

USD 320 Wamego-Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

Addendum 2

Issue Date: 7-26-17

Architect: BBN Architects Inc.

MEP: Orazem & Scalora Engineering, P.A.

Civil Engineer: SMH Consultants

Construction Manager: Coonrod & Associates Construction Co., Inc.

Owner: USD 320 Wamego

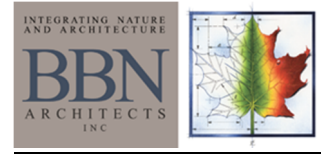
The attached documents and / or items below shall hereby become part of the Construction Documents for the referenced project above.

2-1: Add the following (attached) specification section to the Specifications / Project Manual.

- **071326- Self-Adhering Sheet Waterproofing**
- **075213-Atactic-Polypropylene (APP) Modified Bituminous Membrane Roofing**
- **101116-Markerboards**
- **115213-Projection Screens**

2-2: Replace the existing specification sections / plan sheet in the Specifications / Project Manual with the new specification sections / plan sheet (attached), listed below.

- **077100-Roof Specialties**
- **095113-Acoustical Panel Ceilings**
- **096723-Resinous Flooring**
- **096813-Tile Carpeting**
- **105115-Metal Athletic Lockers**
- **District Kitchen- Sheet C1: Site Plan**



- **District Kitchen- Sheet A002: Wall Types**
- **District Kitchen- Sheet A102: Floor Plan**
- **District Kitchen- Sheet A103: Reflected Ceiling Plan**
- **District Kitchen- Sheet A601: Room Finish Schedule**
- **District Kitchen- Sheet M101: Mechanical Plan**
- **District Kitchen- Sheet P201: Plumbing Waste & Vent Plan**
- **Sports Complex Locker Room- Sheet M101- Mechanical Plan**
- **Sports Complex Locker Room- Sheet E101- Electrical Plans**
- **Sports Complex Locker Room- Sheet P101- Plumbing Plans**
- **Sports Complex Locker Room- Sheet P201- Plumbing Details**

2-3: Attached are the schedules for each building (Sports Complex Locker Room and District Central Kitchen). This is for informational purposes only and is a guideline. The CMAR reserves the right to change this schedule as they see fit.

2-4: Attached are “Utility Scope Clarifications”. These are to clarify the Utilities scope of work (scope package 33A). There will be a future utility bid package that will be bid out at a later date.

2-5: Attached is a “Construction Zone” plan. This is to show the areas that we will be working in and will be blocked off to public access.

2-6: Attached are this phase and bid package’s (Phase 2, BP1), scopes.

2-7: Attached is the subcontractor / supplier bid form that is requested to be used by all bidders.

2-8: Reference Specifications Section 287210 2.1B - Section shall be changed to require a minimum of 50 points, not the 200 points previously described

2-9: Add attached Geotechnical Report to specification sections / project manual.

SECTION 07 13 26 - SELF-ADHERING SHEET WATERPROOFING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Modified bituminous sheet waterproofing, fabric reinforced.
 2. Foundation insulation.
 3. Molded drainage panels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.
- C. Samples: For each exposed product and for each color and texture specified, including the following products:
1. 8-by-8-inch (200-by-200-mm) square of waterproofing and flashing sheet.
 2. 4-by-4-inch (100-by-100-mm) square of drainage panel.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and molded-sheet drainage panels from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil (0.10-mm) thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide W. R. Meadows, Inc; Mel-Rol or comparable product by one of the following:
 - a. American Hydrotech, Inc.
 - b. Carlisle Coatings & Waterproofing Inc.
 - c. CETCO, a Minerals Technologies company.
 - d. GCP Applied Technologies Inc. (formerly Grace Construction Products).
 - 2. Physical Properties:

- a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970/D 1970M.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836/C 836M.
 - e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154/E 154M.
 - f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
 - g. Water Vapor Permeance: 0.05 perm (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
 - h. Hydrostatic-Head Resistance: 200 feet (60 m) minimum; ASTM D 5385.
3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid solvent-borne primer recommended for substrate by sheet-waterproofing material manufacturer.
- C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.
- D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.
- E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.
- F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8-inch (25 by 3 mm), predrilled at 9-inch (229-mm) centers.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft. (112 to 261 L/min. per m).

1. Basis-of-Design Product: Subject to compliance with requirements, provide W. R. Meadows, Inc; Mel-Drain 5035-B or comparable product by one of the following:
 - a. American Hydrotech, Inc.
 - b. Carlisle Coatings & Waterproofing Inc.
 - c. CETCO, a Minerals Technologies company.
 - d. GCP Applied Technologies Inc. (formerly Grace Construction Products).

2.5 INSULATION PANELS

- A. Unfaced, Wall-Insulation Type VI, Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.
 1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch (1.6 mm).
- F. Footing-to-Wall Intersections: Install liquid membrane to build-up horizontal surfaces of footings to provide slope for drainage.
- G. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
 - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- H. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
 - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of liquid membrane on horizontal inside corners and as follows:
 - a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.
- I. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.
- C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
 - 1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).
- D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

- E. Seal edges of sheet-waterproofing terminations with mastic.
- F. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.
- G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150 mm) beyond repaired areas in all directions.

3.4 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install board insulation before installing drainage panels.

3.5 INSULATION PANEL INSTALLATION

- A. Install insulation panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.
- B. On vertical surfaces, set insulation panels in adhesive or tape applied according to manufacturer's written instructions.
- C. On horizontal surfaces of footings, loosely lay insulation panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.
- B. Prepare test and inspection reports.

3.7 PROTECTION, REPAIR, AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

- D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 13 26

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SECTION 07 52 13 - APP MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
1. Atactic-polypropylene (APP)-modified bituminous membrane roofing.
 2. Manufactured copings, reglets, and counterflashing.
 3. Vapor retarder.
 4. Roof insulation.
 5. Cover board.
 6. Walkways.
- B. Related Requirements:
1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
 2. Section 07 71 00 "Roof Specialties" for roof edge specialties and drainage systems.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
 1. Layout and thickness of insulation.
 2. Base flashings and membrane terminations.
 3. Flashing details at penetrations.
 4. Tapered insulation, including slopes.
 5. Crickets, saddles, and tapered edge strips, including slopes.
 6. Insulation-fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Samples for Verification: For the following products:
 1. Cap sheet, of color required.
 2. Flashing sheet, of color required.
 3. Walkway pads or rolls, of color required.
- D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Manufacturer Certificates:
 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - a. Submit evidence of compliance with performance requirements.
 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For roof membrane and insulation, tests performed by a qualified testing agency indicating compliance with specified requirements.

- D. Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Field quality-control reports.
- F. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Protect stored liquid material from direct sunlight.
 - 2. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources.
 - 1. Store in a dry location.
 - 2. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, vapor retarder substrate board, and other components of roofing system.
 2. Warranty Period: 20 years from date of Substantial Completion.
- B. Extension of Warranty Period Proposal: Submit a proposal from Installer to Owner, in the form of an extension of the special warranty for an additional five-years, starting on date initial special warranty is concluded.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard five-year maintenance agreement, starting on date initial correction period is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide indicated products by Performance Roofing Systems, Inc., or comparable products by the following
1. Johns Manville; a Berkshire Hathaway company.
- B. Roofing Membrane System Products:
1. Roofing Sheet: Performance Roof Systems, Inc., "Derbigum GP."
 2. Cap Sheet: Performance Roof Systems, Inc., "Derbicolor GP-**FR**."
- C. Source Limitations: Obtain components including re-cover boards and fasteners for new roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to

defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures.
- D. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system, and shall be listed in FM Global' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
1. Fire/Windstorm Classification: Class 1A-90.
 2. Hail-Resistance Rating: SH.
- E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, ~~Class B~~ Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING SHEET MATERIALS

- A. Roofing Membrane Sheet: ASTM D 6223/D 6223M, Grade S, Type I or II, APP-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); smooth surfaced; suitable for application method specified.
- B. Granule-Surfaced Roofing Cap Sheet: ASTM D 6223/D 6223M, Grade G, Type I or II, fire-resistant, APP-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); granule surfaced; suitable for application method specified, and as follows:
1. Granule Material: Mineral ceramic coated.
 2. Granule Color: White.

2.4 BASE FLASHING SHEET MATERIALS

- A. Flashing Base: ASTM D 6509/D 6509M, Grade S, Type I or II, APP-modified bitumen sheet (reinforced with glass fibers); smooth surfaced; suitable for application method specified; 120 mils (3.0 mm).

- B. Granule-Surfaced Flashing Sheet: ASTM D 6223/D 6223M, Grade G, Type I or II, APP-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); granule surfaced; suitable for application method specified, and as follows:

1. Granule Color: White.

2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.
1. Basis of Design Product: Performance Roof Systems, Inc., "Permastic."
- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- D. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve, color to match roofing.
- E. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.6 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Building Products.
 - c. National Gypsum Company.
 - d. USG Corporation.
 2. Thickness: 5/8 inch (16 mm).
 3. Surface Finish: Factory primed.

- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.7 VAPOR RETARDER

- A. Self-Adhering-Sheet Vapor Retarder: ASTM D 1970/D1970M polyethylene film laminated to layer of rubberized asphalt adhesive, minimum 40-mil- (1.0-mm-) total thickness; maximum permeance rating of 0.1 perm (6 ng/Pa x s x sq. m); cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.

2.8 ROOF INSULATION

- A. General: Preformed roof insulation boards, manufactured or approved by roof membrane manufacturer, approved for use in FM Approvals' RoofNav-listed roofing system identical to that used for this Project.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 3, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle SynTec Incorporated.
 - b. CertainTeed Corporation.
 - c. GAF.
 - d. Hunter Panels.
 - e. Johns Manville; a Berkshire Hathaway company.
 - 2. Compressive Strength: 25 psi (172 kPa).
 - 3. Size: 48 by 48 inches (1219 by 1219 mm).
 - 4. Thickness:
 - a. Base Layer: 2 inches (51 mm).
 - b. Upper Layer: 2 inches (51 mm).
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch (6 mm).
 - 3. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.9 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and re-cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Bead Applied Insulation Adhesive: Insulation manufacturer's recommended bead applied low rise two component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Full-spread spray-applied, low-rise, two-component urethane foam adhesive.
 - 2. Basis of Design Product: Performance Roof Systems, Inc., "Derbibond."
- D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- F. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Building Products.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - 2. Thickness: 1/4 inch (6 mm).
 - 3. Surface Finish: [Factory primed] [Unprimed].

2.10 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Hickman Company, W. P; "PermaSnap Coping System" or products from one of the following:
 - a. Merchant & Evans Inc.
 - b. Metal-Era, Inc.
 - c. Metal-Fab Manufacturing, LLC.
 - 2. Metallic-Coated Steel Sheet Coping Caps: Zinc-coated (galvanized) steel, nominal 0.034-inch (0.86-mm) thickness.
 - a. Surface: Smooth, flat finish.
 - b. Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.

3. Corners: Factory mitered and continuously welded.
4. Coping-Cap Attachment Method: Snap-on or face leg hooked to continuous cleat with back leg fastener exposed, fabricated from coping-cap material.
 - a. Snap-on Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches (300 mm) wide, with integral cleats.

2.11 REGLETS AND COUNTERFLASHINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Fry Reglet Corporation.
 2. Hickman Company, W. P.
 3. Metal-Era, Inc.
 4. Metal-Fab Manufacturing, LLC.
- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
 - 1. Zinc-Coated Steel: Nominal 0.028-inch (0.71-mm) thickness.**
 - ~~1. Stainless Steel: 0.025 inch (0.64 mm) thick.~~
 2. Corners: Factory mitered and continuously welded.
 3. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
 4. Corners: Factory mitered and continuously welded.
 5. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- C. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches (100 mm) and in lengths not exceeding 12 feet (3.6 m) designed to snap into reglets and compress against base flashings with joints lapped, from the following exposed metal:
 - 1. Zinc-Coated Steel: Nominal 0.028-inch (0.71-mm) thickness.**
 - ~~1. Stainless Steel: 0.025 inch (0.64 mm) thick.~~
- D. Accessories:
 1. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
- E. Zinc-Coated Steel Finish: Two-coat fluoropolymer.**
 - 1. Color: As selected by Architect from manufacturer's full range.**
- ~~E. Stainless Steel Finish: No. 2B (bright, cold-rolled, unpolished).~~

2.12 WALKWAYS

- A. Walkway Pads: Reinforced asphaltic composition pads with slip-resisting mineral-granule surface, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 inch (10 mm) thick, minimum.
 - 1. Pad Size: Pad Size: As indicated on the Drawings.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 00 "Steel Decking."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
 - 1. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 INSTALLATION, GENERAL

- A. Comply with roofing system manufacturer's written instructions.
- B. Substrate-Joint Penetrations: Prevent adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
1. Deck Type: I (insulated).
 - a. Substrate Board: Low rise adhesive.
 - b. APP-Modified Asphalt Sheet: Cold applied adhesive.
 - c. APP-Modified Asphalt Cap Sheet with Granular Surfacing: Cold applied adhesive.
- B. Start installation of roofing in presence of manufacturer's technical personnel.
- C. Where roof slope exceeds 1/2 inch per 12 inches (1:24), install roofing sheets parallel with slope.
1. Backnail roofing sheets to substrate according to roofing system manufacturer's written instructions.
- D. Coordinate installation of roofing system so insulation and other components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement, with joints and edges sealed.
 2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.
 3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.5 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (600 mm) in adjacent rows.
1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 2. Tightly butt substrate boards together.
 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

3.6 VAPOR RETARDER INSTALLATION

- A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 and 6 inches (90 and 150 mm), respectively.
 - 1. Extend vertically up parapet walls and projections to a minimum height equal to height of the insulation and cover board.
 - 2. Seal laps by rolling.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.7 INSULATION INSTALLATION

- A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing system with vertical surfaces or angle changes greater than 45 deg F (14 deg C).
- D. Installation Over Metal Decking:
 - 1. Install base layer of insulation with joints staggered not less than 24 inches (600 mm) in adjacent rows.
 - a. Locate end joints over crests of decking.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - 1) Trim insulation, so that water flow is unrestricted.
 - e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - g. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
 - 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.

- 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation, with joints of each layer offset not less than 12 inches (300 mm) from previous layer of insulation.
 - a. Staggered end joints within each layer not less than 24 inches (600 mm) in adjacent rows.
 - b. Install with long joints continuous and with end joints staggered not less than 12 inches (300 mm) in adjacent rows.
 - c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - e. At internal roof drains, slope insulation to create a square drain sump, with each side equal to the diameter of the drain bowl plus 24 inches (600 mm).
 - f. Trim insulation, so that water flow is unrestricted.
 - g. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - h. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - i. Adhere each layer of insulation to substrate using adhesive in accordance with FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines, with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board, so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.9 APP-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

- A. Install modified bituminous roofing sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing sheets over and terminate beyond cants, installing as follows:
 - 1. Adhere to substrate in cold-applied adhesive.
 - 2. Unroll roofing sheets and allow them to relax for minimum time period required by manufacturer.
- B. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 - 1. Repair tears and voids in laps and lapped seams not completely sealed.
 - 2. Apply roofing granules to cover exuded bead at laps while bead is hot.
- C. Install roofing sheets so side and end laps shed water.

3.10 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions and as follows:
 - 1. Prime substrates with asphalt primer if required by roofing system manufacturer.
 - 2. Backer-Sheet Application: Adhere backer sheet to substrate in cold-applied adhesive.
 - 3. Flashing-Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - 1. Seal top termination of base flashing.
- D. Install roofing cap-sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

3.11 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.
2. Interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's required spacing that meets performance requirements.

3.12 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Embedded Reglets: See Section 04 20 00 "Unit Masonry" for installation of reglets as masonry work is installed.
- C. Post Embedded Reglets: Saw cut slot in existing concrete masonry to receive reglets. Slot dimensions shall be 3/8 inch by 1-1/4 inch (9 mm by 32 mm) or as otherwise indicated on the Drawings.
- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches (100 mm) over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with butyl sealant. Fit counterflashings tightly to base flashings.

3.13 WALKWAY INSTALLATION

- A. Walkway Pads: Install walkway pads, using units of size indicated or, if not indicated, of manufacturer's standard size, according to walkway pad manufacturer's written instructions.

3.14 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- B. Roofing system will be considered defective if it does not pass inspections.
 1. Additional inspecting, at Contractor's expense, will be performed to determine if replaced, repaired, or additional work complies with specified requirements.

3.15 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07 52 13

SECTION 10 11 16 - GLASS MARKERBOARDS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Magnetic, optically clear, ghost-free, shatterproof, dry-erase marker.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for markerboards.
- B. Shop Drawings: For markerboards.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
- C. Samples: For each type of visual display unit indicated.
 - 1. Glass Markerboard: Not less than 8-1/2 by 11 inches (215 by 280 mm), with back coating indicated for final Work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For markerboards to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 3. Store materials indoors in a flat, clean and dry area.
 4. Protect materials during storage, handling, and installation to prevent damage.
- C. Deliver factory-fabricated markerboards completely assembled in one piece.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install markerboards until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Source Limitations: Obtain each type of visual display unit from single source from single manufacturer.

2.2 GLASS MARKERBOARDS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide deko Markerboards or comparable product by one of the following:
1. Best-Rite; MooreCo, Inc.
 2. Claridge Products and Equipment, Inc.
 3. Clarus Glassboards, LLC.
 4. Ghent Manufacturing, Inc.
 5. Krystal Glass Writing Boards, Inc.

- B. Glass Markerboards: 6-mm tempered glass markerboard, with smooth polished "Brilliance" edge and rounded "Radiance" corners; color coated on back surface.
- C. Product Attributes:
 - 1. Ghost-free: impervious to staining from dry-erase, wet-erase and permanent markers.
 - 2. Weight: 2.44 lbs per square foot (11.8 kg per square meter).
 - 3. Shatterproof.
 - 4. Optically clear hard coating on face, permanent opaque color on back
- D. Mounting: Z-Clips, holding glass approximately 1 inch (25 mm) from wall surface.
- E. Color and Surface: Diamond.
- F. Accessories: Magnetic buttons, marker holders, and eraser.
- G. Size and Weight: 48 by 96 inches (1219 by 2438 mm) and 78.08 lbs (35.4 kg).

2.3 MATERIALS

- A. Clear Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.
- B. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper preparation and backing for markerboards.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install markerboards in landscape orientation, locations, and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, and accessories necessary for complete installation.
- B. Leave manufacturer's protective peel-coat on markerboard during the installation process. Remove peel-coat prior to use.

3.3 CLEANING AND PROTECTION

- A. Clean markerboards according to manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
 - 1. Do not use solvents, harsh chemicals, or abrasive cleaners on markerboard surface.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect markerboards after installation and cleaning.

END OF SECTION 10 11 16

SECTION 11 52 13 - PROJECTION SCREENS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manually operated, front-projection screens.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for metal support framing for front-projection screens.
 - 2. Section 06 10 00 "Rough Carpentry" for wood backing for screen installation.

1.3 DEFINITIONS

- A. Gain: Ratio of light reflected from screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per SMPTE RP 94.
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface to the most central position on a perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:
 - 1. Drop lengths.
 - 2. Location of seams in viewing surfaces.
 - 3. Location of screen centerline relative to ends of screen case.
 - 4. Details of juncture of exposed surfaces with adjacent finishes.
 - 5. Accessories.
- C. Samples for Initial Selection: For finishes of surface-mounted screen cases.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For front-projection screens to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Environmental Limitations: Do not deliver or install front-projection screens until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Source Limitations for Projection Screens: Obtain front-projection screens from single manufacturer. Obtain accessories, including necessary mounting hardware, from screen manufacturer.

2.2 MANUALLY OPERATED, FRONT-PROJECTION SCREENS

- A. General: Manufacturer's standard spring-roller-operated units, consisting of case, screen, mounting accessories, and other components necessary for a complete installation.
1. Screen Mounting: Top edge securely anchored to a 3-inch- (75-mm-) diameter, rigid steel roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and with a saddle and pull attached to slat by screws.
- B. Bracket-Mounted, Metal-Encased, Manually Operated Screens without Tab Tensioning: Units designed and fabricated for suspending from wall brackets, fabricated from formed-steel sheet not less than 0.027 inch (0.7 mm) thick or from aluminum extrusions; with baked-enamel finish and matching end caps. Provide mounting brackets to allow for 6 inch (150 mm) extension from wall.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Da-Lite Screen Company; Model B or comparable product by one of the following:
 - a. Bretford, Inc.
 - b. Draper Inc.
- C. Case and Bracket Finish Color: Black

2.3 FRONT-PROJECTION SCREEN MATERIAL

- A. Matte-White Viewing Surface: Peak gain of not less than 1.0 and gain of not less than 0.8 at a half-angle of 60 degrees from the axis of the screen surface.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Da-Lite Screen Company; Matte White or comparable product by one of the following:
 - a. Bretford, Inc.
 - b. Draper Inc.
- B. Material: Vinyl-coated, glass-fiber fabric.
- C. Mildew-Resistance Rating: Zero or 1 when tested according to ASTM G 21.
- D. Flame Resistance: Passes NFPA 701.
- E. Flame-Spread Index: Not greater than 75 when tested according to ASTM E 84.
- F. Seamless Construction: Provide screens, in sizes indicated, without seams.
- G. Edge Treatment: Black masking borders.
- H. Size of Viewing Surface: 52 by 92 inches (1321 by 2337 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
 1. Test manually operated units to verify that screen-operating components are in optimum functioning condition.

END OF SECTION 11 52 13

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SECTION 07 71 00 - ROOF SPECIALTIES**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Roof-edge drainage systems.
- B. Related Requirements:
 - 1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section 07 13 13 "Asphalt Shingles" for roof-drip edge fascia.
 - 3. Section 07 72 53 "Snow Guards" for manufactured snow guard devices.
 - 4. Section 07 92 00 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
 - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 3. Review roof drainage and condition of other construction that will affect roof specialties.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof specialties.
 - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
 - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.

3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 4. Detail termination points and assemblies, including fixed points.
 5. Include details of special conditions.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. Samples for Verification:
1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
 2. Include roof-edge drainage systems made from 12-inch (300-mm) lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of roof specialty.
- C. Product Test Reports: For roof-edge flashings, for tests performed by a qualified testing agency.
- D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 07 13 13 "Asphalt Shingles."
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 FABRICATED ROOF-EDGE DRAINAGE SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ATAS International, Inc.
 2. CopperCraft by FABRAL.
 3. Hickman Company, W. P.
 4. Merchant & Evans Inc.
- B. Gutters: Manufactured in uniform section lengths not exceeding 12 feet (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
1. Zinc-Coated Steel: Nominal 0.034-inch (0.86-mm) thickness.
 2. Gutter Profile: Style A according to SMACNA's "Architectural Sheet Metal Manual."
 3. Corners: Factory mitered and mechanically clinched and sealed watertight.
 4. Gutter Supports: Gutter brackets with finish matching the gutters.
- C. Downspouts: Plain rectangular complete with mitered elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Zinc-Coated Steel: Nominal 0.034-inch (0.86-mm) thickness.
 2. **Fabricated Hanger Style: Fig 1-35A**
- D. Zinc-Coated Steel Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.

2.3 ALTERNATE FIELD FABRICATED SEAMLESS ROOF-DRAINAGE

- A. **Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.**
1. **Zinc-Coated Steel: Nominal 0.034-inch (0.86-mm) thickness.**
 1. **Gutter Profile: Style A according to SMACNA's "Architectural Sheet Metal Manual."**
 2. **Expansion Joints: Lap type according to SMACNA Fig 1-6.**
- B. **Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.**
1. **Zinc-Coated Steel: Nominal 0.034-inch (0.86-mm) thickness.**
 2. **Fabricated Hanger Style: Fig 1-35A**
- C. **Zinc-Coated Steel Finish: Two-coat fluoropolymer.**

1. Color: As selected by Architect from manufacturer's full range.**2.32.4 MATERIALS**

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.

2.42.5 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.52.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Galvanized-Steel Sheet Finishes:
1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A 755/A 755M and coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 - 1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise indicated on Drawings.
 - 2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.3 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 36 inches (910 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations not exceeding 50 feet (15.2 m) apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
 - 1. Connect downspouts to underground drainage system indicated.
- D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.**

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

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SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- (150-mm-) long Samples of each type, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Ceiling suspension-system members.
 - 2. Structural members to which suspension systems will be attached.
 - 3. Method of attaching hangers to building structure.
 - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 5. Size and location of initial access modules for acoustical panels.
 - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:

- a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
 8. Minimum Drawing Scale: 1/4 inch = 1 foot (1:48).
- B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and

ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Class A according to ASTM E 1264.
 2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS (ACP-1)

- A. Basis-of-Design Product (ACP-1): Subject to compliance with requirements, provide Armstrong World Industries, Inc Georgian High Washability, Item 794, or comparable product by one of the following:
1. CertainTeed Corporation.
 2. Chicago Metallic Corporation.
 3. USG Corporation.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide panels as follows:
1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
 2. Pattern: CE (perforated, small holes and lightly textured).
- D. Color: White.
- E. Light Reflectance (LR): Not less than 0.88.
- F. Ceiling Attenuation Class (CAC): Not less than 33.
- G. Edge/Joint Detail: Square.
- H. Thickness: 5/8 inch (15 mm).

- I. Modular Size: 24 by 24 inches (610 by 610 mm).
- J. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 ACOUSTICAL PANELS (ACP-2)

- A. Basis-of-Design Product (ACP-2): Subject to compliance with requirements, provide Armstrong World Industries, Inc. Cirrus, Item 584, or comparable product by one of the following:**
 - 1. CertainTeed Corporation.**
 - 2. Chicago Metallic Corporation.**
 - 3. USG Corporation.**
- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.**
- C. Classification: Provide panels as follows:**
 - 1. Type and Form: Type III, mineral base with painted finish; Form 1, nodular.**
 - 2. Pattern: E (lightly textured).**
- D. Color: White.**
- E. Noise Reduction Coefficient (NRC): Not less than 0.70**
- F. Light Reflectance (LR): Not less than 0.86.**
- G. Ceiling Attenuation Class (CAC): Not less than 35.**
- H. Edge/Joint Detail: Tegular (Reveal sized to fit flange of exposed suspension-system members).**
- I. Thickness: 3/4 inch (19 mm).**
- J. Modular Size: 24 by 24 inches (600 by 600 mm).**
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.**

2.42.5 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc Prelude ML or comparable product by one of the following:
1. CertainTeed Corporation.
 2. Chicago Metallic Corporation.
 3. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
1. Structural Classification: Heavy-duty system.
 2. End Condition of Cross Runners: Butt-edge type.
 3. Face Design: Flat, flush.
 4. Cap Material: Cold-rolled steel.
 5. Cap Finish: Painted white.

2.52.6 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.
1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
 4. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- (3.5-mm-) diameter wire.

2.62.7 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong World Industries, Inc compatible products or comparable products by one of the following:
 - 1. CertainTeed Corporation.
 - 2. Chicago Metallic Corporation.
 - 3. USG Corporation.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.72.8 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 7. Do not attach hangers to steel deck tabs.
 - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
 - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes resinous flooring systems **as follows:-**
 - 1. District Kitchen: RF-1, Cementitious urethane system.**
 - 2. Locker Rooms and Shower Rooms: RF-2, Epoxy quartz system.**

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: For each type of exposed finish required.
- C. Samples for Verification: For each resinous flooring system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous flooring component, from manufacturer.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- ~~A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.~~
- ~~B. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.~~
- A. Installer Qualifications: Engage an experienced installer for this project who shall be prequalified and approved in writing by the material manufacturer at the time of project initiation. Acceptability will include judgment on equipment, history, and financial strength. The manufacturer shall not permit the application of any of its materials by untrained, non-approved personnel.**
- 1. Each approved installer shall have been trained by the manufacturer in all phases of surface preparation and application of the specified flooring system.**
 - 2. Each approved installer shall have five years' experience in installing the specified flooring system and shall submit a list of five projects/references as a prequalification requirement. Each of the five projects/references shall be of the same type, comparable size, quantity, and magnitude to this project as a prequalification requirement. Architect reserves the option to personally inspect the projects/references to accept or reject any of the installers prior to bid time as a prequalification requirement.**
 - 3. Subcontractor: The only subcontractor to the installer shall be for concrete surface preparation.**

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. Flammability: Self-extinguishing according to ASTM D 635.

2.2 MANUFACTURERS

- A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING

- A. Resinous Flooring System (**RF-1**): Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Duraflex, Inc. Poly-Crete MDB or comparable product by one of the following:
 - a. BASF Corporation; Construction Systems.
 - ~~a~~.b. **Florock**
 - ~~b~~.c. International Coatings Inc.
 - ~~c~~.d. Key Resin Company.
 - ~~d~~.e. Sherwin-Williams Company, General Polymers.
 - ~~e~~.f. Stonhard, Inc.
 - g. Tennant Coatings, Inc**
 - ~~f~~.h. Tnemec Inc.
- B. System Characteristics:
1. Color and Pattern: As selected by Architect from manufacturer's full range.
 2. Wearing Surface: Textured for slip resistance.
 3. Overall System Thickness: 1/4 inch (6.4 mm).
 4. Federal Agency Approvals: USDA and FDA approved for food-processing environments.
- C. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- D. Base Coats:
1. Resin: Cementitious Urethane.
 2. Formulation Description: 100 percent solids.

3. Type: Pigmented.
4. Application Method: Self-leveling slurry with broadcast aggregates.
5. Number of Coats: One.
6. Thickness of Coats: 3/16 inch (4.8 mm).
7. Aggregates: Colored quartz (ceramic-coated silica).

E. Topcoat: Finish coat.

1. Resin: Epoxy novolac.
2. Formulation Description: 100 percent solids.
3. Type: Pigmented.
4. Number of Coats: One.
5. Thickness of Coats: 1/16 inch (1.6 mm).
6. Finish: Semi-Gloss.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 7,800 psi minimum according to ASTM C 579.
2. Tensile Strength: 4,200 psi minimum according to ASTM C 307.
3. Flexural Modulus of Elasticity: 1.95×10^6 psi minimum according to ASTM C 790.
4. Flexural Strength: 5,076 psi minimum according to ASTM C 580.
5. Water Absorption: 0.04 percent maximum after 24 hours in water according to ASTM D 570.
6. Impact Resistance: >160 in-lb minimum according to ASTM D 1709.
7. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) according to MIL-D-3134J.
8. Abrasion Resistance: 45 mg maximum weight loss according to ASTM D 4060.
9. Hardness: 65, Shore D according to ASTM D 2240.

G. Resinous Flooring System (RF-2): Epoxy based multi roller applied flooring system with colored quartz aggregate and urethane topcoat designed to produce a seamless floor and integral cove base.

1. **Basis-of-Design Product: Subject to compliance with requirements, provide Duraflex, Inc. Dur-A-Quartz, Epoxy-Based seamless flooring system or comparable product by one of the following:**
 - a. **BASF Corporation; Construction Systems.**
 - b. **International Coatings Inc.**
 - c. **Key Resin Company.**
 - d. **Sherwin-Williams Company, General Polymers.**
 - e. **Stonhard, Inc.**
 - f. **Tennant Coatings, Inc**
 - g. **Tnemec Inc.**

H. System Characteristics:

1. **Color and Pattern: As selected by Architect from manufacturer's full range.**
2. **Wearing Surface: Textured for slip resistance.**

3. **Overall System Thickness: 1/8 inch (3.2 mm).**
4. **Federal Agency Approvals: Meet standards of USDA, FDA, and OSHA.**

I. System Materials:

1. **Primer: Dur-A-Flex, Inc, Dur-A-Glaze #4 WB resin and hardener.**
2. **Broadcast Coats: Dur-A-Flex, Inc, Dur-A-Glaze #4 resin and hardener.**
3. **The quartz aggregate shall be Dur-A-Flex, Inc. Q-28 or Q-11 colored quartz aggregate as selected by the Architect.**
4. **Grout Coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.**
5. **Topcoat: Dur-A-Flex, Inc. Armor Top resin, hardener and grit.**

J. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

K. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. **Compressive Strength: 12,500 psi minimum according to ASTM C 579.**
2. **Tensile Strength: 2,600 psi minimum according to ASTM C 307.**
3. **Flexural Modulus of Elasticity: 6.2×10^5 psi minimum according to ASTM C 790.**
4. **Flexural Strength: 4,500 psi minimum according to ASTM C 580.**
5. **Bond Strength to Concrete: 400 psi (substrate failure) according to ASTM D-4541.**
6. **Water Absorption: 0.04 percent maximum after 24 hours in water according to ASTM D 570.**
7. **Impact Resistance: Pass testing according to ML D-3134.**
8. **Abrasion Resistance: 24 mg maximum weight loss according to ASTM D 4060.**
9. **Hardness: 75-80, Shore D according to ASTM D 2240.**
10. **Coefficient of Friction: >0.6 according to ASTM D2047**

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 1. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

1) Minimum Surface Profile: CSP 4-5.

-
- b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
 - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
 - 3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) of slab area in 24 hours.
 - b. Plastic Sheet Test: ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
 - c. Relative Humidity Test: Use in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - 4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
 - C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
 - 1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
 - D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 APPLICATION (RF-1)

- A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
 - 1. Integral Cove Base: 4 inches (100 mm) high.

- C. Self-Leveling Base Coats: Apply self-leveling slurry base coats in thickness indicated for flooring system.
 - 1. Aggregates: Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- D. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 APPLICATION (RF-2)

A. General:

- 1. **The system shall be applied in seven distinct steps as listed below:**
 - a. **Substrate preparation**
 - b. **Priming**
 - c. **First broadcast coat application with first aggregate broadcast**
 - d. **Second broadcast coat with second aggregate broadcast**
 - e. **Grout coat application, sand floor (if required)**
 - f. **First topcoat application**
 - g. **Second topcoat application**
- 2. **Substrates shall be dry and clear of remaining dust or loose particles.**
 - a. **shall be removed using a vacuum or clean, dry, oil-free compressed air. Immediately prior to the application of any component of the system, the surface shall be**
- 3. **Prepare components in accordance with the Manufacturer's recommendations.**
- 4. **Follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.**

B. Primer

- 1. **Apply primer with a 1/8 inch (3 mm) notched squeegee and back rolled at the rate of 200 sf/gal to yield a dry film thickness of 4 mils (100 µm).**

C. Broadcast Coat

- 1. **Apply the broadcast coat as a double broadcast system.**
- 2. **Broadcast Coat: Comprised of a resin and hardener as supplied by the Manufacturer and mixed in the ratio of 2-parts resin to 1-part hardener.**
- 3. **Apply the broadcast coat over horizontal surfaces using "v" notched squeegee and back rolled at the rate of 90-100 sf/gal.**
- 4. **Broadcast colored quartz aggregate to excess into the wet material at the rate of 0.5 lbs/sf.**
- 5. **Allow material to fully cure. Remove loose aggregate.**
- 6. **Apply a second coat of resin with a coverage rate of 90 sf/gal (Q28) or 50 sf/gal (Q11) and broadcast aggregate to excess at the rate of 0.5 lbs/sf.**
- 7. **Allow material to fully cure. Remove loose aggregate.**

D. Grout Coat

1. **Grout Coat: Comprised of liquid components, combined at a ratio of 2 parts resin to 1 part**
2. **Squeegee apply the grout coat at a coverage rate of 90 sf/gal (Q28) or 50 sf/gal (Q11) hardener by volume.**
3. **The grout coat will be back rolled and cross rolled to provide a uniform texture and finish.**

E. Topcoat

1. **Roller apply the topcoat at the rate of 500 sf/gal to yield a dry film thickness of 3 mils.**
2. **Topcoat: Comprised of a liquid resin, hardener and grit that is mixed per the manufacturer's instructions.**

3.33.4 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.
1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.
- B. Core Sampling: At the direction of Owner and at locations designated by Owner, take one core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.43.5 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 09 67 23

SECTION 09 68 13 - TILE CARPETING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes modular carpet tile and walk-off carpet tile
- B. Related Requirements:
 - 1. Section 09 65 19 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.

