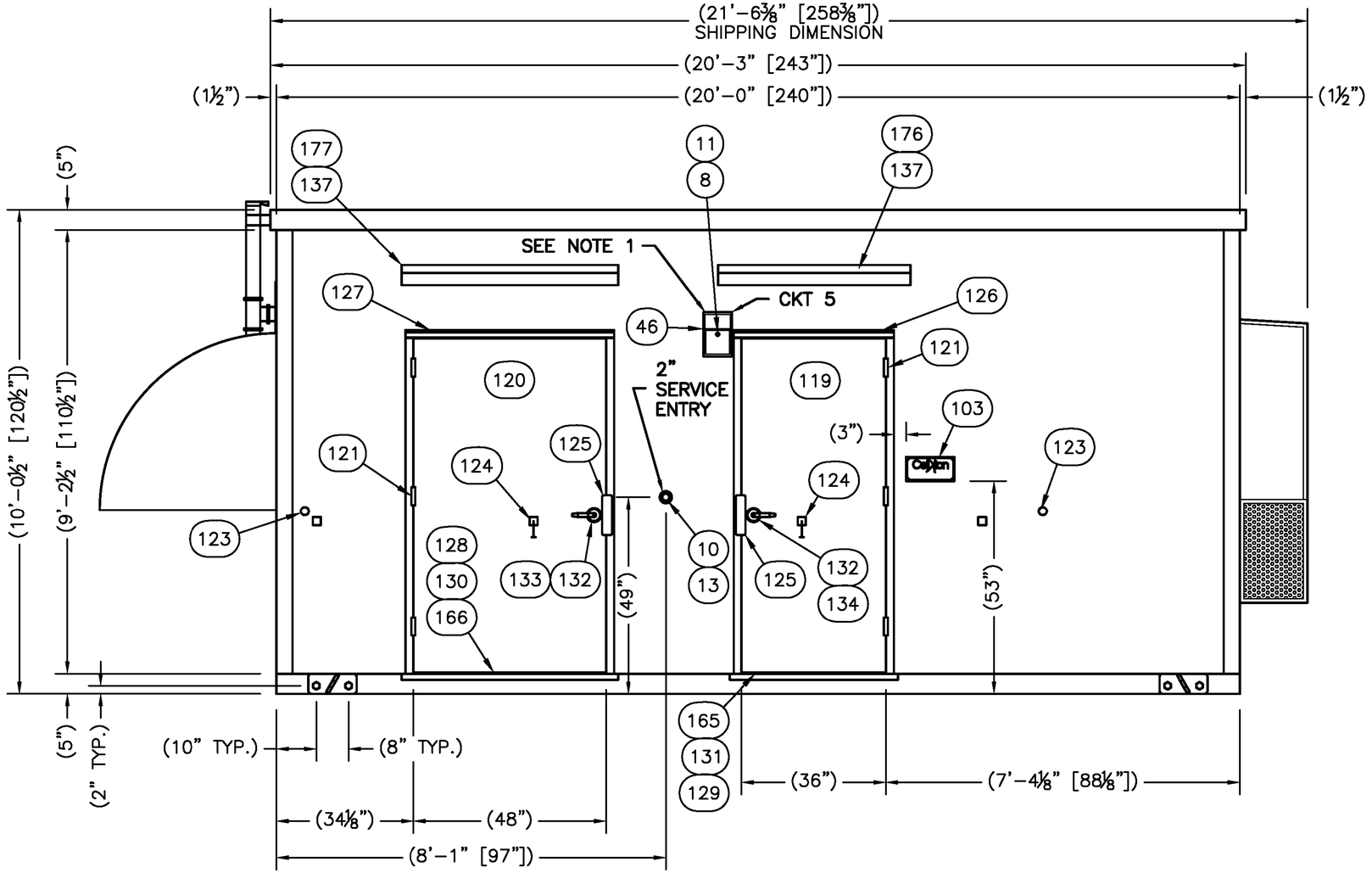
FILENAME: *OHM/SOHM02*

SCALE:	TOLERANCE:
N.T.S.	
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*

SHEET NO.
SHEET 22/53

DRAWING NO.: **SOHM02** **F**

SUB-PARTS LIST			
ITEM	P/N	DESCRIPTION	CUT
126	504400	DOOR,DRIP CAP,NGF16A-48"	40"
127	504405	DOOR,DRIP CAP,NGF16A-54"	52"
165	504216	DOOR,WEATHERSTRIP,SPONGE NEOPRENE	36"
166	504216	DOOR,WEATHERSTRIP,SPONGE NEOPRENE	48"



EXTERIOR ELEVATION "A"

NOTE:

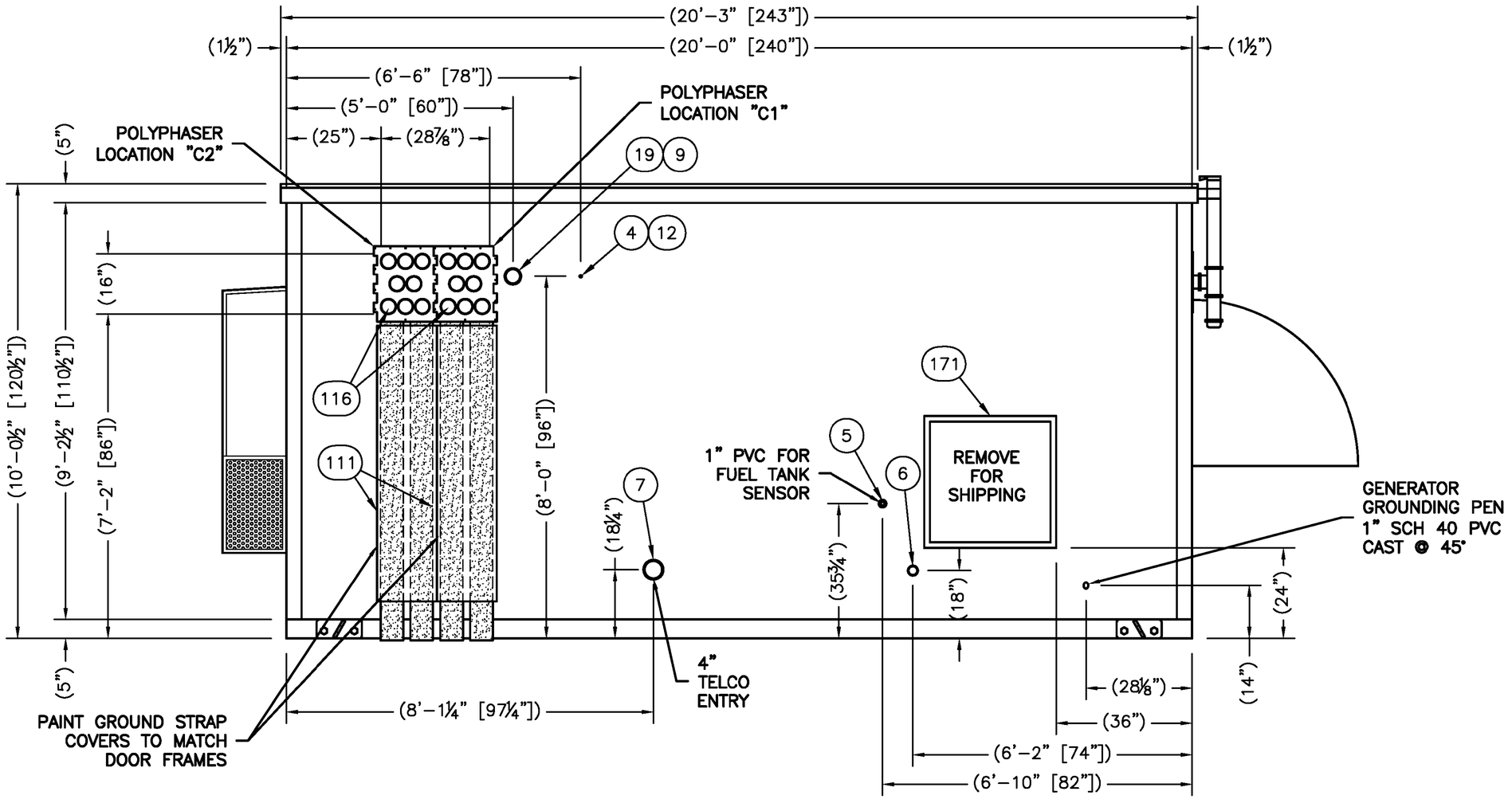
1. LIGHT FIXTURE TO BE INSTALLED AT MANUFACTURER, TESTED FOR FUNCTION, REMOVED AND PACKED INSIDE FOR SHIPMENT.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
B	GWJ	12/09/09	MOVED ID SIGN TO HINGE SIDE OF DOOR	BDB	12/09/09
A	CWW	12/2/09	REMOVED PULL HANDLES & GROUND PENETRATIONS	BDB	12/2/09

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER EXTERIOR "A" ELEVATION

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 23/53*	
DRAWING NO.: *SOHM02*	*F*



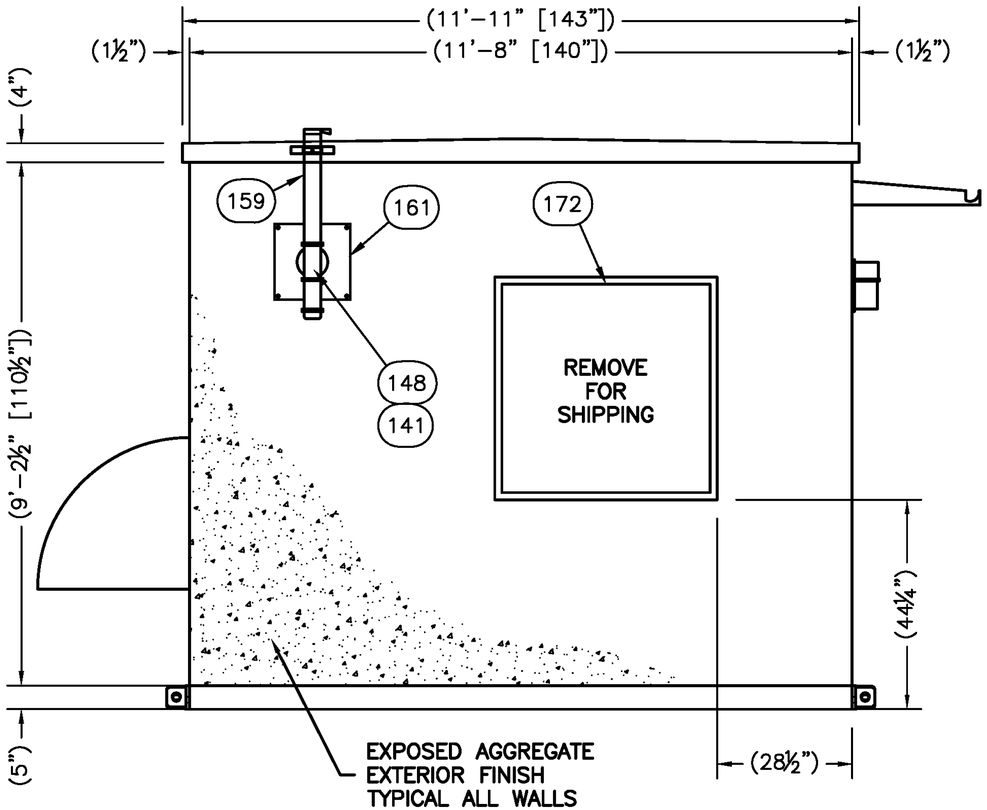
EXTERIOR ELEVATION "C"

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	UPDATED POLYPHASER & TOWER LIGHT PENETRATIONS	BDB	1/26/10
C	DJC	12/14/09	ADDED PIPE CAP FOR GENERATOR FULL LINE	BDB	12/14/09
A	CWW	12/2/09	REMOVED GROUND PENETRATION & VENT		

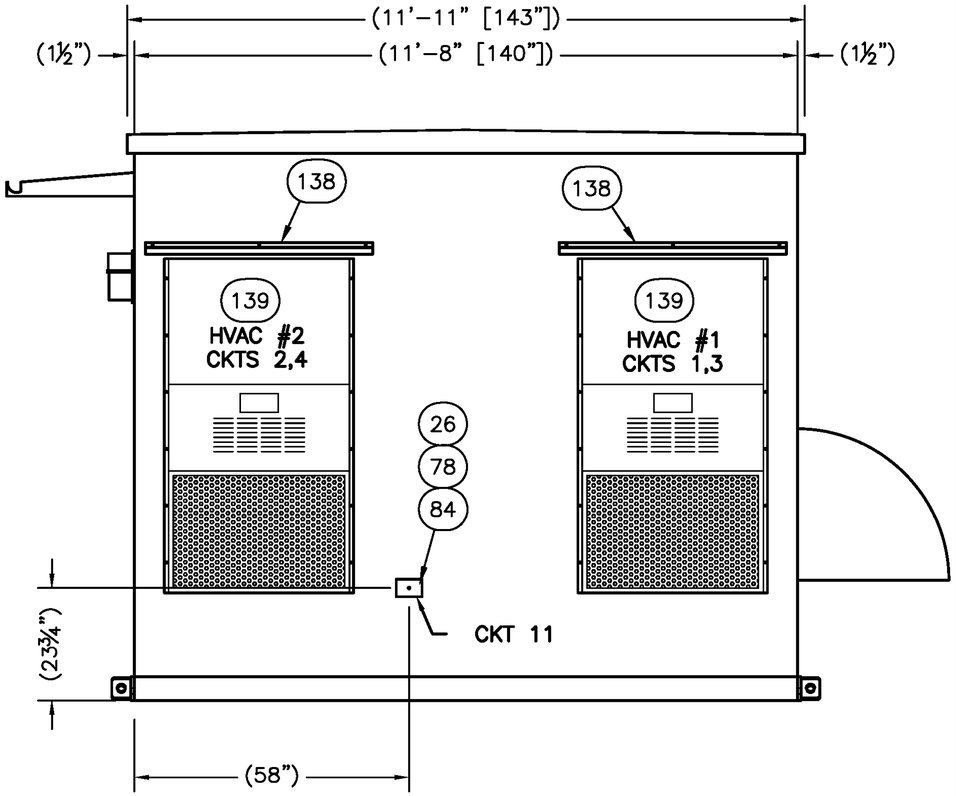
CUSTOMER: OHMARCS

PROJECT: 11'–8" X 20'–0" CONCRETE SHELTER EXTERIOR ELEVATION "C"

FILENAME: OHM/SOHM02	
SCALE: 3/8"=1'–0"	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO. SHEET 24/53	
DRAWING NO.: SOHM02	F



EXTERIOR ELEVATION "B"

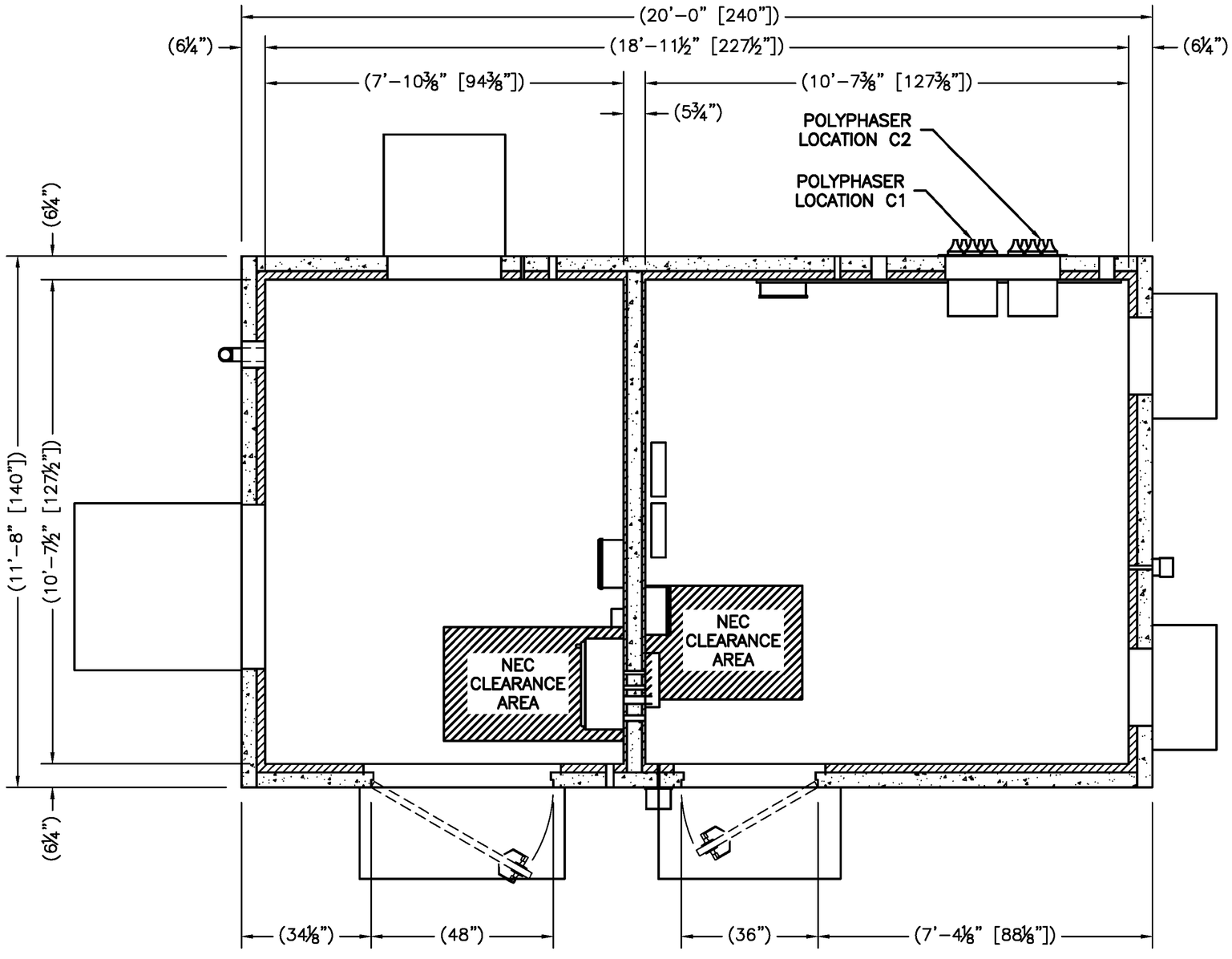


EXTERIOR ELEVATION "D"

CUSTOMER:
OHMARCS

PROJECT:
11'–8" X 20'–0"
CONCRETE SHELTER
EXTERIOR ELEVATIONS
"B" & "D"

FILENAME: OHM/SOHM02	
SCALE: 3/8"=1'–0"	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO. SHEET 25/53	
DRAWING NO.: SOHM02	F



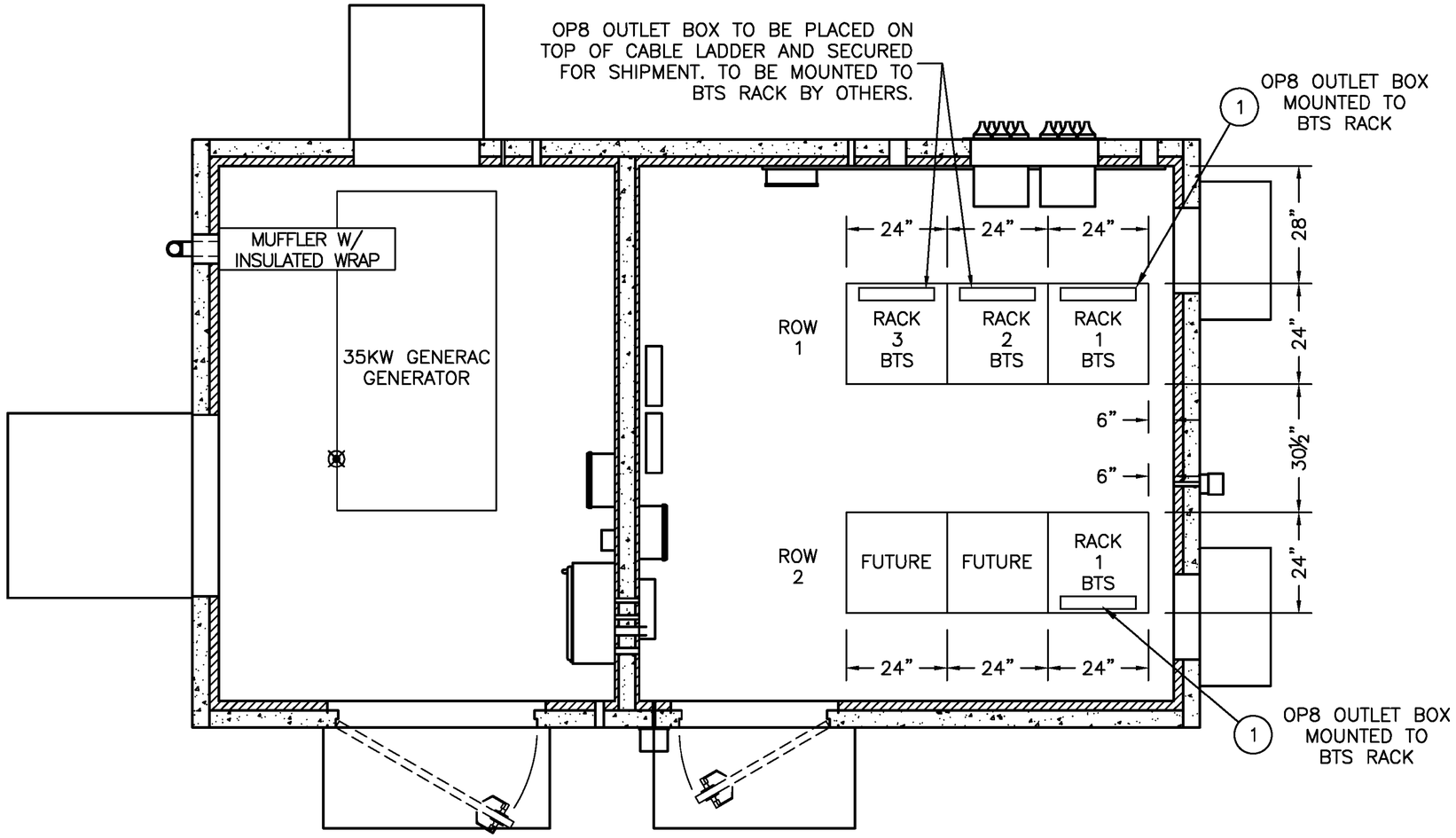
FLOOR PLAN

233.33 SQ.FT. EXTERIOR AREA
112.78 SQ.FT. EQUIPMENT ROOM INTERIOR AREA
83.56 SQ. FT. GENERATOR ROOM INTERIOR AREA

CUSTOMER: OHMARCS

PROJECT: 11'–8" X 20'–0" CONCRETE SHELTER FLOOR PLAN

FILENAME: OHM/SOHM02	
SCALE: 3/8"=1'–0"	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO.: SHEET 26/53	
DRAWING NO.: SOHM02	F



EQUIPMENT LAYOUT

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
F	GWJ	02/04/10	ADDED/REVISED NOTE FOR RACKS 2 & 3	BDB	02/04/10
E	CWW	1/26/10	ADDED OP8 OUTLET BOXES	BDB	1/26/10
C	DJC	12/14/09	RELOCATED EQUIPMENT ROW 1, ADDED DIMENSION	BDB	12/14/09

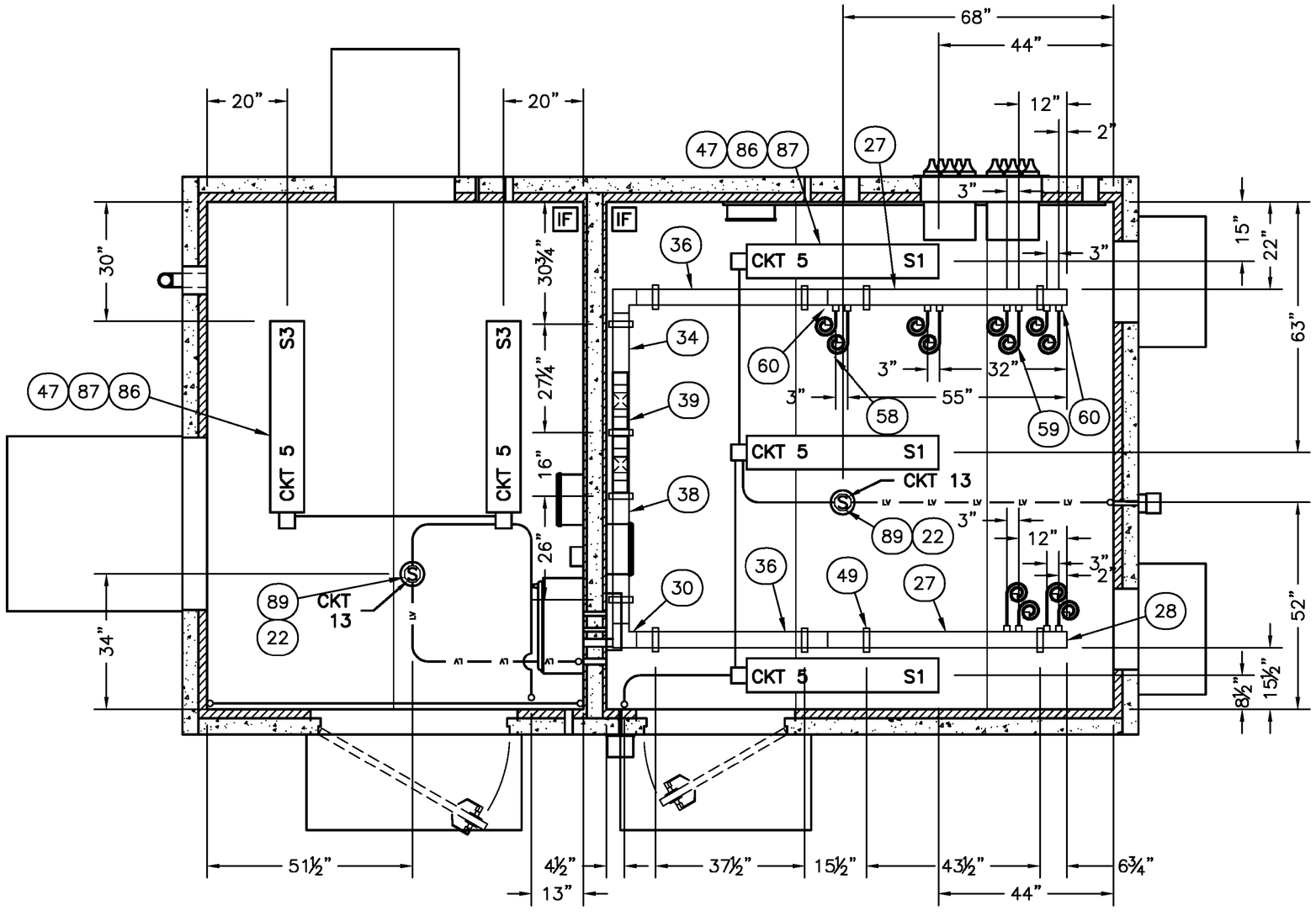
CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER EQUIPMENT LAYOUT

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 27/53*	
DRAWING NO.: *SOHM02*	*F*

SUB–PARTS LIST

ITEM	P/N	DESCRIPTION	CUT	PCS	ITEM	P/N	DESCRIPTION	CUT	PCS
27	430048	WIREWAY,GALV,4"X4"X60",W/O KO'S	60"	2	36	430268	WIREWAY,GALV,4"X4"X48",W/O KO'S	48"	2
34	430252	WIREWAY,GALV,4"X4"X18",W/O KO'S	18"	1	59	410111	CONDUIT,LFMC,3/4",SEALTITE	132"	5



REFLECTED CEILING PLAN ELECTRICAL

NOTE:

1. IF = INTERIOR FINISH START PANEL.

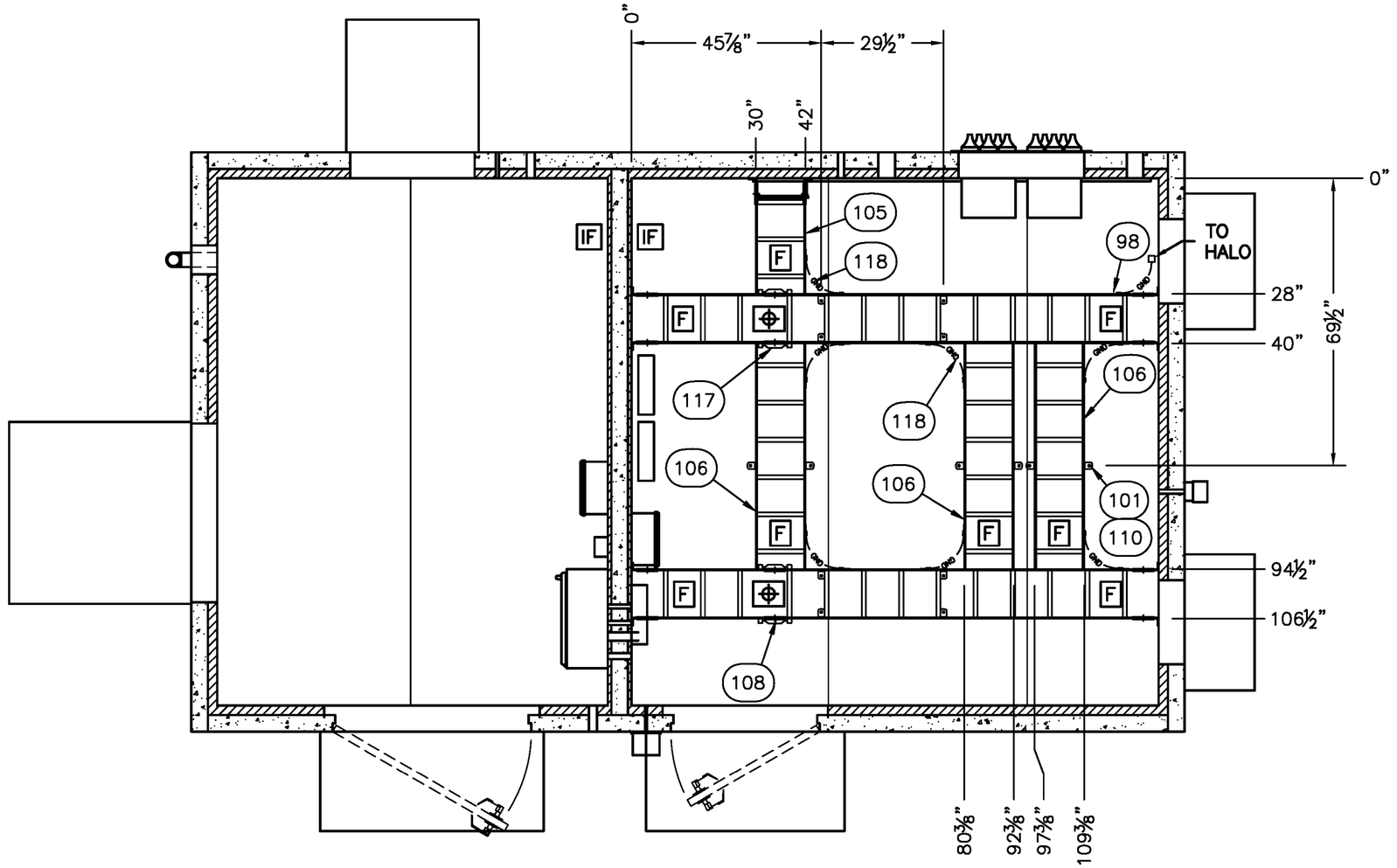
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	CHANGED LIGHT, WIREWAY & UPS DROP LOCATIONS	BDB	1/26/10
D	CWW	12/18/09	CHANGED LIGHT & WIREWAY LOCATIONS	BDB	12/18/09
C	DJC	12/14/09	CHANGED LIGHT, UPS DROP, & WIREWAY LOCATIONS	BDB	12/14/09

CUSTOMER:
OHMARCS

PROJECT:
11'–8" X 20'–0" CONCRETE SHELTER REFLECTED CEILING PLAN – ELECTRICAL

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'–0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 28/53*	
DRAWING NO.: *SOHM02*	*F*

SUB–PARTS LIST				
ITEM	P/N	DESCRIPTION	CUT	PCS
105	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	24"	1
106	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	54 1/2"	3
107	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	63 3/4"	0
108	510000	CABLE LADDER,12"X9'8 1/2",YELLOW ZI	30 3/8"	2



NOTES:

1. [F] = CABLE LADDER FACTORY END.
2. [⊕] = CABLE LADDER SPLICE.
3. [IF] = INTERIOR FINISH START PANEL.
4. CABLE LADDER TO BE MOUNTED 96" A.F.F.

