FINAL INVESTIGATIVE REPORT

COMMUNITY & TECHNICAL COLLEGE PARKING GARAGE EVALUATION

2012052 CTCGE

Fairbanks, Alaska

July 2013

Prepared for:
UAF Facilities Services
Division of Design and Construction
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USKH WO# 1218306

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FOREWORD

USKH Inc. (USKH) has been retained by the UAF Facilities Services – Division of Design and Construction (UAF DDC) to perform Investigative Services relating to the Community Technical College Parking Garage located on Barnette Street in downtown Fairbanks, Alaska.

The original Scope of Work for this project consisted of the following items:

1. Address top level sealing to prevent water infiltration.
2. Removing sufficient exterior panels to no longer require mechanical ventilation.
3. Recommendations regarding Aesthetic and Security improvements related to removing panels.
4. Painting and/or interior lighting recommendations and determine associated costs.
5. Determine if lower level utility pathway can be removed.

Through subsequent meetings in December of 2011 with the UAF Facilities Services – Division of Design and Construction (UAF DDC) and the User, the following items were added to the scope:

6. Conduct a Solar Power Study and determine its associated costs.
7. Conceptualize a sky bridge across Barnette Street and determine associated costs.
8. Perform Mechanical and Electrical Code/Condition/Decommissioning Study and determine associated costs.

In addition to these added scope items, it was requested that we perform an Early Look at life cycle cost of a new roof versus a top level sealing and flashing repair for Item 1 identified above.

These objectives will be accomplished such that the UAF DDC will be able to consider available options.

In December of 2011, our original Draft Investigative Report consisted of Item 1 (Address Top Level Sealing to Prevent Water Infiltration) and Item 2 (Removing sufficient exterior panels to no longer require mechanical ventilation.) of the Scope of Work. In July of 2012 we prepared an updated Draft Investigative Report that incorporated Items 3 through 8.

The information presented in each report has been collected by USKH personnel through site visits, destructive testing, review of available as-built documentation, and research of pertinent materials, etc. Principal personnel involved with the preparation of these reports include:

Name	Discipline	Firm
Frank Thompson, PE	Structural Engineering	USKH
Greg Liebl, PE	Structural Engineering	USKH
Gary Pohl, AIA	Architecture	USKH
Alex DeMambro	Architecture	USKH
Jason Thoma, PE	Mechanical Engineering	USKH
Carl Olson, EIT	Electrical Engineering	USKH

EXECUTIVE SUMMARY

SUMMARY OF CONCLUSIONS

Item 1 – Address Top Level Sealing to Prevent Water Infiltration

USKH found that the topping slab was compromised due to the highly compressible and saturated substrate material that it was constructed on. Due to this condition it is not feasible to simply coat the topping slab to improve water tightness and performance off the top level slab. USKH and ARI recommend that the topping slab, insulation and roofing material be removed down to the structural slab. The structural slabs at the upper and lower levels were found to be in sound structural condition.

Item 2 – Removing Sufficient Exterior Panels to No Longer Require Mechanical Ventilation

USKH concluded that it is feasible and practical under the 2009 IBC requirements to remove sufficient exterior wall area to bring the parking garage into an "open parking garage" classification and eliminate the existing mechanical ventilation systems.

Early Look Package – New Roof vs. Coating and Flashing Analysis

USKH concluded that the new roof provides a better life cycle value to the building for water tightness.

New Roof Life Cycle Cost:	$2,333,098
Coating and Flashing Life Cycle Cost:	$3,900,701

Item 3 – Recommendations Regarding Aesthetic and Security Improvements Related to Removing Panels

USKH has concluded that the conversion of the CTC Parking Garage to a covered, open parking garage will provide opportunities to improve the aesthetics and complement the Tanana Valley Campus Center Building, its sister facility across Barnette, as well greatly improve user comfort, safety and security.

Cost of Aesthetics and Security:	$1,641,960

Item 4 – Painting and/or Interior Lighting Recommendations

USKH found that through the use of paint and new energy efficient lighting of a more natural color, the interior levels of the CTC Parking Garage can be provided with a bright new environment that establishes an invigorated décor at the facility. With the addition of a building roof, the long term insidious damage from moisture can be curtailed, and investment in new finishes becomes warranted. Critical to these efforts will be the proper preparation of substrates to be painted, which will assure long term durability of new finish systems.

Minimum recommendations would be to prepare and paint the concrete ceilings, and install the new LED type lighting fixtures.

Cost of Painting and New Lighting:	$1,746,661

Item 5 – Determine If Lower Level Utility Pathway Can Be Removed

Through field observation, as built review and discussions with the utility company, USKH has determined that removal of the lower level utility pathway can be accomplished with minor re-routing of existing communication lines.

Cost of Removal of the Utility Pathway $41,193

Item 6 – Conduct a Solar Power Study

USKH has determined that with the new roof option, solar power can be added to the building. The simple payback on this system is about 20 years, depending on the future cost of electricity.

Cost of Solar Panels including Structural Impact: $1,249,383

Item 7 – Conceptualize a Sky Bridge Across Barnette Street

USKH has concluded that the construction of an elevated "skybridge" would provide both improved safety and convenience to the staff and students at the UAF CTC Campus.

Without a bridge connection to the Tanana Valley Campus Center Building, users of the CTC Parking Garage will be required to employ a circuitous route of just over 300 feet to make three protected road crossings, and some will likely jay walk to shorten their distance. The preferred alignment for the bridge concept as presented within the following report is just over 100 feet in length, and eliminates pedestrian/vehicle interface. Of course, it must be noted that these distance do not include travel distance within the 300 foot long parking garage itself.

Determination of whether or not the bridge is to be constructed must weigh the cost of initial construction and potential on-going maintenance costs against the potential improvements in safety and convenience, as well as the potential for increased revenue that would be correspondingly realized.

Cost of Skybridge: $1,150,986

Item 8 – Perform Mechanical and Electrical Code/Condition/Decommissioning Study

USKH has concluded that the current mechanical systems within CTC Parking Garage are aged and over-sized for the envisioned future loads. The heating system was originally sized to support the ventilating system, however once the exterior walls of the parking areas are opened up there will no longer be a need for mechanical ventilation of the garage. This allows for the complete removal of the ventilating systems including the heating piping that had been supporting the tempering coils for the system. The mechanical rooms located on the upper level mainly house the ventilating equipment and can be removed completely along with the ventilating systems; any legacy equipment that must remain operational may be moved into the mechanical spaces on the second level. The basement mechanical space will remain operational and heated as this is where the sprinkler system riser is located and where the heating mains enter the building. The heating system will remain in operation as the enclosed stairways at various locations around the garage are heated and should remain so. The system will remain oversized, however this should not affect the system's ability to remain in operation. Based on the future use and opening of the exterior walls, there are no mechanical code issues at this time.

Electrical inspection of the building found numerous instances where the building does not meet current Code requirements. These violations include how emergency power is distributed, egress lighting, and recall for the elevator upon fire alarm. New panel boards and circuiting are recommended in order to bring the building back into compliance with current electrical codes. The building also contains electrical equipment that is currently unused. This equipment should be removed along with electrical appurtenances that supported the mechanical equipment being removed.

Cost of Decommissioning and Code Upgrades: $536,762

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TABLE OF CONTENTS

TABLES AND FIGURES

Tables

Figures

ITEM 1 ADDRESS TOP LEVEL SEALING TO PREVENT WATER INFILTRATION

USKH was retained to perform an investigation of the top level of the Community Technical College Parking Garage in order to address water infiltration prevention to the lower levels. The purpose of this report is to convey information obtained during field observations, destructive testing and review of as-built drawings.

The Community Technical College (CTC) Parking Garage is a concrete parking structure that consists of concrete columns and bearing/shear walls with precast girders supporting the concrete floor slab. According to the as-built drawings the garage was constructed in the mid 1970's, with three levels. The upper or top level is called out as Level R (Roof) or the (Future Third Level), indicating that the structure was designed for an additional parking level or a future roof. As-built drawings call for post-tensioned slabs and girders as an option; but visual inspection shows that the contractor chose to use cast-in-place columns, walls and slabs with precast concrete girders.

1.1 Investigate Slab to Level:

On October 25, 2011 destructive testing of the existing topping slab, insulation and roofing was performed at the upper level to determine the quality of the structural concrete slab. At the upper level, the 4-inch topping slab appeared to be cracking in many places. The contractor cut (4) 2'x2' sections from the 4-inch topping slab to reveal the existing construction.

Figure 1: Roof Core Sample

Beneath the 4-inch slab, it was revealed that a layer of 1 inch blue board insulation and a 1-inch to 1-1/2-inch layer of roofing material was sandwiched between the 4 inch topping slab and the 6-1/2-inch structural slab. The blue board insulation was completely saturated with water and frozen solid. The roofing material appeared to be highly compressible, and in conjunction with the insulation would appear to be a poor sub base for the topping slab considering the traffic load. The 6-1/2-inch structural slab concrete appeared to be in good

condition. The as-built drawings indicated that the typical construction was intended to be the 4-inch topping slab, 1-inch rigid insulation, built up roof and 3 inches of rigid insulation on top of the structural slab. It appears that the bottom 3 inches of rigid was not used for this project. A note on the as-built drawings also states, "Roof Topping to Remain When Future Floor & Roof Added." This would indicate that the original intent was to have four (4) levels of parking and roof to cover the building.

After reviewing the destructive testing results and field observations of the water filtration issue, USKH recommends that the topping slab and roofing material be removed down to the structural roof slab. The cracking in the topping slab due to the compressible sub base of insulation and roofing material has led to saturation of the insulation and roofing material. The water is trapped between the concrete slabs and expands when frozen to further damage the topping slab. It is worth noting that when the water does find its way out, it will not be into a drain system, but rather through the edges of the slab, slab penetrations or joints in the slab.

Figure 2: Water Observed at Penetration in Roof Slab

It appears that work has been performed to attempt to eliminate or dry the saturated layers between the slabs, by core drilling a hole from below to allow the space to drain. It was observed that during the concrete cutting, the water from the concrete cutter made its way to a core drilled hole in the structural slab approximately 60 feet away. There was no hole in the topping slab, so the water traveled beneath the topping slab to find this drain. The gutter overflowed very quickly.

Figure 3: Hole in Structural Slab for Drainage of Between-Slab Moisture

A core sample of the structural floor slab at the second level was taken and the concrete appeared to be in good condition at this location as well.

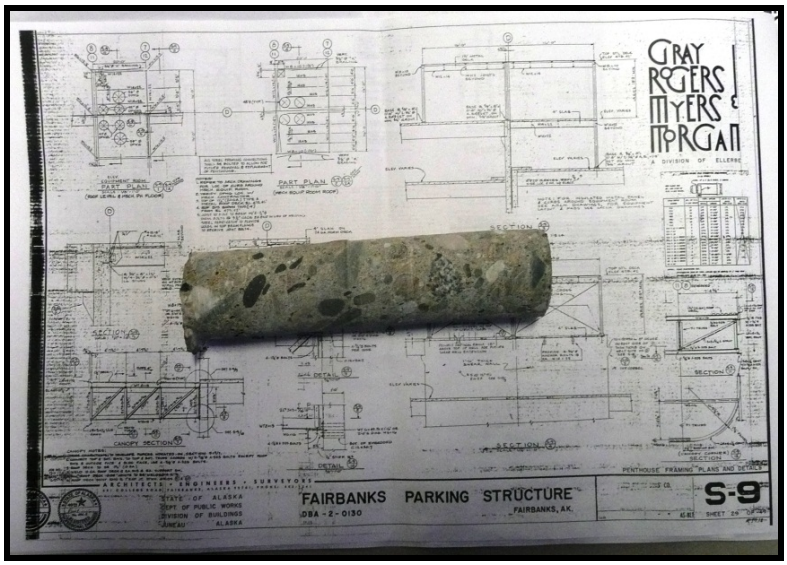

Figure 4: Floor Core Sample

1.2 Investigate Flashing at Top Level (at Edges and Column):

Figure 5: Flashing at Exterior Wall Panel/Concrete Column

USKH has reviewed the installation of the flashing at the upper level and it is our opinion that the flashing was a temporary solution to alleviate water infiltration until the roof was constructed. In some places we found that the flashing was interrupted by the wind girts for the wall panels.

Figure 6: Wind Girt/Flashing

The flashing appears to be a maintenance issue since the joints between the individual pieces of flashing appears to have been caulked multiple times.

Figure 7: Caulking at Flashing Joints

At the lower levels there are obvious signs of water infiltration from the flashed area above, which indicates that the flashing is not working as intended. The flashing connection to the panels, the joints between the flashing and damaged areas of the flashing appear to be allowing water inside the parking structure.

Figure 8: Water Marks Observed Below the Roof Level

The water damage observed in the above picture may be from a combination of the damaged flashing and infiltration from between the topping and structural slabs.

1.3 Slab Sealing Feasibility:

Based upon the investigation of topping slab and flashing conditions; USKH recommends that the topping slab, insulation board and roofing materials be removed and the slab sealed in order to improve the water infiltration issues at the lower levels. The existing topping slab, insulation and roofing material does not have the structural integrity and is not acceptable to receive a waterproof coating.

Applied Restorations Inc. (ARI) recommends the following steps be taken to improve the water infiltration issue at the CTC Parking Garage:

Top Floor Repairs

1) Remove all existing topping slab consisting of concrete, foam insulation boards and roofing material.

2) Inspect the deck for additional cracking, spalling or other indications of deteriorations. Sound all surfaces with chain to ensure that there is no further deterioration or spalling and that the substrate is sound.

3) The entire upper deck to be bead blasted or other acceptable means to remove all contaminates, loose material and provide an acceptable substrate profile to accept the new coatings.

4) Repair all concrete spalls per attached "Concrete Restoration and Repair" utilizing the prescribed ASTM ways and means. Reference Appendix A.

5) Where there are cracks that exceed allowable width and depths inject with Pecora Dynapoxy 450 per attached Pecora Technical Service "Concrete Injection Procedures" and in accordance with all current ASTM bulletins. Reference Appendix A.

6) Minimum width cracks will be gravity fed to refusal with Pecora Epoxy.

7) All cracks to be treated with a mixture of sand and Pecora Dynapoxy, rolled on.

8) Apply a 54 mil coating of Pecora Corporation's Traffic Coating System per specifications attached. Provide an additional coating in the "turning" lanes. Reference Appendix A.

Upon removal of the topping slab, insulation board and roofing material, the transition area from Level 2 to the Level R will need to be addressed by adding a concrete transition with a trench drain. The drains in the upper level will also need to be addressed as follows.

Floor Drain Review

USKH inspected the upper level drains as well as interior level drains of the parking garage. The drains appear to be in fair condition, though there are some fittings that show substantial surface corrosion and several drains on the upper level are surrounded by soil, moss, and shrub growth.

Figure 9: Shrubs and Moss at Upper Level Drain

The upper level drains appear to be set into the upper floor slab only and the structural slab below is core-drilled to provide passage for the drain's conductor piping. Subsequent slabs down through the structure have been sleeved to provide passage down to the lower levels. The drains in each lower level are similarly set into the slab. There are several locations where the structural slab on the upper level appears to have been drilled through to provide an outlet for moisture that has accumulated between the two slabs. These holes and associated piping and/or gutters may be removed and the holes plugged once the sealing project is underway.

When the upper-most floor slab, insulation and roofing material are removed to allow for the sealing of the structural slab the existing drains will need to be removed. The drain conductors will need to be shortened and it is recommended to install new flush-mounted drains in the structural slab. The existing drains may possibly be reused although it would be labor-intensive to carefully remove the drains from the existing slab and clean them up without damaging the drain. If new drains are provided, they should be provided with a stout strainer or grit basket below the surface grate that can be easily cleanout out. This will prevent grit, dirt and debris from entering the drainage piping and clogging the system. Putting the cleaning of these strainers into a regular maintenance schedule will also provide the opportunity to remove any sediment that may build up around the edges of the drains that may otherwise block water from entering the drain and provide a substrate for mosses and shrubs to grow around the drain.

There is a sanitary-wye fitting at the lowest level on the south side of the garage at the bottom of the drain conductor that appears to have been cracked sometime in the past and was "fixed" with what appears to be a flexible caulking material. This fitting should be replaced with a new fitting that is not damaged.

Figure 10: Flexible Caulking Fix on Wye Fitting

Flashing appeared to be damaged in many areas, and allowing water infiltration to the lower levels. USKH recommends a more permanent solution to solving the water infiltration issue such as a roof covering. As-built drawings indicate that a roof was intended to be constructed in the future.

Appendix A -
PECORA PRODUCT INFORMATION

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Technical Service Communication

CONCRETE INJECTION PROCEDURES

I. Crack Analysis

As with all the Pecora products used in the repair and rehabilitation of concrete, the initial job analysis is by far the most important step. Pecora injection resin will weld concrete cracks, but it will not repair the cause of the cracking. Each potential injection job should be thoroughly analyzed to determine the exact cause of the cracking. Correction of the cracking problem may be fairly simple or may be difficult, involving design change. Where a design is necessary, a structural engineer should be retained. Once the problem has been solved, the crack can be repaired by injection. The injection technique cannot be expected to do any more than repair existing cracks. Prevention of future cracking must be addressed separately. Parking garages are a good example of cracking problems that must be thoroughly analyzed. Often inadequate design for expansion and contraction is the cause for parking garage structural cracking. Unless this expansion problem is first solved, the injection will be of little use.

II. Surface Preparation

Lightly sandblast areas to be injected. This helps highlight the cracks and gives a clearer picture of what cracks can be injected.

III. Drilling For Ports

A. When using drill ports it is important to use hollow core bits (Hiller pneumatic bit) with vacuum attached. This helps clear away dust created by drilling into the concrete. Concrete dust can cause lots of problems. For example, any dust remaining in the drilled hole near a crack can combine with the very low viscosity injection resin and form a semi-paste which can slow or even stop the resin flow. The swivel drill chuck will more than pay for itself by eliminating wasted time in correcting blockages caused by dust. Also remember when drilling that cracks do not always run perpendicular to the outer surface. Be careful not to drill beyond a crack which may be running at an angle to the surface.