8. Type, color, and location of insets and borders.
 9. Type, color, and location of edge, transition, and other accessory strips.
 10. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet Tile: Full-size Sample.
 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
- D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.
- E. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
1. Build mockups at locations and in sizes shown on Drawings.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 WALK-OFF CARPET TILE (Walk-Off CPT)**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide J&J Invision; J&J Industries, Inc., Catwalk Walk-Off Modular 7010 or comparable product by one of the following:
 - 1. Bentley Prince Street, Inc.
 - 2. Interface, LLC.
 - 3. Mannington Mills, Inc.
 - 4. Milliken & Company.
 - 5. Mohawk Group (The); Mohawk Carpet, LLC.
 - 6. Patcraft; a division of Shaw Industries, Inc.

7. Philadelphia Commercial; a division of Shaw Industries, Inc.
 8. Shaw Contract Group; a Berkshire Hathaway Company.
 9. Tandus; a Tarkett company.
- B. Colors: Spotlight 1427.
- C. Construction: Textured patterned loop.
- D. Fiber Type: "Encore SD."
- E. Face Weight: 34 oz/sq yd (1,153 g/m²)
- F. Gauge: 1/8 (3.15 rows/cm).
- G. Stitches: 9.5/in (3.74/cm)
- H. Primary Backing/Backcoating: Manufacturer's standard synthetic materials.
- I. Secondary Backing: Manufacturer's standard material.
- J. Size: 24 by 24 inches (610 by 610 mm).
- K. Applied Treatments:
1. Soil-Resistance Treatment: Manufacturer's standard treatment.
- L. Performance Characteristics:
1. Electrostatic Propensity: Less than 3.0 kV according to AATCC 134.

2.2 CARPET TILE (CPT1)

- A. Basis-of-Design Products: The design is based on the designated products. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers specified. Comparable products are subject to review and approval through the submittal process specified.
1. Color 1: Subject to compliance with requirements, provide J&J Invision; J&J Industries, Inc., Fiction Modular 7025, Anti-Climax 1771.
 2. Color 2 - Accent: Subject to compliance with requirements, provide J&J Invision; J&J Industries, Inc., Index Demi-Plank 7009," Works 1836.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Bentley Prince Street, Inc.
 2. Interface, LLC.
 3. Mannington Mills, Inc.
 4. Milliken & Company.
 5. Mohawk Group (The); Mohawk Carpet, LLC.
 6. Patcraft; a division of Shaw Industries, Inc.

7. Philadelphia Commercial; a division of Shaw Industries, Inc.
 8. Tandus; a Tarkett company.
- C. Construction: Textured patterned loop.
 - D. Fiber Type: "Encore BCF."
 - E. Face Weight: 19 oz/sq yd (644 g/m²)
 - F. Gauge: 1/12 (4.72 rows/cm).
 - G. Stitches: 10/in (3.94/cm)
 - H. Primary Backing/Backcoating: Manufacturer's standard synthetic materials.
 - I. Secondary Backing: Manufacturer's standard material.
 - J. Sizes:
 1. Color 1: 24 by 24 inches (610 by 610 mm)
 2. Color 2: 12 by 48 inches (305 by 1219 mm).
 - K. Applied Treatments:
 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - L. Performance Characteristics:
 1. Electrostatic Propensity: Less than 3.0 kV according to AATCC 134.

2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
 1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns indicated on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 10 51 15 - METAL ATHLETIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Welded, open-front athletic lockers: 24-inch-wide by 18-inch-deep by 72-inch-tall (610 mm by 457 mm by 1829 mm) units.
 - 2. Welded, two-tier athletic lockers: 18-inch-wide by 16-inch-deep by 30-inch-tall (457 mm by 406 mm by 762 mm) units.
 - 3. **Locker benches.**

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples: For each color specified, in manufacturer's standard size.
- D. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
 - 2. **Locker benches.**
- E. Product Schedule: For lockers.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Installation instructions.
- C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate sizes and locations of bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
 - 2. Damage from deliberate destruction and vandalism is excluded.
 - 3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.
1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and.

2.3 WELDED, OPEN-FRONT ATHLETIC LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide DeBourgh Mfg. Co.; All American Collegiate/Pro Model or comparable product by one of the following:
1. ASI Storage Solutions; ASI Group.
 2. List Industries Inc.
 3. Lyon Workspace Products, LLC.
 4. Penco Products, Inc.
 5. Republic Storage Systems, LLC.
- B. Locker Arrangement: Open front, with seat/footlocker and upper shelf with security box.
- C. Material: Metallic-coated steel sheet.
- D. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Frames: Continuous 1 inch by 1 inch by 1/8-inch (25 mm by 25 mm by 3 mm) pickled angle iron steel.
 2. Tops and Bottoms: 0.060-inch (1.52-mm) nominal thickness, with single bend at edges.
 3. Backs: 0.048-inch (1.21-mm) nominal thickness.
 4. Shelves: 0.060-inch (1.52-mm) nominal thickness, with double bend at front and single bend at sides and back.
- E. Unperforated Sides: Fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet.
- F. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet or 0.105-inch (2.66-mm) nominal-thickness steel angles; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames.
- G. Reinforced Bottoms: Structural channels, formed from 0.075-inch (1.90-mm) nominal-thickness steel sheet; welded to front and rear of side-panel frames.

- H. Seats/Footlockers: Enclosure full width of bottom of metal locker; fabricated from cold-rolled steel sheet.
1. Seat/Lid: 0.075-inch (1.90-mm) nominal-thickness steel sheet; channel formed and reinforced with stiffeners; with manufacturer's standard, steel continuous hinge that is completely concealed and tamper resistant when seat/lid is closed; with padlock hasp.
 2. Front Panel: 0.075-inch (1.90-mm) nominal-thickness steel sheet; channel formed at top edge; with minilouvers for ventilation; recessed for padlock loop.
 3. Sides: Integral part of unperforated.
- I. Security Boxes: Nonperforated, consisting of partition extending from upper shelf to top of metal locker, fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; with channel-formed, 0.060-inch (1.52-mm) nominal-thickness, steel sheet door frame, and door fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet with right-angle single bend at edges; with manufacturer's standard, steel continuous hinge that is completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Single-Point Latching: Stainless-steel strike plate with integral pull; with steel, nonmoving latch hook with steel padlock loop that projects through door and is finished to match metal locker body.
 2. Locks: Combination padlocks.
- J. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- K. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- L. Coat Rods: Manufacturer's standard.
- M. Coat Rods: 1-inch- (25-mm-) diameter steel, chrome finished.
- N. Continuous Sloping Tops: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
1. Closures: Vertical-end type.
- O. Exposed End Panels: Constructed of 1 inch by 1 inch by 1/8-inch (25 mm by 25 mm by 3 mm) steel angle iron frame with 0.060-inch (1.52-mm) sheet steel welded to steel angle frame
- P. Materials: Metallic-Coated Steel Sheet; ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 (ZF180) zinc-iron, alloy (galvannealed) coating designation.
- Q. Finish: Baked enamel or powder coat.
1. Color: DeBourgh Code Red.

2.4 WELDED TWO-TIERED ATHLETIC LOCKERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide DeBourgh Mfg. Co.; All American Team Lockers or comparable product by one of the following:
1. ASI Storage Solutions; ASI Group.
 2. List Industries Inc.
 3. Lyon Workspace Products, LLC.
 4. Penco Products, Inc.
 5. Republic Storage Systems, LLC.
- B. Expanded-Metal Doors: Fabricated from 3/4-inch (19 mm), 0.090-inch (2.28-mm) nominal-thickness expanded metal; welded to 0.125-inch (3.2-mm) nominal-thickness steel angle frame; with 0.090-inch (2.28-mm) nominal-thickness, steel sheet lock panel backed by 0.060-inch (1.52-mm) nominal-thickness, steel sheet retainer welded to door frame.
- C. Body and Frames: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
1. Sides and Intermediate Partitions: Fabricated from 3/4-inch (19 mm), 0.090-inch (2.28-mm) nominal-thickness expanded metal; welded to 0.125-inch (3.2-mm) nominal-thickness steel angle frame.
 2. Tops and Bottoms: 0.060-inch (1.52-mm) nominal thickness, with single bend at edges.
 3. Backs: 0.048-inch (1.21-mm) nominal thickness.
 4. Cross Frames for Double-Tier Lockers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
- D. Reinforced Bottoms: Structural channels, formed from 0.060-inch (1.52-mm) nominal-thickness steel sheet; welded to front and rear of side-panel frames.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
1. Knuckle Hinges: Steel, full loop, five knuckles, tight pin; minimum 2 inches (51 mm) high. Provide no fewer than three hinges for each door more than 42 inches (1067 mm) high.
- F. Projecting Turn-Handle and Latch: Steel handle welded to manufacturer's standard, three-point, cremone-type latching mechanism consisting of steel rods or bars that engage locker frame at top and bottom of door, and center latch that engages strike jamb; with steel padlock loop.
- G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.
- H. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.
- I. Continuous Zee Base: 4 inches (102 mm) high; fabricated from 0.075-inch (1.90-mm) nominal-thickness steel sheet.

- J. Continuous Sloping Tops: Fabricated from **0.048-inch (1.21-mm)** nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
1. Closures: Vertical-end type.
- K. Materials:
1. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with **A60 (ZF180)** zinc-iron, alloy (galvannealed) coating designation.
 2. Expanded Metal: ASTM F 1267, Type II (flattened), Class I (uncoated), **3/4-inch (19-mm)** steel mesh, with at least 70 percent open area.
- L. Finish: Baked enamel or powder coat.
1. Color: DeBourgh Code Red.

2.5 LOCKER BENCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:**
- 1. ASI Storage Solutions; ASI Group.**
 - 2. Lyon Workspace Products, LLC.**
 - 3. Penco Products, Inc.**
- B. Provide bench units with overall assembly height of 17-1/2 inches (445 mm).**
- C. Bench Tops: Manufacturer's standard one-piece units, with rounded corners and edges.**
- 1. Size: Minimum 12 inches wide by 1-1/4 inches thick (300 mm wide by 32 mm thick) except provide 20- to 24-inch- (508- to 610-mm-) wide tops where accessible benches are indicated.**
 - a. Provide brackets for accessible bench backrest.**
 - 2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.**
- D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:**
- 1. Tubular Steel: 1-1/2-inch- (38-mm-) diameter steel tubing threaded on both ends, with standard pipe flange at top and bell-shaped cast-iron base; with baked-enamel or powder-coat finish; anchored with exposed fasteners.**
 - a. Color: Match metal lockers.**
- E. Materials:**

1. Steel Tube: ASTM A 500/A 500 M, cold rolled.**2.52.6 FABRICATION**

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
 2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
- B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Equipment: Provide each locker with an identification plate and the following equipment:
1. Coat Rods: For each compartment of each locker.
 2. Open-Front Athletic Lockers: Two single-prong wall hooks bolted to locker back and coat rod.
- D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
- E. Accessible Lockers: Fabricate as follows:
1. Locate bottom shelf no lower than 15 inches (381 mm) above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches (1219 mm) above the floor.
- F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.
- G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
1. Sloping-top corner fillers, mitered.
- H. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

2.62.7 ACCESSORIES

- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
- B. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls, and elsewhere as indicated, for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
 3. Anchor back-to-back metal lockers to floor.
- B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
- C. Equipment:
 1. Attach hooks with at least two fasteners.
 2. Attach door locks on doors using security-type fasteners.
 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 1. Attach sloping-top units to metal lockers, with closures at exposed ends.
- E. **Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 60 inches (1500 mm) apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.**
 1. **Provide four pedestals for each accessible bench.**

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 51 15

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NOTES:

IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE NECESSARY PERMITS AND APPROVALS FROM APPROPRIATE REGULATORY AGENCIES (IF APPLICABLE) PRIOR TO COMMENCING THE WORK.

ALL CONSTRUCTION WORK AND UTILITY WORK OUTSIDE OF THE PROPERTY BOUNDARIES SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.

WHEELCHAIR SYMBOLS ARE NOT INCLUDED IN SCOPE OF WORK. SHOWN TO DEPICT LOCATION OF ACCESSIBLE STALLS FOR PERMITTING.

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL DEMOLITION DEBRIS SHALL BE REMOVED FROM THE SITE. NO ON-SITE BURYING OF DEBRIS WILL BE ALLOWED.

ALL HAUL SITES SELECTED FOR COLLECTION OF DEBRIS SHALL BE APPROVED BY THE OWNER/ENGINEER.

ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE OWNER.

ALL TREES NOT NOTED AS BEING REMOVED ARE TO BE SAVED AND SHALL BE PROTECTED DURING CONSTRUCTION.

SAFETY NOTICE TO CONTRACTOR:

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

WARRANTY / DISCLAIMER:

THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER SMH CONSULTANTS NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE SMH CONSULTANTS INSPECTS AND CONTROLS THE PHYSICAL CONSTRUCTION ON THE SITE.

CAUTION - NOTICE TO CONTRACTOR:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST THE EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

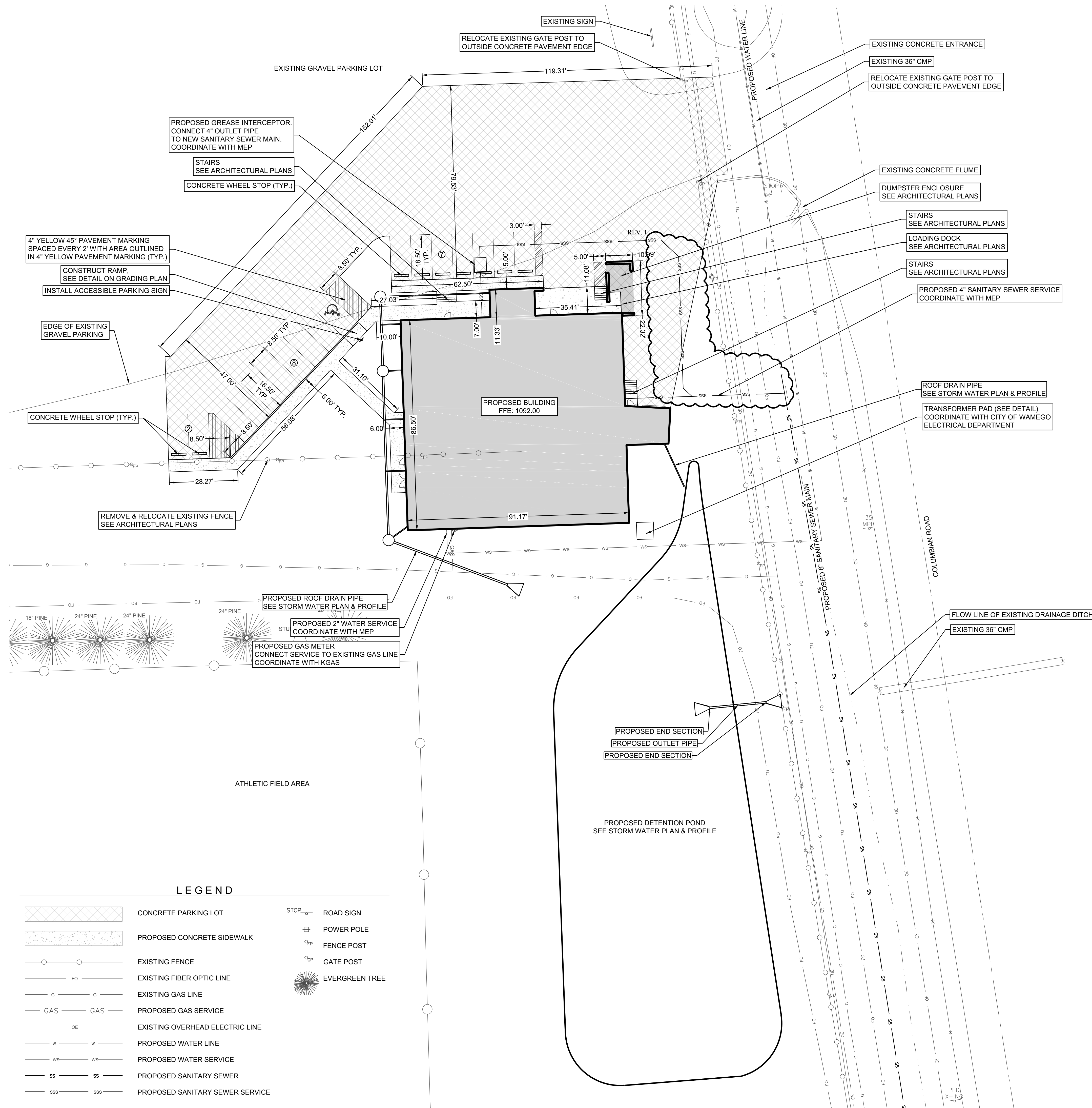
- ELECTRIC** CITY OF WAMEGO
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- TELEPHONE** WTC TELEPHONE SERVICE
ANDY BOECKMAN
1009 LINCOLN AVENUE
WAMEGO, KS 66547
(785) 456-1000
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WAMEGO, KS 66547
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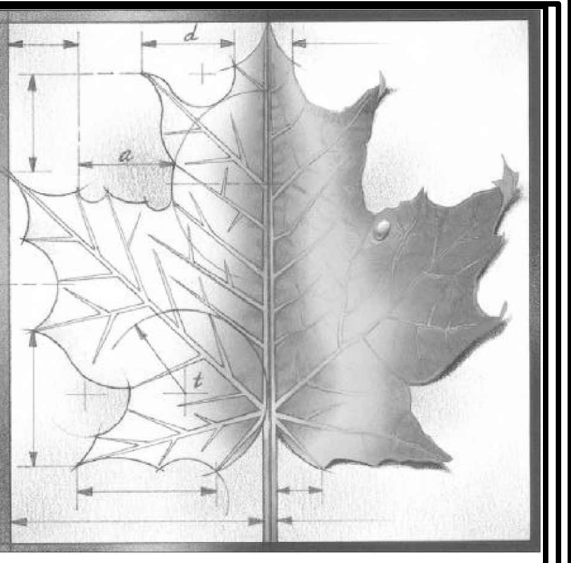
KANSAS ONE CALL SYSTEM, INC.

The utilities as shown on this drawing were developed from the information available. This is not implied nor intended to be the complete inventory of utilities in this area. It is the contractor's responsibility to verify the location of all utilities (whether shown or not) and protect said utilities from any damage. Confirmation Number 17093029.



LEGEND

	CONCRETE PARKING LOT		ROAD SIGN
	PROPOSED CONCRETE SIDEWALK		POWER POLE
	EXISTING FENCE		FENCE POST
	EXISTING FIBER OPTIC LINE		GATE POST
	EXISTING GAS LINE		EVERGREEN TREE
	PROPOSED GAS SERVICE		
	EXISTING OVERHEAD ELECTRIC LINE		
	PROPOSED WATER LINE		
	PROPOSED WATER SERVICE		
	PROPOSED SANITARY SEWER		
	PROPOSED SANITARY SEWER SERVICE		

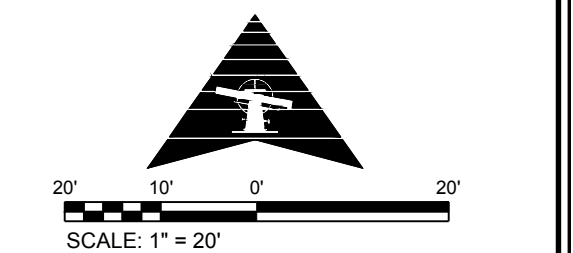
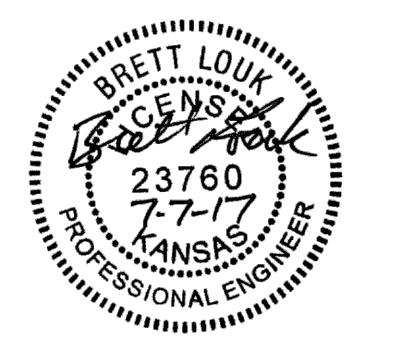


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SMH CONSULTANTS
2017 Vanesta Place, Suite 110
Manhattan, KS 66503
P (785) 776-0541 • F (785) 776-9760



REV	DESCRIPTION	DATE
1	Revised Sanitary Sewer Service Connection	7/21/2017

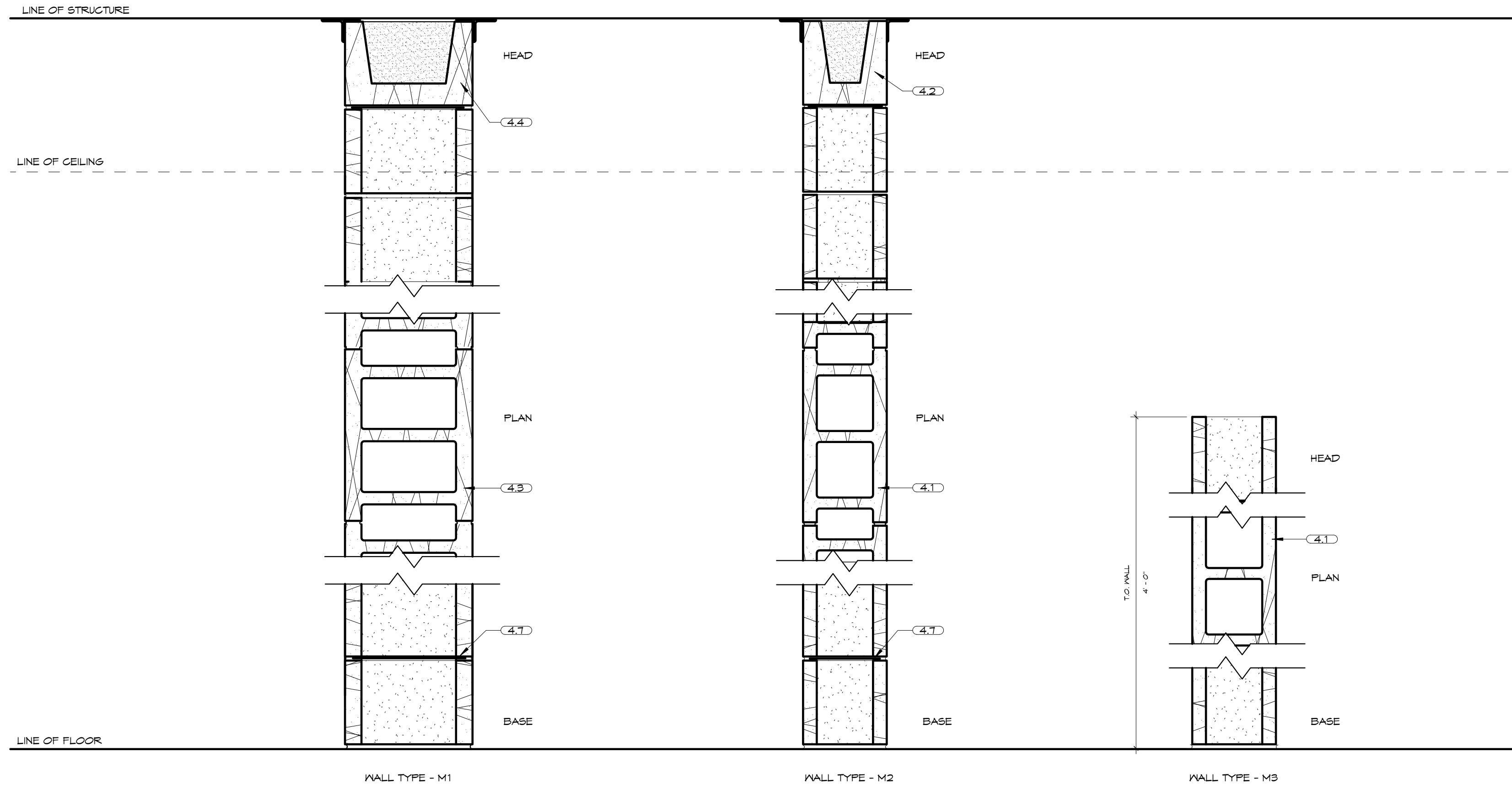
Project Number: **16036**
Date: **7/7/17**

Project Name:
USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
**4290 COLUMBIAN ROAD
WAMEGO, KS**

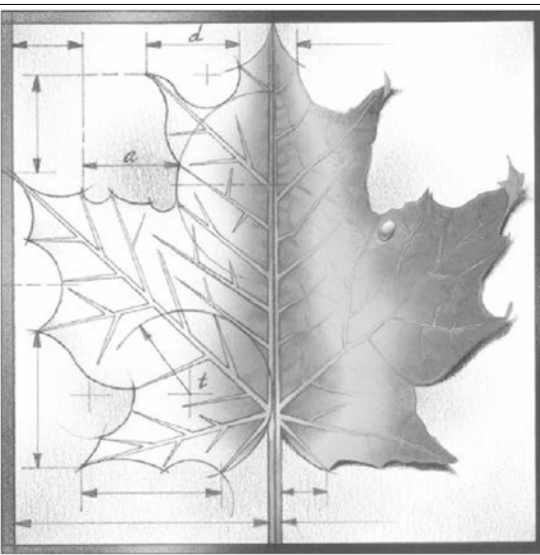
Sheet Title:
SITE PLAN

Sheet:
C1



WALL TYPES
 1 1/2" = 1'-0"

NOTES	
4.1	8" C.M.U.
4.2	8" C.M.U. BOND BEAM
4.3	12" C.M.U.
4.4	12" C.M.U. BOND BEAM
4.7	HORIZONTAL REINFORCING- SEE STRUCTURAL DRWG



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REV	DESCRIPTION	DATE
1	ADDENDUM 2	7/26/17



Project Number: **16036**

Date: **7/7/17**

Project Name:

USD 320 WAMEGO-DISTRICT KITCHEN

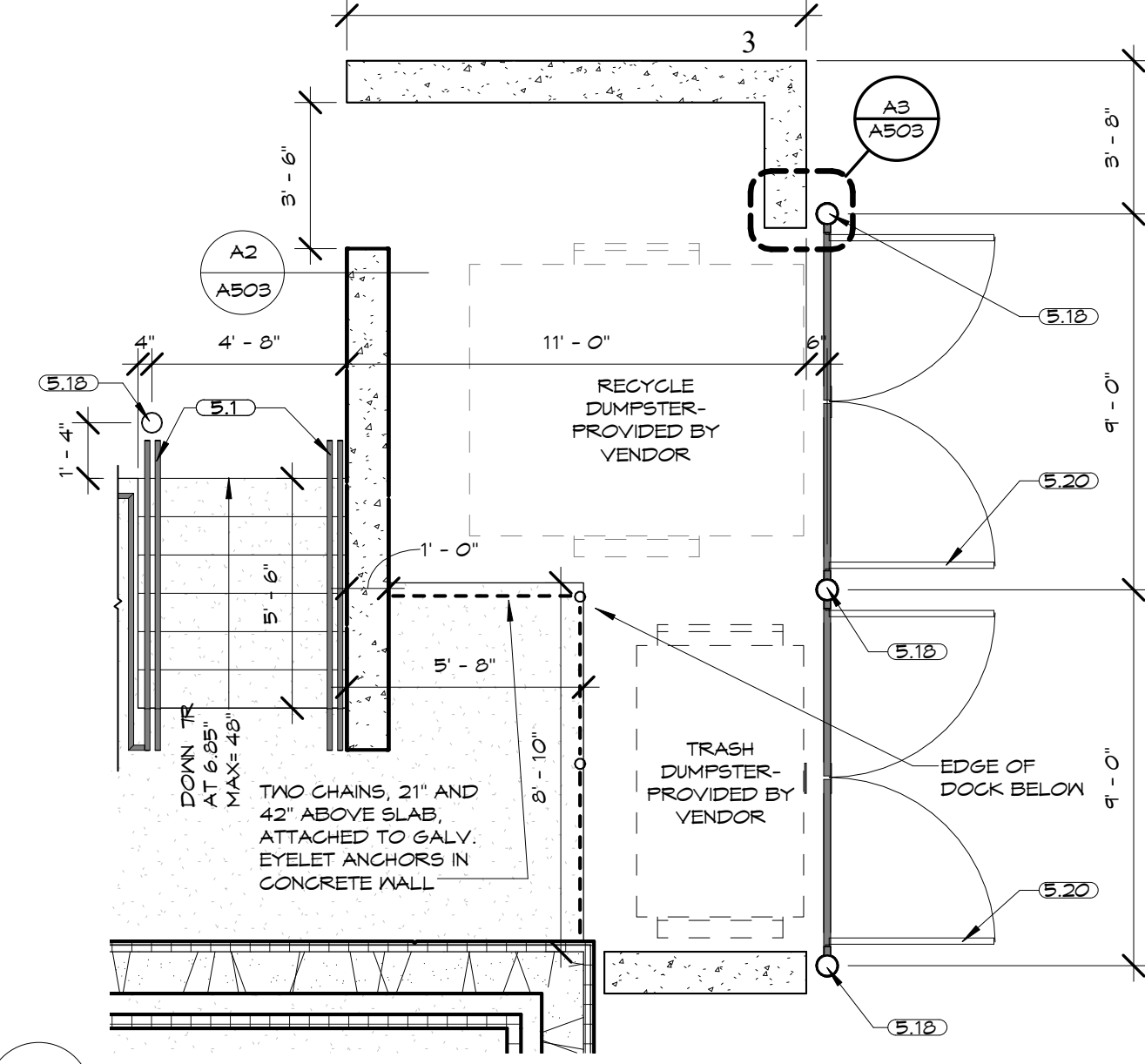
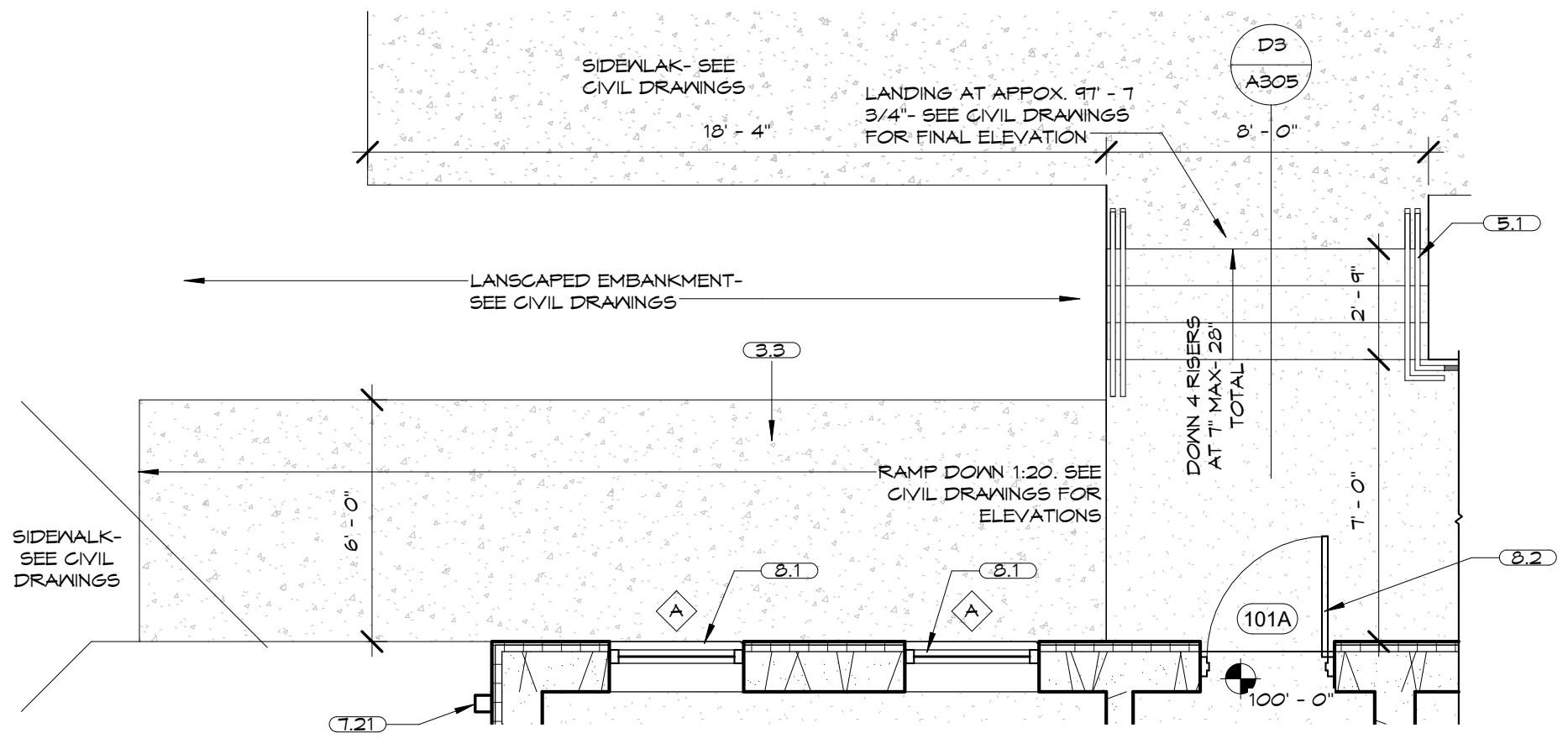
Project Address:
**4290 COLUMBIAN ROAD
 WAMEGO, KS**

Sheet Title:

WALL TYPES

Sheet: **A002**

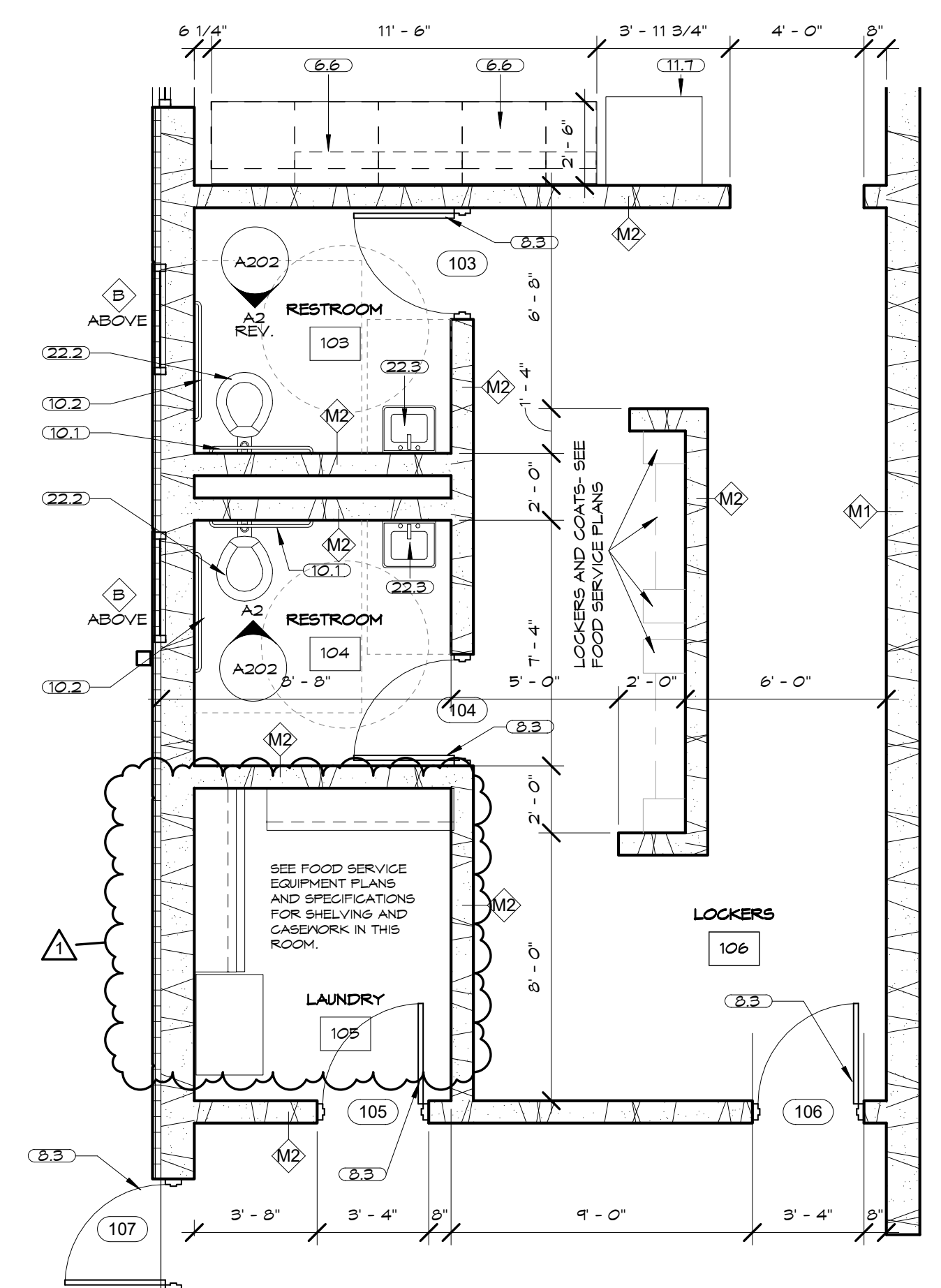
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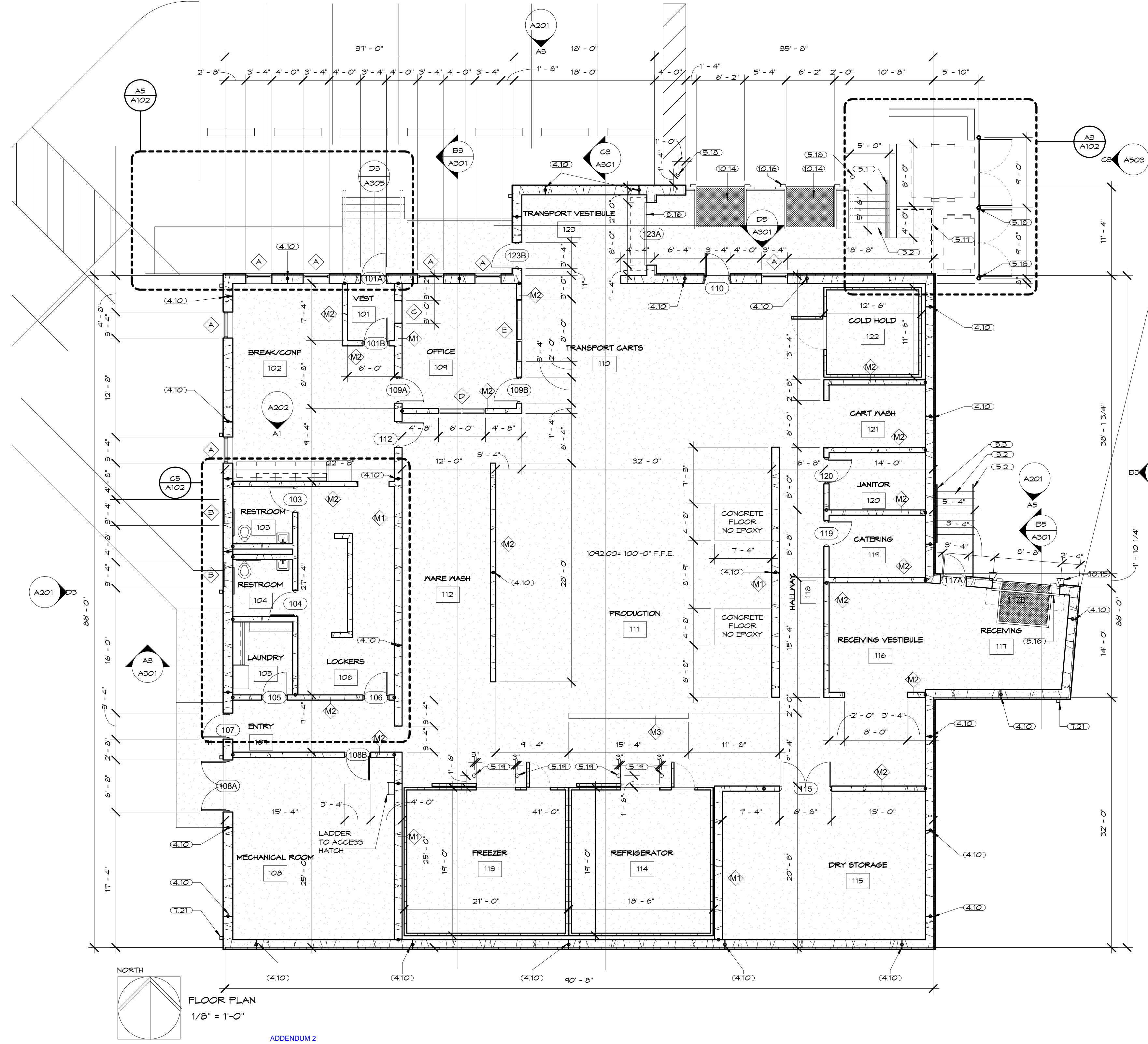
NOTES	
3.2	CONCRETE STAIRS- SEE STRUCTURAL DRWG.
3.3	EXTERIOR CONCRETE PAVEMENT- SEE CIVIL DRWG.
4.10	CONTROL JOINT
5.1	GALVANIZED 2" O.D. GUARDRAIL WITH 1 1/2" O.D. HANDRAIL
5.2	GALVANIZED GUARDRAIL
5.3	GALVANIZED 1 1/2" O.D. HANDRAIL
5.11	GALVANIZED LINKED CHAIN WITH HASP
5.18	GALVANIZED 6" STEEL BOLLARD
5.14	GALVANIZED 4" STEEL BOLLARD
5.20	GALVANIZED STEEL TRASH GATE- 2" X 4" FRAME W/LOUVERS
6.6	CUSTOM CASEWORK
7.21	5' X 5' ALUMINUM DOWNSPOUT
8.1	ALUMINUM STOREFRONT
8.2	ALUMINUM STOREFRONT DOOR
8.3	HOLLOW METAL DOOR
8.16	OVERHEAD COILING DOOR- MOTORIZED
10.1	36" GRAB BAR
10.2	42" GRAB BAR
10.14	DOCK LEVELER
10.15	DOCK SEALER
10.16	DOCK BUMPER
11.7	STANDING REFRIGERATOR- OWNER PROVIDED- N.I.G.
22.2	TOILET- SEE PLUMBING DRWG.
22.3	LAVATORY- SEE PLUMBING DRWG.

A5 ENTRY SIDEWALK DETAIL
A102 1/4" = 1'-0"

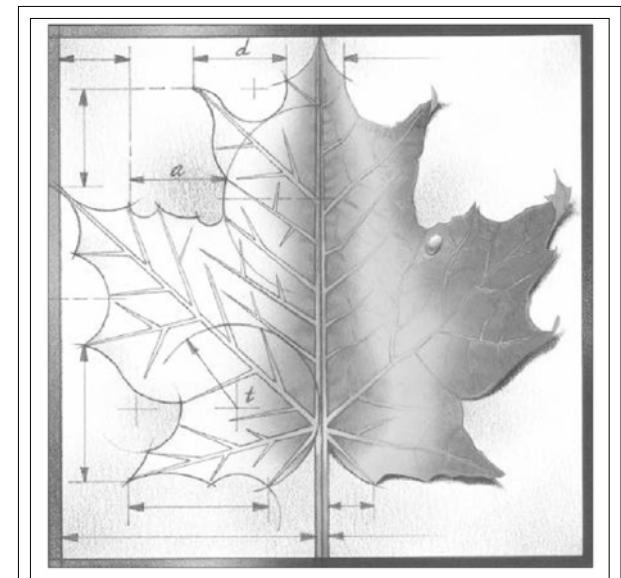
A3 ENLARGED PLAN @ TRASH ENCLOSURE
A102 1/4" = 1'-0"



C5 RESTROOMS AND LAUNDRY
A102 1/4" = 1'-0"



NORTH
FLOOR PLAN
1/8" = 1'-0"



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USD 320 WAMEGO-DISTRICT KITCHEN

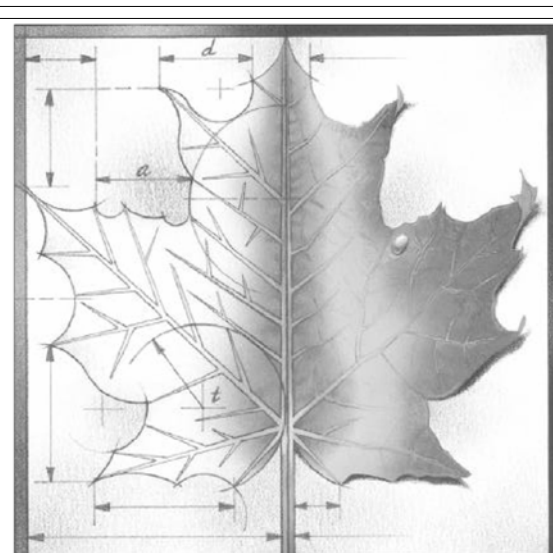
Project Address:
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Sheet Title:
FLOOR PLAN

Sheet:
A102



NORTH
REFLECTED CEILING PLAN
1/8" = 1'-0"



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1	ADDENDUM 2	7/26/17



Project Number: **16036**

Date: **7/7/17**

Project Name:

USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
**4290 COLUMBIAN ROAD
WAMEGO, KS**

Sheet Title:

**REFLECTED
CEILING PLAN**

Sheet: **A103**

OF:

ROOM FINISH SCHEDULE														
ROOM NUMBER	NAME	FLOOR FINISH	BASE FINISH	NORTH MATERIAL	NORTH FINISH	EAST MATERIAL	EAST FINISH	SOUTH MATERIAL	SOUTH FINISH	WEST MATERIAL	WEST FINISH	CEILING FINISH	CEILING HEIGHT	COMMENTS
101	VEST	WOC	R	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	9' - 4"	
102	BREAK/CONF	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-3	ACP-2	9' - 4"	
103	RESTROOM	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	9' - 4"	
104	RESTROOM	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	9' - 4"	
105	LAUNDRY	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	8' - 0"	
106	LOCKERS	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	9' - 4"	
107	ENTRY	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	9' - 0"	
108	MECHANICAL ROOM	SC	SC	CMU	---	CMU	---	CMU	---	CMU	---	EXP	---	
109	OFFICE	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-2	9' - 4"	
110	TRANSPORT CARTS	ER	EB	CMU	EP-1	CMU	EP-1	---	---	CMU	EP-1	ACP-1	10' - 0"	
111	PRODUCTION	ER	EB	---	---	CMU	EP-2	CMU	EP-1	CMU	EP-2	ACP-1	10' - 0"	
112	WARE WASH	ER	EB	---	---	CMU	EP-2	---	---	CMU	EP-1	ACP-1	10' - 0"	
113	FREEZER	SC	---	---	---	---	---	---	---	---	---	---	---	
114	REFRIGERATOR	SC	---	---	---	---	---	---	---	---	---	---	---	
115	DRY STORAGE	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	10' - 0"	
116	RECEIVING VESTIBULE	ER	EB	CMU	EP-1	---	---	CMU	EP-1	CMU	EP-1	ACP-1	9' - 0"	
117	RECEIVING	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	---	---	ACP-1	9' - 0"	
118	HALLWAY	ER	EB	---	---	CMU	EP-1	---	---	CMU	EP-2	ACP-1	10' - 0"	
119	CATERING	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	10' - 0"	
120	JANITOR	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	10' - 0"	
121	CART WASH	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	10' - 0"	
122	COLD HOLD	SC	---	---	---	---	---	---	---	---	---	---	---	
123	TRANSPORT VESTIBULE	ER	EB	CMU	EP-1	CMU	EP-1	CMU	EP-1	CMU	EP-1	ACP-1	8' - 8"	

MATERIAL/FINISH KEY

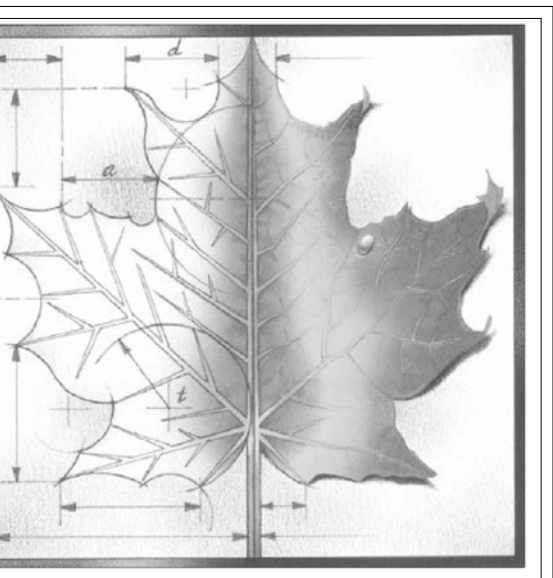
FLOOR FINISHES:
SC - SEALED CONCRETE
ER - EPOXY RESIN
MOC - WALK OFF CARPET

BASE FINISHES:
R - 4" RUBBER BASE COVERED
EB - EPOXY RESIN BASE

WALL MATERIAL:
CMU - CONCRETE MASONRY UNIT

WALL FINISH:
EP 1 - EPOXY PAINT COLOR 1
EP 2 - EPOXY PAINT COLOR 2

CEILING FINISH:
APC1 - ACOUSTIC PANEL CEILING - ARMSTRONG GEORGIAN ITEM 794
APC2 - ACOUSTIC PANEL CEILING - ARMSTRONG CIRRIUS ITEM 584
EXP - EXPOSED CEILING



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A
B
C

1	ADDENDUM 2	7/26/17
REV	DESCRIPTION	DATE



Project Number: 16036

Date: 7/7/17

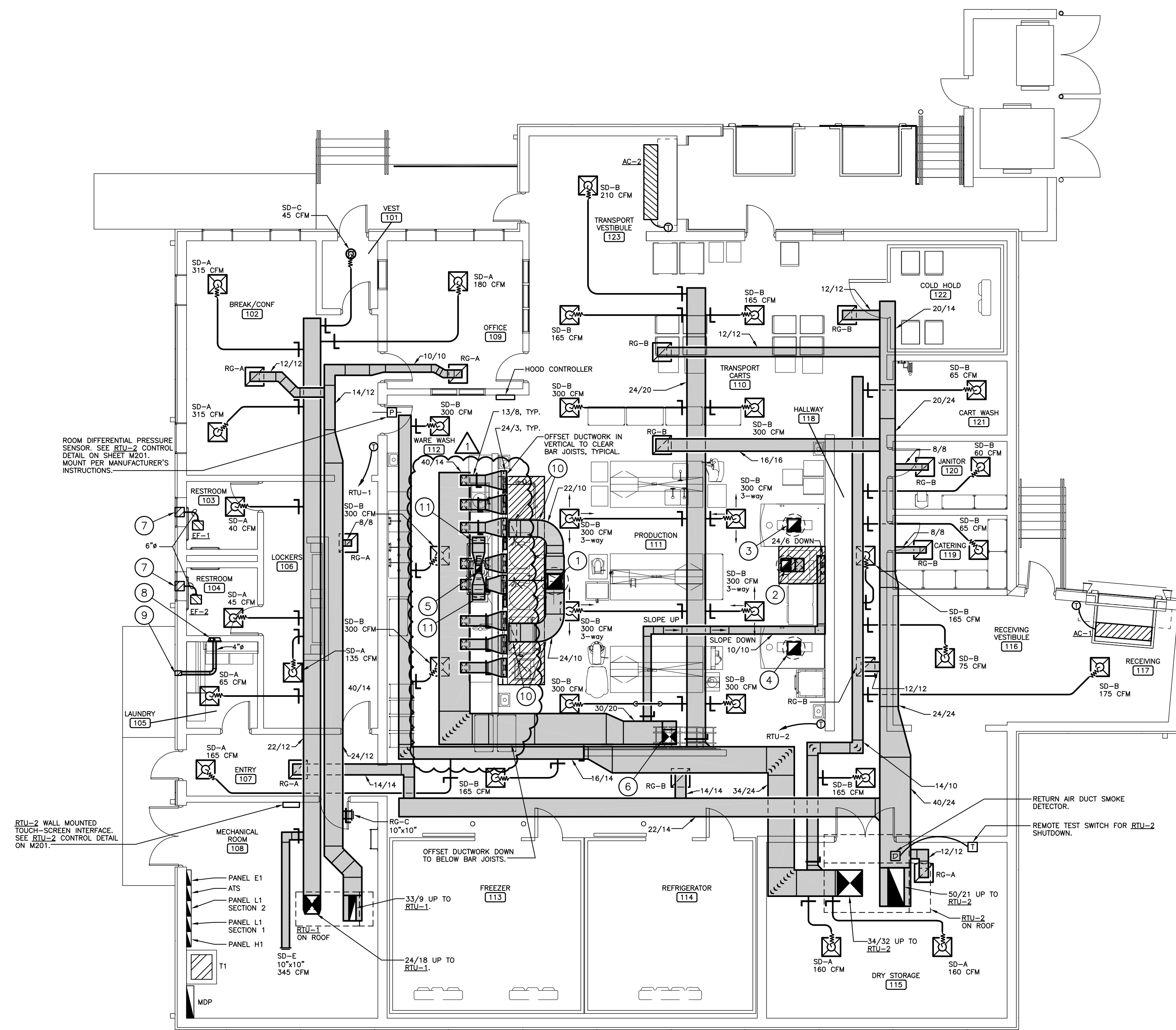
Project Name: USD 320 WAMEGO-DISTRICT KITCHEN

Project Address: 4290 COLUMBIAN ROAD WAMEGO, KS

Sheet Title: ROOM FINISH SCHEDULE

Sheet: A601

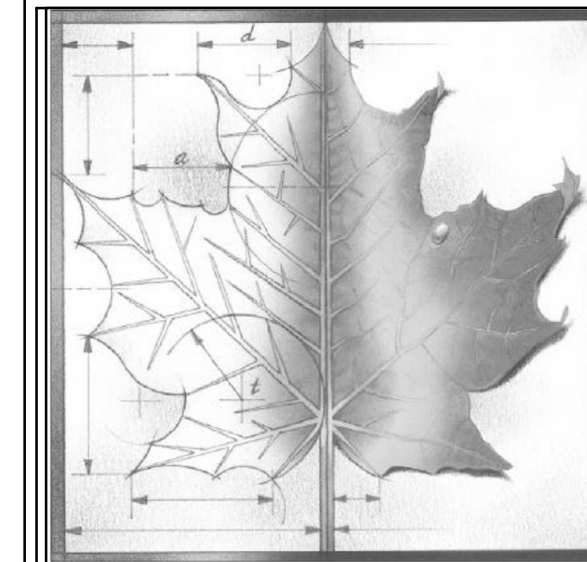
OF:



FLOOR PLAN - MECHANICAL
1/8" = 1'-0"

NOTES BY SYMBOLS:

- ① 24/20 divided flow duct up from (2) 24/10 radius elbow ducts. Transition to 18/18 duct up to KEF-1, see ME101 for roof plan.
- ② 12/12 up to KEF-2, see ME101 for roof plan. 12/12 connection to hood.
- ③ 16/16 up to KEF-3, see ME101 for roof plan. 8"φ connection equipment.
- ④ 16/16 up to KEF-4, see ME101 for roof plan. 8"φ connection equipment.
- ⑤ 8/8 up to KEF-5 and transition to connect to fan inlet, see ME101 for roof plan.
- ⑥ 18/18 up to MAU, see ME101 for roof plan.
- ⑦ 12"x12" exhaust air louver equivalent to Greenheck ESD-435 stationary louver with drainable blades, heavy gauge extruded aluminum blades at 37.5 degree angle on 1-1/4" centers, birdscreen and finish to be selected by architect. Mount bottom of louver at 10'-4" AFF and center above window.
- ⑧ Recessed dryer vent hose box equivalent to Dryerbox-480, installed for upward venting. Mount low in wall, near floor.
- ⑨ Aluminum dryer exhaust wall cap equivalent to Greenheck model WC-4 with backdraft damper, finish to be selected by Architect.
- ⑩ Provide rectangular radius elbow duct. Grease duct to slope to hood.
- ⑪ Route 16/4 exhaust duct up to structure and route horizontal ductwork through joists to 8/8 duct up. Coordinate routing with make-up air ductwork.



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Project Number: **16036**
Date: **7/7/17**
Project Name:

USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
**4290 Columbian Rd.
Wamego, KS**

Sheet Title:
MECHANICAL PLAN

Sheet:
M101
01: **8**

Job No. 15011-1
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Manhattan, Kansas
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PLUMBING EQUIPMENT SCHEDULE

General Notes:

- For fixtures marked (ADA), fixture, trim, mounting dimensions and installation shall meet the requirements of the 2010 Americans With Disabilities Act.
- Coordinate fixture locations with Architectural plans and elevations prior to rough-in.
- All fixtures shall be provided with vandal resistant trim.
- Provide cleanout to allow for completion of fixture.

WC-A (ADA) Zurn Z5615 ADA vitreous china, wall mounted, elongated bowl, siphon jet flushing action, 1.6 GPF, 1-1/2" top spud toilet, open front seat less cover, Sloan Regal 111 XL flush valve with vacuum breaker, angle stop and ADA compliant handle, coated cast iron closet carrier with adjustable closet connection and with feet anchor bolted to floor. Fixture color: White. Mount with rim at 17" AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.

LAV-A (ADA) Zurn Z5344 ADA vitreous china, wall mounted, elongated bowl, siphon jet flushing action, 1.6 GPF, 1-1/2" top spud toilet, open front seat less cover, Sloan Regal 111 XL flush valve with vacuum breaker, angle stop and ADA compliant handle, coated cast iron closet carrier with adjustable closet connection and with feet anchor bolted to floor. Fixture color: White. Mount with rim at 17" AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.

SS Flat MSB2424 24" x 24" x 10" deep Molded Stone one piece service sink with drain and strainer. Trim with Zurn Z843M1-XL-CS faucet with top brace, service stops, check stops, indexed 2-1/2" hot and cold metal lever handles, bucket hook, vacuum breaker, and threaded hose end spout, polished chrome plated finish. Fixture color: White.

GI Schier GB-250 grease interceptor, rotationally molded polyethylene separator, 100 GPM intermittent flow rate, 4" tapped inlet and outlet, 2" tapped internal vent connection, 1,076 lbs of grease capacity, 275 gallons of liquid capacity, integral flow control device on inlet with inlet diffuser, outlet diffuser, composite cover with bolted connection and gas and water tight gasket.

CCB Field adjustable adapter riser cover and riser rated for 16,000 lb load rating. Guy Gray T200 clotheswasher connection box, recessed housing with 1/2" valved hot and cold water top or bottom supply connections as required, and knockout for 2" drain connection. White powder coated steel construction.

IMB Guy Gray BIM875AB icemaker connection box, 20 gauge galvanized steel faceplate, 20 gauge galvanized steel recessed housing with 1/2" lead free valved cold water supply connection.

WH Wade W-8600 non-freeze wall hydrant, cast bronze with satin bronze face, 3/4" inlet and brass casing of sufficient length to extend through walls as required to place valve inside building. Valve rod and seat washer shall be removable through the face of the hydrant. Hydrant shall be furnished with detachable T-handle and integral vacuum breaker.

RH Woodford model RH2-MS freezeless roof hydrant, painted cast iron head assembly, integral cast brass backflow preventer, galvanized pipe casing, one piece plunger, 1/8" drain hole. Provide with cast iron hydrant support, deck flange, well seal, and EPDM boot cover. Hydrant shall be serviceable through the top of the unit without removing the hydrant.

HB Woodford model 26, hose bibb, cast bronze, with rough chrome finish, wheel handle, 3/4" inlet and hose thread outlet. Hose bibb shall be furnished complete with no spray back integral vacuum breaker.

FD-A Floor drain for finished areas - Wade 1100-1 floor drain with clamping collar, adjustable, vandal proof, 6" satin nickel bronze top. Provide with ProSet Systems trap guard T25630-F.

FD-B Floor drain for mechanical rooms - Wade 2350-27 cast iron with bottom outlet, 8" square top, square loose set grate, and removable sediment bucket. Provide with ProSet Systems trap guard T25630-F.

FD-C Floor drain for mechanical rooms - Wade 2350-27 cast iron with bottom outlet, 8" square top, square loose set grate, and removable sediment bucket. Provide with ProSet Systems trap guard T25630-F.

FD-D Floor drain for finished areas - Wade 1100-1 floor drain with clamping collar, adjustable, vandal proof, 6" satin nickel bronze top, 6" funnel. Provide with ProSet Systems trap guard T25630-F.

FS-A 2" Floor sink - Wade 9110 8" square, 6" deep, cast iron with smooth porcelain acid resisting interior, double drainage flange, bottom outlet, acid resisting nickel brass grate with openings as required for indirect drains, and sediment bucket. Omit grate where not required. Use acid resistant porcelain coated cast iron where not subjected to foot traffic. Provide with ProSet Systems trap guard T25630-F.

FS-B 3" Floor sink - Wade 9140 12" square, 8" deep, cast iron with smooth porcelain acid resisting interior, double drainage flange, bottom outlet, acid resisting nickel brass grate with openings as required for indirect drains, and sediment bucket. Omit grate where not required. Use acid resistant porcelain coated cast iron where not subjected to foot traffic. Provide with ProSet Systems trap guard T25630-F.

FS-C 2" Floor sink - Wade 9140 12" square, 8" deep, cast iron with smooth porcelain acid resisting interior, double drainage flange, bottom outlet, acid resisting nickel brass grate with openings as required for indirect drains, and sediment bucket. Omit grate where not required. Use acid resistant porcelain coated cast iron where not subjected to foot traffic. Provide with ProSet Systems trap guard T25630-F.

FS-D 2" Floor sink - Jay R Smith 3320 12"x6" rectangular, 7-3/4" deep, cast iron with smooth porcelain acid resisting interior, double drainage flange, bottom outlet, acid resisting nickel brass grate with openings as required for indirect drains, and sediment bucket. Omit grate where not required. Use acid resistant porcelain coated cast iron where not subjected to foot traffic. Provide with ProSet Systems trap guard T25630-F.

FS-E Floor sink - Advanced Tabco FTG2424 24"x24" square, 4" deep, 14 ga type 304 polished stainless steel body with fully welded joints, bottom pitched to 4" center drain with beehive strainer, subway style grating from 3/16" by 1" solid stainless steel bars. Provide with ProSet Systems trap guard T25630-F.

FS-F Floor sink - Advanced Tabco FTG1830 18"x30" rectangular, 4" deep, 14 ga type 304 polished stainless steel body with fully welded joints, bottom pitched to 4" center drain with beehive strainer, subway style grating from 3/16" by 1" solid stainless steel bars. Provide with ProSet Systems trap guard T25630-F.

FWCO Wade 8560-E cleanout tee with brass threaded plug and 8480-R round stainless steel coverplate secured to plug by countersunk screw.

EGCO Finished grade cleanout, Wade 6000-Z cast iron cleanout with straight body and fitted with bronze countersunk plug, same size as soil pipe with ductile iron scoriated cover. Bring extra heavy cast iron riser pipe to grade. Terminate hub flush in center of 18"x18"x4" (18"x36"x4" for two way cleanout) concrete block when not located in concrete area.

FFCO Finished floor cleanout, Wade 6000-Z-1 cast iron finished floor cleanout with spigot outlet, threaded adjustable housing, flanged ferrule with bronze threaded plug and vandal proof round secured nickel bronze scoriated top.

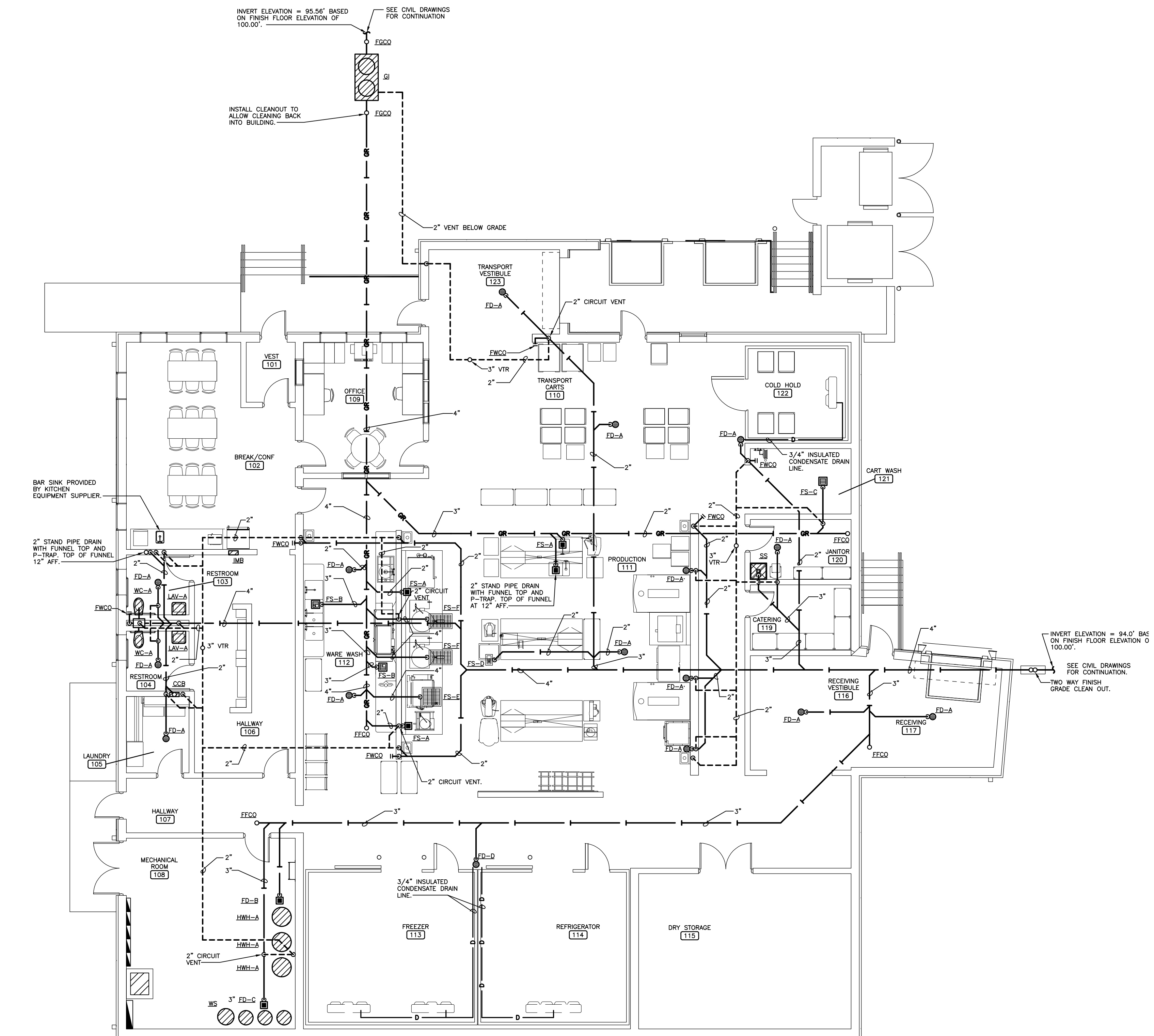
HWH-A A.O. Smith BTH-199 gas fired direct vent water heater, 100 gallon storage, 199 MBH natural gas input, 261 gallons per hour recovery at 90 degrees F rise.

HWP Hot water circulation pump, Taco #005-BF, in-line, 4GPM @ 9 ft. head, 1/35 HP, bronze body, 3250 RPM, 120 volt, 1 phase, 3/4" flanges. Provide bronze companion flanges and aquastat control.

SA Wade Shock Arrestors, stainless steel construction with welded nested bellows, precharged with nitrogen, 125 psi maximum operating pressure, 300 degree F maximum temperature.

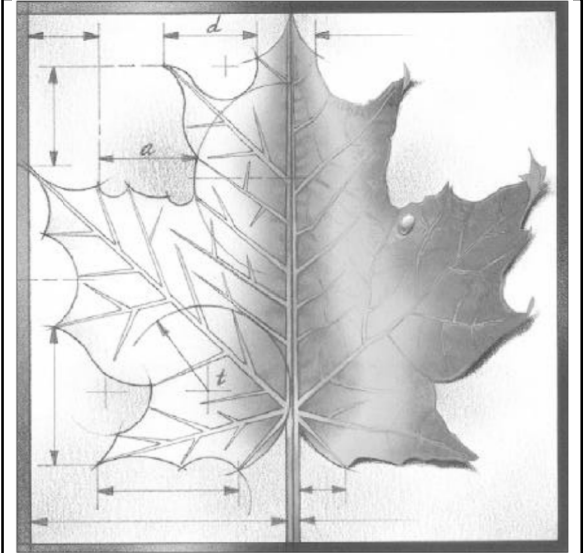
TEA Thermal Expansion Absorber, Amtrol ST-30V-C precharged hydropneumatic steel expansion tank with internal butyl diaphragm. 14.0 gallons total volume, 8.96 gal minimum expansion volume, 150 psig maximum working pressure.

WS Mario MGT-210-2 triple fully automatic parallel water softener with three resin tanks and one brine tank, 140,000 grain exchange capacity in each resin tank at a salt dosage of 6 lb/cu.ft., demand regeneration based on meter, each valve/resin tank rated for 60 gpm at a maximum pressure drop of 15 psi. Low voltage transformers to plug into 15 Amp 120 volt receptacle.