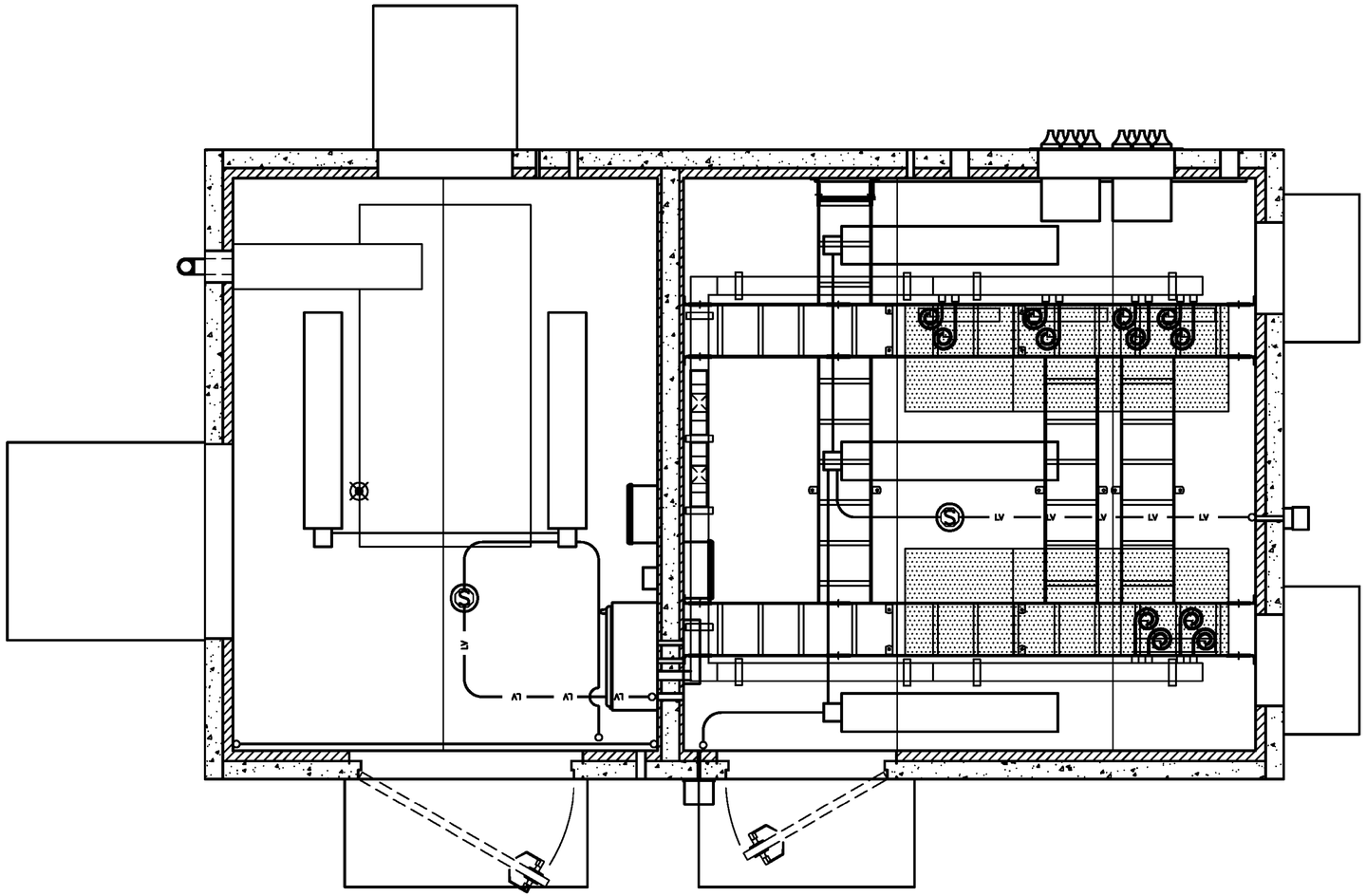
REFLECTED CEILING PLAN MECHANICAL

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
C	DJC	12/14/09	REVISED CABLE TRAY LAYOUT, ADDED NOTES	BDB	12/09/09
B	GWJ	12/09/09	ADDED 29" CABLE TRAY TO "C" WALL	BDB	12/09/09

CUSTOMER: OHMARCS

PROJECT: 11'–8" X 20'–0" CONCRETE SHELTER REFLECTED CEILING PLAN – MECHANICAL

FILENAME: OHM/SOHM02	
SCALE: 3/8"=1'–0"	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO. SHEET 29/53	
DRAWING NO.: SOHM02	F



REFLECTED CEILING PLAN

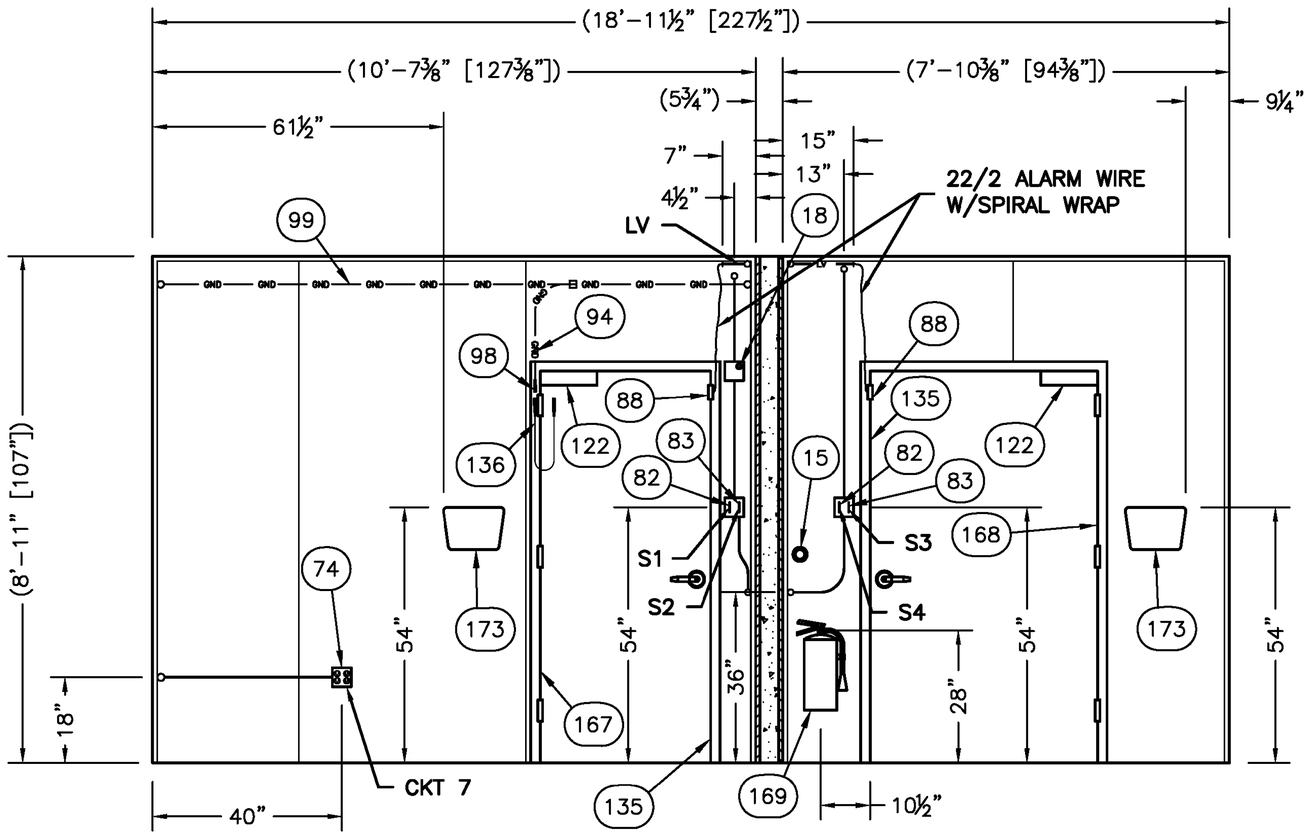
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	CHANGED LIGHT, WIREWAY & UPS DROP LOCATIONS	BDB	1/26/10
D	CWW	12/18/09	CHANGED LIGHT & WIREWAY LOCATIONS	BDB	12/18/09
B	GWJ	12/09/09	UPDATED PLAN TO REFLECT CUSTOMER CHANGES	BDB	12/09/09

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER REFLECTED CEILING PLAN

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 30/53*	
DRAWING NO.: *SOHM02*	*F*

SUB–PARTS LIST				
ITEM	P/N	DESCRIPTION	CUT	PCS
94	400030	WIRE,#6 THHN,STRAND,GRN	294"	1
95	400050	WIRE,#2 THHN,STRAND,GRN	108"	1
99	400541	WIRE,1/0 STRAND COPPER,BARE,TINNED	564"	1



INTERIOR ELEVATION "A"

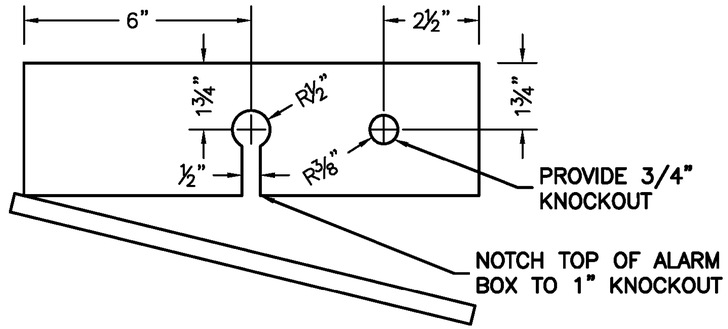
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
A	CWW	12/2/09	REMOVED PULL HANDLES, UPDATED SWITCHES & CONDUIT	BDB	12/2/09

CUSTOMER: *OHMARCS*

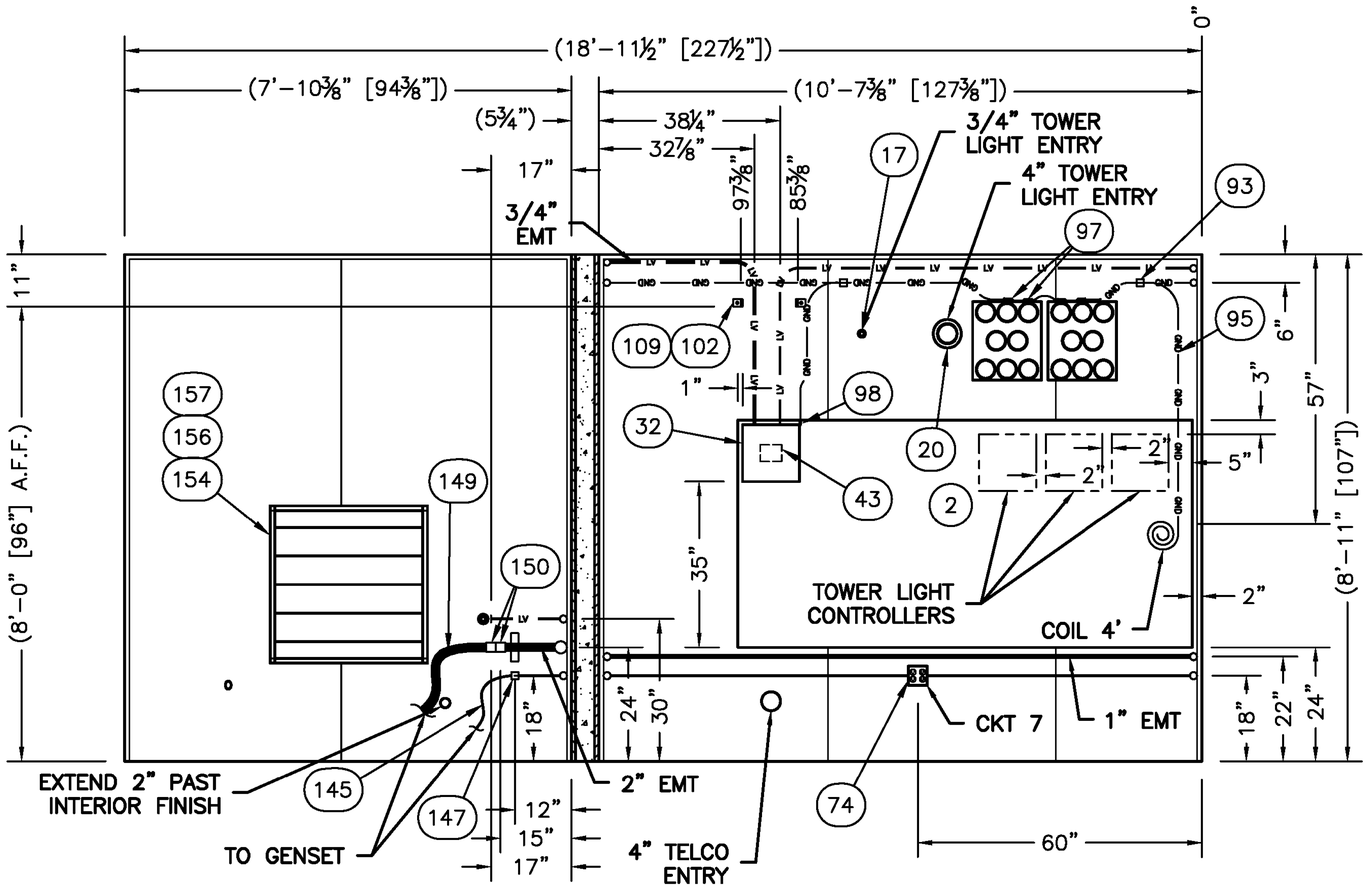
PROJECT: *11'–8" X 20'–0" CONCRETE SHELTER INTERIOR "A" ELEVATION*

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'–0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 31/53*	
DRAWING NO.: *SOHM02*	*F*

SUB-PARTS LIST				
ITEM	P/N	DESCRIPTION	CUT	PCS
145	410112	CONDUIT,LFMC,1/2",SEALTITE	120"	1
149	410232	CONDUIT,LFMC,2",SEALTIGHT	120"	1



ALARM ENCLOSURE TOP DETAIL



INTERIOR ELEVATION "C"

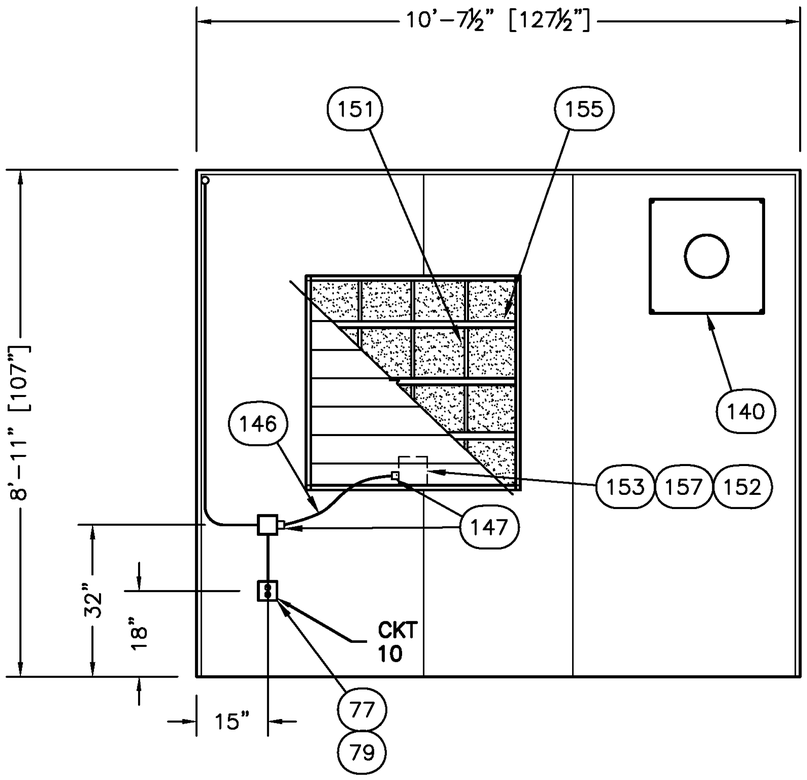
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	UPDATED POLYPHASER & TOWER LIGHT PENETRATIONS	BDB	1/26/10
C	DJC	12/14/09	UPDATED GENERATOR GROUNDING PEN	BDB	12/14/09
B	GWJ	12/09/09	ADDED/RE-ROUTED 1" EMT @ 22" FOR HVAC'S	BDB	12/09/09

CUSTOMER: *OHMARCS*

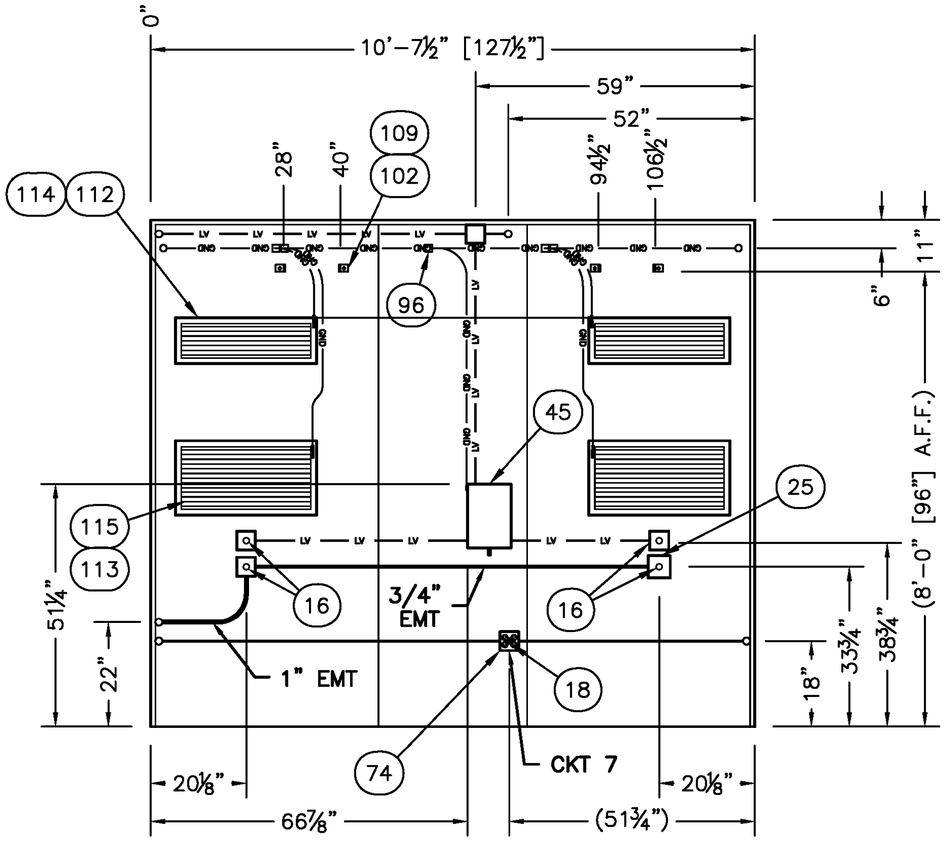
PROJECT: *11'-8" X 20'-0" CONCRETE SHELTER INTERIOR "C" ELEVATION*

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 32/53*	
DRAWING NO.: *SOHM02*	*F*

SUB-PARTS LIST				
ITEM	P/N	DESCRIPTION	CUT	PCS
148	410112	CONDUIT,LFMC,1/2",SEALTITE	30"	1



INTERIOR ELEVATION "B"



INTERIOR ELEVATION "D"

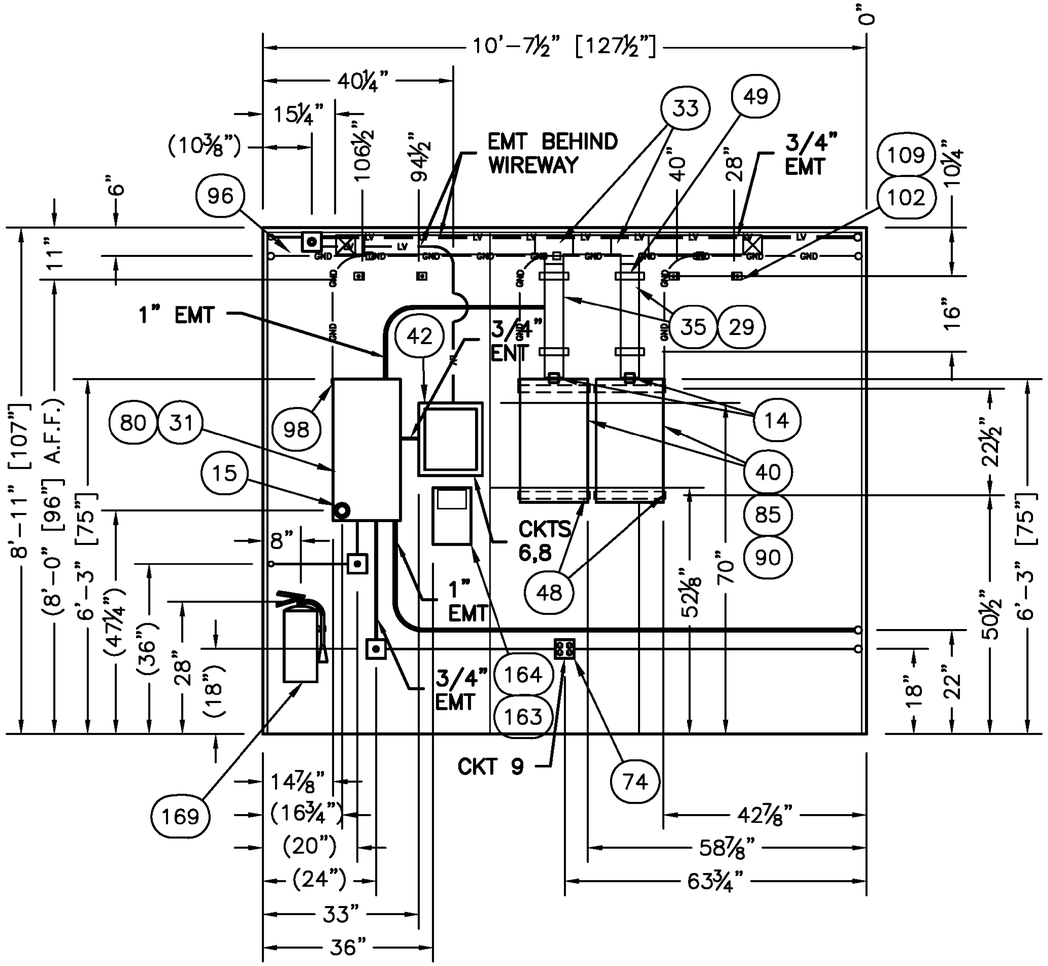
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	UPDATED DRAWING TO SHOW FILTER & FRAME	BDB	1/26/10
C	DJC	12/14/09	RELOCATED CABLE LADDER FLOOR BRACKETS	BDB	12/14/09
B	GWJ	12/09/09	RE-ROUTED CONDUIT FOR HVAC'S/SMIKE ALARM/LEADLAG	BDB	12/09/09

CUSTOMER:
OHMARCS

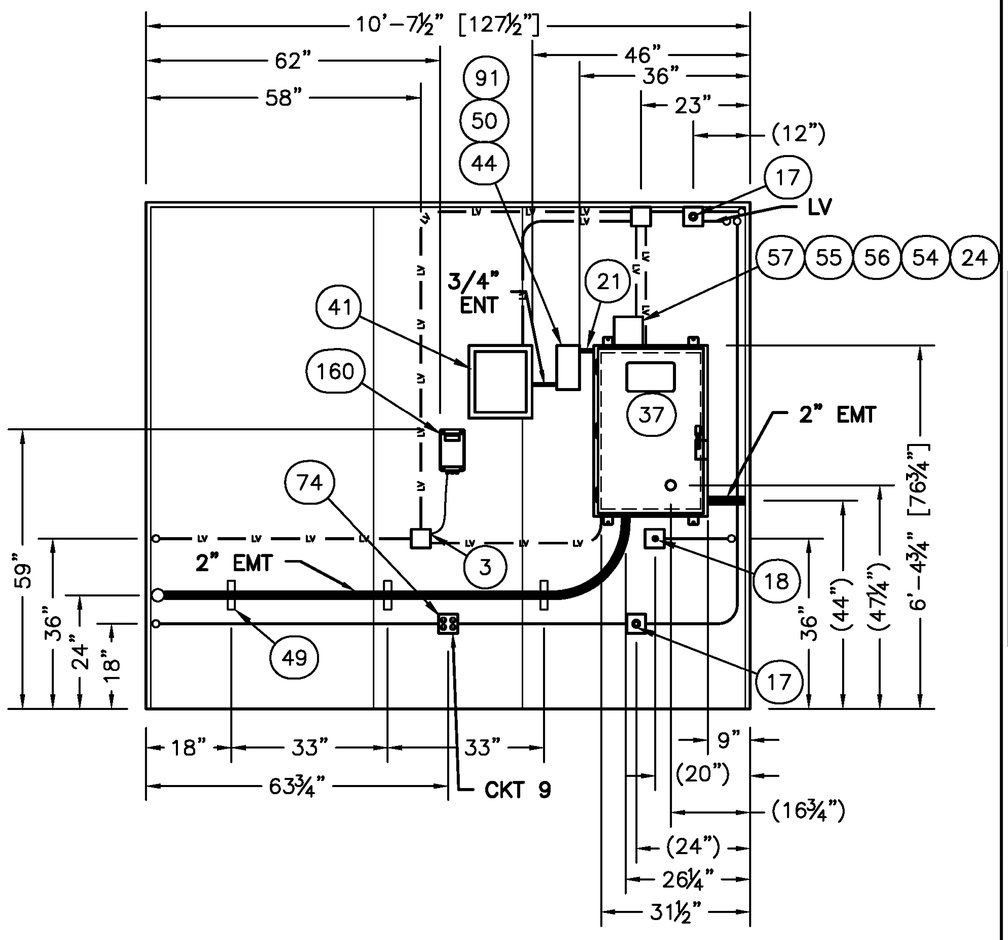
PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER INTERIOR ELEVATIONS "B" & "D"