B. The spacing of ports is determined by the tightness of the crack and the depth of the concrete substrate. Spacing is generally between 4 to 8 inches with the port to be recessed a minimum of 1/2 in.

IV. Setting Surface Ports

Prior to sealing the cracks when surface ports are being used, it is important to align the surface ports directly over the cracks so that the injection resin can flow into the crack. One method of assuring this is to place a nail through the top of the surface port, center the port over the crack, and gently tap the nail into the crack to temporarily hold the port in place. You may also spot the ports with very fast-setting glue.

V. Sealing Cracks and Setting Ports

When surface ports are installed precautions must be taken to keep the ports centered over the crack. To set the ports and complete sealing of the cracks, use Pecora Dynapoxy EP-430 Fast. Using cartridge and gun system, draw a bead along the crack and around the port, finish with a putty knife.

VI. Resin Injection

A. Resin injection can best be accomplished with an injection machine. The pressure can be high or low depending on the type of machine. An excessive high pressure system can create additional stresses in the crack, hydraulic lifting, rupturing of cracked substrate or further elongation of the crack. Low pressure will allow the resin to gradually flow into the crack for total penetration. For delaminations, use less than 10 psi. Also, use low pressure for wood beam injection. On vertical cracks, injection should start at the lowest port and continue upward on the cracked area. For deep penetration it is a good policy to stay on one port and cap the higher ports as clear resin flows through, continue capping ports until the resin flow abates, then move to the last port that resin came through. Pecora

DynaPoxy EP-450 is a very low viscosity resin and will flow in small hairline cracks.

B. Travel of injection can be several feet from point of injection and may take some time before reaching the next port or penetrating through pin holes in the surface. Taking core samples is a good method of quality control.

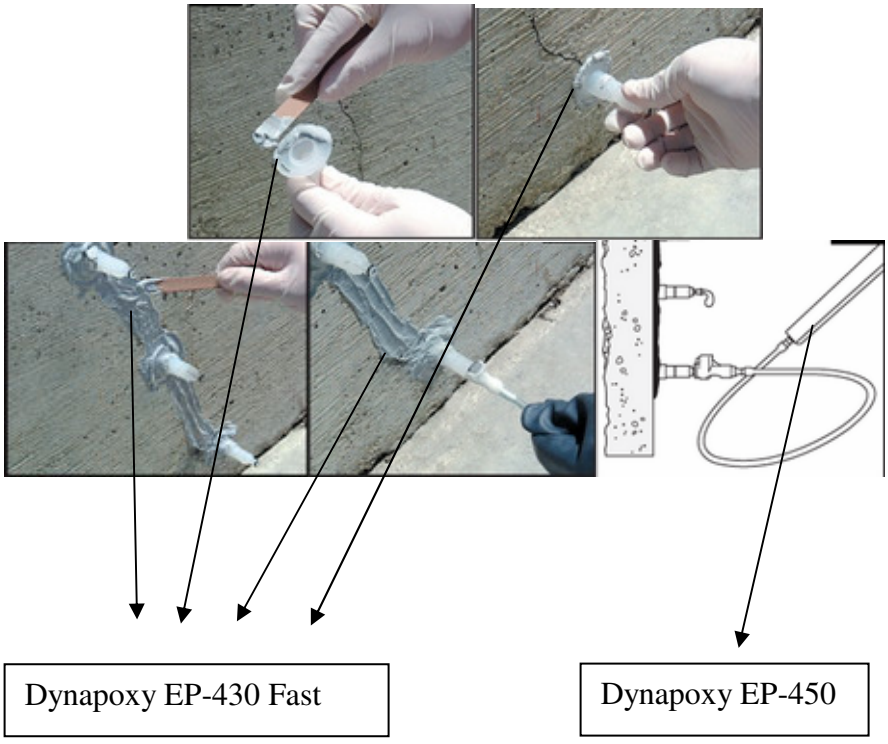
C. Temperature plays a big part in concrete injection. During extremely hot weather an open bridge deck may get up to 140° F. (60°C.). Special precautions are necessary before injection work can be done in such heat. These precautions may include shading the area and providing air conditioning.

D. A cold substrate or temperature will cause an increase in the viscosity of the injection resin, thereby slowing down the rate of injection and subsequent loss of penetration. Epoxy injection undertaken during cold weather requires special precautions. Injection machines must be kept warm, especially the material tanks. Their temperature should be kept at 80°F (26.7°C) and the hoses from the machine should be insulated.

VII. Injecting Delaminations

A. Delamination of concrete structures is an area where injection can also offer selective repair. Delaminations are often associated with bridge decks or other self-supporting structures. The most common delamination is shearing of the concrete, generally at the upper rebar mat. This delamination area is subject to chemical and moisture penetration from the surface which may attack the reinforcing bar. If the delamination is not repaired, traffic may cause the area to pop out through pounding on the delaminated upper concrete layer.

B. Once the delamination has been mapped by drag chain or sounding device, it can then be drilled for injection. The damaged area should have no less than four (4) ports drilled for resin flow, depending on the size and shape of the delamination. This prevents the trapping of water. The delamination is likely to be associated with hollow planes that run along the reinforcing bar. When injecting the delamination, the resin will follow these hollow plane areas and can travel several feet in filling the voids. Use less than 10 psi of pressure when injecting delaminations.



SECTION 03900

CONCRETE RESTORATION AND REPAIR

Display hidden notes to specifier by using "Tools"/"Options"/"View"/"Hidden Text".

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete restoration and repair materials.

B. Concrete mixes.

C. Primers.

D. Latex admixtures/bonding agents.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: New concrete.

1.3 REFERENCES

A. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

B. ASTM C 78 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).

C. ASTM C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50-mm Cube Specimens).

D. ASTM C 157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.

E. ASTM C 190 - Method of Test for Tensile Strength of Hydraulic Cement Mortars (Withdrawn 1990, no replacement).

F. ASTM C 191 - Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle.

G. ASTM C 266 - Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles.

H. ASTM C 348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.

I. ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.

J. ASTM C 469 - Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.

K. ASTM C 488 - Standard Test Method for Conducting Exterior Exposure Tests of Finishes for Thermal Insulation.

L. ASTM C 496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.

M. ASTM C 531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

N. ASTM C 666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

O. ASTM C 672 - Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.

P. ASTM C 827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

Q. ASTM C 882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.

R. ASTM C 928 - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.

S. ASTM C 944 - Standard Test Method for Abrasion Resistance of Concrete or Mortar Surfaces by the Rotating-Cutter Method.

T. ASTM C1042 Standard Test Method for Bond Strength of Latex Systems Used With Concrete By Slant Shear

U. ASTM C 1090 - Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout.

V. ASTM C 1202 - Standard Test Method for Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration.

W. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.

X. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

Y. ICRI Guideline No. 03730 - Surface Preparation Guidelines for Repair of Deteriorated Concrete Resulting from Reinforcing Steel Oxidation.

Z. ICRI Guideline No. 03731 – Selecting Application Methods for the Repair of Concrete Surfaces.

AA. ICRI Guideline No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Show location of repairs, details, anchorage, and other information required for review.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm specializing in the manufacture of concrete restoration and repair materials, with minimum 10 years experience.

B. Installer Qualifications: Firm specializing in installation of concrete restoration and repair materials, with minimum 5 years documented experience with projects of similar scope, design, and materials.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Pecora Corporation, 165 Wambold Road, Harleysville, Pa. 19438 www.pecora.com Chris Sajbel – 303-905-9558

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 CONCRETE RESTORATION AND REPAIR PRODUCTS

A. Horizontal Resurfacing & Topping Repairs for Traffic Areas (Feather Edge to 1/2 inch (13 mm) in depth):
   1. Horizontal Concrete Resurfacer: Pecora Concrete Resurfacer
   2. repair mortar to resurface old distressed concrete or rain pitted new concrete; single component semi flowable consistency allows placements with squeegee, masonry brush or broom; high flexural & compressive strengths. Allows vehicle traffic in 48 hours; uniform superior bond strength. Self curing:
      a. Acceptable Product: Pecora Concrete Resurfacer
      b. Working Time at 70 degrees F (21 degrees C): 20-30 minutes.
      c. Set Time at 70 degrees F (21 degrees C) ASTM C191:
         1) Initial Set: 60-90 minutes.
         2) Final Set: 90-120 minutes
      d. Compressive Strength, (ASTM C109): 3 hours – 1,500 psi (10.3 Mpa), 1 day – 2,400 psi (16.5 MPa), 7 days – 3,600 psi (24.7 MPa), 28 days - 5000 psi (34.5 MPa)
      e. Length Change (ASTM C 157):
         1) Dry: 1 day – 0.004 percent, 7 days - .0000 percent, 28 days – 0.031 percent.
         2) Wet: 1 day - 0.007 percent, 7 days - 0.010 percent, 28 days – 0.031 percent.

   3. Fiber Reinforced , Polymer Modified Concrete Repair Mortar (Very Rapid/High Bond Strength Repair Material):Pre –Blended Cement based mortar achieving high compressive strengths, 2000 psi + in one hour; open to heavy vehicle traffic in 60 minutes, wide temperature installation range 20 degrees F to 100 degrees F (-6 degrees C to 38 degrees C); high performance Fiber Reinforced Repair Mortar- Fast setting Portland cement based repair mortar cement technology with alkali resistant fibers for enhanced impact, flexural & tensile strengths;1/2 inch (12.7mm) to 8 inches (203mm) depth;Non-Corrosive; high flexural and bond strength material.
      a. Acceptable Product: Pecora Tempo 2500.
      b. Meets rapid hardening requirement of ASTM C 928.
      c. Working Time at 70 degrees F (21 degrees C): 15 minutes.
      d. Set Time, (ASTM C 191) at 70 degrees F (21 degrees C):
         1) Initial Set: 18 minutes.
         2) Final Set: 20 Minutes.
      e. Compressive Strength, (ASTM C109), at 75 degrees F (24 degrees C): 1 hour – 2,650 psi (18.3) MPa), 3 hours – 3,800 psi (26.2 MPa), 1 day – 5,400 psi (37.2 MPa), 7 days – 7,800 psi (53.8 MPa), 28 days – 9,100 psi (62.7 MPa).
      f. Bond Strength, (ASTM C 882): 7 days – 1,500 psi (10.3 MPa), 7 days >3000 psi (20.7 MPa).
      g. Flexural Strength, (ASTM C 348): 7 days – 1,100 psi (7.5 MPa), 28 days – 1200 psi (8.3 MPa).
      h. Rapid Freeze Thaw (ASTM C 666B) Resistance 300 Cycles, no sign of spalling, 99.6 percent.
      i. Scaling Resistance Freeze Thaw (ASTM C672), 25 Cycles, No visible

scaling.

j. Length Change Hardened Cement Mortar(ASTM C928); 28 days - .038 percent water storage; Minus percent .094 percent Air Storage.

B. Vertical and Overhead Repairs with Corrosion Inhibitor (1/4 inch to 8 inches (6 mm to 203 mm) in depth):

1. Pecora Vertical and Overhead Repair Mortar: Pre-blended polymer-modified, portland cement based patching mortar; for vertical, and overhead surfaces; contains corrosion inhibitor; non-sag; no forms required up to 2 inches (51 mm); self-curing; low shrinkage; freeze-thaw resistant.
   a. Acceptable Product: Pecora Vertical/Overhead Repair Mortar.
   b. Set Time (ASTM C 191):
      1) Initial Set: approximately 14 minutes.
      2) Final Set: approximately 20 minutes.
   c. Compressive Strength, (ASTM C 109): 1 day – 2,500 psi (17.2 MPa), 7 days – 4,000 psi (27.6 MPa), 28 days – 5,000 psi (34.5 MPa).

C. Vertical Resurfacing, Filling and Smoothing Tilt Up/Cast Concrete/Precast/ Masonry Block (feather edge to 1/2 inch (13 mm)):

1. Pecora Concrete Resurfacer: Polymer enhanced, single component screed mortar for resurfacing vertical concrete surfaces by filling and smoothing surface gaps, bug holes, honeycombs and depressions; contains smooth, non-angular aggregates; accepts most coatings/coverings within 30 minutes; freeze thaw reisistant.
   a. Acceptable Product: Pecora Concrete Resurfacer
   b. Working Time at 70 degrees F (21 degrees C): 30 minutes.
   c. Compressive Strength: (ASTM C109): 1 day – 600 psi (4.1 MPa), 3 days – 1,500 psi (10.3 MPa), 7 days – 2,000 psi (13.8 MPa), 28 days – 3,500 psi (24.1 MPa). 3500 PSI (24.1 MPa).

2.3 CONCRETE MIXES

A. High Performance Concrete Repair Mix: Super plasticized high performance ready mix concrete; for full depth repairs 2 inches (51 mm) or greater; pumpable; structural applications and full depth repairs for highways, structural piers, bridge decks, balconies, parking garages, slabs, industrial floors and foundations.

1. Acceptable Product: Pecora Concrete Patch
2. Exceeds ASTM C 387, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
3. Compressive Strength, (ASTM C 39): 1 day – 2,000 psi (14 MPa), 7 days – 5,000 psi (34 MPa), 28 days – 6,000 psi (41 MPa).
4. Length Change, Dry (ASTM C 157):
   a. Dry: Minus 0.04.
   b. Wet: Plus 0.02.

B. High Performance Concrete Repair Mix with Corrosion Inhibitor: Air entrained super plasticized high performance ready mix concrete with corrosion inhibitor; for full depth repairs 2 inches (51 mm) or greater; pumpable; structural applications and full depth repairs for highways, structural piers, bridge decks, balconies, parking garages, slabs, industrial floors and foundations.

1. Acceptable Product: Pecora Air Entrained Concrete Patch.
2. Exceeds ASTM C 387, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
   a. Compressive Strength, (ASTM C 39): 1 day – 2,000 psi (14 MPa), 7

days – 5,000 psi (34 MPa), 28 days – 6,000 psi (41 MPa).
3. >6000 psi (41 MPa).
4. Length Change (ASTM C 157):
   a. Dry: Minus 0.04.
   b. Wet: Plus 0.02.

2.4 REBAR PROTECTIVE COATING

A. Rebar Anti Corrosion Coating: Polymer based, zero VOC, primer with corrosion inhibitors; for use over prepared reinforcing steel and other steel components.
   1. Acceptable Product: Pecora Rebar Anti Corrosion Coating

2.5 LATEX ADMIXTURES/BONDING AGENTS

A. Concrete Patch Primer: Zero VOC concentrated liquid used prior to installation of cementitious toppings, underlayments, repair mortars and stucco to improve bond strength and curing time; interior or exterior; above and below grade.
   1. Acceptable Primer: Pecora Concrete Patch Primer

B. Concrete Patch Primer: A solvent free/zero VOC liquid acrylic polymer emulsion admixture for cement based products,repair & setting mortars and stucco to enhance or improve bond strength,durability, curing time, workability, and tensile strength;interior or exterior;above or below grade.
   1. Acceptable Acrylic Latex Admixture : Pecora Concrete Patch Primer

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to be repaired. Notify Engineer if surfaces are unacceptable. Do not begin surface preparation or application until unacceptable conditions are corrected.

3.2 SURFACE PREPARATION

A. Areas to be repaired must be clean, sound, and free of dirt, oil, grease, laitance and other contaminants. Clean concrete with citrus-based concrete cleaner and stripper to remove grease. Dense, smooth surfaces shall be mechanically abraded, exposing a new aggregate surface. All loose and deteriorated concrete shall be removed.

B. Substrate to receive patching mortar should be saturated surface dry (SSD) per ACI recommendations.

C. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish, completely removing all contaminants and corrosion. Where corrosion has occurred due to the presence of chlorides, the steel shall be high pressure washed after mechanical cleaning.

D. Areas that will endure heavy industrial traffic should be saw-cut and notched with a hand held chipping hammer.

E. All control and expansion joints should be continued up through the repair mortar.

3.3 MIXING

A. Mix in an appropriate sized mechanical mixer or mix in a bucket using a drill and paddle mixer at low speed (400-600 RPM). First, pour water into the mixing container. Then,

add powder material while continuing to mix. Mix to a uniform consistency for a minimum of three minutes and a maximum of five minutes.

B. Mix only the amount of material that can be placed within working time. Do not re-temper material.

C. Do not blend in excess liquid. Do not use any other admixtures or additives.

3.4 APPLICATION

A. Mortar must be placed immediately upon completion of mixing.

B. Mortar must be scrubbed into substrate ensuring that all pores and voids are filled. While the scrub coat is still plastic, force material against edge of repair with steel trowel working away from the center of the repair.

C. When material has reached proper set, shave, shape or mold with a steel trowel.

3.5 FINISHING

A. Finish material with a broom finish or other desired finish.

3.6 CURING

A. Cure freshly placed mortar with a liquid membrane forming curing compound.

3.7 PROTECTION

A. Protect horizontal surfaces from traffic until repair mortar compound has cured.

END OF SECTION

SECTION 07570 - TRAFFIC COATINGS

****

This guide specification has been prepared by Pecora Corporation to assist design professionals, building owners, and others in the preparation of a specification section fluid applied, monolithic, multi-layered coatings with integral aggregate for pedestrian and vehicular surfaces. This section includes urethane based products which should be used only in exterior or well ventilated interior locations. It may be used as the basis for developing either a project specification or an office master specification. Since it has been prepared according to the principles established in the *Manual of Practice* published by The Construction Specifications Institute, this guide specification may be used in conjunction with most commercially available master specifications sections with minor editing.

The following should be noted in using this guide specifications:

- Notes for review by the user are set off from specification text by rows of asterisks.
- Optional text requiring a selection by the user is enclosed within brackets, e.g.: "Sealant No. [3] [5]."
- Items requiring user input are enclosed within brackets, e.g.: "Color: [_____]."
- Optional paragraphs are separated by an "OR" statement, e.g.:

**** OR ****

This guide specification is available in both hard copy and a variety of electronic formats to suit most popular word processing programs and operating platforms. Please contact your nearest Pecora representative or Pecora Corporation at 1-800-523-6688 for additional copies or for information on available electronic formats.

