PUBLIC WORKS DEPARTMENT
MEMORANDUM # 2018 - 38

DATE: July 23, 2018

TO: Honorable Mayor Carol Dodge and City Council Members

FROM: Robert Webber, MBA – Acting City Manager

SUBJECT: **CR – 81**
WWTP Control Bldg/Lab FFE

PURPOSE

The purpose of this memorandum is to inform Council of costs related to the furnishing of the new wastewater operations building and laboratory.

BACKGROUND

The initial project scope for the 2017 wastewater treatment plant (WWTP) upgrades included a new operations building and laboratory. The original administration building is 40 years old, including the HVAC, plumbing, and other critical infrastructure. Due to budget constraints, a smaller building was constructed with only basic rough-ins, plumbing, electric, and drywall installed. Initially, the building was to be left vacant until funding was secured to complete the upgrades at a later date. Upon completion of the WWTP Upgrades CMAR contract, significant savings were realized and sufficient funding was available to complete the operations building. Furniture, Fixtures and Equipment (FFE) for the new building includes furniture and accessories for office/work space, some HVAC and electrical modifications, window coverings, laboratory casework and fume hood.

BUDGET IMPLICATIONS

Work completed under this contract will be expensed to the Wastewater CIP fund

Appropriation	$499,300.00
HPM Contracting	($499,300.00)
Balance	$0.00

SCHEDULE/TIME IMPLICATION

On March 2018, the City posted an Invitation for Bid (IFB 2018-007) for the City of Northglenn WWTP – Control Building and Laboratory/Furniture Fitout. A mandatory pre-bid meeting was held March 19, 2018 in which three (3) prospective contractors attended. On April 6, the City received bids from one (1) contractor. The single bidder was **HPM, Inc.** with a base bid amount of $499,300.

STAFF RECOMMENDATION

Attached to this memorandum is a Resolution that, if approved, would:

1. Authorize the Mayor to execute a contract between the City of Northglenn and **HPM, Inc.** for the City of Northglenn WWTP – Control Building and Laboratory Fitout in the amount of **$499,300**;

Staff recommends approval of the Resolution.

STAFF REFERENCE

Kent Kisselman, PE, Engineering Manager	kkisselman@northglenn.org	303.450.4005
Evelyn Rhodes, Laboratory Supervisor	erhodes@northglenn.org	303.450.4074
Daniel Martinez, PE, Civil Engineer II	dmartinez@northglenn.org	303.450.8839

ATTACHMENTS

- ☐ Bid Tab
- ☐ Specifications
- ☐ Construction Plans
- ☐ Cost Breakdown

Northglenn

CITY OF NORTHGLENN
FORMAL BID SUMMARY

BID NUMBER: IFB 2018-007
BID NAME: City of Northglenn WWTP - Control Building and Laboratory Furniture Fitout
DEPARTMENT: Public Works

	HPM INC.				
	BID RECEIVED	**BID RECEIVED**	**BID RECEIVED**	**BID RECEIVED**	**BID RECEIVED**
DATE DUE: 4/6/18	**DATE:** 4/6/18	**DATE:**	**DATE:**	**DATE:**	**DATE:**
TIME: 10:00 a.m. MST	**TIME:** 9:39am	**TIME:**	**TIME:**	**TIME:**	**TIME:**
Addendum 1	yes				
Total for all items	$499,300.00				

Finance Department — City's Clerk's Office — Date 4/6/2018

OUTLINE SPECIFICATION

Project Name:	Northglenn WWTP Control Building and Laboratory/Furniture Fitout
Owner:	City of Northglenn
Architect:	**alm$_2$s** **712 Whalers Way, Suite B-100** **Fort Collins, CO 80525** **(970) 223-1820** **Contact:**
Project Location:	5445 Weld County Road #2, Brighton, CO 80603
Date:	February 21, 2018
Construction Start:	Early April, 2018

DIVISION 0 PROCUREMENT AND CONTRACTING REQUIREMENTS

Section 00 11 16 Invitation to Bid
The attached Invitation to Bid is hereby incorporated into these Specifications.

Section 00 41 00 Bid Form
The attached Bid Form is hereby incorporated into these Specifications.

Section 00 52 00 Agreement Forms
The standard City of Northglenn Trade Contractor Agreement, shall form the contract between the Owner and Contractor for this project.

Section 00 72 00 and 00 73 00 General and Supplementary Conditions
The City of Northglenn General Conditions of the Contract for Construction are hereby incorporated into these Specifications by reference.

Section 00 72 00 Insurance Requirements
Contractor shall carry the minimum insurance coverages specified in the General and Supplementary Conditions, or as required by the Owner, and provide certificates of insurance to the Owner verifying such coverage, unless modified in the Owner-Contractor Agreement.

1. Comprehensive general and public liability: $500,000 single occurrence; $1,000,000 aggregate for both bodily injury and property damage.
2. Contractual liability: $500,000 single occurrence; $1,000,000 aggregate for both bodily injury and property damage.
3. Comprehensive automobile liability: $1,000,000.
4. Excess liability (umbrella): $2,000,000.

Each Contractor and Subcontractor shall provide Workmen's Compensation insurance in at least the minimum coverages required by the State of Colorado.

The General Contractor shall require each Subcontractor awarded work as a part of this Project to maintain insurance coverages as negotiated with each Subcontractor, subject to the approval of the Owner.

The Owner shall furnish a Builder's Risk insurance policy to cover the full replacement value of the project separate from this Contract.

Section 00 62 76 and 00 62 80 Payments to the Contractor
Contractor shall complete the City of Northglenn Application and Certificate for Payment, or other payment application form acceptable to the Owner, for progress payments in conformance with the construction progress of the project. The Owner and Architect shall review the applications in conformance with the progress, and authorize payments to the Contractor.

Lien Release: Partial lien releases from all Subcontractors and/or Suppliers will be required from the General Contractor with each pay application, covering the amount of the previous payment to each Subcontractor or Supplier.

Retainage: Retainage in the amount of 10% of the value of the work covered by the application shall be withheld by the Owner, in accordance with the General and Supplementary Conditions.

DIVISION 1 GENERAL REQUIREMENTS

Section 01 11 00 Summary of Work

Project Location: Control Building is at the northeast corner of Weld County Road 11 and East 168th Ave, Brighton, Colorado. The address is 5445 Weld County Road #2, Brighton, CO 80603.

Furnish and provide labor and equipment to install all materials, equipment and fixtures for the Project, as shown on the drawings, including but not limited to:

1. Construction of interior fitout of laboratory space within the control building including HVAC, plumbing and electrical work, as described in the Construction Documents.
2. Construction of built-in workstations and moveable furniture fitout of break/operations room, private offices and other spaces within the building.

Owner to responsible for relocating all equipment noted as "existing" on the drawings from their current lab/office space to the new space and making final connections. Model numbers are provided to ensure proper mechanical, plumbing and electrical hookups/connections are provided within General Contractor's scope of work.

The work of this Project shall be bid and constructed on a Fixed Sum (Lump Sum) basis, unless otherwise modified in Section 01 29 00.

Section 01 14 13 Access to Site

Contractor shall have daily weekday access from 7 a.m. to 6 p.m., to the affected portion of the building during the construction period of the project. Access to other areas of the plant shall be as arranged with the building owner. Employee/worker parking and materials staging areas shall be as arranged by the Owner.

The Owner shall not occupy any portion of the project until Substantial Completion of the work.

Section 01 21 00 Allowances

Description of bid allowances:

1. Allowance No. 1: $15,000 - Northglenn's current contracted with Suez (primary contact: John Wall 303.432.1539) as their vendor for DI system. Suez will move existing equipment from current operations building to mechanical room in new operations building and make connects to new distribution system. Plumbing contractor to provide new looped distribution system per plumbing drawings. Final allowance amount to be adjusted up or down depending on exact price provided by Suez.

Section 01 26 13 RFIs and ASIs

Requirements for Request for Information, assigned by the Contractor, and Architect's Supplemental Instructions, issued by the Architect or Owner.

Section 01 26 63 Change Order Procedures

Contractor shall prepare requests for change orders using AIA G701 forms, furnishing adequate back-up data for the review and approval of the Architect and Owner. Requests shall be itemized for material and labor for each trade, general conditions and overhead and profit.

Section 01 29 73 Schedule of Values

Contractor shall prepare a schedule of values for the work for review and approval of the Architect and Owner. Sections of work shall be in accordance with the Sections of these Specifications, and itemize work for both materials and labor.

Section 01 29 76 Progress Payment Procedures

Applications for progress and final payments to the Contractor shall be made using the standard City of Northglenn application for payment form or the AIA G702 and 703 forms, with the number of notarized copies to be determined at the Pre-Construction Conference.

Section 01 31 13 Project Coordination
Contractor shall coordinate the work of all Subcontractors and materials suppliers as required for a complete Project.

Section 01 31 19 Project Meetings
Architect and/or the Owner shall administer a Pre-Construction Conference and regularly scheduled site conferences involving the Owner, Architect, Contractor and major Subcontractors, as appropriate. The Contractor shall be responsible for keeping records and preparing and distributing minutes of these conferences to all affected parties.

Section 01 31 23 Superintendent
General Contractor or Construction Manager shall provide an experienced, on-site Superintendent to supervise the work of all Subcontractors. The Superintendent shall be on site full time during work of the Project, or as otherwise agreed upon by the Owner.

Section 01 32 16 Construction Progress Schedule
Contractor shall prepare an initial construction schedule and shop drawing submittal log, for review and approval of the Architect and Owner, computer-generated using critical path-type software. Schedules shall be updated at least monthly to coincide with review of progress payment applications.

Section 01 33 23 Shop Drawings, Product Data and Samples
Contractor shall furnish all shop drawings, product data, installation instructions, sample warranties, material and color samples and other data required by specific Sections of the Specifications to the Architect and Owner for approval.

All submittals shall be made in a timely manner, consistent with requirements of the construction schedule. Neither the Owner nor Architect shall be responsible for delays in the work caused by the Contractor's failure to make submittals in a timely manner, the completeness and/or accuracy of such submittals, or failure to allow adequate time for review of submittals by the Architect or his professional consultants.

Contractor shall review and approve shop drawings, product data and samples prior to submission to the Architect (Owner). Contractor shall determine and verify:
1. Quantities.
2. Field measurements and construction criteria.
3. Conformance with specified finishes and color selections.
4. Catalog numbers and similar data.
5. Warranty coverages.
6. Conformance to requirements of Specifications.

Review of shop drawings and submittals by the Architect/Engineer is only for general conformance with design intent of the project and general compliance with the information given in the Contract Documents. Notify the Architect/Engineer in writing at time of submission of any deviations in the submittals from requirements of the Contract Documents. Contractor shall be responsible for meeting all requirements of the Drawings and/or Specifications, whether noted in the Architect/Engineer review or not.

Contractor and/or Subcontractors may use the Architect's and Engineers' electronic CAD files for preparation of shop drawing submittals, upon written request.
1. Architect and Engineers will require a release form to be signed and returned prior to release of any electronic files, waiving liability for any use the Contractor or Subcontractor makes of the electronic files.

Section 01 41 00 Regulatory Requirements
Contractor shall acquire and pay for all plan review fees, building permits, inspections and development fees assessed by the City of Northglenn for the project. These include plan review and permit fees assessed by SafeBuilt (third-party plan reviewer and inspection agency).

All work shall be accomplished in accordance with applicable sections of the International Building Code, International Plumbing Code, International Mechanical Code, International Fire Code and National Electric Code, 2009 editions and

other codes/standards as adopted by the City of Northglenn.

Section 01 45 00 Quality Control

Define standards of quality to be required for materials, equipment and workmanship.

1. Maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship to produce work of specified quality.
2. Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
3. Perform work by persons qualified to produce workmanship of specified quality.
4. Secure products in place with positive anchorage devices designed for the appropriate loads and sized to withstand stresses, vibration and racking.
5. Provide manufacturer's technical assistance, design and/or field representation or inspections as may be necessary for specific materials or systems.

Section 01 45 23 Testing

Contractor shall furnish materials and systems testing that are required to comply with the materials standards specified, including:

1. Pressurized piping testing.
2. Fume hood CFM/exhaust testing.

Section 01 51 00 Temporary Utilities

Mechanical, electrical, water services and toilet facilities within the existing building may be used by the Contractor during construction. Contractor shall provide periodic and final cleaning of bathroom facilities during construction period.

Section 01 54 00 Construction Equipment and Aids

Contractor shall furnish all construction aids required during the course of the project, including hand and power tools, ladders, scaffolding, etc.

Section 01 56 00 Temporary Barriers and Enclosures

Contractor shall erect temporary dust partitions as required to prevent dust, dirt and construction debris from affecting the existing equipment within the building.

Section 01 60 00 Material and Equipment Requirements

All equipment used in the construction of the project shall be in good working order. All materials used in the construction of the project shall be new, unless otherwise shown or approved by the Architect.

Substitutions: Proposed material upgrades and/or substitutions shall be approved by the Architect prior to fabrication or delivery to the site. No product substitution will be allowed without prior approval from the Architect and Owner. Contractor shall provide full description of each requested substitution, including the following minimum information:

1. Comparison of the qualities of the proposed substitution with that specified.
2. Changes required in other elements of the work because of the substitution.
3. Effect on the construction schedule.
4. Cost data comparing the proposed substitution with the product specified.
5. Availability of maintenance service and source of replacement materials.
6. Warranty coverages.

Section 01 73 29 Cutting and Patching

Description of procedures and approvals required prior to cutting, patching and replacement of building components, particularly historical elements.

Section 01 74 13 Cleaning

Contractor shall provide for daily cleaning of the project site and final cleaning at the end of the project.

Section 01 74 19 Construction Waste Management and Removal

This Project shall strive to generate less waste and will recycle or salvage at least 50% by volume of construction and demolition waste. The Contractor shall develop and implement a Construction Waste Management (CWM) plan that identifies proposed deconstruction and salvage opportunities, reduces waste in ordering, storing and installation, recommends recycling activities, identifies licensed haulers and processors of recycled materials, names materials subject to salvage and identifies organizations that accept salvaged materials. The Contractor shall estimate costs for recycling, salvage and reuse onsite and train all site workers on the CWM plan process and requirements.

Contractor shall furnish, maintain and service trash dumpsters or roll-offs as necessary for collection and removal of construction waste materials that are not recycled as specified above. Contractor shall furnish, maintain, service and monitor use of recycling containers for the following materials, at a minimum:

1. Paper.
2. Cardboard.
3. Co-mingled glass and plastic.
4. Aluminum.
5. Steel and ferrous metals.

Section 01 77 00 Closeout Procedures

Description of process by which the project will be closed out, including requirements for final inspection, submittals of record documents and required warranties.

Section 01 78 23 Operating and Maintenance Data

Contractor shall prepare and submit all operation and maintenance data, including all mechanical, plumbing and electrical systems, to the Owner in bound 3-ring hard cover binders.

Section 01 78 36 Warranties and Bonds

Description of project warranty and bonding requirements.

1. Bid Bond: 5% Bid Bond.
2. Performance and Labor Bond: 100% bond required.
3. Complete two-year overall project warranty from the Contractor.
4. Material and equipment warranties as specified in individual Sections of the Specifications, or as normally provided by specified manufacturers.

Contractor shall submit all material and equipment warranties to the Owner as part of the Operations and Maintenance manuals specified above.

Section 01 78 39 Project Record Documents

Contractor shall maintain accurate as-built drawings and specifications for the project, recording all additions, deletions or modifications made during construction. Transmit redlined blueprints and specifications to the Owner at completion of the project.

DIVISION 2 EXISTING CONDITIONS

Section 02 41 19 Selective Demolition

Minor demolition of the existing building materials, equipment and fixtures, as identified on the Drawings, and removal from the site. Miscellaneous items to be reused in the new work, or salvaged by the Owner, include:

1. Cutting of existing concrete flooring to extend and connect below slab plumbing.
2. Minor gypsum wallboard and acoustic lay-in ceiling tile cutting, patching and prep for repair.

DIVISION 3 CONCRETE

Section 03 30 00 Cast-in-Place Concrete
Saw cut and remove existing floor slab as required to make under-slab plumbing connections as shown on the Plumbing Drawings, replace voids with washed gravel then patch back with new concrete. Install 8" long, #3 rebar dowels at 8" o.c. at slab cutout locations; 4,000 psi concrete at 28-day strength.

DIVISION 5 METALS

Section 05 50 13 Miscellaneous Metals
Miscellaneous steel components to support upper cabinetry at peninsulas in laboratory and brace partial height wall at Sample Receiving basin.

Steel shapes and sizes for support posts, base plates and angles as noted on the Drawings.

Tube Steel Post: ASTM A500 Grade B, 58 ksi.
Steel Angle: ASTM A36, 58,000 psi tensile strength.
Base Plate: ASTM A569.

DIVISION 6 WOOD, PLASTICS AND COMPOSITES

Section 06 20 00 Finish Carpentry
Installation of interior finish items including but not limited to: laboratory casework, countertops and accessories; built-in countertop/support brackets; wall-mtd. adjustable shelving; lockers and coat hooks; other items noted on the Drawings.

Blocking/Backing: Furnish and install all blocking and backing required for installation of laboratory casework and built-in workstations including countertop ledgers and sill plates.

Partial Height Wall Framing: Hem-fir stud framing at 16" o.c. with with pressure-treated bottom plate, double top plate and double stud pack at open side.

Wall-Mounted Adjustable Shelving: Knape & Vogt 85/185 Series Extra-Duty Standards and Brackets.. Melamine-faced shelving, ¾" thick x 12" deep x length as shown on the drawings. Color of standards, brackets and shelving to be white.

Single Coat Hook: KES A2165-2 SUS304 Stainless Steel Single Robe Hook, wall mounted, brushed finish

Multi-Hook Coat Rack: KES Wall-Mount Towel/Coat Rack with seven (7) flared top hooks, 21"L, stainless steel

Section 06 41 19 Plastic Laminate-Clad Countertop Fabrications
Countertops: Plastic laminate on (2) layers 3/4" particleboard with 1x4 square backsplash and stained hardwood front apron. Provide plastic laminate end support panels and heavy-duty intermediate steel L-brackets at 48" o.c. maximum.

L-Bracket: 18"x24", 1/8" thick steel with textured powder-coated finish; white color. USF-72531-18X24-BRACKET or approved equal.

DIVISION 7 THERMAL AND MOISTURE PROTECTION

Section 07 92 00 Sealants and Joint Fillers
Interior Areas: One-part general-purpose, non-staining acrylic latex and silicone-based caulk for interior or exterior use.

DIVISION 8 OPENINGS

Section 08 71 00 Commercial Finish Hardware
Replace existing keyway/cylinder in three exterior aluminum storefront doors with new that matches the Owner's keying system for overall treatment plant.

DIVISION 9 FINISHES

Section 09 29 00 Gypsum Board
Interior Partial Height Wall Sheathing: 5/8" moisture-resistant gypsum board; screw installed, taped with smooth finish to match adjacent surfaces.

Patch and repair gypsum wallboard where existing finishes need to be cut and removed to install plumbing, electrical, blocking, etc.

Section 09 65 00 Resilient Flooring
Base: 4" continuous coved rubber base at toe-kicks and side panels of base cabinetry throughout laboratory. Set bottom cove portion of base in a continuous ¼" bead of clear silicone caulking to seal base to floor.
1. Approved Manufacturer: Roppe, Burke, or equal.

Section 09 67 16 Seamless Epoxy Coating
1. Furnish and install 1/8" thick seamless epoxy flooring, integral cove base and wall coatings at cove in Sample Receiving space; Dex-O-Tex Décor-Flor System or approved equal.
2. Create integral curb with three pressure-treated 2x4's full width of opening. Build-up floor with ½" per foot slope to drain with cementitious subbase, Quikrete Floor Mud or approved equal. On walls, cut and remove existing gypsum wallboard and install 5/8" cement tile backer board as substrate for epoxy wall coating.

Section 09 91 00 Painting and Coating
Apply one coat of primer and two coats of paint at new gypsum wallboard locations. Apply one coat at previously finished gypsum wallboard locations including the following locations:
1. Completely recoat east and south walls of Operations/Break Room.
2. Completely recoat all walls throughout Laboratory space.
3. Prime and paint new partial height wing wall adjacent to wash basin in Sample Receiving area.

Section 09 93 00 Staining and Transparent Finishing
One coat stain/sealer and two coats polyurethane finish for hardwood countertop apron, by Olympic or approved equal.

DIVISION 10 SPECIALTIES

Section 10 11 16 Dry-Erase Marker Boards
Dry Erase Board: dryeraseboard.com model #202AH deluxe magnetic porcelain enamel on steel dry erase board with integral marker tray, full length tack rail & mounting hardware, aluminum frame, ½" MDF

backing, and rubber Dura-Safe end caps on marker tray, Class A fire-rated, 48”H x 96”L. Locations as shown on the Drawings.

Section 10 51 00 Wardrobe Lockers
Heavy-duty, modular, ventilated, prefinished baked enamel finish metal wardrobe lockers, 18" wide x 18" deep, single and double-tiered configuration as noted below and shown on the Drawings. Provide raised 6" steel legs and flattop cap. 16 gauge door frames and 14 gauge doors. Provide matching filler panels to close to wall.

Benches: Moveable laminated maple top and aluminum trapezoidal-shaped pedestals, 9-1/2” wide, black anodized finish.

Men’s Locker Rooms

- Lockers (Qty. of 8); Republic Heavy Duty Ventilated Single-Tier Lockers, 18”W x 18”D x 72”H https://republicstorage.com/republicstorage/products/specifications/HDV.pdf
- Bench (Qty. of 3 – two 3’L and one 4’L); Republic Movable Bench https://republicstorage.com/store/locker_accessories_benches?lockers=1
- Coat Rack (Qty. of 2); KES Wall-Mount Towel/Coat Rack with seven (7) flared top hooks, 21”L, stainless steel
- https://www.keshome.com/Hook%20%E9%92%A9?product_id=427

Women’s Locker Rooms

- Lockers (Qty. of 3); Republic Heavy Duty Ventilated, Two (2) Single-Tier Lockers, 18”W x 18”D x 72”H and One (1) Double-Tier Locker, 18”W x 18”D x 36”H https://republicstorage.com/republicstorage/products/specifications/HDV.pdf
- Bench (Qty. of 2); Republic Movable Bench, 36” long https://republicstorage.com/store/locker_accessories_benches?lockers=1
- Coat Rack (Qty. of 1); KES Wall-Mount Towel/Coat Rack with seven (7) flared top hooks, 21”L, stainless steel
- https://www.keshome.com/Hook%20%E9%92%A9?product_id=427

DIVISION 11 EQUIPMENT

Section 11 30 13 Residential Appliances
Residential Electric Appliances: Appliances by General Electric, or approved equal prior to bidding. All new appliances shall be Energy Star certified and ADA compliant.

Appliances:
1. French Door Refrigerator with frost-free freezer and ice maker – GE Model #GWE19JSLSS
2. Dishwasher - GE Model #GLDT696JSS (field verify clearance under existing countertop prior to ordering.)

DIVISION 12 FURNISHINGS

Section 12 21 00 Window Blinds and Film
2” wide premium, faux wood blinds with cordless lift system; Blindster Group A Premium Cordless or approved equal.

Tinting Film: 3M Sun Control Film, Prestige Series for Commercial (15-year warranty), PR 40, visible light transmittance of 39% and UV rejection of 99.9%, as basis of design. Provide three different 24”x24” samples installed on same window for owner to select exact tinting percentage prior to final selection.

Window Blind Locations: All exterior windows in laboratory, laboratory office, plant manager office and

operations/break room.

Window Tinting Film Locations: All exterior windows throughout the building as well as full-lite door and sidelite in laboratory. Tinting is not required at north and south entry vestibules.

Section 12 35 53.13 Metal Laboratory Casework
Modular prefinished powder-coated two-tone steel laboratory casework with chemically resistant black resin countertops and backsplashes; tempered glass doors on upper cabinets. Hamilton Scientific Casework *Inset Steel* line or approved equal prior to bidding. Two-tone color to be selected from full line of standard colors.

Model numbers are noted on the Drawings. Scope shall cover all necessary components needed for a complete installation including, but not limited to, base cabinets, upper cabinets, SS wire pulls (configuration #1), open shelving, pull-out shelving, filler panels, access panels, support brackets, umbilical chases, base plates and blocking.

Section 12 54 00 Furniture
Moveable office furniture as outlined on the drawings including but not limited to fixed and adjustable height desks, task chairs, conference table, conference chairs, bookshelves, lateral files and storage files. All products to be by Allsteel, no substitution unless approved ten days prior to bidding.

DIVISION 22 PLUMBING and DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING

SECTION 22 00 00/23 00 00 – PLUMBING AND HVAC SPECIFICATIONS

Do not scale drawings. Verify dimensions in field prior to commencement of work. Refer to architectural drawings for all dimensions.

All subcontractors shall be licensed, experienced, and thoroughly knowledgeable in their respective areas of the construction industry and shall perform in a responsible manner with established construction sequence, shall recognize the priority of the construction documents, and shall inform the prime contractor of potential problems when the construction documents are unclear or inconsistent.

Subcontractors shall be responsible to notify the prime contractor of discrepancies or conflicts in the construction documents found during bidding and/or prior to performing the work.

Examination of bidding documents.

A. Each bidder shall examine the bidding documents carefully, and not later than seven (7) days prior to the date of receipt of bids, shall make written request to the architect for interpretation or correction of any discrepancies, ambiguities, inconsistencies, or errors therein which he may discover. The architect will issue any interpretation or correction as an addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not covered by addendum or written directive, contractor shall include in his bid, labor materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the contractor due to his failure to make the written requests as described above.

B. Failure to request clarification during the bid period of any inadequacy, omission, or conflict will not relieve the contractor of his responsibilities. The signing of the contract will be considered as implicitly denoting that the contractor has a thorough comprehension of the full intent and scope of the construction contract drawings and specifications.

Provide a base bid which shall include only specified equipment or equipment listed as equivalent. No substitutions for the listed equipment shall be allowed in the base bid.

A. The manufacturer of equipment or materials first named on the drawings is the basis of design. Other manufacturers listed are considered general equivalents only.

B. Coordination of general equivalents and substitutions: where contract documents permit selection from several general equivalents, or where substitutions are authorized, coordinate clearance and other interface requirements with mechanical and other work.

1) Provide necessary additional items so that selected or substituted item operates equivalent to the basis of design and properly fits in the available space allocated for the basis of design.

2) Provide all features which are standard on the basis of design plus any specified options.

3) Be responsible for assuring that piping, conduit, duct, flue, and other service locations for general equivalents or substitutions do not cause access, service, or operational difficulties any greater that would be encountered with the base design.

In as much as design for remodel and/or rehabilitation requires that certain assumptions be made regarding existing conditions, and because some of these assumptions cannot be verified without destroying otherwise adequate or serviceable portions of the building, the Engineer cannot assure the Owner or the contractor that the professional consulting services herein encompass all contingencies. Field coordination during construction is imperative. Make reasonable allowances for unseen conditions.

The Operations building will not be occupied by the Owner during construction. Continued operation of the rest of the facility shall not be hindered by this work.

Be responsible to field verify existing equipment or ductwork remaining to be connected to new or existing systems. Provide ductwork, piping, controls, diffusers, etc., as required to restore continuity of system(s), or to make new work meet existing conditions, whether indicated or not.

Subcontractor shall verify existence and location of all utility services and coordinate as required by their respective area of the construction, notifying the prime contractor of variations or conflicts.

If not specifically defined in these construction documents, materials and/or equipment shall be identified by the subcontractor with sufficient time to allow selection, purchase, and delivery to maintain construction schedule.

Furnish O&M Manuals for HVAC and Plumbing systems within 90 days of system acceptance.

Provide mechanical demolition as required. Refer to architectural demolition drawings for location and extent of demolition required. Visit site prior to bid to determine extent of work involved. Existing fixtures, mechanical equipment, etc., being removed shall be returned to the Owner. Dispose of all removed piping, ductwork, etc. unless noted otherwise. Pipes, ductwork, equipment, etc. To be removed, are shown hatched, unless otherwise noted.

Verify exact locations of existing and new underground utilities, piping, and raceway systems prior to trenching. Contractor shall obtain and verify exact utility company drawings and requirements.

All ductwork, diffusers, piping, fixtures, and equipment shown in light line weight is existing, new indicated by heavier line weight, except where noted. Pipes, etc. To be removed, are shown hatched.

Offset piping, ductwork, etc. As necessary to accommodate structure, beams, and columns, and existing equipment.

All existing support rods and straps now supporting ducts, pipes, air tubing, electrical conduit, etc. That are removed to allow room for installation of new equipment shall be relocated and reinstalled, or replaced if damaged.

Work shall be performed in a workmanlike manner to the satisfaction of the architect, Owner, and Engineer.

It is the contractor's responsibility to perform his/her work in conformance with all applicable codes, ordinances and life safety features as required by local, state, or national authorities. The contractor shall verify with the architect if modification of his/her work is required for compliance.

All work of all trades must be in strict compliance, or exceed the minimum material and method requirements of the 2009 version of the International Building, Mechanical, Plumbing, Energy Conservation, and Fire Codes and the 2017 National Electrical Code, most current NFPA, all local ordinances and amendments and manufacturer's installation recommendations. If a conflict between those publications exists, the most stringent requirement shall apply.

Mechanical work shall conform to the following codes:

ALL LOCAL. CITY, COUNTY, AND STATE CODES
AABC - ASSOCIATE AIR BALANCE COUNCIL
ADC - AIR DIFFUSION COUNCIL
AGA - AMERICAN GAS ASSOCIATION
AMCA - AIR MOVING AND CONTROL ASSOCIATION
ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
ASHRAE - AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS
ASME - AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM - AMERICAN SOCIETY OF TESTING MATERIALS
AWWA - AMERICAN WATER WORKS ASSOCIATION
NFPA - NATIONAL FIRE PROTECTION ASSOCIATION
OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
UL - UNDERWRITERS' LABORATORIES
SMACNA - SHEET METAL AND AIR CONDITIONING NATIONAL ASSOCIATION
GVI - GAS VENT INSTITUTE, EDITION 10-A

Secure all required permits and inspections. Cost of permits and inspections will be covered by the City of Northglenn or waived altogether. Prior to final payment, turn over to architect all certificates of completion.

Warranty the installation against defects in materials and workmanship. The warranty shall be for a period of two years after Owner's acceptance. Defects shall be promptly remedied without cost to the Owner.

Submit record documents to architect. Documents shall include all addendum items, change orders, alterations, re-routings, etc.

Systems shall be complete, operable, and ready for continuous operation prior to acceptance by the Owner.

Systems shall be tested for proper operation. Perform at a minimum all code required tests or systems. If tests of work are defective, contractor shall make corrections necessary at no additional cost to Owner.

All materials and/or equipment shall be handled and installed as per manufacturer's specifications and recommendations.

Submit all mechanical division shop drawing and product data at one time. Partial submittals will be rejected.

Shop drawing submittals shall state capacities, sizes, etc., of all equipment and shall be certified and include computer based project specific selections where applicable. Clearly mark each shop drawing, catalog cut and/or specification

sheet to indicate those products and features which are intended to be furnished. Specifically indicate any deviations from the design intent. Engineer reserves the right to require correction at no cost to Owner for deviations not specifically indicated in the submittals. Review and approval of shop drawings shall not relieve the Contractor from the responsibility of furnishing equipment and materials of proper dimension, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Submittal shall be bound and indexed in a neat and orderly manner.

Submittals shall include, but not be limited to: equipment, fixtures, insulation, pumps, fans, piping, valves, and controls.

Failure to order, or release order for materials and/or equipment will not be accepted as a reason to substitute alternate materials, equipment, or installation methods.

Repair all accidental or intentional damage to match existing construction with no noticeable difference in continuity, appearance or function.

Provide 4" high concrete equipment pads beneath floor mounted mechanical equipment, in addition to any base assemblies required or recommended by the manufacturer.

Fire stopping requirement. Penetrations through rated walls and floors shall be sealed with a material capable of preventing the passage of flames and hot gasses when subjected to the requirements of the test standard specific for fire stops ASTM-E-814. Acceptable materials include: DOW corning RTV fire stop foam for bare pipe, metal conduit, and electrical cable; 3M Fire Dam 150 caulk for bare pipe, metal conduit, and building construction gaps; 3M CP-25 caulk and FS-195 intumescent strips for insulated pipes, plastic pipe or conduit, and electrical cable. Submit UL listed application data for each type of penetration encountered.

Ducts, piping, and conduits penetrating through roof shall have roof flashing compatible with the roofing system. See architectural drawings. In the absence of any other requirements, provide sheet lead type flashing for plumbing vents in built-up roofs, tall cone with EPDM boot for pipe and conduit in single ply membrane roofs, and curbed roof penetrations in all types of roof. Installation shall be watertight.

Coordinate architectural, structural, mechanical, electrical, and interior design drawings prior to installation.

Carefully verify electrical service voltage and phase available.

Mount all stats at 48" AFF In "accessible" areas, 4'6" AFF In other areas, unless noted otherwise. Coordinate location with wall finish, and to avoid casework, furniture, door swings, heat sources, and exterior walls. Notify Engineer of any conflicts prior to beginning thermostat installation.

Submit a written balance report by a NEBB or AABC certified balancing contractor. Balancing procedures shall be in accordance with NEBB or AABC guidelines for proportional balance. Submit report on standard NEBB forms or submit forms for review prior to balancing. Measurements shall include all motor amperage and voltage readings; motor and fan RPMs; static pressure at inlet and outlet of all packaged equipment, fans, coils, and filters; air inlet and outlets.

A. Adjust flows to within 10% of required quantity. Where room air pressure relationship are required to be maintained as shown by a differential of supply and exhaust/return or by note, adjust supply to within 10% and then adjust exhaust/return to provide the indicated room pressure. If actual quantity is less than 90%, investigate cause, attempt to rectify and notify Engineer. Submittal of balance report with less than required flows without explanation is cause for rejection of report.

B. Submit three (3) copies of all submittals in addition to any required by the contractor and his suppliers. These copies shall be retained by the Owner, architect, and Engineer.

Ductwork: (low velocity)

A. Flexible connection: Equivalent to Ventfab, fireproof glass cloth, 10" w.c. Rated.

B. Round duct: Spiral seam, galvanized steel. Die stamped or 5 gore elbows. "Snap-Lock", longitudinal seam duct, or adjustable fittings are acceptable on individual grille/diffuser runouts only.

C. Fume Hood Duct: 18 gauge stainless steel.

1) Seams: welded or brazed. Repair galvanized coating at welds. Grind and polish seams on exposed stainless steel.

D. Ductwork: G60 galvanized sheet steel; lock forming quality; constructed to the latest edition of SMACNA "HVAC Duct Construction Standards"; +/- 1" WC pressure classification, seal class "C"; with galvanized steel fasteners, anchors, angles, straps, etc.

E. Seal all seams (longitudinal and transverse) airtight with united McGill "Uni-Grip" UL listed, water based, non-hardening, elastic sealant or equivalent. Tape not allowed.

Provide ¼" galvanized mesh screen on all combustion air ducts or openings, and all open-end return and exhaust ducts.

All ductwork dimensions are outside sheet metal dimensions.

Ductwork notes:

A. Unless otherwise noted, all changes in direction shall be made with radius elbows with radius to centerline equal to 1.5 duct width.