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 33/53*	
DRAWING NO.: *SOHM02*	*F*

SUB-PARTS LIST				
ITEM	P/N	DESCRIPTION	CUT	PCS
30	430061	WIREWAY,GALV,4"X4",90D ELBOW		2



INTERIOR ELEVATION "E"



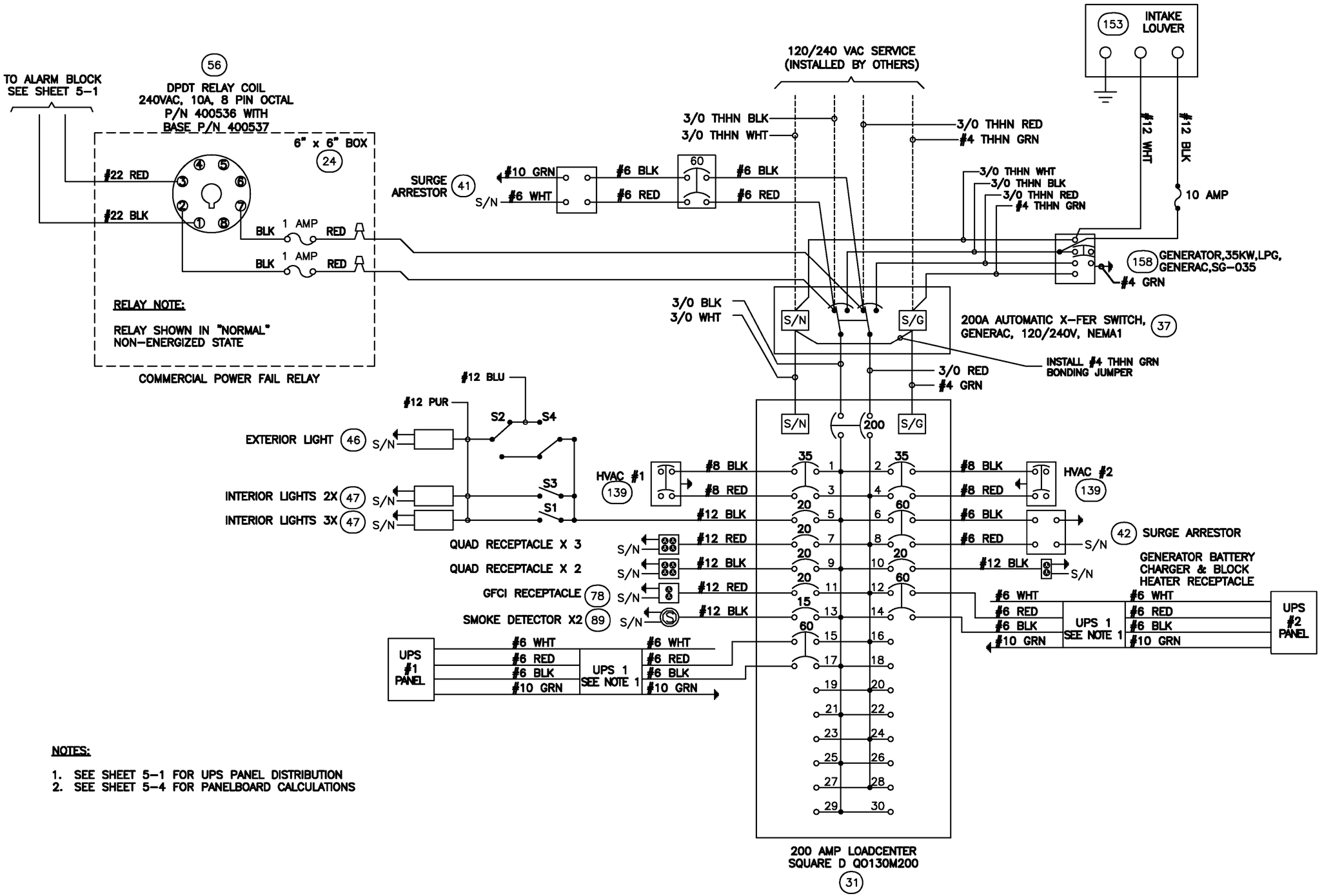
INTERIOR ELEVATION "F"

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	ADDED UPS PANELS; UPDATED WIREWAY AS REQUIRED	BDB	1/26/10
D	CWW	12/18/09	RELOCATED WIREWAY & PANEL	BDB	12/18/09
C	DJC	12/14/09	RELOCATED WIREWAY	BDB	12/14/09

CUSTOMER: *OHMARCS*

PROJECT: *11'-8" X 20'-0" CONCRETE SHELTER INTERIOR ELEVATIONS "E" & "F"*

FILENAME: *OHM/SOHM02*	
SCALE: *3/8"=1'-0"*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 34/53*	
DRAWING NO.: *SOHM02*	*F*



NOTES:

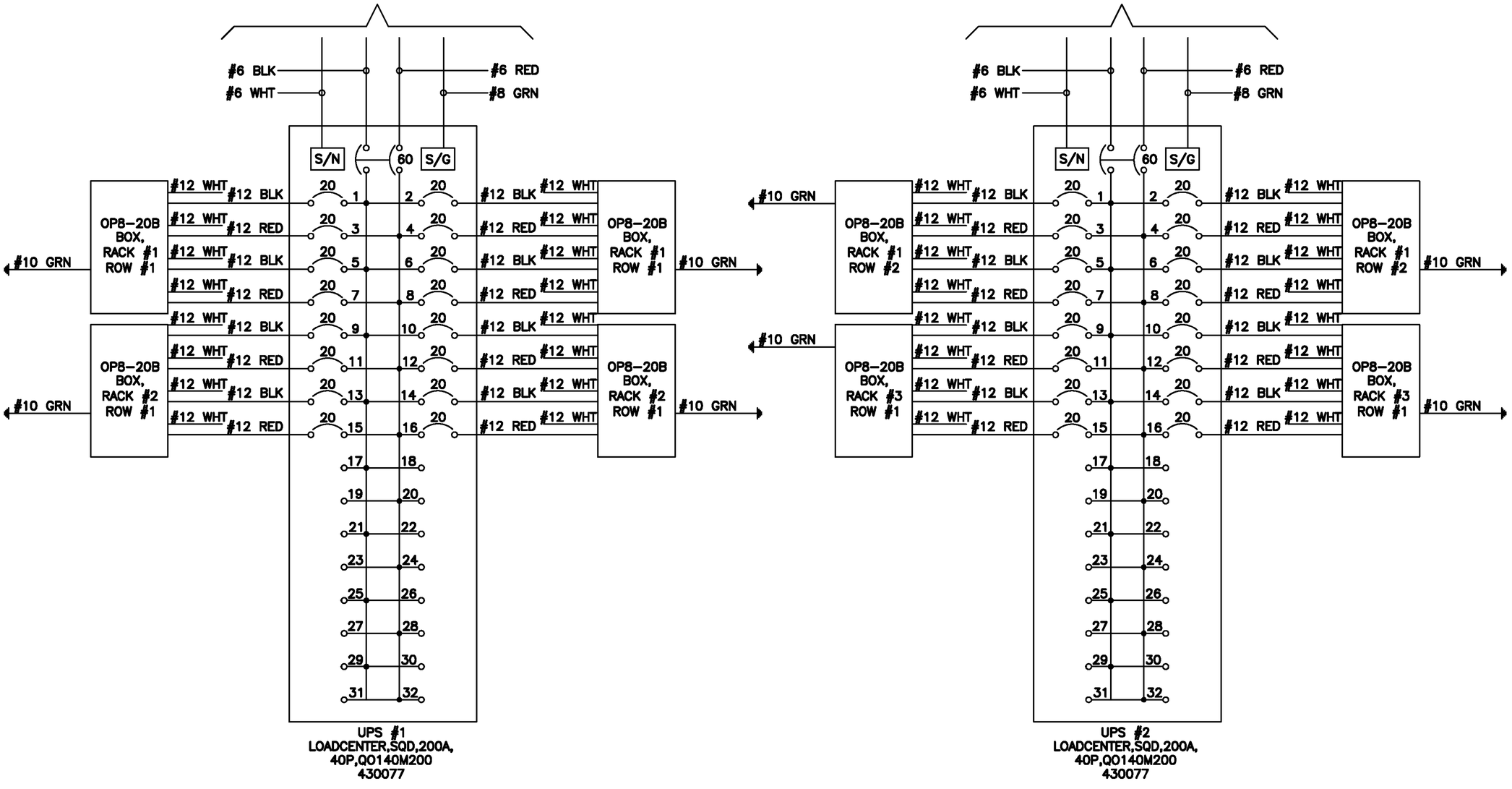
1. SEE SHEET 5-1 FOR UPS PANEL DISTRIBUTION
2. SEE SHEET 5-4 FOR PANELBOARD CALCULATIONS

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
B	GWJ	12/09/09	CONNECTED PWR FAIL RELAY TO X-FER SWCH/REMOVED HEATER	BDB	12/09/09
A	CWW	12/2/09	ADDED UPS DROPS AND 60A BREAKERS	BDB	12/2/09

CUSTOMER: *OHMARCS*

PROJECT: *11'-8" X 20'-0" CONCRETE SHELTER ELECTRICAL SCHEMATIC*

FILENAME: *OHM/SOHM02*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 35/53*	
DRAWING NO.: *SOHM02*	*F*



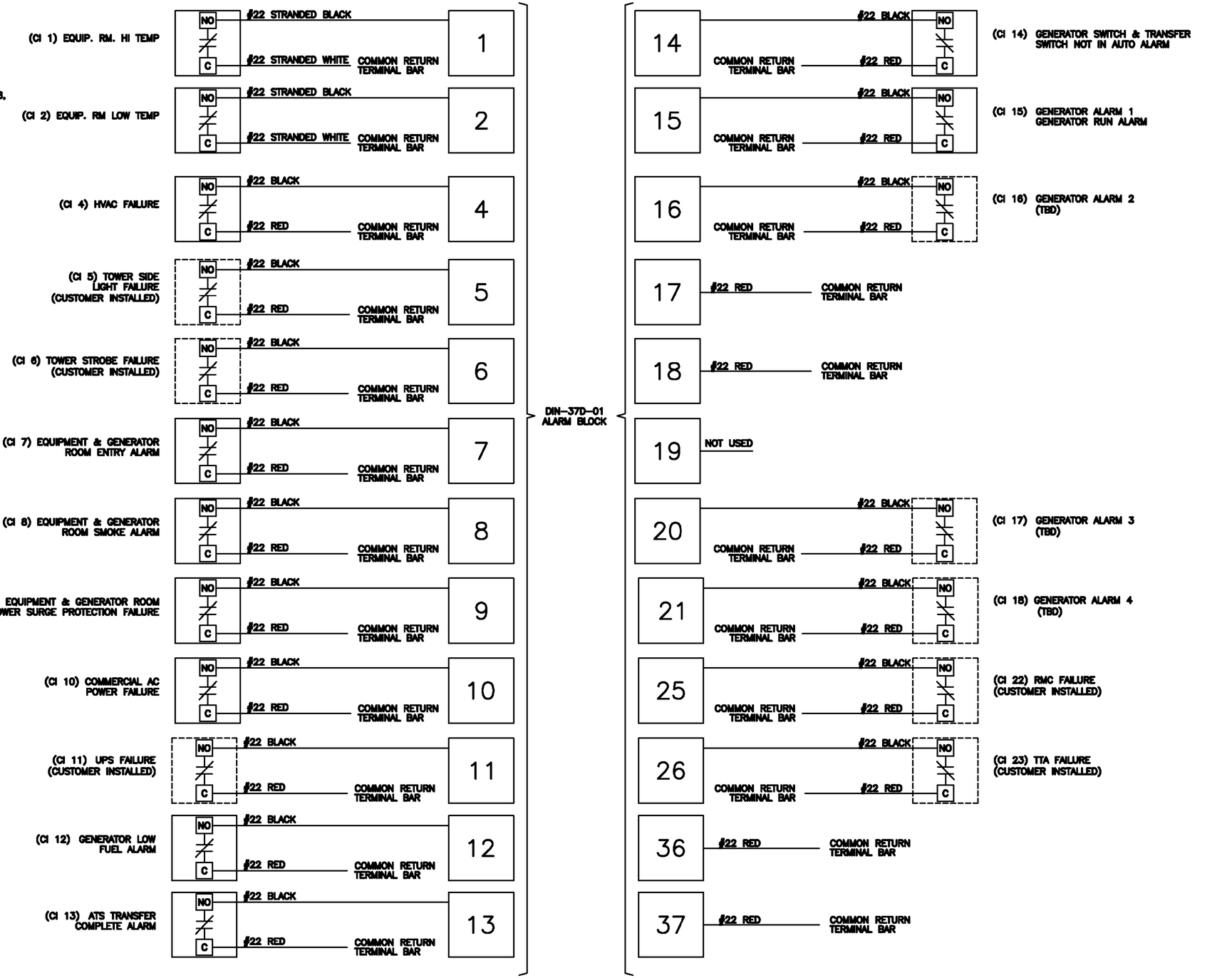
REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	ADDED UPS LOADCENTER WIRING SCHEMATIC; MADE IT 5-1	BDB	1/26/10

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER UPS LOADCENTER WIRING SCHEMATIC

FILENAME: *OHM/SOHM02*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 36/53*	
DRAWING NO.: *SOHM02*	*F*

NOTES:
1. USE AWG WIRE P/N 400011
2. COMMON RETURN TERMINAL BAR TO HAVE MINIMUM OF 18 TERMINALS
3. COMMON RETURN WIRE CAN BE DOUBLED UP ON COMMON RETURN TERMINAL BAR
4. D37 ALARM TERMINALS 3, 22, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34 & 35 TO BE LEFT OPEN AS SPARES.

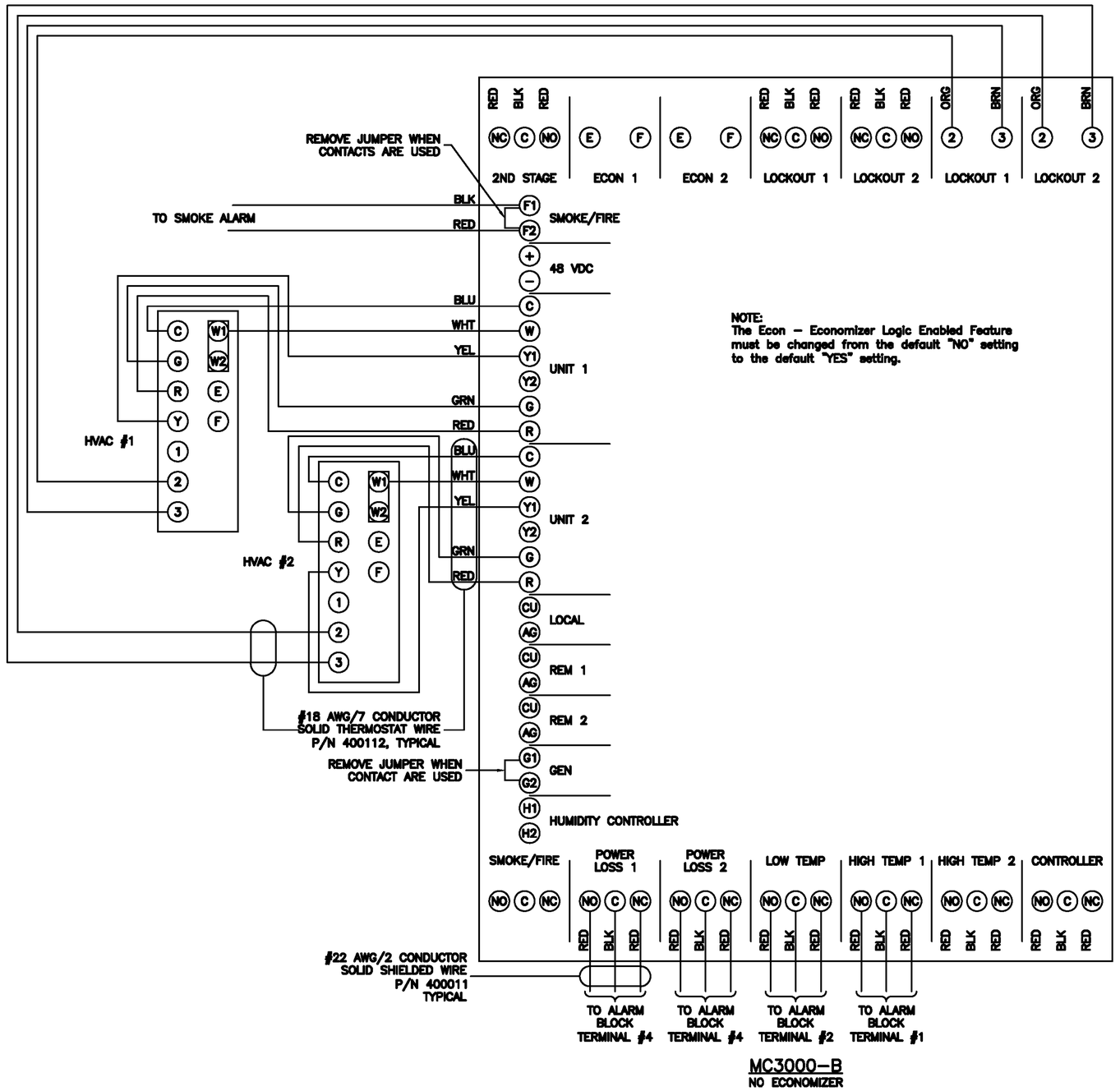


REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	MOVED LOW VOLTAGE SCHEMATIC TO SHEET 5-2	BDB	1/26/10
D	CWW	12/18/09	REPLACED LOW/HIGH TEMP ALARMS	BDB	12/18/09
B	GWJ	12/09/09	REMOVED LOW/HIGH TEMP ALARMS	BDB	12/09/09

CUSTOMER: *OHMARCS*

PROJECT: *11'-8" X 20'-0" CONCRETE SHELTER LOW VOLTAGE SCHEMATIC*

FILENAME: *OHM/SOHM02*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 37/53*	
DRAWING NO.: **SOHM02**	**F**



MC3000–B
NO ECONOMIZER

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	MOVED HVAC WIRING SCHEMATIC TO SHEET 5–3	BDB	1/26/10

CUSTOMER:
OHMARCS

PROJECT:
11'–8" X 20'–0" CONCRETE SHELTER HVAC WIRING SCHEMATIC

FILENAME: OHM/SOHM02	
SCALE: N.T.S.	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO. SHEET 38/53	
DRAWING NO.: SOHM02	F

SINGLE PHASE PANELBOARD CALCULATIONS

PROJECT:					MAIN BREAKER SIZE:	200								DATE:
SOHM02					MAIN FEEDER WIRE SIZE:	3/0								December 1, 2009
					VOLTAGE:	120/240								

CKT #	DESCRIPTION	BREAKER SIZE	WIRE size	WIRE color	"A" CONT	"A" NONC	"B" CONT	"B" NONC	"B" NONC	"B" CONT	"A" NONC	"A" CONT	WIRE color	WIRE size	BREAKER SIZE	DESCRIPTION	CKT #
1	HVAC #1	35 amp	8	BLK	2760	0					0	2760	BLK	8	35 amp	HVAC #2	2
3	"	35 amp	8	RED			2760	0	0	2760			RED	8	35 amp	"	4
5	LIGHTS	20 amp	12	BLK	325	0					0	0	BLK	6	60 amp	SURGE ARRESTOR	6
7	QUAD RECEPTACLES	20 amp	12	RED			1080	0	0	0			RED	6	60 amp	"	8
9	QUAD RECEPTACLES	20 amp	12	BLK	1080	0					0	180	BLK	12	20 amp	DUPLEX RECEPTACLE	10
11	GFCI RECEPTACLES	20 amp	12	RED			180	0	-	-			RED	6	60 amp	UPS #2	12
13	SMOKE DETECTOR	15 amp	12	BLK	10	0					-	-	BLK	6	60 amp	"	14
15	UPS #1	60 amp	6	RED			-	-									16
17	"	60 amp	6	BLK	-	-											18
19																	20
21																	22
23																	24
25																	26
27																	28
29																	30
					4175	0	4020	0	0	2760	0	2940					

PANEL USAGE DATA:	WATTS			
	CONT	NONC.	TOTAL (1.25% cont + nonc)	
A	7115	0	8893.75	CONTROLS
B	6780	0	8475	

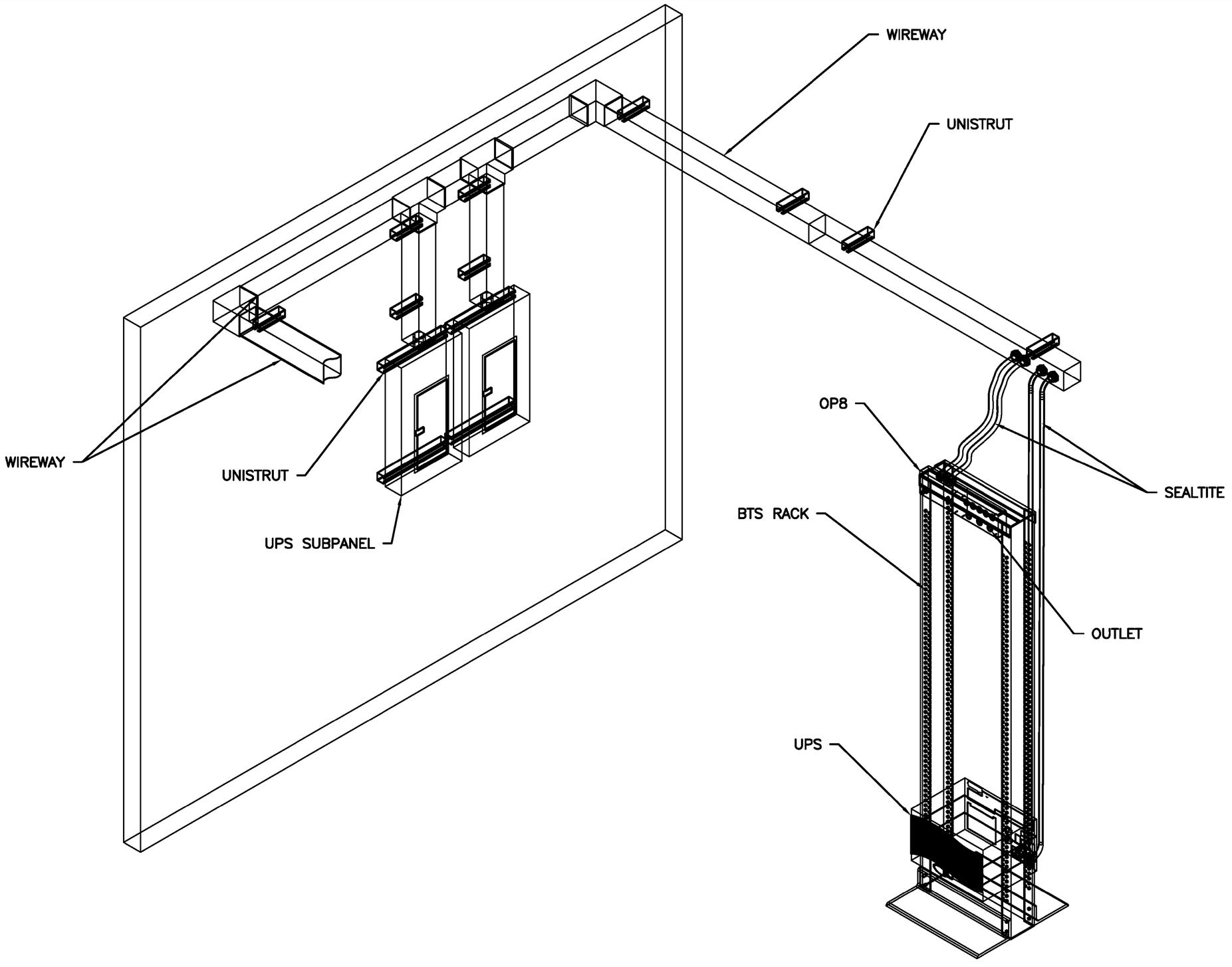
SUMMARY:	WATTS	AMPS			
TOTAL ALLOWED:	24000	200.0	(based on main breaker size)		* ANY CIRCUITS LISTED WITHOUT WATTAGE ARE SHOWN FOR
TOTAL USED:	8894	74.1	(worst case leg from above)		CUSTOMER REFERENCE. ACTUAL PANEL AMPS SHALL NOT
REMAINING AVAILABLE:	15106	125.9	(for additional equipment*)	OK	EXCEED THE CAPACITY OF THE MAIN BREAKER.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	MOVED PANELBOARD CALCULATIONS TO SHEET 5-4	BDB	1/26/10
B	GWJ	12/09/09	UPDATED PANELBOARD CALCULATIONS	BDB	12/09/09
A	CWW	12/2/09	ADDED SHEET 5-3	BDB	12/2/09

CUSTOMER: OHMARCS

PROJECT: 11'-8" X 20'-0" CONCRETE SHELTER PANELBOARD CALCULATIONS

FILENAME: OHM/SOHM02	
SCALE: N.T.S.	TOLERANCE:
DRWN. BY: C. WADE	DATE: 11/30/09
CHK. BY: D. BROYLES	DATE: 11/30/09
ENG. BY:	DATE:
APP. BY: S. LEGGETT	DATE: 11/30/09
SHEET NO. SHEET 39/53	
DRAWING NO.: SOHM02	F

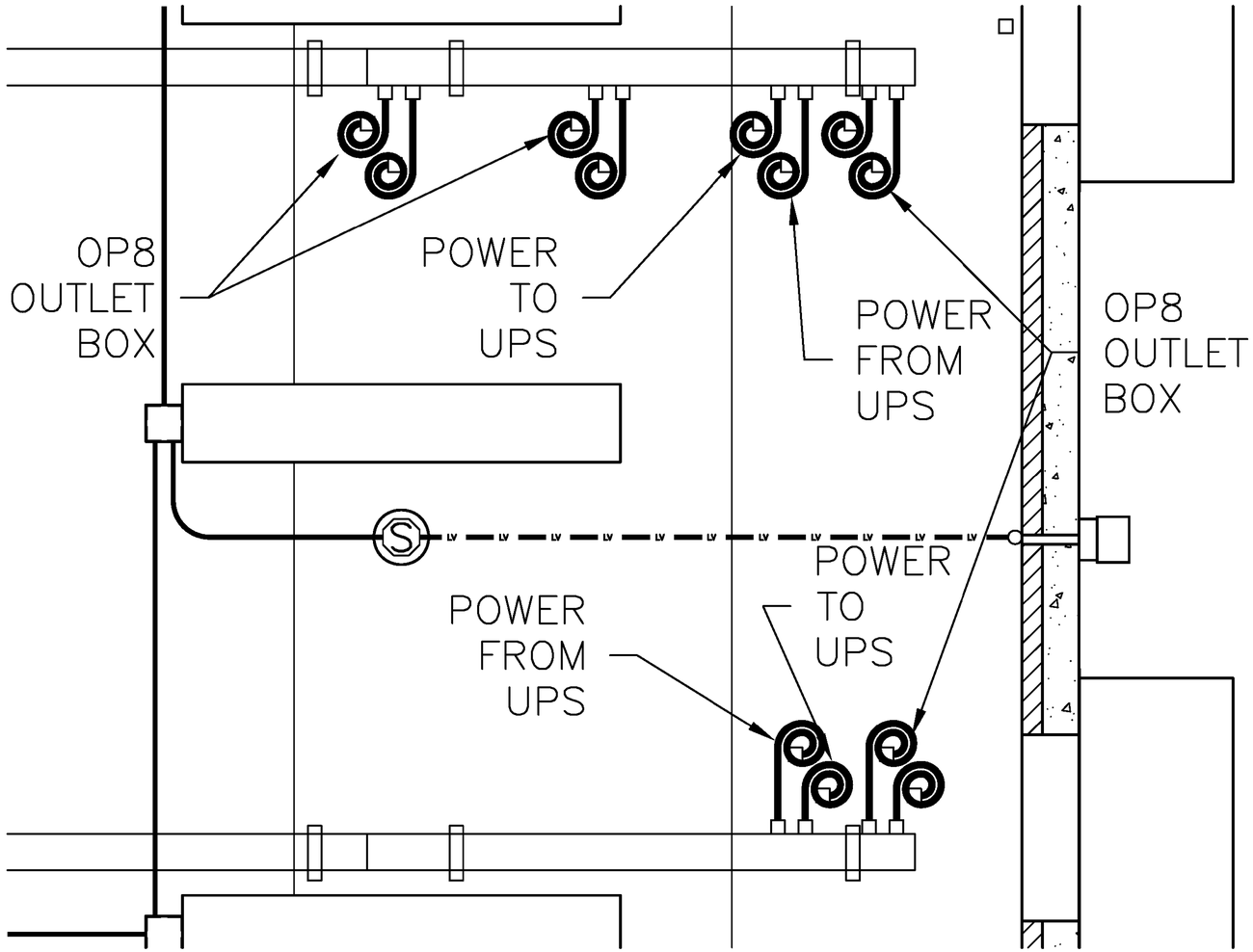


REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	ADDED SHEET 5-5	BDB	1/26/10

CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0"
CONCRETE SHELTER
UPS
ISOMETRIC VIEW

FILENAME: *OHM/SOHM02*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 40/53*	
DRAWING NO.: ***SOHM02***	***F***



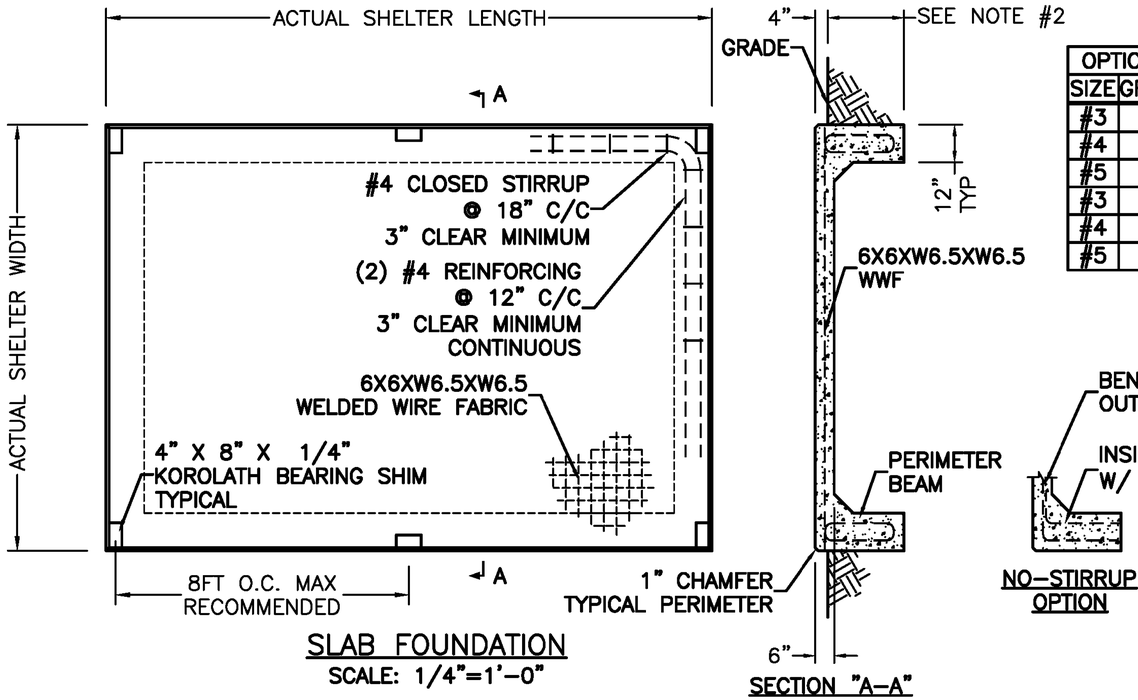
CUSTOMER:
OHMARCS

PROJECT:
11'-8" X 20'-0" CONCRETE SHELTER UPS DROP DETAIL

FILENAME: *OHM/SOHM02*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *C. WADE*	DATE: *11/30/09*
CHK. BY: *D. BROYLES*	DATE: *11/30/09*
ENG. BY:	DATE:
APP. BY: *S. LEGGETT*	DATE: *11/30/09*
SHEET NO. *SHEET 41/53*	
DRAWING NO.: *SOHM02*	*F*

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
E	CWW	1/26/10	ADD SHEET FOR UPS DROP DETAIL	BDB	1/26/10

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
I	PN	09/23/09	REVISED KOROLATH BEARING SHIM DESCRIPTIN	PN	09/23/09
H	DJC	08/17/09	ADD LOCK WASHER TO CON. DETAILS, CHG'D P/N ON PLATE	GAB	08/17/09
G	LD	5/9/07	UPDATED FLOOR TO STANDARD (HIGH SEISMIC)	VGH	5/9/07
F	LD	12/21/06	CHANGED ANCHOR DESCRIPTION	VGH	12/21/06



SLAB FOUNDATION
SCALE: 1/4"=1'-0"

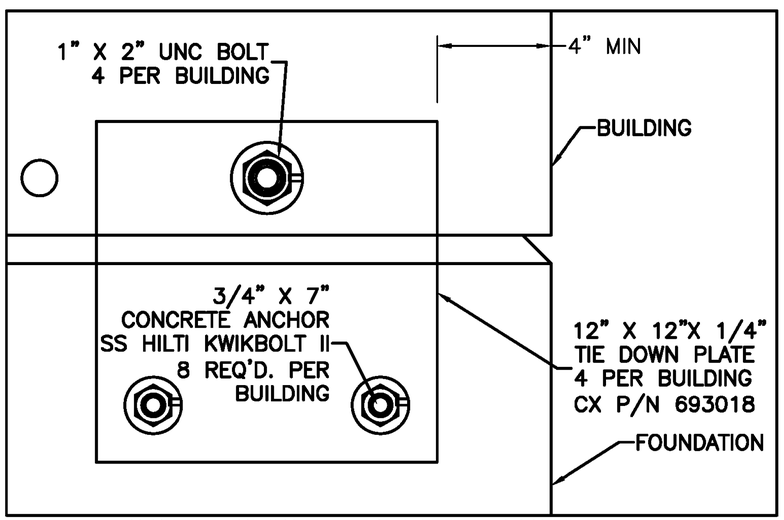
SECTION "A-A"

NO-STIRRUP OPTION

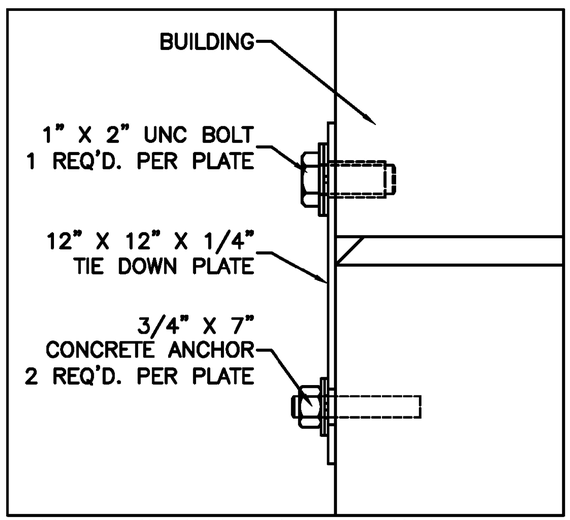
OPTIONAL REINFORCING BAR		
SIZE	GRADE	LAT/LONG SPACING
#3	40	9" C/C
#4	40	16" C/C
#5	40	18" C/C
#3	60	10" C/C
#4	60	18" C/C
#5	60	18" C/C

NOTES:

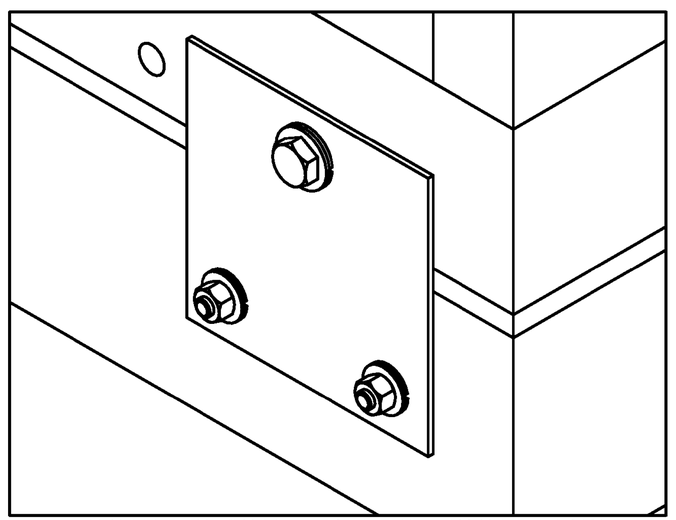
1. WELDED WIRE FABRIC OR OPTIONAL REINFORCING BAR MAY BE USED AS AVAILABLE. SEE CHART FOR SIZE, GRADE, AND SPACING OF REBAR.
2. BOTTOM OF FOOTING TO BE 24" MINIMUM, OR 6" BELOW LOCAL FROST LINE, OR TO 2000 PSF SOIL BEARING CAPACITY, WHICHEVER IS GREATER.
3. USE OF THIS DESIGN REQUIRES VERIFICATION OF SOIL BEARING CAPACITY.
4. SLAB TOLERANCE IS ±1/4"
5. SLOPE GRADE AWAY FROM FOUNDATION.
6. W6.5 AS SPECIFIED FOR THE WWF HAS 0.288" DIAMETER.
7. WWF IS 60 KSI MINIMUM.
8. OVERLAP SPLICES ARE ALLOWED FOR REINFORCING BAR, USE 18" MINIMUM LAP.
9. ALL REQUIRED TIE DOWN PLATES, SHIMS, BOLTS AND ANCHORS SHALL BE PLACED INSIDE SHELTER PRIOR TO SHIPMENT FROM MANUFACTURER
10. CONCRETE STRENGTH, Fc' = 3000 PSI @ 28 DAYS.
11. USE SHIMS AS REQUIRED TO ASSURE SHELTER IS BEARING AT PERIMETER. SEAL PERIMETER W/ CAULK OR GROUT AS DESIRED.
12. REBAR TO BE GROUNDED W/ SOLID COPPER WIRE, #4 MIN. ONE LOCATION MIN, DEFAULT TO BE AT ELECTRICAL SERVICE ENTRY LOCATION. QTY, SIZE, & LOCATION(S) MAY VARY AS SPECIFIED BY CUSTOMER. PIGTAIL(S) TO BE MADE ACCESSIBLE FOR BONDING TO SERVICE GROUND.



CONNECTION DETAIL FRONT
SCALE: 3/16 = 1"



CONNECTION DETAIL SIDE
SCALE: 3/16 = 1"



CONNECTION DETAIL ISOMETRIC
SCALE: 1/8" = 1"

CUSTOMER:

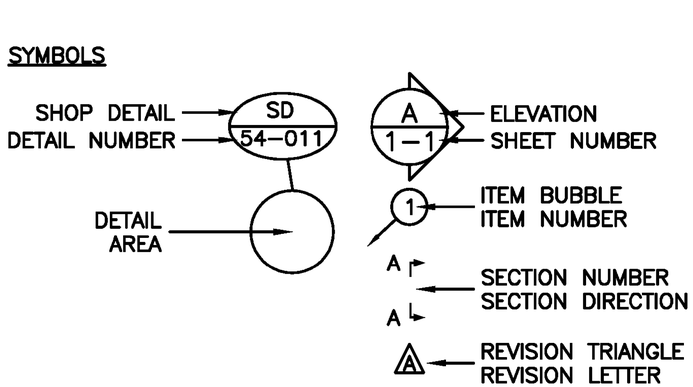
PROJECT:
6" SLAB FOUNDATION PLAN (FLAT TIEDOWN)

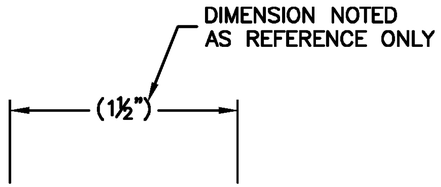
FILENAME: *108-001-D*	
SCALE: *NOTED*	TOLERANCE: *±1/4"*
DRWN. BY: *C.CASINGER*	DATE: *9/26/03*
CHK. BY: *V. HASSELL*	DATE: *9/26/03*
ENG. BY: *K. BARNETT*	DATE: *9/26/03*
APP. BY: *J. HOOD*	DATE: *9/26/03*
SHEET NO. *SHEET 42/53*	
DRAWING NO.: *108-001*	*I*

ABBREVIATIONS

@	AT
A	AMPS
AFF	ABOVE FINISH FLOOR
BCW	BARE COPPER WIRE
BLK	BLACK
BLU	BLUE
BRN	BROWN
BLDG	BUILDING
BOCA	BUILDING OFFICIALS CODE ADMINISTRATION
℄	CENTERLINE
C/C	CENTER TO CENTER
CKT	CIRCUIT
CONC	CONCRETE
CU YD	CUBIC YARD
DIA/Ø	DIAMETER
DIM	DIMENSION
DP	DOUBLE POLE
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DT	DOUBLE THROW
DWG	DRAWING
EA	EACH
EGR	EQUIPMENT GROUND RING
ELEC	ELECTRIC/ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ENT	ELECTRICAL NONMETALLIC TUBING
ELEV	ELEVATION
EQUIP	EQUIPMENT
EXT	EXTERIOR
FMLC	FLEXIBLE METALLIC LIQUID TIGHT CONDUIT
FNLC	FLEXIBLE NONMETALLIC LIQUID TIGHT CONDUIT
FND	FOUNDATION
FRP	FIBERGLASS REINFORCED POLYESTER
FS	FIRE SUPPRESSION
GALV	GALVANIZED
GEN	GENERATOR
GRN	GREEN
GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
HOR	HORIZONTAL
IAW	IN ACCORDANCE WITH
IN	INCH
ID	INSIDE DIAMETER/INSIDE DIMENSION
INSUL	INSULATION
INT	INTERIOR
IMC	INTERNATIONAL MECHANICAL CODE
IPC	INTERNATIONAL PLUMBING CODE
IG	ISOLATED GROUND
JB	JUNCTION BOX
KW	KILOWATT
KO	KNOCKOUT
L	LEFT
L/N	LOAD NEUTRAL
LH	LEFT HAND
LTG	LIGHT/LIGHTNING
LL	LIVE LOAD
LV	LOW VOLTAGE
MFG	MANUFACTURER
MISC	MISCELLANEOUS
NEC	NATIONAL ELECTRIC CODE
NEG	NEGATIVE
NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
NOM	NOMINAL
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
NTS	NOT TO SCALE
OR	ORANGE
OD	OUTSIDE DIAMETER/OUTSIDE DIMENSION
OSB	ORIENTED STRAND BOARD
P	POLE
PDC	POWER DISTRIBUTION CABINET
POS	POSITIVE
LB	POUND (S)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
RECPT	RECEPTACLE
RECT	RECTIFIER
REBAR	REINFORCING STEEL BAR
REQ'D.	REQUIRED
REV	REVISION
R	RIGHT
RH	RIGHT HAND
SHT	SHEET
1Ø	SINGLE PHASE
S/G	SERVICE GROUND
S/N	SERVICE NEUTRAL
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SW	SINGLE POLE SWITCH
SQ FT	SQUARE FEET
SQ IN	SQUARE INCH
STD	STANDARD
SBC	STANDARD BUILDING CODE
SW	SWITCH
TEMP	TEMPERATURE
TSTAT	THERMOSTAT
3Ø	THREE PHASE
3P	THREE POLE
3W	THREE WIRE
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES INC.
UBC	UNIFORM BUILDING CODE
UMC	UNIFORM MECHANICAL CODE
VENT	VENTILATION
V	VOLT
W	WATTS
WP	WEATHER PROOF
WLD	WELDED
WWF	WELDED WIRE FABRIC
WHT	WHITE
W/	WITH
W/O	WITHOUT
YEL	YELLOW

SYMBOLS





REV	BY	DATE	DESCRIPTION	APP.BY	DATE
D	LJL	6/1/09	ADDED ABBREVISTION: AFF	LJL	6/1/09
C	ACM	8/15/08	ADDED ABBREVISTIONS: S/N, S/G, & L/N	VGH	8/15/08
B	VGH	06/02/08	ADDED REFERENCE DIMENSION	VGH	06/02/08
A	CC	7/27/04	REVISED DETAIL SYMBOL	VGH	7/27/04

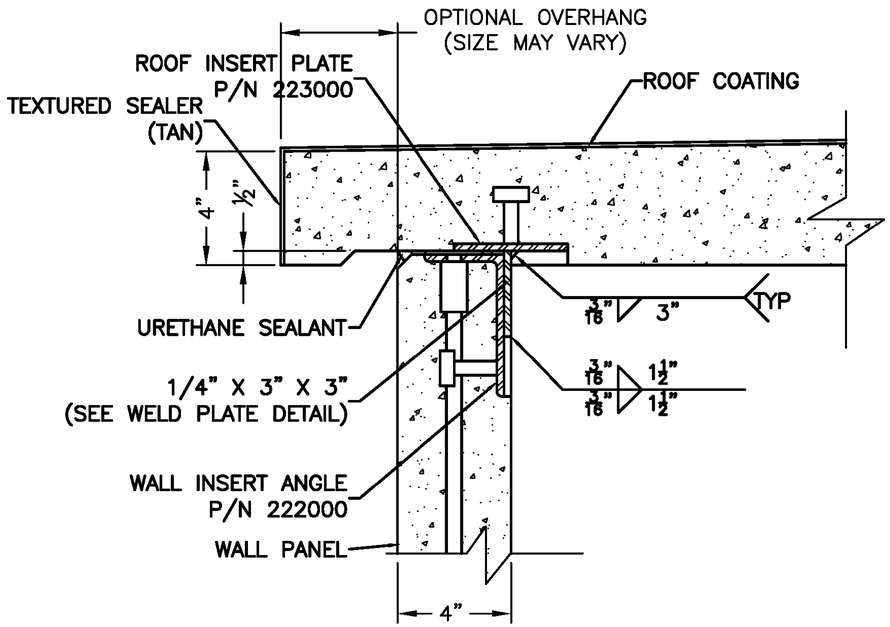
CUSTOMER:
ENGINEERING STANDARD

PROJECT:
ABBREVIATIONS AND SYMBOLS

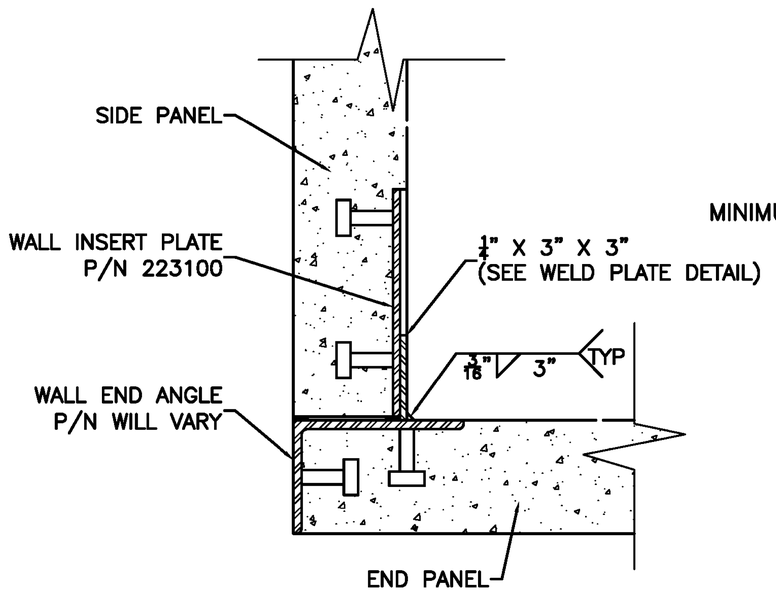
FILENAME: *108-007*	
SCALE: *1"=1"*	TOLERANCE: *NA*
DRWN. BY: *C.CASINGER*	DATE: *12/4/03*
CHK. BY: *K.BARNETT*	DATE: *12/4/03*
ENG. BY: *K.BARNETT*	DATE: *12/4/03*
APP. BY:	DATE:

SHEET NO.
SHEET 43/53

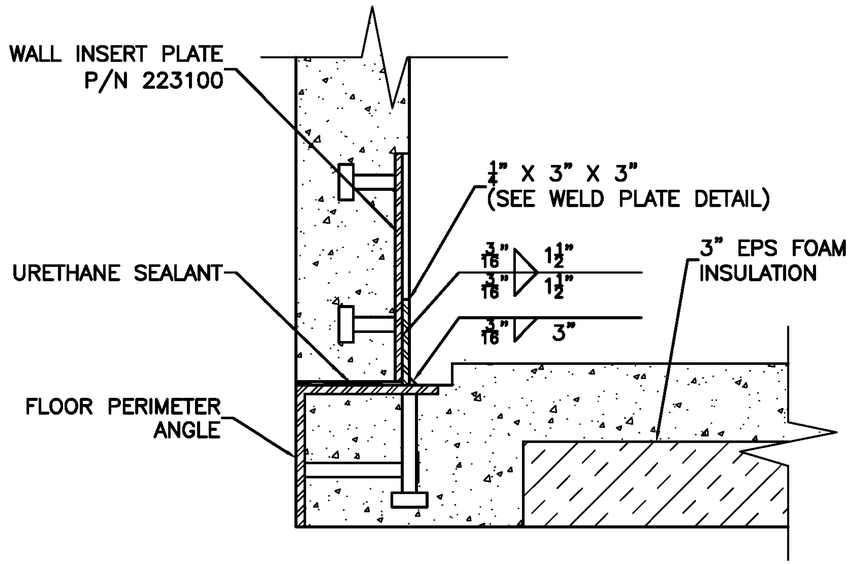
DRAWING NO.: *108-007* *D*



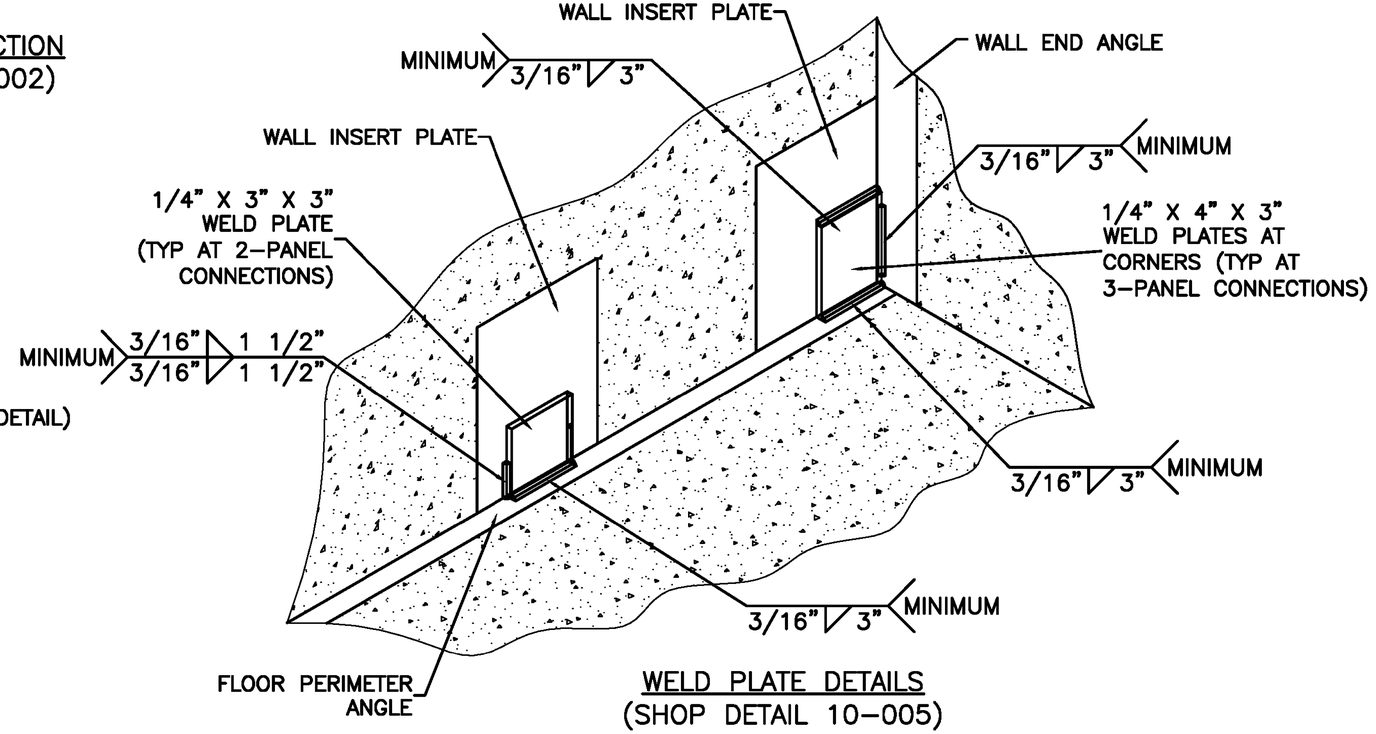
WALL/ROOF CONNECTION
(SHOP DETAIL 10–002)



WALL/WALL CONNECTION
(SHOP DETAIL 10–003)



WALL/FLOOR CONNECTION
(SHOP DETAIL 10–004)



WELD PLATE DETAILS
(SHOP DETAIL 10–005)

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
B	CC	8/5/05	CHG WELD PLATE DETAIL AT 3–PANEL CONNECTIONS	KB	8/5/05
A	CC	7/27/04	REMOVED PART REF.	KB	7/27/04

CUSTOMER:
ENGINEERING STANDARD

PROJECT:
CONCRETE SHELTER PANEL CONNECTION DETAILS

FILENAME: *108–008*	
SCALE: *3/16"=1"*	TOLERANCE:
DRWN. BY: *C.CASINGER*	DATE: *4/5/04*
CHK. BY: *V. HASSELL*	DATE: *4/5/04*
ENG. BY: *K. BARNETT*	DATE: *4/5/04*
APP. BY: *J. HOOD*	DATE: *4/5/04*
SHEET NO. *SHEET 44/53*	
DRAWING NO.: *108–008*	*B*

NOTES:

1. CONDUCTOR COLORS ARE AS FOLLOWING:
   120/240 SINGLE PHASE
   PHASE "A" = BLACK
   PHASE "B" = RED
   NEUTRAL = WHITE
   120/208 THREE PHASE
   PHASE "A" = BLACK
   PHASE "B" = RED
   PHASE "C" = BLUE
   NEUTRAL = WHITE
   277/480 THREE PHASE
   PHASE "A" = YELLOW
   PHASE "B" = BROWN
   PHASE "C" = ORANGE
   NEUTRAL = GRAY

   ALL ELECTRICAL GROUND = GREEN
   ALL ISOLATED GROUND = GREEN/YELLOW STRIPE
   ALL SWITCHED = PURPLE

2. ALL CONDUCTORS (UNLESS OTHERWISE NOTED) TO BE STRANDED THHN OR THWN COPPER WIRE.
3. ALL CONDUIT TO BE 1/2" EMT UNLESS OTHERWISE NOTED.
4. ALL LOW VOLTAGE CONDUIT TO BE ½" EMT UNLESS NOTED.
5. ALL CONDUCTOR AMPACITIES ARE BASED ON TABLE 310–16 NATIONAL ELECTRICAL CODE.
6. CONDUIT FILL BASED ON CHAPTER 9 – NATIONAL ELECTRICAL CODE.
7. PLACEMENT OF ELECTRICAL AND CONDUIT COMPONENTS OR BOXES MAY VARY TO ALIGN WITH COMPONENTS MANUFACTURE'S PRE–MADE BOX KNOCKOUTS. THIS MAY INCLUDE ALIGNMENT WITH SHELTER PENETRATIONS AND/OR INTERFERENCE WITH OTHER COMPONENTS.
8. CONDUIT, ELECTRICAL AND MECHANICAL DIMENSION TOLERANCE SHALL BE ±1/4".
9. DASHED LINES (-----) DENOTE FIELD WORK.
10. ALL CIRCUITS ON 25 AMP THROUGH 60 AMP BREAKER MUST USE #10 GROUND CONDUCTOR.
11. CONDUCTORS SMALLER THAN 4 AWG MUST HAVE CORRECT COLOR INSULATION. CONDUCTORS 4 AWG AND LARGER MAY BE RE–IDENTIFIED BY COLORED TAPE. BLACK INSULATED CONDUCTOR SHALL BE THE ONLY COLOR TO BE RE–IDENTIFIED. IF CONDUCTORS ARE RE–IDENTIFIED, IDENTIFICATION MUST BE APPLIED IN THREE INCH (3") WRAPS, MINIMUM EVERY THREE FEET (3'–0"). RE–IDENTIFICATION SHALL BE VISIBLE BY OPENING ANY ENCLOSURE. WHITE, GRAY AND GREEN CONDUCTORS SHALL NOT BE RE–IDENTIFIED.
12. ALL METALLIC ELECTRICAL BOXES (SWITCH BOXES, DUPLEX BOXES, LIGHTS, JUNCTION BOXES, ETC) SHALL BE CONNECTED TO THE PROTECTED GROUND OF THE ACG DISTRIBUTION PANEL WITH A #12 GREEN INSULATED STRANDED CONDUCTOR WHICH SHALL BE RUN INTERNAL TO THE CONDUIT.