****

PART 1 - GENERAL

1.1 SUMMARY

A. **Section Includes**: Fluid applied, monolithic, multi-layered traffic coating with integral aggregate for [pedestrian] [and] [vehicular] traffic surfaces.

****

NOTE: Edit the following paragraph to coordinate with other sections on the project.

****

B. **Related Sections**:

1. **Section [03300 - Cast-In-Place Concrete] [_____]**: Finishing concrete surfaces.

1.2 REFERENCES

A. Underwriters Laboratories (UL) 790 - Tests for Fire Resistance of Roof Covering Materials.

1.3 SUBMITTALS

****
NOTE: Edit the following paragraph to coordinate with Division 1.
****

A. Submit under provisions of Section [01300] [_____].

B. **Product Data**: Include product description, installation instructions, and recommendations for each material.

C. **Certification**: Manufacturer's certification that proposed traffic coating bears UL 790 Class A fire rating with unlimited incline.

D. **Samples**: Show manufacturer's standard colors.

E. **Applicator Qualifications**: Written documentation of applicator's qualifications, including previous projects.

1.4 QUALITY ASSURANCE

****
NOTE: In the following paragraph, select the desired number of years of experience for the applicator based on the degree of difficulty of the particular project. If documentation of applicator qualifications is required, coordinate with "Submittals."
****

A. **Applicator**: Firm specializing in installing traffic coatings with minimum [3] [__] years [documented] experience in work of this Section.

B. **Traffic Coating**: UL 790 Class A fire rating with unlimited incline.

****
NOTE: Edit the following to suit project requirements.
****

C. **Pre-Installation Conference**:

1. Convene at site [two] [_____] weeks prior to system installation.

2. Attendance: Contractor, Architect, applicator, and manufacturer's representative.

3. Review and discuss submittal data, concrete surface preparation and finish, scheduling, and protection after completion.

D. Make copies of tests conducted on concrete available to manufacturer prior to installation, including compressive strength, chloride analysis or petrographic analysis.

1.5 DELIVERY, STORAGE AND HANDLING

****
NOTE: Edit the following paragraph to coordinate with Division 1.
****

A. Deliver, store and handle products under provisions of Section [01650] [_____].

B. Store aggregates in dry area; prevent inclusion of foreign material.

C. Follow container labels and material Safety Data Sheets.

1.6 PROJECT CONDITIONS

A. Do not apply coatings at ambient temperatures below 50 degrees F (10 degrees C) or above 110 degrees F (43 degrees C) without manufacturer's approval.

B. **Concrete Substrate Conditions**:

1. Curing Method: Water cure or dissipating curing compound approved by coating manufacturer. Cure concrete minimum 28 days prior to coating application.

2. Finish: Power metal float followed by light steel trowel and fine hair broom, or equivalent.

3. Free of excessive roughness, voids, protrusions, and exposed aggregate.

4. Compressive Strength: Minimum 4000 psi at 28 days.

5. Moisture Content: Maximum 14 percent.

C. Provide adequate ventilation and personal protection for workers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Pecora Corporation, Harleysville, PA.

****
NOTE: Edit the following paragraph to coordinate with Division 1.
****

B. **Substitutions**: Under provisions of Section [01630] [_____].

2.2 MATERIALS

A. **Traffic Coating**:

1. Type: One part, cold applied elastomeric coating system.

2. Base Coat: Deck 802.

3. Intermediate Coat: Deck 804.

4. Top Coat: Deck 806.

****

NOTE: Edit the following paragraph to suit project requirements. Refer to Pecora Color Chart for available colors.

****

5. Color: [_____] [To be selected from manufacturer's standards].

2.3 ACCESSORIES

A. **Sealant**: Dynatred.

****

NOTE: Refer to the Pecora "Sealants, Waterproofing, and Glazing Guide" for assistance in selecting the proper primer. Use P-808 only in well ventilated areas and where VOC compliance is not required. Use P–908 only in areas having poor ventilation and where VOC compliance is required.

****

B. **Concrete Primer**: [P-808 epoxy primer] [P-808WB, two part, water based].

****

NOTE: Include the first paragraph for pedestrian bearing systems; include the second paragraph for vehicular bearing systems.

****

C. **Aggregate**: Silica composition, round to sub-angular, 35 to 65 mesh size.

**** OR ****

D. **Aggregate**: Silica composition, round to sub-angular, 20 to 30 or 16 to 20 mesh size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify moisture content of concrete just prior to coating application by rubber mat test or other method approved by coating manufacturer.

B. Do not begin work until unacceptable conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces to receive coatings in accordance with manufacturer's instructions.

B. Shot blast or sandblast old concrete surfaces; remove laitance, sealers, sealants, and coatings.

C. Saw cut cracks greater than 1/16 inch in width and moving cracks less than 1/16 inch in width, to 1/4 inch wide x 1/2 inch deep.

D. Clean joints and saw cut cracks. Install backer rod and sealant. Tool sealant flush.

E. Prime concrete and metal surfaces scheduled to receive coating. Apply primers at minimum rates required by coating manufacturer.

F. Apply sealant at juncture of horizontal and vertical surfaces, including projections through deck, curb, parking bumpers, walls, and other surfaces. Tool sealant to form 1 inch, 45 degree cant.

G. Apply 6 inch wide, 30 mil thick detail coat of base coat material over sealed cracks, control/expansion joints up to 1/2 inch wide, hairline cracks, and cold joints.

3.3 APPLICATION

A. Apply coating system in accordance with manufacturer's instructions.

B. Allow preparatory work to cure 24 hours minimum.

****
NOTE: Include the following for pedestrian bearing systems.
****

C. Apply base coat when primer is dry to touch, at rate of 50 sq ft/gal (1.2 sq m/L). Allow to dry overnight.

D. Apply top coat at rate of 110 sq ft/gal (2.4 sq m/L).

E. Apply aggregate uniformly to wet top coat at minimum rate of 15 lbs/100 sq ft (0.75 kg/sq m). Roll aggregate into wet coating.

**** OR ****

****
NOTE: Include the following for heavy duty pedestrian bearing systems.
****

F. Apply base coat when primer is dry to touch, at rate of 45 sq ft/gal (1.1 sq m/L). Allow to dry overnight.

G. Apply intermediate coat at rate of 80 sq ft/gal (2.0 sq m/L).

H. Apply aggregate uniformly to wet top coat at minimum rate of 15 lbs/100 sq ft (0.75 kg/sq m). Roll aggregate into wet coating. Allow to cure overnight.

I. Apply top coat at rate of 80 sq ft/gal (2.0 sq m/L).

**** OR ****

****
NOTE: Include the following for vehicular bearing systems.
****

J. Apply base coat when primer is dry to touch, at rate of 50 sq ft/gal (1.2 sq m/L). Allow to dry overnight.

K. Apply intermediate coat at a rate of 80 sq ft/gal (2.0 sq m/L). Allow to cure overnight.

L. Apply top coat at a rate of 125 sq ft/gal (3 sq m/L).

M. Apply aggregate uniformly to wet top coat at minimum rate of 15 lbs/100 sq ft (0.75 kg/sq m). Roll aggregate into wet coating. Allow to cure 48 hours minimum.

N. Apply second top coat with aggregate to high traffic areas including ramps, turns, and entrance and exit gates.

**** OR ****

****
NOTE: Include the following for heavy duty vehicular bearing systems.
****

O. Apply base coat when primer is dry to touch, at rate of 50 sq ft/gal (1.2 sq m/L). Allow to dry overnight.

P. Apply intermediate coat at following rates. Allow to cure overnight.

1. Parking Stalls: 100 square feet per gallon (2.4 sq m/L).

2. Drives: 80 square feet per gallon (2.0 sq m/L).

3. Ramps, Entrances, Exits and Turns: Two coats at 50 square feet per gallon (1.2 sq m/L) each.

Q. Apply aggregate uniformly to wet intermediate coat at minimum rate of 15 lbs/100 sq ft (0.75 kg/sq m). Roll aggregate into wet coating. Allow to cure 48 hours minimum.

R. Apply top coat at a rate of 100 sq ft/gal (2.4 sq m/L).

3.4 PROTECTION

A. Allow top coat to cure for 48 hours before opening to traffic.

END OF SECTION 07570

SECTION 07900 - JOINT SEALANTS

****

This guide specification has been prepared by Pecora Corporation to assist design professionals, building owners, and others in the preparation of a specification section covering joint sealants and related items. It may be used as the basis for developing either a project specification or an office master specification. Since it has been prepared according to the principles established in the *Manual of Practice* published by The Construction Specifications Institute, this guide specification may be used in conjunction with most commercially available master specifications sections with minor editing.

- The following should be noted in using this guide specifications:
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- Items requiring user input are enclosed within brackets, e.g.: "Color: [_____]."
- Optional paragraphs are separated by an "OR" statement, e.g.:

**** OR ****

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****

PART 1 - GENERAL

1.1 SUMMARY

A. **Section Includes**:

1. Joint sealants for interior and exterior surfaces.
2. Joint backup materials and accessories.

1.2 REFERENCES

A. American Architectural Manufacturer's Association (AAMA) 850 - Voluntary Specifications and Test Methods for Sealants.

B. American Concrete Institute (ACI) 302.1R - Guide for Concrete Floor and Slab Construction.

C. **American Society for Testing and Materials (ASTM)**:

1. C 790 - Guide for Use of Latex Sealants.

2. C 804 - Practices for Use of Solvent-Release Type Sealants.

3. C 834 - Specification for Latex Sealing Compounds.

4. C 881 - Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

5. C 919 - Practices for Use of Sealants in Acoustical Applications.

6. C 920 - Specification for Elastomeric Joint Sealants.

7. C 1184 - Specification for Structural Sealants.

8. C 1193 - Standard Guide for Use of Joint Sealants.

D. **Federal Specifications (FS)**:

1. SS-S-200E - Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Pavement.

2. TT-S-001657 - Sealing Compound: Single Component, Butyl Rubber Based, Solvent Release Type (For Buildings and Other Types of Construction).

E. Sealant, Waterproofing and Restoration Institute (SWRI) - Sealant and Caulking Guide Specification.

1.3 SUBMITTALS

****
NOTE: Edit the following paragraph to coordinate with Division 1.
****

A. Submit under provisions of Section [01300] [_____].

B. **Product Data**: Include sealants, primers, joint backup materials, bondbreakers, and accessories proposed for use.

C. **Samples**:

1. Color samples for each sealant.

2. 6 inch {150 mm} long joint backup samples.

D. **Applicator Qualifications**: Written documentation of applicator's qualifications, including previous projects.

1.4 QUALITY ASSURANCE

A. Obtain sealants from single manufacturer to ensure compatibility.

****

NOTE: In the following paragraph, select the desired number of years of experience for the applicator based on the degree of difficulty of the particular project. If documentation of applicator qualifications is required, coordinate with “Submittals.”

****

B. Applicator: Firm specializing in installing sealants with minimum [3] [__] years [documented] experience in work of this Section.

C. Perform work in accordance with SWRI Guide Specifications and ASTM C 1193.

D. Perform acoustical sealant application work in accordance with ASTM C 919.

E. Manufacturer to instruct applicator in procedures for intersecting sealants.

1.5 DELIVERY, STORAGE AND HANDLING

****

NOTE: Edit the following paragraph to coordinate with Division 1.

****

A. Deliver, store and handle products under provisions of Section [01650] [_____].

B. Deliver materials in sealed containers with manufacturer's original labels attached.

1.6 PROJECT CONDITIONS

A. Do not apply sealants at temperatures below 40 degrees F (4 degrees C) unless additional steps are taken to prevent freezing and frost buildup.

1.7 SEQUENCING

A. Apply waterproofing, water repellents, and preservatives after application of sealants unless sealant manufacturer’s approval is obtained prior to applying sealant.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Pecora Corporation, Harleysville, PA.

****

NOTE: Edit the following paragraph to coordinate with Division 1.

****

B. Substitutions: Under provisions of Section [01630] [_____].

2.2 JOINT SEALANT MATERIALS

****

NOTE: Refer to the Pecora "Sealants, Waterproofing, and Glazing Guide" for assistance in selecting sealants for specific projects and uses. Assistance may also be obtained from your nearest Pecora representative or by contacting Pecora Corporation at 1-800-523-6688.

****

A. **Sealant No. 1**:

1. Type: Multi component sealant; ASTM C 920, Type M, Grade NS, Class 25, use NT, M, A, and O.

2. Movement Capability: 50 percent in extension and compression.

3. Product: Dynatrol II.

4. Color: [_____] [To be selected from manufacturer's standard colors].

B. **Sealant No. 2**:

1. Type: Single component, moisture curing polyurethane sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, and O.

2. Movement Capability: 25 percent in extension and compression.

3. Product: Dynatrol I.

4. Color: [_____] [To be selected from manufacturer's standard colors].

C. **Sealant No. 3**:

1. Type: Two component, solvent curing acrylic sealant; ASTM C 920, Type M, Grade NS; Class 25, Use T, M, A, and O.

2. Movement Capability: 25 percent in extension and compression.

3. Product: Dynatrol II SG.

4. Color: [_____] [To be selected from manufacturer's standard colors].

D. **Sealant No. 4**:

1. Type: Multi component, chemically curing polyurethane sealant; ASTM C 920, Type M, Grade P, Class 25, Use T, M, A, and O.

2. Movement Capability: 25 percent in extension and compression.

3. Product: NR-200.

4. Color: [_____] [To be selected from manufacturer's standard colors].

**** OR ****

E. **Sealant No. 4**:

1. Type: Single component, moisture curing polyurethane sealant; ASTM C 920, Type S, Grade P, Class 25, Use T, M, A, and O.

2. Movement Capability: 25 percent in extension and compression.

3. Product: NR-201.

4. Color: [_____] [To be selected from manufacturer's standard colors].

F. **Sealant No. 5**:

1. Type: Multi component polyurethane sealant; ASTM C 920, Type M, Grade NS, Class 25, Use T, M, A, and O.

2. Shore A Hardness: Between 45 and 50.

3. Product: Dynatred 40+.

4. Color: [_____] [To be selected from manufacturer's standard colors].

G. **Sealant No. 6**:

1. Type: Single component, low modulus, neutral moisture curing silicone sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G and A.

2. Movement Capability: 50 percent in extension and compression.

3. Product: 864.

4. Color: [_____] [To be selected from manufacturer's standard colors].

H. **Sealant No. 7**:

1. Type: Single component, medium modulus, neutral moisture curing silicone sealant; ASTM C 1184 and ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G and A.

2. Movement Capability: 50 percent in extension and compression.

3. Product: 895.

4. Color: [_____] [To be selected from manufacturer's standard colors].

I. **Sealant No. 8**:

1. Type: Single component, ultra low modulus, neutral moisture curing silicone sealant; ASTM Specification C 920, Type S, Grade NS, Class 25, Use NT, M, G, O and A.

2. Movement Capability: 100 percent in extension and 50 percent in compression.

3. Product: 890.

4. Color: [_____] [To be selected from manufacturer's standard colors].

J. **Sealant No. 9**:

1. Type: Single component, neutral moisture curing silicone sealant; ASTM C 920, Type S, Grade NS, Class 25, USDA approved, Use NT, M, G and A.

2. Product: 898.

3. Color: [_____] [To be selected from manufacturer's standard colors].

K. **Sealant No. 10**:

1. Type: Single component, medium modulus, neutral curing silicone sealant; ASTM C 920, Type S, Grade NS, Class 25,, Use NT, M, G, O and A.

2. Movement Capability: 50 percent in extension and 50 percent in compression.

3. Product: 865.

4. Color: [_____] [To be selected from manufacturer's standard colors].

L. **Sealant No. 11**:

1. Type: Single component acrylic latex sealant; ASTM C 834.

2. Movement Capability: 7-1/2 percent in extension and compression.

3. Product: AC-20.

4. Color: [_____] [To be selected from manufacturer's standard colors].

M. **Sealant No. 12**:

1. Type: Single component, non-drying, non-skinning sealant; AAMA 809.1.

2. Product: BR-96.

3. Color: [_____] [To be selected from manufacturer's standard colors].

N. **Sealant No. 13**:

1. Type: Two component, Grade S/L, high solids epoxy resin sealant; ACI 302.1R-80.

2. Shore A Hardness: 85 plus or minus 10.

3. Product: EP 800.

4. Color: [_____] [To be selected from manufacturer's standard colors].

O. **Sealant No. 14**:

1. Type: Multi-component, jet fuel resistant urethane sealant; FS SS-S-200E.

2. Product: NR300.

3. Color: [_____] [To be selected from manufacturer's standard colors].

P. **Sealant No. 15**:

1. Type: Multi-component, chemical resistant polysulfide sealant; ASTM C 920, Type M, Class 2.5 .

2. Product: GC-2+.

3. Color: [_____] [To be selected from manufacturer's standard colors].

Q. **Sealant No. 16**:

1. Type: Multi-component urethane, abuse and pick-resistant, security sealant; ASTM C 920, Type M, Grade NS, Class 12.5.

2. Movement Capability: 12-1/2 percent in extension and compression.

3. Shore A Hardness: Minimum 55.

4. Product: Dynaflex.

5. Color: [_____] [To be selected from manufacturer's standard colors].

**** OR ****

R. **Sealant No. 16**:

1. Type: Two component, 100 percent solids epoxy resin security sealant; ASTM C 881, Type 1.

2. Shore A Hardness: 95 at 48 hours.

3. Product: Dyna-Poxy EP 1200.

4. Color: [_____] [To be selected from manufacturer's standard colors].

S. **Sealant No. 17**:

1. Type: Single component butyl, non-drying, non-skinning, non-bleeding acoustical sealant.

2. Product: BA-98.

3. Color: [_____] [To be selected from manufacturer's standard colors].

2.3 ACCESSORIES

A. **Primers**: As recommended by sealant manufacturer for project substrates.

B. **Joint Backup**: As follows or as approved by sealant manufacturer.

1. For sealants 1, 2, 3, 6, 7, 8, 9, 10 and 13: Non-staining, open-cell polyurethane, close-cell polyethylene, or soft, reticulated polyethylene.