DUCTWORK SPECIALTIES

A. BACKDRAFT DAMPERS: PROVIDE COUNTER WEIGHT TYPE BACKDRAFT DAMPERS IN ALL DUCTS OPENING TO THE OUTSIDE RUSKIN MODEL CBS-7 OR APPROVED EQUAL.

Support pipe with rod and clevis, ring hangers, trapeze, or clamps. No pipe tape or strapping allowed. All hangers shall be sized for OD of insulation, if any. Protect insulated lines with 20 ga sheet metal shields and provide calcium silicate insulation inserts for all insulated piping. Maintain vapor barrier on all cold lines. Isolate bare copper lines from hangers with Vibrasorb or equivalent, copper coated hangers are not sufficient, wrapping pipe with tape not acceptable.

New hot and cold water branches to be routed from nearest hot water and cold water of line size equal to or greater than new branch—typical.

Refer to plumbing fixture connections schedule for pipe sizes to individual plumbing fixtures.

Provide shock arresters at all domestic hot and cold water branches serving fixtures and equipment with quick closing valves. Such fixtures and equipment include dishwashers. Shock arresters shall be constructed with a piston in a sealed copper tube chamber, and approved for installation within walls without access panels. Sioux chief or equivalent. Bellows type not acceptable.

Domestic hot and cold piping inside building—buried lines, Type "K" soft annealed copper water tube, single length to avoid fittings, (wrought copper fittings where unavoidable) and 1100°F solder. Non-buried lines, Type "L" hard copper water tube, wrought copper fittings and no lead 95-5 solder.

Di-Ionized Water Piping and Valves in Building – CPVC, Schedule 80, opaque.

Vacuum Air System Piping - Type L Copper

Copper pipe valves and specialties

A. Gate valves - bronze, class 125, 200 lb. w.o.g.
B. Ball valves - bronze, class 125, 600 lb. w.o.g.
C. Check valves - bronze, class 125, 200 lb. w.o.g.
D. Balancing valves - 125 psi w.p. For 250 degree Fahrenheit service tight shutoff, Tour and Anderson STA, Armstrong CBV, Gerand, or Flowset, B&G circuit setter.
E. Direct unions: Furnish and install a dielectric union at each connection between dissimilar metals.

Materials; soil, waste, and vent piping (inside building)

A. Lines buried below ground: Standard weight, cast iron soil pipe, and fittings. Hub and spigot with neoprene gaskets.

B. Lines buried below ground: Schedule 40 solid core PVC pipe according to ASTM D 2665 drain, waste and vent and PVC socket fittings according to ASTM D 2665 and ASTM D 3311 DWV patterns and to fit Schedule 40 pipe. Assembled with ASTM F 656 adhesive primer and ASTM D 2564 solvent cement.

C. Lines above ground: Standard weight, cast iron soil pipe, and fittings. Hub and spigot with neoprene gaskets, or no hub with standard clamps. Up through 2-1/2" may be standard weight, galvanized steel pipe with black, wrought iron drain fittings, or DWV copper tube with DWV fittings and 95-5 no lead solder.

Gas piping: Schedule 40 black steel pipe, 150 lb. Malleable iron screwed fittings on above ground pipe, welded fittings with all piping coated and wrapped on buried pipe.

Gas valves: Non-lubricated ball style valve with resilient seats, and adjustable gland packing nut, AGA and UL listed for natural gas service.

Provide plastic grommets on all heating water piping passing through wood joists and studs.

Support each base mounted pump and fan by mason industries or equivalent spring type vibration isolators.

Indoor piping insulation - insulate all new domestic water, domestic hot water, domestic hot water recirculation, and di-ionized water piping with UL approved, white, all service, mineral fiber, snap-on, pipe insulation. Insulate fittings with mineral fiber blanket insulation and pre-molded PVC covers. All materials shall have a smoke developed rating of 50 or less and a flame spread rating of 25 or less. Provide calcium silicate thermal insert at hangers and supports. Insulation shall pass uninterrupted through hangers. Vapor barriers shall be continuous, and sealed with "non-breathing" vapor barrier mastic on piping operating at temperatures below ambient. All raw edges of insulation shall be neatly trimmed and sealed with mastic.

A. Insulation thickness below based on insulation conductivity value not exceeding 0.27 Btu*in/(hr*ft^2*°F):

1) Domestic hot water (DHW) and domestic hot water recirculation: all pipe sizes – 1" thick; non-recirculated DHW runouts within 8 feet of fixtures – 1/2" thick.

2) Domestic cold water: all pipe sizes – 1/2" thick.

3) Di-Ionized Water: all pipe sizes – 3/4" thick.

Clean, sterilize, flush and fill all new and existing systems per specification requirements, prior to startup. Include labor

and materials for final fill of water, refrigerants, oils, grease, gases, antifreeze and brine.

Identification: Label all new piping and equipment. Provide full band or strip type markers and flow arrows on piping. Provide engraved plastic valve tags with valve number and attach with standard chain or s-hooks. Provide engraved plastic sign on or near specified equipment.

DIVISION 26 ELECTRICAL

SECTION 26 00 10 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 PROJECT DESCRIPTION

A. This project is a remodel and addition of a commercial building. The project is approximately 2700 square feet located at Northglenn Wastewater Laboratory in Northglenn, Colorado.

1.02 PROVISIONS

A. Work performed under this division of the specifications shall conform to the requirements of Division 1, and the electrical drawings and all items hereinafter specified.

1. The drawings and specifications for the electrical work are intended to describe a complete electrical system; omission of minor items obviously necessary to accomplish the above intent shall not relieve the Contractor from providing same.

2. Prior to any work being performed under this division examine architectural and mechanical drawings and specifications and if any discrepancies occur between them and the electrical drawings and specifications, report same to the Architect in writing and obtain written instructions for the work.

3. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building will permit. All changes from drawings necessary to make the electrical work conform to the building as-constructed shall be made without cost to the Owner.

4. Coordinate the electrical work with the General Contractor and be responsible to him for satisfactory progress of same. Coordinate electrical work with all other trades on the project without cost to the Owner.

5. Do not scale drawings. Verify dimensions on architectural drawings and in field prior to commencement of work.

6. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any material or installation that does not conform to these drawings and specifications, Contractor shall remove the material from the premises and correct the installation to the satisfaction of the agent.

7. In acceptance or rejection of installed electrical systems, no allowance will be made for lack of skill on the part of the installers.

1.03 WORK INCLUDED

A. The electrical system required for this work to include, but is not necessarily limited to:

1. Complete branch circuit wiring for lighting, motors, receptacles, junction boxes, and similar uses.

2. Lighting fixtures, wall switches, receptacles and similar items.

3. Service entrance, wiring, and outlets for telephone system.

4. Wiring and outlets for data system.

5. Power Owner furnished equipment.

1.04 GENERAL DESIGN/BUILD CRITERIA

A. The design/build guidelines outlined under this section are intended to establish the general criteria for the required design and installation of the electrical system. The guidelines include, but are not limited to:

1. Branch circuits for receptacles shall be on 20 amp, single pole circuit breakers with #12 conductors. No more than eight (8) duplex receptacles shall be on any one branch circuit. Circuits serving bathroom GFIC receptacles may serve lighting but shall not serve any other receptacles. Lighting branch circuit shall not be loaded to more than 70% of breaker rating, in effect, 14 amps per circuit.

2. Provide GFIC receptacles in kitchen, bathrooms, labs, exterior, etc. per NEC requirements.

3. Increase ampacity of branch circuit conductors for continuous loads, motor loads, water heaters, etc. per NEC requirements (e.g. 1.25 x motor full load amps).

4. Provide over-current protection and conductors for appliances and equipment based on manufacturer's recommendations and nameplate rating of equipment to be served.

1.05 CODES AND STANDARDS

A. The applicable and enforced editions of the following Codes and published standards (including supplements and official interpretations) are minimum requirements:

1. NFPA 70 - National Electrical Code (NEC).

2. NFPA 72 – National Fire Alarm Code.

3. NFPA 101 – Life Safety Code.

4. NFPA 110 – Emergency Power Systems

5. Colorado Department of Health "Rules and Regulations Governing Laboratory Services in the State of Colorado".

6. Conform to all applicable State and Local Codes.

7. American National Standards Institute (ANSI).

8. National Electrical Safety Code (NESC).

9. Americans with Disabilities Acts (ADA) and American National Standards Institute (ANSI) 117.

10. National Electrical Manufacturer's Association (NEMA).

11. Underwriter's Laboratories (UL).

12. Insulated Cable Engineers Association (ICEA).

13. International Building Code.

14. International Mechanical Code.

15. International Fire Code.

16. Institute of Electrical and Electronic Engineers (IEEE).

17. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

B. Comply with requirements of Underwriters Laboratories for all items installed for which U.L. standards have been established.

C. The complete installation shall comply with requirements of the utility and telephone companies furnishing service to this installation.

D. The drawings and specifications take precedence when they are more stringent than codes, statutes, or ordinances in effect. Applicable codes, ordinances, standards and statutes take precedence when they are more stringent or conflict with the drawings and specifications.

1.06 EXAMINATION OF BIDDING DOCUMENTS

A. Each bidder shall examine the bidding documents carefully, and not later than seven days prior to the date of receipt of bids, shall make written request to the Architect for interpretation or correction of any discrepancies, ambiguities, inconsistencies, or errors therein which he may discover. The Architect will issue any interpretation or correction as an Addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not covered by addendum or written directive, Contractor shall include in his bid, labor, materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the Contractor due to his failure to make the written requests as described above.

B. Failure to request clarification during the bid phase of any inadequacy, omission, or conflict will not relieve the Contractor of their responsibilities. The signing of the contract will be considered as implicitly denoting that the Contractor has a thorough comprehension of the full intent and scope of the working drawings and specifications.

1.07 EXAMINATION OF PREMISES

A. Visit site prior to bid and verify that conditions are as indicated. Contractor shall include in his bid costs required to make his work meet existing conditions.

1.08 EXISTING CONDITIONS

A. Existing systems and conditions shown on drawings for existing buildings are to be noted "for guidance only". The Electrical Contractor shall field check all existing conditions prior to bidding and is to include in his bid an allowance for extension, removal and/or relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical system to all other work.

B. Where the reuse of existing conduits, wires, devices, etc. is permissible, make certain that the wiring for same is continuous from outlet to outlet and that such circuit or systems shall pass through no outlet or junction boxes which may be rendered inaccessible by the structural changes to be made to the building. Existing conduits, wire, devices, etc. which are not indicated for reuse shall become the property of this Contractor however lighting fixtures, panel fused switches, circuit breakers, fire alarm equipment, etc. shall become the property of the Owner.

C. System outages shall be permitted only at times approved by Owner in writing. Work which could result in an accidental outage (beyond branch circuits) shall be performed with the Owner's maintenance personnel advised of such work.

D. Service shall be maintained to existing areas during construction. Contractor shall provide cables, outlets, etc. as required to maintain continuity of service.

E. Immediately after award of contract, verify available physical space and ampacity of existing panelboards, switchboards, distribution boards, motor control centers, etc., and provide written documentation of findings to the Architect/Engineer. Documentation shall include a minimum 24-hour recording ampere reading on all existing switchgear being utilized for this project.

F. Provide new updated panelboard directories for existing and new circuits being utilized for completion of project.

1.09 PERMITS, FEES & NOTICES

A. Obtain all necessary permits, inspections and certificates that may be necessary for the full completion of the work. Cost of permits and inspections to be paid for directly by Owner or waived. Furnish the Architect and Owner with a certificate of final inspection and approval from the AHJ over the electrical installation.

B. Notify proper authorities when work is ready for inspections required by applicable codes, rules and regulations, allowing sufficient time for inspections to be made without hindering progress of the work. Furnish to the Owner copies of inspection certificates of acceptance.

1.10 TESTS

A. Upon completion of all work and adjustment of all equipment, provide complete operational tests of all electrical equipment provided under this division.

1.11 WARRANTY

A. Guarantee that all work governed by this division shall be free of defects in workmanship, materials and parts for a period of two (2) year after written acceptance. Promptly repair, revise, and replace defects as directed with no additional cost to the Owner (lamps and fuses are exempt).

1.12 RECORD DRAWINGS

A. During the progress of the work, maintain an accurate record of the installation of the electrical system. Upon completion of the electrical installation, transfer all record data to prints of the original drawings. Drawings shall include all addendum items, change orders, alternates, re-routings, etc. As a condition of acceptance of the project, deliver to the Architect one copy of the record drawings.

1.13 PROTECTION

A. Of People: Arrange barriers, signs, etc. as required to minimize the hazard of people. Comply with applicable safety and health regulations. Coordinate as necessary with the Owner and the General Contractor.

B. Of Work: Take all measures necessary to protect the work both before and after installation, to assure that it will be in clean, undamaged, unblemished condition when turned over to the Owner. Repair/replace work damaged during construction.

PART 2 - PRODUCTS

2.01 STANDARD FOR MATERIALS

A. All electrical material shall be new and of the quality and type specified.

B. Manufacturer and catalog number shown in these specifications or on drawings are intended as a guide to quality. Equivalent materials and equipment of other manufacturers will be considered provided such substitutions are requested in accordance with the provisions of paragraph 2.03 and shall include all information necessary to support the claim of equivalency.

C. No extension of completion date shall be allowed for time lost in consideration, shipping, or installation of approved substitutions. Review of substitutions signifies general equality of materials and equipment only. This review does not relieve the Contractor of responsibility for proper operation of the system, compliance with specifications and necessary changes due to dimensional differences or space requirements.

2.02 SHOP DRAWINGS

A. Shop drawings required for this project are as follows:

1. Lighting fixtures
2. Panelboards
3. Wiring devices
4. Fire alarm and detection system
5. Motor starters
6. Disconnects
7. Fuses

8. Conduit

9. Conduit fittings

B. Present shop drawing submittal data at one time, bound in three-ring binders, indexed in a neat and orderly manner. Partial submittals will not be accepted. Provide four sets of submittal data, unless noted otherwise in Division I.

C. Provide, with shop drawing submittal, 1/4" scale layout drawings of rooms with electrical switchgear and transformers. Layouts shall show locations of, and shall be coordinated with mechanical equipment, and equipment shall be drawn to scale.

D. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the Contractor.

E. Shop drawings: Contractor agrees that shop drawing submittals processed by the engineer are not change orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to provide and by detailing the fabrication and installation methods he intends to use. Contractor further agrees that if deviations, discrepancies, or conflicts between shop drawing submittals and contract documents in the form of design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the engineer, the design drawings and specifications shall control and shall be followed.

2.03 SUBSTITUTIONS

A. Bidder's Choice: Material or equipment listed by several manufacturers' names are intended to be bidder's choice, and any of the listed manufacturers may be used in the base bid.

B. Performance Specifications: When any item is specified by requirements to meet a performance, industry or regulating body standard, or is specified by a generic spec, (no manufacturer's name listed) no prior review by the Engineer is needed unless specifically called for in these specifications.

C. Contractor to be responsible for any changes and costs to accommodate any equipment except the first named in the specification.

D. Substitutions of Material (Contractor and owner initiated)

1. Other items of material and equipment not listed as equivalents may be offered (at the Contractor's option) as substitutions to specified items by submitting it as a separate price with his base bid on the Bidder's letterhead.

2. Such substitute proposals shall not be included under the base bid and must be accompanied by full descriptive data on the proposed equipment, together with a statement of the cost to be deducted for each item and all deviations from specified items. Highlight all difference from specified equipment. If any such substitutions are to be considered, the Contractor shall submit a list of the proposed substitution items within 14 days of award of contract. Late requests for proposed substitutions shall not be accepted by the Engineer due to scheduling or delivery concerns.

3. If substitutions are rejected, Electrical Contractor shall supply base bid item as specified.

2.04 PRODUCT HANDLING

A. Use all means necessary to protect electrical system materials before, during and after installation and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

C. Upon completion of all installations, lamping and testing, thoroughly inspect all exposed portions of the electrical installation and completely remove all exposed labels, soil, markings, and foreign materials.

PART 3 - EXECUTION

3.01 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. Contractor's personnel and subcontractors selected to perform the work shall be well versed and skilled in the trades involved.

B. Coordinate electrical equipment and materials installation with other building components.

C. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.

D. Any changes or deviations from the drawings and specifications must be accepted in writing by the Architect/Engineer. All errors in installation shall be corrected at the expense of the Contractor. All specialties shall be installed as detailed on the drawings. Where detail or specific installation requirements are not provided, manufacturer's recommendations shall be followed.

E. Upon completion of work, all equipment and materials shall be installed complete, thoroughly checked, correctly adjusted, and left ready for intended use or operation. All work shall be thoroughly cleaned and all residue shall be removed from surfaces. Exterior surfaces of all material and equipment shall be delivered in a perfect, unblemished condition.

F. Contractor shall provide a complete installation, including all required labor, material, cartage, insurance, and taxes.

3.02 PROGRESS OF WORK

A. Order the progress of electrical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit. Any cost resulting from defective or ill-timed work performed under this Section shall be borne by this Contractor.

3.03 CUTTING AND PATCHING

A. Provide all cutting, trenching, backfilling, patching and refinishing or resurfacing required for electrical work in a manner meeting the approval of the Engineer and at no additional cost to the Owner.

B. All openings made in fire-rated walls, floors, or ceilings shall be patched and made tight in a manner to conform to the fire rating for the surface penetrated.

3.04 DELIVERY AND STORAGE OF MATERIALS

A. Arrange and be held responsible for delivery and safe storage of materials and equipment for electrical installation.

B. Carefully check materials furnished to this Contractor for installation, and provide receipt acknowledging acceptance of delivery and condition of the materials received. Thereafter, assume full responsibility for its safekeeping until the final installation has been reviewed and accepted.

3.05 PROTECTION OF WORK AND PROPERTY

A. Where there are existing facilities, be responsible for the protection thereof, whether or not such facility is to be removed or relocated. Moving or removing any facility must be done so as not to cause interruption of the work of Owner's operation.

B. Close all conduit openings with caps or plugs during installation. Cover all fixtures and equipment and protect against injury. At the final completion, clean all work and deliver in an unblemished condition, or refinish and repaint at the discretion of the Architect.

C. Any equipment or conduit systems found to have been damaged or contaminated above "MILL" or "SHOP" conditions shall be replaced or cleaned to the Engineer's satisfaction.

3.06 FINAL ACCEPTANCE

A. Final acceptance by the Owner will not occur until all operating instructions are received and Owner's personnel have been thoroughly indoctrinated in the maintenance and operation of all equipment.

B. Operating manual, parts lists, and indoctrination of operating and maintenance personnel: Furnish the services of a qualified representative of the supplier for each item or system itemized below who shall instruct specific personnel, as designated by the Owner, in the operation and maintenance of that item or system.

C. Deliver two (2) complete operating manuals and parts lists to the Owner (or his designated representative) at the time of the above required indoctrination. Fully explain the contents of the manuals as part of required indoctrination and instruct the Owner's personnel in the correct procedure in obtaining service, both during and after the guarantee period. The operating manual and parts lists shall give complete information as to whom the Owner shall contact for service and parts, including the address and phone number. Furnish evidence that an authorized service organization regularly carries a complete stock of repair parts for these items (or systems), and that the organization is available for service. Service shall be furnished within twenty-four (24) hours after requested.

D. Clean up: Remove all materials, scrap, etc., relative to the electrical installation and leave the premises and all equipment, lamps, fixtures, etc. in a clean, orderly condition. Any costs to the Owner for clean up of the site will be charged against the Contractor.

E. Acceptance Demonstration: Upon completion of the work, at a time to be designated by the Architect, the Contractor shall demonstrate for the Owner the operation of the entire installation, including all systems provided under this contract.

F. Operating and Acceptance Tests: Provide all labor, instruments, and equipment for the performance of tests as specified. Submit three (3) copies of a typewritten test report for the Architect for his approval.

1. Record the full load current in each phase or line at the main service entrance and for each feeder leaving the main distribution panelboard. Readings shall be taken with the maximum installed load connected and in operation.

2. Perform a careful inspection of the main switchboard bus structure and cable connections to verify that all connections are mechanically and electrically tight.

3. Measure the resistance to ground for the service ground, which shall not exceed ten (10) ohms under normal soil moisture conditions. If required, install additional ground provisions in a manner accepted by the Engineer at no additional cost to the Owner.

3.07 IDENTIFICATION

A. General: Provide the following services and materials to assist the Owner in operation and maintenance.

B. Directory Cards, Nameplates and Labels: No temporary markings, which are visible on equipment, shall remain after the project is complete. Repaint trims, housing, etc., where such markings cannot be readily removed. Defaced finishes must be refinished. All engraved metal or plastic nameplates shall be white letters on a black or gray background. Raised letter type tape shall not be used. No abbreviations in labeling will be permitted without special approval. All panelboards shall be labeled as designated on the electrical drawings. Thoroughly clean surface to which pressure sensitive type labels are applied to assure adherence of label. Directory cards, nameplates, and labels shall indicate the general area and type of electrical load served by each circuit. Provide the following types of labels at these locations.

1. On each feeder switch, combination starter, or circuit breaker located in motor control centers, main service equipment, the main switchboard or panelboard, sub-distribution panelboards, and all special equipment housed in cabinets, the labeling shall be one fourth inch (1/4") minimum height letters.

2. On each separate mounted disconnect and starter for a motor or fixed appliance, indicate motor or appliance designation, voltage, and phase. (Motor or appliance designations shall be as given on the Mechanical or Architectural plans.) Use three-sixteenth inch (3/16") minimum height letters.

3. On telephone terminals indicate terminal number.

4. On all branch circuit panelboards indicate panel designation, voltage and phase. Use three-fourths inch (3/4") minimum height stenciled letters in metal tape or one-half inch (1/2") engraved letters on laminated nameplate. Apply to the inside of each door. All emergency panels and disconnects shall be painted with red enamel.

5. For all branch circuit panelboard directories, provide neatly typed, removable cards and protective plastic faces. Spare circuit breakers shall be identified as such.

6. For all device plates for switches used to control exhaust fans or other equipment, provide one-eighth inch (1/8") minimum height black filled, engraved letters on stainless steel device plates.

7. For all receptacle device plates, provide one-eighth inch (1/8") minimum height letters on white (normal power) and red (emergency power) nameplates indicating panel and circuit number.

8. For all exposed conduits, junction boxes, wiring gutters, etc., provide three-fourths inch (3/4") minimum height stenciled letters, or one-half inch (1/2") minimum height pressure sensitive labels equal to Brady self-sticking vinyl cloth. Labels shall be provided at the following locations:

    a. Entering or leaving panels or switchgear or enclosures.

b. All junction boxes shall be identified as to circuits contained within.
c. Exposed conduits containing circuits above 600 volts shall have voltage labeled at least once for each exposed length or not more than fifteen feet (15'-0") apart.

9. Provide caution signs reading “Danger High Voltage” having two-inch (2”) minimum height letters and affix them to all switchgear, unit substations, transformers, pull boxes, and other equipment associated with systems rated 600 volts or higher. Provide a warning sign at all rooms, enclosures and vaults housing equipment rated above 600 volts in accordance with the National Electrical Code.

10. Provide a sign for the following:

a. High-voltage fused cutouts of the non-load-interrupting type.
b. Sign shall read “Do Not Open Under Load”.
c. Disconnect switches for motors rated more than 50 hp which are incapable of interrupting locked-rotor currents: The sign shall read “Do Not Open Under Load”. Signs shall be one-inch (1”) minimum height, white letters, engraved in a red plastic background.

3.08 ELECTRICAL PROVISIONS FOR ROOFS

A. Raceways penetrating roofs shall be installed in a manner to preserve the integrity of the roof. Provide flashing and counter flashing for all roof penetrations required for the work.

B. Conduits routed above roofs shall be installed a minimum of twelve inches (12") above the finished roof surface, supported on metal stands installed with flashing and counter flashing, with maximum spacing of ten feet (10'-0").

C. Provide weatherproof duplex receptacles on roof so that no equipment installed on the roof is more than twenty-five feet (25'-0") from a receptacle. Connect to nearest receptacle circuit unless indicated on plans.

3.09 CONSTRUCTION LIGHTING AND POWER

A. Provide all temporary facilities required to supply construction power and light. Install and maintain facilities in a manner that will protect the public and workmen. Comply with all applicable laws and regulations.

B. The General Contractor shall pay for all power and light used by him and his subcontractors where construction power is separately metered, or is taken from the permanent project metered service solely for construction use.

3.10 REMODELING PROVISIONS

A. Existing systems and conditions shown on the drawings are provided for guidance only. The Electrical Contractor shall field check all existing conditions prior to bidding and shall include in his bid an allowance for the removal and relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical systems to all other work required for this project.

B. Where the reuse of existing conduits, outlets, junction boxes, etc., is permissible, make certain that the wiring form them is continuous from outlet to outlet. Provide modifications to assure that circuits, or system, shall not pass through outlets or junction boxes which may be rendered inaccessible by changes to

be made to the building. Existing conduits, wire, devices, fixtures, etc., which shall be removed shall become the property of this Contractor unless otherwise noted.

C. Connect new work to existing in a manner that will assure proper raceway grounding throughout in conformance with the National Electrical Code.

D. Remodel Work Cutting and Patching: The Contractor shall perform cutting, channeling, chasing, drilling, etc., as required to install or remove electrical equipment in areas of remodeling. This work shall be performed so as to minimize damage to portions of wall finishes, surfaces, plastering, or the structure which are to be reused, resurfaced, plastered or painted under another division of these specifications.

E. Carefully coordinate with the required remodeling work, cutting and patching etc., performed by the other trades. Remove or relocate existing electrical conduits, wires, devices, fixtures and other equipment as necessary.

F. All outages on portions of existing electrical systems shall be minimized and shall be at a time and of duration as accepted by the Owner.

3.11 ELECTRICAL DEMOLITION

A. Examination

1. Verity field measurements and circuiting arrangements are as shown on drawings.

2. Verify that abandoned wiring and equipment serve only abandoned facilities.

3. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect before disturbing existing installation.

4. Beginning of demolition means installer accepts existing conditions.

B. Preparation

1. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

2. Coordination outages with Architect/Owner.

3. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

4. Existing telephone system: Maintain existing system in service. Disable system only to make switchovers and connections. Notify Owner/Architect in writing at least 24 hours before partially or completely disabling system. Minimize outage duration.

C. Demolition and Extension of Existing Electrical Work

1. Demolish and extend existing electrical work under provisions of Division 1, Division 2, and this section.

2. Remove, relocate, and extend existing installations to accommodate new construction.

3. Remove abandoned wiring to source of supply.

4. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

5. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets, which are not removed.

6. Disconnect and remove abandoned panelboards and distribution equipment.

7. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

8. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

9. Repair adjacent construction and finishes damaged during demolition and extension work.

10. Maintain access to existing electrical installations, which remain active. Modify installation or provide access panel as appropriate.

11. Extend existing installations using materials and methods compatible with existing electrical installation, or as specified in individual section.

D. Cleaning and Repair

1. Clean and repair existing materials and equipment, which remain or are to be reused.

2. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

3. Luminaries: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, non-operational ballasts, and broken electrical parts.

E. Installation

1. Install relocated materials and equipment under the provisions of Division 1.

SECTION 26 10 00 - BASIC MATERIALS AND METHODS

PART 4 - GENERAL (Not Used)

PART 5 - PRODUCTS

5.01 RACEWAYS AND FITTINGS

A. Conduit:

1. Conduits installed underground or in grade slabs shall be Schedule 40 PVC with ground wire.

2. Conduits subject to mechanical damage or where otherwise required by code shall be galvanized rigid heavy wall conduit; all other conduit may be electric metallic tubing.

3. Flexible metallic conduit shall be used where vibration or other reasons do not allow solid connections to motors, equipment, etc. Flex may also be used to fish in existing walls or where required to connection in millwork. The use of flex shall be held to a minimum. Where flexible metallic conduit is used in areas subject to moisture, PVC-coated flex (Liquidtight) shall be used.

4. Where approved by applicable codes, type "ENT" non-metallic conduit may be used for branch circuits.

5. Where approved by applicable codes, type "MC" steel metal clad cable may be used for feeders and branch circuits.

B. Fittings:

1. Use solvent welded fittings for all PVC conduit.

2. Use set-screw or compression fittings for all EMT conduit.

3. Use threaded fittings for all rigid conduit.

5.02 WIRE AND CABLE

A. Voltage range 0 to 24: High conductivity copper, thermo-plastic insulation, 300 volt rating.

B. Voltage range 24 to 600: High conductivity copper, moisture-resistant thermo-plastic insulation, 600 volt 75°C rating for general use. For HID fixtures and wiring within 3 inches of fluorescent ballasts, wire shall be copper, minimum 90°C rated. Sizes indicated are for installation in a maximum 30°C ambient. Conductor ampacity shall be derated for higher ambient installations.

C. Conductors used specifically for equipment or service ground may be bare or have insulation to match circuit/feeder conductors.

5.03 WIRE CONNECTIONS

A. All electrical connections shall be electrically and mechanically secure, using the following methods:

1. Wire size #8 and smaller--pressure type connectors (scotch-lok) or equivalent.

2. Wire size #6 and larger--mechanical or compression lugs, Burndy, T & B, Ilsco or equivalent.

B. Wire termination provisions for panelboards, circuit breakers, safety switches, and all other electrical apparatus shall be listed as suitable for 75°C.

5.04 SURFACE RACEWAYS

A. Surface Metal Raceways: Aluminum with snap-on covers. Manufacturers standard enamel finish in color selected by Architect.

B. Manufacturer shall be Legrand, Thomas& Betts Corporation, Walker systems, Inc. (The Wiremold Company), or approved equal.

5.05 OUTLET BOXES

A. Outlet boxes shall be: one piece steel, galvanized, Steel City Electric, Appleton Electric, Raco or approved equivalent. Where NMC or ENT is used, plastic boxes are acceptable.

5.06 DEVICES

A. Wiring devices shall be specification grade and rated at 20 amperes for light switches and 20 amperes for duplex receptacles. Switches, receptacles, and other devices shall be Leviton Decora style, or Pass Seymour, Cooper, or Hubbell equivalent. Color shall be ivory unless noted otherwise by Architect.

B. GFCI receptacles shall be straight blade feed through type with indicator light that is lighted when device is tripped.

C. Switches shall be 120/277V, 20A, rocker type.

D. Dimmers shall be continuous adjustable slider, modular, full wave, solid state units with integral quiet ON/OFF switch with audible frequency and EMI/RFI suppression filters. Lutron Diva or equal.

E. Incandescent Lamp Dimmers shall be 120V, 600W. ON/OFF switch position shall by pass dimmer module. Dimmers shall require no derating when gauged with other devices.

F. Fluorescent Lamp Dimmer Switches: Modular, compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming and dimmer ballast combination capable of consistent dimming with low end not greater than 10 percent of full brightness.

G. Fan Speed Control: Modular, 120V, full wave, solid-state units with integral, quiet ON/OFF switches and audible frequency and EMI/RFI filters. Comply with UL 1917. Controller shall be three speed adjustable slider, 1.5A

H. Wall plates shall be steel with white baked enamel, suitable for field painting material for finished spaces. Galvanized steel for unfinished spaces. Cast aluminum with spring-loaded lift cover and listed and labeled for use in “wet locations” in damp spaces.

I. Wet locations weatherproof cover plates shall be NEMA250, complying with type 3R weather resistant in-use rating die-cast aluminum with lockable cover.

J. Multi outlet assemblies shall be aluminum 5” high, divided channel raceway for use as a complete matching assembly. Duplex 20 amp receptacles shall be located every 18” or as shown in drawings. Route #12AWG minimum. Derate conductors as required by NEC.

5.07 DISCONNECTS

A. Safety switches shall be heavy-duty, quick-make, quick-break with cover interlock, fusible or non-fusible, and grounding lugs in enclosure to suit locations and requirements. G.E., Siemens, Square D, Cutler-Hammer.

5.08 FUSES

A. Time delay, rejection type, high capacity or current limiting as shown on the drawings. Manufacturers shall be Bussmann, Littelfuse or Gould Shawmut.

B. Provide one (1) set of three (3) spare fuses for each size and type provided on this project. Provide fuses in a sheet metal storage cabinet with a hinged door equipped with clips or cubicles, each marked with the size and type fuse stored therein. Provide nameplate "Spare Fuses". Install in locations as directed by Owner.

5.09 STARTERS

A. Single phase manual starters shall be “quick make-quick break” toggle switch. Single or double pole with a thermal overload heater element capable of interrupting the circuit in case of overload.

B. Magnetic controllers shall be full voltage, non-reversing, across the line starters, with ambient compensated inverse time-current characteristic and NEMA ICS2, Class 2 tripping characteristic.

C. Combination Magnetic Controller: Factory-assembled combination controller and heavy duty disconnect switch with rejection type fuse clips as sized on drawings.

D. Provide two normally open and two normally closed auxiliary contacts for each single speed motor and for each speed of multi-speed motors.

E. Enclosure shall be NEMA 250, Type 1 for dry indoor locations, NEMA 250, Type 3R for outdoor, NEMA 250, Type 4 for damp/wet locations, and NEMA 250, Type4x for kitchens.

F. Provide door mounted LED indicators for the following conditions:

1. Power On

2. Run

3. Over Voltage

G. Provide Hand-Off-Automatic switches on the starter face for all features. The hand position shall not bypass fire stats or other safety features.

H. Starters which are furnished with control circuits shall have integral transformer (with sufficient capacity to operate connected devices plus 100% spare capacity) and 120 volt control circuit. All starters to have thermal overload relays sized for approximately 115% of full load motor current.

I. All 3 phase starters to have overcurrent protection on all three legs. On 3 phase starters 7-1/2 HP and larger furnish a phase monitor control relay, Time Mark B258B, 258B, or A258B Monitor Control Relay or equivalent. Phase monitor relay shall be mounted and wired into the starter enclosure by this Contractor.

5.10 EXTERNAL PULLBOXES

A. Pullboxes, cabinets, etc. mounted on the exterior at grade level shall be weatherproof type with hinged lockable covers secured with tamperproof screws.

PART 6 - EXECUTION

6.01 CONDUIT INSTALLATION

A. All wiring shall be installed in listed metallic raceways. Raceways in slab-on-grade or below grade shall be schedule 40 PVC. Transitions from below to above grade shall be with rigid steel elbows with P.V.C. Jacket or approved equal protection. EMT fittings shall be malleable iron or steel. Connectors shall be insulated throat type.

B. Make conduit bends with standard conduit elbows or conduit bent to not less than the same radius. All bends shall be free from dents or flattening.

C. All fittings in wet places, locations exposed to weather, or buried in masonry, concrete or fill, shall be water-tight. Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's instructions.

D. At locations subject to moisture or vibration, use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

E. Cap conduit ends to prevent entrance of foreign materials during construction.

F. Run concealed conduits in a direct line. Run exposed conduits parallel to, or at right angles with, lines of the building. Install all conduits at least 6" away from flues, steam and hot water pipes. Install horizontal raceway runs above water and steam piping.

G. Run underground conduits a minimum of 2' 0" below grade.

H. Seal all conduit penetrations of fire rated walls, floor, or ceilings with U.L. listed "Dow Corning" #2000 or #2001 fire stop sealant or equivalent.

I. All empty raceway systems shall have a polypropylene pullwire or equal, and shall be identified at all junction, pull and termination points using permanent metallic tags. Tag shall indicate intended use of conduit, origination, and termination points of each individual conduit.

J. Non-metallic and flexible metal conduits shall have a code-sized copper grounding conductor. Increase conduit size as required.