WASTE & VENT PLAN
1/8" = 1'-0"

FIXTURE/DESIGNATION	WASTE	VENT	COLD WTR.	HOT WTR.
FLUSH VALVE WATER CLOSET/WC-A	4"	2"	1"	---
LAVATORY/LAV-A	2"	2"	1/2"	1/2"
BAR SINK/(BY OTHERS)	2"	2"	1/2"	1/2"
SERVICE SINK/SS	3"	2"	1/2"	1/2"
CLOTHESWASHER CONNECTION BOX/CCB	2"	2"	1/2"	1/2"
WALL HYDRANT/WH	---	---	3/4"	---
FLOOR DRAIN/FD-A,B,D	2"	2"	---	---
FLOOR DRAIN/FD-C	3"	2"	---	---
FLOOR SINK/FS-A,C,D	2"	2"	---	---
FLOOR SINK/FS-B	3"	2"	---	---
FLOOR SINK/FS-E,F	4"	2"	---	---
ICE MAKER BOX/IMB	---	---	1/2"	---
WALL HYDRANT/WH	---	---	3/4"	---
HOSE BIBB/HB	---	---	3/4"	---
ROOF HYDRANT/RH	---	---	3/4"	---



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REVISIONS:

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Date: **7/7/17**

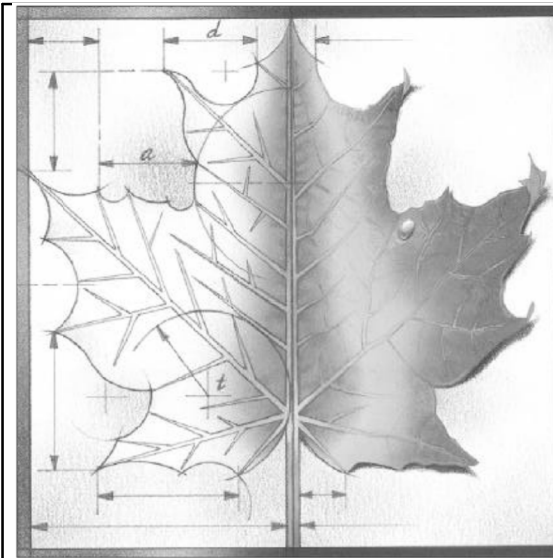
Project Name:
USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
**4290 Columbian Rd.
Wamego, KS**

Sheet Title:
**PLUMBING
WASTE &
VENT PLAN**

Sheet:
P201
8

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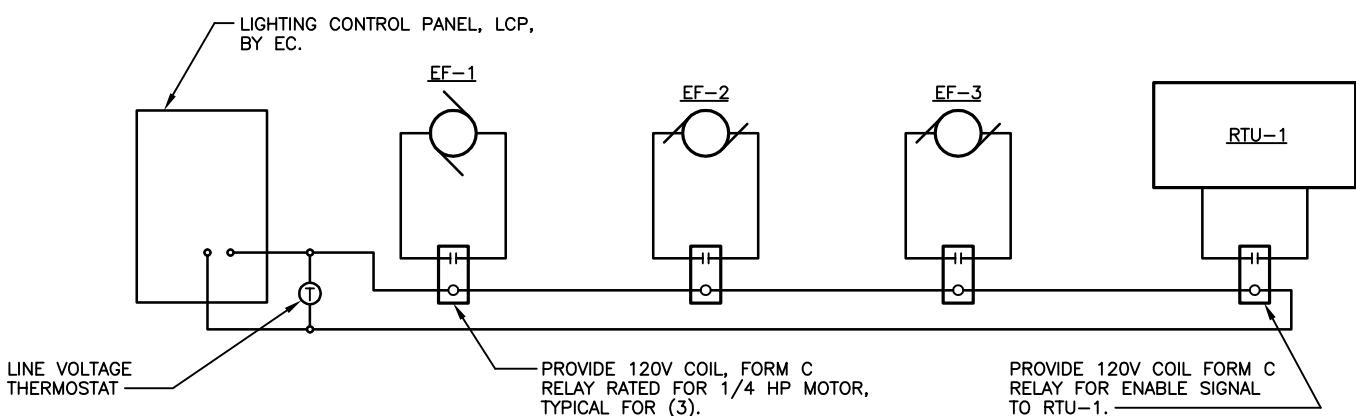
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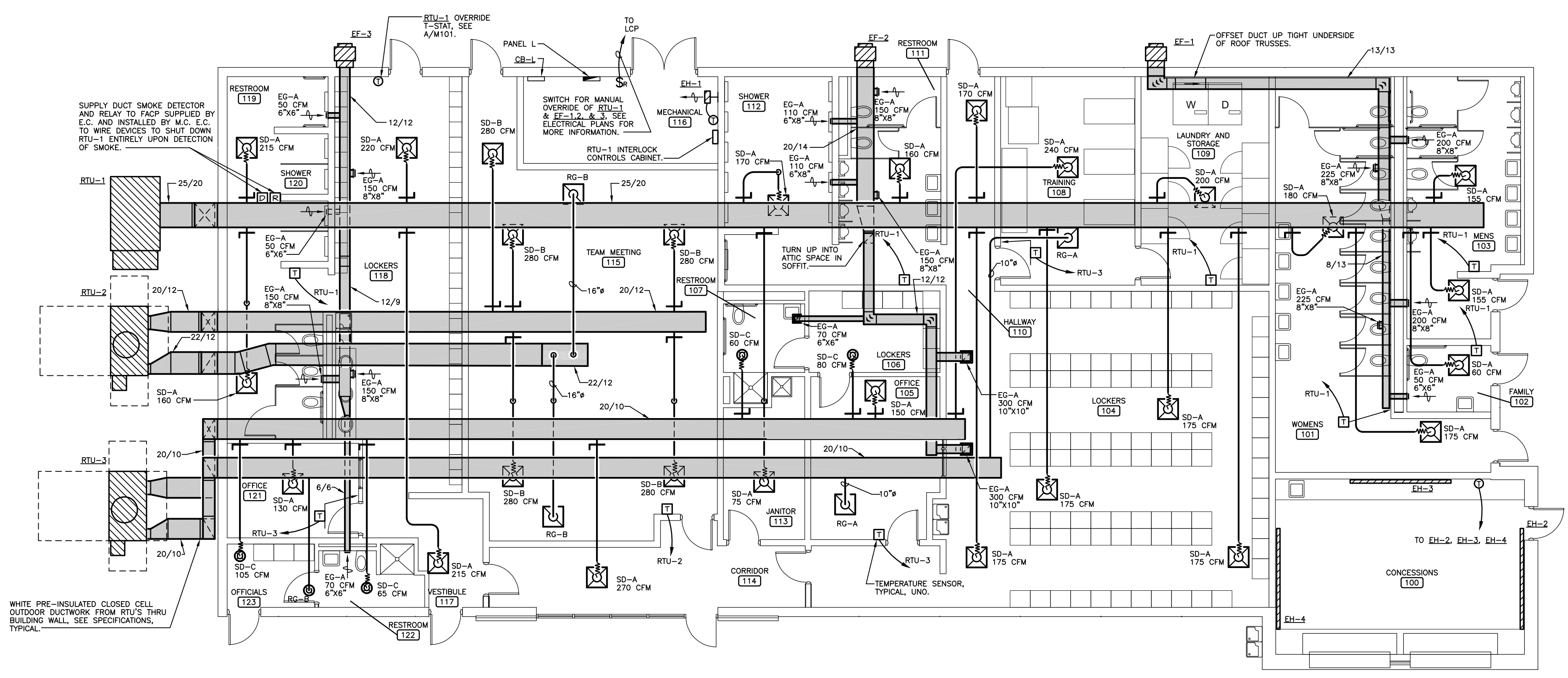
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SEQUENCE OF OPERATION:
1. Interlock all exhaust fans and RTU-1 such that based on either a time of day occupancy schedule, or manual override activation of a light switch in any restroom, manual override from switch in mechanical 116 or locker room space, all (3) exhaust fans shall start and RTU-1 fan shall start and heating shall modulate based on the sequence below. Coordinate programming of manual override switch and occupancy schedule with E.C.
2. Heating:
a. RTU-1 shall modulate gas heating to maintain a setpoint of 70F (adj.) based on base on the average space temperature value returned from (6) temperature sensors. Override control from lighting control panel with signal from line voltage thermostat set to 50F (adj.) for emergency heating operation.
3. Alarms: All room temperature outside of user defined limits, fan failure, deviation of any temperature from setpoint for an adjustable time span, filter dirty.

A RTU-1 EXHAUST FAN INTERLOCK & OVERRIDE DIAGRAM NOT TO SCALE



GENERAL NOTES

- Coordinate main ductwork routes with roof trusses and route between truss webs.
- Coordinate branch duct run-outs with roof truss locations and route between trusses.
- Ductwork in attic shall be lined with 1/2" duct liner and wrapped with 1-1/2" duct wrap.
- At contractor's option, pre-insulated closed-cell ductwork without the exterior wrap can be used in the attic space, in lieu of what is described in note #3 above. Pre-insulated system shall be equivalent to the system described in the specifications, acceptable manufacturers include Kingspan and ThermaDuct.



FLOOR PLAN - MECHANICAL 1/8" = 1'-0"

ELECTRIC HEATER SCHEDULE		
Mark	EH-1	EH-2,3,4
Type	Unit Heater	Cove Heater
Airflow	Horizontal Blow	Radiant
Watts	3,300	1,250
Volts	277	240
Phase	1	1
BASED ON: (Raywall)	H1H5T03N	CV125X

Notes:
1. Provide unit with wall mounting bracket.
2. Provide unit with accessories needed for wall mounted thermostat.
3. Provide unit with 240V line voltage thermostat rated for load.

EXHAUST FAN SCHEDULE				
DESIGNATION	EF-1	EF-2	EF-3	
DUTY	EXHAUST	EXHAUST	EXHAUST	
AREA SERVED	SEE PLANS	SEE PLANS	SEE PLANS	
TYPE	SIDEWALL	SIDEWALL	SIDEWALL	
TYPE	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	
CFM	900	1,190	620	
EXT. S.P. (WG)	0.50	0.50	0.50	
TYPE DRIVE	DIRECT	DIRECT	DIRECT	
DESIGN HP OR (WATTS)	1/4	1/4	1/4	
MOTOR RPM	1,579	1,671	1,303	
MAX. SONES	9.9	11.3	6.9	
ACCESSORIES	1,2,3	1,2,3	1,2,3	
VOLTAGE/PHASE	120/1	120/1	120/1	
BASED ON: (GREENHECK)	CW-099-A	CW-101-A	CW-099-A	

ACCESSORY KEY:
1. Provide with backdraft damper.
2. Provide with factory mounted and wired disconnect.
3. Provide unit mounted solid state speed control.

AIR DEVICE SCHEDULE				
All devices shall be supplied in white finish suitable for field painting.				
SD-A	EH Price AMD/6/4A aluminum louvered flush face diffuser, 24" square face, round neck, gasketed beveled frame. Blow pattern is 4-way unless indicated otherwise.			
	CFM Range	Max. APD	Max. NC	Neck Dia.
	0-110	0.10	30	6"
	111-200	0.10	30	8"
	201-300	0.10	30	10"
	301-400	0.10	30	12"
	401-535	0.10	30	14"
SD-B	Unless noted otherwise, runouts to diffusers shall be same size as neck, EH Price AMD/3P/4A aluminum louvered flush face diffuser, 24" square face, round neck, to lay into T-bar ceiling. Blow pattern is 4-way unless indicated otherwise.			
	CFM Range	Max. APD	Max. NC	Neck Dia.
	0-110	0.10	30	6"
	111-200	0.10	30	8"
	201-300	0.10	30	10"
	301-400	0.10	30	12"
	401-535	0.10	30	14"
RG-A	Unless noted otherwise, runouts to diffusers shall be same size as neck, EH Price AMD/3P aluminum louvered flush face return grille with 12" square neck, 24" square face, gasketed beveled frame. Neck size as indicated on drawings.			
RG-B	EH Price AMD/3P aluminum louvered flush face return grille with 12" square neck, 24" square face, to lay into T-bar ceiling. Neck size as indicated on drawings.			
EG-A	EH Price 630/L extruded aluminum louvered exhaust air grille with 1-1/4" screwed border and gasketed frame. Size as indicated on drawings.			

ROOF TOP UNIT SCHEDULE			
ROOF TOP UNIT	RTU-1	RTU-2	RTU-3
DUTY	HEATING	HEATING/COOLING	HEATING/COOLING
TYPE	NORTH	TEAM MEETING	OFFICES
SERVES	CONFERENCE	HORIZONTAL DISCHARGE	HORIZONTAL DISCHARGE
CONFIGURATION	DOWNFLOW	HORIZONTAL DISCHARGE	HORIZONTAL DISCHARGE
CFM	3,000	1,400	1,100
EXT. S.P. (WG)	0.75	0.75	0.75
MINIMUM O.A. CFM	3,000	650	380
HEATING FUEL	NATURAL GAS	NATURAL GAS	NATURAL GAS
MAXIMUM HEATING INPUT (MBH)	390	140	100
MINIMUM HEATING OUTPUT (MBH)	315.9	113.4	81
HEATING STAGES	MODULATING	1	1
REFRIGERANT	-	R-410A	R-410A
EVAP. E.A.T. DB/WB (F)	-	87.07/68.49	83.98/66.91
CONDENSER E.A.T. DB(F)	-	105	105
NET SENSIBLE COOLING CAPACITY (MBH)	-	43.75	33.96
NET TOTAL COOLING CAPACITY (MBH)	-	45.65	44.23
SUPPLY AIR FAN RPM (or speed)	1,170	1,589	1,650
SUPPLY FAN HP	2	1	1
SUPPLY FAN DRIVE TYPE	DIRECT	DIRECT	DIRECT
CONDENSER FAN HP	-	0.333	0.333
NO. COMPRESSORS	-	1	1
COMPRESSOR FLA (EACH)	-	25.6	21
TOTAL COOLING F.L.A.	14	40	31
MINIMUM CIRCUIT AMPS	17	47	36
MAXIMUM HACR CIRCUIT BRKR. AMPS	25	70	50
FILTERS	2" DISPOSABLE	2" DISPOSABLE	2" DISPOSABLE
VOLTAGE/PHASE	240/1	240/1	240/1
MINIMUM EER (SEER)	-	12.4	13.3
APPROXIMATE WEIGHT INCLUDING CURB, & ACCESSORIES (LBS)	1,300	1,200	1,150
BASED ON: (AAON)	RN-013-3-0-0000-369	RQ-005-1-H-EA09-359	RQ-004-1-H-EA09-339

NOTES:
1. Provide each RTU with a flexible connection at supply and return duct connections and transition as required to duct size.
2. Provide RTU-2 and RTU-3 with modulating hot gas reheat for dehumidification.
3. Provide each RTU with factory installed and wired NEMA 3R disconnect switch.
4. Provide each RTU with factory installed and wired weatherproof GFI NEMA 5-15 receptacle.
5. Provide RTU-1 with 7-day programmable combination thermostat and humidistat.
6. Equip each unit with complete integral control system for thermostat.
7. Install supply air duct smoke detector, provided by Electrical Contractor, in RTU's over 2,000 cfm of supply air. Detector shall be circuited to shut down unit entirely upon detection of smoke.
8. Provide RTU-2 and RTU-3 with 14" high insulated curb compatible with pad mounting on grade.
9. Provide RTU-1 with curb compatible with pad mounting on grade and for horizontal discharge of ductwork from unit through curb.
10. Provide RTU-2 and RTU-3 with factory provided and field installed hail guards.
11. Provide RTU-1 & RTU-3 averaging temperature sensors. Quantities shown on drawings.

C

REVISIONS:	
7/25/2017	

Project Number: 16036

Date: 7/7/17

Project Name: USD 320 SPORTS COMPLEX LOCKER AND CONCESSIONS

Project Address: 4290 Columbian Road Wamego, KS

Sheet Title: MECHANICAL PLAN

Sheet: M101

Sheet: M101

Sheet: M101

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Sheet: M101

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Job No. 15011-1

LIGHTING CONTROL PANEL SCHEDULE

PANEL DESIGNATION: LCP		FEATURES:	
LOCATION: Mech 116		- Integral Astronomical Timeclock	
VOLTS: 120		- SPST 20 amp independently programmable relays	
MOUNTING: Surface		- Keypad with LCD display	
ENCLOSURE: NEMA 1		- Equivalent to Wattstopper LP8	
		- Programmable Group Switching	

RELAY#	CKT.	Description	LV Switch / Sensor	Channel	Load (VA)
1	L-56	Mech 116	Timeclock/Switch	A	164
2	L-58	West Interior Lighting	Timeclock/Switch	A	1,742
3	L-60	East Interior Lighting	Timeclock/Switch	A	1,673
4	L-62	Concessions	Timeclock/Switch	A	423
5	L-64	Exterior Facade Lighting	Timeclock	B	209
6	L-45	Mechanical Equipment	Timeclock/Switch	C	150
7					
8					

Notes:
 1. See plans for low voltage (LV) switch and sensor locations.
 2. Provide all low voltage control circuitry between low voltage controls and panel.

Channel Schedule
 A. Lights shall be Timeclock on/off with manual override, manual 2-hour override during vacancy.
 B. Lights shall be turned on/off by adjustable input from astronomical time clock.
 C. Mechanical equipment activation with Timeclock and manual 2-hour override with light keypad activation from either relay 1 or 2 during vacancy. Manual override of mechanical equipment via low-voltage switch in Mech Room 116.

LIGHTING CONTROL DEVICE SCHEDULE

MARK	MANUF.	DESCRIPTION	MOUNTING
IC	Watt Stopper	LMRC-101 Series Digital On/Off room controller. Plenum-rated construction for mounting above ceiling, RJ45 receptacles for cable connections. Complete installation for integration to lighting management system.	Above Ceiling
KP	Watt Stopper	LMSW-104 Series 4-Button wall switch.	Switch Box

NOTES:
 1. Install occupancy and light level sensors per manufacturer's recommendations.
 2. Provide relays, power supplies, and circuitry for complete operation of sensors.
 3. Set time delays = 120 minutes.

KEYPAD BUTTON SCHEDULE

Room	Control Zone(s)	Rm. Controller	Switch	Occ. Sensor	Control Type
115 - Team Meeting	1	LMRC-101	LMSW-104	-	A

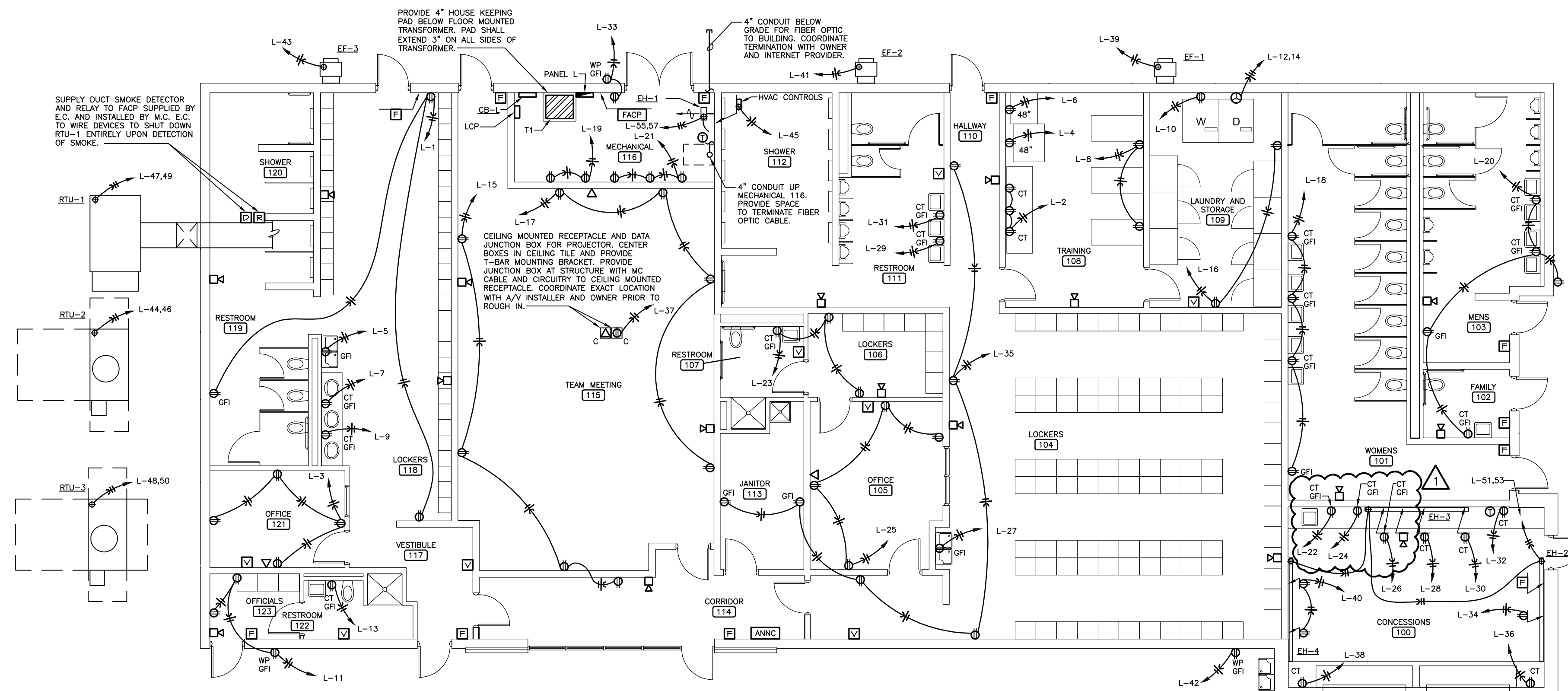
Control Type:
 A Manual On/Off/Dim by Occupant, Timeclock Off with Manual Override

Notes:
 1. Each keypad should have (1) button for on/hold to raise, (1) off/hold to dim, (1) dimming preset all fixtures 33%, and (1) dimming preset all fixtures 67%.

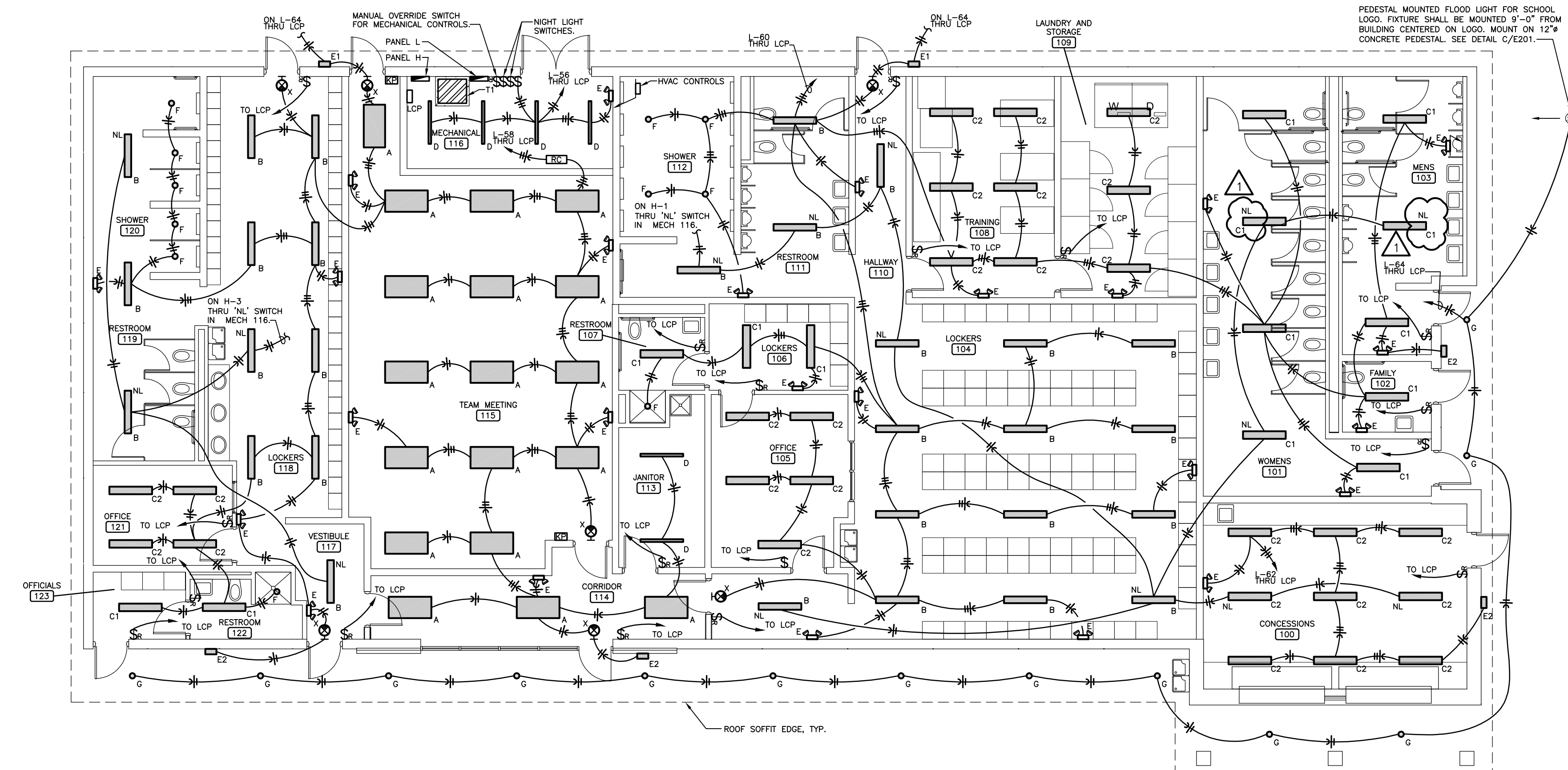
LIGHTING FIXTURE SCHEDULE

MARK	SIZE	MANUF.	DESCRIPTION	LAMPS
A	2' x 4'	Williams	Series PT shallow plenum LED lay-in troffer with die-formed 22 gauge cold rolled steel, diffuse ribbed acrylic, highly reflective non-glare matte white polyester powder coat finish, and electrical access from room-side to allow for service and/or cleaning without removing fixture from ceiling grid. Provide fixture with 4,000K lumen package producing 5,997 delivered lumens at 54 watts, 0-10V dimming driver, minimum 82 CRI and rated for 50,000 hours at 70% lumen maintenance.	LEDs 54W
B	7-3/8" W x 4-1/2" H x 51-7/8" L	Williams	Series 96 LED fully enclosed and gasketed industrial surface mount fixture with polycarbonate toggle latches, closed-cell polyurethane gasket, 5VA (f1) fiberglass exterior enclosure with aluminum internal housing, frosted and ribbed UV stabilized polycarbonate shielding, and electronic driver prewired for non-dimming applications. Provide fixture with 4,000K lumen package producing 4,700 nominal lumens at 40 watts.	LED 40W
C1	2-13/16" H x 8-1/2" W x 4' L	Williams	Series ASM Architectural Surface Mount LED with 0.04" die-formed aluminum housing with die-cast decorative end caps, ribbed acrylic diffuser, and textured matte white polyester powder coat finish. Provide fixture with 4,000K lumen package producing 2,500 nominal lumens at 24 watts, and rated for 50,000 hours at 85% lumen maintenance (L85).	LEDs 24W
C2	2-13/16" H x 8-1/2" W	Williams	Similar to type 'C1' except to be provided with 4,000K lumen package producing 4,600 nominal lumens at 47 watts.	LEDs 47W
D	2-3/4" W x 3-1/4" D x 48" L	Williams	Series 75L lensed LED strip fixture with 22 ga. cold rolled steel housing, all parts painted to a minimum 92% average reflectance, and 0.125" thick acrylic frosted lens. Provide all necessary hardware to surface mount or chain hang fixture as required, and 11-gauge white powder coated wireguard where indicated on plans. Provide fixture with 4,000K lumen package producing 3,800 nominal lumens at 41 watts, on electronic driver prewired for non-dimming applications, and rated for 50,000 hours at 70% lumen maintenance.	LEDs 41W
E	12-1/2" x 5-1/2" x 5-7/8" D	Mule	Series MRD-HO wall mounted emergency light with white thermoplastic housing, 6 volt DC output, rated for 54 watts at 1.5 hours, solid-state battery charger, sealed maintenance free lead-calcium battery, equipped with two low profile adjustable heads and wall mounting bracket. Provide circuitry for and connect to unswitched power from lighting circuit serving the same area as emergency light.	2-12W MR-16
E1	9-1/16" x 6-5/16" x 4" D	Mule	Series MERU wall mounted architectural, low-profile LED with 'normally on' and emergency operation lighting, die-cast aluminum housing and heat sink, scratch resistant polyester powder coat finish in color to be selected by Architect, UV resistant polycarbonate lens, and neoprene seal for weatherproof installation. battery heater rated for -40°F to 122°F at 32 watts for 90 minutes. Provide 3,000K lumen package producing 1,600 lumens in AC operation, and 600 lumens in emergency operation. Provide circuitry for and connect to unswitched power from lighting circuit serving same area as emergency light.	LEDs 15.2W
E2	9-1/16" x 6-5/16" x 4" D	Mule	Similar to fixture type 'E2' except provide fixture for emergency operation only.	LEDs 15.2W
F	6" dia.	Spectrum	Series RDF16LEDXT 6" LED shower light with 20 gauge die formed galvanized housing and frame, aluminum heat sink, semi-diffuse finish, UL listed for damp locations, IC rated, and minimum 83 CRI. Provide fixture with 4,000K lumen package producing 1,000 nominal lumens at 11.1 watts.	LEDs 11.1W
G	6" dia.	Williams	Series ICL60 6" recessed round LED downlight with 22-gauge galvanized steel housing, aluminum heat sink, clear semi-specular reflector, powder coat finish, rated for direct contact to insulation, 55,000 hours at 70% lumen maintenance and minimum 80 CRI. Provide fixture with 3,500K lumen package producing 1,000 lumens at 15 watts, and an electronic driver with 0-10V dimming capability. Provide all hardware required to mount in building soffit.	LEDs 15W
H	8-3/8" H x 4-5/8" W x 6" dia.	Lumen Pulse	Series Lumen Beam small white grade mounted LED building facade light with low copper content high pressure die-cast aluminum housing, heavy aluminum former yoke, stainless steel hardware, silicone sealing devices, clear tempered glass lens and polyester powder coat finish. Provide fixture with white 3,500K LEDs with flood optic, producing 639 lumens at 14 watts, Snoot(LBL), and an electronic driver. Finish selected by Architect.	LEDs 14W
X	12-3/4" x 8-1/2"	Mule	Series Classic emergency powered exit light with red letters, vandal resistant die-cast aluminum housing, universal chevrons, 100 ft. visibility, all required mounting hardware, sealed NiCd emergency power battery rated for 90 minutes, integral solid state battery charger, one or two faces as indicated on plans, wall or ceiling mount as indicated on plans. Provide circuitry for and connect to unswitched power from lighting circuit serving same area as exit light.	LED

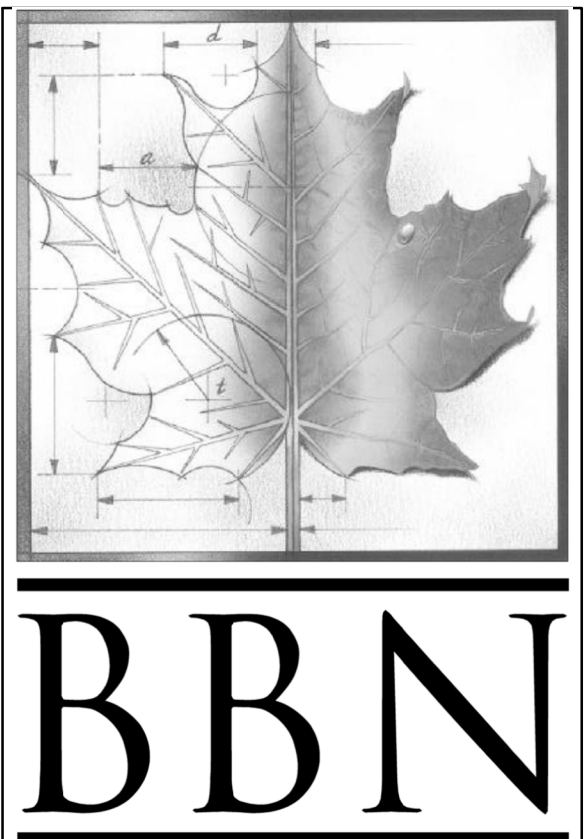
NOTES:
 1. All fixtures to be provided for 120 volt AC operation unless noted otherwise.
 2. Coordinate mounting heights of all wall mounted fixtures with Architect prior to roughing in.