2. For sealants 4, 5, 14 and 15: Closed cell polyethylene.

3. Rigid joint fillers may be used with sealants 4 and 5 if separated from sealant by specified joint backup or bondbreaker tape.

4. Combination Type Backup: When combination rod with open cell interior and continuous plastic skin is required, use Dual-Rod by HMC, Inc. Or approved equal.

5. Size closed cell joint backing for joint width plus 25 percent.

C. Bondbreaker Tape: Pecora No. 531 black polyethylene tape or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare surfaces to receive sealants in accordance with manufacturer's instructions.

B. Perform preparation in accordance with [ASTM C 804 for solvent release] [and] [ASTM C 790 for latex base] sealants.

C. Clean joints and surfaces to receive sealant of frost, dust, loose mortar, and other foreign materials.

D. Clean ferrous metals of rust, mill scale and coatings by wire brush, grinding or sandblasting.

E. Remove oil, grease and temporary protective coatings with cleaners approved by sealant manufacturer. Dry wipe immediately after cleaning with clean, dry cloth before solvent evaporates from surface.

F. Abrade precast concrete, poured-in-place concrete, and masonry surfaces to remove form release agents and chemical retarders which could interfere with sealant adhesion and performance.

G. Brush or blow joints clean.

H. Allow surfaces to dry completely before applying primer or sealant.

I. Apply primer when recommended by sealant manufacturer.

J. **Sealant Dimensions**:

1. Size joints in accordance with sealant manufacturer's instructions.

2. Minimum Joint Dimensions: 1/4 inch (6 mm) wide by 1/4 inch (6 mm) deep, except in metal-to-metal curtain wall applications when recommended by sealant manufacturer.

K. Do not apply sealant until joints comply with manufacturer's requirements.

3.2 APPLICATION

A. Apply sealants in accordance with manufacturer's instructions.

B. Install joint backing with a blunt instrument; prevent puncturing of surface skin.

C. Apply sealant with caulking gun, using proper nozzles.

D. Use sufficient pressure to completely fill joints and ensure full contact of sealant to joint sides.

E. After joints have been filled, tool to eliminate air pockets and voids. Dry tooling is preferred; tooling agents such as xylol may be used if necessary. Avoid contamination of open joints below.

F. Tool surface smooth, uniform and free of ridges, wrinkles, sags, air pockets and embedded impurities.

3.3 CLEANING

A. Remove sealant from adjacent surfaces immediately.

3.4 SCHEDULE

****

NOTE: Edit the following schedule to suit project requirements and in accordance with those particular sealants selected under Part 2 - Products.

****

A. **Exterior Joints**:

1. Vertical Joints Bordered on Both Sides by Porous Building Material Such as Concrete, Natural Stone or Masonry: Sealant No. [1] [2] [6] [8] [or] [10].

2. Vertical Joints Bordered on Both Sides by Nonporous Building Materials Such as Painted Metals, Anodized Aluminum, Mill Finish Aluminum, PVC, Glass, or Porcelain Tile: Sealant No. [6] [7] [8] [or] 10].

3. Masonry Expansion and Control Joints: Sealant No. [1] [2] [6] [7] [8] [or] [10].

4. Cross Joints in Copings and Projecting Stone Work: Sealant No. [1] [2] [or] [6].

5. Vertical Joints Wider than 1.25 Inch: Sealant No. [1] [or] [6].

6. Horizontal Joints in Walks, Terraces, Decks, Concrete Floors, Drives and Parking Garages: Sealant No. [4] [or] [5].

7. Horizontal Joints Subject to Heavy Traffic or Point Loading Such as Fork Lift or High Heel Traffic: Sealant No. 5.

8. Other Exterior Joints: Sealant No. 2.

9. Horizontal Joints Subject to Contact with Jet Fuel: Sealant No. 15.

10. Horizontal Joints Continually Submerged in Water: Sealant No. [5] [or] [16].

11. Vertical Concealed Joints in Metal Curtainwall, Lapped Joints, and Metal Building Panels: Sealant No. [6] [7] [8] [10] or [12].

12. Joints in Exterior Insulation and Finish System: Sealant No. [1] [2] [6] [8] [or] [10].

B. **Interior Joints**:

1. Expansion and Control Joints: Sealant No. [1] [2] [or] [11].

2. Trim or Finish Joints Subject to Minimal Movement: Sealant No. [1] [2] [or] [11].

3. Sanitary Applications Between Glazed Tiles. Sealant No. 9.

4. Expansion Joints in Horizontal Traffic Surfaces: Sealant No. [3] [4] [or] [5].

5. Joints in Horizontal Traffic Surfaces Subject to Heavy Traffic Loads or Point Loading Such as Fork Lift or High Heel Traffic: Sealant No. [5] [or] [13].

6. Sanitary Sealant Applications Between Glazed Tiles Requiring FDA Rating: Sealant No. 9.

7. Vertical and Horizontal Joints Requiring Pick-Resistant Security Sealant: Sealant No. [13] [or] [16].

8. Concealed Applications Requiring Acoustical Seal: Sealant No. 18.

9. Vertical and Horizontal Joints Requiring USDA Approval: Sealant No. [9] [or] [11].

10. Concealed Applications Requiring Acoustical Seal: Sealant No. 17.

11. Vertical and Horizontal Joints Subject to Exposure to Harsh Chemicals: Sealant No. 15.

END OF SECTION 07900

ITEM 2 REMOVING SUFFICIENT EXTERIOR PANELS TO NO LONGER REQUIRE MECHANICAL VENTILATION

Originally envisioned and designed to provide user comfort via a heated environment, the CTC Parking Garage is currently enclosed by insulated metal panels and mechanically ventilated, which requires substantial maintenance and energy costs. The University has requested an analysis to determine if the parking garage can be literally opened up and reclassified as an "open parking garage" under Section 406, Motor-Vehicle-Related Occupancies of the 2009 International Building Code (IBC). The intent would be to eliminate the operationally costly mechanical ventilation systems. Enclosed parking garages are required to be mechanically ventilated under 2009 IBC 409.4.2., which in turn references the International Mechanical Code (IMC), Section 404.

Per IBC Section 406.3.2, an open parking garage is defined as follows:

> **OPEN PARKING GARAGE**. A structure or portion of a structure with the openings as described in Section 406.3.3.1 on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.3.4.

In essence, Section 406.3.3.1 requires the sufficient wall openings on two or more sides to permit natural ventilation, in terms of both area and perimeter, per tier, as follows:

> Area: A minimum of 20 percent of the total perimeter exterior wall area be open.
> Perimeter: The open areas must in turn be located within a minimum of 40 percent of the total perimeter exterior wall length.

A review of the existing garage and the original construction drawings[1] indicate that out of a total perimeter of approximately 868 feet, structural elements (shear panels and columns), comprise a total length of approximately 264 feet, or about 30 percent of the perimeter, at the above grade areas.

The parking garage is constructed with a sloped floor system, and each "tier" therefore extends approximately 8 feet in height from low point to high point. At the lowest tier, the lowest point is therefore about 8 feet below grade.

For the tier areas above grade, it is clearly feasible to remove the metal panel wall system, or cut new openings in the metal panel wall system, that would provide the required 20 percent area within 40 percent of the perimeter.

For the lowest tier areas, the north, south and west sides of the garage can also be accommodated in a similar manner. The east side of the lower tier slopes down from about 4 feet below grade to 8 feet below grade, and providing openings for natural ventilation at the lowest center 230 feet of perimeter will be problematic without the construction of below grade ventilation wells. However, it is believed that the available area on the north, south and west sides can provide the required 20 percent area within 40 percent of the perimeter, as required by IBC Section 406.3.3.1.

[1] "As-Built" structural drawings dated 1974 by Gray Rogers Myers & Morgan.

If there is a concern on the part of either the Authority Having Jurisdiction or the University that the lowest points of the below grade bottom tier will be stagnant in terms of natural ventilation, then two possibilities would available for mitigation:

1) Construct new openings in the foundation wall and ventilation wells with suitable rain/weather protection extending from the bottom of the tier up to above grade.

2) Install an exhaust fan activated by a CO detector to purge this area when air quality is below minimum standards.

The exterior wall panels are supported by steel channel girts that span between the exterior concrete columns and walls. The wind girts are spaced at approximately 5-foot centers vertically and are connected to the panels with self-tapping screws, and to the concrete structure with steel embeds. Field observation found that the connection between the wind girts and the structure did not account for expansion and contraction due to temperature change. The steel channel girts were failing at the connections at some locations, and exhibited signs of corrosion in many places. Wind girts appeared to be bowing in other locations as well. USKH recommends that if wall panels are removed, that the wind girts associated with the panels shall be removed as well. At locations that wind girts are removed, guardrails would need to be installed for safety purposes. Further study is recommended to address aesthetic issues for creating the openings for ventilation and to address structural integrity of the girt framing system.

Figure 11: Wind Girt Connection Failure 1

Figure 12: Wind Girt Connection Failure 2

EARLY LOOK PACKAGE – NEW ROOF VS. COATING AND FLASHING ANALYSIS

After submission of our original Draft Investigative Report addressing Task 1 (to address top level sealing to prevent water infiltration) and Task 2 (for removal of sufficient exterior panels to no longer require mechanical ventilation) and subsequent review by the Owner and User, USKH was further directed to perform a Life Cycle Cost Analysis to determine if a new roof was viable, or if upgrades for coating and flashing would provide better value to upgrading the building.

Results of the Life Cycle Cost Analysis indicate that a roof addition to the building provides better value for solving the water tightness of the structure.

Appendix A - DRAWINGS

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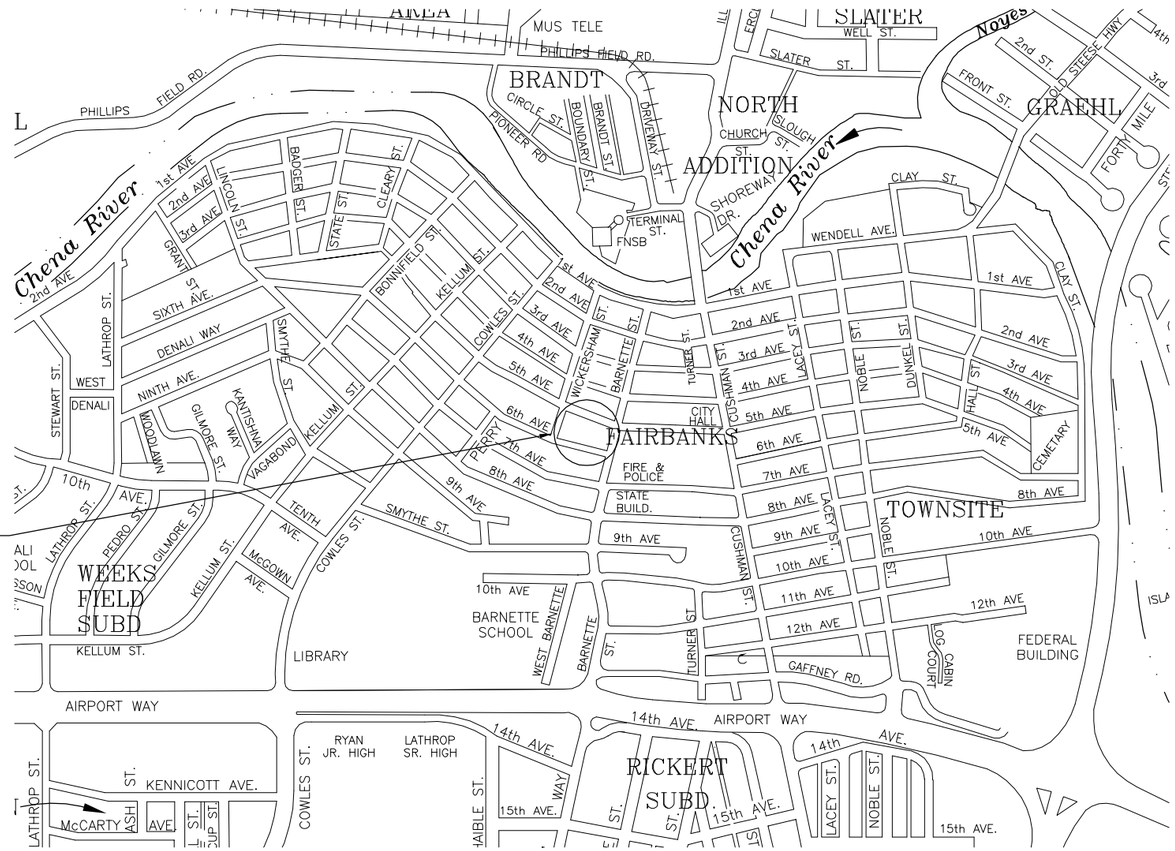
EARLY LOOK AT
ROOF VS. COATING / FLASHING

SHEET INDEX

PROJECT LOCATION



1 T1.0 PROJECT LOCATION
SCALE: NTS

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Drawn	DL	
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Date	3/9/2012	

Sheet Contents:
TITLE SHEET, SHEET INDEX & PROJECT LOCATION

Sheet No.:
T1.0

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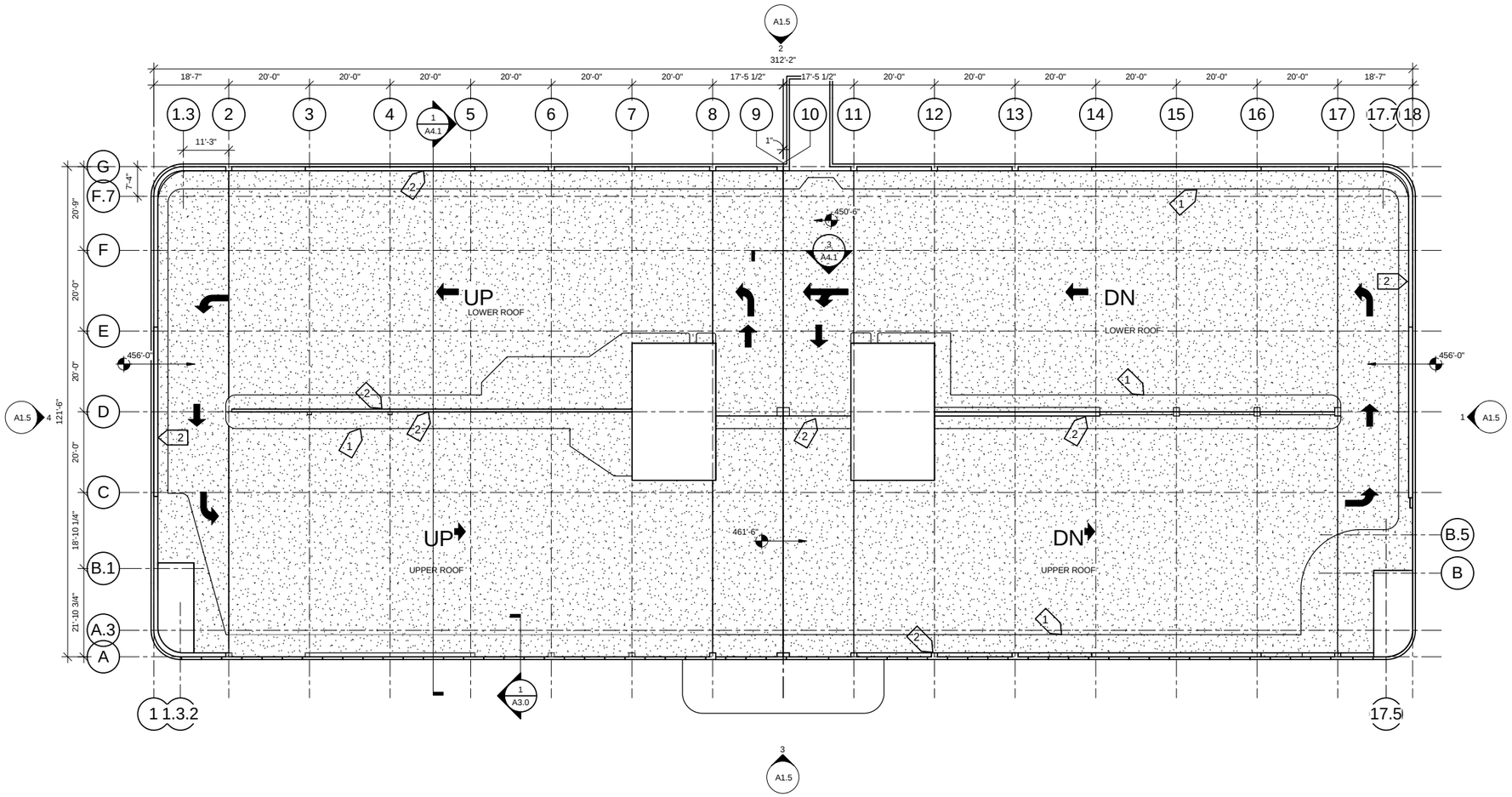

KEY PLAN NOTES:

1 (E) CURB ON TOPPING SLAB TO BE DEMOLISHED GUARDRAIL POSTS TO REMAIN

2 DEMO (E) FLASHING ADJACENT TO (E) WALL PANELS, CONCRETE COLUMNS AND CONCRETE WALLS PANELS TO REMAIN.

PLAN NOTES:

1. DEMO (E) 4" TOPPING SLAB & CURB, 1" RIGID INSULATION, AND 1" -+ BUILT-UP ROOFING MATERIAL.

2. INSPECT THE DECK FOR ADDITIONAL CRACKING, SPALLING OR OTHER INDICATIONS OF DETERIORATIONS. SOUNDS ALL SURFACES WITH CHAIN TO ENSURE THAT THERE IS NO FURTHER DETERIORATION OR SPALLING AND THAT THE SUBSTRATE IS SOUND.

3. THE ENTIRE UPPER DECK TO BE BEAD BLASTED OR OTHER ACCEPTABLE MEANS TO REMOVE ALL CONTAMINATES, LOOSE MATERIAL AND PROVIDE AN ACCEPTABLE SUBSTRATE PROFILE TO ACCEPT THE NEW COATINGS.