K. Conduits penetrating through roof shall have roof flashing with caulk type counter flashing sleeve. Installation shall be watertight.

L. Where panels are installed flush with walls, empty conduits shall be extended from the panel to an accessible space above or below. A minimum of one 3/4"c shall be installed for every three single pole spare circuit breakers or spaces, or fraction thereof, but not less than two conduits.

6.02 WIRE INSTALLATION

A. Branch circuit conductors shall be as follows:

1. For general applications through size #8: THWN 75^{o}C wire and full size ground, or type THHN 90^{o}C.

2. Branch circuit conductors through size #10 to be solid, #8 and larger stranded.

3. Unless indicated on the drawings, (the minimum) wire used for branch circuits shall be #12 THWN protected by 20 ampere circuit breakers.

4. Branch circuits for receptacles shall be on 20 amp, single pole circuit breakers with #12 conductors. No more than eight (8) duplex receptacles shall be on any one branch circuit. Circuits serving bathroom GFCI receptacles may serve lighting but shall not serve any other receptacles.

5. Lighting branch circuit shall not be loaded to more than 70% of breaker rating, in effect, 14 amps per circuit.

B. The drawings indicate the general direction of routes of branch circuit home runs. Continue all such home runs to panels as though the routes were completely indicated.

1. Conductors shall be continuous from outlet box to outlet box, or junction box, with no splices except in such boxes.

2. Do not install wire in conduits until after plastering or drywall is completed and all moisture has been removed from conduits.

6.03 WIRING DEVICE INSTALLATION

A. Review architectural and mechanical drawings before installing outlets. Changing of outlets to conform to these drawings and any other slight change in mounting height or location of outlets required shall be considered as a part of this contract. Use outlet boxes of sufficient size and shape to best suit the particular location and to contain the enclosed wire and connections without crowding. Size all boxes per N.E.C. Article 370.

B. Switch and receptacle outlet boxes shall be standard boxes with cover plates. Where more than one switch or device is located at one point, use gang boxes and gang cover plates.

C. Receptacles in wet locations shall be installed with a hinged outlet cover/enclosure marked “suitable for wet locations while in use” and “UL listed”. There must be a gasket between the enclosure and the mounting surface, and between and hinged cover and mounting plate/base to assure proper seal. Taymac; specification grade or equivalent.

D. Flush mount lighting switches 4'0" centerline above finished floor unless otherwise indicated. Flush mount wall type receptacles and other wall mounted wiring devices and outlets 18 inches centerline above finished floor unless otherwise indicated.

E. Route dedicated neutral conductors on line and load side of dimmers per manufacturer’s instructions.

F. Set metal floor boxes level. Trim after installation to fit flush with finished floor surfaces.

G. Set non-metallic floor boxes level. Trim after installation to fit flush with finished floor surfaces.

H. Identify panelboard and circuit number on receptacles with hot stamped or engraved machine printed label on face of plate.

6.04 MOTORS, MOTOR STARTERS, SAFETY DISCONNECTS, MECHANICAL EQUIPMENT CONTROLS INSTALLATION

A. Unless otherwise indicated, all motors and controls shall be furnished, set in place and wired in accordance with the following schedule. This list does not attempt to include all components. All items necessary for a

complete system shall be included in the base contract. (MD is Mechanical Division--ED is Electrical Division).

ITEM	FURNISHED UNDER	SET IN PLACE OR MTD UNDER	WIRED & CONNECTED UNDER
1. Equipment Motors And Thermal Overloads, Resistance Heaters	MD	MD	ED
2. VFD's, motor controllers; magnetic starters, reduced voltage starters and overload relays	ED	ED(a)	ED
3. Disconnect switches (fused or non-fused), HP rated switches, thermal overload switches and fuses, and manual operating switches	ED(a)	ED(a)	ED
4. Pushbutton stations, pilot lights, multi-speed switches, float switches, thermostats, control relays, timeclocks, control transformers, control panels, motor valves, damper actuators, solenoid valves, EP and PE switches and interlocks	MD	MD	MD(b)

a. If furnished as part of factory wired equipment, then wiring and connections only by ED.
b. If any of these devices carry the full load current to any motor they shall be connected by ED. Control devices carrying full load current furnished by MD and wired by ED shall be located at the device being controlled, unless shown on drawings or mutual agreement is made between the contractors with no change in the contract price.
c. Wiring from alarm contacts to alarm system by ED; all control function wiring by MD. Duct detectors furnished by ED, set in place by MD.

B. Select horsepower rating of motor nameplate full load currents.

C. Identify source panelboard, circuit number, voltage, motor name, and horsepower with engraved machine printed label screw mounted on face of controller/disconnect.

D. ELECTRICAL SUPPORTING controllers to suit motor controlled. Select load current and overload relays to actual

6.05 DEVICES

A. Support all panels, junction boxes and other electrical devices in a manner as required by the N.E.C. Use extra bracing, supports, etc. as necessary to provide a proper and substantial base to which all electrical equipment is attached.

B. Bolt-free standing equipment to 4" high concrete housekeeping pads.

6.06 EQUIPMENT FURNISHED BY OTHERS AND/OR OWNER

A. Verify exact location and requirements of equipment to be furnished by others prior to rough-in.

B. See Division 15 drawings for location of mechanical equipment. Provide service to, and connect equipment as required.

C. Inspect owner furnished equipment for damage, defects, missing components, etc. Report deficiencies to the Owner immediately. Do not install or connect deficient equipment.

D. Rough-in equipment furnished by Owner to locations as required. Final connections will be made by Owner and Architect.

6.07 EQUIPMENT CONNECTIONS

A. Final connections to motors, transformers and other vibrating equipment shall be with seal tite flex and approved fittings. Do not secure conduits, disconnects, or devices to ductwork or mechanical equipment.

B. Final connections to equipment shall be in accordance with manufacturer's approved wiring diagrams, details, and instructions. It shall be the Contractor's responsibility to provide materials and equipment compatible with equipment actually supplied.

C. Electrical Contractor shall provide controls, interlocks, accessories, etc. in motor control starters as required by the temperature control Contractor. Starters shall contain 120V control transformer, pilot light, and pushbuttons or selector switch as required, in addition to other items (auxiliary contacts, door switches, relays, etc.) required. Submit elementary control diagrams.

SECTION 26 40 00 – ELECTRICAL SERVICE AND DISTRIBUTION

PART 7 - GENERAL

7.01 ELECTRICAL SERVICE CHARACTERISTICS

A. The Contractor is responsible for all coordination with the utility company for this project to ensure the installation of electrical services shall be compatible with the utility company’s requirements.

PART 8 - PRODUCTS

8.01 ELECTRICAL SERVICE ENTRANCE EQUIPMENT

A. Electrical service entrance equipment shall be UL listed and labeled for service entrance equipment and shall have an interrupting rating of circuit breaker units equal to or greater than fault currents, which might be imposed on them. It shall further limit the available fault current to branch circuit panels to 10,000 amperes or less.

8.02 SWITCHBOARDS AND DISTRIBUTION PANELBOARDS

A. Switchboards and panelboards shall be complete with: Main circuit breaker(s) as shown on the drawings and be complete with pull or tap boxes, lug landing sections, cross bussing, etc.

B. Branch circuit breakers shall be bolt on, replaceable without disturbing adjacent units.

C. Minimum short circuit rating of integrated assembly shall not be less than 42,000 amperes for panelboards unless noted otherwise.

D. Equipment shall conform to U.L. standard and service equipment shall be configured to conform to the serving utility requirements.

E. Unit shall be enclosed in a NEMA rated housing suitable for location installed.

F. Equipment shall be as manufactured by General Electric, Square D, Siemens or Cutler-Hammer equivalent.

8.03 BRANCH CIRCUIT PANELS

A. Bolt on circuit breaker type with hinged door, indoor circuit directory. Circuit breakers to meet the non-interchangeability requirements of the N.E.C. where applicable; all breakers 20 ampere single pole unless otherwise noted; all multiple units common trip. Mains with lugs or main circuit breakers as shown on the panelboard schedules. All panels to have neutral and ground bus. General Electric, ITE, Square D, Cutler-Hammer equivalent.

B. Molded case circuit breakers with interrupting capacity to meet available fault currents. GFCI circuit breakers shall be single or two pole configurations with 30 mA trip sensitivity. AFCI circuit breakers shall be single pole configuration that provides protection from an arcing fault by de-energizing the circuit when the fault is detected. Shunt trip circuit breaker energized from a separate 120V circuit set to trip at 75 % of rated voltage.

PART 9 - EXECUTION

9.01 MOUNTING

A. Install distribution equipment in accordance with manufacturer's recommendation, and as shown on the drawings.

B. Install wall-mounted equipment 5' 0" centerline above finished floor unless otherwise indicated.

C. Install top of panelboards 6’6” above finished floor unless otherwise noted on the drawings. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Stub four 1-inch empty conduits from panel boards into accessible ceiling space or below slab not on grade.

9.02 IDENTIFICATION

A. Identify panelboard name, voltage and ampacity with engraved machine printed nameplate on panelboard mounted with corrosion resistant screws.

B. Create a typewritten directory schedule indicating installed circuit loads mounted to inside door cover in removable transparent pocket.

9.03 COMPATIBILITY

A. The Contractor is responsible for all coordination with the utility company for this project, to insure the installation of electrical services shall be compatible with the entire project, and to ensure that electrical service is installed at a time as to provide necessary electrical power as required to the completed project. Single phase equipment on a three phase distribution system shall be connected to insure as near a balanced system load as possible.

9.04 SERVICE GROUNDING

A. Take necessary precautions to insure permanent and effective grounding of the service neutral and to insure continuity to ground through the conduit system to all raceways, panels, panelboards, lighting fixtures, switches, motors and other electrical enclosures, by the use of approved methods as defined in the National Electrical Code. Make all ground connections solderless. Securely bond the entire grounding system to cold water mains using rigid clamp jaw type fittings. If ground connection is made to cold water pipe line on building side of water meter, install jumpers by-passing meter.

B. Where non-metallic piping is used for building service, tie reference ground only to metallic piping inside of building and provide a properly sized ground rod system for the primary ground system. Tie reference grounds for metallic piping to the primary ground system.

SECTION 26 50 00 – LIGHTING & LIGHTING CONTROLS

PART 10 - GENERAL

10.01 PROVISIONS

A. Provide all interior lighting fixtures as shown on the plans and hereinafter specified. All items shall be provided to make a complete and operable lighting system, including lamps, ballasts, poles, hangers, painting, plaster frames, etc.

B. Fixture shall be as shown in the fixture schedule. Catalog numbers shown are the latest available at the time of design. If discrepancies occur between description and catalog number, description will take precedence.

C. Verify trim, finish and general description of all lighting fixtures through shop drawing approval prior to placing order for fixtures. Modify catalog numbers accordingly.

D. If it is necessary for the Architect/Engineer to reselect light fixtures which are still available from the manufacturer (i.e. not “discontinued”) but cannot be obtained in time for installation as the result of the contractor’s failure to promptly order such fixtures, the contractor shall be back charged at the rate of $75 per hour for the Architect’s/Engineer’s services.

    1. Alternately, the Contractor may be required to pay to air freight fixtures to the construction site at no additional charge to the Owner if this will result in the specified fixtures being available for installation in time to meet the project schedule.

PART 11 - PRODUCTS (Not Used)

PART 12 - EXECUTION

12.01 INSTALLATION

A. Install lighting fixtures straight and true with reference to adjacent walls, and securely fasten to and support by structural members of the building. Refer to architectural or interior reflected ceiling plans and elevations for exact location of fixtures.

SECTION 27 00 10 – COMMUNICATIONS GENERAL PROVISIONS

PART 13 - GENERAL

13.01 TELEPHONE SYSTEM

A. Provide telephone service raceways, backboards, wiring, outlets and other devices in accordance with the requirements of the telephone company.

B. Provide convenience outlets at all telephone terminal boards.

C. Provide plenum rated Category 5 four pair cable to all outlets. Each outlet to be a single run. Provide modular device at each outlet.

D. Contractor to connect branch cable to device.

E. Contractor to leave sufficient cable at terminal boards for connection by telephone company.

13.02 DATA SYSTEM

A. Provide data service raceways, backboards, wiring, outlets and other devices in accordance with the requirements of the owner's data system vendor.

B. Provide convenience outlets at all data terminal boards.

C. Provide 100 mega-hertz Category 6 CMG, four pair cable to all outlets. Belden, Lucent, Berk-tek or equivalent. Wiring to be routed without any twists or kinks. Individual pairs to be untwisted no more than ½" at each termination point. Contractor to replace any wiring improperly installed at no cost to the owner. Each outlet to be a single run.

D. Provide Lucent series M100BH or Amp, Krone equivalent modular device at each outlet. Device shall be colored blue for data, white for phone, and orange for SCADA.

E. Contractor to connect branch cable to device.

F. Contractor to leave 20 feet minimum cable at terminal boards for connection by data vendor.

END OF SPECIFICATION

City of Northglenn WWTP Control Building
Lab and Furniture Fitout

Northglenn, Colorado

Bid Set

02.26.2018

alm2s Project No. 1620

ABBREVIATIONS

@	AT	(N)	New
A.F.F.	Above Finished Floor	N.I.C.	Not in Contract
A.H.U.	Air-Handling Unit	N.T.S.	Not to Scale
B.O.	Bottom Of	NOM.	Nominal
B.M.	Benchmark	O.A.	Overall
C.J.	Control Joint	O.C.	On Center
C.M.U.	Concrete Masonry Unit	O.D.	Outside Diameter
C.U.	Condensing Unit	O.H.	Overhead
CAB.	Cabinet	PL.LAM.	Plastic Laminate
CER.TL.	Ceramic Tile	P.T.	Pressure-Treated
CONT.	Continuous	P.TL.	Paper Towel Dispenser
D.F.	Drinking Fountain	PLYWD.	Plywood
DBL.	Double	PNT.	Paint
D.S.	Downspout	R.D.	Roof Drain
DWG.	Drawings	R.O.	Rough Opening
E.C.	Electrical Conduit	R.T.U.	Roof - Top Unit
E.F.	Exhaust Fan	REINF.	Reinforce or Reinforcing
E.J.	Expansion Joint	RESIL.	Resilient (flooring or base)
E.W.C.	Electric Water Cooler	REQ'D	Required
EA.	Each	RLG.	Rolling
E.P.PT.	Epoxy Paint	RND.	Round
EQ.	Equal	RW.	Redwood
EXIST or (E)	Existing	S.AC.TL.	Suspended Acoustical Tile
EXT.	Exterior	S.C.	Solid Core (wood)
F.D.	Floor Drain	S.D.	Soap Dispenser
F.E.	Fire Extinguisher	S.S.	Stainless Steel
F.V.	Field Verify	SAIL.CRS.	Sailor Course (masonry)
FIN.	Finish	STL.	Sheet
FLR.	Floor	T.P.	Toilet Paper Dispenser
FTG.	Footing	TEMP.	Tempered (glass)
GALV.	Galvanized	T.O.	Top Of
GYP.BD.	Gypsum Wallboard	TYP.	Typical
HC.	Handicapped	U.N.O.	Unless Noted Otherwise
H.C.	Hollow Core (Wood)	V.C.T.	Vinyl Composition Tile
HDR.	Header	V.	Vent
H.M.	Hollow Metal	VERT.	Vertical
HORIZ.	Horizontal	V.T.R.	Vent Thru Roof
I.D.	Inside Diameter	V.WC.	Vinyl Wallcovering
INS.STL.	Insulated Steel	W/	With
INT.	Interior	W/O	Without
M.O.	Masonry Opening	WD.	Wood
MANUF.	Manufacturer		
MTL.	Metal		

ARCHITECTURAL SYMBOLS

Property Line
Existing Contour
New Contour
Easement / Setback
Sanitary Sewer
Water Line
Gas Line
Storm Drain
Datum
Spot Elevation
Window Type
Drawing Title
Drawing Number
Sheet Number
Scale
Room Name
Room Number

DWG TTL
ROOM NAME

Wall Elevation
Detail
Building Section
Wall Section
Grid Line

NOTES:

All 3D details are used for clarification purposes for corresponding 2D plans, sections, and elevations and should not be solely used for construction purposes without referencing said 2D details.

VICINITY MAP

DRAWING INDEX

ALM2S PROJECT NO. 1620

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Evelyn Rhodes, Laboratory Supervisor
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MECHANICAL/ELECTRICAL:

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Fort Collins, CO
970.221.5691

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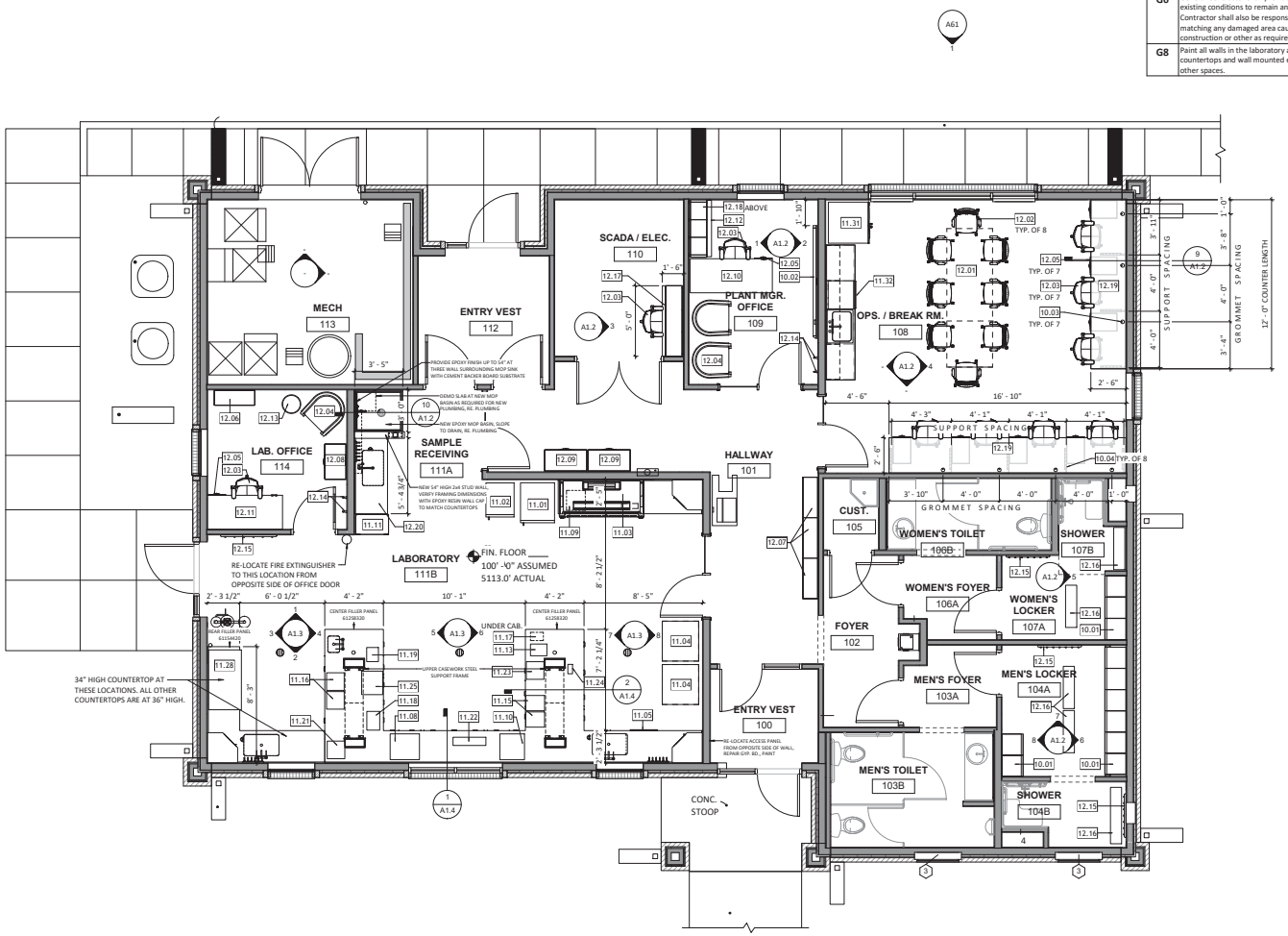

FIRST FLOOR PLAN

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

GENERAL NOTES	
G1	All construction shall be in accordance with the applicable requirements of the IBC, IMC, IECC - 2009 editions approved by the City of Northglenn including local amendments.
G2	The existing conditions depicted on these drawings are based on the best available information. Contractor shall review the drawings, field verify existing conditions, and verify all aspects of this project prior to beginning construction and notify architect and owner representative of any discrepancies.
G3	Dimensions are measured from face of framing for new wall construction and face of finish for existing unless noted otherwise.
G4	Unforeseen Conditions: Should any condition arise which would not normally be anticipated, or should any condition be uncovered which does not match the contract documents, notify the Architect/Owner for direction.
G6	General Contractor shall provide for a smooth transition between existing conditions to remain and new construction. General Contractor shall also be responsible for repairing, patching and matching any damaged area caused by weather, the process of construction or other as required for completion of the new space.
G8	Paint all walls in the laboratory after the installation of casework, countertops and wall mounted equipment. Touch-up paint all other spaces.

SYSTEM NOTES	
10.01	Lockers - 18"w X 18"d x 72" h Republic heavy duty ventilated metal lockers. Single and double tier, see interior elevation.
10.02	96" long x 48" high dry erase/magnetic board with integral marker tray.
10.03	Countertop grommet, 2" diameter black plastic.
10.04	21"x15" Heavy duty L-bracket counter support.
11.01	Lab reagent refrigerator/freezer by VWR, model 97058-840. Contractor provided and installed.
11.02	Lab sample refrigerator by VWR, model 10819-782. Contractor provided and installed.
11.03	Fume hood with blower and cup sink by Cole-Parmer, model WU-09102-76. Re. mechanical. Contractor provided and installed.
11.04	Incubator, large 20 cu. ft. (BOD) by VWR, model 10753-894. Contractor provided and installed.
11.05	Under counter glassware washer by VWR/Labconco, model 97001-144. Re. mechanical. Contractor provided and installed.
11.08	Existing incubator, small 6 cu.ft.(EC) by VWR (model for reference only, 89511-404). Owner provided and installed.
11.09	Existing muffle furnace by Cole-Parmer (model for reference only, WU-33855-30). Owner provided and installed.
11.10	Existing drying oven, 2.3 cu.ft. by VWR (model for reference only, 89511-404). Owner provided and installed.
11.11	Existing lab cart by VWR (model for reference only 470200-418). Owner provided and installed.
11.13	Existing analytical balance by Cole-Parmer (model for reference only, EW11229-13). Owner provided and installed.
11.15	Existing desiccator by VWR (model for reference only, 24983-455). Owner provided and installed.
11.16	Existing microscope by Cole Parmer (model for reference only, WU48925-04) and computer. Owner provided and installed.
11.17	Existing vacuum pump by Cole Parmer (model for reference only, EW79204-70). Owner provided and installed.
11.18	Existing Idexx quantitray sealer by Idexx/VWR (model for reference only, 98-0002570-00). Owner provided and installed.
11.19	Existing digestion block(COD/TNT) by Hach (model for reference only, DRB200-02). Owner provided and installed.
11.21	Existing autoclave. Owner provided and installed.
11.22	Existing alkalinity setup by VWR (model for reference only, 89202-636). Owner provided and installed.
11.23	Existing filtration setup. Owner provided and installed.
11.24	Existing pH/LDO meter by Hach (model for reference only, HQ40D53101301). Owner provided and installed.
11.25	Existing spectrophotometer DR 5000 by Hach (model for reference only, LPV441.99.00012). Owner provided and installed.
11.28	Existing discrete analyzer. Owner provided and installed.
11.31	New counter depth stainless steel french door refrigerator/freezer with icemaker by GE, model GWE19JSLSS.
11.32	New stainless steel dishwasher by GE, model GDF610PSJSS.
12.01	Skovby #39 extendable table in lacquered walnut.
12.02	Allsteel Lyric multi-purpose chair with four leg base with casters and arms. Frame and shell colors TBD from manufacturers standard, (model as basis of design: CMP-PPCONO.3.H.PR6.LA).
12.03	Allsteel Lyric task chair, highback with lumbar, casters and adjustable arms and mesh back. Frame, mesh back, seat cushion and caster color TDB from manufacturers standard.(model as basis of design: CBW-MHH.BLK.BLK.L.BLK.2.HAM22.SX).
12.04	Side chair from American Furniture Warehouse. Roscoe taupe armchair.
12.05	Allsteel Essentials pedestal - mobile box/file with arch pulls. Color to be determined from Core paint colors.
12.06	Allsteel Essentials bookcase, 341/2" wide x 71" high, 4 shelf bookcase. Color to be determined from Core paint colors.
12.07	Allsteel Essentials bookcase, 34 1/2" wide x 41" high, 2 shelf bookcase. Color to be determined from Core paint colors.
12.08	Allsteel Essentials lateral file, 30" wide x 52 1/2" high, 4 drawer high with arch pulls. Color to be determined from Core paint colors.
12.09	Allsteel Essentials lateral file, 36" wide x 39 1/8" high, 3 drawer high with arch pulls. Color to be determined from Core paint colors.
12.10	Allsteel Altitude C-leg height adjustable table, 72" long x 30" deep rectangular laminate desktop up to L2 pricing, 2-stage electric legs in silver with standard controls.
12.11	Allsteel Altitude C-leg height adjustable table, 66" long x 30" deep rectangular laminate desktop up to L2 pricing, 2-stage electric legs in silver with standard controls.
12.12	Allsteel Stride 29" high fixed C-leg fixed with Aware table top, 48" long x 18" deep x 29" rectangular laminate desktop up to L2 pricing and T-mold edging.
12.13	Allsteel Transfer side table, oval, painted base, laminate top up to L3 pricing.
12.14	Single coat hook, KES A216S-2 SUS304, brushed stainless steel.
12.15	7-hook coat rail, KES A4060H7, aluminum.
12.16	Bench, Republic moveable bench with laminated maple top and aluminum trapezoidal-shaped pedestals with black anodized finish. In men's locker room, provide (2)two 3'-0" and (1)one 4'-0" long benches. In women's locker room, provide (2)two 3'-0" long benches.
12.17	Wall mounted adjustable shelving at SCADA/electrical room: provide (4)four 60" high standards, adjust as needed to mount standards to wall studs. Provide (4)four 18" deep brackets to support 60" long x 18" deep laminate work surface, and(12)twelve 14" deep brackets to support (3)three 60" long x 14" deep melamine shelves.
12.18	Wall mounted adjustable shelving at Plant Manager's office: provide (4) 48" high standards, adjust as needed to mount standards to wall studs. Provide (16) sixteen 14" deep brackets to support (4)four 48" long x 14" deep laminate shelves.
12.19	Plastic laminate over two layers of 3/4" MDF board (glued & screwed) work counter with bullnose edge and grommets as shown.
12.20	1" Thick epoxy resin countertop with 3/4" thick x 4" backsplash.
12.21	Wall mounted drying pegboard, 24"x30".

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(970) 223-1820
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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

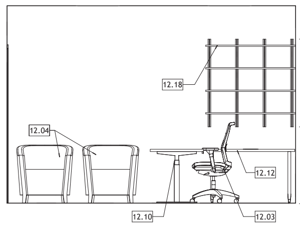
STATE OF COLORADO — LICENSED ARCHITECT — JAMES MASSEY 203420 — 2-26-18

NO	ISSUE	DATE

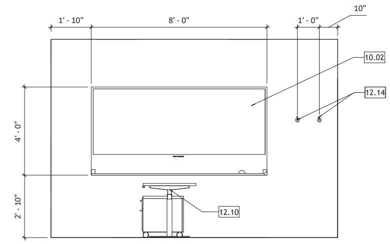
PROJECT 1620
DATE 02.26.2018
DRAWN 22

FIRST FLOOR PLAN

A1.1



1 A1.2 INT. ELEV - PLANT MGR. OFFICE 1
SCALE: 3/8" = 1'-0"



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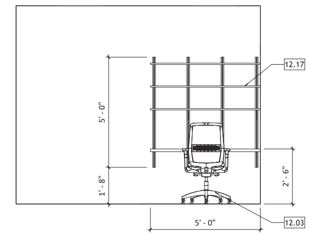

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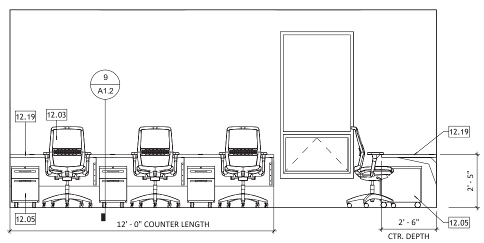

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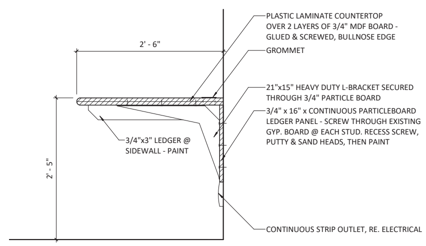

9 A1.2 WORK COUNTER SECTION
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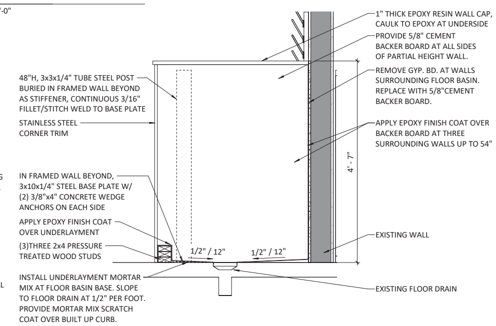

10 A1.2 DTL AT FLOOR BASIN
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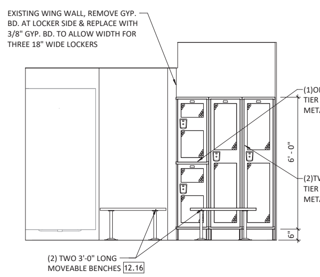
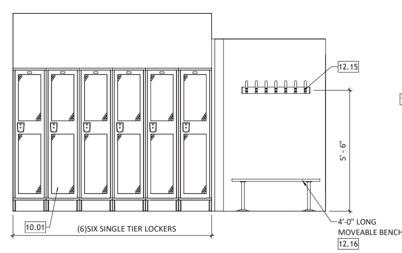


5 A1.2 INT ELEV - WOMENS LOCKERS
SCALE: 3/8" = 1'-0"



6 A1.2 INT ELEV - MENS LOCKER 1
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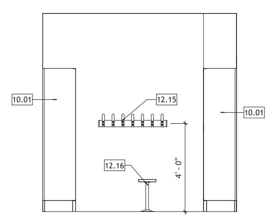

7 A1.2 INT ELEV - MENS LOCKER 2
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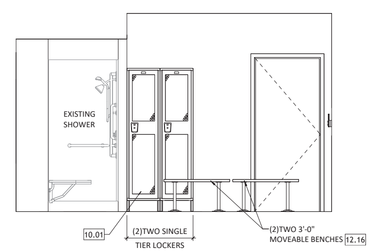

8 A1.2 INT ELEV - MENS LOCKER 3
SCALE: 3/8" = 1'-0"

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12.08	Allsteel Essentials lateral file, 30" wide x 52 1/2" high, 4 drawer high with arch pulls. Color to be determined from Core paint colors.
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12.12	Allsteel Stride 29" high fixed C-leg fixed with Aware table top, 48" long x 18" deep x 29" rectangular laminate desktop up to L2 pricing and T-mold edging.
12.13	Allsteel Transfer side table, oval, painted base, laminate top up to L3 pricing.
12.14	Single coat hook, KES A2165-2 SUS304, brushed stainless steel.
12.15	7-hook coat rail, KES A4060H7, aluminum.
12.16	Bench, Republic moveable bench with laminated maple top and aluminum trapezoidal-shaped pedestals with black anodized finish. In men's locker room, provide (2)two 3'-0" and (1)one 4'-0" long benches. In women's locker room, provide (2)two 3'-0" long benches.
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12.19	Plastic laminate over two layers of 3/4" MDF board (glued & screwed) work counter with bullnose edge and grommets as shown.
12.20	1" Thick epoxy resin countertop with 3/4" thick x 4" backsplash.
12.21	Wall mounted drying pegboard, 24"x30".