LEGEND

= CONDUIT (THICKNESS VARIES WITH SIZE OF CONDUIT)

= GROUND WIRE

= 4 X 4 BOX WITH QUAD RECEPTACLE

= 4 X 4 BOX WITH DUPLEX RECEPTACLE

= 4 X 4 BOX WITH PENETRATION

= 4 X 4 BOX BLANK

= 4 X 4 BOX WITH 2 SWITCHES

= 4 X 4 BOX WITH SINGLE SWITCH

= 4" OCTAGON BOX WITH SMOKE DETECTOR

= 4" OCTAGON BOX WITH HEAT DETECTOR

= 4 X 4 BOX WITH TWIST–LOCK RECEPTACLE

= 4 X 4 BOX WITH TIMER SWITCH

= 4 X 4 BOX WITH HYDROGEN DETECTOR

= PHOTOCELL SWITCH

= SYSTEM GROUND FOR AC CIRCUITS

= ISOLATED GROUND FOR AC CIRCUITS

= VENT FAN

= MOTORIZED DAMPER

= MOTION DETECTOR

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
G	PN	07/16/09	REVISED NOTE 7 & 10	LD	07/16/09
F	VGH	07/18/07	REVISED NOTE 7 & 8	VGH	07/18/07
E	LCS	6/16/06	ADDED MOTION DETECTOR SYMBOL	VGH	6/16/06
D	VGH	01/18/05	REVISED NOTE 10, REMOVED THE WORD "CONDUCTOR"	VGH	01/18/05
C	CC	8/15/05	ADDED SYMBOLS	VGH	8/15/05
B	VGH	4/5/05	REVISED NOTE #10	VGH	4/5/05
A	CC	2/25/05	ADDED SYMBOLS CHG CONDUIT TO 1/2" IN NOTE 3	KB	2/25/05

CUSTOMER:
ENGINEERING STANDARD

PROJECT:
GENERAL ELECTRICAL NOTES AND LEGEND

FILENAME: 108–015	
SCALE: 1"=1"	TOLERANCE:
DRWN. BY: C.CASINGER	DATE: 7/28/04
CHK. BY:	DATE:
ENG. BY: K. BARNETT	DATE: 7/28/04
APP. BY:	DATE:

SHEET NO.
SHEET 45/53

DRAWING NO.: 108–015 G

GENERAL NOTES

1. ALL STEEL FABRICATION AND INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL AISC LRFD(1999) AND AWS D1.1 SPECIFICATIONS.
2. ALL WELDING SHALL BE MIG TYPE WITH THE FOLLOWING OPERATING SETTINGS:

WIRE SIZE	0.35
WIRE FEED SPEED (in/min)	5
VOLTAGE, DC (+)	18.5
AMPERAGE, DC	140
TRAVEL SPEED (in/min)	10–12
SHIELDING GAS	75/25

3. STRUCTURAL STEEL SPECIFICATIONS:
   STRUCTURAL SHAPES ASTM A36M–97a
   HIGH STRENGTH BOLTS, ASTM A 307–97
   OTHER BOLTS, SAE J429 GRADE 5
4. ALL CONCRETE WORK SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE A.C.I. 318–99 BUILDING CODES 311 & 211, AND ASTM STANDARDS C–172–97, C–31/31M96, C–39–96, AND PROVISIONS OF C–94–98.
5. ALL PRECAST STRUCTURAL SAND–LIGHTWEIGHT CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
6. ALL REINFORCING STEEL BARS SHALL BE DOMESTIC, NEW BILLET STEEL CONFORMING TO ASTM A–615m–96a SPECIFICATIONS.
7. CONCRETE COVERAGE OVER ALL REINFORCING STEEL SHALL BE A MINIMUM OF 3/4".
8. ALL REBAR SHALL BE TIED 100% AT THE PERIMETER, AND 50% ELSEWHERE.
9. ALL REBAR WIRE TIES TO BE 16 GAUGE.
10. FIBROUS REINFORCED LIGHTWEIGHT CONCRETE MAY BE USED IN THE ROOF AND FLOOR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS. FIBER REINFORCEMENT MAY BE USED IN THE FLOOR IF DESIRED IN ORDER TO MAKE BATCHING OPERATION MORE EFFICIENT.
11. MAXIMUM JOINT SPACE BETWEEN PANELS SHALL BE 3/8" MEASURED BY REFUSAL OF ABILITY TO PASS A 3/8" ROD ALL THE WAY THROUGH THE JOINT AT ANY POINT ALONG THE JOINT.
12. WELD PLATE CONNECTIONS SHALL BE SPACED AT 4'–8" MAXIMUM ON THE FLOOR AND ROOF PANELS. THIS DIMENSION SHALL BE MAINTAINED EXCEPT IN CASES WHERE OPENINGS PROHIBIT.
13. TOLERANCES SHALL BE AS FOLLOWS:
    PANEL THICKNESS: ±1/8"
    PANEL SIZE: ±1/16"
    PANEL SQUARENESS: ±1/8" AGREEMENT ON DIAGONALS
    LOCATION OF BLOCKOUTS & PVC'S: ±1/4"
    BLOCKOUT DIMENSIONS: +1/4", –0"
    PVC SIZE: USE TRADE SIZE AS LISTED ON PROJECT DRAWINGS
14. REBAR SPLICING IS ALLOWED WHERE SPACE PERMITS. MINIMUM LAP IS 18" FOR #4 REBAR AND 30" FOR #6 REBAR.
15. CONCRETE SHALL HAVE AIR ENTRAINMENT OF 6%, MODERATE EXPOSURE AND A MAXIMUM AGGREGATE SIZE OF 3/8 INCH.
16. CONCRETE SHALL HAVE A WATER–CEMENTITIOUS MATERIAL RATIO OF 0.50.

GENERAL:	THESE REBAR SIZES AND SPACING REPRESENT THE MINIMUM AMOUNT FOR ALL CASTING PLANS. PROJECT DRAWINGS MAY REQUIRE REINFORCEMENT IN ADDITION TO CELLXION STANDARDS.
ROOF PANEL:	#4 (SHORT AXIS) 12" O.C. ON SHELTER WIDTH OF 11'–6" AND LESS, 10" O.C. ON SHELTER WIDTH GREATER THAN 11'–6" AND #4 (LONG AXIS) AT 18" O.C.
WALL PANEL:	#4 AT PERIMETER AND 4 X 4 X W4.5 X W4.5 MESH THROUGHOUT.
FLOOR:	(2)–#6 (SHORT AXIS) EACH RIB, #6 (LONG AXIS) EACH INTERIOR RIB. DECK: 4 X 4 X W4.5 X W4.5 MESH.

SEALANT APPLICATION

STEP 1. AT MATING SURFACES BETWEEN PANELS, APPLY URETHANE SEALANT ($\frac{1}{2}$" BEAD) DURING ASSEMBLY.

STEP 2. URETHANE SEALANT REQUIRED ON ALL JOINTS. APPLY TO EXTERIOR AFTER PANEL ASSEMBLY.

STEP 3. ROOF COATING:
APPLY SHELTER ROOF COATING PER MANUFACTURER INSTRUCTION.
ROOF COATING TO CONFORM TO, ASTM D6083–97A, OBC 1507.15.2 & 2000 IBC 1507.15.2.

STEP 4. APPLY AGGREGATE SEALER TO EXTERIOR WALLS. USE 1 GALLON PER 200 SQ. FEET.

STEP 5. USE TEXTURED SEALER ON ALL SMOOTH EXPOSED SURFACES. USE CEMENTITOUS GRAY PAINT.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
L	DJC	08/21/09	REVISED INFORMATION IN STEP 3	VGH	08/21/09
K	DJC	08/20/09	REVISED STEP 3 OF SEALANT APPLICATION	VGH	08/20/09
J	WGG	11/28/28	REVISED GENERAL NOTES PER J. IRVING MARK–UPS	VGH	11/28/07

CUSTOMER: *ENGINEERING STANDARD*

PROJECT: *GENERAL CASTING SPECIFICATIONS 2000 IBC*

FILENAME: *108–016*

SCALE:	TOLERANCE:
1"=1"	
DRWN. BY: *C.CASINGER*	DATE: *7/28/04*
CHK. BY:	DATE:
ENG. BY:	DATE:
APP. BY:	DATE:

SHEET NO. *SHEET 46/53*

DRAWING NO.: *108–016* *L*

GENERAL NOTES

1. ALL STEEL FABRICATION AND INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL AISC LRFD(1999) AND AWS D1.1 SPECIFICATIONS.
2. ALL WELDING SHALL BE MIG TYPE WITH THE FOLLOWING OPERATING SETTINGS:

WIRE SIZE	0.35
WIRE FEED SPEED (in/min)	5
VOLTAGE, DC (+)	18.5
AMPERAGE, DC	140
TRAVEL SPEED (in/min)	10–12
SHIELDING GAS	75/25

3. STRUCTURAL STEEL SPECIFICATIONS:
   STRUCTURAL SHAPES ASTM A36/A 36M–00
   HIGH STRENGTH BOLTS, ASTM A 307–00
   OTHER BOLTS, SAE J429 GRADE 5
4. ALL CONCRETE WORK SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE A.C.I. 318–02 BUILDING CODES 311 & 211, AND ASTM STANDARDS C–172–99, C–31/C31M98, C–39–99ae1, AND PROVISIONS OF C–94/C94M–00.
5. ALL PRECAST STRUCTURAL SAND–LIGHTWEIGHT CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
6. ALL REINFORCING STEEL BARS SHALL BE DOMESTIC, NEW BILLET STEEL CONFORMING TO ASTM A 615M–00 SPECIFICATIONS.
7. CONCRETE COVERAGE OVER ALL REINFORCING STEEL SHALL BE A MINIMUM OF 3/4".
8. ALL REBAR SHALL BE TIED 100% AT THE PERIMETER, AND 50% ELSEWHERE.
9. ALL REBAR WIRE TIES TO BE 16 GAUGE.
10. FIBROUS REINFORCED LIGHTWEIGHT CONCRETE MAY BE USED IN THE ROOF AND FLOOR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS. FIBER REINFORCEMENT MAY BE USED IN THE FLOOR IF DESIRED IN ORDER TO MAKE BATCHING OPERATION MORE EFFICIENT.
11. MAXIMUM JOINT SPACE BETWEEN PANELS SHALL BE 3/8" MEASURED BY REFUSAL OF ABILITY TO PASS A 3/8" ROD ALL THE WAY THROUGH THE JOINT AT ANY POINT ALONG THE JOINT.
12. WELD PLATE CONNECTIONS SHALL BE SPACED AT 4'–8" MAXIMUM ON THE FLOOR AND ROOF PANELS. THIS DIMENSION SHALL BE MAINTAINED EXCEPT IN CASES WHERE OPENINGS PROHIBIT.
13. TOLERANCES SHALL BE AS FOLLOWS:
    PANEL THICKNESS: ±1/8"
    PANEL SIZE: ±1/16"
    PANEL SQUARENESS: ±1/8" AGREEMENT ON DIAGONALS
    LOCATION OF BLOCKOUTS & PVC'S: ±1/4"
    BLOCKOUT DIMENSIONS: +1/4", –0"
    PVC SIZE: USE TRADE SIZE AS LISTED ON PROJECT DRAWINGS
14. REBAR SPLICING IS ALLOWED WHERE SPACE PERMITS. MINIMUM LAP IS 18" FOR #4 REBAR AND 30" FOR #6 REBAR.
15. CONCRETE SHALL HAVE AIR ENTRAINMENT OF 6%, MODERATE EXPOSURE AND A MAXIMUM AGGREGATE SIZE OF 3/8 INCH.
16. CONCRETE SHALL HAVE A WATER–CEMENTITIOUS MATERIAL RATIO OF 0.50.

GENERAL:	THESE REBAR SIZES AND SPACING REPRESENT THE MINIMUM AMOUNT FOR ALL CASTING PLANS. PROJECT DRAWINGS MAY REQUIRE REINFORCEMENT IN ADDITION TO CELLXION STANDARDS.
ROOF PANEL:	#4 (SHORT AXIS) 12" O.C. ON SHELTER WIDTH OF 11'–6" AND LESS, 10" O.C. ON SHELTER WIDTH GREATER THAN 11'–6" AND #4 (LONG AXIS) AT 18" O.C.
WALL PANEL:	#4 AT PERIMETER AND 4 X 4 X W4.5 X W4.5 MESH THROUGHOUT.
FLOOR:	(2)–#6 (SHORT AXIS) EACH RIB, #6 (LONG AXIS) EACH INTERIOR RIB. DECK: 4 X 4 X W4.5 X W4.5 MESH.

SEALANT APPLICATION

STEP 1. AT MATING SURFACES BETWEEN PANELS, APPLY URETHANE SEALANT ($\frac{1}{2}$" BEAD) DURING ASSEMBLY.

STEP 2. URETHANE SEALANT REQUIRED ON ALL JOINTS. APPLY TO EXTERIOR AFTER PANEL ASSEMBLY.

STEP 3. ROOF COATING:
APPLY SHELTER ROOF COATING PER MANUFACTURER INSTRUCTION.
ROOF COATING TO CONFORM TO, ASTM D6083–97A, OBC 1507.15.2 & 2003 IBC 1507.15.2.

STEP 4. APPLY AGGREGATE SEALER TO EXTERIOR WALLS. USE 1 GALLON PER 200 SQ. FEET.

STEP 5. USE TEXTURED SEALER ON ALL SMOOTH EXPOSED SURFACES. USE CEMENTITOUS GRAY PAINT.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
L	DJC	08/21/09	REVISED INFORMATION IN STEP 3	VGH	08/21/09
K	DJC	08/20/09	REVISED STEP 3 OF SEALANT APPLICATION	VGH	08/20/09
J	WGG	11/28/28	REVISED GENERAL NOTES PER J. IRVING MARK–UPS	VGH	11/28/07

CUSTOMER:
ENGINEERING STANDARD

PROJECT:
GENERAL CASTING SPECIFICATIONS 2003 IBC

FILENAME: *108–016*	
SCALE: *1"=1"*	TOLERANCE:
DRWN. BY: *L. DROZDZ*	DATE: *9/17/07*
CHK. BY:	DATE:
ENG. BY:	DATE:
APP. BY:	DATE:
SHEET NO. *SHEET 47/53*	
DRAWING NO.: *108–016*	*L*

GENERAL NOTES

1. ALL STEEL FABRICATION AND INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL AISC 360–05 AND AWS D1.1–04 SPECIFICATIONS.
2. ALL WELDING SHALL BE MIG TYPE WITH THE FOLLOWING OPERATING SETTINGS:

WIRE SIZE	0.35
WIRE FEED SPEED (in/min)	5
VOLTAGE, DC (+)	18.5
AMPERAGE, DC	140
TRAVEL SPEED (in/min)	10–12
SHIELDING GAS	75/25

3. STRUCTURAL STEEL SPECIFICATIONS:
   STRUCTURAL SHAPES ASTM A36/A 36M–04a
   HIGH STRENGTH BOLTS, ASTM A 307–03
   OTHER BOLTS, SAE J429 GRADE 5
4. ALL CONCRETE WORK SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE A.C.I. 318–05 BUILDING CODES 311 & 211, AND ASTM STANDARDS C–172–04, C–31/C31M98, C–39–05e1, AND PROVISIONS OF C–94/C94M–04.
5. ALL PRECAST STRUCTURAL SAND–LIGHTWEIGHT CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
6. ALL REINFORCING STEEL BARS SHALL BE DOMESTIC, NEW BILLET STEEL CONFORMING TO ASTM A 615M–04a SPECIFICATIONS.
7. CONCRETE COVERAGE OVER ALL REINFORCING STEEL SHALL BE A MINIMUM OF 3/4".
8. ALL REBAR SHALL BE TIED 100% AT THE PERIMETER, AND 50% ELSEWHERE.
9. ALL REBAR WIRE TIES TO BE 16 GAUGE.
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11. MAXIMUM JOINT SPACE BETWEEN PANELS SHALL BE 3/8" MEASURED BY REFUSAL OF ABILITY TO PASS A 3/8" ROD ALL THE WAY THROUGH THE JOINT AT ANY POINT ALONG THE JOINT.
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13. TOLERANCES SHALL BE AS FOLLOWS:
    PANEL THICKNESS: ±1/8"
    PANEL SIZE: ±1/16"
    PANEL SQUARENESS: ±1/8" AGREEMENT ON DIAGONALS
    LOCATION OF BLOCKOUTS & PVC'S: ±1/4"
    BLOCKOUT DIMENSIONS: +1/4", –0"
    PVC SIZE: USE TRADE SIZE AS LISTED ON PROJECT DRAWINGS
14. REBAR SPLICING IS ALLOWED WHERE SPACE PERMITS. MINIMUM LAP IS 18" FOR #4 REBAR AND 30" FOR #6 REBAR.
15. CONCRETE SHALL HAVE AIR ENTRAINMENT OF 6%, MODERATE EXPOSURE AND A MAXIMUM AGGREGATE SIZE OF 3/8 INCH.
16. CONCRETE SHALL HAVE A WATER–CEMENTITIOUS MATERIAL RATIO OF 0.50.

GENERAL:	THESE REBAR SIZES AND SPACING REPRESENT THE MINIMUM AMOUNT FOR ALL CASTING PLANS. PROJECT DRAWINGS MAY REQUIRE REINFORCEMENT IN ADDITION TO CELLXION STANDARDS.
ROOF PANEL:	#4 (SHORT AXIS) 12" O.C. ON SHELTER WIDTH OF 11'–6" AND LESS, 10" O.C. ON SHELTER WIDTH GREATER THAN 11'–6" AND #4 (LONG AXIS) AT 18" O.C.
WALL PANEL:	#4 AT PERIMETER AND 4 X 4 X W4.5 X W4.5 MESH THROUGHOUT.
FLOOR:	(2)–#6 (SHORT AXIS) EACH RIB, #6 (LONG AXIS) EACH INTERIOR RIB. DECK: 4 X 4 X W4.5 X W4.5 MESH.

SEALANT APPLICATION

STEP 1. AT MATING SURFACES BETWEEN PANELS, APPLY URETHANE SEALANT ($\frac{1}{2}$" BEAD) DURING ASSEMBLY.

STEP 2. URETHANE SEALANT REQUIRED ON ALL JOINTS. APPLY TO EXTERIOR AFTER PANEL ASSEMBLY.

STEP 3. ROOF COATING:
APPLY SHELTER ROOF COATING PER MANUFACTURER INSTRUCTION.
ROOF COATING TO CONFORM TO, ASTM D6083–97A, OBC 1507.15.2 & 2006 IBC 1507.15.2.

STEP 4. APPLY AGGREGATE SEALER TO EXTERIOR WALLS. USE 1 GALLON PER 200 SQ. FEET.

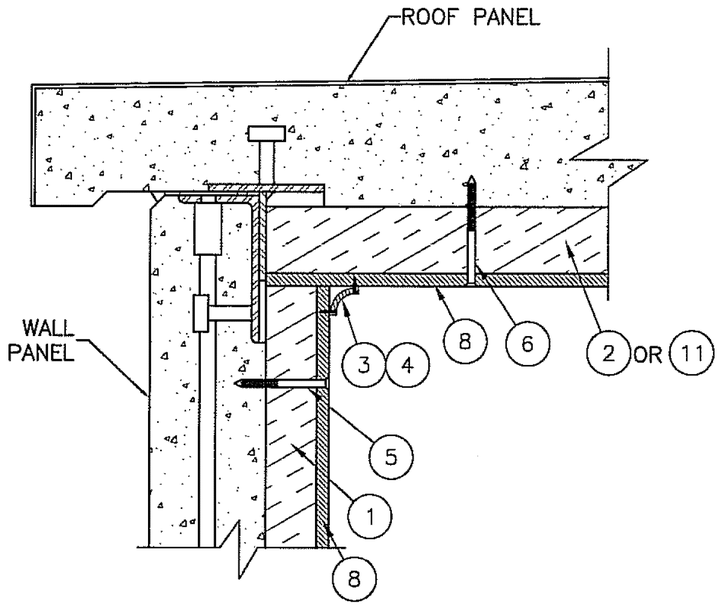
STEP 5. USE TEXTURED SEALER ON ALL SMOOTH EXPOSED SURFACES. USE CEMENTITOUS GRAY PAINT.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
L	DJC	08/21/09	REVISED INFORMATION IN STEP 3	VGH	08/21/09
K	DJC	08/20/09	REVISED STEP 3 OF SEALANT APPLICATION	VGH	08/20/09
J	WGG	11/28/28	REVISED GENERAL NOTES PER J. IRVING MARK–UPS	VGH	11/28/07

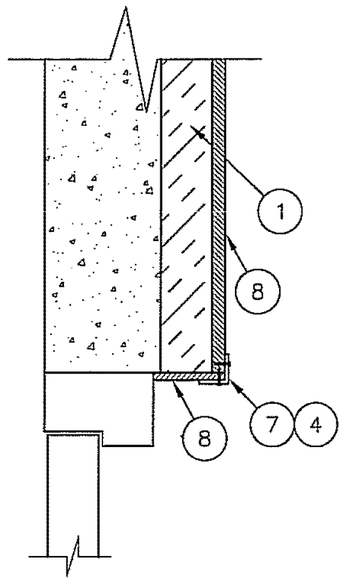
CUSTOMER:
ENGINEERING STANDARD

PROJECT:
GENERAL CASTING SPECIFICATIONS 2006 IBC

FILENAME: *108–016*	
SCALE: *1"=1"*	TOLERANCE:
DRWN. BY: *L. DROZDZ*	DATE: *10/1/07*
CHK. BY:	DATE:
ENG. BY:	DATE:
APP. BY:	DATE:
SHEET NO. *SHEET 48/53*	
DRAWING NO.: *108–016*	*L*



WALL/ROOF SECTION

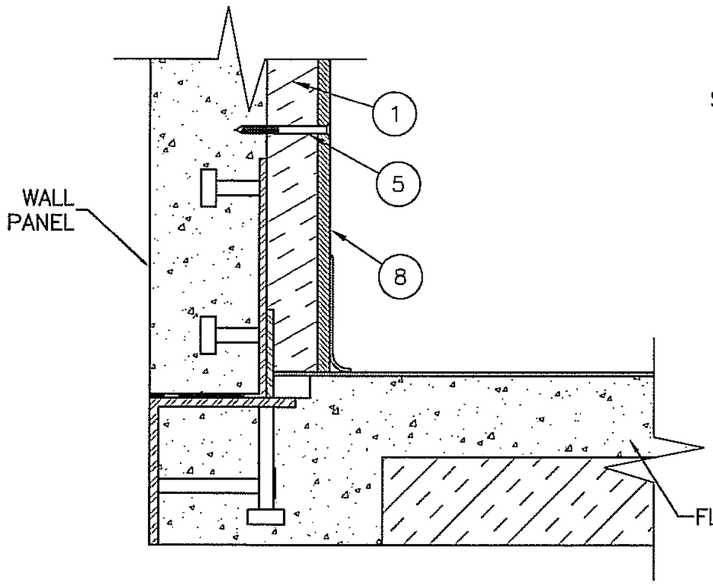


TYP DOOR SECTION
TRIM DETAIL

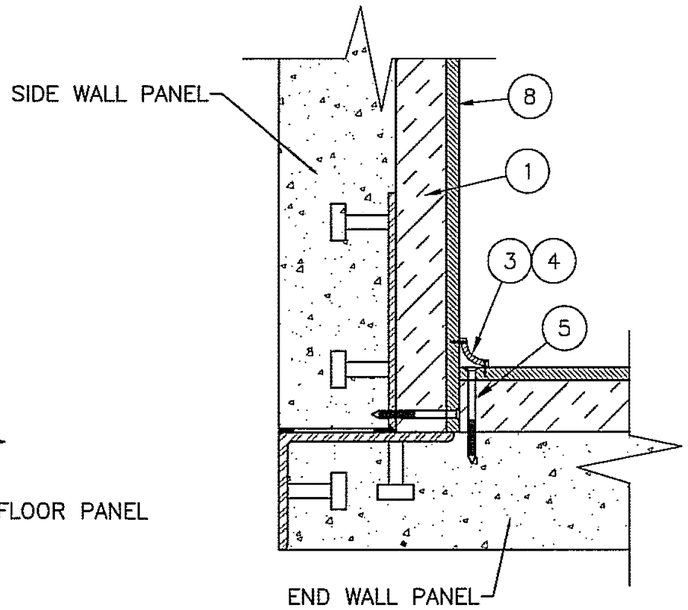
PARTS LIST			
ITEM	U/M	P/N	DESCRIPTION
1	EA.	300032	INSULATION, 1.75" THERMAX, POLY, 48" X 110"
2	EA.	300033	INSULATION, 2.25" THERMAX, POLY, 48" X 132"
3	EA.	320002	TRIM, COVE, VINYL, 10' 0", WHITE
4	EA.	168009	BRAD, WHITE 3/4", 44241
5	EA.	168293	SCREW, CONCRETE, 3/16" X 3 1/4"
6	EA.	168294	SCREW, CONCRETE, 3/16" X 3 3/4"
7	EA.	320020	TRIM, CORNER, WOOD, 1-3/8" X 1-3/8" OUTSI
8	EA.	300028	PANELING, POLY .030, W/ 15/32" OSB, 4' X 9' 1"
9	EA.	320023	TRIM, FRP, VINYL, 10' 0", WHITE, 2 PCS, 2"
10	EA.	320024	TRIM, FRP, VINYL, 12' 0", WHITE, 2 PCS, 2"
11	EA.	300036	INSULATION, 2.25" THERMAX TSX, 48" X 113"

NOTES:

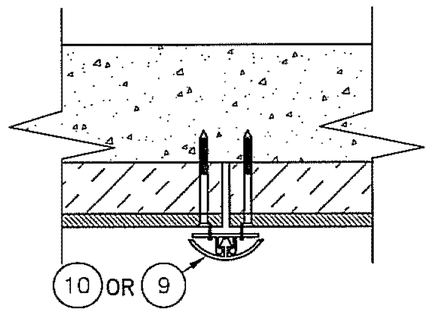
1. INSTALL INTERIOR PANELS W/ CONCRETE SCREWS (LENGTH MAY VARY) 24" O.C. MAX ALONG LENGTH OF PANELS. (NO FASTENERS REQUIRED ALONG SHORT SIDE OF PANELS IF PANEL EDGE IS AT A CORNER)
2. MAX GAP BETWEEN PANELS TO BE $\frac{1}{4}$".
3. USE COVE TRIM IN ALL CORNERS AND AROUND TOP PERIMETER. INSTALL USING $\frac{3}{4}$" BRAD NAILS.
4. TRIM ALL EXPOSED OPENINGS W/ OUTSIDE CORNER TRIM.
5. USE 10 FT TRIM, P/N 320023 FOR JOINT LENGTHS 10FT AND UNDER, USE P/N 320024 FOR JOINT LENGTHS OVER 10FT.