NORTH

1 / A1.0 Level 3 (TOP)
1/16" = 1'-0"

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Sheet Contents:

OPTION A - DEMO PLAN

Sheet No.:

A1.0

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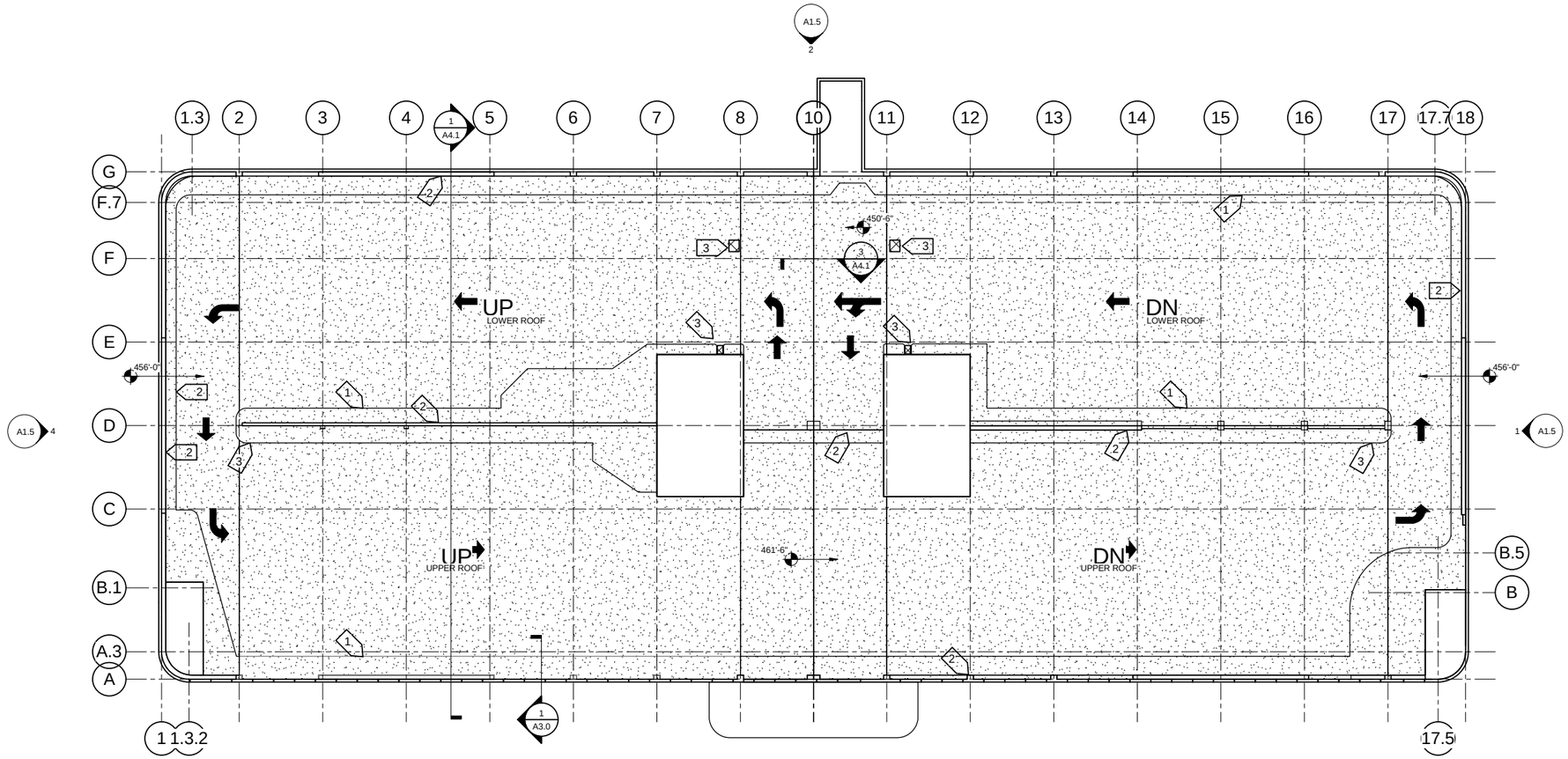

KEY PLAN NOTES:

1. NEW SEALED CURB, RE: DETAILS CAST ON (E) STRUCTURAL SLAB
2. PROVIDE CONTINUOUS LIQUID APPLIED WATERPROOFING MEMBRANE (KEMPEROL OR EQUAL) (APPROX. 12" WIDTH) BETWEEN (E) STRUCTURAL SLAB AND (E) PANELS.
3. SHORTEN (E) DRAIN CONDUCTORS, INSTALL NEW FLUSH MOUNT DRAIN IN STRUCTURAL SLAB

PLAN NOTES:

1. REPAIR ALL CONCRETE SPALLS PER ATTACHED "CONCRETE RESTORATION AND REPAIR" UTILIZING THE PRESCRIBED ASTM WAYS AND MEANS. REFERENCE APPENDIX A REPORT.
2. WHERE THERE ARE CRACKS THAT EXCEED ALLOWABLE WIDTH ND DEPTHS INJECT WITH PECORA DYNAPOXY 450 PER ATTACHED PECORA TECHNICAL SERVICE "CONCRETE INJECTION PROCEDURES" AND IN ACCORDANCE WITH ALL CURRENT ASTM BULLETINS. REFERENCE APPENDIX A OF REPORT.
3. MINIMUM WIDTHS CRACKS WILL BE GRAVITY FED TO REFUSAL WITH PECORA EPOXY
4. ALL CRACKS TO BE TREATED WITH A MIXTURE OF SAND AND PECORA DYNAPOXY, ROLLED ON.
5. APPLY A 54 MIL COATING OF PECORA CORPORATION'S TRAFFIC COATING SYSTEM PER SPECIFICATIONS ATTACHED. PROVIDE AN ADDITIONAL COATING IN THE "TURNING" LANES. REFERENCE APPENDIX A.

NORTH

1 / A2.0 OPTION "A" RENOVATION PLAN
1/16" = 1'-0"

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Sheet Contents:
OPTION A - RENOVATION PLAN

Sheet No.:
A2.0

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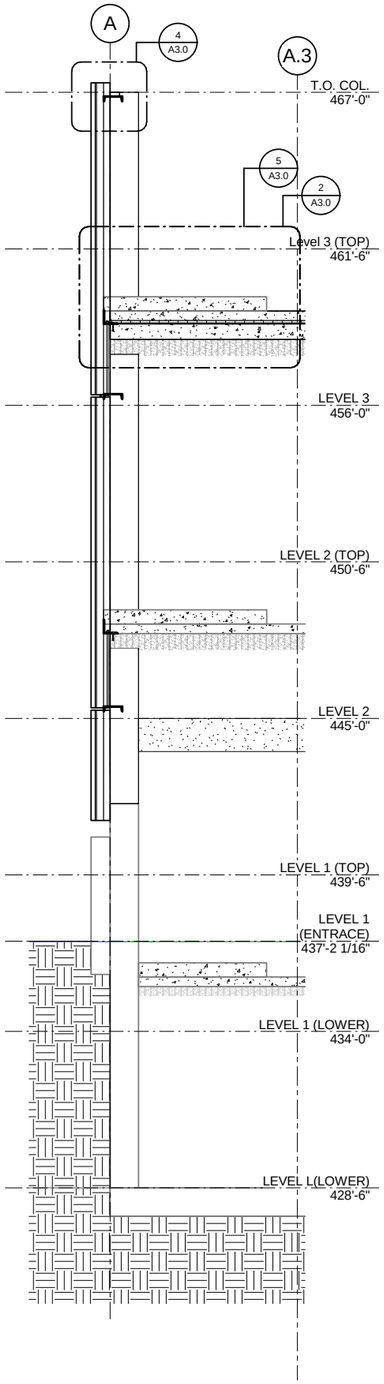
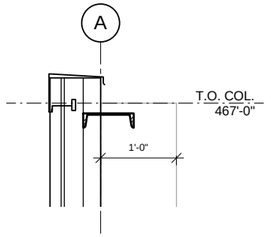
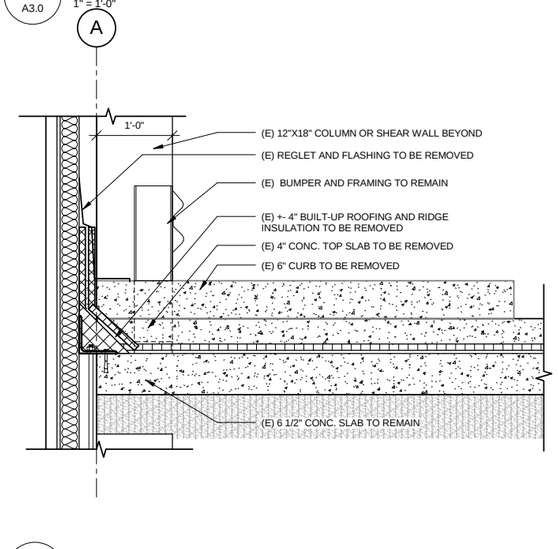


1 (E) TYP. END WALL
A3.0 3/8" = 1'-0"

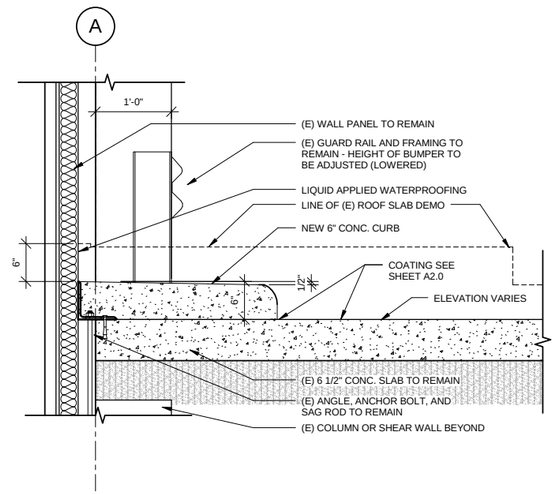


PARAPET DETAIL FOR INFORMATION ONLY - NO WORK TO BE DONE

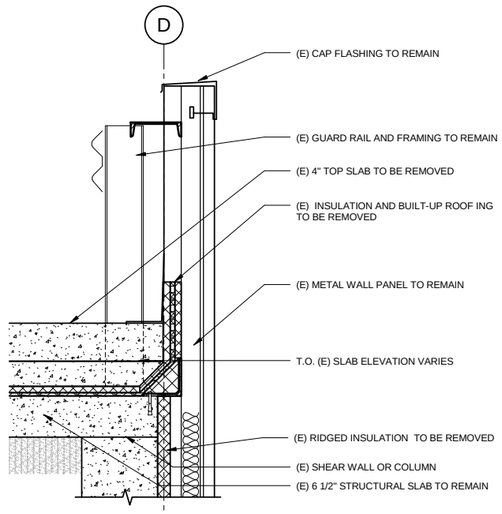
4 A3.0 (E) TYPICAL PARAPET
1" = 1'-0"



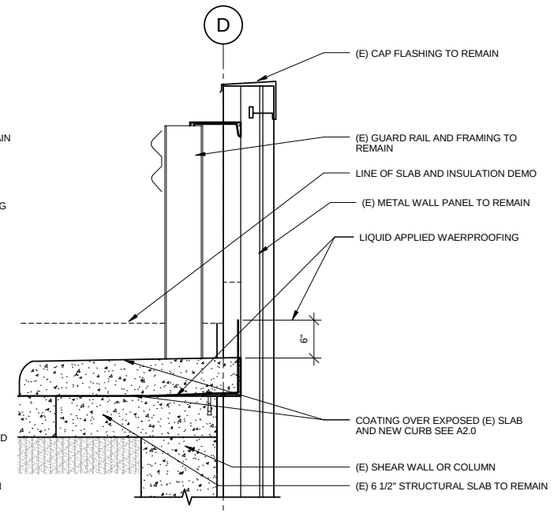
2 A3.0 (E) ROOF LEVEL FLASHING
1" = 1'-0"

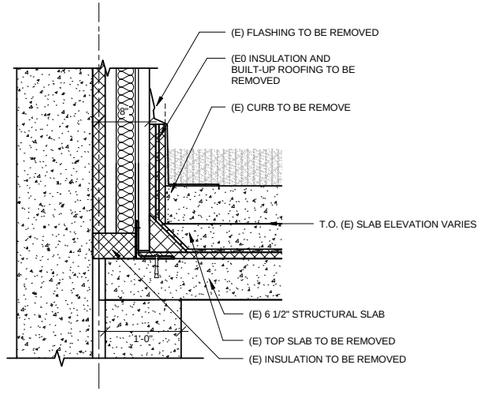


5 A3.0 NEW ROOF FLASHING - TYPICAL
1" = 1'-0"

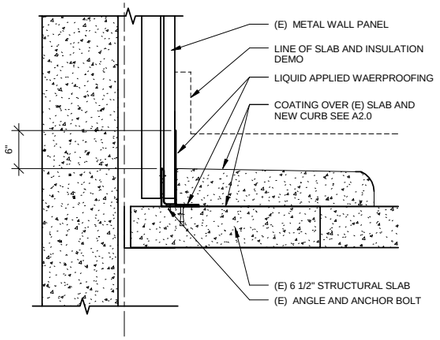


3 A3.0 (E) CENTER WALL
1" = 1'-0"





6 A3.0 NEW CENTER WALL - FLASHING
1" = 1'-0"



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Sheet Contents:
OPTION A - WATER PROOFING EXISTING SLAB - DETAILS

Sheet No.:
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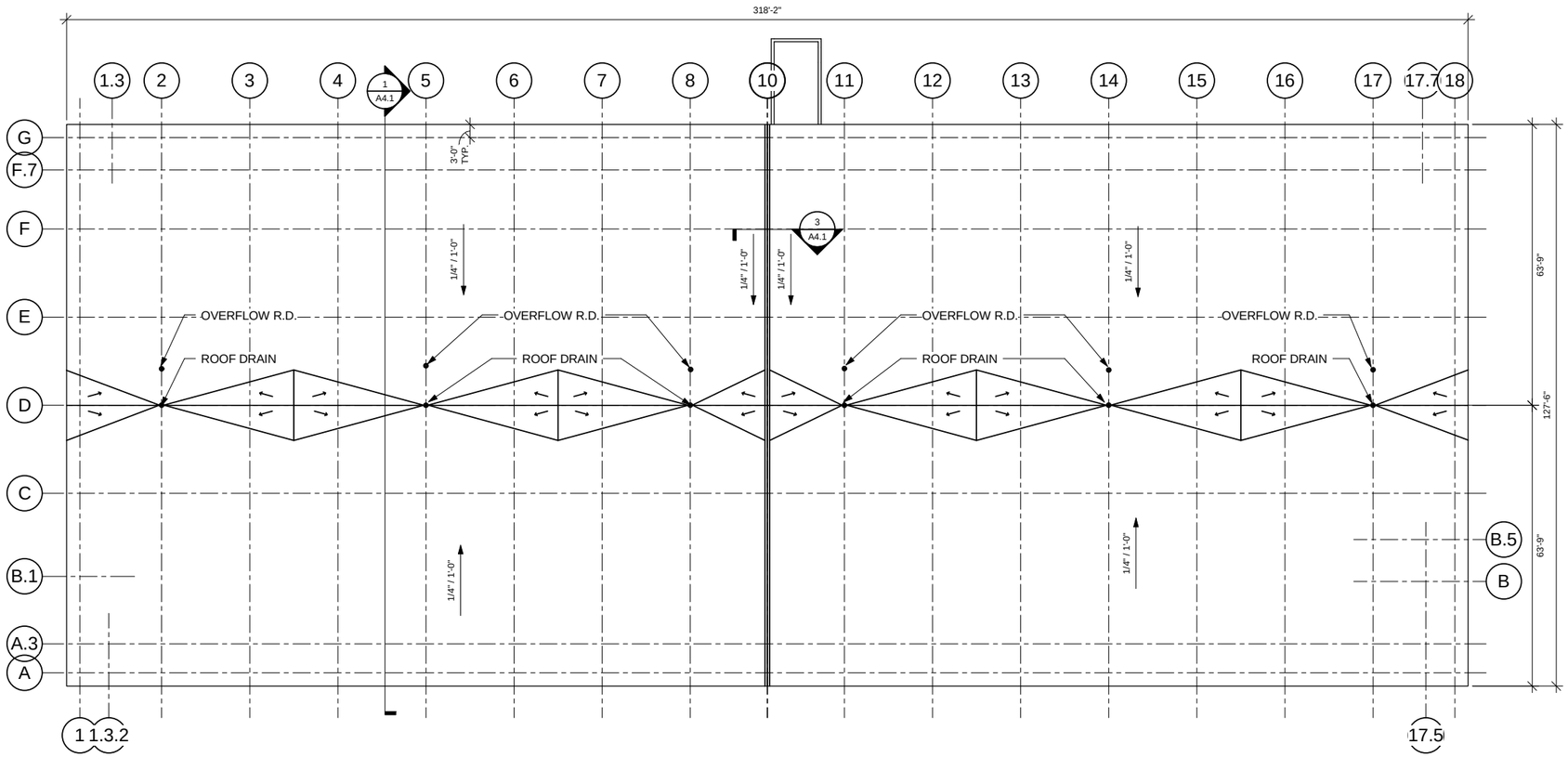

1 A4.0 ROOF PLAN
1/16" = 1'-0"

PLAN NOTES:

1. METAL ROOFING - 60 MIL REINFORCED EPDM (FULLY ADHERED), 5/8" GLASS MAT GYPSUM SHEATHING OVER METAL DECK,

SEE SHEET S1.0/ 2.0 FOR SPAN AND STRUCTURAL DETAILS

NORTH

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Sheet Contents:

OPTION B -NEW ROOF PLAN

Sheet No.:

A4.0

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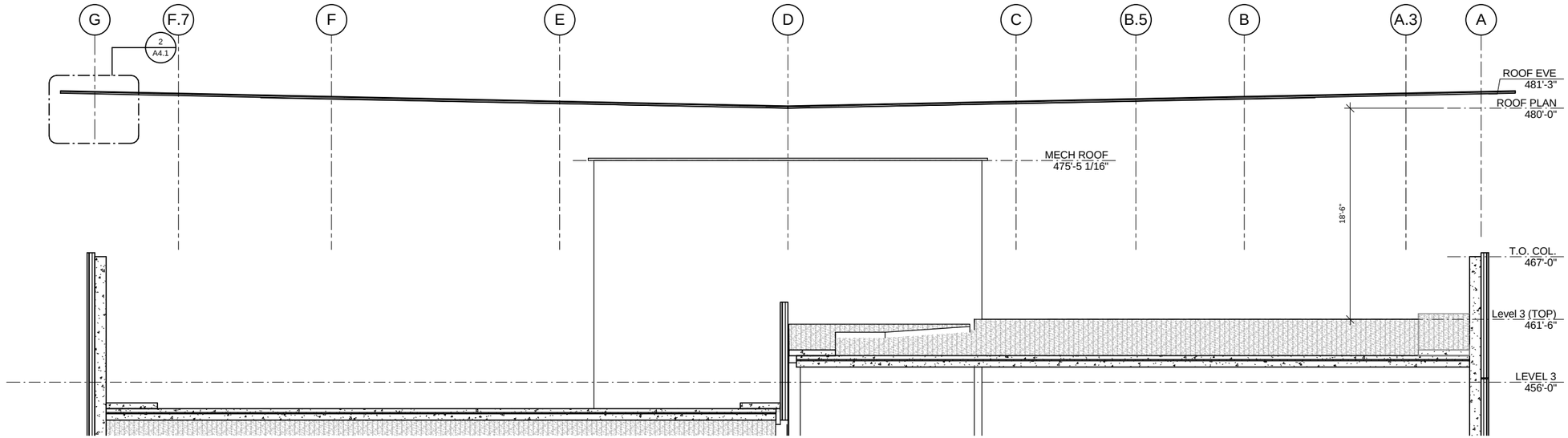

1 A4.1 NEW ROOF SECTION
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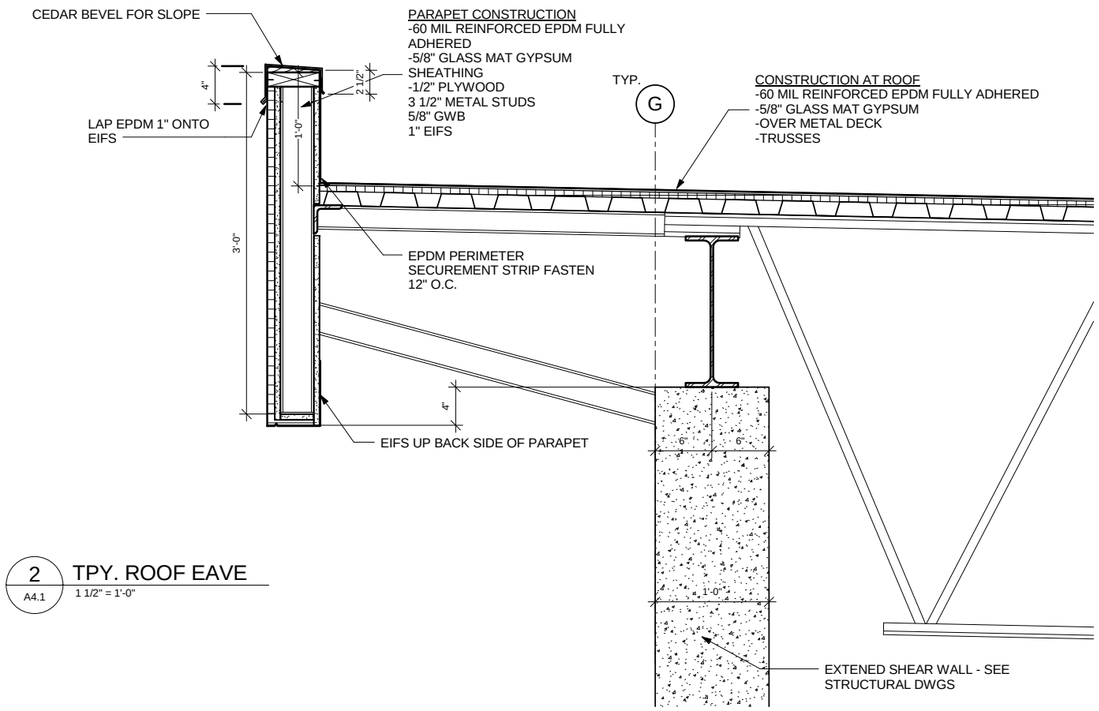
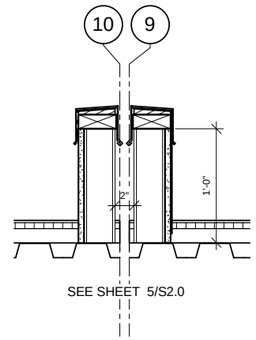


2 A4.1 TPY. ROOF EAVE
1 1/2" = 1'-0"



3 A4.1 TYP. ROOF AT COL. LINE 9/10
1 1/2" = 1'-0"

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Sheet Contents:
OPTION B NEW ROOF - DETAILS /SECTION

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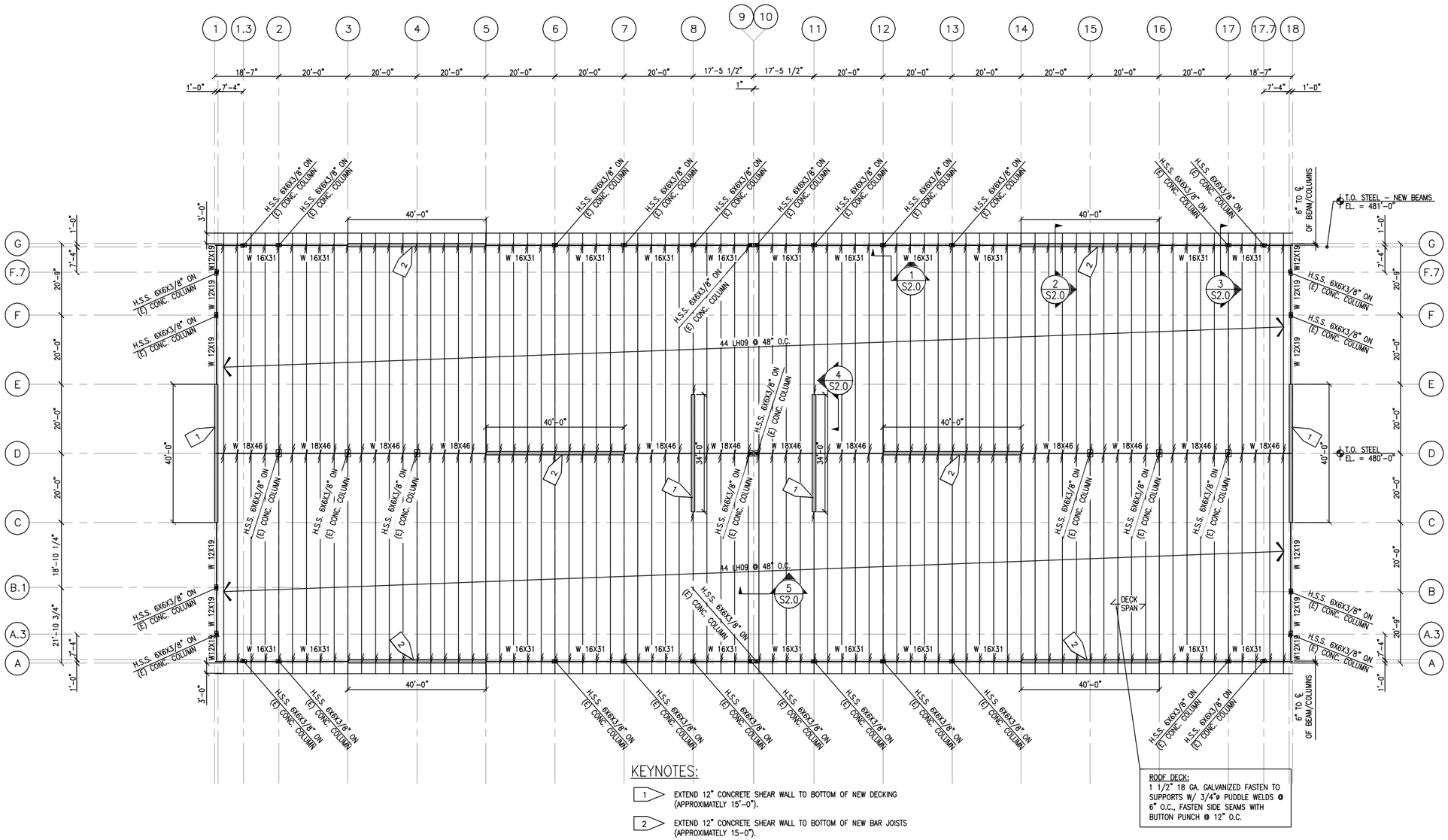

KEYNOTES:

1. EXTEND 12" CONCRETE SHEAR WALL TO BOTTOM OF NEW DECKING (APPROXIMATELY 15'-0").
2. EXTEND 12" CONCRETE SHEAR WALL TO BOTTOM OF NEW BAR JOISTS (APPROXIMATELY 15-0").

ROOF DECK:
1 1/2" 18 GA. GALVANIZED FASTEN TO SUPPORTS W/ 3/4"ø PUDDLE WELDS @ 6" O.C., FASTEN SIDE SEAMS WITH BUTTON PUNCH @ 12" O.C.

N

1 / S1.0 OPTION B – NEW ROOF FRAMING PLAN

SCALE: 1/16"= 1'-0"

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Sheet Contents:
OPTION B
NEW ROOF
FRAMING PLAN

Sheet No.:
S1.0

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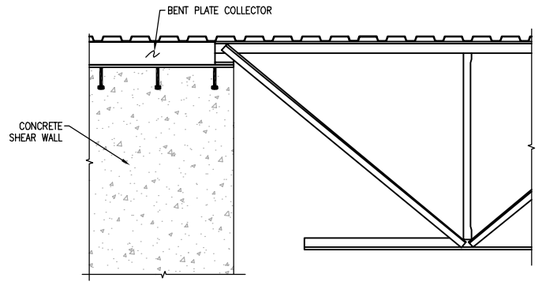

4 S2.0 FRAMING DETAIL
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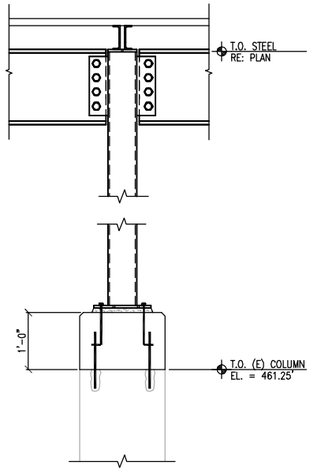
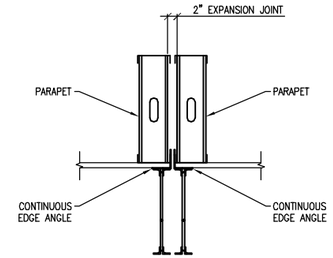
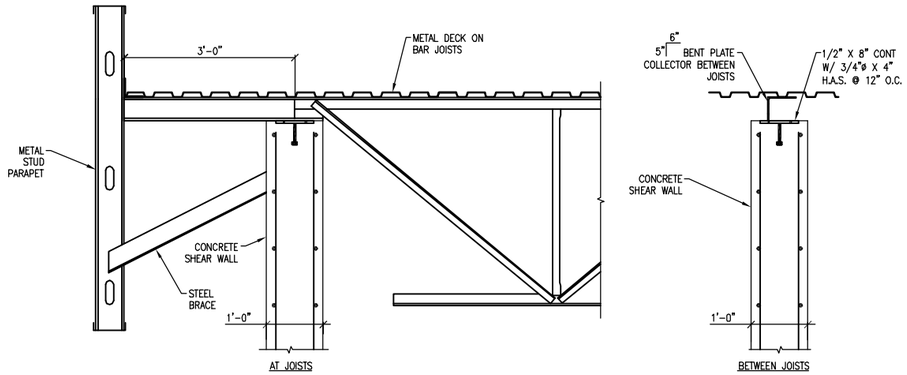


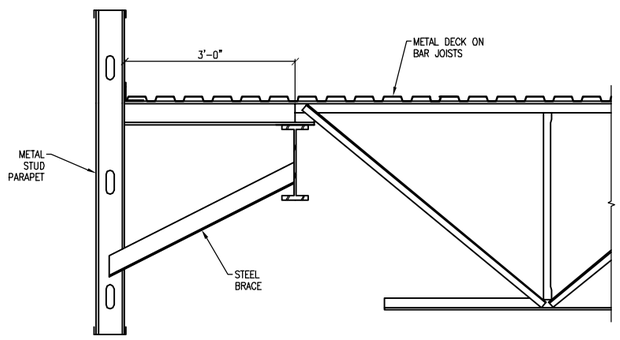
1 S2.0 TYP. STEEL COLUMN ON CONCRETE COLUMN DETAIL
SCALE: 3/4"= 1'-0"



4 S2.0 FRAMING DETAIL
SCALE: 3/4"= 1'-0"



2 S2.0 FRAMING DETAIL
SCALE: 3/4"= 1'-0"



3 S2.0 FRAMING DETAIL
SCALE: 3/4"= 1'-0"

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UAF PARKING GARAGE RENOVATION - EARLY LOOK AT ROOF VS. COATING / FLASHING

Project Mgr.	LIEBL	
Drawn	DJL	
Checked	FST	GAL
Date	3/9/2012	

Sheet Contents:
OPTION B
NEW ROOF
TYPICAL DETAILS

Sheet No.:
S2.0

USKH W.O. 1218306

Appendix B -
COST ESTIMATE

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Life Cycle Cost Analysis - Summary

UAF Community and Technical College Parking Garage Upgrade Plan

UAF # 2012052 CTCGE

Study Period:	20
Discount Rate:	3.10%

Life Cycle Costs of Project Alternatives

	Option A - Renovate and Coat Deck	Option B - Roof
Initial Investment Cost	**$2,738,734**	**$2,240,787**
Operations Cost	**$1,056,147**	**$92,311**
Replacement Cost	**$105,820**	**$0**
Residual Value	**$0**	**$0**
Total Life Cycle Cost	**$3,900,701**	**$2,333,098**
GSF of Project	39,500 GSF	35,900 GSF
Initial Cost/GSF	$69.34	$62.42
LCC/GSF	$98.75	$64.99

Life Cycle Cost Analysis - Renovate and Coat Deck

UAF Community and Technical College Parking Garage Upgrade Plan

UAF # 2012052 CTCGE

GSF: 39,500 GSF

	Quantity	Unit	Unit Cost	Total Cost	Years	Present Value
Initial Expenses						
Initial Investment Cost (one time start-up costs)						
Design Services	10%		$2,489,758	$248,976	0	$248,976
Construction	1	LPSM	$2,489,758	$2,489,758	0	$2,489,758
Future Expenses						
Operations Cost (annual costs)						
Snow Removal	3,878	CY	$18.48	$71,648	20	$1,056,147
70 in/yr compacts 50% =35" * area	3,878	CY				
Replacement Cost (scheduled replacement of building system or component)						
Membrane Repairs	1	LPSM	$143,600	$143,600	10	$105,820
Residual Value (value of facility at end of study period)						
None						
Total Life Cycle of Option A						**$3,900,701**

Life Cycle Cost Analysis - Roof

UAF Community and Technical College Parking Garage Upgrade Plan

UAF # 2012052 CTCGE

GSF: 35,900 GSF

	Quantity	Unit	Unit Cost	Total Cost	Years	Present Value
Initial Expenses						
Initial Investment Cost (one time start-up costs)						
Design Services	15%		$1,948,510	$292,277	0	$292,277
Construction	1	LPSM	$1,948,510	$1,948,510	0	$1,948,510
Future Expenses						
Operations Cost (annual costs)						
Electricity	26,093	KWH	$0.24	$6,262	20	$92,311
Heat Trace 9mth*30*24*14/1000						
Heat Trace	6,653	KWH				
Lighting - 9mth*18hr*4000w	19,440	KWH				
Maintenance & Repair Cost (upkeep costs…estimate on annual basis)						
NONE						
Replacement Cost (scheduled replacement of building system or component)						
NONE						
Residual Value (value of facility at end of study period)						
NONE						
Total Life Cycle of Option B						**$2,333,098**

EARLY LOOK PACKAGE - New Roof vs. Coating and Flashing Analysis

UAF CTC Parking Garage, Project No. 2012052 CTCGE

Fairbanks, Alaska

Construction Cost Estimate
Draft Investigative Report Submittal
July 9, 2012

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Fairbanks, AK 99701
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EARLY LOOK PACKAGE - New Roof vs. Coating and Flashing Analysis

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Description	Estimated Cost	Estimated Cost Plus Contingency & Escalation
Option A - Renovate and Coat Deck	$2,122,964	$2,489,758
Option B - Roof	$1,661,453	$1,948,510

Estimating Contingency:				15.0%
Escalation For Inflation:	6 Mths	@	4.0%	2.0%

Documents

Estimating Package Dated 2/28/12
CTC Garage Evaluation_Draft Investigative Report, Dated December 2011

Notes and Assumptions

1 Based on 2012 procurement/2012 construction.
2 Labor rates based on Davis Bacon, 50 hours/week.
3 Weather, logistics and construction time window has been considered, assuming summer construcion
4 Assumes open competitive bid procurement.
5 Materials storage area will be designated near the building.