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

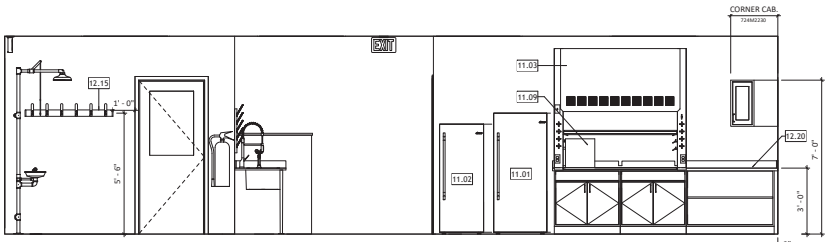
STATE OF COLORADO LICENSED ARCHITECT 203420 2-26-18

NO	ISSUE	DATE

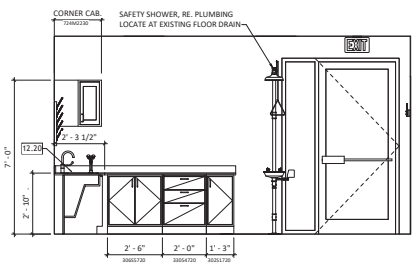
PROJECT 1620
DATE 02.26.2018
DRAWN Author

INTERIOR ELEVATIONS

A1.2



1 A1.3 **INT ELEV - LAB 1**
SCALE: 3/8" = 1'-0"



3 A1.3 **INT ELEV - LAB 3**
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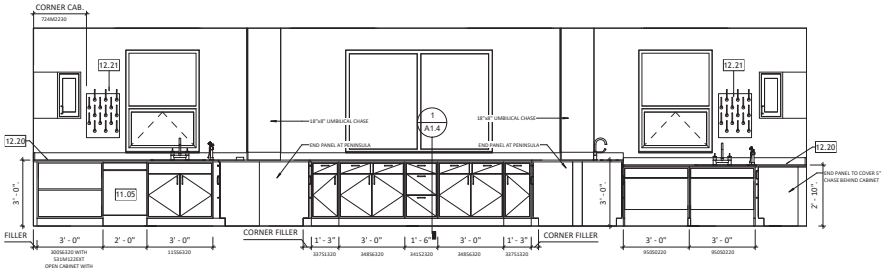

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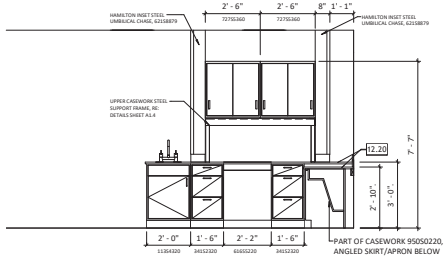
SCALE: 3/8" = 1'-0"



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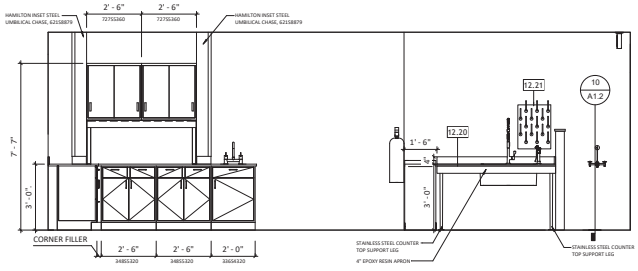
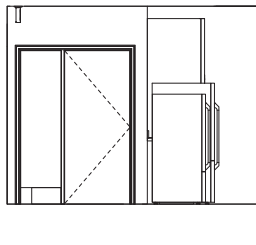
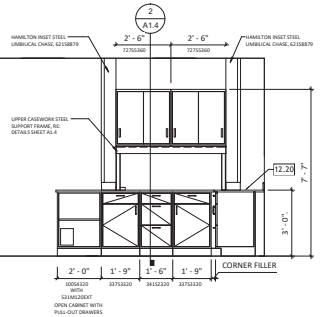
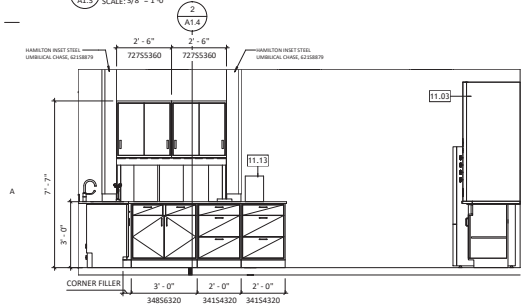


5 A1.3 **INT ELEV - LAB 5**
SCALE: 3/8" = 1'-0"



6 A1.3 **INT ELEV - LAB 6**
SCALE: 3/8" = 1'-0"





7 A1.3 **INT ELEV - LAB 7**
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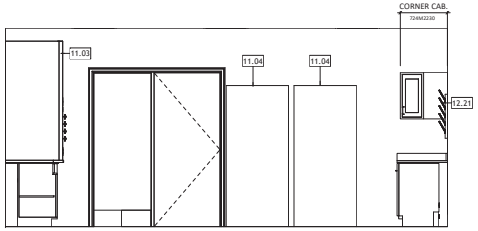

8 A1.3 **INT ELEV - LAB 8**
SCALE: 3/8" = 1'-0"

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12.03	Allsteel Lyric task chair, highback with lumbar, casters and adjustable arms and mesh back. Frame, mesh back, seat cushion and caster color TDB from manufacturers standard,(model as basis of design: CBW-MHH.BLK.BLK.L.BLK.2.HAM22.SX).
12.04	Side chair from American Furniture Warehouse. Roscoe taupe armchair.
12.05	Allsteel Essentials pedestal - mobile box/file with arch pulls. Color to be determined from Core paint colors.
12.06	Allsteel Essentials bookcase, 341/2" wide x 71" high, 4 shelf bookcase. Color to be determined from Core paint colors.
12.07	Allsteel Essentials bookcase, 34 1/2" wide x 41" high, 2 shelf bookcase. Color to be determined from Core paint colors.
12.08	Allsteel Essentials lateral file, 30" wide x 52 1/2" high, 4 drawer high with arch pulls. Color to be determined from Core paint colors.
12.09	Allsteel Essentials lateral file, 36" wide x 39 1/8" high, 3 drawer high with arch pulls. Color to be determined from Core paint colors.
12.10	Allsteel Altitude C-leg height adjustable table, 72" long x 30" deep rectangular laminate desktop up to L2 pricing, 2-stage electric legs in silver with standard controls.
12.11	Allsteel Altitude C-leg height adjustable table, 66" long x 30" deep rectangular laminate desktop up to L2 pricing, 2-stage electric legs in silver with standard controls.
12.12	Allsteel Stride 29" high fixed C-leg fixed with Aware table top, 48" long x 18" deep x 29" rectangular laminate desktop up to L2 pricing and T-mold edging.
12.13	Allsteel Transfer side table, oval, painted base, laminate top up to L3 pricing.
12.14	Single coat hook, KES A2165-2 SUS304, brushed stainless steel.
12.15	7-hook coat rail, KES A4060H7, aluminum.
12.16	Bench, Republic moveable bench with laminated maple top and aluminum trapezoidal-shaped pedestals with black anodized finish. In men's locker room, provide (2)two 3'-0" and (1)one 4'-0" long benches. In women's locker room, provide (2)two 3'-0" long benches.
12.17	Wall mounted adjustable shelving at SCADA/electrical room: provide (4)four 60" high standards, adjust as needed to mount standards to wall studs. Provide (4)four 18" deep brackets to support 60" long x 18" deep laminate work surface, and(12)twelve 14" deep brackets to support (3)three 60" long x 14" deep melamine shelves.
12.18	Wall mounted adjustable shelving at Plant Manager's office: provide (4) 48" high standards, adjust as needed to mount standards to wall studs. Provide (16) sixteen 14" deep brackets to support (4)four 48" long x 14" deep laminate shelves.
12.19	Plastic laminate over two layers of 3/4" MDF board (glued & screwed) work counter with bullnose edge and grommets as shown.
12.20	1" Thick epoxy resin countertop with 3/4" thick x 4" backsplash.
12.21	Wall mounted drying pegboard, 24"x30".

GENERAL NOTES	
G1	All construction shall be in accordance with the applicable requirements of the IBC, IMC, IECC - 2009 editions approved by the City of Northglenn including local amendments.
G2	The existing conditions depicted on these drawings are based on the best available information. Contractor shall review the drawings, field verify existing conditions, and verify all aspects of this project prior to beginning construction and notify architect and owner representative of any discrepancies.
G3	Dimensions are measured from face of framing for new wall construction and face of finish for existing unless noted otherwise.
G4	Unforeseen Conditions: Should any condition arise which would not normally be anticipated, or should any condition be uncovered which does not match the contract documents, notify the Architect/Owner for direction.
G6	General Contractor shall provide for a smooth transition between existing conditions to remain and new construction. General Contractor shall also be responsible for repairing, patching and matching any damaged area caused by weather, the process of construction or other as required for completion of the new space.
G8	Paint all walls in the laboratory after the installation of casework, countertops and wall mounted equipment. Touch-up paint all other spaces.

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

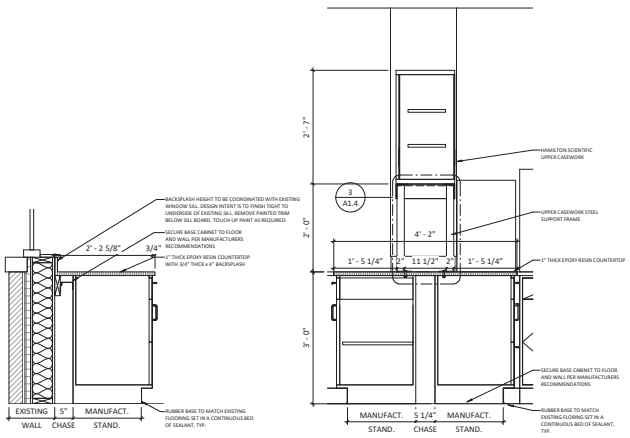
STATE OF COLORADO
JAMES A. KASSEL
203420
2-26-18
LICENSED ARCHITECT

NO	ISSUE	DATE

PROJECT 1620
DATE 02.26.2018
DRAWN Author

INTERIOR ELEVATIONS

A1.3



1 A1.4 **CASEWORK SECTION 1, TYP**
SCALE: 3/4" = 1'-0"

2 A1.4 **CASEWORK SECTION 2, TYP.**
SCALE: 3/4" = 1'-0"

3 A1.4 **CASEWORK SUPPORT DETAIL, TYP.**
SCALE: 3" = 1'-0"

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

STATE OF COLORADO
BRYAN K. MASSEY
203420
2-26-18
LICENSED ARCHITECT

NO	ISSUE	DATE

PROJECT 1620
DATE 02.26.2018
DRAWN Author

SECTIONS AND DETAILS

A1.4

MECHANICAL SYSTEMS LEGEND

PIPING SYMBOLS

	90° ELBOW DN
	90° ELBOW UP
	TEE DOWN
	TEE UP
	BUTTERFLY VALVE
	SHUT OFF (BALL, GATE, BUTTERFLY)
	GLOBE VALVE
	CHECK VALVE
	FLOW CONTROL VALVE
	BALL VALVE
	PLUG OR BALANCING VALVE
	FLOW BALANCING VALVE
	PLUG VALVE IN RISER
	GATE OR GLOBE VALVE IN RISER
	DRAIN VALVE W/ HOSE END
	TEMPERATURE CONTROL VALVE (2-WAY)
	TEMPERATURE CONTROL VALVE (3-WAY)
	PRESSURE REDUCING VALVE
	SOLENOID VALVE
	VENTURI/FLOW INDICATOR
	PUMP & EQUIPMENT CONNECTOR
	PIPE UNION
	DOUBLE CHECK BACKFLOW PREVENTER
	PIPE ANCHOR
	PIPE EXPANSION JOINT
	FLEXIBLE CONNECTOR
	SAFETY RELIEF VALVE
	AIR VENT
	PRESSURE - TEMP. TAP
	PRESSURE GAUGE W/ PIG TAIL & COCK
	THERMOMETER
	VACUUM BREAKER
	STRAINER W/ BLOW-OFF VALVE
	SHOCK ABSORBER
	FLOW SWITCH
	HORIZONTAL CLEANOUT
	VERTICAL CLEANOUT
	FLOOR DRAIN
	FLOOR SINK
	ROOF DRAIN
	DECK/ROOF DRAIN ABOVE
TC	TEMPERATURE CONTROLLER OR SENSOR
H B	HOSE BIBB
W H	WALL HYDRANT

NOTES

1. ALL SYMBOLS, ABBREVIATIONS, AND DESIGNATIONS ON LEGEND SHEET ARE NOT NECESSARILY USED ON THIS PROJECT.
2. THIS DRAWING SET CONSISTS OF DATA GENERATED, IN PART, BY OTHER PARTIES. NOT ALL SYMBOLOGIES AND NOTATION CONVENTIONS OCCURRING IN THIS DRAWING SET ARE NECESSARILY DEFINED ON THESE LEGENDS. CONSULT THE ENGINEER IN THE EVENT SYMBOLOGY OR NOTATION INTERPRETATION IS REQUIRED.

EQUIPMENT ABBREVIATIONS

AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
B	BOILER (HOT WATER)
BB	BASE BOARD
BT	BUFFER TANK
CC	COOLING COIL
CH	CHILLER
CP	CIRC PUMP
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME BOX
DC	DUCT COIL
DEF	DISHWASHER EXHAUST FAN
EBH	ELECTRIC BASEBOARD HEATER
ECU	EVAPORATIVE COOLING UNIT
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
EWH	ELECTRIC WATER HEATER
F	FURNACE
FC	FAN COIL
FP	FAN POWERED BOX
GF	GLYCOL FEEDER
H	HUMIDIFIER
HC	HEATING COIL
HP	HEAT PUMP
HX	HEAT EXCHANGER
KEF	KITCHEN EXHAUST FAN
MAU	MAKE-UP AIR UNIT
MCC	MOTOR CONTROL CENTER
MV	MIXING VALVE
P	PUMP
RF	RETURN (OR RELIEF) AIR FAN
RZ	RADIANT ZONE
SA	SNOWMELT AREA
SB	SUMP BASIN
SF	SUPPLY FAN
SP	SUMP PUMP
ST	STORAGE TANK
TMV	THERMOSTATIC MIXING VALVE
UH	UNIT HEATER
VR	VARIABLE VOLUME BOX W/ REHEAT
VV	VARIABLE VOLUME BOX
WH	WATER HEATER

PLAN SYMBOLS

	CONTROL PANEL/RADIANT MANIFOLD
CDS	CARBON DIOXIDE SENSOR
COS	CARBON MONOXIDE SENSOR
H	HUMIDISTAT
RS	REMOTE TEMPERATURE SENSOR
T	THERMOSTAT
DSP	DUCT STATIC PRESSURE SENSOR
RP	ROOM PRESSURE SENSOR
EPO	EMERGENCY POWER OFF SWITCH
PR	PLUMBING/HVAC RISER
	DIAGRAM CONTINUATION REFERENCE
	SECTION CUT LETTER/SHEET SHOWN ON
	POINT OF DISCONNECTION
	POINT OF NEW CONNECTION
	ACCESS PANEL
	SNOWMELT MANIFOLD

PLAN ABBREVIATIONS

AAV	AIR ADMITTANCE VALVE
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
BDD	BACK DRAFT DAMPER
BLDG	BUILDING
B/W	BETWEEN
C	COMMON (OR CLOSED)
CA	COMBUSTION AIR
CDBBC	CONTINUATION DESIGN BUILD BY CONTRACTOR
CFM	CUBIC FEET PER MINUTE (AIR FLOW RATE)
CLG	CEILING (OR COOLING)
CO	CLEANOUT
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECT (OR CONNECTION)
COTG	CLEANOUT TO GRADE
CW	DOMESTIC WATER
DHR	DOMESTIC HOT WATER RECIRC
DN	DOWN
(E)	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
(F)	FUTURE
FA	FREE AREA
FBO	FURNISHED BY OWNER
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER
FFI	FOR FURTHER INFORMATION
FSD	COMBINATION FIRE/SMOKE DAMPER
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE (WATER FLOW RATE)
HP	HORSEPOWER
HW	DOMESTIC HOT WATER
HWR	DOMESTIC HOT WATER RECIRC
ILO	IN LIEU OF
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FOOT
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MFG	MANUFACTURER
MOD	MOTOR OPERATED DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OBD	OPPOSED BLADE VOLUME DAMPER
OC	ON CENTER
OSA	OUTSIDE AIR
RA	RETURN AIR
RE:	REFER TO:
REQ'D	REQUIRED
REQ'MTS	REQUIREMENTS
SA	SUPPLY AIR
SF	SQUARE FOOT (FEET)
SP	STATIC PRESSURE
SS	STAINLESS STEEL
TA	THROW-AWAY (TRANSFER AIR)
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
W/	WITH
W/O	WITHOUT
WCO	WALL CLEANOUT
VTR	VENT THRU ROOF
XFR	TRANSFER
Ø	DIAMETER

PIPING DESIGNATIONS

HYDRONIC PIPING

HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
HWS(LT)	HEATING WATER SUPPLY (LOW TEMP)
HWR(LT)	HEATING WATER RETURN (LOW TEMP)
HWS(HT)	HEATING WATER SUPPLY (HIGH TEMP)
HWR(HT)	HEATING WATER RETURN (HIGH TEMP)

PLUMBING PIPING

G	NATURAL GAS
MG	MEDIUM PRESSURE GAS
PG	PROPANE GAS
LPG	LIQUID PROPANE GAS
PD	PROPANE DRAIN
D	DRAIN PIPE
DS	SOLID DRAIN PIPE
RS	REFRIGERANT SUCTION
RL	REFRIGERANT LIQUID
CW	DOMESTIC WATER
HW	DOMESTIC HOT WATER
HWC	DHW RECIRCULATION
140° HW	DOMESTIC HOT WATER (TEMP. SHOWN)
NS	NON-SOFTENED DOMESTIC WATER
THW	TEMPERED WATER
DIW	DI-IODIZED WATER
DIWC	DI-IODIZED WATER RECIRCULATION
F	FIRE LINE
PW	PRESSURIZED WASTE
W	WASTE PIPE
V	PLUMBING VENT PIPE
AW	ACID WASTE PIPE
AV	ACID VENT PIPE
GW	GREASE WASTE PIPE
GV	GREASE VENT
ST	STORM DRAIN PIPE
ST(OF)	STORM DRAIN OVERFLOW
SD	SECONDARY DRAIN
SO	SAND AND OIL WASTE
CA	COMPRESSED AIR PIPE
VAC	VACUUM AIR

DUCTWORK LEGEND

SINGLE LINE	DESCRIPTION	DOUBLE LINE
	90° ELBOW DOWN (ROUND DUCT ONLY)	
	ROUND 90° ELBOW UP (ROUND DUCT ONLY)	
D	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE) D = DROP R = RISE	D
	ROUND RADIUS ELBOW	
	90° STRAIGHT TEE	
	90° CONICAL TEE	
	45° BRANCH	
	45° CONICAL TEE	
	SIZE OR SHAPE TRANSITION	
	ROUND FLEXIBLE DUCT	
	90° ELBOW DN (NEGATIVE PRESSURE)	
	90° ELBOW DN (POSITIVE PRESSURE)	
	90° ELBOW UP (NEGATIVE PRESSURE)	
	90° ELBOW UP (POSITIVE PRESSURE)	
	90° RADIUS ELBOW	
	90° RADIUS ELBOW W/TURNING VANES	
	SQUARE DUCT SPLIT	
	ROUND DUCT SPLIT	
	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW & SPLITTER DAMPER	
	POSITIVE PRESSURE RISER, TYPICALLY SUPPLY	
	NEGATIVE PRESSURE RISER, TYPICALLY RETURN, EXHAUST OR OUTSIDE AIR	
F/S	COMBINATION FIRE & SMOKE DAMPER	F/S
	FIRE DAMPER	
	SMOKE DAMPER	
	MOTOR OPERATED DAMPER (MOD)	
	MANUAL VOLUME DAMPER, SINGLE BLADE DAMPER (SBD) FOR ROUND OR <10" TALL, OPPOSED BLADE DAMPER (OBD) >10" TALL	
BDD	BACKDRAFT DAMPER	BDD
SD	SMOKE DETECTOR	SD
24x36	DUCT SIZE: FIRST NUMBER IS PLAN WIDTH, SECOND NUMBER IS DEPTH.	24x36

MECHANICAL SHEET INDEX

#	TITLE	ISSUE LOG: DRAWING ISSUED FOR CONSTRUCTION	DRAWING ISSUED FOR CONSTRUCTION (ADDENDUM #1)	DRAWING ISSUED FOR CONSTRUCTION (ADDENDUM #2)
M0.0	MECHANICAL COVER SHEET	X	X	X
M0.1	MECHANICAL SCHEDULES	X	X	X
M1.0	FIRST FLOOR MECHANICAL DEMOLITION PLAN	X	DISCONTINUED	
M1.1	FIRST FLOOR HVAC PLAN	X	X	X
M1.2	FIRST FLOOR PLUMBING PLAN	X	X	X
M2.0	MECHANICAL DIAGRAMS	X	X	X
DATE		02.26.2018	03.21.2018	02.26.2018

ISSUE LOG KEY:
'X' ISSUED AS PART OF A SET
' ' NOT PART OF SET
'•' ISSUED FOR INFORMATION ONLY

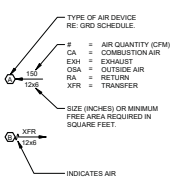
FIXTURE CONNECTION SCHEDULE

ABBREV.		HW	CW	WASTE	VENT
BS	BAR SINK	1/2"	1/2"	1-1/2"	1-1/2"
CS	CLOTHES WASHER ROUGH-IN	1/2"	1/2"	2"	1-1/2"
DF	DRINKING FOUNTAIN / E.W.C.	-	1/2"	1-1/2"	1-1/2"
DM	DISH MACHINE ROUGH-IN	3/4"	3/4"	2"	1-1/2"
DW	DISHWASHER ROUGH-IN	1/2"	-	2"	1-1/2"
FD	FLOOR DRAIN	-	-	2"	1-1/2"
FS	FLOOR SINK	-	-	3"	2"
HB	HOSE BIB	-	3/4"	-	-
HS	HAND SINK	1/2"	1/2"	1-1/2"	1-1/2"
KS	KITCHEN SINK W/ OR W/O DISPOSER	1/2"	1/2"	2"	1-1/2"
LAV	LAVATORY	1/2"	1/2"	1-1/2"	1-1/2"
MSB	MOP SERVICE BASIN	3/4"	3/4"	3"	2"
SH	SHOWER / BATHTUB	3/4"	3/4"	2"	1-1/2"
SS	SERVICE SINK	1/2"	1/2"	3"	2"
TD	TROUGH DRAIN	-	-	3"	2"
UR	URINAL (BLOWOUT)	-	1"	2"	1-1/2"
UR	URINAL (WASHDOWN)	-	3/4"	2"	1-1/2"
UR	URINAL (WATERLESS)	-	-	2"	1-1/2"
WC	WATER CLOSET (FLUSH VALVE)	-	1"	4"	2"
WCT	WATER CLOSET (FLUSH TANK)	-	1/2"	4"	2"
WS	WORK SINK	3/4"	3/4"	2"	1-1/2"

NOTES

1. SIZES SHOWN ARE MINIMUM PIPE SIZES TO A SINGLE FIXTURE. LARGER SIZES MAY BE INDICATED ON PLANS WHERE REQUIRED.
2. MINIMUM DOMESTIC PIPE SIZE TO (2) OR MORE FIXTURES IS 3/4".
3. RE: MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR INDIRECT WASTE SIZES.
4. WASTE AND VENT SIZES SHOWN ABOVE APPLY TO INDIVIDUAL VENTING ONLY. WHERE ALLOWED, INDIVIDUAL VENT CONNECTIONS MAY BE OMITTED OR SIZES MAY VARY WHEN CIRCUIT VENTS, COMMON VENTS, WASTE STACK VENTS, WET VENTS, OR COMBINATION DRAIN AND VENT SYSTEMS ARE USED. PRIOR APPROVAL FROM THE ENGINEER IS REQUIRED TO USE THESE ALTERNATIVE VENTING METHODS.
5. PROVIDE TRAP PRIMER FOR ALL FLOOR DRAINS AND FLOOR SINKS NOT LOCATED IN FOOD SERVICE AREAS.
6. MINIMUM SIZE FOR WASTE AND VENT PIPING BENEATH SLAB IS 2".
7. ALL FIXTURES LISTED ARE NOT NECESSARILY USED ON THIS PROJECT.

AIR DEVICE DESIGNATION KEY

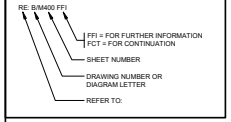


NOTE
FOR STANDARD MODULE SIZE REGISTERS, SIZE GIVEN IS NECK SIZE. REFER TO GRD SCHEDULE FOR MODULE SIZE.

PROJECT ALTITUDE

5,100' ABOVE SEA LEVEL

REFERENCE SAMPLE



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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED ANDREW PAGELER 44377 PROFESSIONAL ENGINEER

NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CRB

MECHANICAL COVER SHEET

M0.0

BG BUILDINGWORKS
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SINGLE-ZONE VENTILATION SCHEDULE

VENTILATION EQUATION VARIABLE DEFINITIONS:
BREATHING ZONE OUTDOOR AIRFLOW, Vbz
ZONE FLOOR AREA, Az
ZONE POPULATION, Pz
AREA OUTDOOR AIR RATE, Ra
PEOPLE OUTDOOR AIR RATE, Rp
ZONE AIR DISTRIBUTION EFFECTIVENESS, Ez
ZONE OUTDOOR AIRFLOW, Voz
SYSTEM OUTDOOR AIR INTAKE FLOW RATE, Vot

VENTILATION EQUATIONS:
Vbz = Rp * Pz + Ra * Az (EQUATION 4-1)
Voz = Vbz / Ez (EQUATION 4-2)
Vot = Voz (EQUATION 4-3 - SINGLE ZONE SYSTEMS)

NOTES:
1. SCHEDULE IS BASED ON 2009 INTERNATIONAL MECHANICAL CODE.
2. Vot IS THE REQUIRED ZONE AIRFLOW DURING OCCUPIED PERIODS.

FUR-1 SUMMARY

SPACE NAME	AREA (SQ.FT.)	SYSTEM POPULATION	PEOPLE OA (CFM/PERSON)	AREA OA (CFM/SQ.FT.)	BREATHING ZONE OA (CFM)	SYSTEM AIR DIST. EFFECTIVENESS	Voz [CFM]	SYSTEM OA (CFM)
LAB	722	2	10	0.18	150	0.8	187	201
LAB OFFICE	98	1	5	0.06	11	0.8	14	

SCHEDULE NOTES:

1. ALL STARTERS FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED UNDER THIS CONTRACT AND SET IN PLACE AND WIRED BY EC. VFD'S NOT INCLUDED AS PART OF THE EQUIPMENT WIRING PACKAGE SHALL BE FURNISHED, SET IN PLACE AND WIRED BY THE EC, U.N.O.
2. NOT ALL EQUIPMENT REQUIRED UNDER THIS CONTRACT IS NECESSARILY SPECIFIED ON THE SCHEDULE SHEETS. PLAN & DIAGRAM NOTATIONS AND PROJECT MANUAL CONTAIN EQUIPMENT SPECIFICATIONS AS WELL.
3. NOT ALL CAPACITIES, CHARACTERISTICS, AND CONSTRUCTION FEATURES REQUIRED ARE NECESSARILY INDICATED IN THE EQUIPMENT SCHEDULES. RE: PLANS AND SPECIFICATIONS FOR ADDITIONAL REQMTS.
4. CAPACITIES, CHARACTERISTICS, AND CONSTRUCTION FEATURES OF THE SCHEDULED EQUIPMENT ARE HEREBY INCORPORATED INTO THE PROJECT REQUIREMENTS. EQUIVALENT PRODUCTS PERFORMANCE AND CONSTRUCTION FEATURES SHALL MEET OR EXCEED THAT OF THE SPECIFIED EQUIPMENT WHETHER SCHEDULED OR NOT.
5. NOT ALL EQUIPMENT AVAILABLE FROM LISTED "EQUIVALENT" MANUFACTURERS LISTED IS NECESSARILY EQUIVALENT TO THE BASIS OF DESIGN EQUIPMENT SPECIFIED. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY COSTS, RESULTANT CHANGES TO OTHER DIVISIONS, AND SPATIAL REQ'MTS FOR EQUIPMENT OTHER THAN SCHEDULED.
6. ALL MANUFACTURERS REPRESENTATIVES SHALL READ AND UNDERSTAND THE CONTROL DIAGRAMS AND COORDINATE WITH TCC TO PROVIDE A FULLY FUNCTIONING SYSTEM AS DESCRIBED IN THE CONTROL DIAGRAMS.

MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

ITEM	FURNISHED UNDER	SET IN PLACE OR MTD. UNDER	WIRED/ CONNECTED UNDER
1. EQUIPMENT MOTORS AND THERMAL OVERLOADS, RESISTANCE HEATERS.	MD	MD	ED
2. VFD'S, MOTOR CONTROLLERS; MAGNETIC STARTERS, REDUCED VOLTAGE STARTERS AND OVERLOAD RELAYS.	MD	ED(a)	ED
3. DISCONNECT SWITCHES (FUSED OR NON-FUSED), HP RATED SWITCHES, THERMAL OVERLOAD SWITCHES AND FUSES AND MANUAL OPERATING SWITCHES.	ED(a)	ED(a)	ED
4. PUSHBUTTON STATIONS, PILOT LIGHTS, MULTI-SPEED SWITCHES, FLOAT SWITCHES, THERMOSTATS, CONTROL RELAYS, TIMECLOCKS, CONTROL TRANSFORMERS, CONTROL PANELS, MOTOR VALVES, DAMPER ACTUATORS, SOLENOID VALVES, EP AND PE SWITCHES AND INTERLOCKS.	MD	MD	MD(b)
5. 120 VOLT POWER FOR BAS PANELS, FIRE PROTECTION AND BOILER CONTROLS.	ED	ED	ED
6. FIRE/SMOKE DAMPERS AND ELEVATOR VENT DAMPERS.	MD	MD	ED(c)

MD = MECHANICAL DIVISION
ED = ELECTRICAL DIVISION

NOTES:
(a) IF FURNISHED AS PART OF FACTORY-WIRED EQUIPMENT, THEN WIRING AND CONNECTIONS ONLY BY ED
(b) IF ANY OF THESE DEVICES CARRY THE FULL LOAD CURRENT TO ANY MOTOR THEY SHALL BE CONNECTED BY ED. CONTROL DEVICES CARRYING FULL LOAD CURRENT FURNISHED BY MD AND WIRED BY ED SHALL BE LOCATED AT THE DEVICE BEING CONTROLLED, UNLESS SHOWN ON DRAWINGS OR MUTUAL AGREEMENT IS MADE BETWEEN THE CONTRACTORS WITH NO CHANGE IN THE CONTRACT PRICE.
(c) WIRING FROM ALARM CONTACTS TO ALARM SYSTEM BY ED; ALL CONTROL FUNCTION WIRING BY MD. DUCT DETECTORS FURNISHED BY ED, SET IN PLACE BY MD.

GENERAL NOTES: THE ABOVE LIST DOES NOT ATTEMPT TO INCLUDE ALL COMPONENTS. ALL ITEMS NECESSARY FOR A COMPLETE SYSTEM SHALL BE INCLUDED IN THE BASE CONTRACT.

PUMP SCHEDULE

MARK	SERVICE	TYPE	GPM	PUMP HEAD (FT)	FLUID	MOTOR HP	MOTOR VOLT/ PH	MANUFACTURER* & MODEL #	ACCESSORIES	REMARKS
P-2	DOMESTIC COLD WATER	SIMPLEX BOOSTER PUMP	35	121	WATER	5	460/3	SYNCROFLO, SIMPLEX 32-160b SHP	PROVIDE WITH MODEL 185 HYDROCUMULATOR TANK HCT-1	A, B

MANUFACTURERS:
* GRUNDFOS, TACO OR AURORA EQUIVALENT
GENERAL NOTES:
A: FLUID TEMP. 40°F.
B: PROVIDE WITH VFD AND CONTROL PACKAGE, 2 PRESSURE GAUGES, STEEL PUMP SKID WITH BOLTED PANEL STAND, CHECK VALVES, BUTTERFLY ISOLATION VALVES ON SUCTION AND DISCHARGE SIDES, AND 304 STAINLESS STEEL PUMP.

PLUMBING FIXTURE SCHEDULE

SYMBOL	TYPE	A.D.A.	FINISH	MANUFACTURER* & MODEL #	FAUCET TRIM MFR.* & MODEL #	ACCESSORIES	ACCESSORIES	REMARKS
P1	EPOXY RESIN UNDER MOUNT SINK	NO	BLACK	DURCON, U61C	CHICAGO FAUCETS, 786-GN8BVBE7CP, SWING NECK	BRADLEY EYE/FACE WASH, S19-270E	RYAN HERCO FLOW SOLUTIONS, R-500 STRAIGHT GLOBE VALVE, DECK MOUNTED.	B
P2	EPOXY RESIN UNDER MOUNT SINK	NO	BLACK	DURCON, U05C	CHICAGO FAUCETS, 786-GN8BVBE7CP, SWING NECK	-	-	-
P3	EPOXY RESIN DROP-IN SINK	YES	BLACK	DURCON, A55	CHICAGO FAUCETS, 786-GN8BVBE7CP, SWING NECK	BRADLEY EYE/FACE WASH, S19-290D	RYAN HERCO FLOW SOLUTIONS, R-100 BALL VALVE, DECK MOUNTED.	B
P4	EPOXY RESIN UNDER MOUNT SINK	NO	BLACK	DURCON, U61C	CHICAGO FAUCETS, 919-L613AABCP	BRADLEY EYE/FACE WASH, S19-270E	RYAN HERCO FLOW SOLUTIONS, R-500 STRAIGHT GLOBE VALVE, DECK MOUNTED.	B
P5	THERMOSTATIC MIXING VALVE	-	-	-	BRADLEY, NAVIGATOR S19-2200 EFX60	-		SET TO 90°F. MUST COMPLY WITH ANSI Z358.1.
P6	MOP SINK FAUCET	NO	CHROME	-	T & S BRASS AND BRONZE WORKS, PG-8WREV	PROVIDE WALL HOOK FOR MOUNTING NOZZLE.	-	-
P7	EPOXY RESIN CUP SINK	NO	BLACK	DURCON, TS18	CHICAGO FAUCETS, 201-AGN2BVBE7-317, SWING NECK	PROVIDE WITH REMOVABLE STRAINER.	ORION, STYLE 10 DILUTION TANK/TRAP - 2 GALLONS - SINGLE INLET - PROVIDE WITH LIMESTONE CHIPS.	-
P8	THERMOSTATIC MIXING VALVE	-	-	-	BRADLEY, NAVIGATOR S19-2000 EFX8	-		SET TO 90°F. MUST COMPLY WITH ANSI Z358.1.
P9	EMERGENCY SHOWER - EYE - FACE WASH	NO	YELLOW	BRADLEY, S19-310AC	-	-		A
P10	VACUUM FAUCET	YES	CHROME	CHICAGO FAUCETS, 980-909-957-3KAGV	-	-	-	-
P11	REDUCED PRESSURE BACKFLOW PREVENTER	-	-	WATTS, LF919-QT-S	-	919AGC	-	C

MANUFACTURERS:
FIXTURE: AMERICAN STANDARD, UNIVERSAL RUNDLE, FIAT STERN WILLIAMS, DURCON
FAUCET: SPEAKMAN, DELTA, AMERICAN STANDARD
DRAIN: JOSAM, WADE SMITH, ZURN
REMARKS/NOTES:
A: PROVIDE WITH P5.
B: PROVIDE WITH P8.
C: PROVIDE WITH AIR GAP FITTING AND STRAINER. ROUTE AIR GAP FITTING DISCHARGE TO NEAREST FLOOR SINK.

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MECHANICAL SCHEDULES

M0.1

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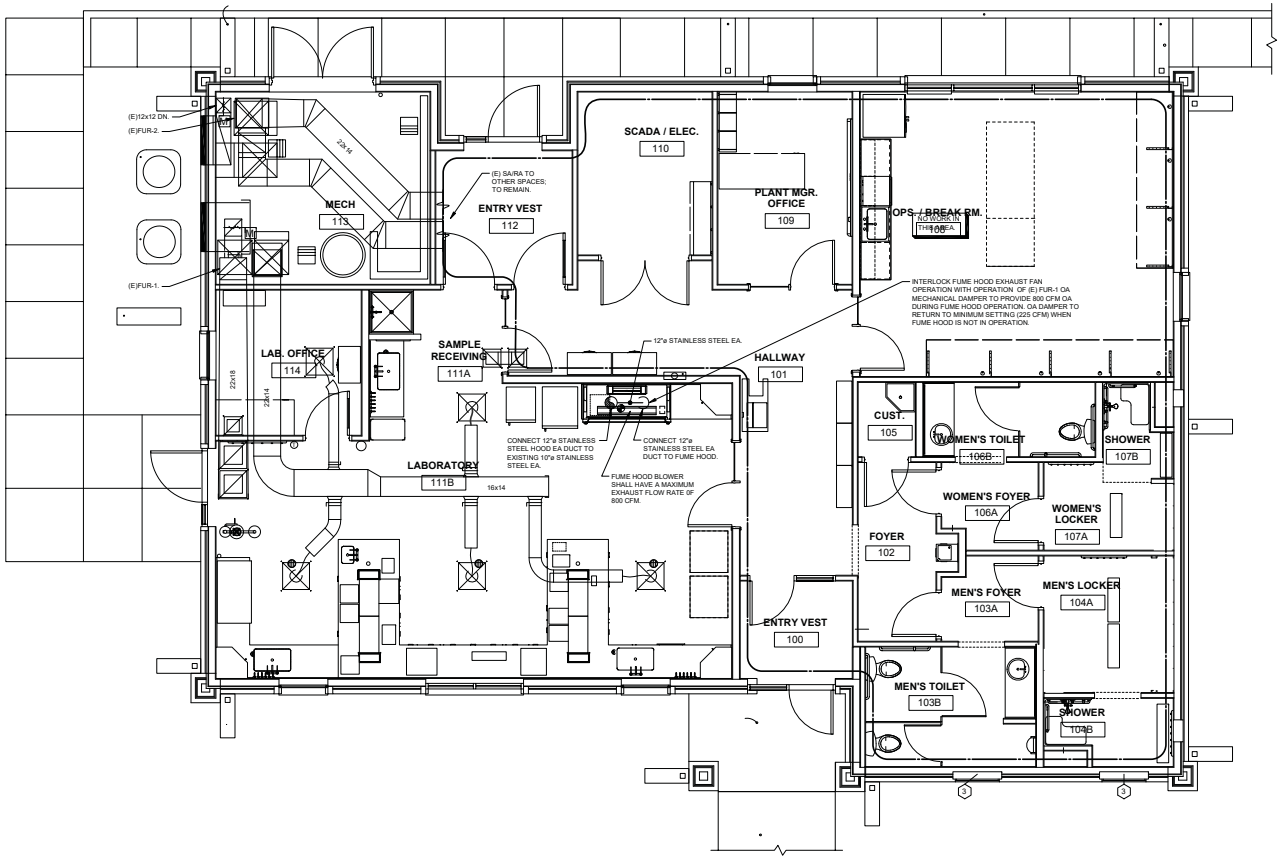
NOTES:

1. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, FIRE PROTECTION, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY INSTALLATIONS.
2. DO NOT ROUTE DUCTWORK OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR.
3. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL (N) MOTORIZED EQUIPMENT.
4. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER DUCTS, PIPES, AND ELECTRICAL.