WALL/FLOOR SECTION



WALL/WALL SECTION



JOINT DETAIL
PLAN VIEW SECTION

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
C	DJC	08/21/09	REVISED NOTES	VGH	08/21/09
B	GAB	03/06/09	CHG'D OSB TO 15/32"	VGH	03/06/09
A	LD	10/11/07	CHG DESCRIPTION OF INSULATION	VGH	10/11/07

CUSTOMER:
ENGINEERING STANDARD

PROJECT:
CONCRETE SHELTER INT. PANELING INSTALL (1) LAYER WALLS <= 9'-6"

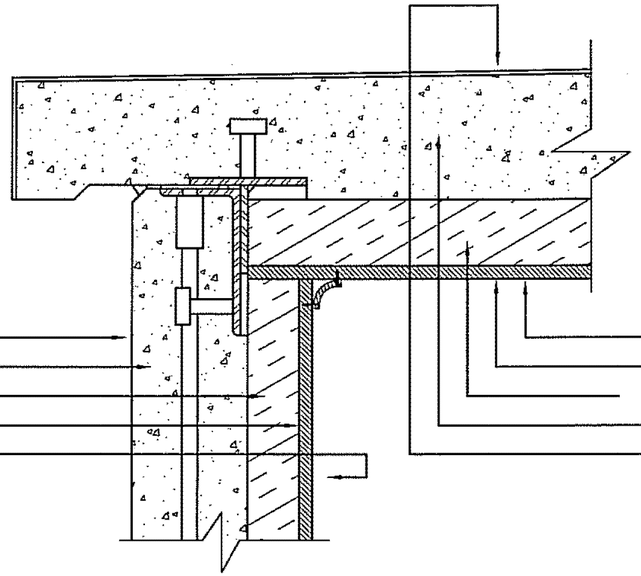
FILENAME: *108-035*	
SCALE: *3/16"=1"*	TOLERANCE:
DRWN. BY: *C. CASINGER*	DATE: *10/6/05*
CHK. BY: *V. HASSELL*	DATE: *10/6/05*
ENG. BY: *K. BARNETT*	DATE: *10/6/05*
APP. BY:	DATE:

SHEET NO.
SHEET 49/53

DRAWING NO.: *108-035* *C*

WALL

(HEAT CAPACITY = 8 BTU/°F)

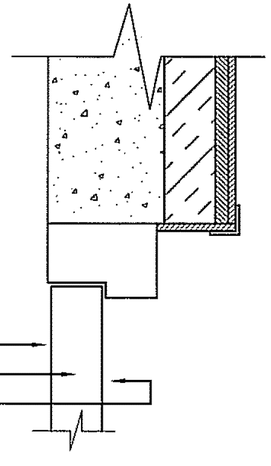


0.25	OUTSIDE AIR FILM
1.36	4" L.W. CONCRETE
11.20	1¾" THERMAX INSUL
0.54	7/16" PANELING
1.70	INSIDE AIR FILM
15.05	OVERALL R–VALUE
0.066	OVERALL U–FACTOR

CEILING

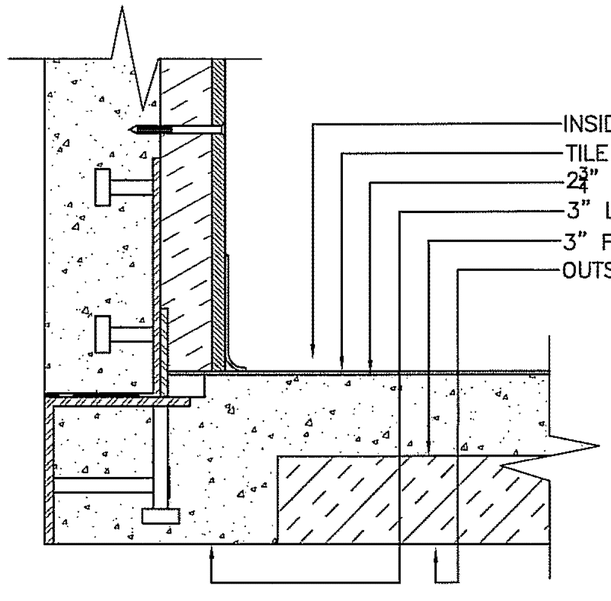
INSIDE AIR FILM	4.55
7/16" PANELING	0.54
2¼" THERMAX INSUL.	14.40
4.5"(AVG) L.W. CONCRETE	1.53
OUTSIDE AIR FILM	0.25
21.27	OVERALL R–VALUE
0.047	OVERALL U–FACTOR

METAL DOOR



0.25	OUTSIDE AIR FILM
7.00	BEAD BOARD INSUL.
1.35	INSIDE AIR FILM
8.60	OVERALL R–VALUE
0.116	OVERALL U–FACTOR

FLOOR

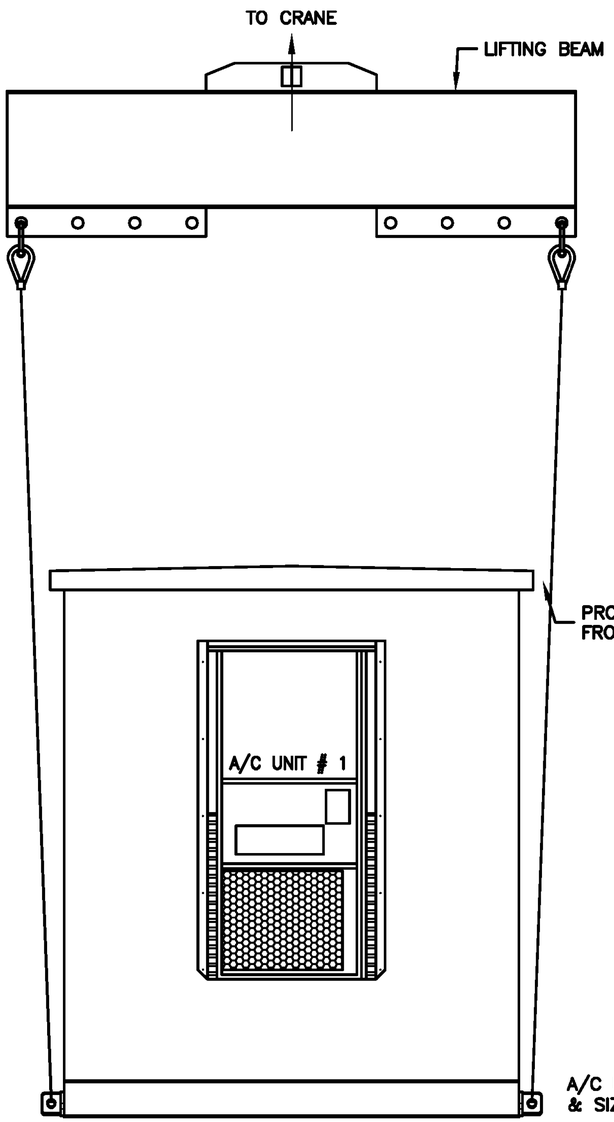


	RIB	DECK
INSIDE AIR FILM	1.10	1.10
TILE	0.05	0.05
2¾" L.W. CONCRETE (DECK)	0.94	0.94
3" L.W. CONCRETE (RIB)	1.02	––
3" FOAM INSERT	––	15.00
OUTSIDE AIR FILM	0.25	0.25
	3.36	17.34 TOTAL 'R'
	0.298	0.058 TOTAL 'U'
	0.286	0.714 SURFACE AREA RATIO
	0.960	12.380 R–FACTOR PER SURFACE AREA
	0.074	OVERALL U–FACTOR
	13.340	OVERALL R–VALUE

CUSTOMER:
ENGINEERING STANDARD

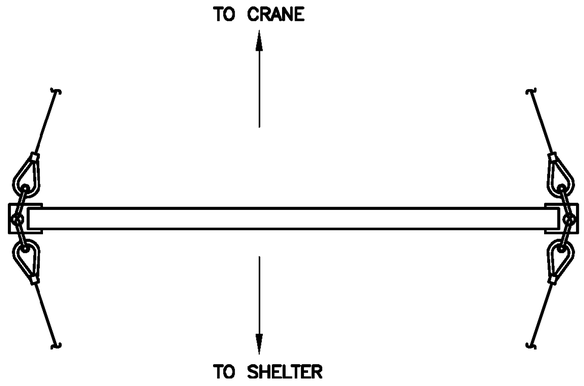
PROJECT:
CONCRETE SHELTER
INT. PANELING INSTALL
(1) LAYER
R/U CALCULATIONS

FILENAME: 108–035	
SCALE:	TOLERANCE:
DRWN. BY: C. CASINGER	DATE: 10/6/05
CHK. BY: V. HASSELL	DATE: 10/6/05
ENG. BY: K. BARNETT	DATE: 10/6/05
APP. BY:	DATE:
SHEET NO. SHEET 50/53	
DRAWING NO.: 108–035	C



END VIEW

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



OPTIONAL SPREADER BAR

SIDE VIEW

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

EQUIPMENT REQUIRED	
QTY.	DESCRIPTION
6	SHACKLES
8	CHOKERS (20" MIN)
1	SPREADER BAR OR LIFTING BEAM
AR	MUD MATS (SEE NOTE #2)

NOTES:

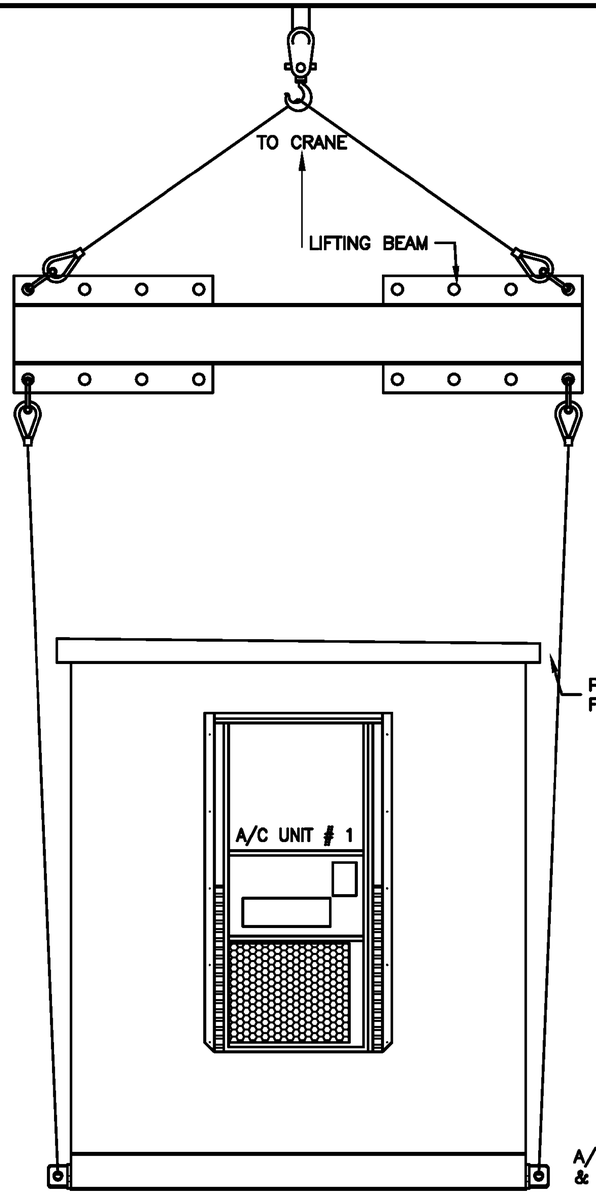
1. FOUR (4) LIFTING POINTS REQUIRED ONLY FOR SHELTER LESS THAN 24' LONG.
2. SHELTER SIZE & CONFIG. MAY VARY.
3. COMPENSATE WEIGHT DIFFERENCE WITH ADDITIONAL SHACKLES IF REQ'D.
4. MUD MATS ARE TO BE USED IF SITE CONDITIONS WARRANT.
5. REVIEW WEIGHT TICKETS AND SITE CONDITIONS TO DETERMINE PROPER SIZING OF EQUIPMENT AND RIGGING.
6. SPREADER LENGTH TO BE WIDER THAN SHELTER TO KEEP CABLES FROM RUBBING AT ROOF.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
A	AMM	9/15/09	ADDED 8 LIFTING POINTS OPTION	LD	9/15/09

CUSTOMER:
PREP TO MOVE STANDARD

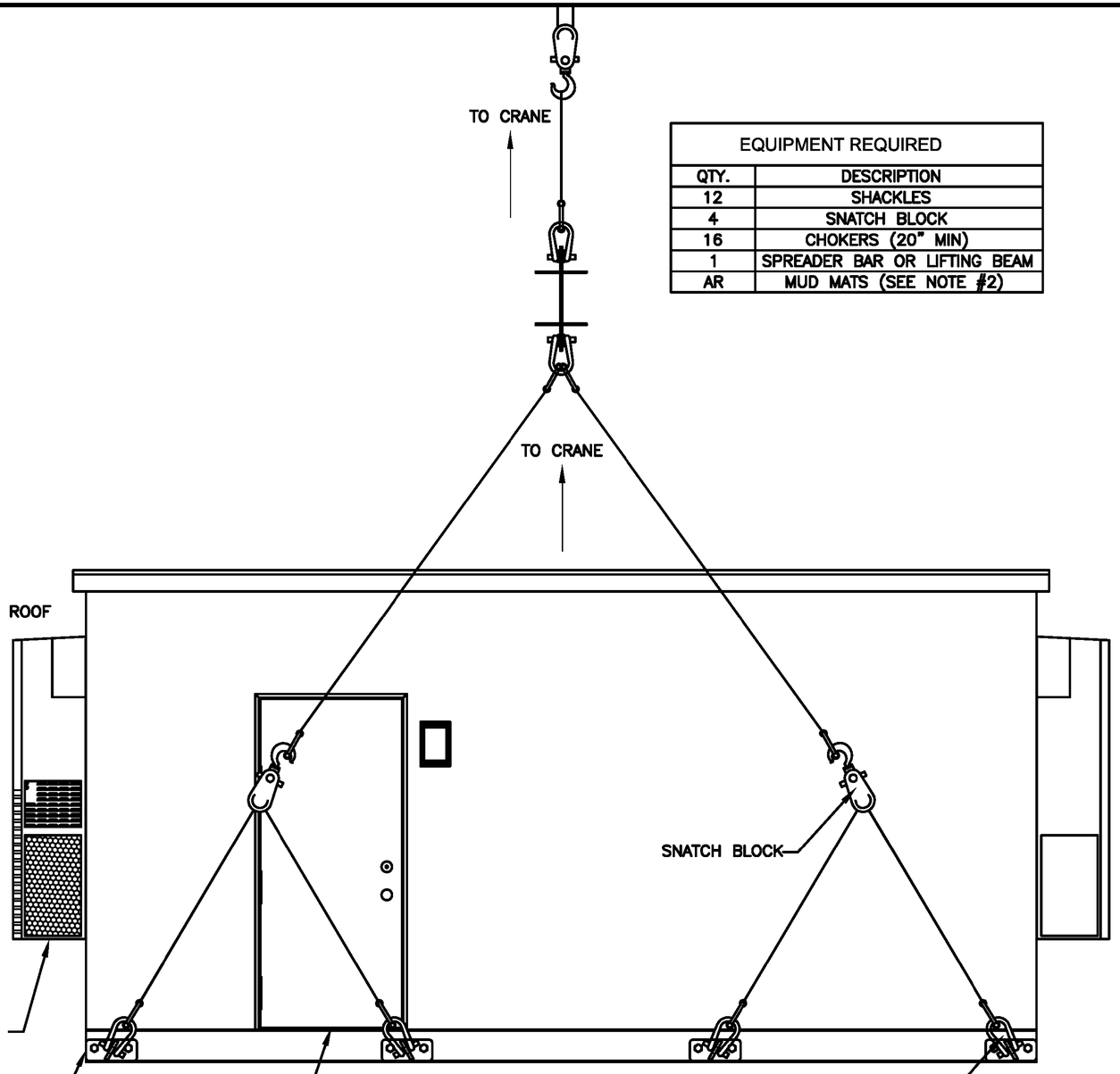
PROJECT:
SHELTER LIFTING DETAILS 4 LIFTING POINTS

FILENAME: *108-088*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *J. ASHLEY*	DATE: *5/13/08*
CHK. BY: *V. HASSELL*	DATE: *5/13/08*
ENG. BY:	DATE:
APP. BY:	DATE:
SHEET NO. *SHEET 51/53*	
DRAWING NO.: *108-088*	*A*



END VIEW

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



SIDE VIEW

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

EQUIPMENT REQUIRED	
QTY.	DESCRIPTION
12	SHACKLES
4	SNATCH BLOCK
16	CHOKERS (20" MIN)
1	SPREADER BAR OR LIFTING BEAM
AR	MUD MATS (SEE NOTE #2)

NOTES:

1. EIGHT (8) LIFTING POINTS REQUIRED ONLY FOR SHELTER 24' AND LONGER.
2. SHELTER SIZE & CONFIG. MAY VARY.
3. COMPENSATE WEIGHT DIFFERENCE WITH ADDITIONAL SHACKLES IF REQ'D.
4. MUD MATS ARE TO BE USED IF SITE CONDITIONS WARRANT.
5. REVIEW WEIGHT TICKETS AND SITE CONDITIONS TO DETERMINE PROPER SIZING OF EQUIPMENT AND RIGGING.
6. SPREADER LENGTH TO BE WIDER THAN SHELTER TO KEEP CABLES FROM RUBBING AT ROOF.

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
A	AMM	9/15/09	ADDED 8 LIFTING POINTS OPTION	LD	9/15/09

CUSTOMER:
PREP TO MOVE STANDARD

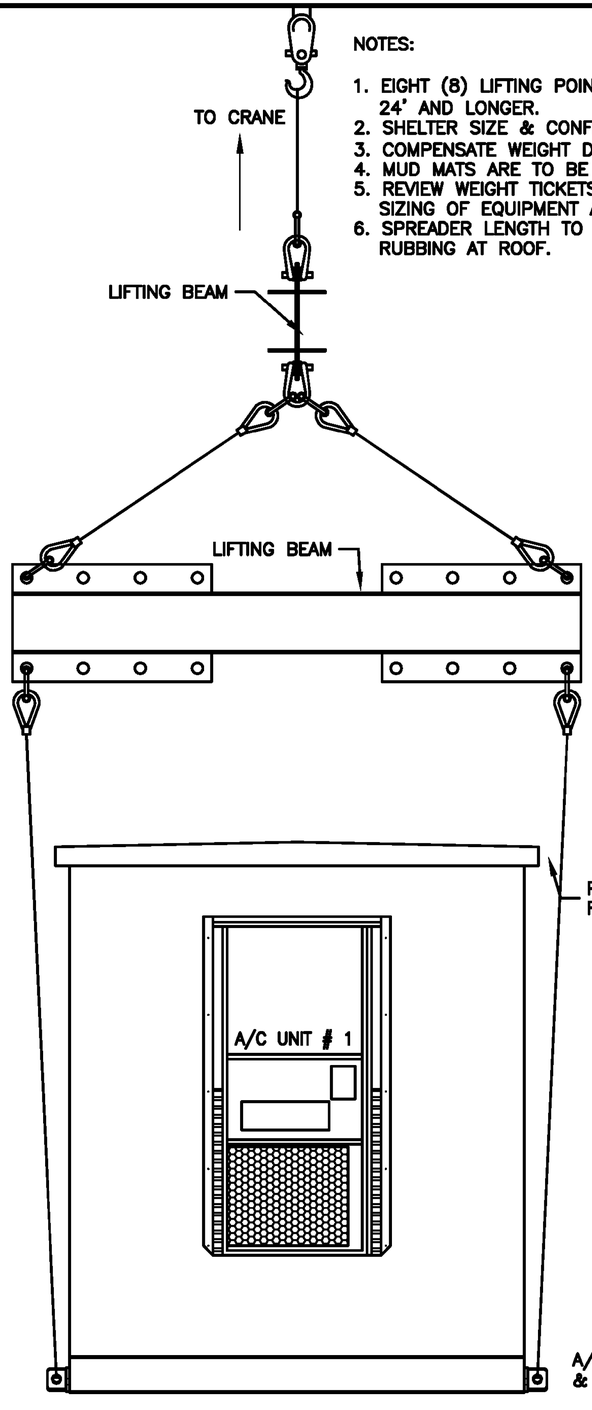
PROJECT:
SHELTER LIFTING DETAILS 8 LIFTING POINTS OPTION-1

FILENAME: *108-088*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *J. ASHLEY*	DATE: *5/13/08*
CHK. BY: *V. HASSELL*	DATE: *5/13/08*
ENG. BY:	DATE:
APP. BY:	DATE:
SHEET NO. *SHEET 52/53*	
DRAWING NO.: *108-088*	*A*

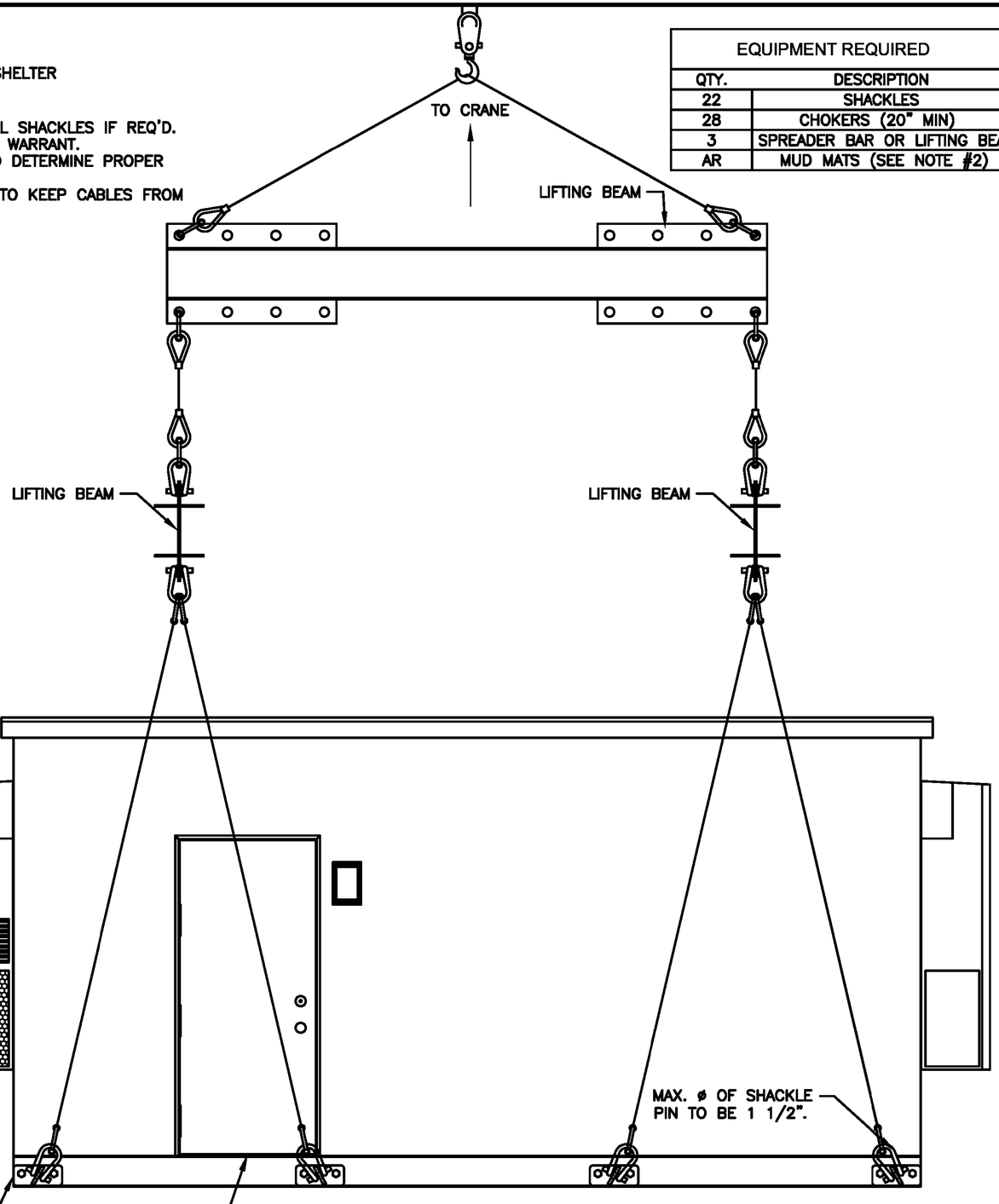
NOTES:

1. EIGHT (8) LIFTING POINTS REQUIRED ONLY FOR SHELTER 24' AND LONGER.
2. SHELTER SIZE & CONFIG. MAY VARY.
3. COMPENSATE WEIGHT DIFFERENCE WITH ADDITIONAL SHACKLES IF REQ'D.
4. MUD MATS ARE TO BE USED IF SITE CONDITIONS WARRANT.
5. REVIEW WEIGHT TICKETS AND SITE CONDITIONS TO DETERMINE PROPER SIZING OF EQUIPMENT AND RIGGING.
6. SPREADER LENGTH TO BE WIDER THAN SHELTER TO KEEP CABLES FROM RUBBING AT ROOF.

EQUIPMENT REQUIRED	
QTY.	DESCRIPTION
22	SHACKLES
28	CHOKERS (20" MIN)
3	SPREADER BAR OR LIFTING BEAM
AR	MUD MATS (SEE NOTE #2)



END VIEW
SCALE: 1/4" = 1'-0"



SIDE VIEW
SCALE: 1/4" = 1'-0"

REV	BY	DATE	DESCRIPTION	APP.BY	DATE
A	AMM	9/15/09	ADDED 8 LIFTING POINTS OPTION	LD	9/15/09

CUSTOMER:
PREP TO MOVE STANDARD

PROJECT:
SHELTER LIFTING DETAILS 8 LIFTING POINTS OPTION-2

FILENAME: *108-088*	
SCALE: *N.T.S.*	TOLERANCE:
DRWN. BY: *J. ASHLEY*	DATE: *5/13/08*
CHK. BY: *V. HASSELL*	DATE: *5/13/08*
ENG. BY:	DATE:
APP. BY:	DATE:
SHEET NO. *SHEET 53/53*	
DRAWING NO.: *108-088*	*A*

SECTION 31 00 00 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for pavements.
2. Subbase and base course for asphalt paving.

B. Related Sections include the following:
1. 31 11 00 "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping[**and stockpiling**] topsoil, and removal of above- and below-grade improvements and utilities.
2. 32 92 19 "Lawns and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: [**ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM**], or a combination of these groups; free of rock or gravel larger than [**3 inches**] in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups [**GC, SC, CL, ML, OL, CH, MH, OH, and PT**], or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1inch sieve and 0 to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than [8 inches] in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus [1 inch].
2. Pavements: Plus or minus [1/2 inch].

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 SUBBASE AND BASE COURSES

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:
   1. Shape base course to required crown elevations and cross-slope grades.
   2. Place base course 6 inches or less in compacted thickness in a single layer.
   3. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
   4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

   1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
   2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 00 00

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Clearing and grubbing.
   2. Stripping and stockpiling topsoil.
   3. Temporary erosion and sedimentation control measures.

B. Related Sections include the following:
   1. 31 00 00 "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS[**(Not Applicable)**]

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

C. Excavate for and remove underground utilities indicated to be removed.

D. Removal of underground utilities is included in Division 2 Sections covering site utilities.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within tree protection zones.
3. Dispose of excess topsoil as specified for waste material disposal.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.7 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 10 00

SECTION 32 13 13 – CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:
   1. Walkways.
   2. Pads

B. Related Sections include the following:

   1. 31 00 00 "Earthwork" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Qualification Data: For testing agency.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Fiber reinforcement.
   4. Admixtures.
   5. Curing compounds.

6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

F. Field quality-control test reports.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

D. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I

B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4500 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 2 Section "Earthwork."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.

5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows[**to match jointing of existing adjacent concrete pavement**]:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a [**1/4-inch (6-mm)**] radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a [**1/4-inch (6-mm)**] radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

J. Screed pavement surfaces with a straightedge and strike off.

K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped Multi Agency Radio Communication System December 29, 2009 Columbia Road & I-90 Cuyahoga County, Ohio

at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. 5000 sq. ft. or fraction thereof of each concrete mix placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding
2. Erosion-control material(s).

B. Related Sections:

1. 31 10 00 "Site Clearing" for topsoil stripping and stockpiling.
2. 31 00 00 "Earthwork" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass, identifying source, including name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizer, from manufacturer.

E. Material Test Reports: For existing surface soil.

F. Planting Schedule: Indicating anticipated planting dates for each type of planting.

G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: April 15th – May 15th
2. Fall Planting: August 1st – September 1st

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 MAINTENANCE SERVICE

A. Initial Lawn Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded Lawns: 60 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than [**85**] percent pure seed, and not more than 0.5 percent weed seed:

1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars.
2. Sun and Partial Shade: Proportioned by weight as follows:

a. 50 percent Kentucky bluegrass (Poa pratensis).
b. 30 percent chewings red fescue (Festuca rubra variety).
c. 10 percent perennial ryegrass (Lolium perenne).
d. 10 percent redtop (Agrostis alba).

3. Shade: Proportioned by weight as follows:

a. 50 percent chewings red fescue (Festuca rubra variety).
b. 35 percent rough bluegrass (Poa trivialis).
c. 15 percent redtop (Agrostis alba).

2.2 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
3. Provide lime in form of dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.

G. Sand: Clean, washed, natural or manufactured, free of toxic materials.

H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through **3/4-inch (19-mm)** sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 percent of dry weight.

B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.

2.5 PLANTING ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.6 FERTILIZER

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.

2.8 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long. To be used as ditch location.

2.9 PLANTING SOIL MIX

A. Contractor to provide planting soil mix recommendations from a nursery local to the project area. Please recommend the following items.

1. Ratio of Loose Compost to Topsoil by Volume: Multi Agency Radio Communication System December 29, 2009 Columbia Road & I-90 Cuyahoga County, Ohio

2. Ratio of Loose Peat to Topsoil by Volume:
3. Ratio of Loose Wood Derivatives to Topsoil by Volume:
4. Weight of Lime per 1000 Sq. Ft.
5. Weight of [**Sulfur**] [**Iron Sulfate**] [**Aluminum Sulfate**] per 1000 Sq. Ft.
6. Weight of Agricultural Gypsum per 1000 Sq. Ft.
7. Volume of Sand Plus 10 Percent [**Diatomaceous Earth**] [**Zeolites**] per 1000 Sq. Ft.:
8. Weight of Bonemeal per 1000 Sq. Ft.
9. Weight of Superphosphate per 1000 Sq. Ft.:
10. Weight of Commercial Fertilizer per 1000 Sq. Ft. :
11. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 LAWN PREPARATION

A. Limit lawn subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of **4 inches**. Remove stones larger than **1 inch** in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.
2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil mix to a depth of **4 inches** but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately 1/2 the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top **2 inches** of subgrade. Spread remainder of planting soil mix.

C. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least **6 inches** .Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top **4 inches** of soil. Till soil to a homogeneous mixture of fine texture.

    a. Apply fertilizer directly to surface soil before loosening.

3. Remove stones larger than **1 inch** in any dimension and sticks, roots, trash, and other extraneous matter.

4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. For erosion-control mats, install planting mix in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

B. Fill cells of erosion-control mat with planting mix and compact before planting.

C. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

D. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph .Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of **3 to 4 lb/1000 sq. ft.**.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of **2 tons/acre** to form a continuous blanket **1-1/2 inches** in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

F. Protect seeded areas from hot, dry weather or drying winds by applying [**peat mulch]** [**planting soil**] [**topsoil**] within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a depth of **3/16 inch**, and roll surface smooth.

3.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than **1500-lb/acre** dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than **500-lb/acre** dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of **1000 lb/acre**.

3.7 LAWN RENOVATION

A. Renovate existing lawn.

B. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
2. Provide new topsoil as required.

C. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.

D. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

E. Mow, dethatch, core aerate, and rake existing lawn.

F. emove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches .

I. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

J. Apply seed and protect with straw mulch as required for new lawns.

K. Water newly planted areas and keep moist until new lawn is established.

3.8 LAWN MAINTENANCE

A. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

B. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches .

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water lawn with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow grass to a height of 1/2 to 1 inch .

D. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least **1 lb/1000 sq. ft.** to lawn area.

3.9 SATISFACTORY LAWNS

A. Lawn installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding **90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches .**
2. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Lawn: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass; and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Lawn: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants; and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.10 CLEANUP AND PROTECTION

A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 32 92 19

SECTION 33 49 13 – STORM DRAINAGE – for Drive Pipe

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes gravity-flow, non-pressure storm drainage outside the building, with the following components:
   1. Precast concrete manholes.