EARLY LOOK PACKAGE - New Roof vs. Coating and Flashing Analysis | **Construction Cost Estimate**

UAF CTC Parking Garage, Project No. 2012052 CTCGE | **Draft Investigative Report Submittal**

Prepared for USKH, Inc. by Estimations | **July 9, 2012**

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
1											
2	**Option A - Renovate and Coat Deck**										
3											
4	**Demolition**										
5	Demo Slab & Curbs	39,500	SF			0.050	1,975.0	$147,384	$43,450	$190,834	$209,917
6	Demo Flashing	876	LF			0.040	35.0	$2,612		$2,612	$2,873
7	Demo Roofing	39,500	SF			0.030	1,185.0	$88,430		$88,430	$97,273
8	Hauling and Dump Fees	1,048	TONS	$7.58	$7,944	0.580	607.8	$45,357	$15,188	$68,489	$75,338
9											
10	**Deck Inspection and Sounding**	39,500	SF			0.002	79.0	$5,895	$2,800	$8,695	$9,565
11											
12	**Seal & Coatings**										
13	Seal Curb	560	LF	$30.00	$16,800					$16,800	$18,480
14	Seal Slab Edges	876	LF	$30.00	$26,280					$26,280	$28,908
15	Sandblast & Chaining	39,500	SF	$2.00	$79,000	0.057	2,251.5	$168,017		$247,017	$271,719
16	Surface Repairs	39,500	SF	$3.00	$118,500	0.029	1,145.5	$85,483		$203,983	$224,381
17	Traffic Topping	39,500	SF	$16.00	$632,000	0.040	1,580.0	$117,907		$749,907	$824,898
18											
19											
20											
21											
22											
23											
24											
27											
28											
29											
30											
31	**General Requirements**	12%									$164,206
32	**General Contractor Overhead & Profit**	10%									$153,259
33	**General Contractor Bond & Insurance**	2.5%									$42,146
34											
35	**Subtotal: Option A - Renovate and Coat Deck**				$880,524		8,858.8	$661,085	$61,438	$1,603,047	**$2,122,964**
36	Average Unit Price for this division is: $212.30 per Sf based on 10,000 Sf										
37											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
38											
39	**Option B - Roof**										
40											
41	**Shear Walls 12"T, 15'H**	**5,250**	**SF**								
42	Forms	10,500	SF	$3.50	$36,750	0.200	2,100.0	$163,875	$5,250	$205,875	$205,875
43	Re-steel	25,521	LBS	$0.75	$19,141	0.013	331.8	$25,892		$45,033	$45,033
44	Concrete	204	CY	$130.00	$26,542	1.286	262.6	$20,492	$6,125	$53,159	$53,159
45	Finish - Sack/Rub	10,500	SF	$0.20	$2,100	0.040	420.0	$32,775		$34,875	$34,875
46											
47	**Structural Framing**										
48	Roof Framing	24,935	LBS	$1.45	$36,156	0.007	174.5	$14,826	$1,995	$52,977	$58,274
49	Columns	17,901	LBS	$1.45	$25,956	0.007	125.3	$10,646	$1,432	$38,034	$41,837
50	Allow For Plate, Anchorage, Etc.	8,567	LBS	$1.45	$12,422	0.014	119.9	$10,187		$22,609	$24,870
51	Roof Joists	206,390	LBS	$1.45	$299,266	0.007	1,444.7	$122,747	$16,511	$438,524	$482,377
52	Roof Decking 1.5" 20Ga	40,042	SF	$2.50	$100,105	0.013	520.5	$44,224		$144,329	$158,762
53											
54	**Parapet**										
55	Metal Framing 6" 16 Ga 16" o.c.	4,967	SF	$2.98	$14,801	0.060	298.0	$25,319		$40,120	$44,132
56	Bracing	1,752	LF	$2.29	$4,012	0.057	99.9	$8,488		$12,500	$13,750
57	Metal Siding	4,967	SF	$6.00	$29,802	0.057	283.1	$23,180		$52,982	$58,280
58	Coping	876	LF	$14.00	$12,264	0.086	75.3	$5,852		$18,116	$18,116
59	Densdeck On Interior	1,752	SF	$0.75	$1,314	0.010	17.5	$1,360		$2,674	$2,674
60											
61	**Membrane Roofing**	**40,042**	**SF**								
62	Tapered Insulation, 1/4" Per Foot	4,665	BF	$0.55	$2,566	0.003	14.0	$1,082		$3,648	$4,013
63	Densdeck	40,042	SF	$0.65	$26,027	0.008	320.3	$24,751		$50,778	$55,856
64	EPDM Membrane, Fully Adhered	42,670	SF	$1.20	$51,204	0.019	810.7	$63,008		$114,212	$114,212
65											
66											
67											
70											
71											
72											
73											
74											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
75											
76	**Roof Drains**										
77	Roof Drains, Incl Overflow Drains	12	EA	$380.00	$4,560	2.300	27.6	$2,181		$6,741	$8,426
78	Rain Leader, Svc Wt Cast Iron										
79	4" Pipe	620	LF	$12.25	$7,595	0.419	259.8	$20,527		$28,122	$35,153
80	6" Pipe	60	LF	$19.13	$1,148	0.434	26.0	$2,054		$3,202	$4,003
81	Fittings	1	LS	$655.73	$656	42.870	42.9	$3,390		$4,046	$5,058
82	Heat Trace	680	LF	$14.00	$9,520	0.057	38.8	$3,140		$12,660	$15,825
83											
84	**Lighting**										
85	LED Parking Lights	100	EA	$180.00	$18,000	2.000	200.0	$16,186		$34,186	$42,733
86	Wiring: 3/4" Cond, 3-#12, Gnd	3,500	LF	$2.20	$7,700	0.120	420.0	$33,991		$41,691	$52,114
87	Lighting Controls	1	LS	$5,000.00	$5,000	8.000	8.0	$647		$5,647	$7,059
88											
89											
90											
91											
94											
95											
96											
97											
98											
99											
100											
101											
102											
103											
104											
105	**General Requirements**	8%									$27,556
106	**General Contractor Overhead & Profit**	10%									$37,201
107	**General Contractor Bond & Insurance**	2.5%									$10,230
108											
109	**Subtotal: Option B - Roof**				$754,607		8,441.2	$680,820	$31,313	$1,466,740	**$1,661,453**
110											
111											

ITEM 3 RECOMMENDATIONS REGARDING AESTHETIC AND SECURITY IMPROVEMENTS RELATED TO REMOVING PANELS

Completed in the late 1970's as a fully enclosed structure, the CTC Parking Garage architectural visage is worn, dated and independent of the CTC Building in terms of vernacular and color. With the determination to decommission and remove the mechanical ventilation systems as determined in Item 2 and further addressed in Item 8 of this report, and to provide a new roof at the top level, several opportunities are provided. The removal of portions of the existing metal panel façade to provide natural ventilation as an "open parking garage" will allow:

- Development of a new architectural appearance that is more aesthetic and aligned with the CTC Building across Barnette Street.
- Introduction of natural light into the facility and visibility into the facility from the exterior public ways.
- Installation of security systems and controls to improve safety and security at the facility, which will employ an unattended mode of operation.

In the design of the new building exterior, particular attention must be paid to creating a new aesthetic in a cost effective manner by minimizing alterations to the existing structure, providing the ability to secure the building perimeter for security, and adding new surveillance and security systems.

3.1 Architectural

The proposed architectural design concept as presented graphically in Appendix A is based on changing from enclosed parking garage with an open upper level into an open parking garage with a new roof. Key concept elements include:

- Retaining the existing lower fluted concrete exterior wainscot which runs continuously around the building perimeter. Prepare and repaint in a new color scheme.
- Removal of the majority of the existing metal insulated panels from the building, except at the stair wells, where they will be retained to provide weather protection and heated enclosures for patrons using the facilities. Prepare and repaint existing panels to remain in a new color scheme.
- Installation of articulated architectural perforated panel which will provide an interesting exterior design that will allow natural light in to the garage during daylight hours, provide views in and out of the structure to creating a safer and more comfortable experience, and provide a continuous physical security barrier. Architectural perforated panels would extend to the top structural girt line at Elevation 467 feet.
- Installation of a new roof with an extended cantilever edge for weather protection, which will "float" several feet above the top level of the architectural perforated panels.
- Repair the existing large canopy soffit at the vehicle entry/exit and provide new flush metal soffit panels.
- Coordination of color selections for exterior finish materials that are complimentary of the theme established at the CTC Building located across Barnette Street.
- Integral to the architectural design concept is the use of LED lighting as a design element, which would illuminate the architectural elements and give the facility a unique and interesting signature throughout the cold dark winter months in Fairbanks, with minimal electrical consumption.

Perforated panels will be factory finished aluminum of various degrees of transparency (percent of open area) and varying colors. Information on the types of panels which may be considered are included in Appendix B – Product Data.

3.2 Structural

The existing structural framework, consisting of structural channel wind girts at approximately 5'-0" on center spacing vertically, will be upgraded at the connections throughout. The connection upgrade would consist of providing a new angle with slotted holes that would either weld to the existing embeds or have an epoxy anchor connection to the existing concrete walls or columns.

3.3 Electrical

CCTV

Color video cameras would aid in monitoring the parking garage. Cameras should be provided in the following locations:

- Vehicle exit and entrance area.
- Within stairwells.
- Inside the elevator car.

CCTV would be able to be monitored via Internet protocol using a secure password system.

Card Readers – All Doors

To improve security card readers should be placed at all exterior doors. A security gate with card reader could also be added to the inbound and outbound traffic lanes. Providing card readers at all exterior doors and traffic lanes would limit access to the parking garage to current students, faculty, staff and other users of the parking garage. CTC students, faculty and staff already have Polar Express cards that are used with door card readers so the implementation of card readers at the parking garage would extend their access function.

Emergency Phones and Communications

Emergency phones should be provided at the entrance to the exit doors on each floor of the parking garage. There should be some discussion on if there is any desire to install two-way call boxes at the entrance to the parking garage. This would allow CTC students, faculty or staff to talk to security to override security gates and locks or express concern about something at the parking garage.

Appendix A - DRAWINGS

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CTC PARKING GARAGE AESTHETIC-SECURITY IMPROVEMENTS - ITEM 3

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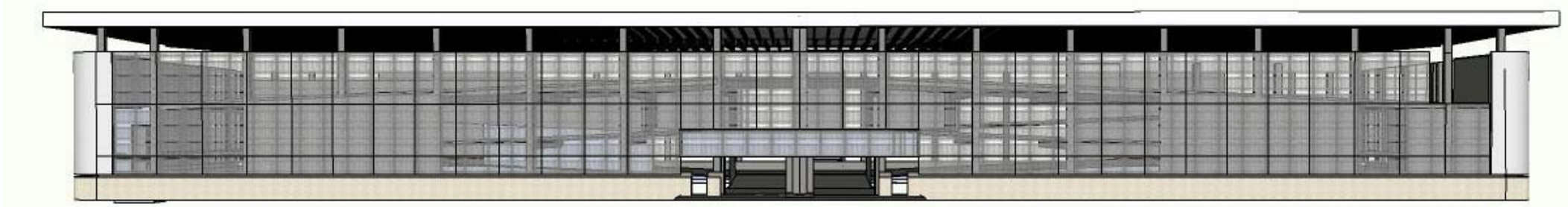

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Project:

UAF PARKING GARAGE RENOVATION - NEW ROOF AND AESTHETIC - SECURITY IMPROVEMENTS ITEM 3

USKH
Anchorage, Alaska

Project Mgr.	LIEBL	
Drawn	AHD	
Checked	FST	
Date	07.10.2012	

Sheet Contents:

TITLE SHEET

Sheet No.:

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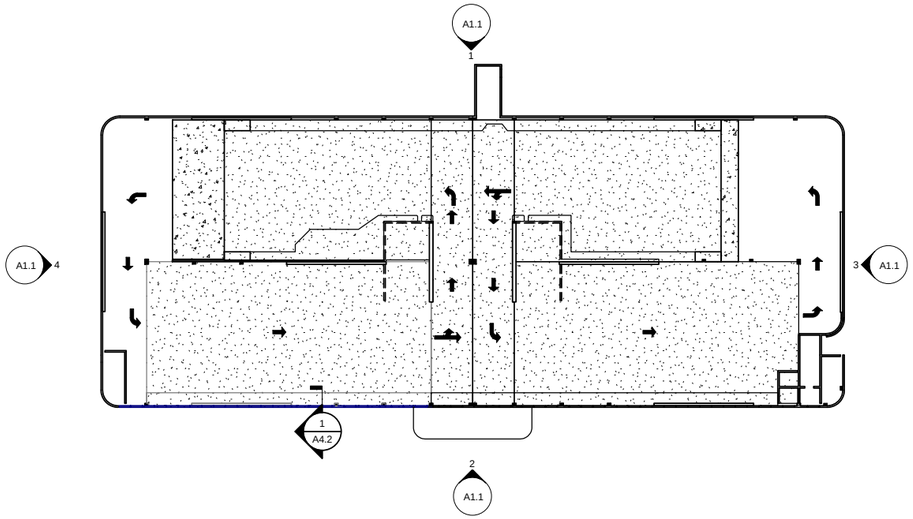

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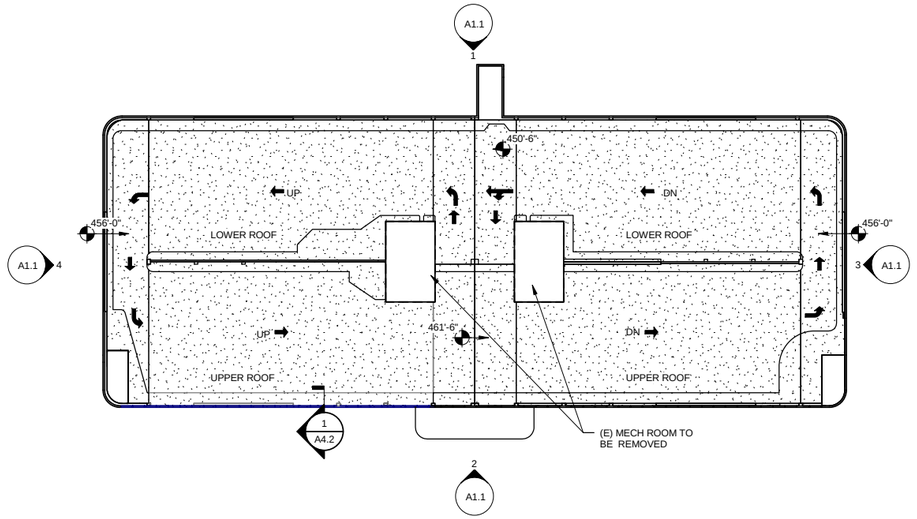

4 A1.0 Level 3 (TOP)
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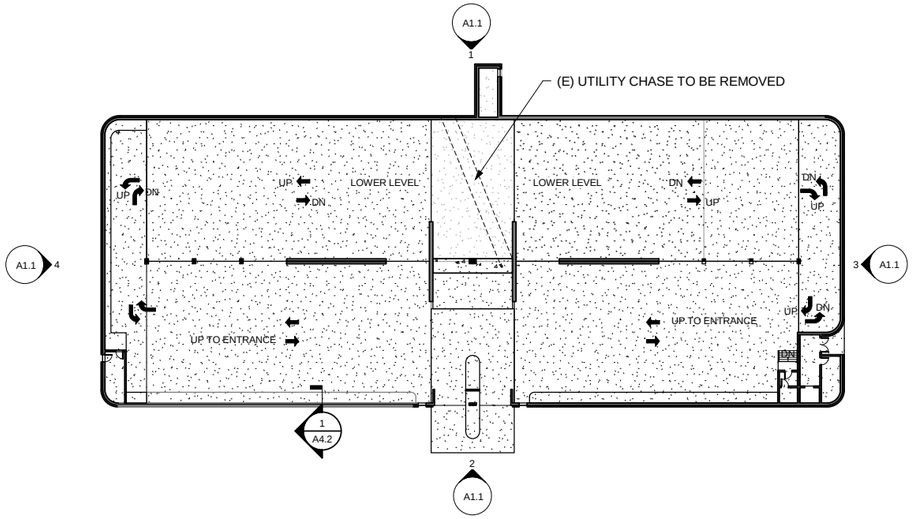

1 A1.0 LEVEL 1 (LOWER)
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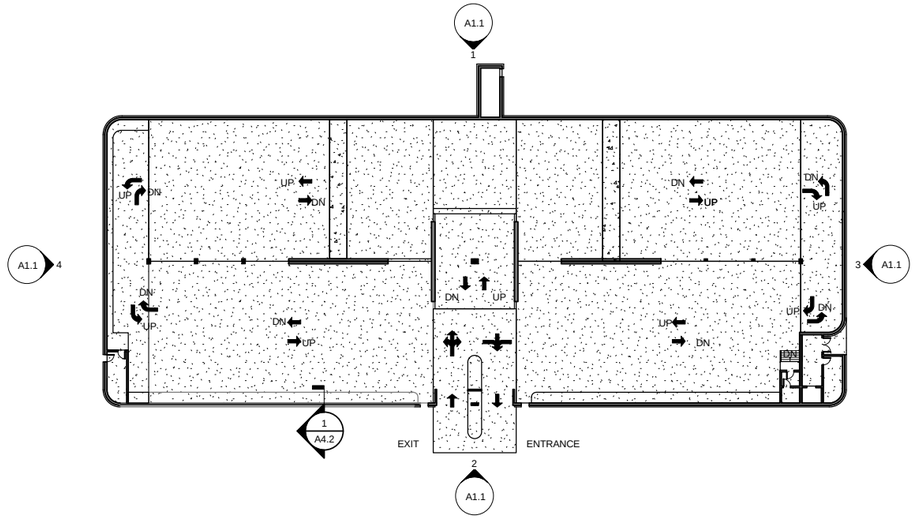

2 A1.0 LEVEL 1 (ENTRANCE)
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Anchorage, Alaska

Project Mgr.	LIEBL	
Drawn	AHD	
Checked	FST	
Date	07.10.2012	

Sheet Contents:
EXISTING FLOOR PLANS

Sheet No.:
A1.0

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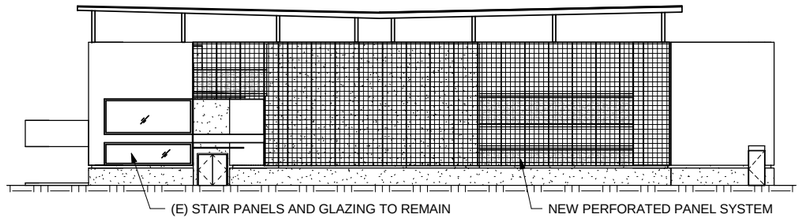
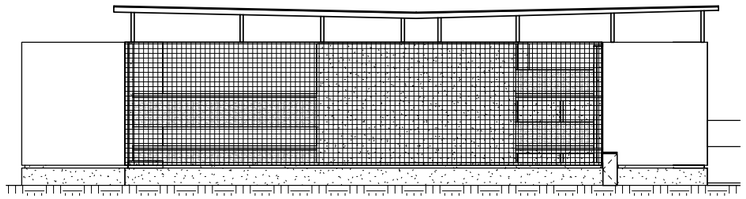