1 FIRST FLOOR HVAC PLAN
SCALE: 1/4" = 1'-0"

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FIRST FLOOR HVAC PLAN

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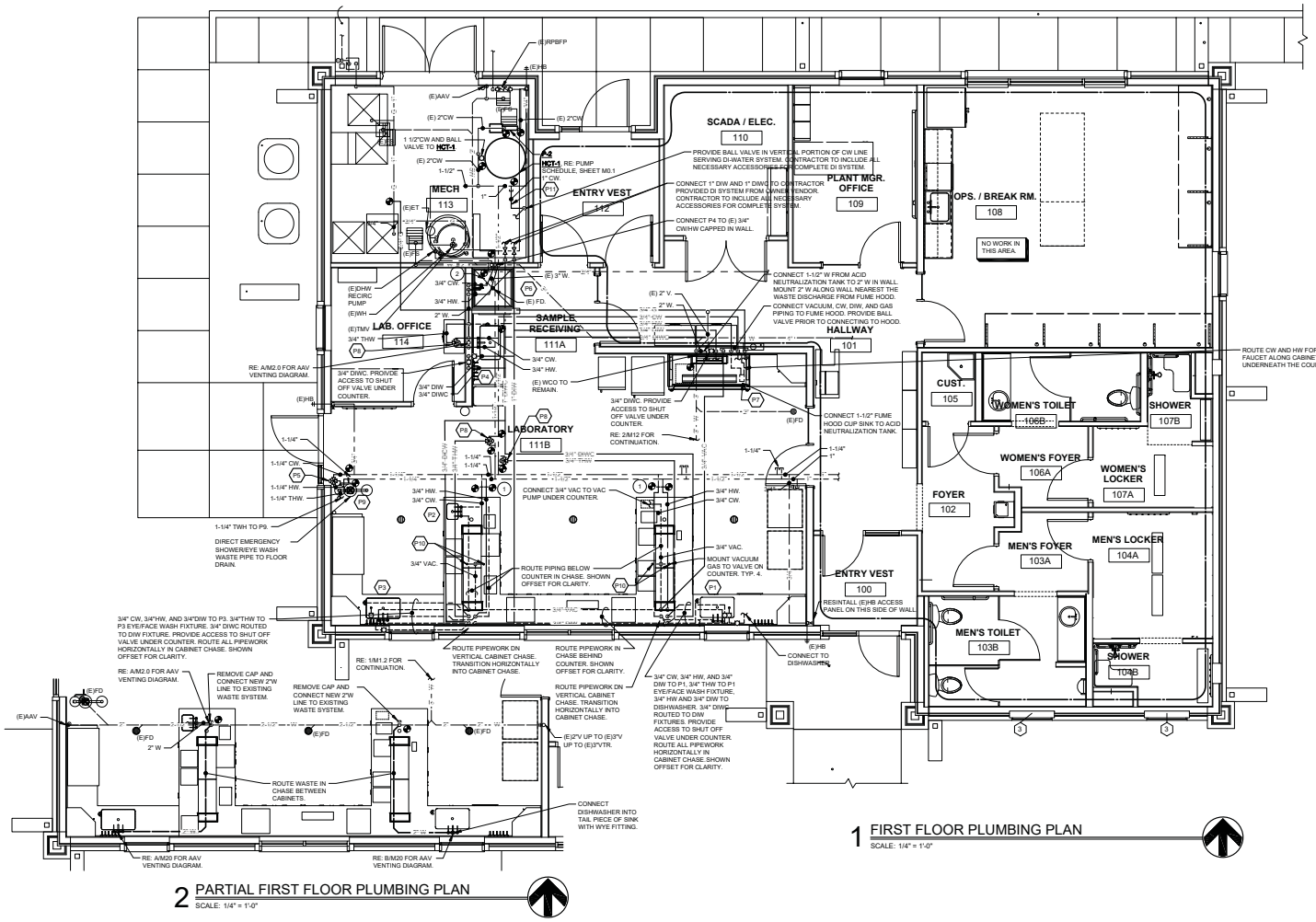

1 FIRST FLOOR PLUMBING PLAN
SCALE: 1/4" = 1'-0"

2 PARTIAL FIRST FLOOR PLUMBING PLAN
SCALE: 1/4" = 1'-0"

NOTES:

1. REFER TO THE PLUMBING FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES TO INDIVIDUAL FIXTURES.
2. NOT ALL REQUIRED CLEANOUTS ARE NECESSARILY SHOWN ON THESE PLANS. PROVIDE CLEANOUTS ON WASTE, VENT AND STORM PIPING AS REQUIRED BY CODE AND FOR REASONABLE MAINTENANCE BASED ON ACTUAL FIELD INSTALLATION. COORDINATE LOCATIONS WITH ARCHITECT/ENGINEER.
3. PIPING ON EXTERIOR WALLS TO BE ROUTED IN FRAMED WALL ON INTERIOR SIDE OF INSULATION WITHIN CABINET CHASE.
4. INSTALL THERMOSTATIC MIXING VALVES, ASSE 1070 LISTED, AT EACH PUBLIC HANDWASHING LAVATORY/SINK. SIZE TO MATCH HW PIPE SIZE.
5. DO NOT ROUTE PIPING OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS. MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 26 CONTRACTOR.
6. PROVIDE FLEXIBLE PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
7. ROUTE DOMESTIC HOT WATER RECIRC TO WITHIN 3 FEET OF ALL HOT WATER FIXTURES.
8. PEX PIPING SHALL NOT BE ALLOWED TO PENETRATE FIRE BARRIERS WHERE FIRE CAULKING IS REQUIRED.
9. ALL VALVES SHALL BE INSTALLED ABOVE DROP-IN CEILINGS IN ACCESSIBLE LOCATIONS.
10. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER PIPES, DUCTS, AND ELECTRICAL.

FLAG NOTES:

1. CONNECT (N) CW/HW TO (E) STUBS.
2. (E) FD TO BE REUSED BY EPOXY MOP SINK FLOOR BASIN. CONNECT (N) 2"W LINE TO (E) 3"W LINE FROM (E) FD.

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FIRST FLOOR PLUMBING PLAN

M1.2

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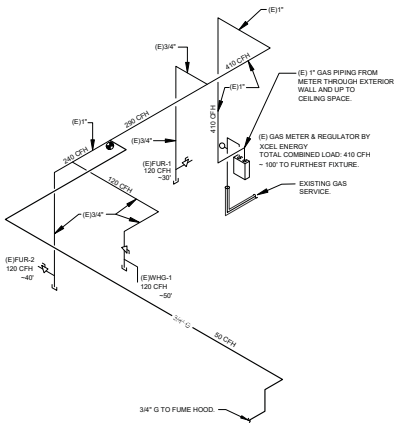
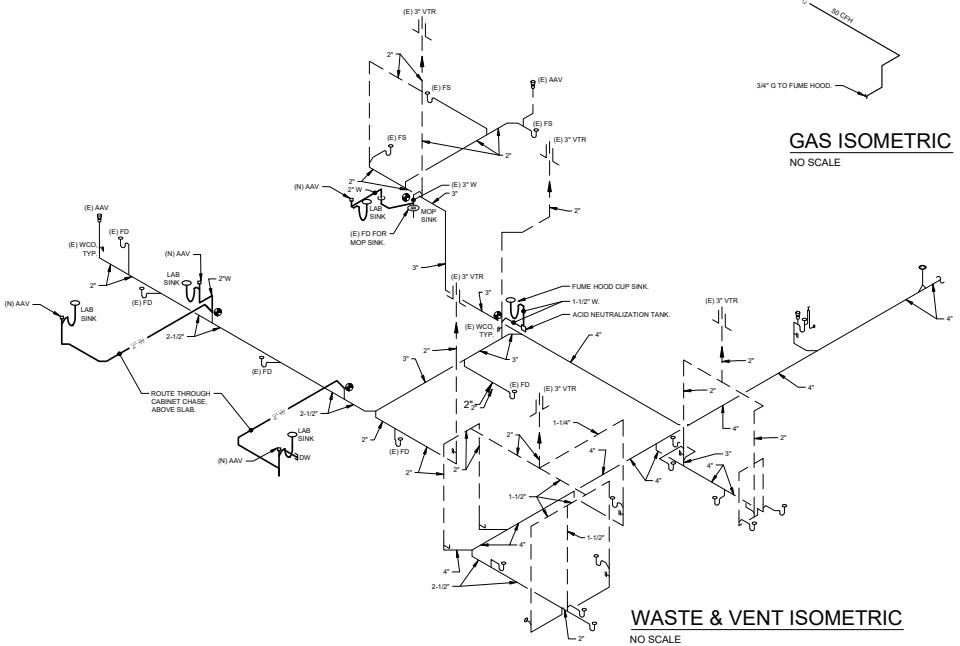
GAS CONNECTION SCHEDULE

EQUIPMENT	BTUH	CFH	DISTANCE TO EQUIPMENT	GAS SIZE TO EQUIP
(E)FUR-1	120,000	120	30'	3/4"
(E)FUR-2	120,000	120	40'	3/4"
(E)WHG-1	120,000	120	50'	3/4"
FUME HOOD	50,000	50	100'	3/4"
TOTAL NEW LOAD	410,000	410		
DISTANCE TO FURTHEST FIXTURE	100'			
(E) GAS MAIN SIZE	1"			

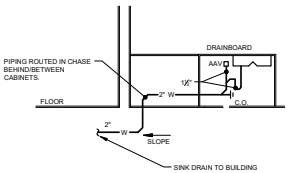


GAS ISOMETRIC
NO SCALE

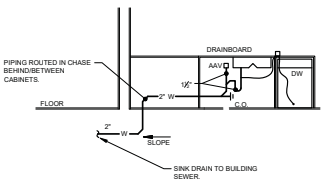


WASTE & VENT ISOMETRIC
NO SCALE

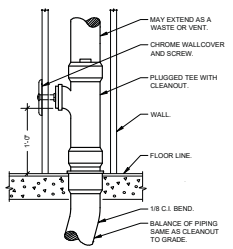
NOTES:
1) DO NOT DOWNSIZE ANY WASTE OR VENT PIPING.
2) PROVIDE ALL WALL CLEANOUTS UNDER LAVS AND SINKS AS INDICATED.
3) INSTALL ALL AIR ADMITTANCE VALVES PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.



AAV AT ISLAND SINK DIAGRAM
NO SCALE
A



AAV AT ISLAND SINK WITH DW DIAGRAM
NO SCALE
B



WALL CLEANOUT DIAGRAM
NO SCALE
C

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MECHANICAL DIAGRAMS

M2.0

ELECTRICAL SYSTEMS LEGEND

NOTE: ALL SYMBOLS SHOWN ON LEGEND ARE NOT NECESSARILY USED.

VOICE/DATA SYMBOLS

- TELEPHONE WALL OUTLET
- DOUBLE TELEPHONE WALL OUTLET
- TELEPHONE FLOOR OUTLET
- DATA WALL OUTLET
- DATA WALL OUTLET MOUNTED ABOVE COUNTER
- DATA WALL OUTLET
- DATA FLOOR OUTLET
- COMBO PHONE/DATA OUTLET
- DOUBLE COMBO PHONE/DATA OUTLET
- COMBO PHONE/DATA FLOOR OUTLET
- VOICE/DATA/FIBER OUTLET
- POINT OF SALE (POS) OUTLET
- AUTOMATED TELLER MACHINE (ATM) STATION
- PUBLIC PAYPHONE OUTLET
- ELEVATOR PHONE OUTLET
- FAX/COPIER OUTLET
- EMERGENCY SERVICES PHONE OUTLET
- POWER/TELECOM POLE
- WIRELESS LAN (WI-FI) ACCESS POINT OUTLET
- MULTI-OUTLET WIREWAY
- SINGLE GANG DATA BACKBOX

LIGHTING FIXTURE SYMBOLS

- RECESSED LIGHTING FIXTURE
- DIRECTIONAL/ADJUSTABLE RECESSED LIGHTING FIXTURE
- SURFACE MOUNTED LIGHT
- PENDANT MOUNTED LIGHT
- WALL MOUNTED LIGHT
- WALL MOUNTED UP-LIGHT
- MONO-POINT LIGHTING FIXTURE
- RECESSED STEP LIGHT
- FLUORESCENT STRIP LIGHT
- WALL MOUNTED LINEAR FLUORESCENT LIGHT
- RECESSED OR SURFACE MOUNTED FLUORESCENT TROFFER
- FIXTURE WITH EMERGENCY BACKUP OR ON EM CIRCUIT
- CEILING MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN
- WALL MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN
- EMERGENCY LIGHTS
- EXTERIOR POLE MOUNTED LIGHT
- EXTERIOR POST (BOLLARD) MOUNTED LIGHT

LIGHTING CONTROL SYMBOLS

- S — SWITCH
- S^3 — THREE-WAY SWITCH
- S^4 — FOUR-WAY SWITCH
- S^J — DOOR JAMB SWITCH
- S^K — KEY SWITCH
- S^V — VARIABLE SPEED SWITCH
- S^T — THERMAL OVERLOAD SWITCH
- D — DIMMER
- D^3 — THREE-WAY DIMMER
- LV — LOW VOLTAGE SWITCH
- S^O — WALL OCCUPANCY SENSOR/SWITCH
- OS — OCCUPANCY SENSOR - WALL MOUNTED
- OS — OCCUPANCY SENSOR - CEILING MOUNTED
- OS — OCCUPANCY SENSOR - CORRIDOR CEILING MOUNTED
- DL — DAYLIGHT PHOTO SENSOR

AUDIOVISUAL SYMBOLS

- TELEVISION OUTLET - WALL MOUNTED
- TELEVISION OUTLET - CEILING MOUNTED
- TELEVISION OUTLET - FLOORBOX
- AUDIOVISUAL OUTLET - WALL MOUNTED
- AUDIOVISUAL OUTLET - CEILING MOUNTED
- AUDIOVISUAL OUTLET - FLOORBOX
- LOUDSPEAKER - CEILING MOUNTED
- LOUDSPEAKER - WALL MOUNTED
- SPK — LOUDSPEAKER OUTLET
- LOUDSPEAKER - POWERED SUBWOOFER
- LOUDSPEAKER BAR - LEFT/CENTER/RIGHT
- LOUDSPEAKER BAR - STEREO
- LOUDSPEAKER BAR - CENTER CHANNEL
- MICROPHONE OUTLET - FLOORBOX
- MICROPHONE OUTLET - WALL MOUNTED
- INTERACTIVE (ELECTRONIC) WHITEBOARD
- PROJECTION SCREEN, TELEVISION, OR OTHER DISPLAY EQPT
- VIDEO PROJECTOR
- SPEAKER ZONE HOMERUN

POWER SYMBOLS

- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE
- GFCI DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE; HALF SWITCHED
- ISOLATED GROUND DUPLEX RECEPTACLE
- MULTI-OUTLET PLUG STRIP
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DOUBLE DUPLEX RECEPTACLE
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE; HALF SWITCHED
- FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE AND TELECOM
- WALL MOUNTED SPECIAL OUTLET AS NOTED
- SPECIAL OUTLET AS NOTED
- JUNCTION BOX
- WALL MOUNTED JUNCTION BOX
- FLOOR MOUNTED JUNCTION BOX
- DIVISION 15 EQUIPMENT POWER CONNECTION
- TIMER SWITCH
- FUSED DISCONNECT
- NON FUSED DISCONNECT
- MOTOR STARTER
- ENCLOSED CIRCUIT BREAKER
- PULL BOX
- PUSH BUTTON
- TIME CLOCK
- PHOTO-CELL
- TRANSFORMER
- PANELBOARD OR LOADCENTER
- CONTACTOR
- ELECTRIC MOTOR
- METER
- THERMOSTAT
- ATS — AUTOMATIC TRANSFER SWITCH
- CIRCUIT HOMERUN
- CONDUIT RUN
- CONDUIT RUN BELOW GRADE
- CONDUIT UP
- CONDUIT DOWN
- S — SWITCH
- S^T — THERMAL OVERLOAD SWITCH
- S^V — VARIABLE SPEED SWITCH
- S^K — KEY SWITCH

ONE-LINE DIAGRAM SYMBOLS

- DISCONNECT SWITCH
- FUSE
- CIRCUIT BREAKER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- M — METER
- V — VOLT-METER
- A — AMP-METER
- SPD — SURGE PROTECTION DEVICE
- SELECTOR SWITCH
- GROUND FAULT PROTECTION
- SHUNT TRIP
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- GROUND
- COLD WATER GROUND CONNECTION
- BUILDING STEEL GROUND CONNECTION

ABBREVIATIONS

- AFC - ABOVE FINISHED CEILING
- AFF - ABOVE FINISHED FLOOR
- AFG - ABOVE FINISHED GRADE
- AHJ - AUTHORITY HAVING JURISDICTION
- AL - ALUMINUM
- AP - ACCESS POINT
- AWG - AMERICAN WIRE GAUGE
- BAS - BUILDING AUTOMATION SYSTEM
- BFG - BELOW FINISH GRADE
- BMS - BUILDING MANAGEMENT SYSTEM
- C - CONDUIT
- CATV - COMMUNITY (CABLE) ANTENNA TELEVISION SYSTEM
- CCTV - CLOSED CIRCUIT TELEVISION
- CKT - CIRCUIT
- CPU - CENTRAL PROCESSING UNIT
- CT - CURRENT TRANSFORMER
- DISP - GARBAGE DISPOSAL
- DW - DISHWASHER
- (E) - EXISTING
- EM - EMERGENCY
- EWC - ELECTRIC WATER COOLER
- FA - FIRE ALARM
- FACP - FIRE ALARM CONTROL PANEL
- FBO - FURNISHED BY OTHERS
- GC - GENERAL CONTRACTOR
- GFI - GROUND FAULT CIRCUIT INTERRUPTER
- GRD - GROUND
- IAW - IN ACCORDANCE WITH
- IC - INTERMEDIATE CROSS-CONNECT
- IDF - INTERMEDIATE DISTRIBUTION FRAME
- IG - ISOLATED GROUND
- IR - INFRARED
- LAN - LOCAL AREA NETWORK
- MDF - MAIN DISTRIBUTION FRAME
- (N) - NEW
- NIC - NOT IN CONTRACT
- NL - NIGHT LIGHT
- NTS - NOT TO SCALE
- OC - ON CENTER
- PA - PUBLIC ADDRESS
- REF - REFRIGERATOR
- TTB - TELECOMMUNICATIONS TERMINAL BOARD
- TVSS - TRANSIENT VOLTAGE SURGE SUPPRESSOR
- TVTB - TELEVISION TERMINAL BOARD
- UG - UNDERGROUND
- UNO - UNLESS NOTED OTHERWISE
- V - VOLT
- W - WATT
- WAN - WIDE AREA NETWORK
- WAP - WIRELESS ACCESS POINT
- WLAN - WIRELESS LOCAL AREA NETWORK
- WP - WEATHERPROOF
- XP - EXPLOSIONPROOF
- +18" - MOUNTING HEIGHT TO CENTERLINE OF DEVICE ABOVE FINISH FLOOR (VERIFY W/ ARCH ELEVS)

NOTES:

- LIGHT LINEWEIGHT INDICATES EXISTING.
- HATCHED AREAS INDICATE DEMOLITION.
- 'C' ADJACENT TO A DEVICE INDICATES MOUNTING ABOVE COUNTERTOP.

ELECTRICAL SHEET INDEX

ISSUE LOG

#	TITLE	OWNER REVIEW SET	OWNER CHECK SET	CONSTRUCTION DOCUMENTS
E0.0	ELECTRICAL COVER SHEET	√	√	√
E0.1	ELECTRICAL ONE-LINE DIAGRAM	√	√	√
E0.2	ELECTRICAL SCHEDULES	√	√	√
E1.0	FIRST FLOOR ELECTRICAL DEMOLITION PLAN	√	√	√
E1.1	FIRST FLOOR POWER PLAN	√	√	√
E1.2	FIRST FLOOR LIGHTING PLAN	√	√	√
E1.3	FIRST FLOOR TECHNOLOGY PLAN	√	√	√
E2.0	ELECTRICAL DIAGRAMS	√	√	√
DATE		02.07.2018	02.21.2018	02.26.2018

ISSUE LOG KEY:
'√' ISSUED AS PART OF A SET
' ' NOT PART OF SET
'*' ISSUED FOR INFORMATION ONLY

GENERAL NOTES:

1. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS ON ARCHITECTURAL DRAWINGS AND IN FIELD PRIOR TO COMMENCEMENT OF WORK.
2. VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN HIS BID COSTS REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS.
3. SYSTEM OUTAGES SHALL BE PERMITTED ONLY AT TIMES APPROVED BY OWNER - IN WRITING. WORK WHICH COULD RESULT IN AN ACCIDENTAL OUTAGE (BEYOND BRANCH CIRCUITS) SHALL BE PERFORMED WITH THE OWNER'S MAINTENANCE PERSONNEL ADVISED OF SUCH WORK.
4. SERVICE SHALL BE MAINTAINED TO EXISTING AREAS DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE PORTABLE GENERATORS, CABLES, OUTLETS, ETC. AS REQUIRED TO MAINTAIN CONTINUITY OF SERVICE. PLACEMENT OF SUCH PORTABLE EQUIPMENT SHALL BE SUBJECT TO OWNER APPROVAL.
5. REVIEW ARCHITECTURAL, MECHANICAL AND OTHER DRAWINGS PRIOR TO BID.
6. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT.
7. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE, AND NATIONAL CODES AND ORDINANCES.
8. PROVIDE PERMITS AND INSPECTIONS REQUIRED.
9. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS.
10. EXISTING SYSTEMS AND CONDITIONS SHOWN ON DRAWINGS FOR EXISTING BUILDINGS ARE TO BE NOTED "FOR GUIDANCE ONLY". THE ELECTRICAL CONTRACTOR TO FIELD CHECK ALL EXISTING CONDITIONS PRIOR TO BIDDING AND TO INCLUDE IN HIS BID AN ALLOWANCE FOR REMOVAL AND/OR RELOCATION OF EXISTING CONDUITS, WIRES, DEVICES, FIXTURES, OR OTHER EQUIPMENT AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING ELECTRICAL SYSTEM TO ALL OTHER WORK AS REQUIRED
11. PROVIDE ELECTRICAL DEMOLITION REQUIRED. REFER TO ARCHITECTURAL AND ELECTRICAL DEMOLITION DRAWINGS FOR LOCATION AND EXTENT OF DEMOLITION REQUIRED. CONTRACTOR SHALL VISIT SITE PRIOR TO BID TO DETERMINE EXTENT OF WORK INVOLVED.
12. PROVIDE ALL NECESSARY DEMOLITION TO REMOVE EXISTING UNUSED CONDUIT, WIRE, CABLE, J-BOXES, RECEPTACLES, SWITCHES, LIGHTS, FIRE ALARMS DEVICES, ETC. COMPLETE WITH ASSOCIATED CIRCUITING TO SOURCE. WHERE IT IS NOT FEASIBLE TO REMOVE THE ABOVE, OUTLET SHALL BE ABANDONED, WIRE REMOVED, AND BLANK COVER PLATES PROVIDED.
13. ALL (E) EQUIPMENT, LAMPS, BALLASTS, ETC. BEING REMOVED SHALL BE DISCARDED IN ACCORDANCE WITH APPLICABLE EPA REQUIREMENTS.
14. EXISTING LIGHT FIXTURES, ELECTRICAL EQUIPMENT, ETC. BEING REMOVED SHALL BE RETURNED TO THE OWNER, EXCEPT FOR THOSE ITEMS BEING RELOCATED.
15. VERIFY EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
16. INSTALL ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO INSTALLATION.
17. FINAL CONNECTIONS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING PROVIDED UNDER THIS SECTION, OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION.
19. ALL ELECTRICAL SYSTEMS COMPONENTS SHALL BE LISTED OR LABELED BY U.L. OR OTHER RECOGNIZED TESTING FACILITY.
20. WIRING DEVICES SHALL BE SPECIFICATION GRADE AND RATED AT 20 AMPERES FOR LIGHT SWITCHES, AND 20 AMPERES FOR DUPLEX RECEPTACLES. THE COLOR OF THE DEVICES AND COVER PLATES SHALL BE AS DIRECTED BY ARCHITECT.
21. ALL WIRING SHALL BE INSTALLED IN LISTED METALLIC RACEWAYS, UNLESS NOTED OTHERWISE. CONNECTORS SHALL BE INSULATED THROAT TYPE. MINIMUM RACEWAY SIZE IS 3/4". ALL FEEDERS SHALL BE INSTALLED IN RACEWAY CONFIGURATIONS SHOWN ON ONE-LINE. BRANCH CIRCUITS 25A AND LARGER SHALL BE INSTALLED IN INDIVIDUAL RACEWAYS. BRANCH CIRCUITS 20A AND SMALLER MAY BE GROUPED INTO RACEWAYS AS TO NOT EXCEED 6 CURRENT-CARRYING 75-DEGREE CONDUCTORS, OR 9 CURRENT-CARRYING 90-DEGREE CONDUCTORS, IN A SINGLE RACEWAY. METAL CLAD CABLE IS [NOT] PERMITTED.
22. ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A 200LB NYLON PULL STRING OR EQUAL, AND SHALL BE IDENTIFIED AT ALL JUNCTION, PULL AND TERMINATION POINTS, USING PERMANENT METALLIC TAGS. TAG SHALL INDICATE INTENDED USE OF CONDUIT, ORIGINATION, AND TERMINATION POINTS OF EACH INDIVIDUAL CONDUIT.
23. WIRE SHALL BE COPPER, 75 DEGREE CELSIUS RATED FOR GENERAL USE. WIRING WITHIN 3 INCHES OF FLUORESCENT BALLASTS WIRE SHALL BE COPPER, MINIMUM 90 DEGREE CELSIUS RATED. SIZES INDICATED ARE FOR INSTALLATION IN A MAXIMUM 30 DEGREE CELSIUS AMBIENT. CONDUCTOR AMPACITY SHALL BE DERATED FOR HIGHER AMBIENT INSTALLATIONS.
24. PROVIDE NEW UPDATED PANELBOARD DIRECTORIES FOR EXISTING AND NEW CIRCUITS BEING UTILIZED FOR COMPLETION OF PROJECT.
25. PANEL DIRECTORIES SHALL BE REMOVABLE. ROOM NAMES AND NUMBERS SHALL BE AS DIRECTED BY OWNER. DIRECTORIES SHALL BE TYPED AND INSTALLED UNDER CLEAR PLASTIC COVERS.
26. FINAL CONNECTIONS TO MOTORS, TRANSFORMERS, AND OTHER VIBRATING EQUIPMENT SHALL BE SEAL TITE FLEX AND APPROVED FITTINGS. DO NOT SECURE CONDUITS, DISCONNECTS, OR DEVICES TO DUCTWORK OR MECHANICAL EQUIPMENT.
27. FIRE ALARM, SOUND, TELEPHONE, COMPUTER AND SIMILAR SYSTEMS CONDUITS LARGER THAN 1" SHALL HAVE LONG RADIUS SWEEPS (12 TIMES THE DIAMETER).
28. SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE, CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.
29. GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE OWNER.
30. SYSTEMS SHALL BE COMPLETE, OPERABLE, AND READY FOR CONTINUOUS OPERATION. LIGHTS, SWITCHES, RECEPTACLES, MOTORS, ETC. SHALL BE CONNECTED AND OPERABLE.

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

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NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

ELECTRICAL COVER SHEET

E0.0

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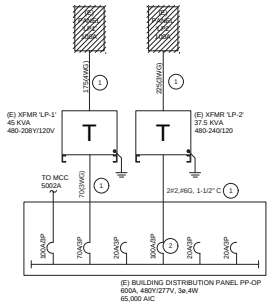
NOTES:

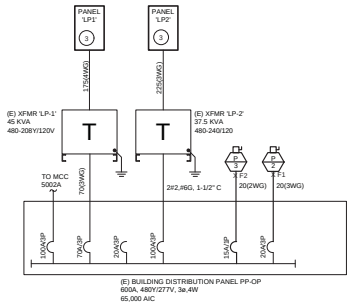
1. HATCHED AREA INDICATES EQUIPMENT TO BE REMOVED.
3. LIGHT LINE WEIGHT DENOTES EXISTING CONDITIONS, HEAVY LINE WEIGHT DENOTES NEW WORK.
4. VARIATIONS IN ELECTRICAL DISTRIBUTION CONFIGURATIONS MAY EXIST IN THE FIELD. NOTIFY ENGINEER IMMEDIATELY IF INSTALLED CONDITIONS ARE SIGNIFICANTLY DIFFERENT THAN REPRESENTED IN THESE DOCUMENTS.
5. VARIATIONS IN EXACT LAYOUT MAY DIFFER IN FIELD. FIELD-VERIFY EXISTING CONDITIONS AND PROVIDE WORK TO MEET DESIGN INTENT.

FLAG NOTES:

1. FEEDER CONDUITS AND CONDUCTOR SIZES ARE BASED ON AS-BUILT DRAWINGS. VERIFY SIZES IN FIELD. IF SMALLER CONDUCTORS ARE DISCOVERED PULL NEW TO MATCH WHAT IS SHOWN ON THIS SHEET.
2. EXISTING BREAKER IS 3 POLE, ONLY 2 POLES ARE REQUIRED.
3. NEW PANEL AIC TO MATCH EXISTING PANEL AIC (10,000A)



1 EXISTING ONE-LINE DIAGRAM
SCALE: N.T.S.



2 NEW ONE-LINE DIAGRAM
SCALE: N.T.S.

SHORT CIRCUIT / VOLTAGE DROP CALCULATION SUMMARY

POINT	TAG	VOLTAGE / PHASE	LENGTH (FT)	COPPER / ALUMINUM	CONDUIT	WIRE SIZE	# OF SETS	FEEDER VOLTAGE DROP (%)	TOTAL VOLTAGE DROP (%)	Isc AVAILABLE UPSTREAM	Isc (FAULT)
F1	P-2	480V, 3Ø	25	C	S	12	1	0.2%	0.2%	65,000	6,188
F2	P-3	480V, 3Ø	35	C	S	12	1	0.2%	0.2%	65,000	6,188

** THE BUILDING DISTRIBUTION PANEL IS RATED FOR A MAXIMUM (SYMMETRICAL) FAULT OF 65,000 AMPS. SHORT CIRCUIT CALCULATIONS ARE FURNISHED FOR ALL FAULT LEVELS ABOVE 10,000 AMPS @ 208 VOLT (14,000 AT 480 VOLT). ANY FAULT CURRENT BELOW THIS LEVEL IS CONSIDERED SAFE FOR THE ELECTRICAL SYSTEM TO CLEAR OR EQUIPMENT IS BUILT TO WITHSTAND THIS LEVEL OF FAULT SAFELY.

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Northglenn, Colorado

COLORADO LICENSED PROFESSIONAL ENGINEER 02/28/18 42213

NO	ISSUE	DATE
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PROJECT 1620
DATE 02.26.2018
DRAWN CJB

ELECTRICAL ONE-LINE DIAGRAM

E0.1

MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

	ITEM	FURNISHED UNDER	SET IN PLACE OR MTD. UNDER	WIRED / CONNECTED UNDER
1.	EQUIPMENT MOTORS AND THERMAL OVERLOADS, RESISTANCE HEATERS	MD	MD	ED
2.	VFDs, MOTOR CONTROLLERS; MAGNETIC STARTERS, REDUCED VOLTAGE STARTERS AND OVERLOAD RELAYS	MD	ED(a)	ED
3.	DISCONNECT SWITCHES (FUSED OR NON-FUSED), HP RATED SWITCHES, THERMAL OVERLOAD SWITCHES AND FUSES, AND MANUAL OPERATING SWITCHES	ED(a)	ED(a)	ED
4.	PUSHBUTTON STATIONS, PILOT LIGHTS, MULTI-SPEED SWITCHES, FLOAT SWITCHES, THERMOSTATS, CONTROL RELAYS, TIMECLOCKS, CONTROL TRANSFORMERS, CONTROL PANELS, MOTOR VALVES, DAMPER ACTUATORS, SOLENOID VALVES, EP AND PE SWITCHES AND INTERLOCKS	MD	MD	MD(b)
5.	120 VOLT POWER FOR BAS PANELS, FIRE PROTECTION AND BOILER CONTROLS	ED	ED	ED
6.	FIRE/SMOKE DAMPERS AND ELEVATOR VENT DAMPERS	MD	MD	ED(c)

MD = MECHANICAL DIVISION
ED = ELECTRICAL DIVISION

NOTES:

(a) IF FURNISHED AS PART OF FACTORY-WIRED EQUIPMENT, THEN WIRING AND CONNECTIONS ONLY BY ED

(b) IF ANY OF THESE DEVICES CARRY THE FULL LOAD CURRENT TO ANY MOTOR THEY SHALL BE CONNECTED BY ED. CONTROL DEVICES CARRYING FULL LOAD CURRENT FURNISHED BY MD AND WIRED BY ED SHALL BE LOCATED AT THE DEVICE BEING CONTROLLED, UNLESS SHOWN ON DRAWINGS OR MUTUAL AGREEMENT IS MADE BETWEEN THE CONTRACTORS WITH NO CHANGE IN THE CONTRACT PRICE.

(c) WIRING FROM ALARM CONTACTS TO ALARM SYSTEM BY ED; ALL CONTROL FUNCTION WIRING BY MD. DUCT DETECTORS FURNISHED BY ED, SET IN PLACE BY MD

GENERAL NOTE: THE ABOVE LIST DOES NOT ATTEMPT TO INCLUDE ALL COMPONENTS. ALL ITEMS NECESSARY FOR A COMPLETE SYSTEM SHALL BE INCLUDED IN THE BASE CONTRACT.

LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MOUNTING	TYPE	INPUT WATTS	VOLT	MANUFACTURER	CATALOG NUMBER	SPECIFIC NOTES
C S1	UNDER CABINET	SURFACE	LED	6W/FT	24V VIA 120V DRIVER	MP LIGHTING	L101N-7-S2-W3SH-W-F-D-MA OR EQUIVALENT	(1)

GENERAL NOTES:

A. THE LUMINAIRE SCHEDULE CAN NOT BE USED INDEPENDENTLY OF THE DRAWINGS AND SPECIFICATIONS TO OBTAIN LUMINAIRE COSTS. THE INDIVIDUAL ESTABLISHING LUMINAIRE COSTS SHALL NOT QUOTE PRICING WITHOUT FIRST SEEING APPLICABLE ELECTRICAL DRAWINGS AND ELECTRICAL DIVISION SPECIFICATIONS. THE CONTRACTOR IS REPONSIBLE FOR PROVIDING NECESSARY DRAWINGS AND SPECIFICATIONS TO THE INDIVIDUAL QUOTING LUMINAIRE PRICING.

B. REFER TO DRAWINGS FOR FIXTURES REQUIRING EMERGENCY BATTERY BACKUP OPTION (SHOWN BY HATCH IN/OVER SYMBOL). MINIMUM LIGHT OUTPUT FOR EM BALLAST SHALL BE 600 LUMENS.

C. ALL FLUORESCENT LAMPS ARE TO BE 3500° KELVIN COLOR TEMPERATURE

SPECIFIC NOTES:

(1) PROVIDE MANUFACTURER RECOMMENDED DRIVER.
(2)
(3)
(4)

LAB EQUIPMENT SCHEDULE

MARK	DESCRIPTION	VOLT / PHASE	HP / WATTS	AMPS	CONNECTION				FEEDER	CIRCUIT	SPECIFIC NOTES
					HARDWIRED	RECEPTACLE	DISCONNECT	HEIGHT			
L1	LAB REFRIGERATOR, 30 CU FT CAPACITY	120/1		9.0		X			20(2WG)	LP2-1 LP2-3	
L2	DRYING OVEN, 2.3 CU FT	120/1		14.0		X			20(2WG)	LP1-27	
L3	ANALYTICAL BALANCE	120/1		2.0		X			20(2WG)	(1)	
L4	BALANCE TABLE	N/A									
L5	DESICCATOR	120/1	11W			X			20(2WG)	(1)	
L6	MULTI METER (PH, DO, COND)	N/A									
L7	LAB CARTS	N/A									
L8	MICROSCOPE	120/1		2.0		X			20(2WG)	(1)	
L9	BOD ANALYZER	N/A									
L10	REAGENT CABINET	N/A									
L11	DISTILLATION SYSTEM	120/1		15.0		X			20(2WG)	LP2-29	
L12	DISCRETE ANALYZER (N, P, CN)	120/1	22W			X			20(2WG)	(1)	
L13	SPECTROPHOTOMETER DR 2800	120/1		2.0		X			20(2WG)	(1)	
L14	AUTOCLAVE, 0.5 CU FT	120/1		10.0		X			20(2WG)	LP2-24	
L15	VACUUM PUMP	120/1		5.0		X			20(2WG)	LP2-10	
L16	INCUBATOR, SMALL	240/1	800W			X			20(3WG)	LP1-29/31	NEMA 6-20R
L17	MUFFLE FURNACE	208/1		20.0		X			30(3WG)	LP1-32/34	NEMA 6-30R
L18	INCUBATOR, LARGE 20 CU FT	120/1		7.0		X			20(2WG)	LP2-30 LP2-32	
L19	IDEXX QUANTITRAY SEALER	120/1		6.0		X			20(2WG)	LP2-26	
L20	FUME HOOD*	120/1		10.0		X			20(2WG)	LP2-22	
L21	WATER PURIFICATION SYSTEM W/UV										
L22	DIGESTION BLOCK (COD)	120/1		5.0		X			20(2WG)	(1)	
L23	STEAM BATH	120/1		11.0		X			20(2WG)	(1)	
L24	WATER BATH	120/1		1.5		X			20(2WG)	(1)	
L25	UNDERCOUNTER GLASSWARE WASHER*	120/1		20.0	X				30(2WG)	LP1-24	
L26	NOT USED										
L27	ULTRASONIC CLEANER	120/1		5.0		X			20(2WG)	(1)	
L28	DESKTOP COMPUTER	120/1		4.0		X			20(2WG)	(1)	
L29	TURBIDIMETER	120/1		1.0		X			20(2WG)	(1)	
L30	ALKALINITY SETUP (BURET STAND ETC)	N/A									
L31	FILTRATION SETUP LG (3 PLACE MANIFOLD)	N/A									
L32	FILTRATION SETUP SMALL (FLASK)	N/A									
L33	PHLDO METER	N/A									
L34	SPECTROPHOTOMETER DR 5000	120/1		1.0		X			20(2WG)	(1)	

GENERAL NOTES:

A. FIELD VERIFY ALL EQUIPMENT POWER AND CONNECTION REQUIREMENTS WITH KITCHEN CONTRACTOR AND MANUFACTURER'S INFORMATION.
B. HARD WIRED EQUIPMENT CONNECTIONS SHALL BE SEALTIGHT.
C. E.C. SHALL COORDINATE ALL CONNECTION POINT LOCATIONS AND RECEPTACLE CONFIGURATIONS WITH THE KITCHEN CONSULTANT. VERIFY EQUIPMENT DISCONNECT REQUIREMENTS PRIOR TO INSTALLATION.
D. ANY EQUIPMENT UNDER HOOD TIES INTO FIRE SUPPRESSION SYSTEM. PROVIDE SHUNT TRIP CIRCUIT BREAKER TO TURN EQUIPMENT OFF WHEN FIRE SUPPRESSION SYSTEM IS ACTIVATED.
E. PROVIDE ALL EQUIPMENT DISCONNECTS IN KITCHEN WITH NEMA 3R RATING.
F. COORDINATE CONTROLS WITH KITCHEN EQUIPMENT VENDOR.

SPECIFIC NOTES:

(1) MOBILE UNIT PLUGGED INTO NEAREST OUTLET.
(2)
(3)
(4)

MECHANICAL EQUIPMENT SCHEDULE

MARK	DESCRIPTION	VOLT / PHASE	HP	WATTS	FLA	MCA	MOCP	STARTER	DISCONNECT/ FUSE SIZE	FEEDER	SPECIFIC NOTES
P-2	BOOSTER PUMP	480/3	5						20/3 HD 10A CLASS RK2 TIME DELAY FUSES	20(3WG)	
P-3	DI SYSTEM	277/1	1						20/2 HD 10A CLASS RK2 TIME DELAY FUSES	20(2WG)	(1)

GENERAL NOTES:

A. SEE SPECIFICATIONS FOR ELECTRICAL DIVISION AND MECHANICAL DIVISION MOTOR STARTER COORDINATION.
B. PROVIDE PHASE PROTECTION FOR ALL THREE PHASE MOTORS ABOVE 7-1/2 HP.
C. PROVIDE ALL EXTERIOR DISCONNECTS WITH NEMA 3R RATING.
D. WHEN EQUIPMENT IS LISTED WITH ONLY A HORSEPOWER RATING THE DISCONNECT AND FEEDER ARE SIZED PER THE N.E.C.

SPECIFIC NOTES:

(1) VERIFY ELECTRICAL REQUIREMENTS WITH EQUIPMENT PROVIDER PRIOR TO ROUGH IN. ELECTRICAL CONTRACTOR TO MAKE ALL EQUIPMENT ELECTRICAL TERMINATIONS.

PANEL: LP1 — **LOCATION:** ELEC ROOM — **MOUNTING:** SURFACE

VOLTAGE: 120/208V, 3PH, 4W — **MINIMUM BUS:** 225 — **MAIN:** 150/3 CB — **MINIMUM AIC:** 10,000

NO.	LOAD A	LOAD B	LOAD C	TYPE	LOAD DESCRIPTION	BREAKER POLE	BREAKER TRIP	BUS A	BUS B	BUS C	BREAKER TRIP	BREAKER POLE	TYPE	LOAD DESCRIPTION	LOAD A	LOAD B	LOAD C	NO.
1	720			R	ISLAND RCPT	1	20	+			20	1	R	R-MECH	120			2
3					SPARE	1	20		+		20	1	R	ISLAND RCPT		720		4
5					SPARE	1	20			+	20	1		SPARE				6
7	500			E	ACCESS GATE	2	20	+			20	1	E	EXHAUST FANS	925			8
9		500		E					+		50	2	E	AC-1		180		10
11			3810	E	ACCU-A	2	60			+			E				180	12
13	3810			E				+			60	2	E	ACCU-2	3810			14
15		2600		E	ACCU-3	2	60	+					E			3810		16
17			2600	E					+		30	1	R	HOT WATER RECIRC			200	18
19	1310			E	EUR-1	1	20	+			20	1	R	OUTDOOR RCPT	600			20
21		1310		E	EUR-2	1	20		+		20	1		SPARE				22
23					SPARE	1	20			+	30	1	E	GLASSWARE WASHER		2400		24
25					SPARE	1	20	+			20	1		SPARE				26
27	1680			E	DRYING OVEN	1	20		+		20	1		SPARE				28
29		400		E						+	20	1		SPARE				30
31	450			E	INCUBATOR	2	20	+			60	2	E	MUFFLE FURNACE	2400			32
33		180		R	SCADA DESK	1	20		+				E			2400		34
35			360	R	SCADA	1	20			+	20	1	R	OPS RM 1			180	36
37	360			R	OPS RM 4	1	20	+			20	1	R	OPS RM 2	360			38
39		360		R	OPS RM 5	1	20		+		20	1	R	OPS RM 3		360		40
41			168	L	UNDERCOUNTER LTG	1	20			+	20	1	R	WALL RCPT			360	42

LOAD TYPE	PANEL TOTAL	FIXED THRU TOTAL	SUBFIXED TOTAL	FEEDER SUBTOTAL	DEMAND	FEEDER TOTAL
(L) LIGHTING	168			168	125%	210
(R) RECEPTACLES	4560			4560	NEC 220	4560
(LM) LARGEST MOTOR	0			0	25%	0
(M) MOTORS (ALL)	0			0	100%	0
(K) EQUIPMENT	3480			3480	100%	3480
(A) APPLIANCES	0			0	0	0

PANEL TOTAL (KVA): 39.8
PANEL TOTAL (A): 111

GENERAL NOTES:
A. BOLD INDICATES NEW POWER CONNECTION.
B.
C.
D.
E.

SPECIFIC NOTES:
(1)
(2)
(3)
(4)

PANEL: LP-2 — **LOCATION:** ELEC ROOM — **MOUNTING:** SURFACE

VOLTAGE: 120/240V, 1PH, 3W — **MINIMUM BUS:** 225 — **MAIN:** 150/2 CB — **MINIMUM AIC:** 10,000

NO.	LOAD A	LOAD B	TYPE	LOAD DESCRIPTION	BREAKER POLE	BREAKER TRIP	BUS A	BUS B	BREAKER TRIP	BREAKER POLE	TYPE	LOAD DESCRIPTION	LOAD A	LOAD B	NO.
1	1680		E	LAB REF 1	1	20	+		20	1	R	MEC/VESTELEC RCPT	1680		2
3		1680	E	LAB REF 2	1	20		+	20	1	R	BRK RM EBF		1080	4
5	150		L	EXTERIOR LIGHTS	1	20	+		20	1	R	PLNT MGR HALL RCPT	1620		6
7		1260	R	BRK RM RCPT	1	20		+	20	1		SPARE		0	8
9	1800		E	BRK RM DISHWASHER	1	20	+		20	2	E	VACUUM PUMP	600		10
11		1260	R	CUST/LOCKER RCPT	1	20		+	20	1		SPARE			12
13	1800		R	SOUTH LAB WALL RCPT	1	20	+		20	1		MECH VEST ELEC LIGHTS	315		14
15		1020	R	NORTH WALL RCPT	1	20		+	20	1	L	PLNT MGR HALL LIGHT		280	16
17	720		R	ISLAND RCPT	1	20	+		20	1	L	LAB/OFFICE LIGHTS	970		18
19		720	R	LAB OFFICE RCPT	1	20		+	20	1	L	CUST/LOCKER LIGHTS		595	20
21	240		L	BRK RM LIGHTS	1	20	+		20	1	E	FUME HOOD	1200		22
23				SPARE	1	20		+	20	1	E	AUTO CLAVE		1200	24
25	960		LM	GRINDER PUMP	2	20	+		20	1	E	IDEXX QUANTITRAY	1080		26
27		960	LM					+	20	1		SPARE			28
29	1800		E	DISTILLATION SYSTEM	1	20	+		20	1	E	INCUBATOR	840		30
31				SPARE	1	20		+	20	1	E	INCUBATOR		840	32
33				SPARE	1	20	+		20	1		SPARE			34
35				SPARE	1	20		+	20	1		SPARE			36
37				SPARE	1	20	+		20	1		SPARE			38
39				SPARE	1	20		+	20	1		SPARE			40
41				SPARE	1	20	+		20	1		SPARE			42

LOAD TYPE	PANEL TOTAL	FIXED THRU TOTAL	SUBFIXED TOTAL	FEEDER SUBTOTAL	DEMAND	FEEDER TOTAL
(L) LIGHTING	315			315	125%	394
(R) RECEPTACLES	3180			3180	NEC 220	3180
(LM) LARGEST MOTOR	960			960	25%	240
(M) MOTORS (ALL)	1920			1920	100%	1920
(K) EQUIPMENT	3240			3240	100%	3240
(A) APPLIANCES	0			0	0	0

PANEL TOTAL (KVA): 28.3
PANEL TOTAL (A): 118

GENERAL NOTES:
A. BOLD INDICATES NEW POWER CONNECTION.
B.
C.
D.
E.

SPECIFIC NOTES:
(1)
(2)
(3)
(4)
(5)
(6)

WIRING SCHEDULE - COPPER

AMPS	(2WG) 1Ø, 2 WIRE, GROUND	(3WG) 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND	(4WG) 3Ø, 4 WIRE, GROUND
20	(2#12 & 1#12 G) 3/4"C	(3#12 & 1#12 G) 3/4"C	(4#12 & 1#12 G) 3/4"C
30	(2#10 & 1#10 G) 3/4"C	(3#10 & 1#10 G) 3/4"C	(4#10 & 1#10 G) 3/4"C
40	(2#8 & 1#10 G) 3/4"C	(3#8 & 1#10 G) 3/4"C	(4#8 & 1#10 G) 1"C
50	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C
60	(2#4 & 1#10 G) 1"C	(3#4 & 1#10 G) 1"C	(4#4 & 1#10 G) 1 1/4"C
70	(2#4 & 1#8 G) 1"C	(3#4 & 1#8 G) 1 1/4"C	(4#4 & 1#8 G) 1 1/4"C
80	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
90	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
100	(2#1 & 1#8 G) 1 1/4"C	(3#1 & 1#8 G) 1 1/2"C	(4#1 & 1#8 G) 1 1/2"C
110	(2#1 & 1#6 G) 1 1/4"C	(3#1 & 1#6 G) 1 1/2"C	(4#1 & 1#6 G) 1 1/2"C
125	(2#1 & 1#6 G) 1 1/4"C	(3#1 & 1#6 G) 1 1/2"C	(4#1 & 1#6 G) 1 1/2"C
150	(2#1/0 & 1#6 G) 1 1/4"C	(3#1/0 & 1#6 G) 1 1/2"C	(4#1/0 & 1#6 G) 2"C
175	(2#2/0 & 1#6 G) 1 1/2"C	(3#2/0 & 1#6 G) 2"C	(4#2/0 & 1#6 G) 2"C
200	(2#3/0 & 1#6 G) 1 1/2"C	(3#3/0 & 1#6 G) 2"C	(4#3/0 & 1#6 G) 2"C
225	(2#4/0 & 1#4 G) 2"C	(3#4/0 & 1#4 G) 2"C	(4#4/0 & 1#4 G) 2 1/2"C

CONDUCTOR SIZES ARE BASED ON 60° TERMINATIONS LESS THAN 100A AND 75° TERMINATIONS GREATER THAN 100A
CONDUIT SIZES ARE BASED ON NEC TABLE 4 (EMC) AND TABLE 5 (THHN INSULATION).

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED ELECTRICAL ENGINEER 02/20/18 42213 PROFESSIONAL ENGINEER

NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

ELECTRICAL SCHEDULES

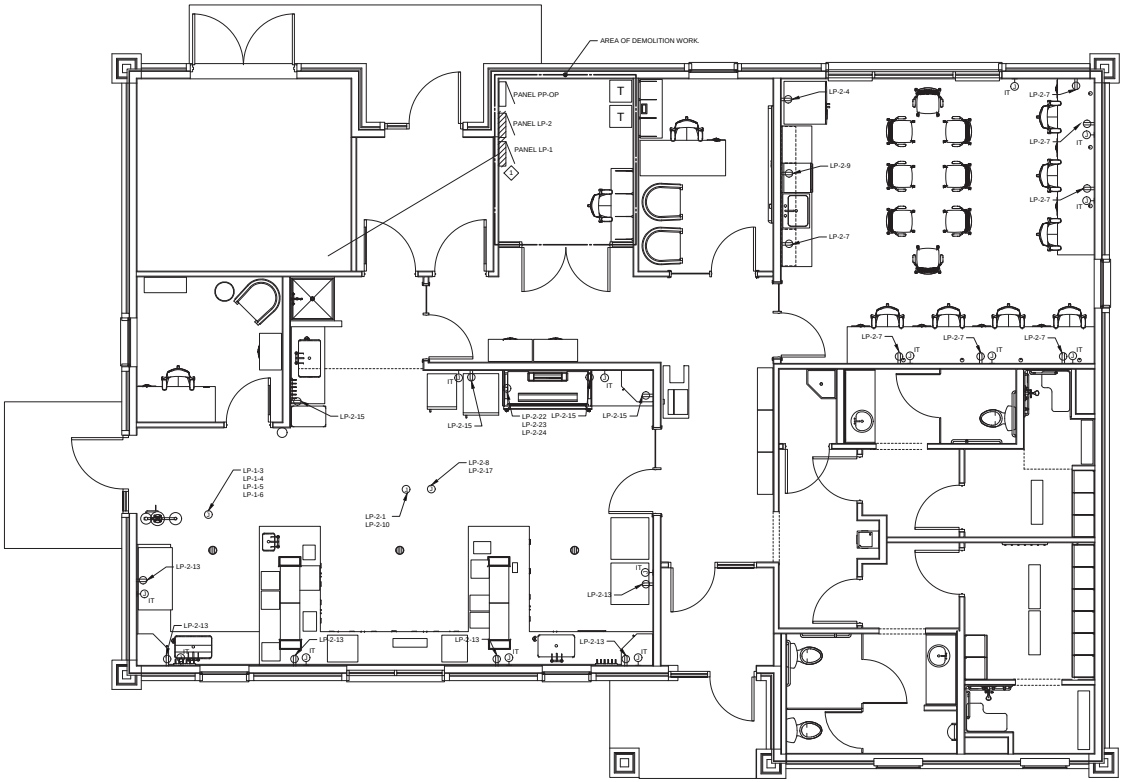
E0.2

NOTES:

1. XXX

DEMO NOTES:

1 REMOVE TWO EXISTING PANELS. TAG AND PRESERVE CONDUCTORS FOR RECONNECTION TO NEW PANELS.



1 FIRST FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED ELECTRICAL CONTRACTOR 02/20/18 4221

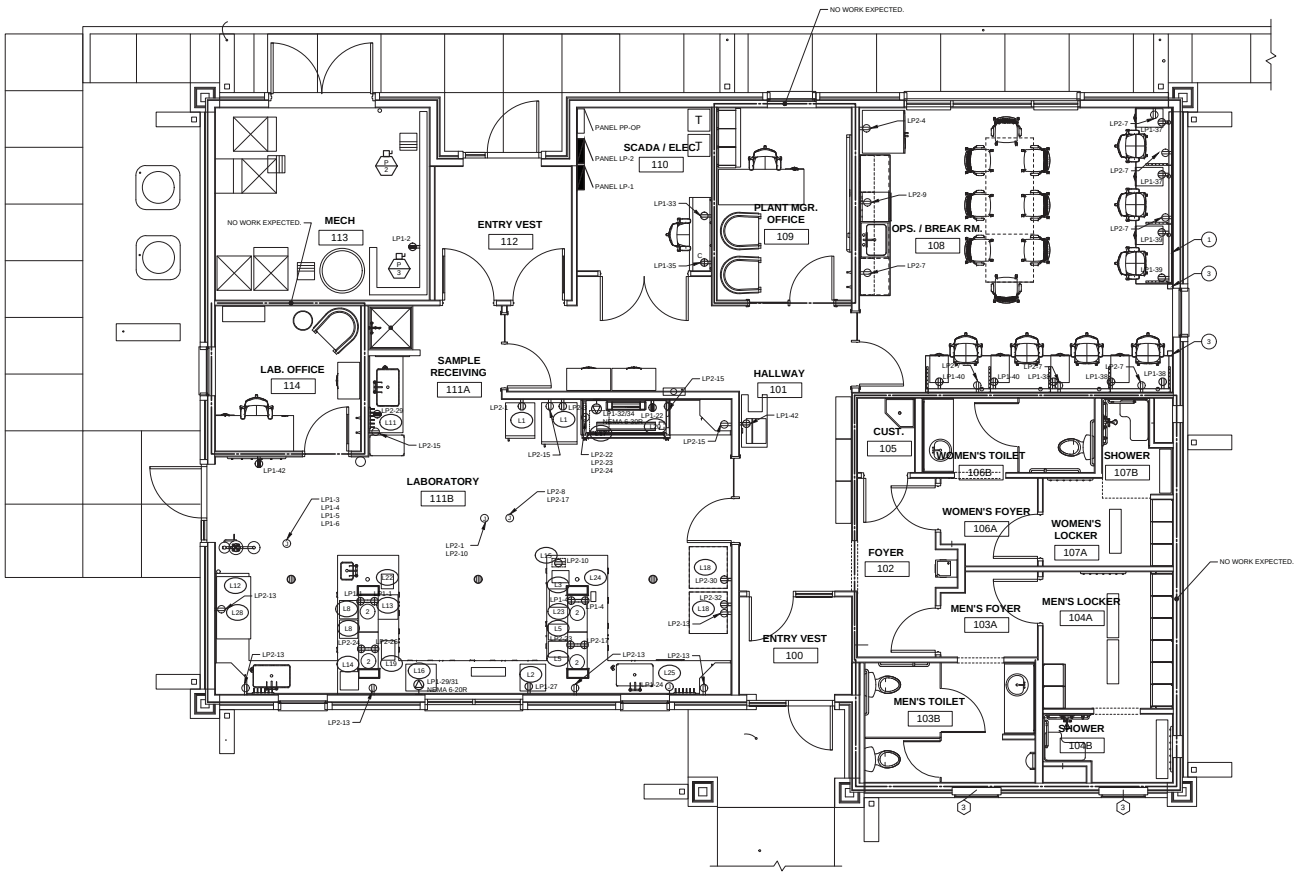
NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

FIRST FLOOR ELECTRICAL DEMOLITION PLAN

E1.0

BG BUILDINGWORKS
systems fulfilled
303.278.3820 www.bgbuildingworks.com
Project No. 9925.00



1 FIRST FLOOR POWER PLAN
SCALE: 1/4" = 1'-0"

NOTES:

1. VERIFY LAB EQUIPMENT LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL PLANS.
2. ROUTE ALL CONDUITS IN THE LABORATORY WITHIN COUNTERTOP AND COUNTERTOP SUPPORT CHASE.
3. LIGHT LINE WEIGHT DENOTES EXISTING CONDITIONS, HEAVY LINE WEIGHT DENOTES NEW WORK.
4. MAINTAIN POWER TO ALL EXISTING SYSTEMS.
4. VARIATIONS IN ELECTRICAL DISTRIBUTION CONFIGURATIONS MAY EXIST IN THE FIELD. NOTIFY ENGINEER IMMEDIATELY IF INSTALLED CONDITIONS ARE SIGNIFICANTLY DIFFERENT THAN REPRESENTED IN THESE DOCUMENTS.
5. VARIATIONS IN EXACT LAYOUT MAY DIFFER IN FIELD. FIELD-VERIFY EXISTING CONDITIONS AND PROVIDE WORK TO MEET DESIGN INTENT.

FLAG NOTES:

1. SURFACE METAL RACEWAY WITH UL LISTED DIVISION FOR POWER AND DATA. WIREMOLD ALDS4000 OR PRE-APPROVED EQUIVALENT. MOUNT BENEATH COUNTERTOP SUPPORTS.
2. HARDWIRED DOUBLE FACED, QUAD OUTLET. POWER HUB. TAYLOR SCIENTIFIC 80-2615-01 OR PRE-APPROVED EQUIVALENT.
3. SURFACE METAL RACEWAY RISER INTO CEILING SPACE WITH UL LISTED DIVISION FOR POWER AND DATA. WIREMOLD ALDS4000 OR PRE-APPROVED EQUIVALENT.

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED
ERIC C. RUBOTTOM
02/26/18
42213
PROFESSIONAL ENGINEER

NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

FIRST FLOOR POWER PLAN

E1.1

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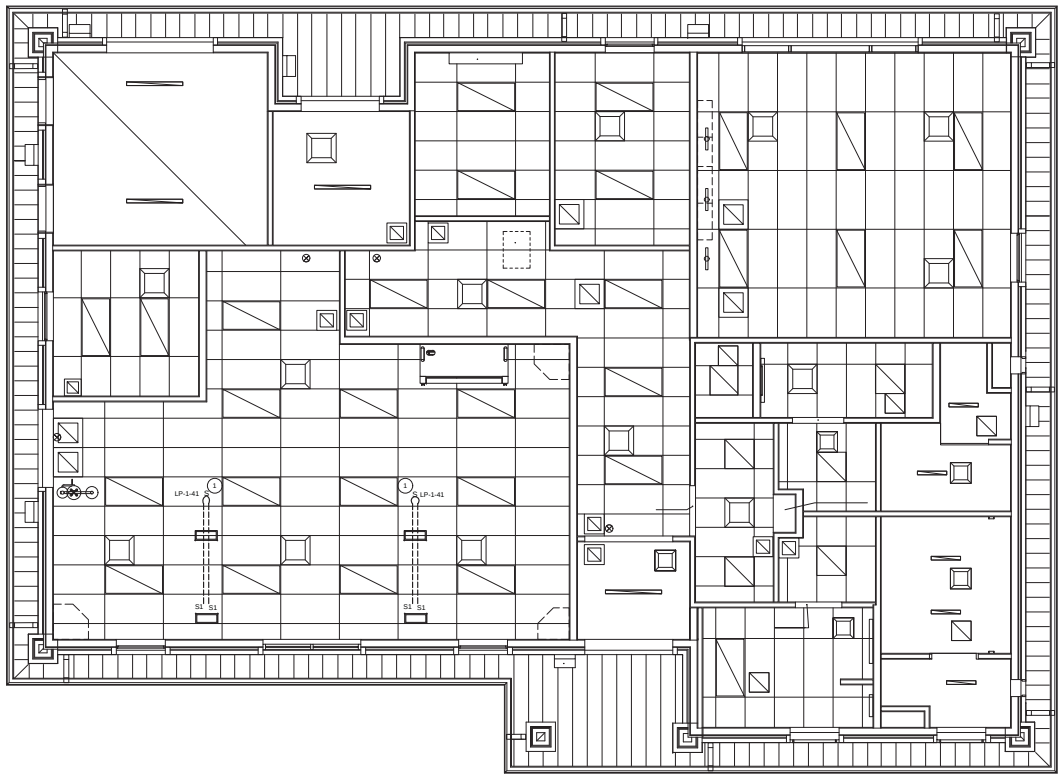
Project No. 8925.00 Copyright 2018
ALBUQUERQUE | AVON | DENVER | FORT COLLINS

NOTES:

1. ALL EXISTING LIGHTING TO REMAIN.
2. VERIFY LAB EQUIPMENT LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL PLANS.
3. ROUTE ALL CONDUITS IN THE LABORATORY WITHIN COUNTERTOP AND COUNTERTOP SUPPORT CHASE.
4. LIGHT LINE WEIGHT DENOTES EXISTING CONDITIONS, HEAVY LINE WEIGHT DENOTES NEW WORK.
5. MAINTAIN POWER TO ALL EXISTING SYSTEMS.
6. VARIATIONS IN ELECTRICAL DISTRIBUTION CONFIGURATIONS MAY EXIST IN THE FIELD. NOTIFY ENGINEER IMMEDIATELY IF INSTALLED CONDITIONS ARE SIGNIFICANTLY DIFFERENT THAN REPRESENTED IN THESE DOCUMENTS.
7. VARIATIONS IN EXACT LAYOUT MAY DIFFER IN FIELD. FIELD-VERIFY EXISTING CONDITIONS AND PROVIDE WORK TO MEET DESIGN INTENT.

FLAG NOTES:

(1) MOUNT LIGHT FIXTURE AND SWITCH TO BOTTOM OF NEW CABINETS.



1 FIRST FLOOR LIGHTING PLAN
SCALE: 1/4" = 1'-0"

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED REGISTERED PROFESSIONAL ENGINEER 02/28/18 42213

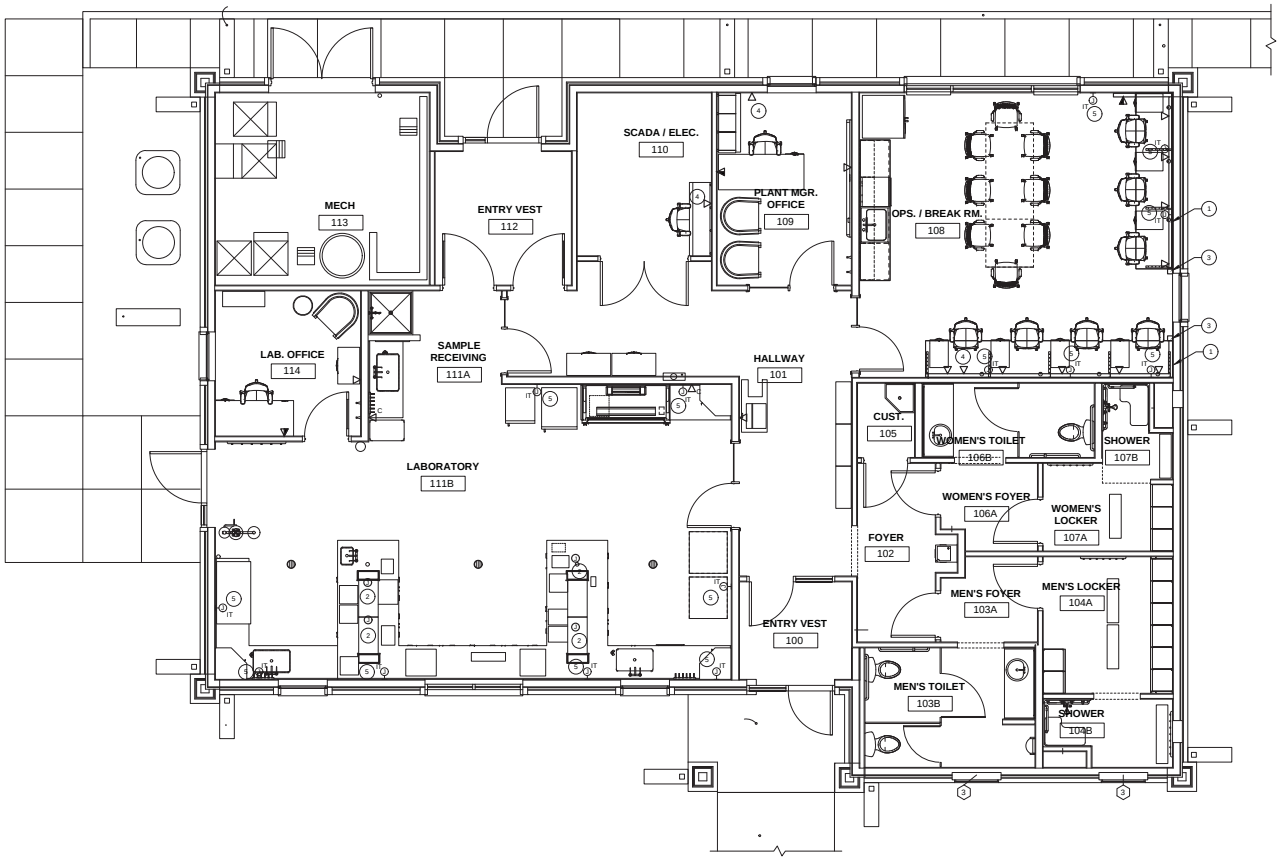
NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

FIRST FLOOR LIGHTING PLAN

E1.2

BG BUILDINGWORKS
systems fulfilled
303.278.3800 www.bgbuildingworks.com
Project No. 8925.00



1 FIRST FLOOR TECHNOLOGY PLAN
SCALE: 1/4" = 1'-0"

NOTES:

1. FOR EACH DATA WALL OUTLET ROUTE CABLES VIA J-HOOK TO SCADA/ELEC ROOM 110. COIL 5' OF CABLE ABOVE THE CEILING IN THE SPACE SERVED FOR EACH OUTLET. COIL 20' OF CABLE ABOVE THE CEILING IN THE SCADA/ELEC ROOM FOR TERMINATION BY THE OWNER.
2. PROVIDE FIRE STOP SLEEVES FOR ALL PENETRATIONS THROUGH FIRE RATED WALLS.
3. ROUTE ALL CONDUITS IN THE LABORATORY WITHIN COUNTERTOP AND COUNTERTOP SUPPORT CHASE.
4. ANY EXISTING FIRE ALARM SYSTEM TO REMAIN IN PLACE.
5. VERIFY LAB EQUIPMENT LOCATIONS AND ELEVATIONS WITH ARCHITECTURAL PLANS.
6. LIGHT LINE WEIGHT DENOTES EXISTING CONDITIONS, HEAVY LINE WEIGHT DENOTES NEW WORK.
7. VARIATIONS IN EXACT LAYOUT MAY DIFFER IN FIELD. FIELD-VERIFY EXISTING CONDITIONS AND PROVIDE WORK TO MEET DESIGN INTENT.

FLAG NOTES:

1. SURFACE METAL RACEWAY WITH UL LISTED DIVISION FOR POWER AND DATA. WIREMOLD ALDS4000 OR PRE-APPROVED EQUIVALENT.
2. HARDWIRED DOUBLE FACED, QUAD OUTLET, DATA HUB. TAYLOR SCIENTIFIC 80-2615-01 OR PRE-APPROVED EQUIVALENT.
3. SURFACE METAL RACEWAY RISER INTO CEILING SPACE WITH UL LISTED DIVISION FOR POWER AND DATA. WIREMOLD ALDS4000 OR PRE-APPROVED EQUIVALENT
4. SCADA NETWORK OUTLET. PROVIDE ORANGE DATA JACK IN LIEU OF BLUE DATA JACK.
5. REPLACE EXISTING BLANK FACEPLATE WITH NEW TWO-PORT RJ45 OUTLETS. PULL TWO NEW CAT6 CABLES TO SCADA/ELEC ROOM 110 IF CAT6 WIRING WAS NOT PREVIOUSLY INSTALLED.