NORTH
FLOOR PLAN - POWER
 1/8" = 1'-0"



NORTH
FLOOR PLAN - LIGHTING
 1/8" = 1'-0"



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REVISIONS:

7/25/2017	

Project Number: **16036**
 Date: **7/7/17**

Project Name:
USD 320 SPORTS COMPLEX LOCKER AND CONCESSIONS

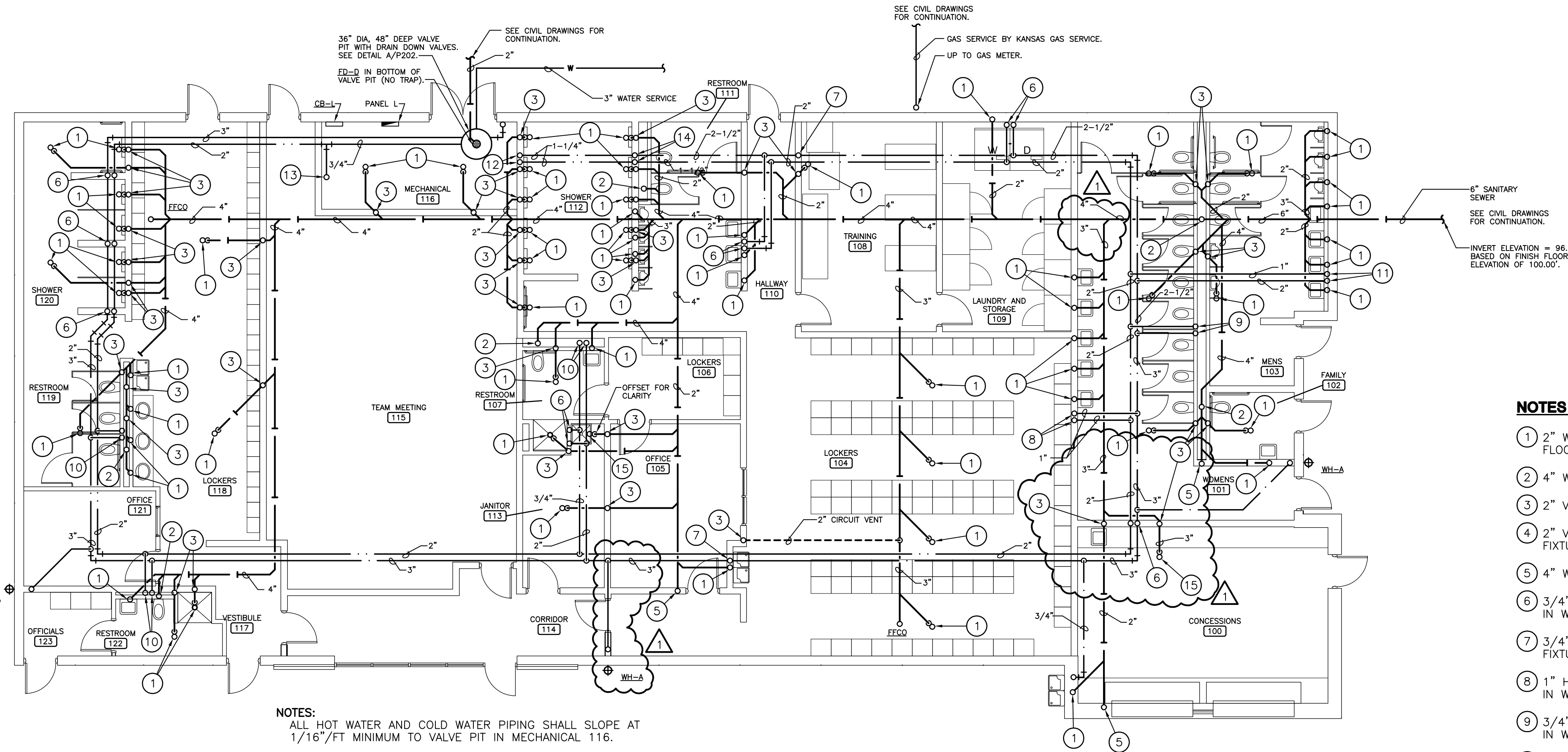
Project Address:
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 Wamego, KS**

Sheet Title:
ELECTRICAL PLANS

Sheet:
E101

Job No. 15011-1

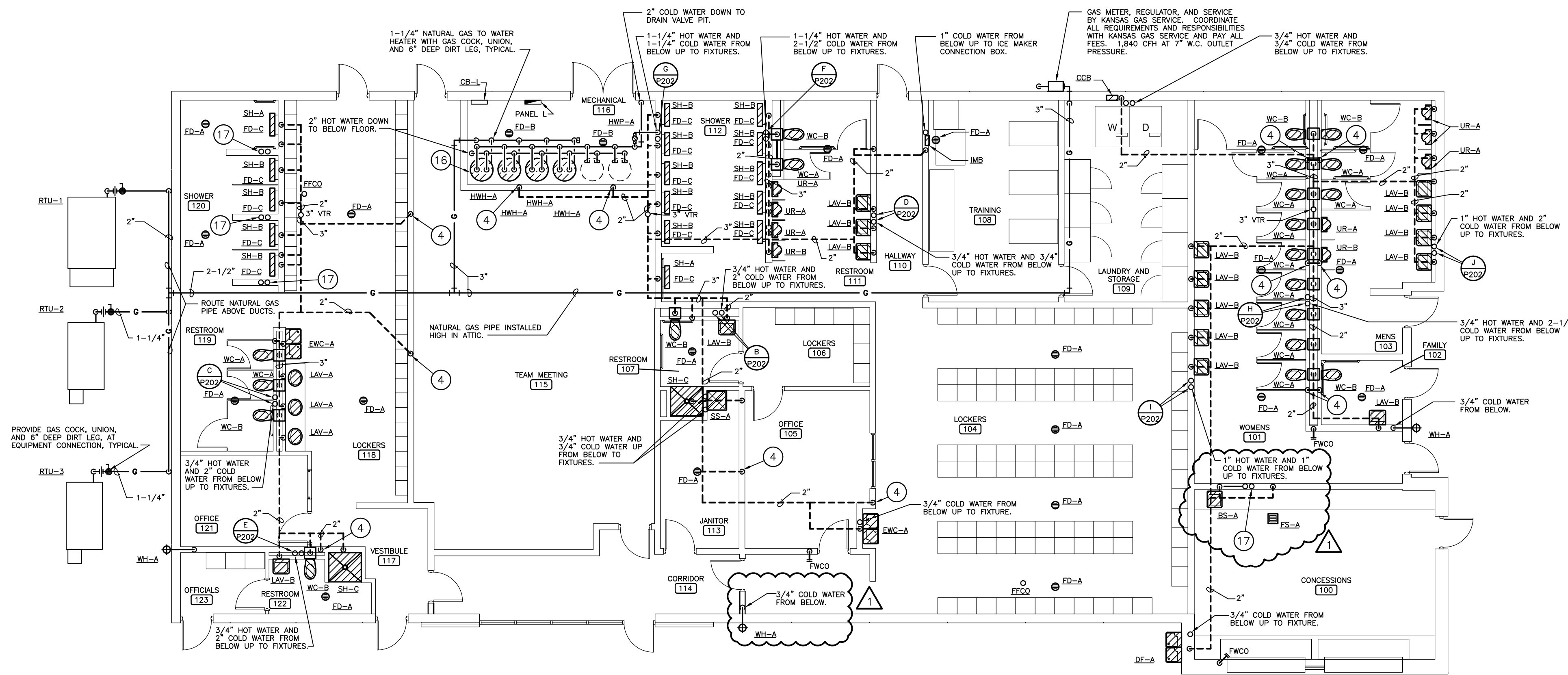
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NOTES:
 ALL HOT WATER AND COLD WATER PIPING SHALL SLOPE AT
 1/16"/FT MINIMUM TO VALVE PIT IN MECHANICAL 116.

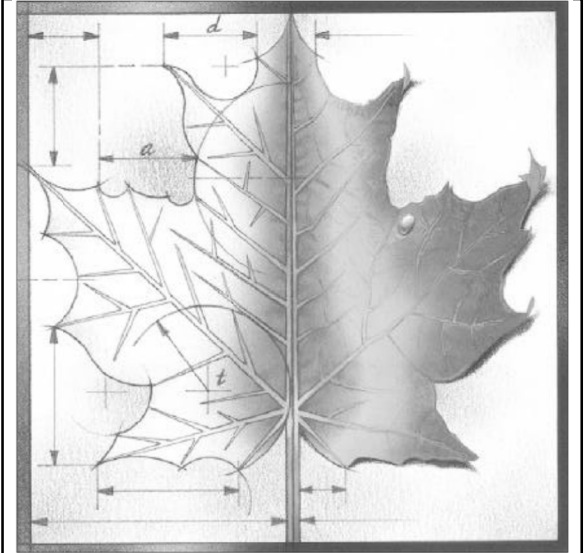


UNDER FLOOR PLUMBING PLAN
 1/8" = 1'-0"



PLUMBING FLOOR PLAN
 1/8" = 1'-0"

- NOTES BY SYMBOLS**
- ① 2" WASTE FROM FIXTURE OR FLOOR DRAIN ABOVE.
 - ② 4" WASTE UP TO FIXTURE(S) ABOVE.
 - ③ 2" VENT UP.
 - ④ 2" VENT FROM FLOOR DRAIN OR FIXTURE(S) BELOW.
 - ⑤ 4" WASTE UP TO FWCO.
 - ⑥ 3/4" HW AND 3/4" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑦ 3/4" CW UP IN WALL TO FIXTURE ABOVE.
 - ⑧ 1" HW AND 1" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑨ 3/4" HW AND 2-1/2" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑩ 3/4" HW AND 2" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑪ 1" HW AND 2" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑫ 1-1/4" HW AND 1-1/4" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑬ 2" HOT WATER UP.
 - ⑭ 1-1/4" HW AND 2-1/2" CW UP IN WALL TO FIXTURES ABOVE.
 - ⑮ 3" WASTE FROM FIXTURE ABOVE.
 - ⑯ PROVIDE MANUFACTURER PROVIDED CONCENTRIC VENT FOR WATER HEATERS. ROUTE COMBUSTION INTAKE AND EXHAUST PIPING THROUGH ATTIC TO ROOF DIRECTLY ABOVE WATER HEATER. INSTALL ALL CONCENTRIC VENTS LEVEL AND EQUALLY SPACED, TYPICAL FOR (4).
 - ⑰ 3/4" HOT WATER AND 3/4" COLD WATER FROM BELOW TO FIXTURE(S).



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Project Number: **16036**

Date: **7/7/17**

Project Name:
**USD 320 SPORTS
 COMPLEX LOCKER
 AND CONCESSIONS**

Project Address:
**4290 Columbian Road
 Wamego, KS**

Sheet Title:
**PLUMBING
 PLANS**

Sheet:
P101

OF: **8**

Job No. 15011-1

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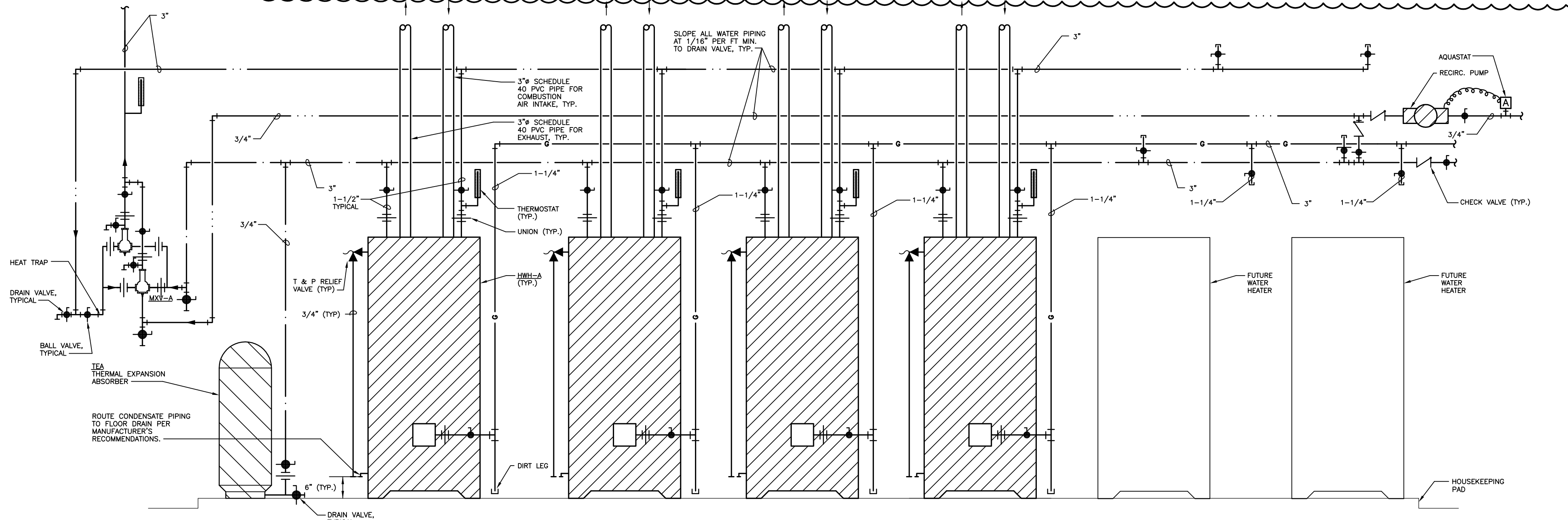
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FIXTURE/DESIGNATION	WASTE	VENT	COLD WTR.	HOT WTR.
FLUSH VALVE WATER CLOSET/WC-A,B	4"	2"	1"	---
URINAL/UR-A,B	2"	2"	3/4"	---
LAVATORY/LAV-A,B	2"	2"	1/2"	1/2"
SHOWER/SH-A,B,C	2"	2"	1/2"	1/2"
SERVICE SINK/SS-A	3"	2"	1/2"	1/2"
ELECTRIC WATER COOLER/EWC-A	---	---	1/2"	---
DRINK FOUNTAIN/DF-A	2"	2"	1/2"	---
CLOTHESWASHER CONNECTION BOX/CCB	2"	2"	1/2"	1/2"
ICE MAKER BOX/IMB	---	---	1/2"	---
WALL HYDRANT/WH-A,B	---	---	3/4"	---
HOSE BIBB/HB-A	---	---	3/4"	---
FLOOR DRAIN/ED-A,B,C,D	2"	2"	---	---
FLOOR SINK/FS-A	3"	2"	---	---
BAR SINK/BS-A	2"	2"	1/2"	1/2"

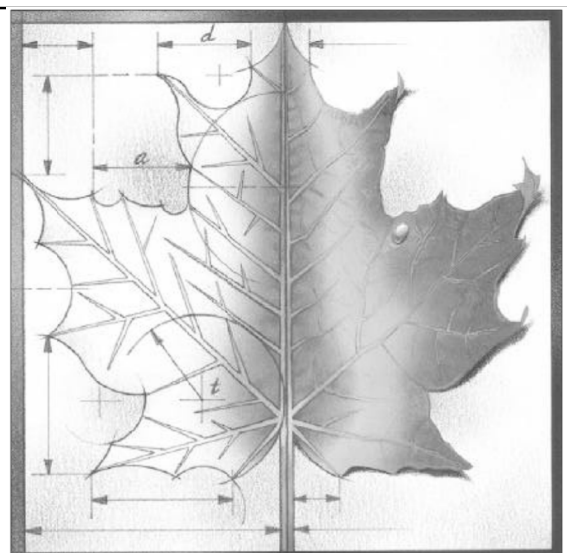


PLUMBING EQUIPMENT SCHEDULE

General Notes:	
1. For fixtures marked (ADA), fixture, trim, mounting dimensions and installation shall meet the requirements of the 2010 Americans With Disabilities Act.	
2. Coordinate fixture locations with Architectural plans and elevations prior to rough-in.	
3. All fixtures shall be provided with vandal resistant trim.	
4. Provide vendor required for complete installation of fixture.	
WC-A	Zurn Z5615 vitreous china, wall mounted, elongated bowl, siphon jet flushing action, 1.6 GPF, 1-1/2" spud toilet, open front seat less cover, Sloan Regal 111-XL flush valve with vacuum breaker and angle stop, coated cast iron closet carrier with adjustable closet connection and with feet anchor bolted to floor. Fixture color: White. Mount with rim at 15 inches AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.
WC-B (ADA)	Zurn Z5615 ADA vitreous china, wall mounted, elongated bowl, siphon jet flushing action, 1.6 GPF, 1-1/2" top spud toilet, open front seat less cover, Sloan Regal 111-XL flush valve with vacuum breaker, angle stop and ADA compliant handle, coated cast iron closet carrier with adjustable closet connection and with feet anchor bolted to floor. Fixture color: White. Mount with rim at 17" AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.
UR-A	Zurn Z5755-U vitreous china, wall hung washout flushing action, extended rim, 1.0 GPF, 3/4" top spud, integral trap, wall hanger carrier with feet anchor bolted to floor, Sloan Regal 180-1 XL flush valve with vacuum breaker and angle stop. Fixture color: White. Mount with lip at 24" AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.
UR-B (ADA)	Zurn Z5755-U vitreous china, wall hung, washout flushing action, extended rim, 1.0 GPF, 3/4" top spud, integral trap, wall hanger carrier with feet anchor bolted to floor, Sloan Regal 180-1 XL flush valve with vacuum breaker, ADA compliant handle and angle stop. Fixture color: White. Mount with lip at maximum of 17" AFF. NO SUBSTITUTIONS FOR FLUSH VALVE.
LAV-A	Zurn Z8124 self-rimming round vitreous china lavatory, 19" outside diameter, front overflow. Trim with Zurn Z81101-XL-3M 4" centerset faucet with 4" spout, 0.5 gpm flow control, grid drain, indexed hot or cold 2-1/2" metal lever handles, Dearborn supplies with stops and escutcheon plate, Dearborn #760W 17 ga. offset tailpiece and 1-1/4" cast brass P-trap with cleanout plug. Fixture color: White. Insulate water and waste piping below sink with manufactured piping covers consisting of flexible vinyl insulation with white finish and access to piping, equivalent to Handi-Lav-Guard manufactured by Treubro Inc.
LAV-B (ADA)	Zurn Z5344 20" x 18" vitreous china front overflow lavatory for concealed arms. Trim with Zurn Z81101-XL-3M 4" centerset faucet with 4" spout, 0.5 gpm flow control, grid drain, indexes hot or cold 2-1/2" metal lever handles, Dearborn supplies with stops and escutcheon plate, Dearborn #760W 17 ga. offset tailpiece and 1-1/4" cast brass P-trap with cleanout plug. Fixture color: White. Insulate water and waste piping below sink with manufactured piping covers consisting of flexible vinyl insulation with white finish and access to piping, equivalent to Handi-Lav-Guard manufactured by Treubro Inc. Provide carrier with feet anchor bolted to floor.
SH-A	Trim for shower: Zurn Z7301-SS-MT-12 pressure balancing valve with integral stops, metal lever handle, institutional fixed spray shower head with integral 2.5 GPM flow control. Piping shall be concealed in wall. Install valve at 48" AFF, head at 72" AFF.
SH-B (ADA)	Provide trim for handicapped accessible shower: Zurn Z7301-SS-MT-DV2P-HW-VB anti-scald pressure balancing mixing valve with ADA compliant handle, adjustable stop screw to limit handle turn, and integral service stops, Z7000-12-1.75 institutional fixed spray shower head with integral 1.75 GPM flow control, wall and hand spray unit with 60" of flexible rubber lined metal hose with in-line vacuum breaker, wall spout, 24" slide bar with bracket, and diverter valve with ADA compliant metal lever handle. Piping shall be concealed in wall. See Handicapped Accessible Shower Detail for mounting heights.
SH-C (ADA)	Comfort Designs XST 3838 BFRF 1.0 RRF-1 36" x 36" x 78-7/8" ADA compliant gelcoat shower enclosure, center sloping floor, center drain location with self caulking brass shower drain, curtain rod, ADA compliant 1-1/2" dia. stainless steel grab bars, 1" threshold, Color: White. Trim with Zurn Z7300-SS-MT-VB anti-scald pressure balancing mixing valve with ADA compliant handle, adjustable stop screw to limit handle turn, and integral service stops, hand spray unit with 60" of flexible rubber lined metal hose with in-line vacuum breaker, wall spout, 24" slide bar with bracket. Piping shall be concealed in wall. See Handicapped Accessible Shower Detail for mounting heights. Enclosure shall be recessed in floor to maintain ADA complaint threshold.
EWC-A (ADA)	Halsey Taylor #HIB-HACGS two-level, lead free, wall hung electric drinking fountain with front mounted push bars for water control, single water chilling unit with capacity to cool 8.0 GPH from 80 degrees F to 50 degrees F at 90 degrees F room temperature, with Refrigerant 134a, and single plumbing and electrical rough-in. Tops shall be stainless steel, frame shall be heavy duty welded steel with beige steel cabinet. Provide with supply stops and 1-1/4" Dearborn 17 gauge cast brass P-trap with cleanout plug. Electrical characteristics: 120 volt/1 phase, 4.8 F.L.A. Provide with bottle filling station with 1.1 GPM fill rate.
DF-A (ADA)	Halsey Taylor #HDF-BLEBP two-level, lead free stainless steel drinking fountain with freeze resistant boxes to be installed inside the building, vandal-resistant bubblers, self-closing vandal-resistant actuation mechanism, 1-1/4" 17 gauge P-traps with cleanout plug, and 3/4" diameter Schedule 40 PVC pipe for venting to roof.
BS-A	Just SL-2222-A-GR self-rimming single compartment Type 304 18-8 stainless steel sink, 16"L x 19"W x 7-1/2"D inside, fully sound deadened, holes as required for scheduled trim, with JB-99 strainer. Trim with Zurn Z831A4-XL-16F faucet with 8" centers, gooseneck swing spout, 1.0 gpm flow control and indexed 4" hot or cold metal wristblade handles, Dearborn supplies with stops and escutcheon plate, 1-1/4" cast brass P-trap with cleanout plug.
CCB	Guy Gray B200 clotheswasher connection box, recessed housing with 1/2" valved hot and cold water top or bottom supply connections as required, and knockout for 2" drain connection. Galvanized steel construction.
IMB	Guy Gray BIM875AB icemaker connection box, 20 gauge galvanized steel faceplate, 20 gauge galvanized steel recessed housing with 1/2" lead free valved cold water supply connection.
WH-A	Wade W-8600 non-freeze wall hydrant, cast bronze with satin bronze face, 3/4" inlet and brass casing of sufficient length to extend through walls as required to place valve inside building. Valve rod and seat washer shall be removable through the face of the hydrant. Hydrant shall be furnished complete with detachable T-handle and integral vacuum breaker.
HB-A	Woodford Model 26, hose bibb, cast bronze, with rough chrome finish, wheel handle, 3/4" inlet and hose thread outlet. Hose bibb shall be furnished complete with no spray back integral vacuum breaker.
FD-A	Floor drain for finished areas - Wade 1100-1 floor drain with clamping collar, adjustable, vandal proof, 6" satin nickel bronze top. Provide with ProSet Systems trap guard T25630-F.
FD-B	Floor drain for mechanical rooms - Wade 2350-27 cast iron with bottom outlet, 8" square top, square loose set grate, and removable sediment bucket. Provide with ProSet Systems trap guard T25630-F.
FD-C	Floor drain for showers - Zurn ZS880-28 4" x 28" stainless steel shower drain with bottom outlet, adjustable top with Type 304 stainless steel slotted heel-proof grate. Fabricated stainless steel body with V shaped channel, 2" No-Hub center drain, secured leveling frame. Provide with ProSet Systems trap guard T25630-F.
FD-D	Floor drain Sioux Chief 841-2P 2" PVC floor drain with 6" dia polypropylene strainer.
FWCO	Wade 8560-E cleanout tee with brass threaded plug and 8480-R round stainless steel coverplate secured to plug by countersunk screw.
FGCO	Finished grade cleanout, Wade 6000-2 cast iron cleanout with straight body and fitted with bronze countersunk plug, same size as soil pipe with ductile iron scoriated cover. Bring extra heavy cast iron riser pipe to grade. Terminate hub flange in center of 18"x18"x4" (18" x 36" x 4" for two way cleanout) concrete block when not located in concrete area.
FFCO	Finished floor cleanout, Wade 6000-Z-1 cast iron finished floor cleanout with spigot outlet, threaded adjustable housing, flanged ferrule with bronze threaded plug and vandal proof round secured nickel bronze scoriated top.
HWH-A	A.O. Smith BTH-199 gas fired direct vent water heater, 100gallon storage, 199 MBH natural gas input, 261 gallon per hour recovery at 90 degrees F rise.
MXV-A	Leonard #TM-520B-LF-DT-TT high-low thermostatic water mixing valve assembly for exposed exposed piping with Type TM Thermostatic Water Mixing Valve with solid bimetal thermostat directly linked to valve porting, adjustable limit stops, color coded scale, wall support, inlet union angle strainer checkstops, outlet volume control/shutoff, pressure regulating valve with pressure gauges, Type TM Thermostatic Water Mixing Valve with solid bimetal thermostat directly linked to valve porting, assembly shall be capable of providing 29 gpm of tempered water at 10 psi pressure drop, 1.0 gpm minimum flow rate, adjustable limit stops, color coded scale, outlet volume control/shutoff, dial thermometer (range: 0 degrees F to 140 degrees F), rough bronze finish.
HWP-A	Hot water circulation pump, Taco #005-BF, in-line, 4GPM @ 9 ft. head, 1/35 HP, bronze body, 3250 RPM, 120 volt, 1 phase, 3/4" flanges. Provide bronze companion flanges and aquagast control.
SA-A	Wade Shock Arrestors, stainless steel construction with welded nested bellows, precharged with nitrogen, 125 psi maximum operating pressure, 300 degree F maximum temperature. Fixture Units Designation Wade Catalog No. PDI Rating 1-11 SA-5 5 A 12-32 SA-10 10 B 33-60 SA-20 20 C
TEA-A	Thermal Expansion Absorber, Amtral ST-85CL precharged hydropneumatic steel expansion tank with replaceable internal butyl bladder. 22.0 gallons total volume, 11.0 gal minimum expansion volume, bottom system connection, 150 psig maximum working pressure.
SS-A	Fiat MSB2424 24"x24"x10" deep Molded Stone one piece service sink with drain and strainer. Trim with Zurn Z843M1-XL-CS faucet with top brace, service stops, check stops, indexed 2-1/2" hot and cold metal lever handles, bucket hook, vacuum breaker, and threaded hose end spout, polished chrome plated finish. Fixture color: White.
FS-A	Model Sink Wade 9445 12" square, 6" deep, cast iron with smooth porcelain with stainless interior, double drainage flange, bottom outlet, acid resisting nickel brass grate with openings as required for indirect drains, and sediment bucket. Omit grate where not required. Use acid resistant porcelain coated cast iron where not subjected to foot traffic. Provide with ProSet Systems trap guard T25630-F.



B HOT WATER HEATER DETAIL
NOT TO SCALE



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COMPLEX LOCKER
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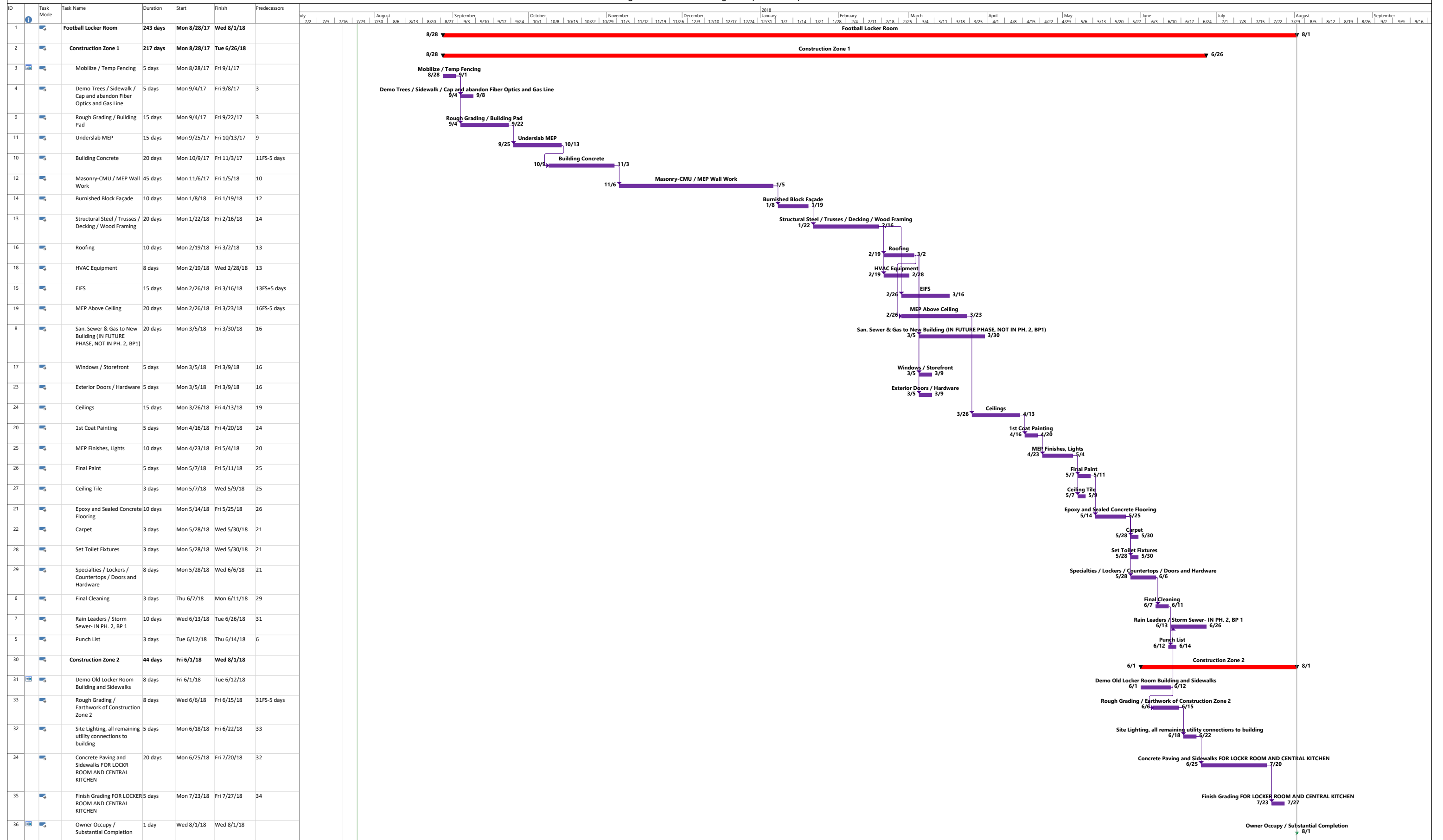
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Sheet Title:
**PLUMBING
DETAILS**

Sheet:
P201
OF: **8**

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USD 320 Wamego-Phase 2-Bid Package 1- Sports Complex Locker Rooms



Project: FB Locker Room Sched Date: Tue 7/25/17	Task Split	Milestone Summary	Project Summary Inactive Task	Inactive Milestone Inactive Summary	Manual Task Duration-only	Manual Summary Rollup Manual Summary	Start-only Finish-only	External Tasks External Milestone	Deadline Progress	Manual Progress
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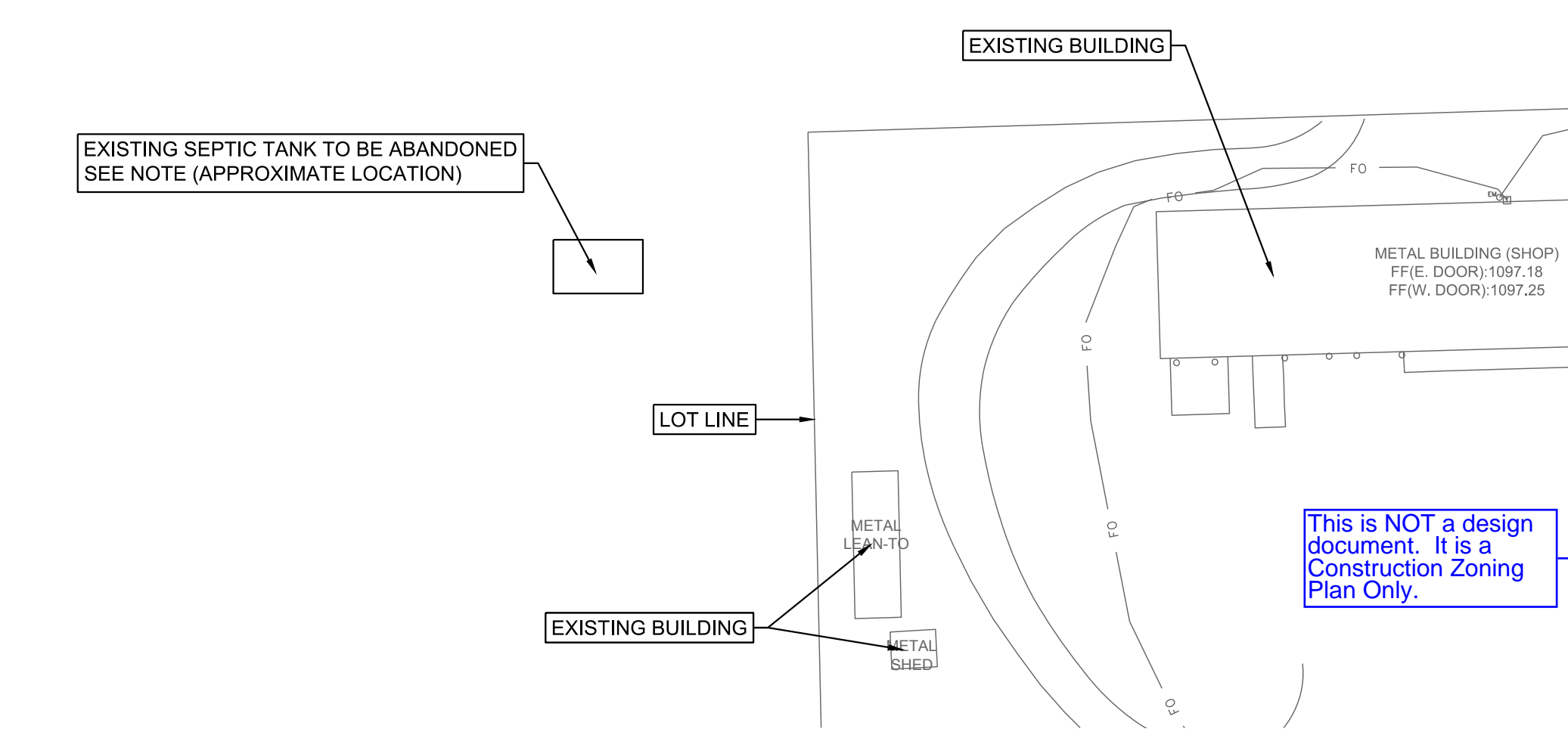
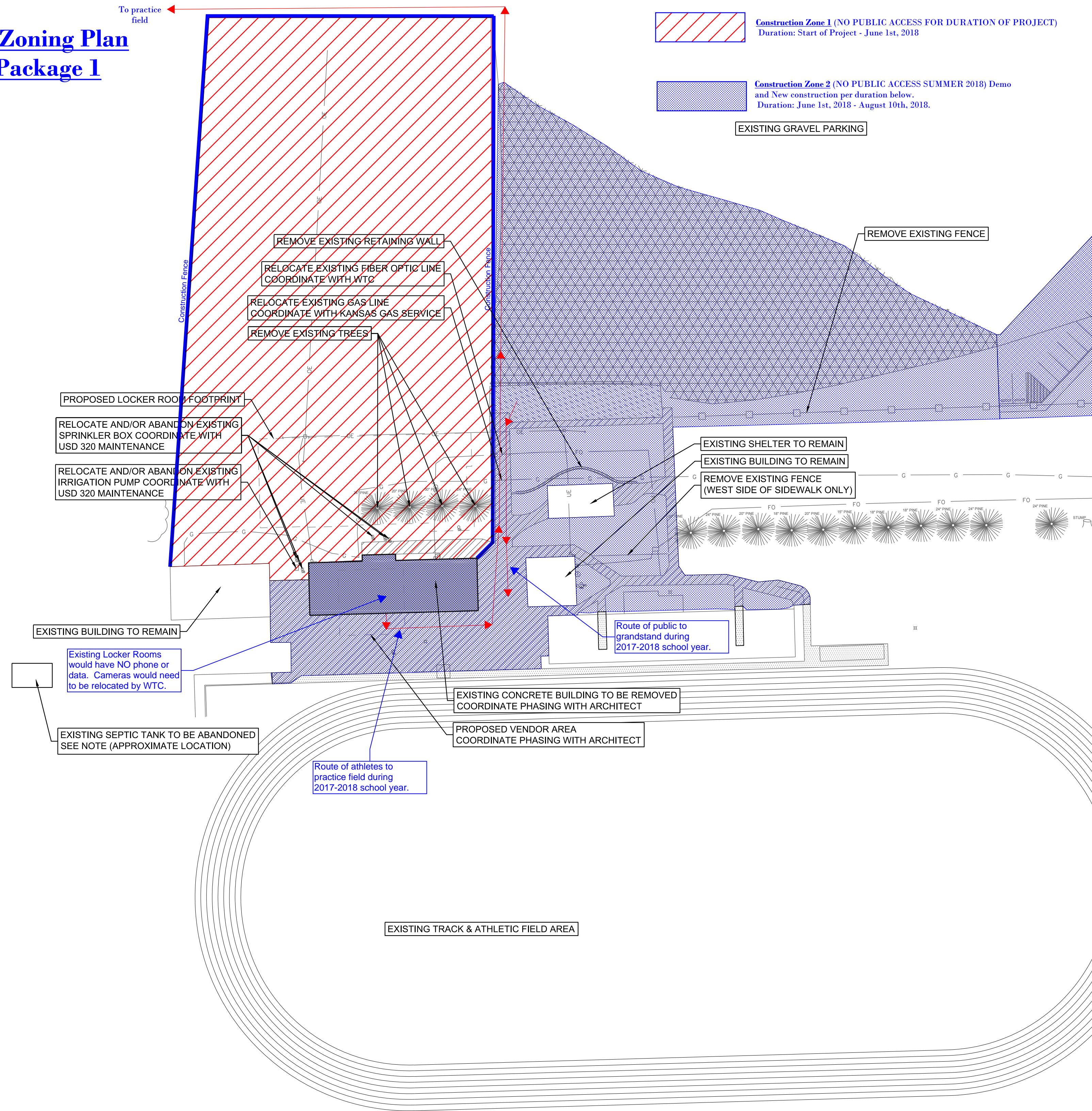
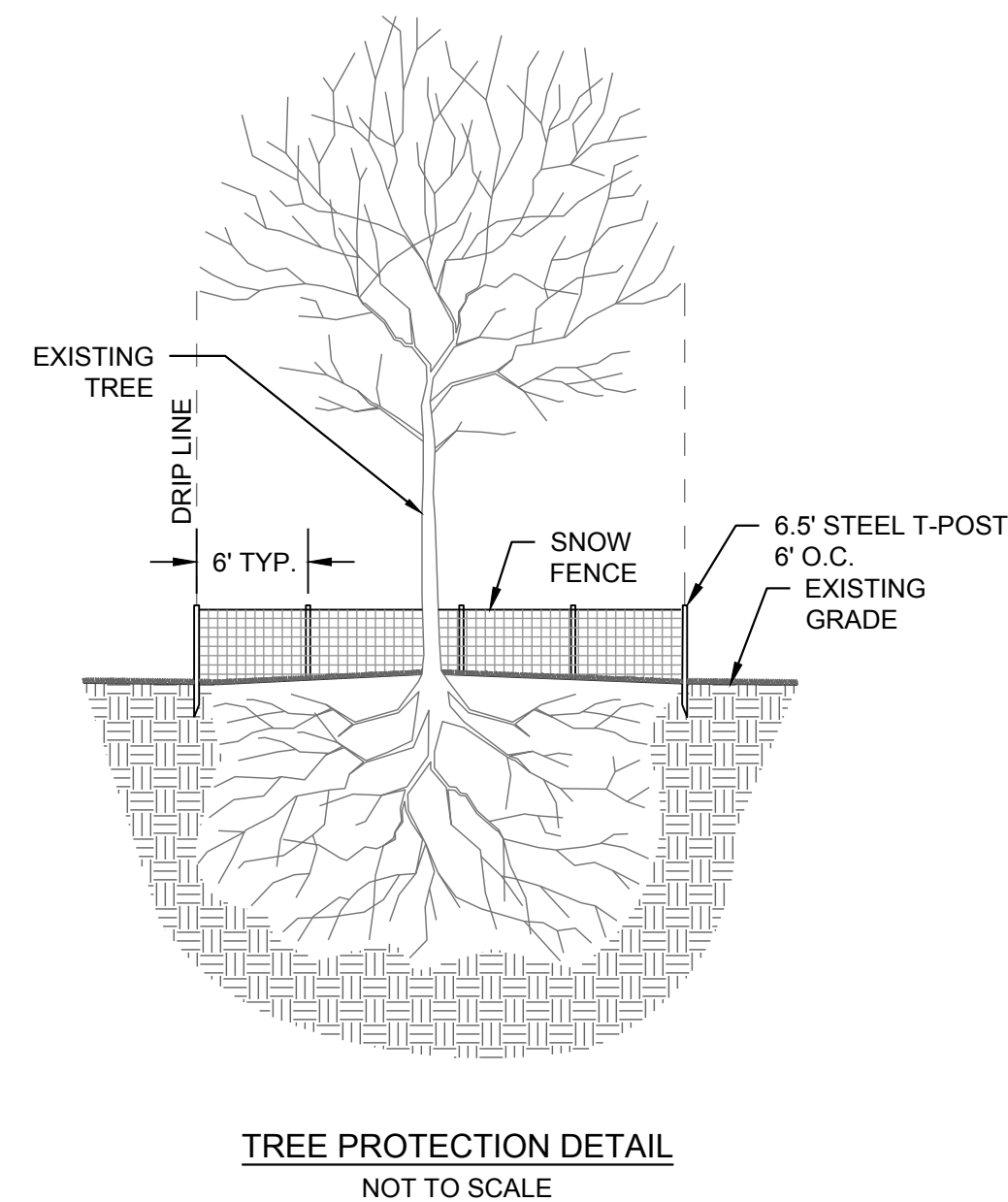
Construction Zoning Plan Phase 2, Bid Package 1 (PH2, BPI)