1.3 DEFINITIONS

A. PE: Polyethylene plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silttight, unless otherwise indicated.

1.5 SUBMITTALS

A. Shop Drawings: For the following:

B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

C. Field quality-control test reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe, fitting, and joining materials.

2.3 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings: AASHTO M 294, Type C, with smooth waterway for coupling joints.

1. Soiltight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 PIPING APPLICATIONS

A. Gravity-Flow, Nonpressure Sewer Piping: Use any of the following pipe materials for each size range:

1. NPS 8 to NPS 12 (DN 200 to DN 300): Corrugated PE drainage pipe and fittings in NPS 8 and NPS 10 (DN 200 and DN 250) and corrugated PE pipe and fittings in NPS 12 (DN 300), soiltight couplings, and coupled joints.

3.3 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, nonpressure drainage piping according to the following:

1 Install piping pitched down in direction of flow, at minimum slope as indicated.
2 Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
3 Install piping with 48-inch minimum cover.
4 Install piping below frost line.
5 Install PE corrugated sewer piping according to CPPA’s “Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings.”

3.4 PIPE JOINT CONSTRUCTION

A. Basic pipe joint construction is specified in Division 2 Section "Piped Utilities - Basic Materials and Methods." Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

B. Join gravity-flow, nonpressure drainage piping according to the following:
1. Join corrugated PE piping according to CPPA 100 and the following:

a. Use soiltight couplings for Type 2, soiltight joints.

2. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasket joints.

3.5 IDENTIFICATION

A. Materials and their installation are specified in division 2 Section "Earthwork." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
   1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.6 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.

   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:

      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.

   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

      a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
      b. Option: Test plastic piping according to ASTM F 1417.
      c. Option: Test concrete piping according to ASTM C 924 (ASTM C 924M).

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.7 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 33 49 13

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Excavation for post bases; concrete foundation for posts.

C. Manual gates and related hardware.

D. Chain Link Construction Fencing and Swing Gates

1.02 RELATED SECTIONS

A. Section 32 13 13 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 UNIT PRICES - MEASUREMENT AND PAYMENT

A. See Section - Unit Prices, for additional unit price requirements.

B. Fencing: By the linear foot, to the fence height specified, based on the specified post spacing. Includes posts, rails, tension wire, fabric, accessories, attachments.

C. Post Footings: Each unit footing, to the depth specified. Includes excavation, concrete placed, finishing.

D. Gates: By the square foot. Includes frame posts, fabric, accessories, hardware.

1.04 REFERENCES

A. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2003.

C. ASTM A 428/A 428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles; 2001.

D. ASTM A 491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric; 2003.

E. ASTM F 567 - Standard Practice for Installation of Chain-Link Fence; 2000.

F. ASTM F 1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 1997 (Reapproved 2003).

1.05 SUBMITTALS

A. See Section- Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

D. Samples: Submit two samples of fence fabric, slat infill, 6 inch by 6 inch size illustrating construction and colored finish.

E. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this

section, with not less than three years of documented experience.

B. Comply with Chain Link Fence Manufacturer's Institute Product Manual.

PART 2 PRODUCTS

2.01 Chain Link Construction Fencing and Swing Gates:
1 Temporary use on site – remove after construction is complete.
2 6' high
3 Refer to Civil drawings for extent.
4 Swing gates – remove after construction is complete.

2.02 MATERIALS

A. Posts, Rails, and Frames: ASTM F 1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 25 ksi.

B. Wire Fabric: ASTM A 491 aluminum coated steel chain link fabric.

C. Concrete: Type specified in Section 32 13 13.

2.03 COMPONENTS

A. Line Posts: 1.9 inch diameter.

B. Corner and Terminal Posts: 2.38 inch.

C. Gate Posts: 3.5 inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Gate Frame: 1.66 inch diameter for welded fabrication.

F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage thick, top selvage knuckle end closed, bottom selvage twisted tight.

G. Tension Wire: 6 gage thick steel, single strand.

H. Tie Wire: Aluminum alloy steel wire.

2.04 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

C. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.

D. Gate Hardware: Fork latch with gravity drop; two 180 degree gate hinges per leaf and hardware for padlock.

2.05 FINISHES

A. Components (Other than Fabric): Galvanized in accordance with ASTM A 123/A 123M, at 1.7 oz/sq ft.
B. Components (Fabric): Aluminum coated at 0.40 oz/sq ft, when measured in accordance with ASTM A 428/A 428M.

C. Hardware: Hot-dip galvanized to weight required by ASTM A 153/A 153M.

D. Accessories: Same finish as framing.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F 567.

B. Place fabric on outside of posts and rails.

C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F 567.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F 567.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

H. Install center brace rail on corner gate leaves.

I. Do not stretch fabric until concrete foundation has cured 28 days.

J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

K. Position bottom of fabric 2 inches above finished grade.

L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

N. Install bottom tension wire stretched taut between terminal posts.

O. Do not attach the hinged side of gate to building wall; provide gate posts.

P. Install gate with fabric to match fence. Install hardware.

Q. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.02 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

3.03 CONSTRUCTION FENCING

A. Install at perimeter of designated “Phase I” construction area, as shown on Civil drawings.

B. Install 2 swing gates at designated contractors entrance

C. Remove cyclone fencing and swing gates once project is complete.

END OF SECTION

psi Information To Build On
Engineering • Consulting • Testing

February 4, 2011

Mr. Kenneth B. Stewart, P.E.
Senior Vice President
Director of Land Development
Jobes Henderson & Associates, Inc.
59 Grant Street
Newark, Ohio 43055
kstewart@jobeshenderson.com

Re: Report of Subsurface Exploration
Proposed Communication Tower
Township Hwy. 188
Keene Township, Coshocton County, Ohio
PSI File Number: 0142-402

Dear Mr. Stewart:

In compliance with your instructions, we have conducted a subsurface exploration for the above-referenced project. The results of this exploration, together with our recommendations, are to be found in the accompanying report, three (3) copies of which are being transmitted herewith.

After the plans and specifications are complete, PSI should review the final design and specifications in order to verify that the earthwork and foundation recommendations are properly interpreted and implemented. **It is considered imperative that the geotechnical engineer and/or its representative be present during earthwork operations and foundation installations to observe the field conditions with respect to the design assumptions and specifications. PSI will not be held responsible for interpretations and field quality control observations made by others.**

Please advise us of the appropriate time to discuss the field quality control and engineering services, and we will be pleased to meet with you at your convenience.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Eram Iqbal, P.E.
Department Manager

A. Veeramani, P.E.
District Manager

REPORT OF
GEOTECHNICAL SUBSURFACE EXPLORATION

FOR THE PROPOSED

COMMUNICATION TOWER
TOWNSHIP HWY. 188
KEENE TOWNSHIP, COSHOCTON COUNTY, OHIO

PREPARED FOR

JOBES HENDERSON & ASSOCIATES, INC.
59 GRANT STREET
NEWARK, OHIO 43055

PREPARED BY

PROFESSIONAL SERVICE INDUSTRIES, INC.
5555 CANAL ROAD
CLEVELAND, OH 44125

PSI FILE NUMBER: 0142-402

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PROJECT INFORMATION

Project Authorization

This report presents the results of a geotechnical subsurface exploration, conducted for Jobes Henderson & Associates, Inc., in connection with the proposed communication tower located off of Township Highway 188, in Keene Township, Coshocton County, Ohio. PSI's services for this project were performed in accordance with PSI Proposal No. 0142-35613 dated December 16, 2010 and revised on December 17, 2010. The proposal included a proposed scope of services, estimated cost, unit rates and PSI's General Conditions. Authorization to perform this exploration and analysis was in the form of a signed acceptance of the aforementioned proposal an acknowledged by Mr. Kenneth B. Stewart, Senior Vice President of Jobes Henderson & Associates, Inc. on December 20, 2010.

Project Description

Based on the information provided by Mr. Kenneth B. Stewart, Senior Vice President of Jobes Henderson & Associates, Inc., the proposed project will include construction of a self supporting, communication tower (Sabre Model S3TL) with three (3) legs. The proposed self supporting tower will be 360 feet in height, with a base width of 33 feet and tapering to 5 feet at the top. The proposed communication tower foundation design will be based on the provided structural loading information, as follows:

Factored Uplift:	532 Kips
Factored Download:	630 Kips
Factored Shear:	60 Kips
Wind speed w/o ice:	90 mph
Wind speed with ¾" ice:	40 mph

Additionally, a slab-on-grade building structure will also be constructed immediately southeast to the communication tower.

If any of the noted information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate. Based upon existing topographical information, maximum cut and fill operations of approximately 2.0 feet will be required for the proposed development.

Purpose and Scope of Services

The purpose of this exploration was to evaluate the soil, rock and groundwater conditions at the site, and to provide geotechnical recommendations for foundation design and construction, site preparation and other construction considerations.

The scope of the exploration and analysis included visiting the project site, drilling four (4) standard test borings and coring areas bedrock formation, within the proposed communication tower and shelter areas, completing a laboratory testing program, and submitting an engineering analysis and evaluation of the subsurface materials.

The scope of services did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions are strictly for the information of the client.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The site area for the proposed communication tower is south of Township Highway 188 (40°22' 12.98"N & 81°48' 20.02"W) in Keene Township, Coshocton County, Ohio. Specifically, the site is located off of Township Highway along a dirt driveway, located approximately 1600 feet west from the intersection with Township Highway 189.

The proposed construction areas are presently covered with grass, a few trees and brush. Based on the existing topographical information, the site slopes downward from northeast to southwest with maximum elevation difference of about 5 feet within the communication tower and shelter areas. At the time of the field drilling operations, surface drainage appeared to be fair. However, we recommend that any existing utility lines be checked and marked prior to construction activities.

Subsurface Conditions

The general subsurface conditions at the site were explored with four (4) test borings, B-1 through B-4, including three (3) for the communication tower and one (1) for the shelter area. The test borings were extended to depths ranging from approximately 8.5 to 19 feet below the existing surface grades with a 5.0-foot rock core at the test boring location B-3. The test boring locations were selected, field located and surveyed by the representatives of Jobes Henderson & Associates, Inc. prior to the field drilling operations.

Field and laboratory testing were completed in general accordance with ASTM standards. The types of subsurface materials encountered in the test borings have been visually classified. The results of the visual classifications, the Standard Penetration tests and water level observations are presented on the boring logs in the Appendix of this report. Representative samples of the soils and rock were placed in sample jars, and are now stored in the laboratory for further analysis, if requested. Unless notified to the contrary, all samples will be disposed of after sixty (60) days.

During field drilling operations, the site was covered with ice and snow. Therefore, it was difficult to measure precisely if there was topsoil at the site areas.

Below the existing surface grades, fine grained natural cohesive soils were encountered at all test boring locations to depths of approximately 5 to 6.5 feet below the existing surface grades. The natural soils consisted of clayey silt, containing variable fractions of sand, stone and rock fragments. The natural soils exhibited moisture contents ranging from 5 to 21 percent and a medium stiff to stiff consistency based on the Standard Penetration tests.

The area's bottommost formation consisted of very weak to moderately strong, brown, highly to slightly weathered sandstone. The area's weathered sandstone bedrock formation was cored from 13.8 to 18.8 feet below the surface grades, at the test boring location B-3 with a recovery rate of 86 percent, R.Q.D. of about 71% percent and unconfined compression strength values of 2814 psi and 2925 psi.

The subsurface description is of a generalized nature provided to highlight the major strata encountered. The boring logs included in the *Appendix* of this report should be reviewed for specific information at the individual boring locations. The stratifications shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between the boring locations. The stratifications represent the approximate boundary between the subsurface materials, and the transition may be gradual or not clearly defined.

Groundwater Conditions

No free groundwater was encountered at any test boring locations during and after completion of the field drilling operations. However, groundwater levels fluctuate seasonally as a function of rainfall. During a time of year or weather different from the time of drilling, there may be a considerable change in the water table or the occurrence of water where not previously encountered. Furthermore, the water levels in the boreholes often are not representative of the actual groundwater level, because the boreholes remain open for a relatively short time.

In fine grained soils, the soil color variation from gray to brown can be an indicator of the prevailing groundwater elevation. Above the prevailing groundwater elevation the soils usually oxidize to brown color. Therefore, it is recommended the site contractor should install monitoring wells and observe for a period of time, to establish groundwater elevations.

EVALUATION AND RECOMMENDATIONS

Site Preparation

Prior to placing structural fill, foundations or concrete on the site, all grass, topsoil, excessively wet soils, and soft/loose or obviously compressible materials, should be completely removed from the proposed construction areas. The subgrade should then be proofrolled with a loaded tandem-axle dump truck until the grade offers a relatively unyielding surface. Areas exhibiting excessive yielding or wet conditions can be stabilized by choking the exposed subgrades with No. 1 & 2 Stones or similar coarse aggregate. After the existing subgrade soils are excavated to design grade, proper control of subgrade compaction and the placement and compaction of new fill materials should be observed and tested by a representative of PSI.

Materials selected for use as structural fill should not contain more than 3 percent by weight of organic matter, waste construction debris, or other deleterious materials. Fill materials should generally have a standard Proctor maximum dry density greater than 110 pounds per cubic foot (pcf), an Atterberg Liquid Limit less than 40, a Plasticity Index of less than 15, and a maximum particle size of 2 inches or less. Structural fill should consist of non-expansive materials. Pyritic and/or potentially expansive materials, such as mine tailings, shales and slag should not be used as structural fill.

The fill should be placed in layers of not more than 8 inches in thickness, with each layer being compacted to a minimum density of 100 percent of the maximum dry density and within ± 2% of the optimum moisture content, as determined by the Standard Proctor Method ASTM D-698. Moisture control (increasing or decreasing the natural moisture content) of the engineered fill materials may be necessary for compaction.

Foundation Recommendations

Communication Tower

Considering the subsurface conditions and the proposed construction, the proposed communication tower can be founded on either conventional shallow bearing spread footing foundations or drilled caissons.

Shallow Foundations

It is recommended that all foundations should bear within the area's weathered sandstone bedrock formation. Foundations supporting the proposed communication tower can be designed utilizing maximum allowable rock bearing pressure of 8,000 pounds per square foot (psf). All foundations must be placed at a minimum depth of 42 inches below the finished grades in order to protect against frost action.

Footing bearing surfaces are to be critically inspected to verify consistency and compatibility with subsurface exploration data. Foundation bearing surface evaluations should be performed in the foundation excavations to identify isolated poor quality rock and to enable the development of remedial measures, if needed. Foundation bearing surface evaluations should be performed in each excavation prior to placement of reinforcing steel. Soft, loose or excessively wet rock zones encountered at the foundation subgrades should be remediated, as directed by the geotechnical engineer.

Extreme care should be taken to prevent weakening of the foundation bearing materials because of prolonged atmospheric exposure, construction activity disturbance or an increase in moisture content. In the event that an overnight delay in concrete placement is anticipated, the foundation excavations should be cut approximately 6 inches high and subsequently excavated to final grade immediately before placement of concrete.

The following design values can be utilized to design the foundations for uplift and lateral loading:

Backfill Total density (γ)	-	120 pcf
Ultimate shear strength in the rock formation	-	8,000 psf
Coefficient of friction between concrete and rock	-	0.4

Based on the table 1615.1.1 of the OBC Building Code, the test boring results and review of the geology in vicinity to the project area, a site classification of 'B' can be utilized for the foundation design.

Drilled Caissons

Alternatively, the proposed communication tower can be supported on a deep-seated foundation system consisting of drilled caissons bearing within the area's weathered sandstone bedrock formation. Based on the field drilling operations, the area's rock formation was encountered at depths of about 5.0 to 6.5 feet below the existing surface grades. **Therefore, the exact depth to the caisson bearing surface should be established at each caisson location prior to drilling operations.**

Design factors for the design of the individual caissons as a function of penetration are as follows:

Penetration Depth (**)	**Allowable Factors**	
Feet	**Factor "F"**	**Factor "E"**
7.0	3	7
10.0'	5	11
15.0'	7	13
20.0'	9	19

(**) - Penetration depth is defined below the existing site grades.

Allowable caisson capacity is defined by the following relationships:

$$Q_c = AE + PF$$
$$Q_t = PF$$

Where,

Q_c and Q_t	-	Allowable Compression and Tension Capacity in Kips
P	-	Caisson Perimeter, Feet
A	-	Caisson End Area, Square Feet
F	-	Friction Factor
E	-	End Bearing Factor

The corresponding factor of safety will be in the range of 2 to 3.

Caisson excavations are to be concreted immediately following inspection and approval and are to be protected to the fullest extent possible from groundwater ingress and inundation. In the event that it is impossible to dewater any given excavation, concreting operations are to be carried out employing carefully controlled full depth tremie devices and procedures. It is recommended that concrete in a caisson be poured the same day that the caisson is drilled and have a slump of 6-8 inches. Reinforcement for the individual caisson units should be designed for the maximum bending moment and shear force expected at any section of the caisson member during the worst loading conditions. Every precaution is to be taken during the course of casing removal procedures to preclude the possibility of groundwater or soil "blow in" below the bottom of the casing.

During the course of the concreting operations care is to be exercised to protect and to prevent misalignment of the included reinforcing steel.

Communication Shelter

Considering the subsurface conditions, the proposed precast and prefabricated concrete-steel communication shelter building structure will be founded on a rigid concrete mat foundation. Foundations supporting the proposed structure can bear on the natural or compacted engineered fill soils, and can be designed utilizing a maximum allowable soil bearing pressure of 2,500 pounds per square foot (psf). Also, we recommend that a subgrade modulus (k) of 100 pci be used in design calculations.

The mat foundation can be designed with a perimeter frost cut-off wall bearing at a depth of at least 42 inches below the finished grades. Bottom depth of the mat can be 12 inches below the finished grades. The concrete should be placed in accordance with ACI specifications. The mat foundation should be suitably reinforced per structural considerations. We recommend that a minimum of 6-inch thick, free-draining granular material, such as AASHTO No.57 stone, be placed beneath the mat foundation to

enhance drainage. A representative of PSI should be present during foundation construction.

Footing bearing surfaces are to be critically inspected and tested to verify consistency and compatibility with subsurface exploration data, and to assure that the recommended bearing capacity is being achieved. A representative of PSI should be present at the site during foundation excavation and construction.

Based on the structural loads, it is anticipated that total and differential foundation settlements will be less than 1.0-inch and 0.50-inch, respectively. However, actual settlements will be dependent upon the depth of the foundations, column spacing, structural loads and other related factors. The structural and architectural design should include provisions for liberally spaced, vertical control joints to minimize the affects of potential settlement.

Drainage and Groundwater Control

No free groundwater was encountered during and after completion of the field drilling operations at nay of the test boring locations. However, groundwater seepage may be encountered during the foundation excavation. Therefore, a gravity drainage system, sump pump or other conventional dewatering procedure, as deemed necessary for the field conditions should be implemented throughout excavation and construction, such that the water elevation is maintained at least 2 feet below the excavation bottom at all times. Every effort should be made to keep the excavations dry if water is encountered.

Excavations

In Federal Register, Volume 54, No. 209 (October, 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P." This document was issued to better insure the safety of workers entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations or foundation excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced. If they are not followed closely, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person" as defined in "CFR Part 1926," should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred. If the excavations are left open and exposed to the elements for a significant length of time, desiccation of the clays may create minute shrinkage cracks which could allow large pieces of clay to collapse or slide into the excavation.

Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

Weather Considerations

The soils encountered at the sites are known to be sensitive to disturbances caused by construction traffic and to changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Care should be exercised during the grading operations at the site. Due to the fine-grained nature of the surficial soils, the traffic of heavy equipment, including heavy compaction equipment, may very well create pumping and a general deterioration of those soils in the presence of water. Therefore, the grading should, if at all possible, be performed during a dry season. A layer of crushed stone may be required to allow the movement of construction traffic over the site during the rainy season. The contractor should maintain positive site drainage and if wet/pumping conditions occur, the contractor will be responsible to over excavate the wet soils and replace them with a properly compacted structural fill.

REPORT LIMITATIONS

The recommendations submitted are based on the available subsurface information obtained by PSI and design details furnished by Jobes Henderson & Associates, Inc., for the proposed project. If there are any revisions to the plans for the proposed project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the geotechnical recommendations for the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein, have been presented after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are complete, it is recommended that PSI be provided the opportunity to review the final design and specifications, in order to verify that the earthwork and foundation recommendations are properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Jobes Henderson & Associates, Inc., for the specific application to the proposed communication tower, located off of Township Highway 188, in Keene Township, Coshocton County, Ohio.

APPENDIX

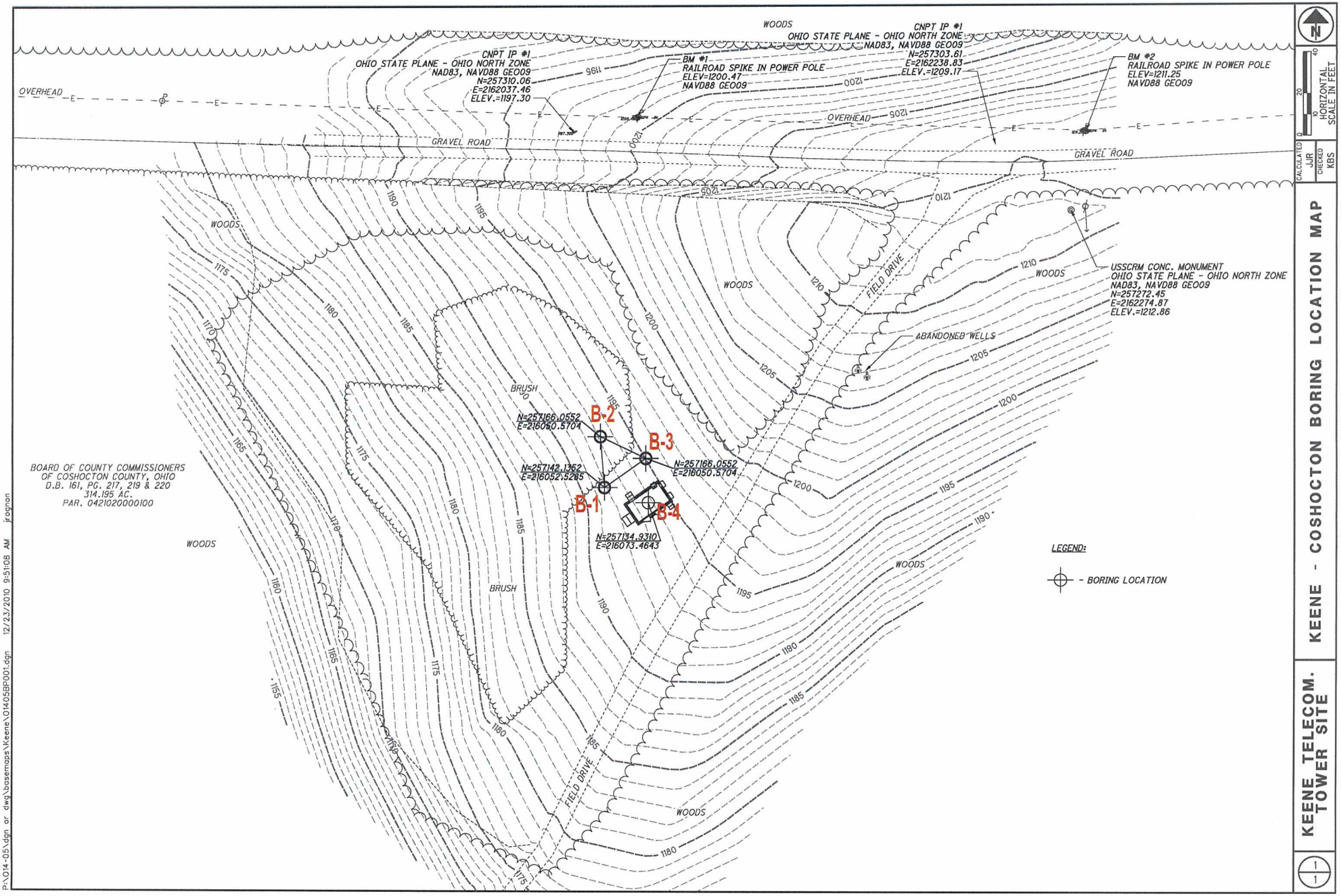
Boring Location Plan

Boring Logs

Reports of Soil Analysis

General Notes

USCS Soil Classification Chart


CNPT IP #1
OHIO STATE PLANE - OHIO NORTH ZONE
NAD83, NAVD88 GEO09
N=257310.06
E=2162037.46
ELEV.=1197.30
BM #1
RAILROAD SPIKE IN POWER POLE
ELEV=1200.47
NAVD88 GEO09
CNPT IP #1
OHIO STATE PLANE - OHIO NORTH ZONE
NAD83, NAVD88 GEO09
N=257303.61
E=2162238.83
ELEV.=1209.17
BM #2
RAILROAD SPIKE IN POWER POLE
ELEV=1211.25
NAVD88 GEO09
USSCRM CONC. MONUMENT
OHIO STATE PLANE - OHIO NORTH ZONE
NAD83, NAVD88 GEO09
N=257272.45
E=2162274.87
ELEV.=1212.86
OVERHEAD
GRAVEL ROAD
FIELD DRIVE
ABANDONED WELLS
WOODS
BRUSH
B-1
B-2
B-3
B-4
N=257166.0552
E=216050.5704
N=257142.1362
E=216052.5285
N=257166.0552
E=216050.5704
N=257134.9310
E=216073.4643
BOARD OF COUNTY COMMISSIONERS
OF COSHOCTON COUNTY, OHIO
D.B. 161, PG. 217, 219 & 220
314.195 AC.
PAR. 0421020000100
LEGEND:
- BORING LOCATION
HORIZONTAL SCALE IN FEET
CALCULATED JJR
CHECKED KDS
KEENE TELECOM. TOWER SITE
KEENE - COSHOCTON BORING LOCATION MAP
1-1
P:\014-05\dgn or dwg\basemaps\Keene\014058P001.dgn 12/23/2010 9:51:08 AM jrognon

Client: Jobes Henderson & Associates, Inc.	PSI Project #0142-402	Boring Log Number: B-1
	Sheet: 1 of 1	
Project: Proposed Cell Tower	Location: Township Hwy. 188, Keene Township, Coshocton County, Ohio	

Professional Service Industries, Inc.

Surface Elevation: 1190.00± MSL

Sample No./Type	Description of Material	Elevation (ft)	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)
1SS	Medium Stiff, Brown, Moist, Clayey SILT, Little Sand, Trace Gravel (ML)			7 (4-3-4)	15		
2SS	** PI = 4		5	5 (2-2-3)	18	23	27
3SS	Slightly Strong to Strong, Damp, Brown, Weathered SANDSTONE	1184.5		50/3" (46-50/3")	10		
4SS	END OF BORING	1181.4		50/1" (50/1")	7		

⊗ "N" Blows Per Foot (0 20 40 60)

○ Unconfined Compressive Strength (tsf)

Calibrated Hand Penetrometer (tsf) (0 2 4 6)

Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

▽ Water Level While Drilling None

▼ Water Level At Completion None

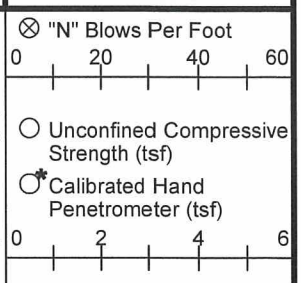
_____ After Completion

Boring Started: 1/27/2011	Completed: 1/27/2011		Engineer: ST
Drilling Method: 2.25" HSA		Office: Cleveland	Drawn By: JM
Driller: B.T.	Drill Rig: CME-55	Hole Depth (ft): 8.6	Approved:

Note: Boring backfilled with soil/auger cuttings.

Client: Jobes Henderson & Associates, Inc.	PSI Project #0142-402	Boring Log Number: B-2	Professional Service Industries, Inc.
	Sheet: 1 of 1		
Project: Proposed Cell Tower	Location: Township Hwy. 188, Keene Township, Coshocton County, Ohio		

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Elevation (ft)	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)
					Surface Elevation: 1191.92± MSL					
1SS					Stiff, Brown, Moist, Clayey SILT, Little Sand, Trace Gravel, Trace Organics (ML)		14 (5-6-8)	15		
2SS							12 (7-7-5)	15		
						5				
3SS *				1185.4	Moderately Strong, Brown, Damp, Weathered SANDSTONE		8-50/2" (4-8-50/2")	17 10		
4SS				1183.3			50/0.5" (50/0.5")	5		
					END OF BORING					



Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

▽ Water Level While Drilling None	Boring Started: 1/27/2011	Completed: 1/27/2011		Engineer: ST
▼ Water Level At Completion None	Drilling Method: 2.25" HSA		Office: Cleveland	Drawn By: JM
_____ After Completion	Driller: B.T.	Drill Rig: CME-55	Hole Depth (ft): 8.6	Approved:
	Note: Boring backfilled with soil/auger cuttings.			

Client: Jobes Henderson & Associates, Inc.	PSI Project #0142-402	Boring Log Number: B-3
	Sheet: 1 of 1	
Project: Proposed Cell Tower	Location: Township Hwy. 188, Keene Township, Coshocton County, Ohio	

Professional Service Industries, Inc.