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

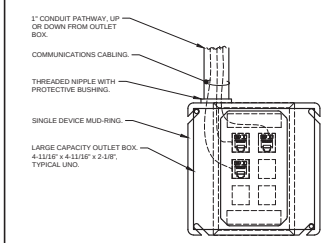
COLORADO LICENSED
ERIC C. RUBOTTOM
02/28/18
42213
PROFESSIONAL ENGINEER

NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

FIRST FLOOR TECHNOLOGY PLAN

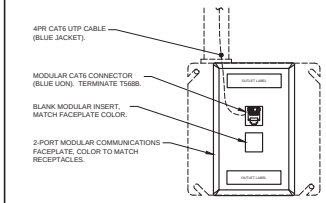
E1.3



COMMUNICATIONS OUTLET BOX DIAGRAM

NO SCALE

(D)

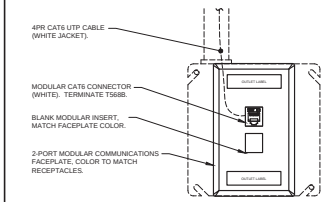


NOTES:
1. PROVIDE LEVEL 1 ADMINISTRATION PER ANSI/TIA/EIA-606.
2. PROVIDE LABEL ON FRONT OF FACEPLATE.

DATA OUTLET DIAGRAM

NO SCALE PLAN SYMBOL: ▽ OR ▽

(E)

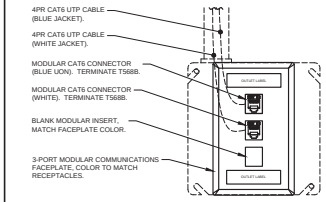


NOTES:
1. PROVIDE LEVEL 1 ADMINISTRATION PER ANSI/TIA/EIA-606.
2. PROVIDE LABEL ON FRONT OF FACEPLATE.

VOICE OUTLET DIAGRAM

NO SCALE PLAN SYMBOL: ▼ OR ▼

(F)

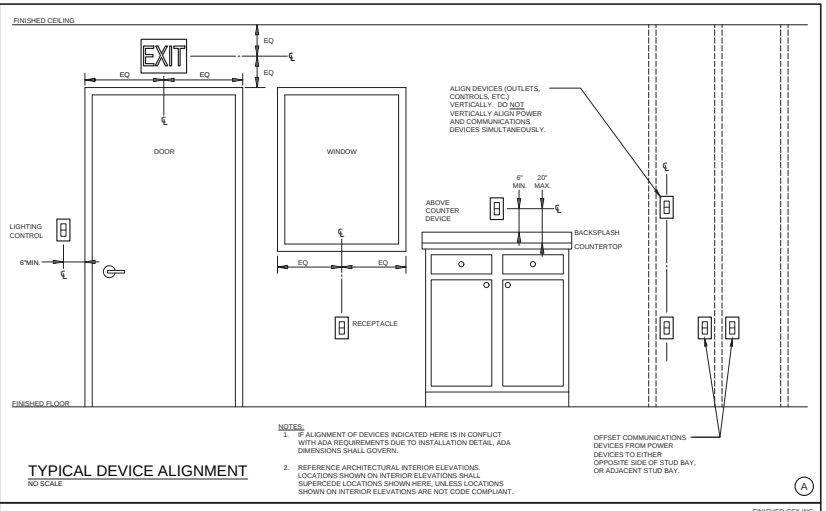


NOTES:
1. PROVIDE LEVEL 1 ADMINISTRATION PER ANSI/TIA/EIA-606.
2. PROVIDE LABEL ON FRONT OF FACEPLATE.

VOICE/DATA OUTLET DIAGRAM

NO SCALE PLAN SYMBOL: ▼ OR ▼

(G)

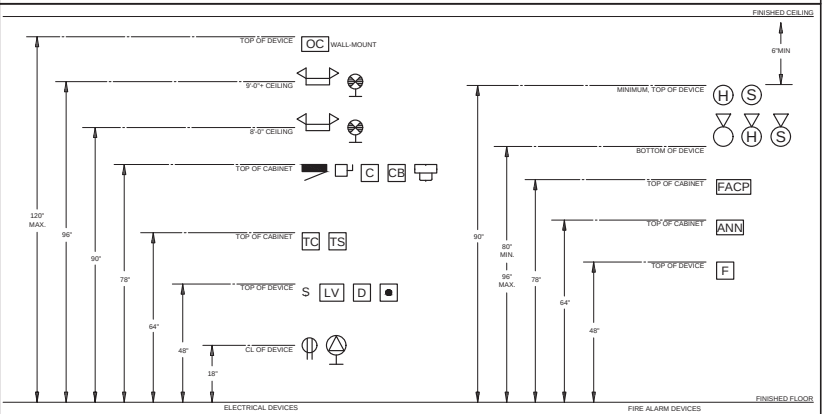


NOTES:
1. IF ALIGNMENT OF DEVICES INDICATED HERE IS IN CONFLICT WITH ADA REQUIREMENTS DUE TO INSTALLATION DETAIL, ADA DIMENSIONS SHALL GOVERN.
2. REFERENCE ARCHITECTURAL INTERIOR ELEVATIONS. LOCATIONS SHOWN ON INTERIOR ELEVATIONS SHALL SUPERCEDE LOCATIONS SHOWN HERE. UNLESS LOCATIONS SHOWN ON INTERIOR ELEVATIONS ARE NOT CODE COMPLIANT.

TYPICAL DEVICE ALIGNMENT

NO SCALE

(A)

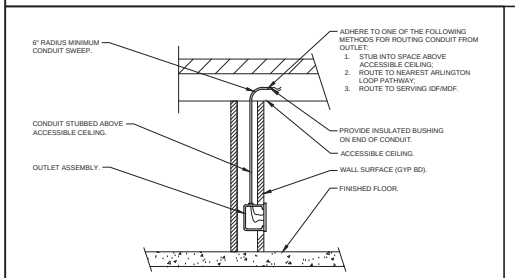


NOTES:
1. IF MOUNTING HEIGHT OF DEVICES INDICATED HERE IS IN CONFLICT WITH ADA REQUIREMENTS DUE TO INSTALLATION DETAIL, ADA DIMENSIONS SHALL GOVERN.
2. REFERENCE ARCHITECTURAL INTERIOR ELEVATIONS. LOCATIONS SHOWN ON INTERIOR ELEVATIONS SHALL SUPERCEDE LOCATIONS SHOWN HERE. UNLESS LOCATIONS SHOWN ON INTERIOR ELEVATIONS ARE NOT CODE COMPLIANT.

TYPICAL DEVICE MOUNTING HEIGHTS

NO SCALE

(B)



OUTLET PATHWAY DIAGRAM

NO SCALE

(C)

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City of Northglenn WWTP Control Building Lab and Furniture Fitout
Northglenn, Colorado

COLORADO LICENSED PROFESSIONAL ENGINEER 02/20/18 42213

NO	ISSUE	DATE
1	CDs	02.26.18

PROJECT 1620
DATE 02.26.2018
DRAWN CJB

ELECTRICAL DIAGRAMS

E2.0

BG BUILDINGWORKS systems fulfilled
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Project No. 9925.00 Copyright 2018
ALBUQUERQUE | AVON | DENVER | FORT COLLINS

City of Northglenn Lab Fit out
Bid Date 4/4/18

Division	Description		
1	General Conditions	$	68,536
6	Wood and Plastics	$	10,500
8	Openings	$	4,500
9	Finishes	$	21,038
10	Specialities	$	11,018
11	Residential Appliances	$	2,700
11	Fume Hood	$	14,668
11	VWR Equipment	$	22,774
12	Casework	$	56,118
12	Furniture	$	12,659
12	Conference Table	$	3,150
12	American Furniture Chairs	$	750
12	Window Coverings	$	2,324
22	DI System Allowance	$	15,000
22	Plumbing	$	142,600
23	HVAC	$	13,450
26	Electrical	$	38,500
27	Communications	$	11,600
	Subtotal	**$**	**451,885**
	Insurances G/L and Builders Risk	$	8,734
	Bond	$	5,991
	Fee	$	32,690
	Total Bid	**$**	**499,300**

SPONSORED BY: MAYOR DODGE

COUNCILMAN'S RESOLUTION

RESOLUTION NO.

No. CR-81
Series of 2018

Series of 2018

A RESOLUTION APPROVING AN AGREEMENT BETWEEN THE CITY OF NORTHGLENN AND HPM, INC. FOR THE WASTEWATER TREATMENT PLANT CONTROL BUILDING AND LABORATORY FURNITURE, FIXTURES, AND EQUIPMENT

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF NORTHGLENN, COLORADO, THAT:

Section 1. The Trade Contractor Agreement between the City of Northglenn and HPM, Inc., attached hereto, in an amount not to exceed $499,300.00 for the Wastewater Treatment Plant Control Building and Laboratory Furniture, Fixtures, and Equipment is hereby approved and the Mayor is authorized to execute same on behalf of the City of Northglenn.

DATED, at Northglenn, Colorado, this _____day of _____, 2018.

ANTONIO B. ESQUIBEL
Mayor Pro Tem

ATTEST:

JOHANNA SMALL, CMC
City Clerk

APPROVED AS TO FORM:

COREY Y. HOFFMANN
City Attorney

TRADE CONTRACTOR AGREEMENT

TABLE OF CONTENTS

TRADE CONTRACTOR AGREEMENT

THIS AGREEMENT is made and entered into this _____ day of _____,20_____, by and between the City of Northglenn, State of Colorado, a Colorado home rule municipal corporation, hereinafter referred to as the "City" or "Owner" and HPM, Inc., hereinafter referred to as the "Trade Contractor".

ARTICLE 1 - GENERAL PROVISIONS AND SERVICES

A. The Trade Contractor will commence and fully complete the construction of the WWTP Control Building and Laboratory/Furniture Fitout Project, which is described in **Exhibit A**, which is attached hereto and made a part hereof ("Project").

B. The Trade Contractor will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.

C. The Trade Contractor will commence the work required by the contract documents within ten (10) calendar days after the date of the notification to proceed and will complete the same within two hundred calendar (200) day, unless the period for completion is extended otherwise by the contract documents. The Trade Contractor agrees to pay as liquidated damages, and not as a penalty, the sum of five hundred dollars ($500.00) for each consecutive calendar day's delay in completing this Contract after the completion dated specified herein, excluding any approved extensions of time because of unavoidable delay.

D. The Trade Contractor agrees to perform all of the work described in the contract documents and to comply with the terms therein for an amount not to exceed four hundred ninety nine thousand three hundred dollars ($499,300.00) as described in Article 5 of this Agreement.

ARTICLE 2 - DEFINITIONS

A. Wherever used in the contract documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1. Addenda - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the contract documents, drawings and specifications, by additions, deletions, clarifications or corrections.

2. Architect - The Architect shall be ALM2S

3. Bid - The offer or proposal of the bidder submitted in the prescribed form setting forth the prices for the work to be performed.

4. Bidder - Any person, firm or corporation submitting a bid for the work.

5. Bonds - Bid, performance and payment bonds and other instruments of security, furnished by the Trade Contractor and his surety in accordance with the contract documents.

6. Change Order - A written order to the Trade Contractor authorizing an addition, deletion or revision in the work within the general scope of the contract documents, or authorizing an adjustment in the contract price and/or contract time.

7. Contract Documents - The contract, including advertisement for bids, information for bidders, bid, bid bond agreement, bid schedule, labor and material, payment bond, performance bond, notice of award, notice to proceed, change order, general conditions, special conditions, general specifications, special specifications, scopes of work, addenda, drawings, schedules and any and all other documents or papers included or referred to in the foregoing documents are part of the Contract Documents

8. Contract Price - The total monies payable to the Trade Contractor under the terms and conditions of the contract documents.

9. Contract Time - The number of calendar days stated in the contract documents for the completion of the work.

10. Date of Award - Date of award of contract shall mean the date formal notice of such award, approved by the Owner, has been delivered to the intended awardee, or mailed to him at the main business address shown in his proposal by the Owner or it's authorized representative.

11. Day or Days - Unless herein otherwise expressly defined, "day" shall mean calendar day or days.

12. Drawings, Plans or Contract Documents - The part of the contract documents which shows the characteristics and scope of the work to be performed and which has been prepared or approved by the Engineer and/or Architect.

13. Engineer shall be as determined by the Public Works Director

14. Field Order - A written order effecting a change in the work not involving an adjustment in the contract price or an extension of the contract time, issued by the Engineer or the Owner to the Trade Contractor during construction.

15. Major Equipment or Major Equipment Items - Installation of major equipment to be furnished and placed under the contract awarded to the Trade Contractor and/or installations of major equipment to be furnished by the Owner and received, unloaded, stored, and placed under the contract awarded to the Trade Contractor.

16. Notice of Award - The written notice of the acceptance of the bid from the Owner to the successful bidder.

17. Notice to Proceed - Written communication issued by the Owner to the Trade Contractor authorizing him to proceed with the work and establishing the date of commencement of the work.

18. Owner or City - The City of Northglenn, Colorado, a home rule municipality. The Public Works Director of the Owner, or his designee, is the Owner's representative.

19. Project - Construction of the project described in **Exhibit A.**

20. Shop Drawings - All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Trade Contractor, a subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the work shall be fabricated or installed.

21. Site - The lands and other places on, under, in, or through which the work is to be executed or carried out and any other lands or places provided by the Owner for the purposes of the contract together with such other places as may be specifically designed in the contract documents as forming part of the site.

22. Special Conditions - Supplemental conditions that apply to specific aspects of the project or modifications to the general conditions that are to be adhered to in the project.

23. Subcontractor - An individual, firm or corporation having a direct contract with the Trade Contractor or with any other subcontractor for the performance of a part of the work at the site.

24. Substantial Completion - That date as certified by the Owner when the construction of the project or a specified part thereof is sufficiently completed, in accordance with the contract documents, so that the project or specified part can be utilized for the purposes for which it is intended.

25. Suppliers - Any person, supplier, or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site. A supplier is not a subcontractor who purchases an item of equipment from a manufacturer.

26. Trade Contractor - The person, firm or corporation with whom the City of Northglenn has executed this Agreement.

27. Work - All labor necessary to produce the construction required by the contract documents, and all materials and equipment incorporated or to be incorporated in the project. The work and the project are used interchangeably to mean the same thing.

28. Written Notice - Any notice to any party of the Agreement relative to any part of the Agreement in writing and considered delivered and the service thereof completed when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the work.

ARTICLE 3 - DESCRIPTION OF WORK AND SERVICES

Section 1. Drawings and Specifications.

A. The intent of the drawings and specifications is that the Trade Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the work in accordance with the contract documents and all incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the Owner.

B. Up to three (3) copies of the drawings and specifications will be furnished to the Trade Contractor without charge upon request, and any additional copies which the Trade Contractor may request will be furnished at the cost of reproduction. The drawings and specifications are to be used only in connection with the work specified herein and, with the exception of the signed contract set and As-Built drawings, are to be returned at the completion of the contract.

C. In case of conflict between the drawings and specifications, the drawings will govern. In case of conflict between the special specifications and the general specifications, the special specifications shall govern. Figure dimension on drawings will govern over scale dimensions, and detailed drawings will govern over general drawings. Notwithstanding the above, a document which is more restrictive or requires greater responsibility or increased compliance by the Trade Contractor shall govern.

D. Any discrepancies found between the drawings and specifications and site conditions or any inconsistencies or ambiguities in the drawings or specifications shall be immediately reported to the Owner, in writing, who will promptly resolve such inconsistencies or ambiguities in writing. Work done on unreported discrepancies, inconsistencies or ambiguities by the Trade Contractor shall be done at the Trade Contractor's risk.

E. The Trade Contractor may be furnished additional instructions and detail drawings, by the Owner, as necessary to carry out the work required by the contract documents. All additional instructions and detail drawings shall be issued to the Trade Contractor by the Owner.

F. The additional drawings and instructions thus supplied will become a part of the contract documents. The Trade Contractor shall carry out the work in accordance with the additional detail drawings and instructions.

Section 2. Materials, Services and Facilities.

A. It is understood that, except as otherwise specifically stated in the contract documents, the Trade Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature and all other services and facilities of any nature whatsoever necessary to execute, complete and deliver the work within the specified time.

B. In addition to the requirements for major equipment items previously given, within fourteen (14) days after execution of the Contract, the Trade Contractor shall submit to the Owner and Engineer a complete listing of the manufacturers of each item of equipment or assembly fabricated off the site which he proposed to furnish for the project, together with sufficient information, including shop assembly and detail drawings, manufacturers' specifications and performance data, to demonstrate clearly that the materials and equipment to be furnished comply with the provisions and intent of the contract documents. If the information shows any deviation from the Contract requirements, the Trade Contractor shall advise the Engineer and Owner of the deviation and state the reason for it in writing.

C. Only first class materials and materials which conform to the requirements of the specifications shall be incorporated in the work. All materials shall be new unless specified to be otherwise.

D. When requested by the Owner, the Trade Contractor shall furnish a written statement of the origin, composition, and manufacturer of any or all materials (manufactured, produced or grown) that are to be used in the work. The sources of supply of each material used will be approved by the Owner before delivery is started. If, at any time, sources previously approved, fail to produce materials acceptable to the Owner, the Trade Contractor shall furnish materials from other sources.

E. Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials and equipment to be incorporated in the work shall be located so as to facilitate prompt inspection.

F. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

G. Materials, supplies, and equipment shall be in accordance with samples submitted by the Trade Contractor and approved by the Engineer or Architect.

H. Materials, supplies or equipment to be incorporated into the work shall not be purchased by the Trade Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

I. The Trade Contractor shall retain, for the benefit of the Owner, all materials and supplies that are purchased for the project but are not used as a part of the project. The Owner may take any of the materials and supplies that are used in the project for any City purpose. Any materials and supplies not taken by the Owner shall be removed from the project site by the Trade Contractor.

Section 3. Shop Drawings.

A. The Trade Contractor shall submit shop drawings, samples and O&M manuals as may be necessary for the prosecution of the work as required by the contract documents on a timely basis so that the project schedule is not affected. The Engineer will promptly review all shop drawings. All such drawings will be approved and signed by the Engineer, and will be null and void unless authorized by such signature. The Engineer's approval of any shop drawing will not release the Trade Contractor from responsibility for deviations from the contract documents. The approval of any shop drawings which substantially deviates from the requirements of the contract documents shall be evidenced by a change order.

B. All drawings and details on items of major equipment will be reviewed by the Engineer only after the complete set of drawings and details covering the entire equipment package to be furnished under a particular major equipment item are submitted. Drawings submitted on a piecemeal basis covering only parts of the equipment package will be held for checking until the entire set of drawings are received.

C. The Trade Contractor shall also submit to the Engineer shop drawings showing all necessary detail for the proper installation of materials into the completed work, as provided by this Agreement.

D. The Trade Contractor shall make any indicated corrections on the drawings returned and shall resubmit corrected drawings until final approval is obtained.

E. The Trade Contractor shall have no claims for damages or extension of time on account of any delay in the work resulting from the rejection of material or from review, revision and resubmittal of drawings when the review, revision and resubmittal is due to changes to the original design documents, and other data for approval by the Engineer.

F. Each shop drawing shall be dated and shall be identified with the name of the project, the division, if any, the Contract item number, and the name of the Trade Contractor.

G. When submitted for the Engineer's review, shop drawings shall bear the Trade Contractor's certification that he has reviewed, checked and approved the shop drawings and that they are in conformance with the requirements of the contract documents.

H. The Trade Contractor shall submit the shop drawings in accordance with the general requirements.

I. Portions of the work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved sample shall be kept in good order by the Trade Contractor at the site and shall be available to the Engineer.

J. By approving and submitting shop drawings and samples, the Trade Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each shop drawing and sample with the requirements of the work and of the contract documents.

Section 4. Records, Accounts and Audits.

A. The Trade Contractor agrees to keep one complete set of records and books of account on a recognized cost accounting basis (satisfactory to the Engineer), showing all expenditures, of whatever nature, made pursuant to the provisions of this Contract.

B. The Trade Contractor shall furnish the Engineer and Owner with such records, information and data as may be reasonable. The Engineer and Owner shall at all reasonable times be afforded the opportunity to inspect and/or audit the above-specified books and records of said Trade Contractor.

Section 5. Inspection and Testing.

A. All materials and equipment used in the construction of the project will be subject to adequate inspection and testing in accordance with generally accepted standards.

B. The Trade Contractor shall give sufficient advance notice of placing orders to permit tests to be completed before materials are incorporated in the work.

C. The Owner will provide all inspection and testing services required by the Contract Documents, unless specifically noted in the contract specifications for special inspection and testing services, such as, by way of example, welding inspections on off-site assembly.

D. Neither observations by the Engineer, and Owner, tests nor approvals by persons other than the Engineer and Owner will relieve the Trade Contractor from his obligations to perform the work in accordance with the requirements of the contract documents.

E. The Engineer, the Owner, and their representatives will at all times have access to the work and to locations where materials or equipment are being manufactured, stored, or prepared for use under these contract documents, and they shall have full facilities for unrestricted inspection of such materials, equipment, and work including full access to purchasing and engineering information, but not including prices, to the extent of uncovering, testing, or removing portions of the finished work. The Engineer and Owner shall be furnished with such information as may be required regarding materials used and the process of manufacture for the various items of equipment. Inspections by the Engineer and Owner of equipment or materials during its manufacture will be performed by or for the Owner solely in an effort to detect discrepancies and defects as early as possible, when they can be most readily corrected, and the work thereby expedited. No acceptance of equipment or materials will be construed to result from such shop inspections by the Engineer and Owner Any inspections or tests or waivers thereof will not relieve the Trade Contractor of responsibility for meeting all requirements of these contract documents.

F. In addition, authorized representatives and agents of any participating federal or state agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The Trade Contractor shall provide proper facilities for such access and observation of the work and also for any inspection or testing thereof.

G. In case of disputes between the Trade Contractor and the Engineer as to materials furnished or manner of performing the work, the Owner will have authority to reject materials or suspend the work until the question at issue can be decided by the Owner. The Owner is authorized to revoke, alter, enlarge, relax or release any requirements of these specifications, and to approve or accept any portion of the work, and to issue instructions contrary to the drawings and specifications.

Section 6. Construction Review

A. The Engineer will periodically observe the construction of all work covered by this Contract. The Engineer, on behalf of the Owner, shall be authorized to determine the amount or quantities of the several items of work which are to be paid for under this Contract; to order field changes within the scope of the Contract and to render decisions on any questions which may arise relative to the execution of the work covered by this Contract. The Engineer does not have authority to suspend work on the project. The Trade Contractor shall not suspend any portion of the work nor resume suspended work without the written authority of the Owner.

B. Neither Engineer's authority to act under the Contract nor any decision made by Engineer in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the Engineer to the Trade Contractor, any subcontractor, any supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

C. Whenever in the drawings, plans or Contract Documents the terms "as ordered", "as directed", or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of Engineer as to the work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the work for compliance with the contract documents. The use of any such

term or adjective shall not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility for the project. Neither the Owner nor the Engineer will be responsible for the acts or omissions of Contractor or any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

D. Periodic observation of the work in progress by the Engineer will be done whenever the Contractor is performing work that requires review as determined by the Engineer. The normal working time shall be during a regular 5-day, 40-hour work week, Monday through Friday. If the Trade Contractor elects to work more than 40 hours per week and observation is required during this overtime work as determined by the Engineer, the Engineer shall be paid by the Trade Contractor at the rate as specified herein for all review time required over the normal 5-day, 40-hour week. If the Engineer or his authorized representative is called to the job site to address problems created by the Trade Contractor, he will be paid by the Trade Contractor at the same rate as for overtime review as stated above. This payment shall be made by a credit to the Owner, and then the Engineer shall bill the Owner for the same.

E. If any work has been covered which the Engineer has not been specifically requested to observe prior to its being covered, or if the Engineer considers it necessary or advisable that covered work be inspected or tested by others, the Trade Contractor at the Engineer's request shall uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in question, furnishing all necessary labor, materials, tools and equipment. If it is found that such work is defective, the Trade Contractor shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such work is not found to be defective, the Trade Contractor will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate change order will be issued.

Section 7. Surveys, Permits and Regulations.

A. The Owner will furnish any existing land surveys in the Owner's possession. Provided however, the Trade Contractor shall perform all necessary land surveys to complete the work required by this Agreement. The Trade Contractor shall provide detailed construction staking.

B. At the beginning of the construction or as the work progresses, the Trade Contractor shall be responsible for the installation of property corners and the setting of bench marks.

C. Bench marks and survey stakes shall be preserved by the Trade Contractor and in case of their destruction, or removal by him, his employees, or others, they shall be replaced at the Trade Contractor's expense and his Sureties shall be liable therefor.

D. The Trade Contractor shall be responsible for elevations used in computing his bid.

E. The Trade Contractor shall secure and pay for all necessary permits, fees and licenses in connection with the performance of its work and shall pay all municipal and other governmental fees in connection therewith except those expressly provided by the specifications as being the responsibility of the Owner, and shall furnish at its expense any and all bonds and

cash or other deposits required by law or required by any lawful body having the right to make demand therefor.

F. The Owner will provide rights-of-way and permanent and temporary easements as shown on the plans for construction purposes. Any additional land actually needed by the Trade Contractor for the performance of the work, proper location of his plant and equipment, or the storage of materials and supplies for the work, shall be furnished by the Trade Contractor.

Section 8. Protection of Work, Property and Persons.

A. The Trade Contractor shall be responsible for initiating and maintaining all safety precautions and programs in connection with the work. Neither the Owner nor the Engineer will be responsible for Trade Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. The Trade Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the work who may be affected thereby, all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

B. The Trade Contractor shall at all times consult with and obtain the approval of the Owner for the storage of material, operation of equipment, placing of temporary structures or dispositions of any surplus or waste materials upon property of the Owner anywhere outside the limits of construction. The Trade Contractor shall comply with all state, federal and local laws related to the storage or placement of any supplies, equipment, structures, or any other materials.

C. The Trade Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He shall notify owners of adjacent utilities when prosecution of the work may affect them. The Trade Contractor shall remedy at his expense all damage, injury, or loss to any property or person caused, directly or indirectly, in whole or in part, by the Trade Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, except damage or loss attributable to the fault of the contract documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Trade Contractor. Notwithstanding the provisions of C.R.S. § 13-20-802.5(2), for purposes of this Contract, the measure of damages shall never be deemed to be the fair market value of the real property without an alleged construction defect.

D. The Trade Contractor shall observe all rules and regulations of the health department having jurisdiction and shall take precautions to avoid creating unsanitary conditions.

E. In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Trade Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss.

F. The Trade Contractor shall at all times conduct and work in such a manner as to

cause the least inconvenience and greatest protection to the general public. The Trade Contractor shall furnish and maintain barricades, warning signs, red flags, lights, and temporary passageways as may be necessary to protect the work and to safeguard the public. The cost of furnishing and maintaining the above facilities shall be incidental to the contract and no extra compensation for it will be allowed.

G. Throughout the performance of the work or in connection with this Contract, the Trade Contractor shall construct and adequately maintain suitable and safe crossings over trenches and such detours as are necessary to care for public and private traffic. The material excavated from trenches shall be compactly deposited along the sides of the trench or elsewhere in such a manner as shall give as little inconvenience as possible to the traveling public, to adjoining property owners, to other trade contractors, or to the City.

H. In performing the work, the Trade Contractor shall take the necessary action, including making arrangements with the owners or operators of existing power, cable and telephone lines, fiber-optic and telemetry lines, gas, water, sewer and other utilities or installations that may be encountered, whether privately or publicly owned, to prevent interference with the conditions, operations and maintenance of the respective utilities in a manner satisfactory to the owners, or operators of the respective utilities. Relocation or repair of utilities encountered even though not shown on the plans, shall be the responsibility of the Trade Contractor. The cost of the above measures, including maintaining of guards, watchmen, signals, barricades and temporary structures, making any necessary repairs and other cooperative or corrective work shall be borne by the Trade Contractor and shall be included in the prices bid in the Proposal for the related items of work. Neither the Owner nor the Engineer shall be responsible to the Contractor for the existence of utilities not shown on the plans or drawings and the Trade Contractor remains obligated under this paragraph for all hidden utilities.

I. The Trade Contractor shall be responsible for the preservation of all private or public property along and adjacent to the work and shall take all necessary precautions to prevent damage or injury thereto. Such preservation and protection shall include but not be limited to, trees, stone walls, fences, mail boxes, monuments, irrigation ditches, driveways, road access culverts, underground pipelines and structures. Such preservation and protection shall apply to all underground pipelines and utilities whether public, private or individually owned that are in or adjacent to the right-of-way. When direct or indirect damage is done to public or private property on account of the act, omission, neglect or misconduct in the prosecution or non-prosecution of the work on the part of the Trade Contractor, such property shall be restored by the Trade Contractor at the Trade Contractor's expense to a condition similar or equivalent to that which existed before such damage or injury was done, and brought up to current codes if applicable. The Trade Contractor shall be responsible for making all arrangements at his own expense for moving and operating equipment at temporary crossings of telephone and transmission lines, railroad tracks, irrigation ditches and pipelines.

Section 9. Communication with the Owner.

The Trade Contractor shall designate a responsible member of its organization at the site, whose duty shall be designated as the contact person for all communication between the Owner and the Trade Contractor. Said designated representative shall also be responsible to attend such meetings, as may be required to insure coordination and adequate performance of the work.

Section 10. Scope of Work.

The scope of work is described in the contract documents which are appended hereto and incorporated herein by this reference.

Section 11. Trade Contractor's Responsibility.

A. The Trade Contractor shall be responsible for all the work under this Contract until completion and final acceptance by the Owner.

B. The Trade Contractor shall supervise and direct the work. He shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

C. The Trade Contractor shall employ on the work only such persons who are competent and skilled in their assignments. Any employee who obstructs the progress of the work through incompetence or other means or conducts himself improperly shall be discharged or removed from the work when so requested by the Owner. This section shall not create a duty for the Owner to evaluate or assess the competence or skills of the Trade Contractors employees.

D. The Trade Contractor warrants that all materials and equipment furnished and incorporated by him in the project shall be new, unless otherwise specified, and that all work under this Trade Contract shall be of good quality, free from fault and defects and in conformity with the contract documents. All work not conforming to these standards shall be considered defective. The warranty provided herein shall be in addition to and not in limitation of any other warranty or remedy required by law or by the contract documents.

E. The Trade Contractor agrees that if he should fail or neglect to prosecute the work diligently and properly, or fail to perform any provisions of this Trade Contract, that the Owner, after three (3) days written notice to said Trade Contractor may, without prejudice to any other remedy, make good such deficiencies and may deduct the cost thereof from the payments then or thereafter due to the Trade Contractor pursuant to this Contract.

F. Tools furnished with any equipment may be used when approved by the Owner and shall be turned over to the Owner after completion of the work in a condition acceptable to the Owner. In case of rejection by the Owner, the Trade Contractor shall replace the tool or tools at no extra cost to the Owner.

G. Upon completion and before final acceptance of the work, the Trade Contractor shall remove from the site of the work and property of the Owner, all machinery, equipment, surplus materials, rubbish, barricades, signs and temporary structures and shall leave the premises in a condition which is satisfactory to the Owner.

H. The Trade Contractor shall keep one record set of the contract documents annotated to show all changes made during construction.

I. The Trade Contractor shall be responsible for the acts and omissions of all his employees and all subcontractors, their agents and employees and all other persons performing any of the work under a contract with the Trade Contractor.

J. Upon completion of the work, the Trade Contractor shall, at his or its expense, remove from the vicinity of the work, all plant, buildings, rubbish, unused materials, concrete forms

and other like material, belonging to him or used under his direction during construction, and in the event of his failure to do so, the same may be removed by the Owner and the Trade Contractor, his Surety or Sureties, shall be liable for the cost thereof. Also during the construction of the work, the site, partially finished structures, and material stockpiles shall be kept in a reasonable state of order and cleanliness.

Section 12. Changes in the Work.

A. CHANGES. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive, or Order for a Minor Change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

1. A Change Order shall be based upon agreement among the Owner, Contractor, and Engineer; a Construction Change Directive requires agreement by the Owner and Engineer and may or may not be agreed to by the Contractor; an Order for a Minor Change in the Work may be issued by the Engineer alone.

2. Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive, or Order for a Minor Change in the Work.

3. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to the quantities of work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted; provided however, that Owner may increase the number of units without change in the unit price if reasonable.

B. CHANGE ORDERS. The Contract Sum and the Contract Time may be changed only by Change Order. Methods used in determining adjustments to the Contract Sum may include those listed in Subsection C below. A Change Order is a written order to the Contractor, signed by the Contractor, the Owner and the Engineer, stating their agreement upon all of the following:

1. A change in the Work;

2. The amount of the adjustment in the Contract Sum, if any; and

3. The extent of the adjustment in the Contract Time, if any.

C. CONSTRUCTION CHANGE DIRECTIVES. A Construction Change Directive is a written order directed to the Contractor and signed by the Owner and Engineer, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

1. A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

2. If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

a. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

b. By unit prices stated in the Contract Documents or subsequently agreed upon;

c. By cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

d. By the method provided in Subparagraph (C)(3)(5).

3. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the work involved and advise the Engineer and Owner of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

4. A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

5. If the Contractor does not respond promptly to the Construction Change Directive or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Engineer on the basis of reasonable expenditures and savings of those performing the work attributable to the change, including, in case of an increase in the Contract Sum, a percentage fee for overhead and profit not to exceed five percent (5%) of such work's actual cost for Contractor and ten percent (10%) of such work's actual cost to be apportioned between any and all subcontractors and sub-subcontractors. For work performed by Contractor's own forces, Contractor's mark-up shall be limited to actual cost plus a percentage fee for overhead and profit not to exceed ten percent (10%). In such case, the Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting of actual costs together with appropriate supporting data. For the purposes of this Subparagraph, actual costs shall be defined as and limited to the following:

a. Costs of labor, including Social Security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

b. Costs of materials, supplies, and equipment, including costs of transportation, whether incorporated or consumed;

c. Reasonable rental costs of machinery and equipment, exclusive of hand tools, obtained and used specifically for such work, whether rented from the Contractor or others; and

d. Costs of premiums for all bonds (if any), permit fees, and sales, use or similar taxes directly attributable to such work. Actual cost does not include any item which could be deemed to be a general conditions cost or overhead, such as but not limited to, the cost of Contractor and Subcontractor supervisory personnel assigned to the Work, and field office and related expenses.

6. Pending final determination of actual cost to the Owner, amounts not in dispute may be included in applications for payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Engineer. When both additions and credits covering related work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7. If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be determined in accordance with Article 5 hereof.

8. When the adjustments in the Contract Sum and Contract Time are determined as provided herein, such determination shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

D. MINOR CHANGES IN THE WORK

1. The Engineer will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

2. The Owner may at any time as the need arises, order changes within the scope of work without invalidating the Agreement. If such changes increase or decrease the amount due under the contract documents or in the time required for performance of the work, and equitable adjustment will be authorized by change order.

3. The Owner also may, at any time, by issuing a field order, make changes in the details of the work. The Trade Contractor shall proceed with the performance of any changes in the work so ordered by the Owner unless the Trade Contractor believes that such field order entitles him to a change in contract price or time, or both, in which event he shall give the Owner written notice thereof within ten (10) days after the receipt of the ordered change, and the Trade Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the Owner.

Section 14. Contract Documents.

In case of conflict between this Contract, the general conditions of the contract for construction, and the supplementary conditions, this Contract will govern.

ARTICLE 4 – TRADE CONTRACTOR'S CONSTRUCTION SCHEDULE

Section 1. Preconstruction Conference.