LEGEND

	EXISTING CONCRETE TO BE REMOVED
	EXISTING CONCRETE TO REMAIN
	EXISTING ASPHALT TO BE REMOVED
	EXISTING GRAVEL TO BE REMOVED & STOCKPILED
	EXISTING BUILDING TO BE REMOVED
	PROPOSED BUILDING
	WATER STRUCTURES
	TELEPHONE STRUCTURES
	SANITARY SEWER SERVICE LINE
	WATER SERVICE LINE
	GAS LINE
	FIBER OPTIC CABLE
	UNDERGROUND ELECTRIC

NOTES:

- CONTRACTOR TO COORDINATE ALL DEMOLITION AND PHASING OF DEMOLITION WITH ARCHITECT.
- ALL CONSTRUCTION WORK AND UTILITY WORK OUTSIDE OF THE PROPERTY BOUNDARIES SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.
- FOR CONSTRUCTION OF NEW SIDEWALK, PARTIAL PANEL REMOVAL OF EXISTING SIDEWALK WILL NOT BE ALLOWED. IF A PARTIAL PANEL IS REMOVED THEN ENTIRE PANEL SHALL BE REMOVED AND REPLACED AS NEEDED.
- ALL TREES ARE TO REMAIN UNLESS OTHERWISE NOTED.
- TREES AND SHRUBS WHICH ARE IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. TREES AND SHRUBS WHICH ARE NOT IN CONFLICT WITH PROPOSED NEW CONSTRUCTION AND NOT SHOWN TO BE REMOVED SHALL BE SAVED AND PROTECTED FROM DAMAGE.
- TREE PROTECTION MEASURES SHALL BE IMPLEMENTED FOR ANY TREE WHICH WILL HAVE CONSTRUCTION ACTIVITY LOCATED WITHIN 5 FEET OF THE DRIP LINE.
- MINIMIZE DISTURBANCE OF ROOTS WITHIN DRIP LINES OF TREES WHERE CONSTRUCTION ACTIVITY IS PLANNED.
- INSTALL TEMPORARY TREE PROTECTION MEASURES PRIOR TO COMMENCING ANY REMOVAL OR SITE DEMOLITION WORK. INSPECT TREE PROTECTION FENCE DAILY, AND MAINTAIN THROUGHOUT THE DURATION OF CONSTRUCTION. REMOVE FENCE WHEN CONSTRUCTION IS COMPLETE.
- DO NOT STORE MATERIALS, DEBRIS, OR SALVAGED OR EXCAVATED MATERIALS INSIDE THE TREE PROTECTION ZONE. DO NOT PARK VEHICLES OR EQUIPMENT INSIDE THE TREE PROTECTION ZONE.
- ALL DEMOLITION DEBRIS SHALL BE REMOVED FROM THE SITE. NO ON-SITE BURYING OF DEBRIS WILL BE ALLOWED.
- ALL HAUL SITES SELECTED FOR COLLECTION OF DEBRIS SHALL BE APPROVED BY THE OWNER/ENGINEER.
- IN LOCATIONS WHERE PROPOSED IMPROVEMENTS ARE NOT LOCATED, REMOVE STUMPS, ROOTS, AND OTHER DEBRIS PROTRUDING THROUGH GROUND SURFACE TO A DEPTH OF 24 INCHES BELOW FINISH SUBGRADE ELEVATION. IN ALL OTHER LOCATIONS COMPLETE REMOVAL IS REQUIRED.
- EXISTING SEPTIC TANKS SHALL BE PUMPED EMPTY, TOP CRUSHED IN, AND BACKFILLED WITH SAND. ALL OTHER LINES MAY BE CAPPED. COORDINATE SEPTIC TANK ABANDONMENT WITH: SCOTT SCHWINN, R.S. COUNTY SANITARIAN, 612 E. CAMPBELL ST. WESTMORELAND, KS 66549 785-457-3397



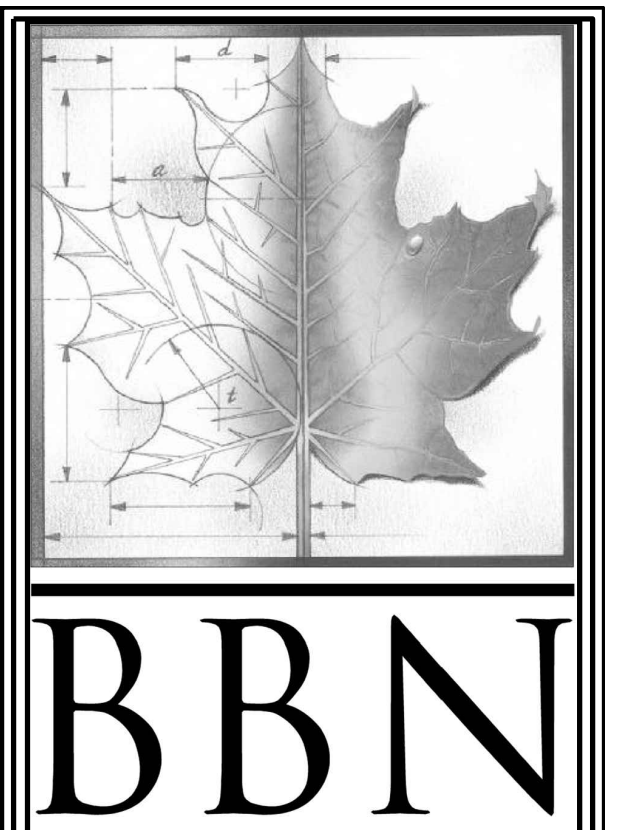
Construction Zone 1 (NO PUBLIC ACCESS FOR DURATION OF PROJECT)
Duration: Start of Project - June 1st, 2018

Construction Zone 2 (NO PUBLIC ACCESS SUMMER 2018) Demo and New construction per duration below.
Duration: June 1st, 2018 - August 10th, 2018.

EXISTING GRAVEL PARKING

- REMOVE EXISTING RETAINING WALL
- RELOCATE EXISTING FIBER OPTIC LINE COORDINATE WITH WTC
- RELOCATE EXISTING GAS LINE COORDINATE WITH KANSAS GAS SERVICE
- REMOVE EXISTING TREES
- RELOCATE AND/OR ABANDON EXISTING SPRINKLER BOX COORDINATE WITH USD 320 MAINTENANCE
- RELOCATE AND/OR ABANDON EXISTING IRRIGATION PUMP COORDINATE WITH USD 320 MAINTENANCE
- EXISTING SHELTER TO REMAIN
- EXISTING BUILDING TO REMAIN
- REMOVE EXISTING FENCE (WEST SIDE OF SIDEWALK ONLY)

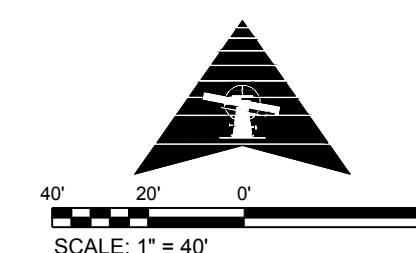
- PROPOSED LOCKER ROOM FOOTPRINT
- EXISTING TRACK & ATHLETIC FIELD AREA
- EXISTING SEPTIC TANK TO BE ABANDONED (SEE NOTE (APPROXIMATE LOCATION))
- PROPOSED VENDOR AREA COORDINATE PHASING WITH ARCHITECT
- Route of public to grandstand during 2017-2018 school year.
- Route of athletes to practice field during 2017-2018 school year.



BBN ARCHITECTS INC
228 POYNITZ AVENUE
MANHATTAN, KANSAS 66502
PH: 785-776-4912 • FAX: 785-776-0944
WWW.BBNARCHITECTS.COM

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SMH CONSULTANTS
2017 Vanesta Place, Suite 110
Manhattan, KS 66503
P (785)776-0541 • F (785)776-9760



REV	DESCRIPTION	DATE

Project Number: **16036**

Date: **7/7/17**

Project Name:
USD 320 SPORTS COMPLEX LOCKER AND CONCESSIONS

Project Address:
4290 COLUMBIAN ROAD WAMEGO, KS

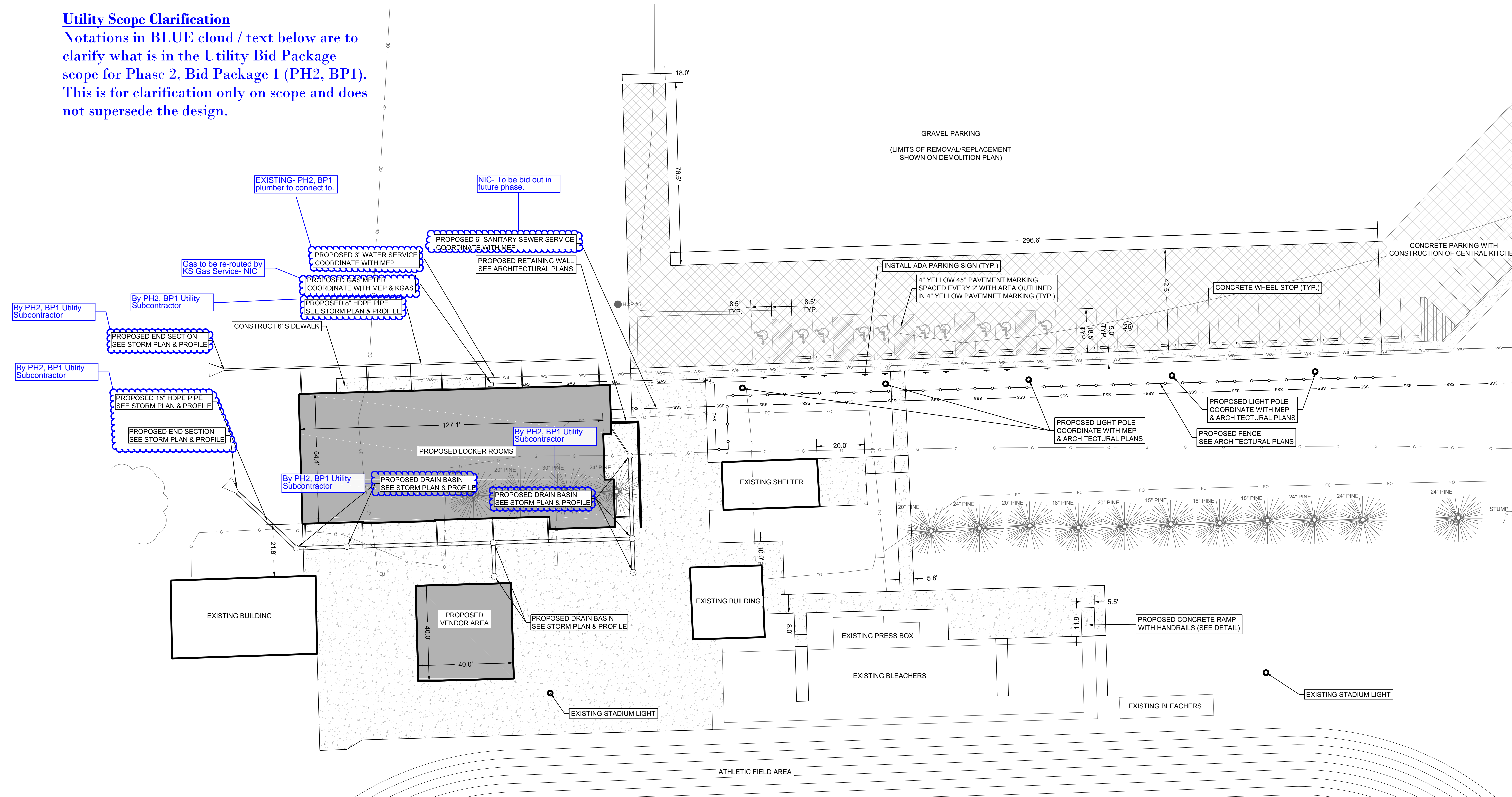
Sheet Title:
DEMOLITION PLAN

Sheet:
C1

This is NOT a design document. It is a Construction Zoning Plan Only.

Utility Scope Clarification

Notations in BLUE cloud / text below are to clarify what is in the Utility Bid Package scope for Phase 2, Bid Package 1 (PH2, BP1). This is for clarification only on scope and does not supersede the design.



NOTES:

IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE NECESSARY PERMITS AND APPROVALS FROM APPROPRIATE REGULATORY AGENCIES (IF APPLICABLE) PRIOR TO COMMENCING THE WORK.

ALL CONSTRUCTION WORK AND UTILITY WORK OUTSIDE OF THE PROPERTY BOUNDARIES SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.

WHEELCHAIR SYMBOLS ARE NOT INCLUDED IN SCOPE OF WORK. SHOWN TO DEPICT LOCATION OF ACCESSIBLE STALLS FOR PERMITTING.

ALL EXISTING SIDEWALKS ARE TO REMAIN UNLESS OTHERWISE NOTED.

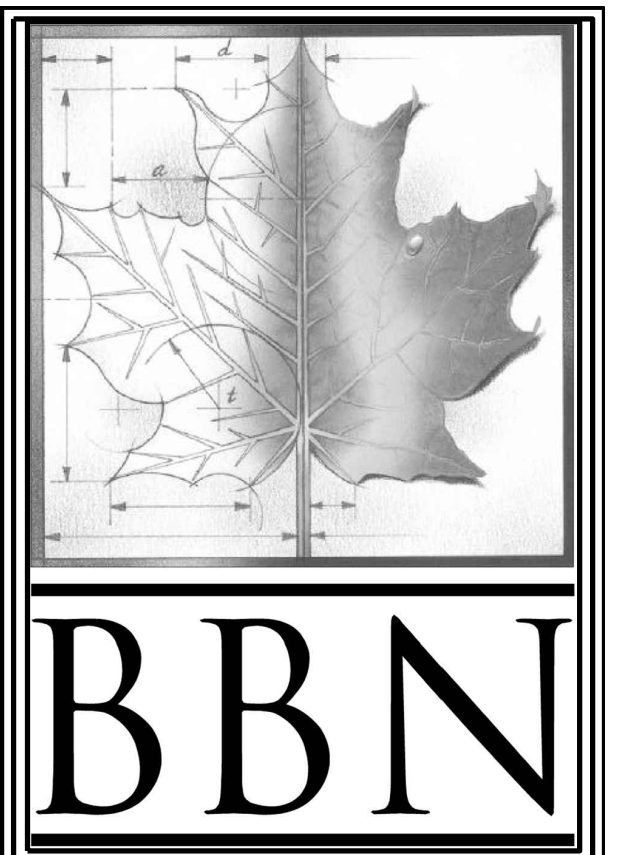
ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE OWNER.

ALL CONSTRUCTION PHASING OF PROPOSED IMPROVEMENTS TO BE COORDINATED WITH ARCHITECT.

LEGEND

	CONCRETE PARKING LOT
	PROPOSED CONCRETE SIDEWALK
	SANITARY SEWER SERVICE LINE
	WATER SERVICE LINE
	GAS LINE
	FIBER OPTIC CABLE
	UNDERGROUND ELECTRIC



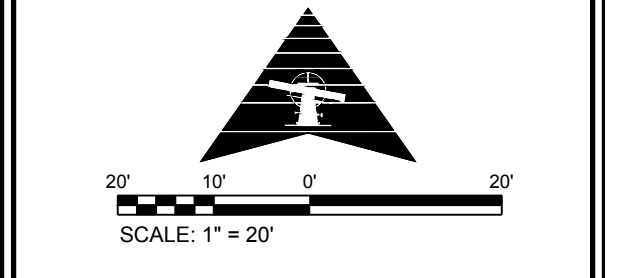
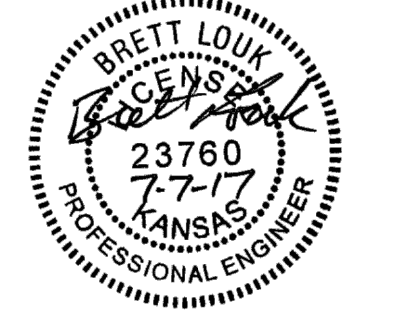
BBN

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228 POYNIZ AVENUE
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WWW.BBNARCHITECTS.COM

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Manhattan, KS 66503
P (785)776-0541 • F (785)776-9760



REV	DESCRIPTION	DATE

Project Number: **16036**
Date: **7/7/17**

Project Name:
USD 320 SPORTS COMPLEX LOCKER AND CONCESSIONS

Project Address:
4290 COLUMBIAN ROAD WAMEGO, KS

Sheet Title:
SITE PLAN

Sheet:
C2

This is NOT a design document. It is a Utility Scope Clarification Only.

NOTES:

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ALL CONSTRUCTION WORK AND UTILITY WORK OUTSIDE OF THE PROPERTY BOUNDARIES SHALL BE PERFORMED IN COOPERATION WITH AND IN ACCORDANCE WITH REGULATIONS OF THE AUTHORITIES CONCERNED.

WHEELCHAIR SYMBOLS ARE NOT INCLUDED IN SCOPE OF WORK. SHOWN TO DEPICT LOCATION OF ACCESSIBLE STALLS FOR PERMITTING.

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

ALL DEMOLITION DEBRIS SHALL BE REMOVED FROM THE SITE. NO ON-SITE BURYING OF DEBRIS WILL BE ALLOWED.

ALL HAUL SITES SELECTED FOR COLLECTION OF DEBRIS SHALL BE APPROVED BY THE OWNER/ENGINEER.

ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE OWNER.

ALL TREES NOT NOTED AS BEING REMOVED ARE TO BE SAVED AND SHALL BE PROTECTED DURING CONSTRUCTION.

SAFETY NOTICE TO CONTRACTOR:

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

WARRANTY / DISCLAIMER:

THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED BY THE OWNER AT THIS TIME. HOWEVER, NEITHER SMH CONSULTANTS NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED, EXCEPT IN THE SPECIFIC CASES WHERE SMH CONSULTANTS INSPECTS AND CONTROLS THE PHYSICAL CONSTRUCTION ON THE SITE.

CAUTION - NOTICE TO CONTRACTOR:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST THE EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT LOCATIONS OF POSSIBLE CONFLICTS PRIOR TO ANY CONSTRUCTION.

ELECTRIC CITY OF WAMEGO
430 LINCOLN AVENUE
WAMEGO, KS 66547
(785) 456-9119

TELEPHONE WTC TELEPHONE SERVICE
ANDY BOECKMAN
1009 LINCOLN AVENUE
WAMEGO, KS 66547
(785) 456-1000

WATER & SEWER CITY OF WAMEGO
430 LINCOLN AVENUE
WAMEGO, KS 66547
(785) 456-9119

CABLE COX COMMUNICATIONS
GLENN CALHOON
931 SW HENDERSON
TOPEKA, KS 66615
(785) 215-6705

GAS KANSAS GAS SERVICE
JULIE ROBLER
225 SETH CHILD ROAD
MANHATTAN, KS 66502
(785) 587-2339



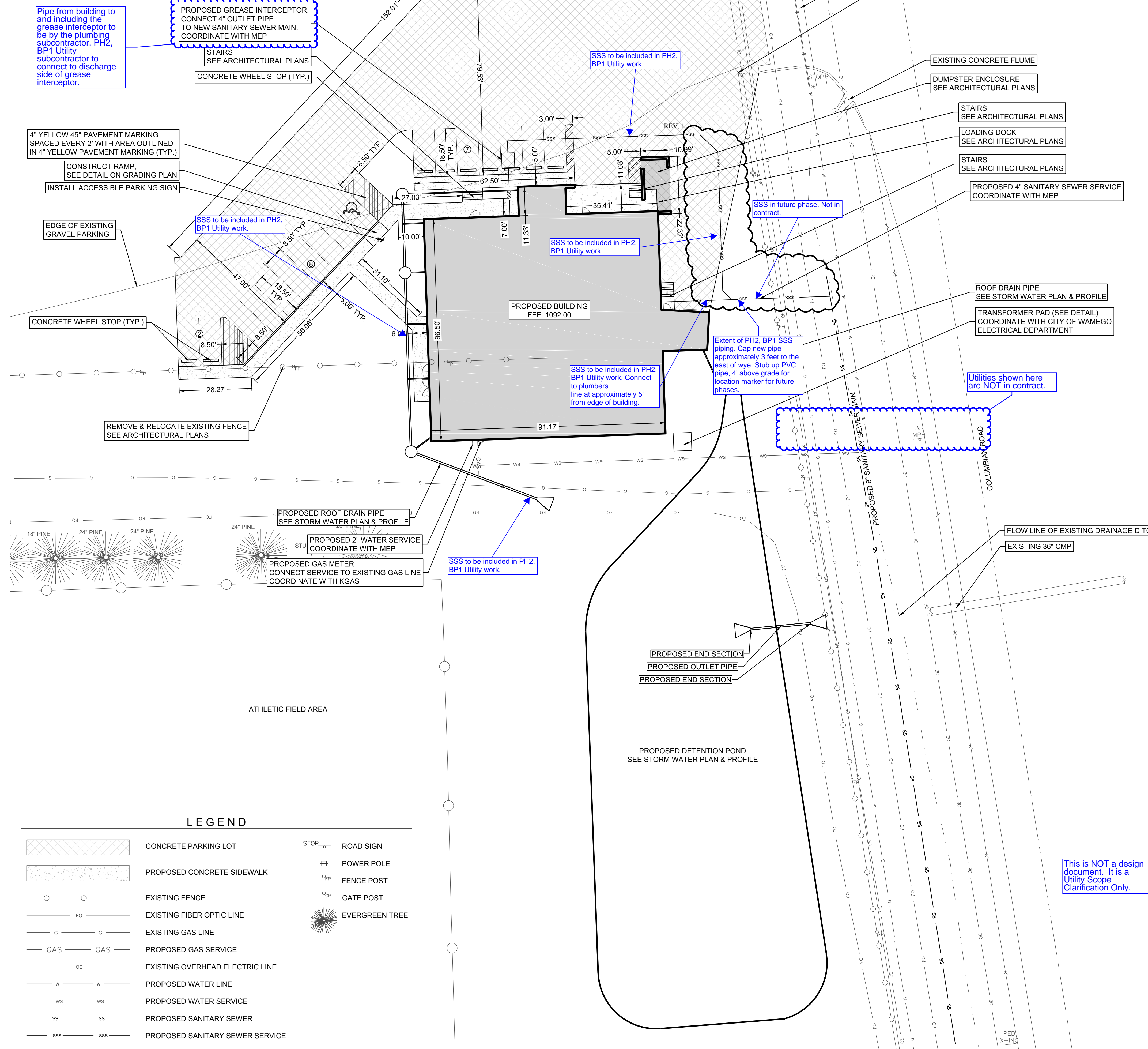
CALL BEFORE YOU
DIG - DRILL - BLAST
800-344-7233
(DIG-SAFE)
(316) 687-3753
(FAX)

KANSAS ONE CALL SYSTEM, INC.

The utilities as shown on this drawing were developed from the information available. This is not implied nor intended to be the complete inventory of utilities in this area. It is the contractor's responsibility to verify the location of all utilities (whether shown or not) and protect said utilities from any damage. Confirmation Number 17093029.

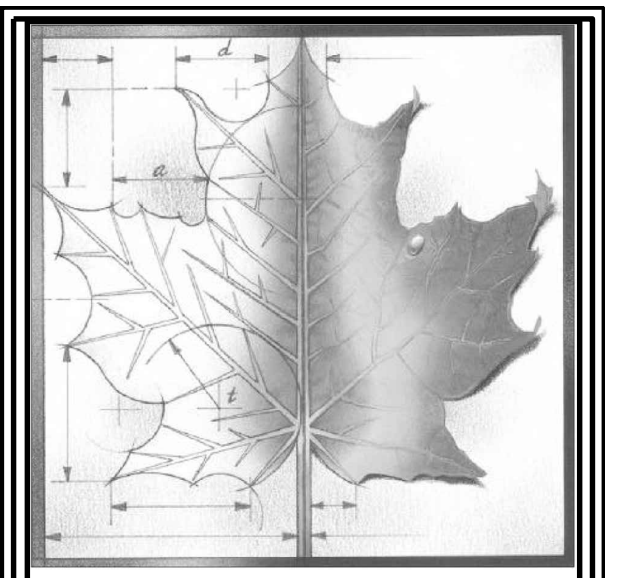
Utility Scope Clarification

Notations in BLUE cloud / text below are to clarify what is in the Utility Bid Package scope for Phase 2, Bid Package 1 (PH2, BP1). This is for clarification only on scope and does not supersede the design.



LEGEND			
	CONCRETE PARKING LOT		ROAD SIGN
	PROPOSED CONCRETE SIDEWALK		POWER POLE
	EXISTING FENCE		FENCE POST
	EXISTING FIBER OPTIC LINE		GATE POST
	EXISTING GAS LINE		EVERGREEN TREE
	PROPOSED GAS SERVICE		
	EXISTING OVERHEAD ELECTRIC LINE		
	PROPOSED WATER LINE		
	PROPOSED WATER SERVICE		
	PROPOSED SANITARY SEWER		
	PROPOSED SANITARY SEWER SERVICE		

This is NOT a design document. It is a Utility Scope Clarification Only.

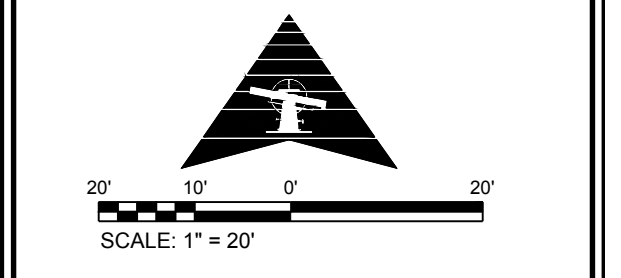


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Manhattan, KS 66503
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REV	DESCRIPTION	DATE
1	Revised Sanitary Sewer Service Connection	7/21/2017

Project Number: **16036**
Date: **7/7/17**

Project Name:
USD 320 WAMEGO-DISTRICT KITCHEN

Project Address:
4290 COLUMBIAN ROAD WAMEGO, KS

Sheet Title:
SITE PLAN

Sheet:
C1

USD 320 Wamego- Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

These are the preferred bid scopes. It is the intent to select the lowest, responsible bidder or combination of bidders to provide the most benefit economically to the owner. The owner, architect, engineer and / or construction manager reserve the right to reject any and all bids.

BID SCOPES

<u>BID SCOPES</u>	<u>Specification Section Name</u>	<u>Description</u>
02A-Demolition		
02.41.19	Selective Demolition- Demo of existing football locker room only.	Complete- Labor and equipment to demo items per plans.
02B-Site Demolition		
02.41.19	Selective Demolition- Demo of all site items noted, including but not limited to fence, gates, sidewalks and trees.	Complete- Labor and equipment to demo items per plans.
03A-Building Concrete		
03.30.00	Cast in Place Concrete	Complete- Labor, material and equipment
03.33.00	Architectural Concrete	Complete- Labor, material and equipment
31.20.00	Earth Moving	Complete- Labor, material and equipment for this scope only and per requirements in geotechnical report.
	* The building pad will be constructed by the earthwork subcontractor. After the pad is built, the concrete subcontractor will excavate and backfill as necessary for footing / foundation installation.	
07.21.00	Thermal Insulation	Complete- Labor, material and equipment for foundation insulation.
04A-Masonry		
04.20.00	Unit Masonry	Complete- Labor, material and equipment
07.21.00	Thermal Insulation	Complete- Labor, material and equipment for rigid masonry in between wythes of masonry.
05A-Steel Supply		
05.12.00	Structural Steel Framing	Furnish and deliver to job site
05.21.00	Steel Joist Framing	Furnish and deliver to job site
05.31.00	Steel Decking	Furnish and deliver to job site
05.50.00	Metal Fabrications- EXCLUDING COUNTERTOP SUPPORTS (IF APPLICABLE)	Furnish and deliver to job site
05.52.13	Pipe and Tube Railings	Furnish and deliver to job site
05B-Steel Erection		
05.12.00	Structural Steel Framing	Labor and equipment for install only.
05.21.00	Steel Joist Framing	Labor and equipment for install only.
05.31.00	Steel Decking	Labor and equipment for install only.
05.50.00	Metal Fabrications- EXCLUDING COUNTERTOP SUPPORTS (IF APPLICABLE)	Labor and equipment for install only.
05.52.13	Pipe and Tube Railings	Labor and equipment for install only.
	*Welding materials is included in this scope.	
06A-Rough Carpentry		
06.10.00	Rough Carpentry	Complete- Labor, material and equipment
06.17.53	Shop-Fabricated Wood Trusses	Labor and equipment for install only.
	*Roof wood sheathing	Complete- Labor, material and equipment
	*Nails, screws and other misc. fasteners are included in this scope.	
06B-Trusses Supply		
06.17.53	Shop-Fabricated Wood Trusses	Furnish and delivery only.

USD 320 Wamego- Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

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BID SCOPES

<u>BID SCOPES</u>	<u>Specification Section Name</u>	<u>Description</u>
06C-Cabinetry		
06.41.16	Plastic-Laminate-Faced Architectural Cabinets	Furnish and delivery only.
12.36.23	Plastic-Laminate-Clad Countertops	Furnish and delivery only.
05.58.00	Formed-Metal Fabrications	Complete- Labor, material and equipment
07A-EIFS		
07.24.19	Water-Drainage Exterior Insulation and Finish System (EIFS)	Complete- Labor, material and equipment
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.
07B-Roofing		
07.31.13	Asphalt Shingles	Complete- Labor, material and equipment
07.42.93	Soffit Panels	Complete- Labor, material and equipment
07.52.13	Atactic-Polypropylene (APP) Modified Bituminous Membrane Roofing	Complete- Labor, material and equipment
07.71.00	Roof Specialties	Complete- Labor, material and equipment
07.72.00	Roof Accessories	Complete- Labor, material and equipment
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.
07C-Waterproofing		
07.13.26	Self-Adhering Sheet Waterproofing	Complete- Labor, material and equipment
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.
07D-Thermal Insulation		
07.21.00	Thermal Insulation- Includes all insulation EXCEPT masonry and concrete rigid board insulation.	Complete- Labor, material and equipment
07E- Joint Sealants		
07.92.00	Joint Sealants- All joint sealants EXCEPT as required in scope 22A, 07C, 07B, 07A and 32A.	Complete- Labor, material and equipment
08A-HM Doors and Frames		
08.11.13	Hollow Metal Doors and Frames	Furnish and deliver only.
08.71.00	Door Hardware- Locker Rooms - All door hardware EXCEPT Aluminum hardware.	Furnish and deliver only.
08.71.00	Door Hardware- Central Kitchen - All door hardware EXCEPT Aluminum hardware.	Furnish and deliver only.
08B-Coiling, Overhead Doors		
08.33.13	Coiling Counter Doors	Complete- Labor, material and equipment
08.33.23	Overhead Coiling Doors	Complete- Labor, material and equipment
08C-Glass and Glazing		
08.80.00	Glazing	Complete- Labor, material and equipment
08.41.13	Aluminum Framed Entrances and Storefronts	Complete- Labor, material and equipment
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.
09A-Flooring		
09.65.19	Wall Base and Accessories (FORTHCOMING IN ADDENDUM)	Complete- Labor, material and equipment
09.68.13	Tile Carpeting (FORTHCOMING IN ADDENDUM)	Complete- Labor, material and equipment

USD 320 Wamego- Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

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BID SCOPES

<u>BID SCOPES</u>	<u>Specification Section Name</u>	<u>Description</u>
09B-Resinous Flooring		
09.67.23	Resinous Flooring	Complete- Labor, material and equipment
09C-Painting		
09.91.13	Exterior Painting	Complete- Labor, material and equipment
09.91.23	Interior Painting	Complete- Labor, material and equipment
09D-Drywall		
05.40.00	Cold-Formed Metal Framing	Complete- Labor, material and equipment
09.21.16	Gypsum Board Assemblies	Complete- Labor, material and equipment
09.51.13	Acoustical Panel Ceilings	Complete- Labor, material and equipment
10A-Specialties		
10.11.16	Markerboards	Bidders can bid any or all of these sections.
10.21.13	Toilet Compartments	
10.28.00	Toilet and Bath Accessories	
10.41.16	Emergency Key Cabinets	
10.44.00	Fire Protection Specialties	
10.51.13	Metal Lockers	
10.51.15	Metal Athletic Lockers	
11.13.16	Loading Dock Seals and Shelters	
10.44.00	Fire Protection Specialties (FORTHCOMING IN ADDENDUM)	
11.52.13	Projection Screens	
10B-Signage		
10.14.19	Dimensional Letter Signage	Complete- Labor, material and equipment
11A-Loading Dock Equipment		
11.13.16	Stationary Loading Dock Equipment	Complete- Labor, material and equipment
22A-Plumbing		
Division 22	Plumbing	Complete- Labor, material and equipment
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.
31.20.00	Earth Moving	Complete- Labor, material and equipment for this scope only and per requirements in geotechnical report.
* Includes extending all plumbing as shown, from the building, 5'-0" and capping for connection by the utility contractor. This scope DOES NOT include rain leaders.		
23A-HVAC		
Division 23	HVAC	Complete-Labor, material and equipment
26A-Electrical		
Division 26	Electrical	Complete- Labor, material and equipment
28.72.10	Fire Alarm Systems	Complete- Labor, material and equipment
31.20.00	Earth Moving	Complete- Labor, material and equipment for this scope only.
07.92.00	Joint Sealants	Complete- Labor, material and equipment for this scope only.