Surface Elevation: 1193.73± MSL

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Elevation (ft)	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)
1SS					Medium Stiff to Hard, Brown, Moist, Clayey SILT, Little Sand, Trace Gravel (ML)		6 (3-3-3)	18		
2SS							11 (4-6-5)	21		
						5				
3SS *				1187.7	Very Weak to Moderately Strong, Brown, Damp, Medium Grain, Thin to Medium Bedding, Slightly to Highly Weathered SANDSTONE		32 (13-20-12)	17 6		
4SS							18 (12-9-9)	12		
						10				
5SS					ROCK CORE DATA Run: 13.8' to 18.8' Recovery: 86% R.Q.D.: 71% Unconfined Compressive Strength: 14.0' - 14.5' - 2814 psi 15.5' - 16.0' - 2925 psi		50/4" (50/4")	6		
						15				
				1174.9	END OF BORING					

"N" Blows Per Foot: 0 20 40 60

Unconfined Compressive Strength (tsf)

Calibrated Hand Penetrometer (tsf): 0 2 4 6

Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

Water Level While Drilling None

Water Level At Completion None

_____ After Completion

Boring Started: 1/27/2011	Completed: 1/27/2011		Engineer: ST
Drilling Method: 2.25" HSA		Office: Cleveland	Drawn By: JM
Driller: B.T.	Drill Rig: CME-55	Hole Depth (ft): 18.8	Approved:
Note: Boring backfilled with soil/auger cuttings.			

Client: Jobes Henderson & Associates, Inc.	PSI Project #0142-402	Boring Log Number: B-4
	Sheet: 1 of 1	
Project: Proposed Cell Tower	Location: Township Hwy. 188, Keene Township, Coshocton County, Ohio	Professional Service Industries, Inc.

Surface Elevation: 1192.38± MSL

Sample No./Type	Sample Location	Sample Recovery	Graphical Log	Elevation (ft)	Description of Material	Depth (ft)	Blows Per Foot	Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)
1SS					Medium Stiff to Very Stiff, Brown, Moist, Clayey SILT, Little Sand, Little Gravel (ML)		8 (3-3-5)	16		
2SS					** PI = 5		21 (5-8-13)	12	23	28
				1187.4		5				
3SS					Slightly Strong, Brown, Damp, Weathered SANDSTONE		50/4" (50/4")	8		
4SS				1183.7			50/2" (50/2")	6		
					END OF BORING					

"N" Blows Per Foot: 0 20 40 60

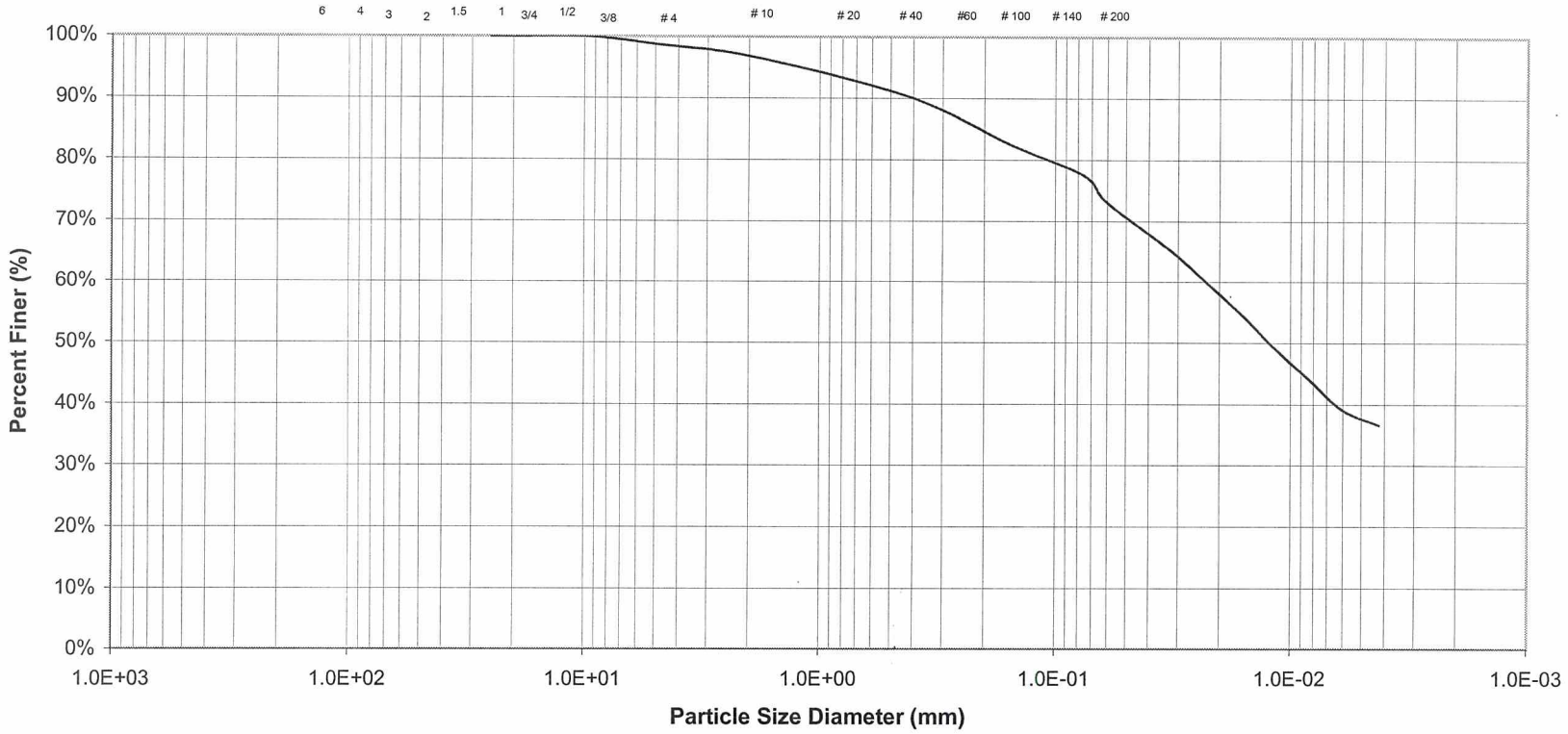
Unconfined Compressive Strength (tsf)

Calibrated Hand Penetrometer (tsf): 0 2 4 6

Note: The stratification lines indicated here are approximate. In-situ, the transition between soil types may be gradual.

▽ Water Level While Drilling None	Boring Started: 1/27/2011	Completed: 1/27/2011	Engineer: ST
▼ Water Level At Completion None	Drilling Method: 2.25" HSA	Office: Cleveland	Drawn By: JM
_____ After Completion	Driller: B.T.	Drill Rig: CME-55	Hole Depth (ft): 8.7	Approved:
	Note: Boring backfilled with soil/auger cuttings.		

U.S. STANDARD SIEVE OPENINGS IN INCHES | U.S. STANDARD SIEVE NUMBERS | HYDROMETER

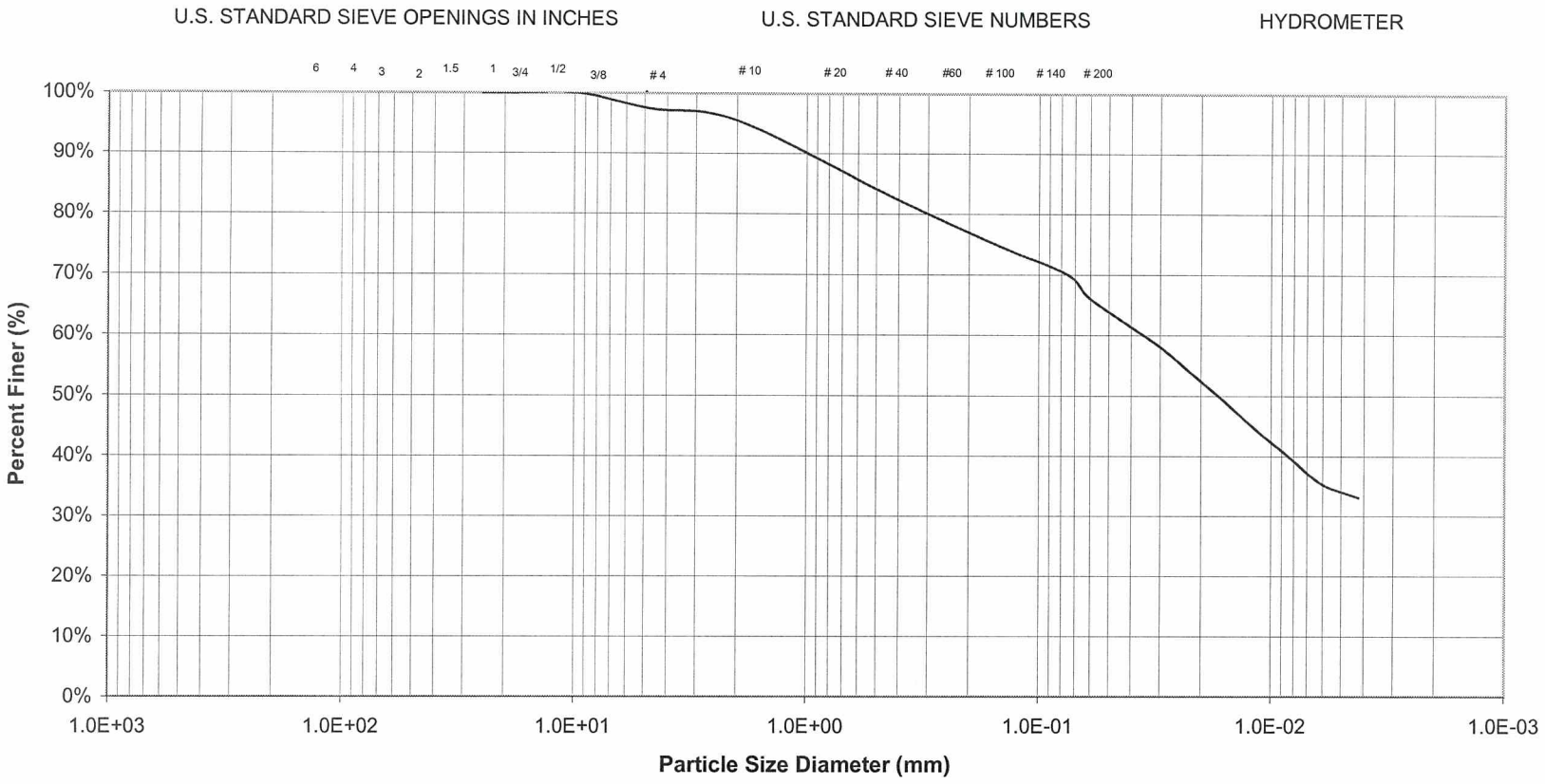


COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Boring No.	Sample No.	Depth	Classification	Nat. w	LL	PL	PI	Project
B-1	SS-2	2.5'-4.0'	Clayey SILT, Some Sand, Trace		27	23	4	Jobes Henderson & Associates, Inc.
			Gravel (ML)					Proposed Communication Tower
								Township Hwy. 188
Max. Particle Size (in)								Keene Township, Coshocton County, Ohio

REPORT OF SOIL ANALYSIS

File No. 0142-402



COBBLE	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Boring No.	Sample No.	Depth	Classification	Nat. w	LL	PL	PI	Project
B-4	SS-2	2.5'-4.0'	Clayey SILT, Some Sand, Trace		28	23	5	Jobes Henderson & Associates, Inc.
			Gravel (ML)					Proposed Communication Tower
								Township Hwy. 188
Max. Particle Size (in)								Keene Township, Coshocton County, Ohio

REPORT OF SOIL ANALYSIS

File No. 0142-402

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split-spoon.
Qu:	Unconfined compressive strength, tsf.
Qp:	Penetrometer value, index value of unconfined compressive strength, tsf.
Mc:	Water content, %.
PL:	Plastic limit, %.
LL:	Liquid Limit, %.
PI:	Plasticity Index.
γd:	Natural dry density, pcf.
▼	Groundwater level observed at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

SS:	Split-Spoon – 1 3/8" I.D., 2" O.D., except where noted.
ST:	Shelby Tube – 3" O.D., except where noted.
AU:	Auger Sample.
DB:	Diamond Bit.
CB:	Carbide Bit.
WS:	Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION (Terzaghi & Peck, 1948)

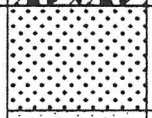
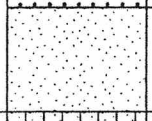
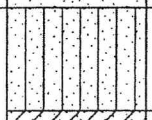
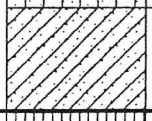
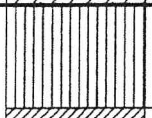
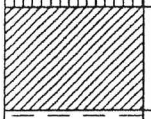
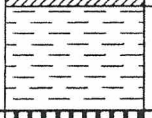
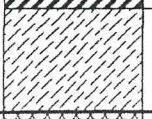
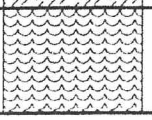
TERM (COHESIONLESS SOILS)	STANDARD PENETRATION RESISTANCE
Very Loose	0 – 4
Loose	4 – 10
Medium	10 – 30
Dense	30 – 50
Very Dense	Over 50

TERM (COHESIVE SOILS)	Qu – (TSF)
Very Soft	0 – 0.25
Soft	0.25 – 0.50
Medium	0.50 – 1.00
Stiff	1.00 – 2.00
Very Stiff	2.00 – 4.00
Hard	4.00+

PARTICLE SIZE (ASTM D2487 AND D422)

Boulders	≥ 12 in. (300mm)
Cobbles	< 12 in.(300mm) to 3 in. (75mm)
Gravel	< 3 in. (75mm) to 4.75mm (#4 sieve)
Coarse Sand	<4.75mm (#4 sieve) to 2mm (#10 sieve)
Medium Sand	<2mm (10 sieve) to 425μm (#40 sieve)
Fine Sand	<425μm (#40 sieve) to 75μm (#200 sieve)
Silt	<75μm (#200 sieve) to 5μm
Clay	<5μm

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Jobes Henderson & ASSOCIATES

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Tel: 740.344.5451
Fax: 740.344.5746

59 Grant Street
Newark, Ohio 43055

INGRESS/EGRESS EASEMENT
DESCRIPTION FOR A 0.111 ACRE TRACT

Situated in the State of Ohio, County of Coshocton, Township of White Eyes, being a part of the Northwest quarter of Section 5, Township 6, Range 5, and being part of that 314.195 acre tract as conveyed to the Board of County Commissioners of Coshocton County, Ohio by deed of record in Deed Book 161, Page 217-220, all references being to those of record in the Recorder's Office, Coshocton County, Ohio, said 0.111 acre tract being more particularly bounded and described as follows:

Commencing for reference at the Northwest Corner of Section 5, White Eyes Township;

Thence along the westerly line of Section 5, **South 01°49'05" West, 985.91 feet** to a point on the centerline of Township Road 188;

Thence along the centerline of Township Road 188, the following three (3) courses and distances:

South 87°57'43" East, 300.32 feet to a point;

South 87°32'36" East, 121.35 feet to a point; and…

South 89°16'57" East, 41.28 feet to the **Point of Beginning** for the **0.111 acre INGRESS/EGRESS EASEMENT** herein to be described;

Thence continuing along said centerline, **South 89°16'57" East, 26.07 feet** to a point;

Thence leaving said centerline and across said 314.195 acre tract, the following seven (7) courses and distances:

South 40°37'33" West, 120.17 feet to a point;

South 30°50'10" West, 117.42 feet to a point;

North 34°40'48" West, 42.78 feet to a point on the southerly line of a 0.230 acre Lease Area;

North 55°19'12" East, along said southerly line, **20.00 feet** to a point;

South 34°40'48" East, 11.69 feet to a point;

North 30°50'10" East, 88.05 feet to a point; and…

North 40°37'33" East, 105.15 feet to the **Point of Beginning** and containing **0.111 acres,** more or less, according to a survey conducted by Jobes Henderson and Associates, Inc. in December of 2010.

The bearings in the above description are based on the Ohio State Plane Coordinate System, South Zone.

Subject to all valid and existing easements, restrictions and conditions of record.

January 25, 2011
P:/O14-05/survey/legals/Coshocton/0.111acres

Jeremy L. Van Ostran, P.S.
Surveyor No. 8283

Jobes Henderson & ASSOCIATES

www.jobeshenderson.com

Tel: 740.344.5451
Fax: 740.344.5746

59 Grant Street
Newark, Ohio 43055

LEASE AREA
DESCRIPTION FOR A 0.230 ACRE TRACT

Situated in the State of Ohio, County of Coshocton, Township of White Eyes, being a part of the Northwest quarter of Section 5, Township 6, Range 5, and being part of that 314.195 acre tract as conveyed to the Board of County Commissioners of Coshocton County, Ohio by deed of record in Deed Book 161, Page 217-220, all references being to those of record in the Recorder's Office, Coshocton County, Ohio, said 0.230 acre tract being more particularly bounded and described as follows:

Commencing for reference at the Northwest Corner of Section 5, White Eyes Township;

Thence along the westerly line of Section 5, **South 01°49'05" West, 985.91 feet** to a point on the centerline of Township Road 188;

Thence along the centerline of Township Road 188, the following two (2) courses and distances:

South 87°57'43" East, 300.32 feet to a point; and …

South 87°32'36" East, 3.01 feet to a point,

Thence leaving said centerline and across said 314.195 acre tract, **South 03°31'07" West, 59.59 feet** to an iron pin set at the **Point of Beginning** for the **0.230 acre LEASE AREA** herein to be described;

Thence continuing across said 314.195 acre tract, the following four (4) courses and distances:

South 34°40'48" East, 100.00 feet to an iron pin set;

South 55°19'12" West, 100.00 feet to an iron pin set;

North 34°40'48" West, 100.00 feet to an iron pin set; and…

North 55°19'12" East, 100.00 feet to the **Point of Beginning** and containing **0.230 acres,** more or less, according to a survey conducted by Jobes Henderson and Associates, Inc. in December of 2010.

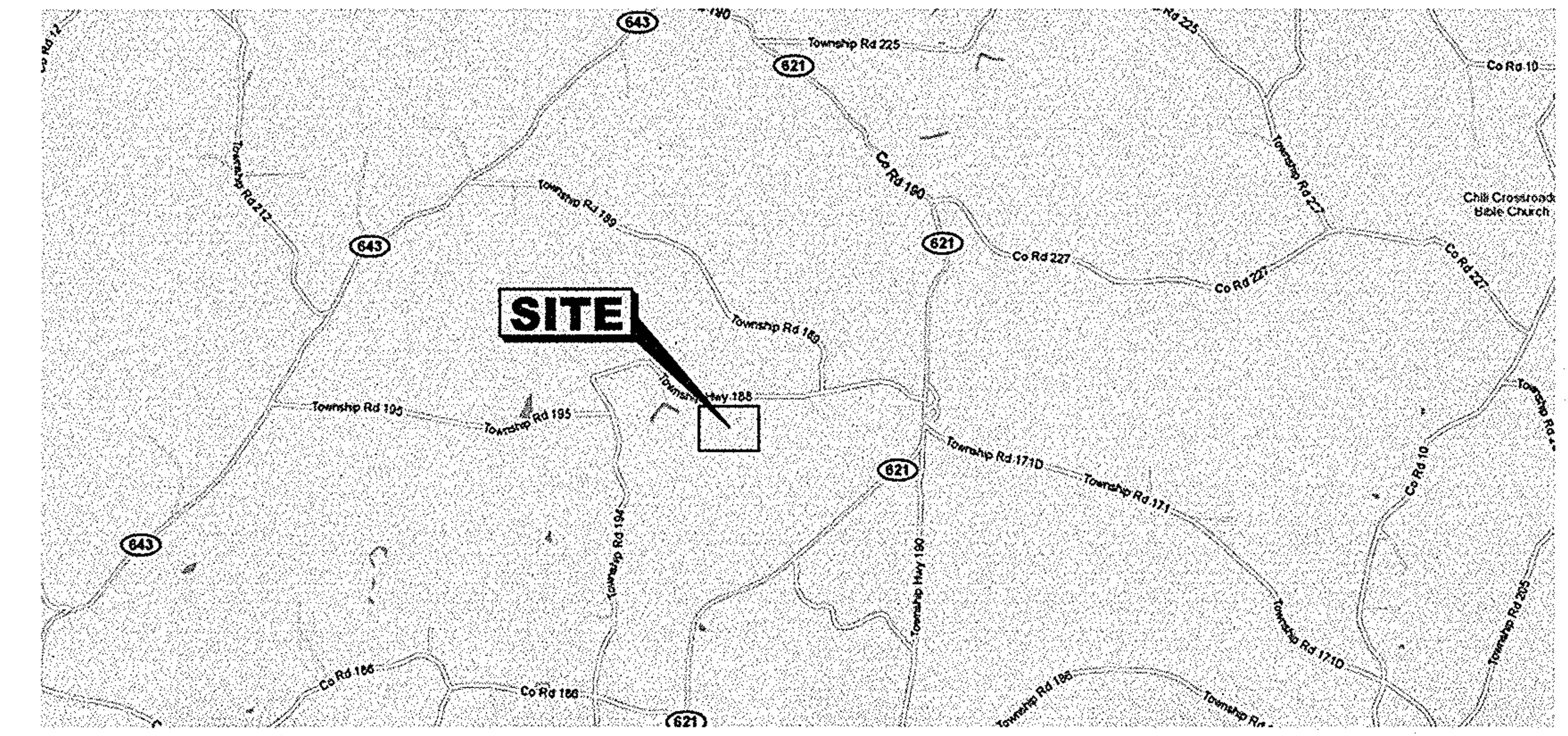
The bearings in the above description are based on the Ohio State Plane Coordinate System, South Zone.

Subject to all valid and existing easements, restrictions and conditions of record.

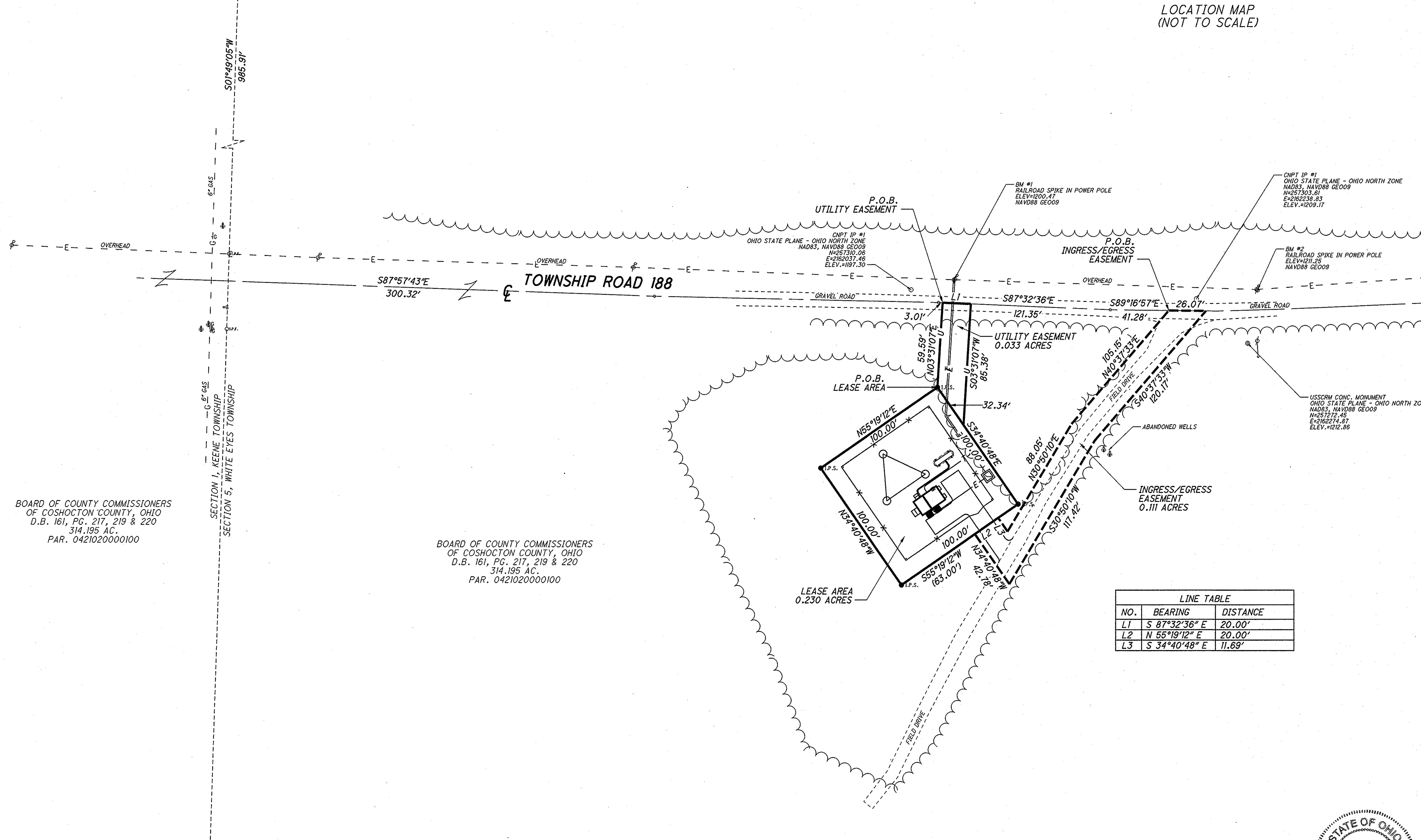
January 25, 2011
P:/O14-05/survey/legals/Coshocton/0.230acres

Jeremy L. Van Ostran, P.S.
Surveyor No. 8283

NOTE:
BEARINGS HEREIN ARE BAS ON THE OHIO STATE PLANE COORDINATE SYSTEM - NORTH ZONE.



LOCATION MAP
(NOT TO SCALE)



LINE TABLE		
NO.	BEARING	DISTANCE
L1	S 87°32'36" E	20.00'
L2	N 55°19'12" E	20.00'
L3	S 34°40'48" E	11.69'

LEGEND

- : FIRE HYDRANT
- : WATER SHUTOFF VALVE
- : WATER VALVE
- :GAS VALVE
- : GASLINE MARKER
- : POWER POLE
- : ANCHOR
- : RAILROAD SPIKE FOUND
- I.P.F. : IRON PIN FOUND
- P.K.F. : PK NAIL FOUND
- I.P.S. : IRON PIN SET (5/8" REBAR WITH RED ID CAP STAMPED "JHA 8283")
- : ANGLE POINT

JEREMY L. VAN OSTRAN P.S. 8283

STATE OF OHIO JEREMY LEWIS VAN OSTRAN 8283 REGISTERED SURVEYOR 1/27/11

HORIZONTAL SCALE IN FEET: 0 20 40 80

ORIGINAL SHEET SIZE: 22"X34"

NO.	REVISION	DATE
--	--	--
--	--	--
--	--	--
--	--	--
--	--	--

DRAWN: MJM
CHECKED: —
REVIEWED: —
DATE: 01/25/11

Jobes Henderson & ASSOCIATES
Breaking Ground | Breaking Boundaries
Tel: 740.344.5451
Fax: 740.344.5746
59 Grant Street
Newark, Ohio 43055
www.jobeshenderson.com

TOWER SITE
KEANE-WHITE EYES TWP.

COSHOCTON COUNTY, OHIO

DRAWING NAME: KEANE

JOB NUMBER: 014-05

1 / 1

Jobes Henderson & ASSOCIATES

www.jobeshenderson.com

Tel: 740.344.5451
Fax: 740.344.5746

59 Grant Street
Newark, Ohio 43055

UTILITY EASEMENT
DESCRIPTION FOR A 0.033 ACRE TRACT

Situated in the State of Ohio, County of Coshocton, Township of White Eyes, being a part of the Northwest quarter of Section 5, Township 6, Range 5, and being part of that 314.195 acre tract as conveyed to the Board of County Commissioners of Coshocton County, Ohio by deed of record in Deed Book 161, Page 217-220, all references being to those of record in the Recorder's Office, Coshocton County, Ohio, said 0.033 acre tract being more particularly bounded and described as follows:

Commencing for reference at the Northwest Corner of Section 5, White Eyes Township;

Thence along the westerly line of Section 5, **South 01°49'05" West,** a distance of **985.91 feet** to a point on the centerline of Township Road 188;

Thence along the centerline of Township Road 188, the following two (2) courses and distances:

South 87°57'43" East, a distance of **300.32 feet** to a point; and …

South 87°32'36" East, a distance of **3.01 feet** to the **Point of Beginning** for the **0.019 acre UTILITY EASEMENT** herein to be described;

Thence continuing along said centerline, **South 87°32'36" East,** a distance of **20.00 feet** to a point;

Thence leaving said centerline and across said 314.195 acre tract, the following three (3) courses and distances:

South 03°31'07" West, a distance of **85.38 feet** to a point on the easterly line of a 0.230 acre Lease Area;

North 34°40'48" West, along said easterly line, a distance of **32.34 feet** to an iron pin set; and…

North 03°31'07" East, a distance of **59.59 feet** to the **Point of Beginning** and containing **0.033 acres,** more or less, according to a survey conducted by Jobes Henderson and Associates, Inc. in December of 2010.

The bearings in the above description are based on the Ohio State Plane Coordinate System, South Zone.

Subject to all valid and existing easements, restrictions and conditions of record.

January 25, 2011
P:/O14-05/survey/legals/Coshocton/0.033acres

Jeremy L. Van Ostran, P.S.
Surveyor No. 8283