A preconstruction conference shall be scheduled at the time the Notice of Award is issued. The Trade Contractor, at the preconstruction conference, shall prepare and submit for the Owner's and the Engineer's review and approval a Trade Contractor's construction schedule for the Work, in such and form and detail as the Owner may require. The schedule shall not exceed time limits under the Contract Documents, shall be revised as required herein and at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire project to the extent required by the Contract Documents, and shall provide for the expeditious and practicable execution of the Work. The schedule shall indicate the proposed starting and completion dates for the various subdivisions of the Work as well as the totality of the Work. The schedule shall be updated every fourteen (14) days for submitted to Engineer with Trade Contractor's applications for payment. Each schedule shall contain a comparison of actual progress with the estimated progress for such time stated in the original schedule. If any schedule submitted sets forth a date for Substantial Completion for the Work or any phase of the Work beyond the date(s) of Substantial Completion established in the Contract (as the same may be extended as provided in the Contract Documents), the Trade Contractor shall submit to Engineer and Owner for their review and approval, a narrative description of the means and methods which Trade Contractor intends to employ to expedite the progress of the Work to ensure timely completion of the various phases of the Work as well as the totality of the Work. To ensure such timely completion, Trade Contractor shall take all necessary action including, without limitation, increasing the number of personnel and labor on the Project and implementing overtime and double shifts. In that event, Trade Contractor shall not be entitled to an adjustment in the Contract Sum or the Schedule.

Section 2. Schedule of Submittals.

The Contractor shall prepare and keep current, for the Engineer's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Engineer reasonable time to review submittals.

Section 3. Conformance to Schedule.

The Contractor shall conform to the most recent schedules.

ARTICLE 5 - TIME FOR COMPLETION AND LIQUIDATED DAMAGES

A. The date of beginning and the time for completion of the work are essential conditions of the contract documents and the work embraced shall be commenced on a date specified in the notice to proceed.

B. The Trade Contractor shall proceed with the work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the Trade Contractor and the Owner, that the contract time for the completion of the work described herein is a reasonable time, If Trade Contractor is delayed in the progress of the Work by fire, unusual delay in transportation, unanticipated adverse weather conditions, or other unavoidable casualties beyond Trade Contractor's control other than unanticipated adverse weather conditions, the Contract Time shall be extended for a reasonable period of time. "Weather" means precipitation, temperature, or wind, and an "adverse weather condition" means

weather that on any calendar day varies from the average weather conditions for that day by more one hundred percent (100%) as measured by the National Oceanic and Atmospheric Administration. The term "unanticipated adverse weather conditions" means the number of days in excess of the anticipated adverse weather days per month as set forth below:

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
7	4	4	4	6	3	4	2	3	3	2	5

By reason of example only, if in March there are two (2) days when the snowfall exceeds the average snowfall for that day by one hundred percent (100%), those two (2) days will have experienced an adverse weather condition. However, there will have been no unanticipated adverse weather condition in March, because there are four (4) anticipated adverse weather days in March, which should be accounted for in the schedule. If, however, there are five (5) days in which the snowfall exceeds the average snowfall by one hundred percent (100%), an unanticipated adverse weather condition will have occurred, and Trade Contractor shall be entitled to request an extension of time.

C. If the Trade Contractor shall fail to complete the work within the Contract Time, or extension of time granted by the Owner, then the Trade Contractor shall pay to the Owner the amount of liquidated damages and not as penalty the sum of five hundred dollars ($500.00) for each calendar day that the Trade Contractor shall be in default after the time stipulated in the contract documents.

D. The Owner will charge the Trade Contractor, and may deduct from the partial and final payment for the work, all architectural, engineering and construction management expenses incurred by the Owner in connection with any work accomplished after the specified completion date.

E. The Trade Contractor will not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following, and the Trade Contractor has promptly given written notice of such delay to the Owner.

1. To any preference, priority or allocation order duly issued by the Owner.

2. To unforeseeable causes beyond the control and without the fault or negligence of the Trade Contractor, including, but not restricted to, unforeseen conditions, acts of God, or of the public enemy, acts of the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

3. To any delays of subcontractors occasioned by any of the causes specified in subparagraphs 1 and 2 of this paragraph E.

F. The Trade Contractor waives any right of recovery or reimbursement or by whatever name, as against the Owner or the Engineer, as a result of any delay or increase on overhead cost incurred by the Trade Contractor's association with any action or inaction on the part of any other trade contractor or supplier.

G. Any request for extension of the Contract Time shall be made in writing to the

Project Manager not more than seven (7) days after commencement of the delay; otherwise it shall be waived. Any such request shall contain an estimate of the probable effect of such delay on the progress of the Work.

H. In strict accordance with C.R.S. § 24-91-103.5, the City shall not amend the Contract Price to provide for additional compensation for any delays in performance which are not the result of acts or omissions of the City or persons acting on behalf of the City.

ARTICLE 6 - CONTRACT SUM

Section 1. Monthly or Progress Payments.

A. The City Council of the City of Northglenn has appropriated the money necessary to fund this project. The Owner shall pay the Trade Contractor in current funds for the performance of the work, subject to any additions and deletions, by written change order, the total sum not to exceed four hundred ninety nine thousand three hundred dollars ($499,300.00) (the "Original Contract Amount"). Notwithstanding anything to the contrary contained in this Agreement, no change order or other form of directive by the Owner requiring additional compensable work to be performed, which causes the aggregate amount payable under this Agreement, to exceed the amount appropriated for the Original Contract Amount, unless the Trade Contractor is given written assurance by the City of Northglenn that lawful appropriations have been made by the City Council of the City of Northglenn to cover the cost of the additional work.

B. The Engineer has, by separate agreement with the Owner, agreed to include in its monthly work estimate to the Owner, a review of the Trade Contractor's estimates of the value of all work, labor, and materials of the Trade Contractor incorporated into the Project. The Trade Contractor hereby agrees that estimates provided to the Engineer for review for the Owner shall be for work actually performed upon the project and that all such work, including labor and materials, have been paid. The determination of the amount of work completed on each application for payment by the Trade Contractor shall be made by the Engineer and shall thereafter be subject to approval by the Owner. Such determination, however, by the Engineer or approval by the Owner shall not be construed as acceptance of the work.

1. Before the first application for payment, the Trade Contractor shall submit to the Engineer and Owner a schedule of values to be allocated to the various portions of the Work, which in the aggregate equals the total Contract Sum, divided so as to facilitate payments to subcontractors, supported by such evidence of correctness as the Engineer may direct. This schedule, when approved by the Engineer, shall be used to monitor the progress of the Work and as a basis for making progress payments hereunder. Application for monthly progress payments shall be made in writing in accordance with this Contract and shall be submitted on approved forms provided by the Owner and shall be submitted to the Owner on or before the twentieth (20th) day of each month. Applications received on time will be paid on the twentieth (20th) day of the following month, providing that the Owner approves such recommendations of the Engineer. Applications received after the twentieth (20th) day of each month shall paid after the Owner's next pay period.

2. Pursuant to Colo. Rev. Stat. § 24-91-103, as may be amended, where the Original Contract Amount exceeds one hundred fifty thousand dollars ($150,000.00), the

Owner may retain up to five percent (5%) of the calculated value of completed work from each progress payment up until the contract is completed satisfactorily and finally accepted by the Owner. If the Owner finds satisfactory progress is being made in any phase of the contract, the Trade Contractor may make written request of the Owner for final payment of the withheld percentage. The Owner may agree to final payment of the withheld percentage if the Owner finds satisfactory and substantial reasons exist for the payment. The Trade Contractor must provide written approval to the Owner from any surety furnishing bonds for the contract work in order to receive said payment of the withheld percentage.

3. Upon receipt of written notice from the Trade Contractor that his work is ready for final inspection and acceptance by the Owner and upon receipt of final application for payment, the Owner will promptly make such final field review subject to the final payment requirements contained in Colo. Rev. Stat. § 38-26-107, as amended. If the Owner finds that the work is acceptable under the contract documents, he will recommend to the Owner that a final certificate of payment be issued. Neither final payment nor the remaining retention shall become due until the Trade Contractor submits to the Engineer an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work, have been paid or otherwise satisfied. Likewise, final payment shall not be made until the consent of the surety to final payment has been obtained, and if required by the Owner, such other data establishing payment or satisfaction of all obligations, including releases, final lien waivers, and receipts and warranties, if any, have been provided to the Engineer for the use and benefit of the Owner. Should any subcontractor of the Trade Contractor or supplier of said Trade Contractor refuse to furnish any warranty and/or release or waiver, the Owner in its sole discretion, may refuse to certify final payment. The Trade Contractor may then furnish sufficient bonds satisfactory to the Owner to indemnify the Owner against any such liens.

4. Notwithstanding anything else to the contrary contained herein, such final payment by the Owner shall not be construed as a waiver of any claims affecting or arising from:

a. Unsettled liens;

b. Faulty or defective work appearing after substantial completion;

c. Failure of the work to comply with the requirements of the contract documents;

d. Terms of any special warranties required by the contract documents.

5. The acceptance by the Trade Contractor of final payment shall be and shall operate as a release to the Owner from all claims and all liability to the Trade Contractor for all things done or furnished in connection with this work and for every act and neglect of the Owner and others relating to or arising out of the work other than claims in stated amounts as may be specifically expected by the Trade Contractor with the consent of the Owner. Any payment, however, final or otherwise, will not release the Trade Contractor or his sureties from any obligations under the contract documents or the performance bond and labor and material payment bond.

ARTICLE 7 - CORRECTION OF WORK

A. During the life of the Contract and for a period of two (2) years after final acceptance, the Trade Contractor shall promptly remove from the premises all work rejected by the Owner for failure to comply with the contract documents, whether incorporated in the construction or not, and the Trade Contractor shall promptly replace and re-execute the work in accordance with the contract documents and without expense to the Owner and shall bear the expense of making good all work of other trade contractors destroyed or damaged by such removal or replacement. The Owner, however, may at its discretion elect to accept an equitable reduction in price or a refund instead of correction of the condemned work.

B. All removal and replacement work shall be done at the Trade Contractor's expense. If the Trade Contractor does not take action to remove such rejected work within ten (10) days after receipt of written notice, the Owner may remove such work and store the materials all at the expense of the Trade Contractor.

ARTICLE 8 - TEMPORARY FACILITIES AND SERVICES

Unless otherwise provided in this Contract, the Trade Contractor shall furnish and make available, at no cost, all temporary facilities, including all power needed for heating and protection of facilities and work. It is the expressed intent of the parties that the Trade Contractor shall be responsible for and at its sole cost all heating and protection of facilities and work.

ARTICLE 9 - INDEMNIFICATION AND INSURANCE

Section 1. Indemnification.

The Contractor, to the fullest extent permitted by law, shall defend, indemnify and hold harmless the City, its officers, employees, agents and their insurers, from and against all liability, claims and demands on account of injury, loss or damage, including without limitation, claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage or any other loss of any kind whatsoever, which arises out of or is in any manner connected with this Contract, to the extent that such injury, loss or damage is attributable to the act, omission, error, professional error, mistake, negligence or other fault of the Contractor, the Contractor's employees, subcontractors or anyone else employed directly or indirectly by the Contractor, Contractor's employees or subcontractor.

The Contractor, to the fullest extent permitted by law, shall defend, investigate, handle, respond and provide defense for and defend against any such liability, claims or demands at the sole expense of the Contractor, or at the option of the City, Contractor agrees to pay the City or reimburse the City for defense costs incurred by the City in connection with any such liability, claims, or demands. The Contractor, to the fullest extent permitted by law, shall defend and bear all other costs and expenses related thereto, including court costs and attorney fees, whether or not such liability, claims or demands alleged are groundless, false or fraudulent.

This indemnification provision is intended to comply with C.R.S. § 13-21-111.5(6), as amended, and shall be read as broadly as permitted to satisfy that intent.

Section 2. Insurance.

A. The Contractor agrees to obtain and maintain during the life of this Contract, a policy or policies of insurance against all liability, claims, demands and other obligations assumed by the Contractor pursuant to Section 1 above. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. The Contractor shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to Section 1 above, by reason of its failure to obtain and maintain during the life of this Contract insurance in sufficient amounts, durations, or types.

B. Contractor shall obtain and maintain during the life of this Contract, and shall cause any subcontractor to obtain and maintain during the life of this Contract, the minimum insurance coverages listed below. Such coverages shall be obtained and maintained with forms and insurers acceptable to the City. All coverages shall be continuously maintained to cover all liability, claims, demands and other obligations assumed by the Contractor pursuant to Section 1 above. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

1. Worker's Compensation Insurance to cover obligations imposed by applicable law for any employee engaged in the performance of the work under this Contract, and Employers Liability Insurance with minimum limits of five hundred thousand dollars ($500,000) each incident, five hundred thousand dollars ($500,000) disease—policy limit, and five hundred thousand dollars ($500,000) disease—each employee.

2. General Public Liability Insurance to be written with a limit of liability of not less than one million dollars ($1,000,000) for all damages arising out of bodily injury, personal injury (including coverage for employee and contractual acts), including death, at any time resulting therefrom, sustained by any one person and not less than two million dollars ($2,000,000) for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by two or more persons in any one accident. This policy shall also include coverage for blanket contractual and independent contractor risks. The limits of General Public Liability Insurance for broad form property damage (including products and completed operations) shall be not less than one million dollars ($1,000,000) for all damages arising out of injury to or destruction of property in any one (1) accident and not less than two million dollars ($2,000,000) for all damages arising out of injury to, or destruction of property, including the City's property, during the policy period. The General Public Liability Insurance policy shall include coverage for explosion, collapse and underground hazards. The policy shall contain a severability of interests provision.

3. Protective Liability and Property Damage insurance covering the liability of the Owner, including any employee, officer or agent of the Owner with respect to all operations under the Contract by the Trade Contractor or his sub-contractors shall be obtained and maintained during the life of the contract. The limits of the Owner's Protective Liability Policy, to be provided by the Trade Contractor, as described in this Section 2, shall be increased to the same limits as described above for the Trade Contractor's General Public Liability Insurance.

4. Comprehensive Automobile Liability Insurance with minimum combined single limits for bodily injury and property damage of not less than one million dollars

($1,000,000) each occurrence and one million dollars ($1,000,000) aggregate with respect to each of the Trade Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision. If the Trade Contractor has no owned automobiles, the requirements of this paragraph shall be met by each employee of the Trade Contractor providing services to the Owner under this contract.

C. To the extent that liability results from the acts or omissions of the Trade Contractor, all Insurance Policies and Certificates of Insurance issued for this project shall name as additional insured(s), the Owner, whether private or governmental, the Owner's officers and employees, and the Engineer and its agents and employees, and any other person(s), company(ies), or entity(ies) deemed necessary by the Owner. The Trade Contractor shall be solely responsible for any deductible losses under any policy required herein.

D. The insurance provided by the Trade Contractor shall be primary to insurance carried by the Owner, the Engineer, and all other additional insureds, and the principal defense of any claims resulting from the Trade Contractor's obligations under the Contract shall rest with the Trade Contractor's Insurer.

Section 3. Certificates of Insurance.

A. The certificate of insurance provided by the Trade Contractor shall be completed by the Trade Contractor's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by the Owner prior to commencement of the contract. No other form of certificate shall be used. The certificate shall identify this Contract and shall provide that the coverages afforded under the policies shall not be cancelled, terminated or materially changed until at least thirty (30) days prior written notice has been given to the Owner. The completed certificate of insurance shall be sent to:

Director of Public Works
City of Northglenn
11701 Community Center Drive
Northglenn, Colorado 80233-8061

B. Failure on the part of the Trade Contractor to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which the Owner may immediately terminate this contract, or at its discretion the Owner may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by the Owner shall be repaid by the Trade Contractor to the Owner upon demand, or the Owner may offset the cost of the premiums against any monies due to the Trade Contractor from the Owner.

C. The Owner reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

D. The parties hereto understand and agree that the Owner is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently three hundred fifty thousand dollars ($350,000) per person and nine hundred ninety thousand dollars ($990,000) per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, 24-10-114 et seq., C.R.S., as from time to time

amended, or otherwise available to the Owner, its officers or employees.

ARTICLE 10 - PERFORMANCE, LABOR AND MATERIAL PAYMENT BONDS

The Trade Contractor shall within ten (10) days after the receipt of a notice of award, furnish the Owner with a performance bond and a payment bond in penal sums equal to the amount of the contract price, conditioned upon the performance by the Trade Contractor of all undertakings, covenants, terms, conditions and agreements of the contract documents, and upon the prompt payment by the Trade Contractor to all persons supplying labor and materials in the prosecution of the work provided by the contract documents. Such bonds shall be executed by the Trade Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these bonds shall be borne by the Trade Contractor. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, the Trade Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Trade Contractor. No further payments will be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

ARTICLE 11 – CLAIMS AND DISPUTES

A. Definition. A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment of contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. The term “claim” also includes other disputes between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate claims shall rest with the party making the claim.

B. Decision of Engineer or Architect. Claims may, upon request of both the Contractor and the Owner, be referred initially to the Engineer or Architect for action as provided in Article 3, Section 12.

C. Time limits on Claims. Claims by either party must be made within twenty one (21) days after occurrence of the event giving rise to such claim or within twenty one (21) days after the claimant first recognizes, or reasonably should have recognized, the condition giving rise to the claim, whichever is later. An additional claim made after the initial claim has been implemented by change order will not be considered unless submitted in a timely manner.

D. Continuing Contract Performance. Pending final resolution of a claim, including litigation, unless otherwise directed by Owner in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

E. Waiver of Claims: Final Payment. The making of Final Payment shall constitute a waiver of claims by the Owner except those arising from:

1. Liens, claims, security interests, or encumbrances arising out of the Contract and unsettled;

2. Failure of the Work to comply with the requirements of the Contract Documents;

3. Terms of special warranties required by the Contract Documents; or

4. Faulty or defective work appearing after Substantial Completion.

F. Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than seven (7) days after first observance of the conditions. Site conditions which an experienced and prudent contractor could have anticipated by visiting the site, familiarizing himself with the local conditions under which the Work is to be performed and correlating his observations with the requirements of the Contract Documents shall not be considered as claims for concealed or unknown conditions, nor shall the locations of utilities which differ from locations provided by the utility companies. The Engineer or Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or the required time for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Engineer or Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Engineer or Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within twenty-one (21) days after the Engineer or Architect has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Engineer or Architect for initial determination, subject to further proceeding pursuant to these Contract Documents.

G. Claims for Additional Cost. If the Contractor wishes to make claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the work. Said notice shall itemize all claims and shall contain sufficient detail and substantiating data to permit evaluation of same by Owner and Engineer or Architect. No such claim shall be valid unless so made. Prior notice is not required for claims relating to an emergency endangering life or property. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Engineer or Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Engineer or Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension, or (7) other reasonable grounds, claim shall be filed in accordance with the procedure established herein Any change in the Contract Sum resulting from such claim shall be authorized by change order or construction change directive.

H. Claims for additional time. If the Contractor wishes to make claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one claim is necessary.

I. Injury or damage to person or property. Subject to the Parties' obligations and responsibilities under the Contract Documents in general and Article 8 hereof in particular, if either party to the Contract suffers injury or damage to person or property because of an act or omission

of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a claim for additional cost or time related to this claim is to be asserted, it shall be filed as provided in Article 3, Section 12.

ARTICLE 12 - RESOLUTION OF CLAIMS AND DISPUTES

A. The Engineer (if the matter is referred to the Engineer for initial decision) will review claims and take one or more of the following preliminary actions within ten (10) days of receipt of a claim: (1) request additional supporting data from the claimant; (2) submit a schedule to the parties indicating when the Engineer expects to take action; (3) reject the claim in whole or in part, stating the reasons for rejection; (4) recommend approval of the claim by the other party; or (5) suggest a compromise. The Engineer may also, but is not obligated to, notify the surety, if any, of the nature and amount of the claim.

B. If a claim has been resolved, the Engineer (or at the Owner's option, Owner), will prepare or obtain appropriate documentation.

C. If a claim has not been resolved, the party making the claim shall within ten (10) days after the Engineer's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Engineer; (2) modify the initial claim; or (3) notify the Engineer that the initial claim stands.

D. If a claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Engineer, the Engineer will notify the parties in writing that the Engineer's decision will be made within seven (7) days, which decision will be considered advisory only and not binding on the parties in the event of litigation in respect of the claim. Upon expiration of such time period, the Engineer will render to the parties the Engineer's written decision relative to the claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Trade Contractor's default, the Engineer may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

E. The dispute clause does not preclude the considerations of questions of fact or law in connection with decisions provided for in Paragraph A above. Nothing in this Agreement, however, shall be construed as making final a decision of an administrative official, representative or City Council on a question of fact or law.

F. As between the parties of this Agreement, as to all acts or failure to act by either party of this Agreement, any applicable statute of limitation shall commence to run from the date of the agreed party's discovery of such act or failure to act.

G. The Trade Contractor shall give written notice to the Owner within ten (10) days of any dispute/claim arising under this Contract upon which the Trade Contractor seeks compensation or change of contract documents, otherwise the Trade Contractor's dispute/claim shall be deemed waived. Said ten (10) days written notice shall not be deemed to run from the date of discovery in this instance but from the date the dispute/claim has arisen.

ARTICLE 13- TERMINATION

A. This Agreement may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this Agreement through no fault of the terminating party; provided that no such termination may be effected unless the other party is given (1) not less than ten (10) days written notice (delivered by certified mail, return receipt requested) of intent to terminate; and (2) an opportunity for consultation with the terminating party prior to termination.

B. This Agreement may be suspended or terminated in whole or in part, in writing, by the Owner for its convenience; provided that no such termination may be effected unless the Trade Contractor is given (1) not less than ten (10) days written notice (delivered by certified mail, return receipt requested) of intent to suspend or terminate; and (2) an opportunity for consultation with the Owner prior to suspension or termination.

C. Suspension for Convenience: The Owner, for its own convenience, may suspend the contract in whole or in part at any time by written notice to the Trade Contractor. Such notice shall state the extent and the effective date of such suspension, and on the effective date thereof the Trade Contractor shall promptly suspend such work to the extent specified, and during the period of such suspension shall properly care for and protect all work and materials, housing and equipment on hand for construction under the contract. The Trade Contractor also shall promptly supply the Owner with copies of all outstanding orders for materials, equipment and services, and shall take such action relative to such orders as may be directed by the Owner. If the performance of the work is thus suspended, the Trade Contractor shall be entitled to be reimbursed for all additional expense incurred by reason of such suspension as agreed upon by the Trade Contractor and the Owner.

D. Termination for Convenience:

1. The Owner may for its own convenience terminate work under the contract in whole or in part at any time by written notice to the Trade Contractor. Such notice shall state the extent and effective date of such termination and on the effective date thereof, the Trade Contractor will, and as to the extent directed, stop work under the contract and the placement of further orders of subcontracts under the contract, terminate work under order and subcontracts under the contract, and take any necessary action to protect property in the Trade Contractor's possession in which the Owner has or may acquire an interest.

2. In the event of such termination, the Owner shall pay to the Trade Contractor: (1) its direct costs (excluding overhead) for all work done in conformity with the Contract to the effective date of such termination and (2) other costs pertaining to the work which the Trade Contractor may incur as a result of such termination, all as approved by the Owner plus ten percent (10%) of such costs (excluding costs under (2) above) for overhead and profit, provided, however, that in no event shall the total amount to be paid under this Article 11, Section D.(2) plus payments previously made, exceed the lesser of (a) the total aggregate contract price specified in the Trade Contract; or (b) that proportion of the aggregate total contract price specified in the date of termination bears to the entire work to be performed hereunder. Any payment under this Article 11, Section D.(2) shall be made upon the expiration of the period within which liens may be filed under the laws of the state of Colorado, subject, however, to withholding by the Owner for the reasons and in the manner provided in those provisions pertaining to withholding of payments for

liens.

E. Termination for Default:

1. The Owner shall have the right to terminate the employment of the Trade Contractor after giving ten (10) days written notice of the termination to the Trade Contractor in the event of any default by the Trade Contractor. In the event of such termination, the Owner may take possession of the work and of all materials, tools and equipment thereon and may finish the work by whatever method and means he may select. It shall be considered a default by the Trade Contractor whenever he shall:

a. Disregard or violate important provisions of the contract documents or the Owner's instructions, or fail to prosecute the work according to the agreement schedule of completion, including extensions thereof;

b. Fail to provide a qualified representative, competent workmen or subcontractors, or proper materials, or fail to make prompt payment therefor; and

c. Fail to submit a completion schedule within fourteen (14) days after award of contract.

2. Upon termination of the contract by the Owner for default by the Trade Contractor, no further payments shall be due to the Trade Contractor until the work is completed. If the unpaid balance of the contract amount shall exceed the cost of completing the work including all overhead costs, the excess shall be paid to the Trade Contractor. If the cost of completing the work shall exceed the unpaid balance, the Trade Contractor shall pay the difference to the Owner. The amount of the cost incurred by the Owner in implementing the work, and the damage incurred through the Trade Contractor's default, shall be approved by the Owner.

3. The provisions of this Article 11, Section D.(2) shall not apply in the event of default of the Trade Contractor; provided, however, that the provisions of Article 11, Section D.(2) shall apply in the event of substantial failure by the Owner to fulfill its obligations under this Agreement.

ARTICLE 14 - SIMULTANEOUS WORK BY OTHERS

A. The Owner reserves the right to let other contracts in connection with this project. The Trade Contractor shall afford other trade contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

B. If the proper execution or results of any part of the Trade Contractor's work depends upon the work of any other trade contractor, the Trade Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. Failure of the Trade Contractor to so inspect and report defects shall constitute an acceptance of the other trade contractors' work as fit and proper for the addition of his work thereto, except as to defects which may develop in the other trade contractors' work after the execution of his work.

C. The Trade Contractor shall coordinate his operations with those of other trade contractors. Cooperation will be required in the arrangement for the storage of materials and in

the detailed execution of the work.

D. The Trade Contractor, including his subcontractors, shall keep informed of the progress and the detail work of other trade contractors and shall notify the Engineer immediately of lack of progress, defective workmanship, or lack of coordination on the part of other trade contractors. Failure of the Trade Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress, defective workmanship, or lack of coordination by others shall be construed as acceptance by him of the work and the status of work as being satisfactory for proper execution of his own work.

E. All materials and labor shall be furnished at such times as shall be for the best interest of all trade contractors concerned, to the end that the combined work of all may be properly and fully completed on contract time.

F. Nothing herein shall be construed in any way as giving the Trade Contractor a claim as against the Owner and the Engineer resulting in any revised schedule based upon delay caused by any other trade contractor or supplier.

ARTICLE 15 - SUBCONTRACTING

A. The Trade Contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.

B. Before execution of the contract, the Trade Contractor shall submit the names of all subcontractors, including contact persons, phone numbers, and addresses to the Engineer or Architect and Owner. The Trade Contractor shall also promptly notify all parties of any changes in subcontractors or subcontractor contact information.

C. The Trade Contractor shall be fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

D. The Trade Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Trade Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Trade Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Trade Contractor under any provision of the contract documents.

E. Nothing contained in this Contract will create any contractual relation between any subcontractor and the Owner.

ARTICLE 16 - GUARANTY

A. The Trade Contractor shall guarantee all materials and equipment furnished and work performed for a period of two (2) years from the date of final acceptance of the contract by the Owner that the work is free from all defects due to faulty materials or workmanship and that the Trade Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Trade Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Trade Contractor the cost thereby incurred. The performance bond shall remain in full force and effect through the guarantee period.

B. Whenever in the specifications a guarantee or maintenance bond is required to be furnished for any item of equipment, material or portion of the work, such guarantee shall be submitted to the Owner and a written approval will be issued to the Trade Contractor before any such equipment, material or construction is ordered and incorporated in work by the Trade Contractor.

ARTICLE 17 - SALES TAX

The Trade Contractor and all of his subcontractors must make application to the Colorado State Department of Revenue for a certificate of exemption to permit the purchase of building materials for the construction of this project without payment of the sales tax. Prior to the start of construction, the Trade Contractor shall furnish copies of such certificates to the Owner. Applications and certificates must be on forms provided by the Department of Revenue.

ARTICLE 18 - MISCELLANEOUS PROVISIONS

A. This Agreement is made and entered into subject and conformable to the laws of the State of Colorado and the Home Rule Charter of the City of Northglenn. To the extent any provision hereof is inconsistent with said laws and Charter, said laws and Charter shall control.

B. The Trade Contractor shall comply with all federal and state laws and local ordinances and regulations which affect those engaged or employed in the work or which affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same, and shall at all times observe and comply with all such existing laws, ordinances, regulations and decrees, and shall protect and indemnify the Owner and the Engineer against any claim or liabilities arising solely from or based solely on the violations of such law, ordinance, regulation, order or decree, whether by itself, its subconsultants, agents, or employees.

C. The Trade Contractor will take affirmative action to not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex or handicap, if otherwise qualified.

D. In the event any provision of this Agreement is held invalid and unenforceable, the remaining provisions shall be valid and binding upon the parties.

E. One or more waivers by either party of any provision, term, condition or covenant

shall not be construed by the other party as a waiver of a subsequent breach of the same by the other party.

F. The Owner and the Trade Contractor each binds itself and its partners, successors, executors, administrators, and assigns to this Agreement. Neither the Owner nor the Trade Contractor will assign, sublet, or transfer its interest in this Agreement without the written consent of the other.

G. Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of any public body which may be a party hereto, nor shall it be construed as giving any rights or benefits hereunder to anyone other than the Owner and the Trade Contractor.

H. Illegal Aliens.

1. Certification. By entering into this Agreement, Contractor hereby certifies that, at the time of this certification, it does not knowingly employ or contract with an illegal alien who will perform work under the Agreement and that Contractor will participate in either the E-Verify Program administered by the United States Department of Homeland Security and Social Security Administration or the Department Program administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired for employment to perform work under the Agreement.

2. Prohibited Acts. Contractor shall not:

a. Knowingly employ or contract with an illegal alien to perform work under this Agreement; or

b. Enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this Agreement.

3. Verification.

a. Contractor has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this Agreement through participation in either the E-Verify Program or the Department Program.

b. Contractor shall not use the E-Verify Program or the Department Program procedures to undertake pre-employment screening of job applicants while this Agreement is being performed.

c. If Contractor obtains actual knowledge that a subcontractor performing work under this Agreement knowingly employs or contracts with an illegal alien who is performing work under the Agreement, Contractor shall:

i. Notify the subcontractor and the City within three (3) days that Contractor has actual knowledge that the subcontractor is employing or contracting with an illegal alien who is performing work under the Agreement; and

ii. Terminate the subcontract with the subcontractor if within three (3) days of receiving the notice required pursuant to subparagraph (a) hereof, the subcontractor does not stop employing or contracting with the illegal alien who is performing work under the Agreement; except that Contractor shall not terminate the contract with the subcontractor if during such three (3) days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien who is performing work under the Agreement.

4. Duty to Comply with Investigations. Contractor shall comply with any reasonable request by the Colorado Department of Labor and Employment made in the course of an investigation conducted pursuant to C.R.S. § 8-17.5-102(5)(a) to ensure that Contractor is complying with the terms of this Agreement.

5. If Contractor does not currently employ any employees, Contractor shall sign the No Employee Affidavit attached hereto.

6. If Contractor wishes to verify the lawful presence of newly hired employees who perform work under the Agreement via the Department Program, Contractor shall sign the Department Program Affidavit attached hereto.

I. Keep Jobs in Colorado Act: Pursuant to the Keep Jobs in Colorado Act, C.R.S. 8-17-101 *et seq.* (the "Act") and the rules adopted by the Division of Labor of the Colorado Department of Labor and Employment implementing the Act (the "Rules"), the Contractor shall employ Colorado labor to perform at least eighty percent (80%) of the work and shall obtain and maintain the records required by the Act and the Rules. For purposes of this Section "Colorado labor" means any person who is a resident of the state of Colorado at the time of this Project, without discrimination as to race, color, creed, sex, sexual orientation, marital status, national origin, ancestry, age, or religion except when sex or age is a bona fide qualification. A resident of the state is a person who can provide a valid Colorado driver's license, a valid Colorado state-issued photo identification, or documentation that he or she has resided in Colorado for the last thirty (30) days. Contractor represents that it is familiar with the requirements of the Act and the Rules and will fully comply with same. This Section shall not apply to any project for which appropriation or expenditure of moneys may be reasonably expected not to exceed five hundred thousand dollars ($500,000) in the aggregate for any fiscal year.

ARTICLE 19 - ATTACHMENTS, SCHEDULES AND SIGNATURES

It is further mutually agreed that this Agreement and the contract documents constitute the entire Agreement between the Owner and the Trade Contractor and supersede all prior or oral understandings. This Agreement may only be amended, supplemented, modified, or cancelled by a duly executed written amendment.

IN WITNESS WHEREOF the parties hereto each herewith subscribe the same in triplicate.

CITY OF NORTHGLENN, COLORADO

By: _____

Name: Carol A. Dodge

Title: Mayor

ATTEST:

_____
Johanna Small, CMC, City Clerk

APPROVED AS TO FORM:

_____
Corey Y. Hoffmann, City Attorney

TRADE CONTRACTOR

By: Ray Hallquist

Name: Ray Hallquist

Title: President

STATE OF COLORADO)
) ss.
COUNTY OF Arapahoe)

The foregoing instrument was acknowledged before me this 5th day of June, 2018 by Ray Hallquist, as President of HPM Inc.

My commission expires: 12/16/19

Witness my hand and official seal.

Susanne Heinert
Notary Public

SUSANNE HEINERT
NOTARY PUBLIC - STATE OF COLORADO
My Identification # 20154048190
Expires December 16, 2019

PROSPECTIVE CONTRACTOR'S CERTIFICATE REGARDING EMPLOYING OR CONTRACTING WITH AN ILLEGAL ALIEN

FROM: HPM, Inc.
(Prospective *Contractor*)

TO: City of Northglenn
11701 Community Center Drive
Northglenn, Colorado 80233-8061

Project Name WWTP Control Building and Laboratory/Furniture Fitout

Bid Number _____ Project No. 2018-063

As a prospective Contractor for the above-identified bid, I (we) do hereby certify that, as of the date of this certification, I (we) do not knowingly employ or contract with an illegal alien who will perform work under the Agreement and that I (we) will confirm the employment eligibility of all employees who are newly hired for employment to perform work under the Agreement through participation in either the E-Verify Program administered by the United States Department of Homeland Security and Social Security Administration or the Department Program administered by the Colorado Department of Labor and Employment.

Executed this 30 day of May, 2018

Prospective Contractor HPM, Inc.

By: _____

Title: President

DEPARTMENT PROGRAM AFFIDAVIT

(To be completed if Contractor participates in the Department of Labor Lawful Presence Verification Program)

I, HPM, Inc., as a public contractor under contract with the City of Northglenn (the "City"), hereby affirm that:

1. I have examined or will examine the legal work status of all employees who are newly hired for employment to perform work under this public contract for services ("Contract") with the City within twenty (20) days after such hiring date;

2. I have retained or will retain file copies of all documents required by 8 U.S.C. § 1324a, which verify the employment eligibility and identity of newly hired employees who perform work under this Contract; and

3. I have not and will not alter or falsify the identification documents for my newly hired employees who perform work under this Contract.

Ray Hallgust
Contractor Signature

6/5/2018
Date

STATE OF COLORADO)
) ss.
COUNTY OF Arapahoe)

The foregoing instrument was subscribed, sworn to and acknowledged before me this 5th day of June, 2018, by Ray Hallgust as President of HPM Inc..

My commission expires: 12/16/19

(S E A L)

Susanne Heinert
Notary Public

SUSANNE HEINERT
NOTARY PUBLIC - STATE OF COLORADO
My Identification # 20154048190
Expires December 16, 2019