USD 320 Wamego- Phase 2-Bid Package 1- Sports Complex Locker Rooms and District Central Kitchen

These are the preferred bid scopes. It is the intent to select the lowest, responsible bidder or combination of bidders to provide the most benefit economically to the owner. The owner, architect, engineer and / or construction manager reserve the right to reject any and all bids.

BID SCOPES

<u>BID SCOPES</u>	<u>Specification Section Name</u>	<u>Description</u>
31A-Sitework		
*See 02B for Site Demo		
31.20.00	Earth Moving	Complete- Labor, material and equipment
	* Includes constructing the building subgrade pad. This pad will then be excavated and backfilled by the concrete subcontractor, as necessary for footing installation.	
	* Including finish grading, stockpiling of rock at parking lot, LVC under pavement areas as indicated and topsoil furnish and install.	
	* Includes requirements of earthwork in geotechnical report.	
32A-Paving		
	Paving, Curb and Gutter	Complete- Labor, material and equipment
	Striping / Painting and Joint Sealing of Parking Lot	Complete- Labor, material and equipment
33A-Utilities		
	Site utilities as shown on civil plans AND per utility scope clarification plans (Addendum 2).	Complete- Labor, material and equipment
	Includes rain leaders, storm water piping, connecting rain leaders to downspouts.	Complete- Labor, material and equipment
	Gas line and Fiber Optic line to be coordinate by C&A.	
50A-Misc. INSTALL		
10.11.16	Markerboards	
10.21.13	Toilet Compartments	
10.28.00	Toilet and Bath Accessories	
10.41.16	Emergency Key Cabinets	
10.44.00	Fire Protection Specialties	
10.51.13	Metal Lockers	
10.51.15	Metal Athletic Lockers	
11.13.16	Loading Dock Seals and Shelters	
10.44.00	Fire Protection Specialties (FORTHCOMING IN ADDENDUM)	
08.11.13	Hollow Metal Doors and Frames	
08.71.00	Door Hardware- <u>Locker Rooms</u> - All door hardware EXCEPT Aluminum hardware.	
08.71.00	Door Hardware- <u>Central Kitchen</u> - All door hardware EXCEPT Aluminum hardware.	
06.41.16	Plastic-Laminate-Faced Architectural Cabinets	
12.36.23	Plastic-Laminate-Clad Countertops	
11.52.13	Projection Screens	

Bidders can bid any or all of these sections.

Sub-Contract / Material Supplier Bid Form

USD 320 Wamego- Phase 2-Bid Package 1-
Sports Complex Locker Rooms and
Project: **District Kitchen**
Wamego, KS

Architect: BBN Architects Inc.
MEP Engineer: Orazem & Scalora Engineering, P.A.
Civil Engineer: SMH Consultants
Owner: USD 320 Wamego
Construction Manager: Coonrod & Associates Construction Co., Inc.

Date: _____

Bidder Company Name: _____

Bidder Address: _____

Bidder Contact Name: _____

Bidder Contact Phone Number: _____

Bidder Contact Email: _____

Scope of Work / Bid Scope (Reference Bid Scopes issued by CM):
Scope clarifications may be attached to this bid form.

Base Bid:

In compliance with the Instructions to Bidders, plans, specifications / project manual and any and all addenda for this project, the undersigned agrees to fully furnish all material and equipment and perform all labor for above scope of work and/or bid package designated, for the lump sum of

_____ Dollars

(\$ _____)

Please provide a breakdown of your lump sum bid, per location. THIS BREAKDOWN IS FOR INFORMATION PURPOSES ONLY. LOWEST RESPONSIBLE BIDDER WILL BE DETERMINED BY THE LUMP SUM BID PRICE ABOVE.

Sports Complex Locker Room \$ _____

District Central Kitchen \$ _____

Unit Prices: (IF ADDED BY ADDENDUM)

_____	\$ _____	\$ / _____
_____	\$ _____	\$ / _____
_____	\$ _____	\$ / _____

Bid Alternates:

In compliance with the Instructions to Bidders, plans, specifications and any and all addenda for this project, the undersigned agrees to fully furnish all material and equipment and perform all labor for above scope of work and/or bid package designated as it pertains to the alternates, for the lump sum of

<u>IF ADDED BY ADDENDUM</u>		ADD	DEDUCT
Alternate	# _____	\$ _____	\$< _____ >
Alternate	# _____	\$ _____	\$< _____ >
Alternate	# _____	\$ _____	\$< _____ >
Alternate	# _____	\$ _____	\$< _____ >

GEOTECHNICAL EXPLORATION REPORT
Proposed Sports Complex Improvements
USD 320 Sports Complex
Columbian Road and US Highway 24
Wamego, Kansas

GSI Project No. 1773023A
March 1, 2017

Prepared by:

GSI Engineering, LLC
4503 East 47th Street South
Wichita, Kansas 67210
(316) 554-0725

Prepared for:

USD 320 Wamego School
District
1008 8th Street
Wamego, Kansas 66547

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study.* Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



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APPENDICES

- Appendix A - General Vicinity Map
Boring Location Plan
- Appendix B - Boring Logs
Key to Symbols
Legend & Nomenclature
Unified Soil Classification System (USCS)
- Appendix C - Field & Laboratory Test Results



1. INTRODUCTION

1.1 General

This report summarizes the findings of our geotechnical exploration for the proposed improvements to the Unified School District (USD) 320 sports complex located at Columbian Road and U.S. Highway 24 in Wamego, Kansas. The scope of work was outlined in our proposal dated January 17, 2017. Mr. Patrick Schaub of USD 320 authorized this exploration on February 1, 2017.

The purpose of this geotechnical study is to explore the subsurface conditions at the proposed site with exploratory borings, evaluate the engineering properties of the subsurface materials with appropriate field and laboratory tests, and perform engineering analyses for developing design and construction recommendations for the proposed project.

1.2 Project Description

We understand the proposed project involves several improvements to the existing USD 320 sports complex. These improvements will include a new artificial turf field, a paved handicapped vehicle viewing space, a 6,750 square foot locker room/concessions/restroom building, and a new 8,000 square foot district kitchen with associated parking lot. We understand the single-story kitchen and locker room structures will be of concrete masonry unit (CMU) construction with concrete slab-on-grade floors. We estimate that the structures will have maximum column and continuous wall loads on the order of 40 kips and 3 kips per lineal foot, respectively.

Based on our experience with similar projects, we anticipate the new artificial turf will be placed on approximately 6 to 12 inches of aggregate subbase, which is in turn placed on the prepared soil subgrade.

We assume site grading required to bring the various project areas to the desired grade will be minimal, with cuts and fills of less than 2 feet.

We anticipate that the pavements will support predominately light passenger cars with less frequent panel delivery vans, passenger vans, and trash trucks.

A site plan is included in Appendix A for reference.

2. FIELD EXPLORATION

We drilled a total of 14 borings for this geotechnical exploration on February 9, 2017 with a Mobile B-61 truck-mounted drilling rig using 3.25-inch inside diameter hollow stem augers. We drilled the borings within the various project areas to depths ranging from 5 to 10 feet below the site grade at the time of our exploration.

Boring locations were indicated on a preliminary site sketch provided by Mr. Carl Riblett of BBN Architects. GSI personnel established field locations by measuring distances from reference points shown on this preliminary site plan. Locations of the borings in relation to existing and proposed features are indicated on the Boring Location Plan included in Appendix A. The locations of the borings should be considered accurate only to the degree implied by the methods used in their determination.

Our drill crew obtained soil samples at the intervals shown on the boring logs in Appendix B. Recovered samples were sealed in plastic containers, labeled, and protected for transportation to the laboratory for further examination, testing, and classification.

We obtained split-barrel samples (designated "Split Spoon" or "S" samples) while performing Standard Penetration Tests (SPT) with a 1-3/8 inch I.D. thick-walled sampler, driven using an automatic hammer in general accordance with ASTM D1586, "*Penetration Test and Split-Barrel Sampling of Soils.*" The "N" value, reported in blows per foot (bpf), equals the number of blows required to drive the sampler through the last 12 inches of the 18-inch sample interval using a 140-pound hammer falling 30 inches.

We obtained undisturbed samples (designated "Shelby Tube" or "U" samples) with 3-inch O.D. thin-walled tube samplers, hydraulically pushed in general accordance with ASTM D1587, "*Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.*"

Our drilling personnel prepared field boring logs during drilling operations. These field logs report drilling and sampling methods, sampling intervals, groundwater measurements and the subsurface conditions we encountered. At the conclusion of drilling, our drill crew made groundwater measurements and backfilled the borings in accordance with Kansas state regulations.

3. SITE CONDITIONS

3.1 Regional Geology

This project lies within the Glaciated geomorphic region of northeast Kansas. The topography of this region was created by the advance of Ice Age glaciers and is characterized by steeply rolling hills with areas of level upland divides and alluvial lowlands. Soil stratigraphy generally consists of Pre-Illinoian glacial till (drift) overlain in some areas by loess deposits of varying thickness. Pre-Illinoian glacial till consists of a well graded mixture of clay, silt, and sand having pebbles, cobbles, and occasional boulders. The loess is an eolian (wind-blown) deposit of clay and silt which tends to have a relatively uniform particle size and varies in thickness from a trace in the southwest portion of the region to over 100 feet along the Missouri River. In some areas, loess and glacial till have been eroded, creating residual soils weathered from the underlying bedrock. The surficial soils throughout the area are underlain by the Pennsylvanian bedrock system which consists of undifferentiated formations of shale and limestone.

3.2 Surface Conditions

At the time of our exploration, the proposed project areas comprised grass lawn areas on the north side of the existing football field. We observed several outbuildings and mature trees throughout the area.

3.3 Subsurface Conditions

Although we observed some variability, the subsurface materials we encountered within the depths of exploration generally comprised lean clay with intermittent lenses of clayey sand, sandy lean clay, and fat clay. General descriptions of the strata we encountered are presented below, while more detailed subsurface information is presented on the boring logs located in Appendix B. Please note that the indicated depths are relative to the site grade at the time of our exploration.

The majority of the soils we encountered throughout our borings comprised lean clay or sandy lean clay. We also encountered intermittent and variable lenses of clayey sand and fat clay. These materials were generally described as dark brown or dark yellowish brown to olive or light brown and moist to very moist. We measured Standard Penetration Test (SPT) N-values in the clays between 4 and 27 blows per foot (bpf), indicating these soils are in a medium stiff to very stiff condition. We measured SPT N-values in the sandy lenses between 11 and 40 bpf, indicating the clayey sand is in a medium dense to dense condition.



3.4 Groundwater Conditions

Our drill crew made water level observations during drilling and after completion of the borings to evaluate groundwater conditions. We did not encounter groundwater in any of our soil borings.

The groundwater conditions we observed during our exploration program should not be construed to represent an absolute or permanent condition. Uncertainty is involved with short-term water level observations in boreholes.

The free groundwater surface or groundwater table within unconfined aquifers is generally a subdued reflection of surface topography. Water generally flows downward from upland positions (recharge zones) to low lying areas or surface water bodies (discharge zones). As such, the groundwater level and the amount and level of any perched water on the site may be expected to fluctuate with variations in precipitation, site grading, drainage and adjacent land use. Long-term monitoring utilizing piezometers or observation wells is required to evaluate the potential range of groundwater conditions.



4. LABORATORY TESTING

Our engineering staff reviewed the field boring logs to outline the depth, thickness and extent of the soil strata. The samples taken from the borings were examined in our laboratory and visually classified in general accordance with ASTM D2488, “*Description and Identification of Soils (Visual-Manual Procedure)*.” We established a testing program to evaluate the engineering properties of the recovered samples. A GSI technician performed laboratory testing in general accordance with the following current ASTM test methods:

- Moisture Content (ASTM D2216, “*Laboratory Determination of Water (Moisture) Content of Soil and Rock*”)
- Unit Weight (ASTM D7263, “*Laboratory Determination of Density (Unit Weight) of Soil Specimens*”)
- Atterberg Limits (ASTM D4318, “*Liquid Limit, Plastic Limit, and Plasticity Index of Soils*”)
- Minus No. 200 Sieve Wash (ASTM D1140, “*Amount of Material in Soils Finer Than the No. 200 (75- μ m) Sieve*”)
- Unconfined Compressive Strength (ASTM D2166, “*Unconfined Compressive Strength of Cohesive Soil*”)

Laboratory test results are presented on the boring logs in Appendix B and tabulated in Appendix C.

Moisture content and unit weight tests were used to evaluate the existing moisture-density condition of the soils. The Atterberg limits and Minus No. 200 sieve tests were used to help classify the soils under the Unified Soils Classification System. The Atterberg limits were also used to evaluate the plasticity characteristics of the soils. Unconfined compression tests were used to define the stress-strain characteristics and related shear strength of the soils.

The following data summarize our laboratory test results. We used these data to develop the allowable bearing values, anticipated settlements, and other geotechnical design criteria for the project.

- Natural Moisture Content..... 13.1 to 31.9%
- Wet Density..... 118.9 to 127.1 lb/ft³
- Dry Density..... 97.7 to 103.6 lb/ft³
- Unconfined Compressive Strength 1.13 to 3.23 kips/ft²



- Liquid Limit..... 39 to 66
- Plastic Limit..... 16 to 20
- Plasticity Index 20 to 47
- Percent Passing the No. 200 Sieve 22.4 to 45.4%
- Standard Penetration Test (SPT 'N' blows per foot) 4 to 40

Based on the results of this testing program, we reviewed and supplemented the field logs to arrive at the final logs as presented in Appendix B. The final logs represent our interpretation of the field logs and reflect the additional information obtained from the laboratory testing. Stratification boundaries indicated on the boring logs were based on observations made during drilling, an extrapolation of information obtained by evaluating samples from the borings, and comparisons of similar engineering characteristics. Locations of these boundaries are approximate and the transitions between soil types may be gradual rather than clearly defined.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General Geotechnical Considerations

The soils we encountered in the test borings are generally capable of supporting the anticipated loads on shallow foundations. We did not encounter groundwater within the depth of expected excavation.

The near-surface clay soils we encountered within the kitchen and locker room areas are classified as moderately to highly plastic and may be susceptible to changes in strength and volume (shrink/swell) with changes in moisture content. These soils are not recommended for direct support of floor slabs or pavements, unless chemically stabilized as outlined later in this report.

5.2 Earthwork

5.2.1 Site Preparation

Existing structures within the proposed building pads must be removed and the associated foundations excavated. Excavations resulting from demolition activities must be filled with an engineered structural fill that is placed, moisture conditioned and compacted in accordance with the following paragraphs.

Adjacent foundations and structures that will remain must be protected (where applicable) while performing excavations and soil improvement programs. Roof drains and stormwater drainage from these structures as well as the surrounding area should be directed away from the proposed construction area(s).

We recommend existing utilities within the proposed building areas be relocated to avoid passing beneath the new structures. Abandoned utility pipes that cannot be removed must be plugged with grout to reduce the potential for future collapse or moisture migration into the subgrade soils. Excavations resulting from utility removal must be replaced with engineered structural fill as outlined in Section 5.2.6.

Trees within the areas to be prepared for development must be removed. The root-balls and surrounding soils containing observable organic material must also be removed. We expect the root-balls will extend to substantially greater depths than the topsoil stripping depth. The root-ball

excavations must be filled with an engineered structural fill that is placed, moisture conditioned and compacted in accordance with Section 5.2.5.

In preparing the site for construction, existing pavements, surface vegetation and topsoil containing a significant percentage of organic matter (including the existing natural grass field) should be removed from the areas beneath structures and any other areas that are to be paved, cut or receive fill. The removal depth for this site is expected to be approximately 6 inches. However, the removal depth should be monitored during stripping and adjusted as required. This material should either be removed from the site or stockpiled for later use in landscaping of unpaved or non-structural areas.

After removal of the topsoil and pavements, the subgrade should be proof rolled with a loaded tandem axle dump truck or equivalent (loaded water truck, loaded concrete mixer or motor grader with a minimum weight of 20 tons). A proof-roll is considered acceptable if no ruts greater than one inch deep appear behind the loaded vehicle, and no pumping or weaving is observed as the wheels pass over the area. Any soft or unsuitable areas should be compacted or removed and replaced with stable fill material similar in composition to the surrounding soils. If necessary, clean materials such as crushed concrete or crushed stone may be used to stabilize areas where wet soil or water is present. Geogrid or structural geotextile may be used in conjunction with crushed concrete or stone to provide additional stabilization.

Prior to fill placement, the top 9 inches of the ground surface in fill areas should be scarified, moisture conditioned and recompacted in accordance with Section 5.2.5 to eliminate a plane of weakness along the contact surface.

5.2.2 General Structural Fill

General structural fill should be used for mass site grading, landscaping applications or as utility trench backfill outside of building areas. General structural fill may also be used to within 12 inches of the base of any granular cushion beneath floor slabs and to within 9 inches of the base of any vehicular pavements. In the former applications, low volume change materials are required immediately below the floor slabs or pavements (low volume change material is discussed in the following section).

General structural fill may comprise cohesive or granular material but should be free from organic matter or debris. Granular materials used as general structural fill should be well graded, have a maximum particle size of 1.5 inches, and meet KDOT freeze/thaw durability and sulfate soundness requirements.

If free of organic matter or debris, all on-site soils may be reused as general structural fill within the areas outlined above.

5.2.3 Low Volume Change Material (LVC)

Low volume change (LVC) material as specified for use below floor slabs, artificial turf surfacing, and pavements must consist of material with a liquid limit (LL) less than 40 and a plasticity index (PI) between 10 and 20. LVC material could be a granular material but must have sufficient cohesion to form a compactable, uniform and stable subgrade. This typically translates to a material with greater than 15 percent fines (percent passing the No. 200 sieve). However, silty gravel (such as KDOT AB-3) or limestone screenings are also acceptable LVC materials. Granular materials with less than 15 percent fines may be used within confined areas such as within foundation stem walls.

The following table outlines the project areas at which the on-site soils, if free of organic matter or debris, may be considered LVC material as defined in this section.

Table 5.2.3-1: Suitability of On-Site Soils for LVC Material

<i>Project Area</i>	<i>Borings</i>	<i>Soils Suitable as LVC?</i>
Football Field	F-1, F-2, F-3	Yes
Handicapped Vehicle Viewing	H-1, H-2, H-3	Yes
District Kitchen	K-1, K-2, K-3, K-4	No
Kitchen Parking	KP-1, KP-2	No
Locker Rooms/Concessions/Restroom	L-1, L-2	No

On-site soils not considered LVC material as defined in this section may be chemically stabilized as outlined below.

5.2.4 Chemical Stabilization of Soil

The moderately to highly plastic clay soils we encountered in this exploration are considered moisture sensitive and may lose strength and undergo volume changes with fluctuations in moisture content. The on-site clay soils are not suitable for use as LVC material without chemical stabilization. Chemical stabilization may be achieved by amending the soil with 14 to 16 percent class “C” fly ash, 6 to 8 percent cement kiln dust (CKD), or 3 to 5 percent Portland cement.

We recommend a laboratory standard Proctor Moisture-Density Relationship (ASTM D698, “*Laboratory Compaction Characteristics of Soil Using Standard Effort*”) be performed prior to field mixing using a sample of the soil to be stabilized and the proposed amendment (fly ash, CKD or Portland cement). The sample should be prepared in advance to match the intended field mix proportions, using the same amendment source as will be utilized in the field.

Fly Ash Stabilization

Prior to the introduction of fly ash, the soil material should be thoroughly pulverized to reduce clods to ½ inch or less. During the pulverization process, we recommend that water be added to reach a moisture content at or above the optimum moisture content as determined by ASTM D698 for the proposed fly ash-soil mixture. The fly ash should remain dry and be protected from external sources of moisture during transportation and storage. Fly ash material that is introduced to moisture prior to incorporation with the soil must be discarded.

The fly ash and soil should be thoroughly mixed within ½ hour after introduction. The moisture content should be field tested immediately following mixing and adjusted as needed to maintain a range between optimum and 4 percent above optimum. The fly ash-soil mixture should not be allowed to air dry. If the moisture content is determined to be in excess of 4 percent of optimum, additional fly ash should be applied to achieve the specified moisture content. Compaction of the fly ash supplemented soil should be completed within 2 hours after incorporation. Additional compaction after 2 hours may cause degradation of the soil strength. The fly ash-soil mixture should be compacted as noted in Section 5.2.5 (engineered structural fill).

Fly ash mixing should not be performed at ambient air temperatures below 50 degrees Fahrenheit.

Cement Kiln Dust

Cement kiln dust can also be used as a soil stabilization agent and should be incorporated into the soils using the procedures outlined for fly ash stabilization. Cement kiln dust may be used at temperatures below 50 degrees Fahrenheit, provided the soil to be amended is frost-free.

Portland Cement

Type I/II Portland cement can be used as a soil stabilization agent using dry application methods as outlined above, or by injection of a liquefied cementitious mixture into the soil to be treated. Cement treatment and mixing can be performed at temperatures below 50 degrees Fahrenheit, provided the soil to be amended is frost-free.

Stabilized Subgrade Maintenance

Stabilized soil that will be utilized as floor slab subgrade should not be allowed to freeze prior to floor slab placement. Stabilized soil that will be utilized as pavement subgrade should be covered with a minimum of 3.5 inches of asphalt or the full Portland cement concrete pavement section prior to being subjected to freezing conditions. If paving/slab placement does not immediately follow soil stabilization, the supplemented soil should be kept moist and trafficking minimized for a curing period of approximately 5 to 7 days following compaction. In areas that are to be paved, an asphalt prime coat could be applied over the stabilized material surface as an alternative to periodic moisture additions to maintain acceptable moisture throughout curing.

If the stabilized subgrade deteriorates prior to paving or slab placement, we recommend any unstable areas be scarified and recompacted. We recommend an additional 4 to 6 percent class "C" fly ash be incorporated in areas that are to be scarified and recompacted. Expansive soils stabilized with cement kiln dust may be reworked without additional amendment. Other soil types may require the incorporation of additional cement kiln dust to restore the desired strength characteristics.

5.2.5 Compaction of Engineered Structural Fills

Unless otherwise noted, fill materials should be placed in loose lifts not to exceed 9 inches and be compacted to a minimum of 95 percent of the maximum dry unit weight obtained from ASTM D698 (Standard Proctor). Moisture content at the time of compaction should be controlled to between optimum and 4 percent above optimum moisture content.

If possible, granular fill materials containing less than 15 percent fines should be compacted to a minimum of 95 percent of the maximum dry unit weight obtained from ASTM D698. Granular fill materials which do not produce a definable moisture-density curve when tested according to ASTM D698 should be compacted to a minimum of 75 percent relative density (ASTM D4253, “*Maximum Index Density and Unit Weight of Soils Using a Vibratory Table*” and ASTM D4254, “*Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density*”). Granular materials should be placed at a moisture content that will achieve the desired densities. Please note that relative density and standard Proctor tests measure different parameters and are not interchangeable.

In general, proper compaction of cohesive soils can be achieved with sheepsfoot or pneumatic-type compactors, while compaction of granular soils can be achieved with smooth-drum or smooth-plate vibratory compactors. Water flooding is not an acceptable compaction method for any soil type.

5.2.6 Utility Trench Backfill

As a minimum, utility trench backfill material should meet the requirements of general structural fill as defined in Section 5.2.2. Where utility trenches pass beneath structures, pavements or flatwork, the upper foot of utility backfill should meet the requirements of LVC material as defined in Section 5.2.3. Backfill soils in utility trenches must be placed in lifts of 6 inches or less in loose thickness and be compacted in accordance with Section 5.2.5.

Controlled low strength material (CLSM) or flowable fill may also be used for utility backfills. We recommend designing flowable fill with a compressive strength between 50 and 300 pounds per square inch (psi). CLSM with a maximum compressive strength less than 300 psi can be readily excavated with a backhoe. The intent for the CLSM is to provide a backfill that can be placed in a single lift, without personnel entering the excavation and without the need for compaction equipment.

Where used beneath pavements, flatwork or structures, CLSM should be terminated one foot below the structure, floor slab or pavement subgrade elevation. To provide uniform support beneath pavements, flatwork and structures, the fill placed over the CLSM should be of similar composition as the surrounding bearing materials and be constructed as moisture-conditioned and compacted engineered structural fill in accordance with Section 5.2.5.

5.2.7 Foundation Backfill

As a minimum, backfill soils for formed foundations should meet the requirements of general structural fill as defined in Section 5.2.2. However, we recommend fill around foundations meet the requirements of LVC material as defined in Section 5.2.3. The use of LVC material to backfill foundations is intended to help reduce desiccation cracking adjacent to the structure, which can provide a pathway for water to infiltrate the foundation subgrade. If other cohesive materials are used to backfill foundations, the risk of differential movements caused by water infiltration into the foundation subgrade may be increased.

We also recommend the upper 18 inches of exterior foundation backfill have sufficient cohesion to direct surface water away from the structure. Granular materials such as sand and gravel are not suitable for use as exterior foundation backfill in the surficial 18 inches.

Backfill soils around formed foundations must be placed in lifts of 6 inches or less in loose thickness and be moisture conditioned and compacted in accordance with Section 5.2.5. Care should be exercised during compaction to avoid applying excessive stress to the foundation surfaces. Where both sides of a foundation wall are backfilled, the fill should be placed simultaneously in uniform lifts on both sides of the wall to reduce unbalanced lateral loads.

5.2.8 Correction of Unsuitable Foundation Soils

If soft, loose, or otherwise unsuitable soils are encountered at the base of any foundations, an over-excavation and replacement/recompaction procedure will be required. The unsuitable soils beneath the foundations should be removed to the required depth, with the excavation extending laterally 9 inches in all directions for each vertical foot of over-excavation. Structural fill for the over-excavated areas should be of similar composition as the surrounding materials or meet the requirements of LVC material as defined in Section 5.2.3. Backfill material should be compacted in accordance with Section 5.2.5. CLSM, as defined in Section 5.2.6 may also be used to backfill over-excavated areas.

5.2.9 Excavation Slopes

Vertical cuts and excavations may stand for short periods of time, but should not be considered stable in any case. All excavations should be sloped back, shored, or shielded for the protection of workers. As a minimum, trenching and excavation activities should conform to federal and local regulations.

The soils we encountered in the test borings generally classify as a type “B” soil according to OSHA's Construction Standards for Excavations. In general, the maximum allowable slope for shallow excavations of less than 20 feet in a type “B” soil is 1H:1V, although other provisions and restrictions may apply. If different soil types are encountered, the maximum allowable slope may be different.

The Contractor is responsible for designing any excavation slopes or temporary shoring. The Contractor must also be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in federal, state, or local safety regulations, such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations.

Excavations performed near existing structures must not compromise the integrity or support of the existing foundation elements. Shoring, bracing, underpinning or other methods of maintaining foundation integrity may be required.

The information presented in this section is solely for our client's reference. **GSI assumes no responsibility for site safety or the implementation of proper excavation techniques.**

5.3 Foundations

Based on the subsurface conditions revealed by the boring and testing program, this site appears suitable for use of a shallow foundation system. The selection of an allowable soil bearing pressure for shallow foundation elements must fulfill two requirements. First, the foundation load must be sufficiently less than the ultimate soil bearing capacity to ensure stability. Second, the total and differential settlements must not exceed amounts which will produce adverse behavior of the superstructure.

In order to meet the previous criteria, we have explored both the bearing capacity and the load settlement characteristics of the site soils assuming typical wall loads of 3 kips per lineal foot and typical column loads of 40 kips. The bearing capacity is based on a factor of safety of three against the full dead load plus normal live load. In our analysis, we used a maximum allowable total settlement of 1 inch and a maximum allowable differential settlement of $\frac{3}{4}$ of an inch within 50 lineal feet. These limits are generally considered acceptable for most structures.

A net allowable soil bearing pressure of 3,000 pounds per square foot (psf) may be used to size shallow foundation elements bearing on undisturbed native soils or properly placed fill material. The allowable bearing pressure is expressed in terms of the net pressure transferred to the soil. The net allowable bearing pressure is defined as the total structural dead load including the weight of the foundation elements, less the weight of the soil excavated for the foundation elements. This value may be increased by one-third for transient loading conditions such as wind or seismic forces.

This site appears to be suitable for the use of trenched “grade beam” type footings. Trenched footings utilize the excavation side walls as a form. Because separate forms do not need to be installed, this type of footing can be constructed more quickly and eliminate the need to backfill the foundation. Stresses applied to the soil by the foundation are also distributed more evenly.

All exterior and any interior foundation elements exposed to freezing conditions should be constructed at least 3.5 feet below the surrounding exterior grade to help reduce the effects of frost and seasonal moisture changes. Interior footings, which will be protected from the effects of frost, may be founded 1.5 feet below finished floor elevation.

We recommend that concrete be placed as soon as practical after footing excavation, with as little disturbance to the bearing soils as possible. Footing excavations should be free of loose soil or debris. Loose or disturbed soil must be removed or compacted prior to foundation construction. Water that collects in the excavations should be promptly removed to prevent softening of the foundation supporting soils prior to concrete placement. In addition, we recommend all excavations be observed by our geotechnical personnel prior to placement of concrete for the possible presence of unsuitable bearing soils. If unsuitable bearing soils are encountered during construction, these areas should be corrected in accordance with Section 5.2.8.

If shallow foundations are designed and constructed in accordance with the recommendations presented, total settlements are not expected to exceed 1 inch with differential settlements less than $\frac{3}{4}$ of an inch within 50 lineal feet.

5.4 Floor Slabs

The clay soils we encountered near the surface at the district kitchen and locker room structures are moderately to highly plastic and susceptible to changes in strength and volume (shrink/swell) with



changes in moisture content. Such changes present a risk of causing slab movement. Most slabs-on-grade will experience some amount of vertical movement, which the Owner must be willing to accept. Recommendations to help reduce the risk of movement of slabs supported on clay soils are presented below.

To provide uniform support for floor slabs and reduce the potential for subgrade volume change, we recommend all floor slabs bear on a minimum of 12 inches of LVC material as defined in Section 5.2.3 (or chemically stabilized on-site soils as outlined in Section 5.2.4). The placement and compaction of the LVC material should conform to the recommendations in Section 5.2.5 of this report. Depending on final grades, some over-excavation of the existing clay soils may be required to develop the 12-inch layer of LVC material.

By constructing a 12-inch layer of low plasticity, low volume change material immediately beneath the floor slab and closely controlling the moisture and density of the scarified soil and new fill materials, it is our opinion that the potential for detrimental floor slab movement will be reduced to less than $\frac{3}{4}$ of an inch. If slab movements up to $\frac{3}{4}$ of an inch are not acceptable, please contact GSI for further floor slab recommendations.

We recommend a 2- to 4-inch thick sand cushion be placed beneath the floor slabs in addition to the low plasticity, low volume change material. This layer should be free-draining, well-graded and compacted by vibration prior to placing the floor slab. The sand cushion should be moist, but not saturated, at the time of concrete placement.

We also recommend the moisture content of upper 9 inches of the subgrade be checked prior to placement of a sand base, reinforcing steel or concrete floor slab. If the moisture content of the subgrade is below optimum, we recommend the subgrade be scarified, moisture conditioned and recompacted according to Section 5.2.5.

In many construction projects, the moisture content of the floor slab subgrade is tested during grading of the site and then remains exposed until floor slab placement occurs several weeks later. In this situation, even LVC material is subject to some swell movement if not properly moisture conditioned prior to slab placement. Periodic applications of water will help maintain the proper moisture content of subgrade soils. The risk of differential movements can be reduced by creating and properly

preparing a LVC zone beneath the slab as well as ensuring proper drainage is maintained around the structure at all times.

We recommend the floor covering manufacturer be consulted regarding the use of a vapor retarder beneath floor slabs. If a vapor retarder is recommended by the floor covering manufacturer, it should conform to the manufacturer's specifications to maintain the product warranty.

5.5 Pavement Recommendations

The asphalt and Portland cement concrete pavement recommendations provided below are separated into a regular duty and a heavy duty section. To perform properly, the pavement sections require that the subgrade be prepared in accordance with the recommendations in Section 5.5.1.

5.5.1 Pavement Subgrade Preparation

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of the subgrade. The stability and quality of the pavement subgrade is particularly important where high traffic volume and heavy axle loads are anticipated.

We recommend that as a minimum, the top 9 inches of the pavement subgrade in vehicular areas (including the district kitchen parking lot and handicapped vehicle viewing area) be constructed of LVC material (as defined in Section 5.2.3) or chemically-stabilized on-site soils. Additional LVC material below vehicular pavements will enhance pavement performance, but is an economic consideration between initial construction cost and future potential pavement maintenance costs.

Providing LVC material or moisture-conditioning the native soils beneath pedestrian pavements will enhance pavement performance but is an economic consideration between initial construction cost and future potential pavement maintenance costs. If pedestrian pavements are constructed on unimproved native soils, the Owner should expect some movement to occur as the result of seasonal moisture fluctuations.

The top 9 inches of pavement subgrade should be compacted to a minimum of 95 percent of the maximum dry unit weight determined by ASTM D698. The moisture content should also be controlled to between optimum and 4 percent above the optimum moisture content.

To detect any localized areas of instability, the final subgrade should be proof rolled with a loaded tandem axle dump truck or equivalent (loaded water truck, loaded concrete mixer or motor grader with a minimum weight of 20 tons) immediately prior to placement of the concrete or asphalt. Unstable areas should be removed and replaced or reworked to provide a more uniform subgrade. If necessary, clean materials such as crushed concrete or crushed stone may be used to stabilize areas where wet soil or water is present. Geogrid or structural geotextile may be used in conjunction with crushed concrete or stone to provide additional stabilization.

We also recommend the moisture content of the subgrade be checked prior to paving. If the moisture content is below optimum, we recommend the subgrade be scarified, moisture conditioned and recompacted according to Section 5.2.5.

5.5.2 Recommended Design Sections

The pavement sections for this project are based on our experience with similar pavements and a design life of 15 to 20 years. The regular duty pavement sections are intended for passenger car and light truck traffic and parking areas. The heavy duty pavement sections are intended for areas that will experience high traffic volumes or heavy axle loads such as main access drives or delivery truck routes. Portland cement concrete pavements are recommended for areas with frequent start-stop or turning traffic such as entrance and exit aprons or the parking stalls closest to buildings, as well as areas that support stationary loads such as dumpsters.

Our recommendations for full-depth asphalt and Portland cement concrete pavement sections are presented in the following tables.

Table 5.5.2-1: Full-Depth ACC Pavement Design Recommendations

	<i>Thickness (Inches)</i>	
	<i>Regular Duty Section</i>	<i>Heavy Duty Section</i>
<i>KDOT BM-2 Wear Course</i>	2.0	2.0
<i>KDOT BM-2 Base Course</i>	3.5	5.5
<i>LVC Subgrade</i>	9.0 (minimum)	9.0 (minimum)

**LVC subgrade placed and compacted in accordance with Section 5.5.1.*

Table 5.5.2-2: PCC Pavement Design Recommendations

	<i>Thickness (Inches)</i>		
	<i>Sidewalks & Pedestrian Areas</i>	<i>Regular Duty Section</i>	<i>Heavy Duty Section</i>
<i>KDOT MA-2 Air Entrained Portland Cement Concrete (in.)</i>	4.0	5.0	6.0
<i>LVC Subgrade</i>	See Section 5.5.1	9.0 (minimum)	9.0 (minimum)

**LVC subgrade placed and compacted in accordance with Section 5.5.1.*

5.5.3 Asphaltic Cement Concrete Pavement Construction

Asphalt should be placed at an ambient temperature above 40 degrees Fahrenheit. Asphalt temperature at the time of compaction should be between 265 and 330 degrees Fahrenheit. We recommend the initial asphalt lift placed directly on the subgrade should be compacted to a minimum of 94 percent of the Marshall density with subsequent asphalt lifts compacted to a minimum of 96 percent of the Marshall density. Please note that recommendations regarding compaction temperature and percentage for a specific pavement design should supersede these recommendations.

All asphaltic concrete mix designs should be submitted to GSI and reviewed to determine if the designs are consistent with the recommendations given in this report. We also recommend a GSI representative be present during paving operations to help ensure adherence to project pavement specifications.

5.5.4 General Pavement Considerations

Pavement service life can be significantly reduced if the pavement is constructed on a poor subgrade, if poor surface or subsurface drainage is present, or if the pavement is not maintained properly. We emphasize the importance of preparing the pavement subgrade in accordance with the procedures listed in the previous sections of this report.

Drainage of surface and subsurface water is also a critical component of pavement performance. Wetting of the subgrade soils or base course will cause loss of support strength resulting in premature pavement distress. Surface drainage should be designed to remove all water from paved

areas. All curbs, including those surrounding pavement islands, should be backfilled as soon as possible after construction of the pavement. Backfill should be compacted and sloped to prevent water from ponding and infiltrating under the pavement. Regular active maintenance of pavements, which includes filling of cracks and joints, is required to minimize water infiltration and lengthen pavement life.

5.6 Artificial Turf Field Recommendations

As with pavement sections, the performance of the new artificial turf field is directly affected by the degree of compaction, uniformity, and stability of the soil subgrade beneath the granular subbase.

After removal of any topsoil/root zone associated with the existing grass field, we recommend that as a minimum, the top 9 inches of the subgrade beneath the granular subbase be constructed of LVC material. The borings we performed indicate that the soil within the existing field meets the requirements of LVC material as defined in Section 5.2.3. As such, the 9 inch LVC zone could comprise on-site soils that have been moisture conditioned and recompacted in place.

The top 9 inches of the soil subgrade beneath any granular subbase associated with the new turf should be compacted to a minimum of 95 percent of the maximum dry unit weight determined by ASTM D698. The moisture content should also be controlled to between optimum and 4 percent above the optimum moisture content.

To detect any localized areas of instability, the final subgrade should be proof rolled with a loaded tandem axle dump truck or equivalent (loaded water truck, loaded concrete mixer or motor grader with a minimum weight of 20 tons) immediately prior to placement of the field subbase. Unstable areas should be removed and replaced or reworked to provide a more uniform subgrade.

The service life of the new field can be reduced if the turf system is constructed on a poor subgrade. We emphasize the importance of preparing the subgrade in accordance with the procedures listed in the previous sections of this report.

Drainage of surface and subsurface water is also a critical component of the subgrade performance. Wetting of the subgrade soils will cause loss of support strength resulting in premature distress.

Surface and subsurface drainage should be provided to remove all water that may enter the turf subbase.

5.7 Lateral Earth Pressures

Earth-retaining structures should be designed to withstand lateral earth pressures caused by adjacent soil and applied surcharge loads. The magnitude of the lateral earth pressure will depend on the height of the walls, stiffness of the walls, magnitude of the surcharge loads behind the walls, and the backfill and existing soil conditions behind the walls.

Table 5.7-1: Lateral Earth Pressure Coefficients

Soil Type (USCS Symbol)	Wet Unit Weight (pcf)	Drained Friction Angle (Φ')	At Rest (K_o)	Active (K_a)	Passive (K_p)
Lean Clay/Sandy Lean Clay (CL)	120	25	0.58	0.41	2.46
Granular Backfill (SP, SW, GP)	120	34	0.44	0.28	3.54

The values provided above are empirical and are based on basic testing as well as our experience with similar materials. These values also assume a vertical wall with a horizontal retained surface behind the wall. Lateral earth pressure parameters for granular backfill may be used only if the granular backfill extends upward from the heel of the wall at a slope shallower than 1H:1V. Please contact us if different backfill materials or wall geometries are a consideration for this project.

Static surcharge loads imposed on below-grade walls may be computed by multiplying the static surcharge load (q) by the appropriate lateral earth pressure coefficient (K_a or K_o). Sliding friction effects along the base of the wall may be evaluated using an ultimate sliding friction coefficient (μ) of 0.35. Appropriate factors of safety should be applied to the computed lateral earth pressures and sliding friction resistance. We recommend an underdrain system with a gravity drain or sump pump be provided to prevent hydrostatic forces from developing behind the wall.

5.8 Surface Drainage and Landscaping

The success of the shallow foundation system, slab-on-grade floor system, artificial turf field, and pavement section is contingent upon keeping the moisture content of subgrade soils as constant as

possible and not allowing surface drainage to have a path to the subsurface soils. Positive surface drainage away from structures must be maintained throughout the design life of the structures. Landscaped areas should be designed and constructed such that irrigation and other surface water will be collected and carried away from foundation elements. Pavements should be sloped or crowned to direct surface water to storm sewer systems or detention/retention ponds.

During construction, temporary grades should be established to prevent runoff from entering excavations or footing trenches. Backfill should be placed as soon as concrete structural strength requirements are met and should be graded to drain away from the building.

The final grade of the foundation backfill and any overlying pavements should have a positive slope away from foundation walls on all sides. We typically recommend a minimum slope of one inch per foot for the first 5 to 10 feet for uncovered surfaces. However, the slope may be decreased if the ground surface adjacent to foundations is covered with concrete slabs or asphalt pavements. For other areas of the site, we recommend a minimum slope of two percent. Pavements and exterior slabs that abut structures should be carefully sealed against moisture intrusion at the joint. All downspouts and faucets should discharge onto splash blocks that extend at least five feet from the building line or be tied into the storm drain system. Splash blocks should slope away from the foundation walls.

The placement of vegetation and plantings next to the foundation should be minimized. Where landscaping is required, we recommend considering plants and vegetation that require minimal irrigation. Irrigation within ten feet of the foundation should be carefully controlled and minimized.

5.9 Construction Considerations

If construction of the project is to be performed during periods of freezing temperatures, steps should be taken to prevent the soils under floor slabs, footings, or pavements from freezing. In no case should the fill materials, floor slabs, foundations, pavements, or other exterior flat work be placed on frozen or partially frozen materials. Frozen materials should be removed and replaced with a suitable material as described in earlier sections of this report.



Care should be exercised during excavation of new footings to avoid undermining the existing footings. Shoring, bracing, underpinning or other methods of maintaining foundation integrity may be required.

Construction performed during periods of high precipitation may result in saturated unstable soils, and caving or sloughing of excavations. Control of soil moisture will be necessary for successful soil compaction, and to maintain soil bearing capacity.

5.10 Construction Observation and Quality Assurance

We recommend that GSI review those portions of the plans and specifications that pertain to foundations and earthwork to evaluate consistency with our findings and recommendations. GSI will provide up to 2 hours of engineering support services at no charge to review project documents for adherence to our recommendations.

Site grading, including proof-rolling, replacement or recompaction of material, and placement of fill and backfill, should be observed by a quality assurance technician from GSI under the direction of a registered professional engineer. The technician should perform density tests and make any other observations necessary to assure that the requirements of the specifications are being achieved.

It is the opinion of GSI that construction observation by the geotechnical engineer of record or his designated representative is necessary to complete the design process. Field observation services are viewed as essential and a continuation of the design process. Unless these services are provided by GSI, the geotechnical engineer will not be responsible for improper use of our recommendations or failure by others to recognize conditions which may be detrimental to the successful completion of the project.

GSI will be available to make field observations and provide consultation services as may be necessary. A written proposal outlining the cost of construction testing services such as soil, concrete, masonry, steel and pavement quality assurance can be provided upon request.



6. CLOSING REMARKS AND LIMITATIONS

This report is presented in broad terms to provide an assessment of the subsurface conditions and their potential effect on the adequate design and economical construction of the proposed structures, pavements, and artificial turf field. The analyses, conclusions, and recommendations contained in this report are based on the site conditions existing at the time of the exploration, the project layout described herein, and the assumption that the information obtained from our 14 borings is representative of subsurface conditions throughout the site.

Any changes in the design or location of the proposed structure should be assumed to invalidate the conclusions and recommendations given in this report until we have had the opportunity to review the changes and, if necessary, modify our conclusions and recommendations accordingly. If subsurface conditions different from those encountered in the explorations are observed during construction or appear to be present beneath excavations, GSI should be advised at once so that the conditions can be reviewed and recommendations reconsidered where necessary.

If there is a substantial lapse in time between the submission of this report and the start of construction, or if site conditions or the project layout have significantly changed (due to further development of grading plans, natural causes, or construction operations at or adjacent to the site), we recommend that this report be reviewed to determine the applicability of our previous conclusions and recommendations.

Our geotechnical exploration and subsequent recommendations address only the design and construction considerations contained in this report. We make no warranty for the contents of this report, neither expressed nor implied, except that our professional services were performed in accordance with engineering principles and practices generally accepted at this time and location.

The scope of services for this exploration did not include a wetlands evaluation, an environmental assessment, or an investigation for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air within or adjacent to this site. If contamination is suspected or is a concern, we recommend the scope of this study be expanded to include an environmental assessment.

This report was prepared by the firm of GSI Engineering, LLC (GSI) under the supervision of a professional engineer registered in the State of Kansas. Report preparation was in accordance with

generally accepted geotechnical engineering practices for the exclusive use of our client for evaluating the design of the project as it relates to the geotechnical aspects discussed herein. Recommendations are based on the applicable standards of the profession at the time of this report within this geographic area. GSI Engineering, LLC will not be responsible for misrepresentation of this report resulting from partial reproduction or paraphrasing of its contents.

We appreciate the opportunity to be of service on this project. Please contact us if we can provide further information regarding the contents of this report or the scope and cost of additional services.

Respectfully submitted,
GSI Engineering, LLC



Thomas C. Kettler, Jr., P.E.
Senior Engineer



Matthew N. Tye, I.E.
Staff Engineer

TCK/MNT

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Kansas.

Sections covered by this seal:

Sections 1 through 6 and all pages included as appendices within this bound document.

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APPENDIX A

General Vicinity Map
Boring Location Plan



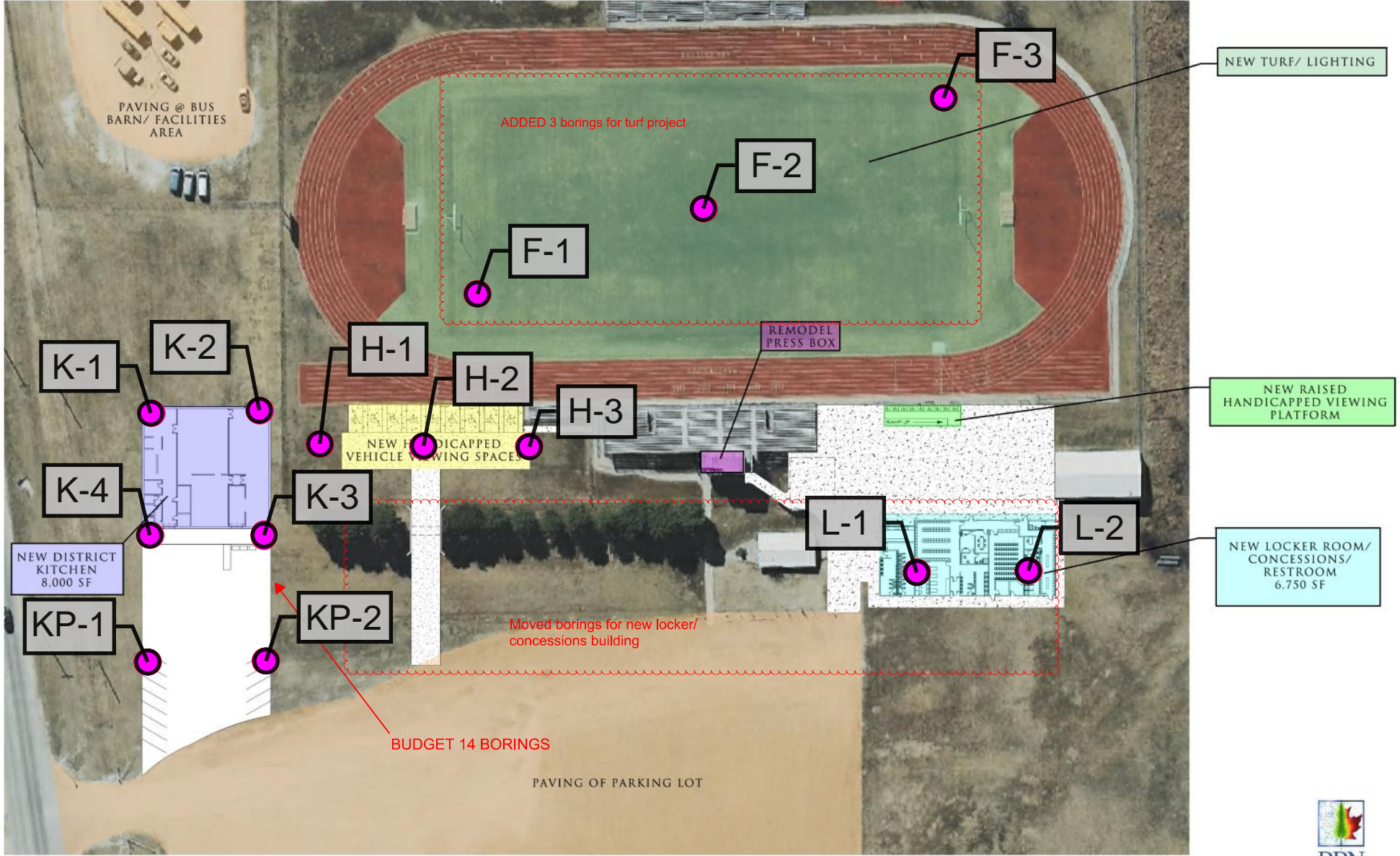
FIG. #:	PROJ #:
1	1773023A
DATE:	SCALE:
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MNT	MNT



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APPENDUM 2
 07/26/17

**GENERAL VICINITY MAP
 USD 320 SPORTS COMPLEX
 WAMEGO, KANSAS**



SITE PLAN - NEW LOCKER ROOMS/ CONCESSIONS/ DISTRICT KITCHEN - SPORTS COMPLEX

APPENDIX B

Boring Logs

Key to Symbols

Legend & Nomenclature

Unified Soil Classification System (USCS)

BORING LOG No. F-1

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
F-1	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL	0.5'				
	S-1	11		▨▨▨▨▨	CLAYEY SAND- dark brown, moist, medium dense, roots LL=43; PL=17; PI=26 % Pass #200: 45.4	2.0'	SC	15.5		
	S-2	15		▨▨▨▨▨	LEAN CLAY- light brown, moist, stiff		CL	22.6		
	S-3	16		▨▨▨▨▨	- as above			23.4		
5					Bottom of Boring @ 5'	5.0'				
10										
15										
20										
25										
30										
35										
40										

BORING LOG No. F-2

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
F-2	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	Grass		Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling	3.25-inch Inside Diameter Hollow Stem Augers		TOTAL DEPTH
					5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL					
	S-1	11		/ / / / /	LEAN CLAY- dark brown, moist, stiff, roots	CL	22.7			
	S-2	16		. . . . .	CLAYEY SAND- yellowish brown, moist, medium dense, trace gravel	SC	14.4			
					% Pass #200: 22.4					
5	S-3	10		/ / / / /	LEAN CLAY- light brown, moist, stiff, iron	CL	31.9			
					Bottom of Boring @ 5'					
10										
15										
20										
25										
30										
35										
40										

BORING LOG No. F-3

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
F-3	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	Grass		Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling	DRILLING METHOD		TOTAL DEPTH
			3.25-inch Inside Diameter Hollow Stem Augers		5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.				
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf					
				GEOLOGIC DESCRIPTION & OTHER REMARKS									
				6" TOPSOIL	0.5'								
	S-1	6			SANDY LEAN CLAY- dark brown, moist, medium stiff, roots LL=39; PL=19; PI=20 - dark yellowish brown, very stiff, iron, else as above - calcium, else as above	CL							
	S-2	16									22.1		
	S-3	19									17.6		
5					5.0'								
				Bottom of Boring @ 5'									
10													
15													
20													
25													
30													
35													
40													

BORING LOG No. H-1

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
H-1	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	Grass		Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling	3.25-inch Inside Diameter Hollow Stem Augers		TOTAL DEPTH
					5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS					
				6" TOPSOIL					
	S-1	7		SANDY LEAN CLAY- dark brown, moist, medium stiff LL=39; PL=16; PI=23	CL	14.9			
	S-2	14		- dark yellowish brown, stiff, else as above		12.8			
	S-3	13		- iron, else as above		15.6			
5				Bottom of Boring @ 5'					
10									
15									
20									
25									
30									
35									
40									

BORING LOG No. H-2

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
H-2	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL	0.5'				
	S-1	11			LEAN CLAY- dark brown, moist, stiff, roots	0.5'	CL	19.8		
	S-2	20			SANDY LEAN CLAY- dark yellowish brown, moist, very stiff	2.0'		17.6		
	S-3	17			- iron, else as above		CL	15.7		
5					Bottom of Boring @ 5'	5.0'				
10										
15										
20										
25										
30										
35										
40										

BORING LOG No. H-3

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
H-3	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		DRILLING METHOD	TOTAL DEPTH
				3.25-inch Inside Diameter Hollow Stem Augers	5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS					
				✓✓✓✓✓ 6" TOPSOIL					
	S-1	14		LEAN CLAY- dark brown, moist, stiff	CL	18.0			
	S-2	11		- light brown, moist, iron, rust stains, else as above		23.5			
5	S-3	24		SANDY LEAN CLAY- light brown, moist, very stiff, iron, rust stains	CL	22.8			
				Bottom of Boring @ 5'					
10									
15									
20									
25									
30									
35									
40									

BORING LOG No. K-1

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
K-1	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	10.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL					
	S-1	10			LEAN CLAY- dark brown, moist, stiff, roots	CL	27.4			
	S-2	22			SANDY LEAN CLAY- olive brown, moist, very stiff, root hairs	CL	19.8			
5	S-3	23			LEAN CLAY- olive brown, moist, very stiff, calcium, iron	CL	13.2			
	S-4	9			- stiff, else as above		17.7			
10					Bottom of Boring @ 10'					
15										
20										
25										
30										
35										
40										

BORING LOG No. K-3

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
K-3	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	10.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.	
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf		q _u ksf
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL					
	S-1	8		/ / / / /	LEAN CLAY- dark brown, moist, stiff, roots		20.3			
	S-2	27			- olive brown, very stiff, calcium, roots		20.4			
5	S-3	25			- iron, else as above	CL	17.8			
	S-4	7			- dark yellowish brown, medium stiff, else as above		17.4			
10					Bottom of Boring @ 10'					
15										
20										
25										
30										
35										
40										

BORING LOG No. K-4

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
K-4	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	10.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL					
	S-1	10			LEAN CLAY- olive brown, moist, stiff, roots	CL	20.0			
	S/U-2	16			FAT CLAY- dark yellowish brown, moist, stiff, calcium LL=66; PL=19; PI=47	CH	25.4	97.7	3.23	
5	S-3	22			LEAN CLAY- olive brown, moist, very stiff					
						CL				
	S-4	14			- dark yellowish brown, stiff, else as above					
10					Bottom of Boring @ 10'					
15										
20										
25										
30										
35										
40										

BORING LOG No. KP-1

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
KP-1	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	Grass		Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling	3.25-inch Inside Diameter Hollow Stem Augers		TOTAL DEPTH
					5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS					
				6" TOPSOIL					
	S-1	7		LEAN CLAY- dark brown, moist, medium stiff, roots LL=46; PL=18; PI=28		23.4			
	S-2	16		- olive brown, stiff, else as above	CL	18.7			
	S-3	15		- dark yellowish brown, trace gravel, else as above		18.2			
5				Bottom of Boring @ 5'					
10									
15									
20									
25									
30									
35									
40									

BORING LOG No. KP-2

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
KP-2	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	5.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION			LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL					
	S-1	9		/ / / / /	LEAN CLAY- dark brown, moist, stiff, roots	CL	23.1			
	S-2	13		. . . . .	SANDY LEAN CLAY- dark yellowish brown, moist, stiff	CL	18.3			
	S-3	19		. . . . .	- very stiff, else as above		16.1			
5					Bottom of Boring @ 5'					
10										
15										
20										
25										
30										
35										
40										

BORING LOG No. L-1

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
L-1	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	10.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.	
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE		USCS CLASS.	MC %	Dry Dens. pcf		q _u ksf
				GEOLOGIC DESCRIPTION & OTHER REMARKS						
				✓✓✓✓✓	6" TOPSOIL	0.5'				
	S-1	40			CLAYEY SAND- dark yellowish brown, moist, hard LL=44; PL=18; PI=26 % Pass #200: 32.8	2.5'	SC	13.1		
	S-2	16			LEAN CLAY- light brown, moist, very stiff, iron, rust stains, trace gravel			25.1		
5	S-3	19			- as above		CL	23.2		
	S-4	10			- stiff, else as above					
10					Bottom of Boring @ 10'	10.0'				
15										
20										
25										
30										
35										
40										

BORING LOG No. L-2

BORING NO.	LOCATION OF BORING	ELEVATION	DATUM	DRILLER	LOGGER
L-2	See Boring Location Plan			J. Tinnell	R. Hopkins
WATER LEVEL OBSERVATIONS			TYPE OF SURFACE		DRILL RIG
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	AFTER DRILLING	Grass	Mobile B-61
N.E.	N.E.	Boring Plugged After Drilling		3.25-inch Inside Diameter Hollow Stem Augers	10.0 ft.

DEP. FT.	SAMPLE DATA			SOIL DESCRIPTION		LABORATORY DATA			ELEV. FT.
	SAMPLE NO. & TYPE	"N" BLOWS (FT)	% REC.	COLOR, CONSISTENCY, MOISTURE	USCS CLASS.	MC %	Dry Dens. pcf	q _u ksf	
				GEOLOGIC DESCRIPTION & OTHER REMARKS					
				✓✓✓✓✓	6" TOPSOIL				
	S-1	19		/ / / / /	LEAN CLAY- dark brown, moist, very stiff		15.1		
	S/U-2	23			- dark yellowish brown, trace gravel, else as above LL=45; PL=19; PI=26		22.7	103.6	1.13
5	S-3	25			- light brown, else as above	CL	23.6		
	S-4	4			- medium stiff, rust stains, else as above				
10					Bottom of Boring @ 10'				
15									
20									
25									
30									
35									
40									

KEY TO SYMBOLS

Symbol Description

Strata symbols



Topsoil



Clayey sand



Low plasticity
clay



Lean clay w/sand or sandy lean
clay



High plasticity
clay

Notes:

1. The exploratory borings were drilled on February 9, 2017 using 3.25-inch inside diameter hollow stem augers.
2. These logs are subject to the limitations, conclusions, and recommendations in this report.
3. Results of tests conducted on samples recovered are reported on the logs.

Boring Log Legend and Nomenclature

Items shown on boring logs refer to the following:

1. **Depth** - Depth below ground surface or drilling platform

2. **Sample** -Types designated by letter:
 - A - Disturbed sample, obtained from auger cuttings or wash water.
 - S - Split barrel sample, obtained by driving a 2-inch split-barrel sampler unless otherwise noted.
 - C - California liner sample, obtained using a thick-walled liner sampler containing 2-inch-diameter liner tubes.
 - U - Undisturbed sample, obtained using a thin-walled tube, 3-inch-diameter, or as noted, and open sampling head.

Recovery - Recovery is expressed as a percentage of the length recovered to the total length pushed, driven or cored.

Resistance - Resistance is designated as follows:

 - P - Sample pushed in one continuous movement by hydraulic rig action.
 - 12 - The Standard Penetration Resistance is the number of blows for the last 12 inches of penetration of split spoon sampler, driven by a 140-pound hammer falling 30 inches.
 - 50/4" - Number of blows to drive sampler distance shown.

3. **Soil Description** - Description of material according to the Unified Soil Classification: word description giving soil constituents, consistency or density, and other appropriate classification characteristics. Geologic name or type of deposit and other pertinent information, where appropriate, is shown under Geologic Description or other Remarks. A solid line indicates the approximate location of stratigraphic change.

4. **Lab Data** – Laboratory test data.

5. **Legend**

A.D. — After drilling	N.A. — Not Applicable
A.T.D. — At time of drilling	N.D. — Not detectable due to
C.F.A. — Continuous flight auger	drilling method
D.W.L. — Drill water loss	N.E. — None encountered
D.W.R. — Drill water return	N.R. — Not recorded
E.D. — End of drilling	R.Q.D. — Rock quality designation
H.B. — Hole backfilled	R.W.B. — Rotary wash boring

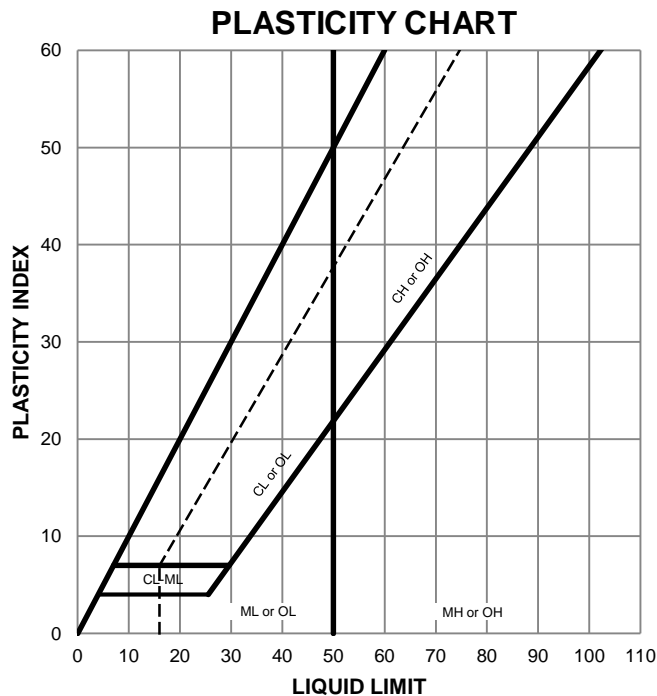
6. **Limitations** - The lines between materials shown on the boring logs represent approximate boundaries between material types and the changes may be gradual. Water level readings shown on the logs were made at the time and under the conditions indicated. Fluctuations in the water levels may occur with time. The boring logs in this report are subject to the limitations, explanations and conclusions of this report.

UNIFIED SOIL CLASSIFICATION SYSTEM

GROUP NAME	GROUP SYMBOL	SOIL DESCRIPTION	COMMENTS
Peat	Pt	Highly Organic Soils	50% or More Is Smaller than No. 200 Sieve
Fat Clay	CH	Clay - Liquid Limit \Rightarrow 50*	
Elastic Silt	MH	Silt - Liquid Limit \Rightarrow 50*	
Lean Clay	CL	Clay - Liquid Limit $<$ 50*	
Silt	ML	Silt - Liquid Limit $<$ 50*	
Silty Clay	CL-ML	Silty Clay*	
Clayey Sand	SC	Sands with 12 to 50% Smaller than No. 200 Sieve	More than 50% Is Larger than No. 200 Sieve and % Sand $>$ % Gravel
Silty Sand	SM	Sands with 5 to 12% Smaller than No. 200 Sieve	
Poorly-Graded Sand with Clay	SP-SC	Sands with Less than 5% Smaller than No. 200 Sieve	
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay**	SW-SC		
Well-Graded Sand with Silt**	SW-SM		
Poorly-Graded Sand	SP	Gravels with 12 to 50% Smaller than No. 200 Sieve	
Well-Graded Sand**	SW		
Clayey Gravel	GC		
Silty Gravel	GM		
Poorly-Graded Gravel with Clay	GP-GC	Gravels with 5 to 12% Smaller than No. 200 Sieve	
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay**	GW-GC		
Well-Graded Gravel with Silt**	GW-GP		
Poorly-Graded Gravel	GP	Gravels with Less than 5% Smaller than No. 200 Sieve	
Well-Graded Gravel**	GW		

*See Plasticity Chart for definition of silts and clays. If organic, use OL or OH.

**See definition of well-graded



LEGEND OF TERMS

MOISTURE CONDITIONS
Dry, Slightly Moist, Moist, Very Moist, Wet (Saturated)

SOIL CONSISTENCY

Fine-Grained Soils

Description	SPT (N)	UCS (q_u , tsf)
Very Soft	0-2	0-0.25
Soft	2-4	0.25-0.50
Medium Stiff	4-8	0.50-1.0
Stiff	8-16	1.0-2.0
Very Stiff	16-32	2.0-4.0
Hard	$>$ 32	$>$ 4.0

Coarse-Grained Soils

Description	SPT (N)
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	$>$ 50

CLASSIFICATION OF SANDS & GRAVELS

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Fines (Silt or Clay)
10"	3"	3/4"	#4	#10	#40	#200	

Well-Graded Sands (SW): $C_u \geq 6$ and $1 \leq C_c \leq 3$

Well-Graded Gravels (GW): $C_u \geq 4$ and $1 \leq C_c \leq 3$



APPENDIX C

Field & Laboratory Test Results

Boring No.	Sample No.	Sample Depth (ft)	Sample Type	Sample Diameter (in)	Sample Length (in)	Moisture Content (%)	Wet Unit Weight (lb/ft ³)	Dry Unit Weight (lb/ft ³)	Unconfined Compressive Strength (kips/ft ²)	Atterberg Limits			Percent Passing No. 200 Sieve	Blow Counts SPT 'N' (blows/ft)	USCS Soil Classification
										Liquid Limit	Plastic Limit	Plasticity Index			
F-1	S-1	0.5-2.0	Split Spoon			15.5				43	17	26	45.4	11	SC
	S-2	2.0-3.5	Split Spoon			22.6								15	CL
	S-3	3.5-5.0	Split Spoon			23.4								16	CL
F-2	S-1	0.5-2.0	Split Spoon			22.7								11	CL
	S-2	2.0-3.5	Split Spoon			14.4							22.4	16	SC
	S-3	3.5-5.0	Split Spoon			31.9								10	CL
F-3	S-1	0.5-2.0	Split Spoon			22.1				39	19	20		6	Sandy CL
	S-2	2.0-3.5	Split Spoon			17.6								16	Sandy CL
	S-3	3.5-5.0	Split Spoon			20.2								19	Sandy CL
H-1	S-1	0.5-2.0	Split Spoon			14.9				39	16	23		7	Sandy CL
	S-2	2.0-3.5	Split Spoon			12.8								14	Sandy CL
	S-3	3.5-5.0	Split Spoon			15.6								13	Sandy CL
H-2	S-1	0.5-2.0	Split Spoon			19.8								11	CL
	S-2	2.0-3.5	Split Spoon			17.6								20	Sandy CL
	S-3	3.5-5.0	Split Spoon			15.7								17	Sandy CL
H-3	S-1	0.5-2.0	Split Spoon			18.0								14	CL
	S-2	2.0-3.5	Split Spoon			23.5								11	CL
	S-3	3.5-5.0	Split Spoon			22.8								24	Sandy CL



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SUMMARY OF FIELD AND LABORATORY TEST RESULTS

Project: **USD 320 Sports Complex**
Location: **Wamego, Kansas**
Job Number: **1773023A** Date: **3/1/2017**

Boring No.	Sample No.	Sample Depth (ft)	Sample Type	Sample Diameter (in)	Sample Length (in)	Moisture Content (%)	Wet Unit Weight (lb/ft ³)	Dry Unit Weight (lb/ft ³)	Unconfined Compressive Strength (kips/ft ²)	Atterberg Limits			Percent Passing No. 200 Sieve	Blow Counts SPT 'N' (blows/ft)	USCS Soil Classification
										Liquid Limit	Plastic Limit	Plasticity Index			
K-1	S-1	0.5-2.0	Split Spoon			27.4								10	CL
	S-2	2.5-4.0	Split Spoon			19.8								22	Sandy CL
	S-3	5.0-6.5	Split Spoon			13.2								23	CL
	S-4	8.5-10.0	Split Spoon			17.7								9	CL
K-2	S-1	0.5-2.0	Split Spoon			20.5				46	20	26		11	CL
	S-2	2.5-4.0	Split Spoon			21.0								26	CL
	S/U-3	5.0-6.5	Split Spoon	2.85	5.58	17.5	118.9	101.2	2.02					10	CL
	S-4	8.5-10.0	Split Spoon			18.1								7	Sandy CL
K-3	S-1	0.5-2.0	Split Spoon			20.3								8	CL
	S-2	2.5-4.0	Split Spoon			20.4								27	CL
	S-3	5.0-6.5	Split Spoon			17.8								25	CL
	S-4	8.5-10.0	Split Spoon			17.4								7	CL
K-4	S-1	0.5-2.0	Split Spoon			20.0								10	CL
	S/U-2	2.5-4.0	Split Spoon	2.85	5.58	25.4	122.5	97.7	3.23	66	19	47		16	CH
	S-3	5.0-6.5	Split Spoon			17.6								22	CL
	S-4	8.5-10.0	Split Spoon			20.6								14	CL
KP-1	S-1	0.5-2.0	Split Spoon			23.4				46	18	28		7	CL
	S-2	2.0-3.5	Split Spoon			18.7								16	CL
	S-3	3.5-5.0	Split Spoon			18.2								15	CL
KP-2	S-1	0.5-2.0	Split Spoon			23.1								9	CL
	S-2	2.0-3.5	Split Spoon			18.3								13	Sandy CL
	S-3	3.5-5.0	Split Spoon			16.1								19	Sandy CL



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**SUMMARY OF FIELD AND
LABORATORY TEST
RESULTS**

Project:	USD 320 Sports Complex	
Location:	Wamego, Kansas	
Job Number:	1773023A	Date: 3/1/2017

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