3 A1.1 EAST EXTERIOR ELEVATION
1/16" = 1'-0"



4 A1.1 WEST EXTERIOR ELEVATION
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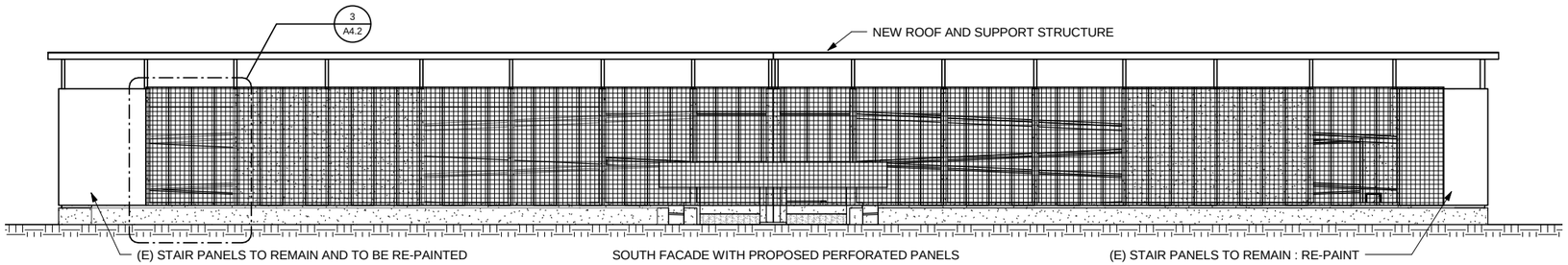

2 A1.1 SOUTH EXTERIOR ELEVATION
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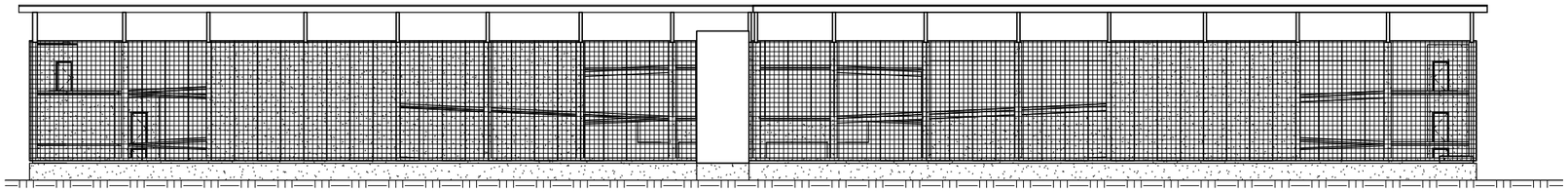

1 A1.1 NORTH EXTERIOR ELEVATION
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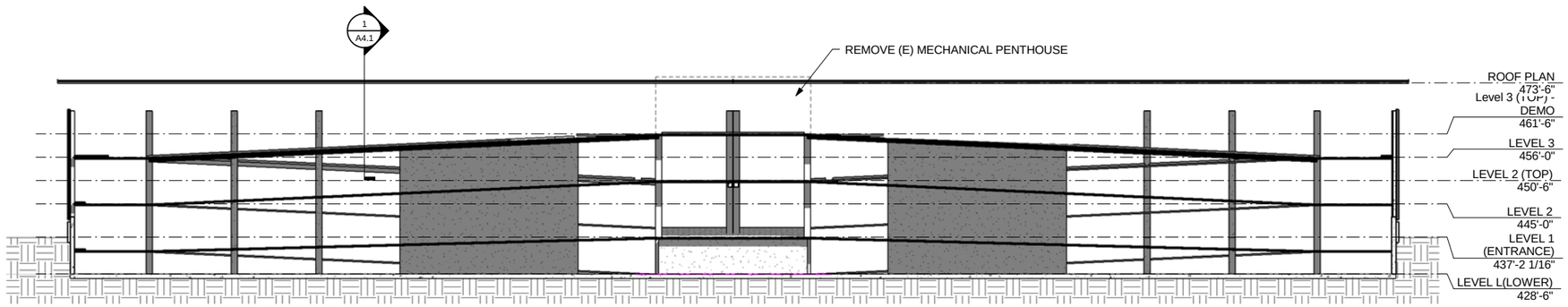

5 A1.1 EAST WEST SECTION
1/16" = 1'-0"

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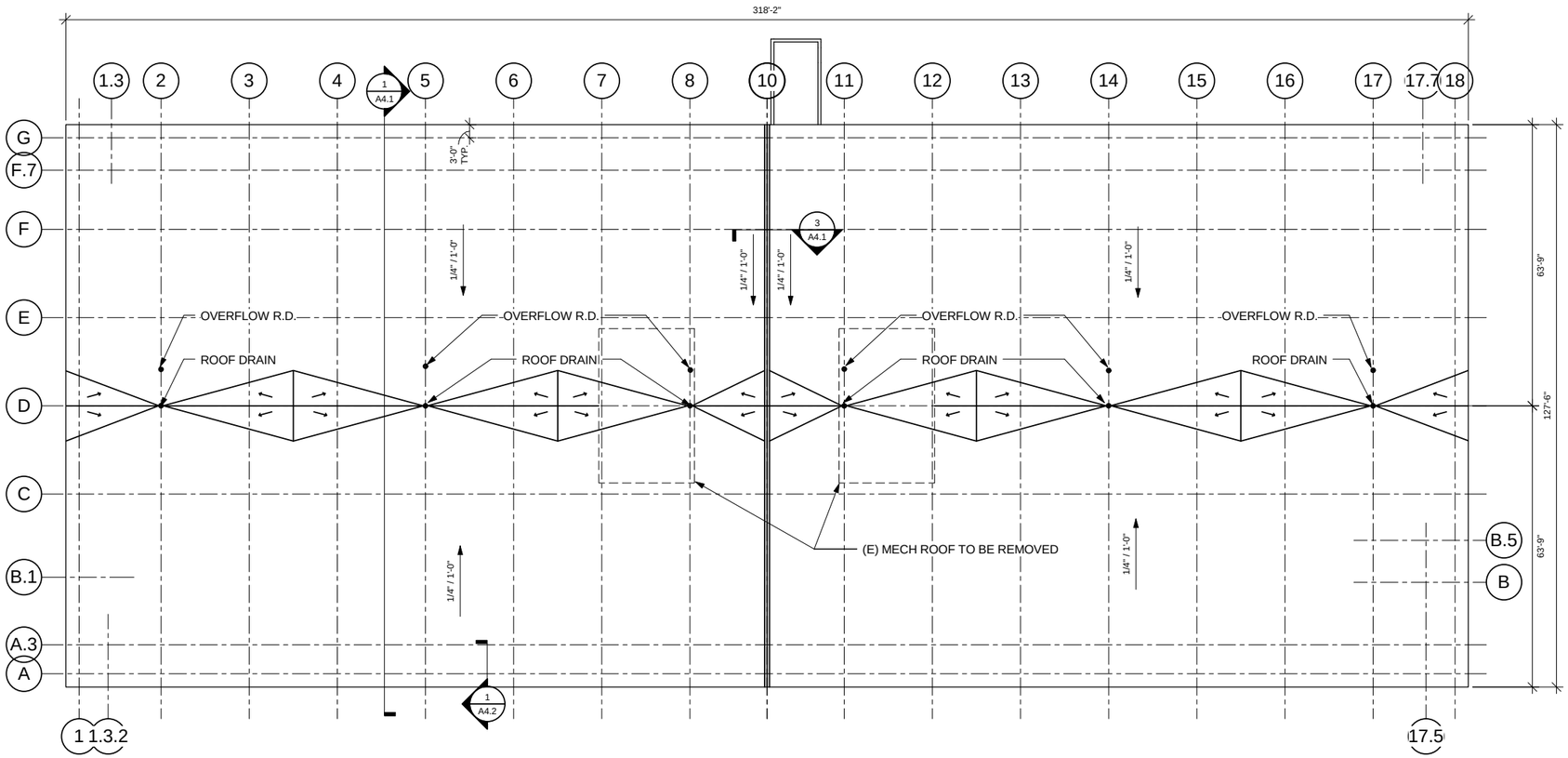
Project:
UAF PARKING GARAGE RENOVATION - NEW ROOF AND AESTHETIC - SECURITY IMPROVEMENTS ITEM 3
USKH
Anchorage, Alaska

Project Mgr.	LIEBL	
Drawn	AHD	
Checked	FST	
Date	07.10.2012	

Sheet Contents:
ELEVATIONS WITH NEW PERFORATED PANEL SYSTEM

Sheet No.:
A1.1

USKH W.O. 1218306



1 A2.0 ROOF PLAN
1/16" = 1'-0"

PLAN NOTES:

1. METAL ROOFING - 60 MIL REINFORCED EPDM (FULLY ADHERED), 5/8" GLASS MAT GYPSUM SHEATHING OVER METAL DECK.

NORTH

DRAFT INVESTIGATIVE REPORT
11X17 SHEETS ARE HALF SIZE

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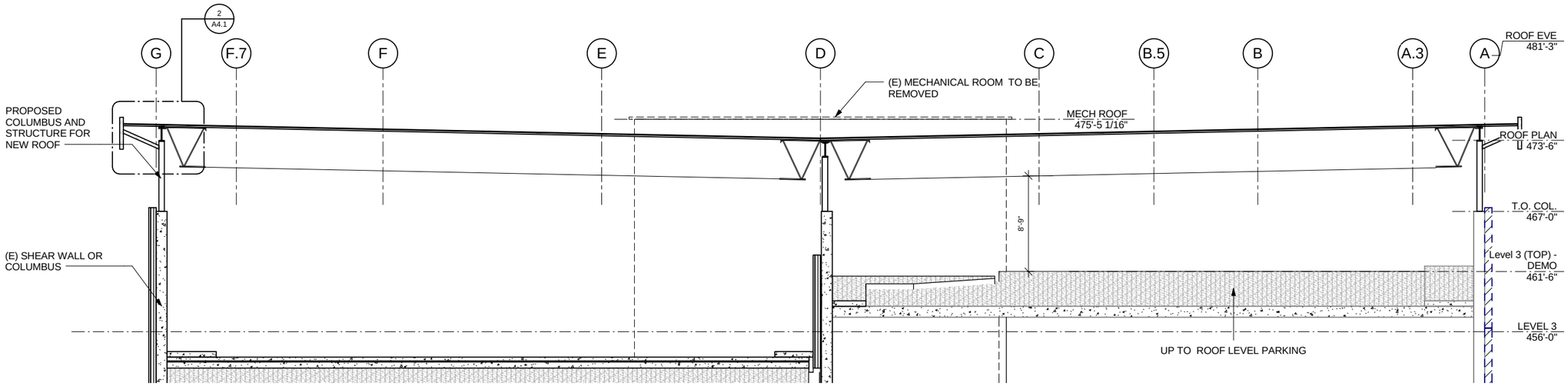
USKH
Anchorage, Alaska

Project Mgr.	LIEBL	
Drawn	AHD	
Checked	FST	
Date	07.10.2012	

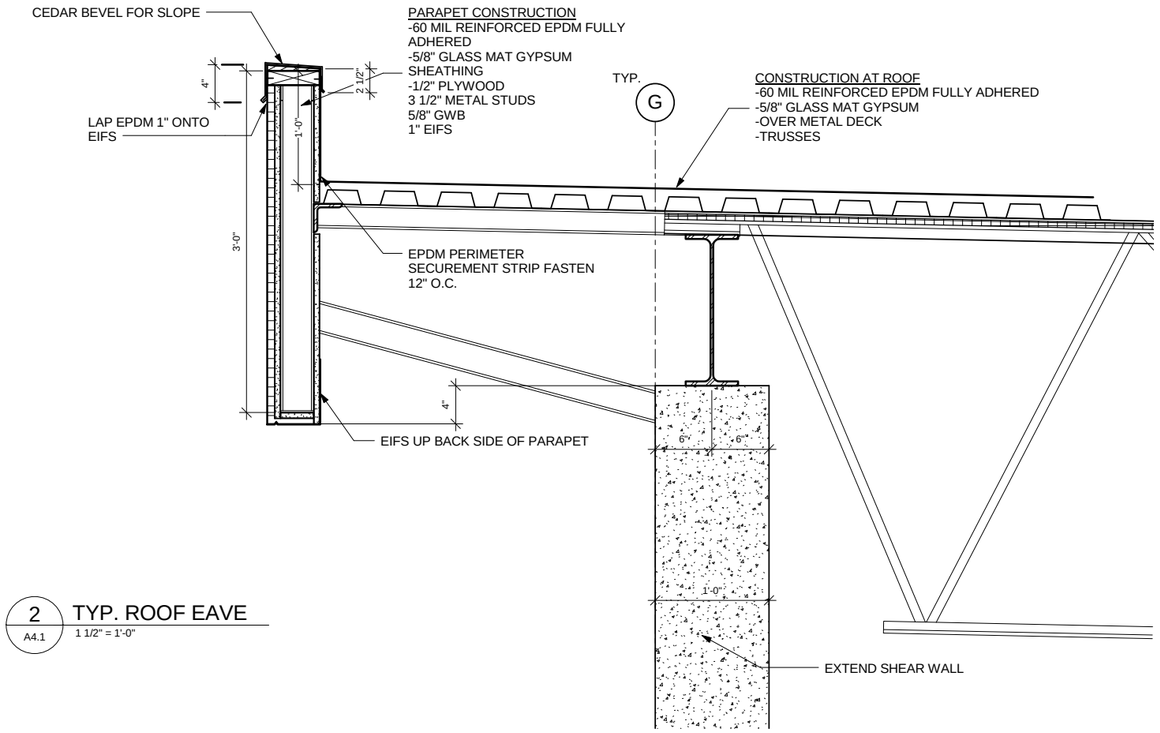
Sheet Contents:
NEW ROOF PLAN

Sheet No.:
A2.0

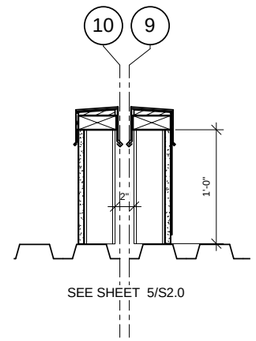
USKH W.O. 1218306



1 A4.1 NEW ROOF SECTION
3/16" = 1'-0"



2 A4.1 TYP. ROOF EAVE
1 1/2" = 1'-0"



3 A4.1 TYP. ROOF AT COL. LINE 9/10
1 1/2" = 1'-0"

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11X17 SHEETS ARE HALF SIZE

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USKH
Anchorage, Alaska

Project Mgr.	LIEBL	
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Checked	FST	
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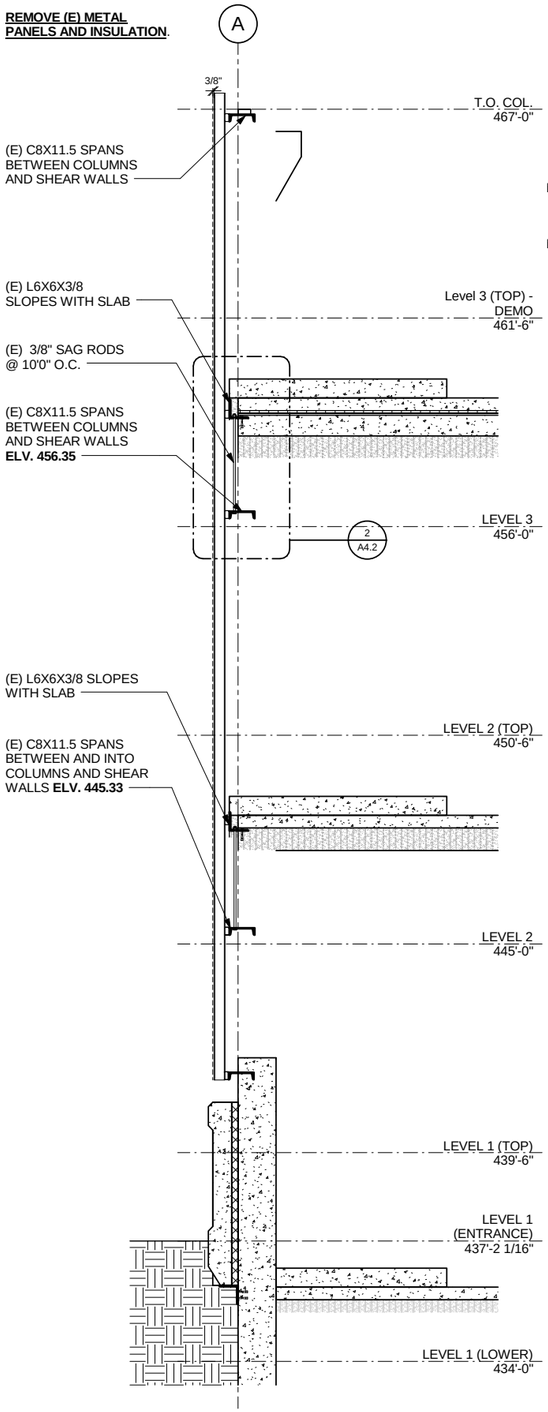
Sheet Contents:
NEW ROOF - DETAILS/SECTION

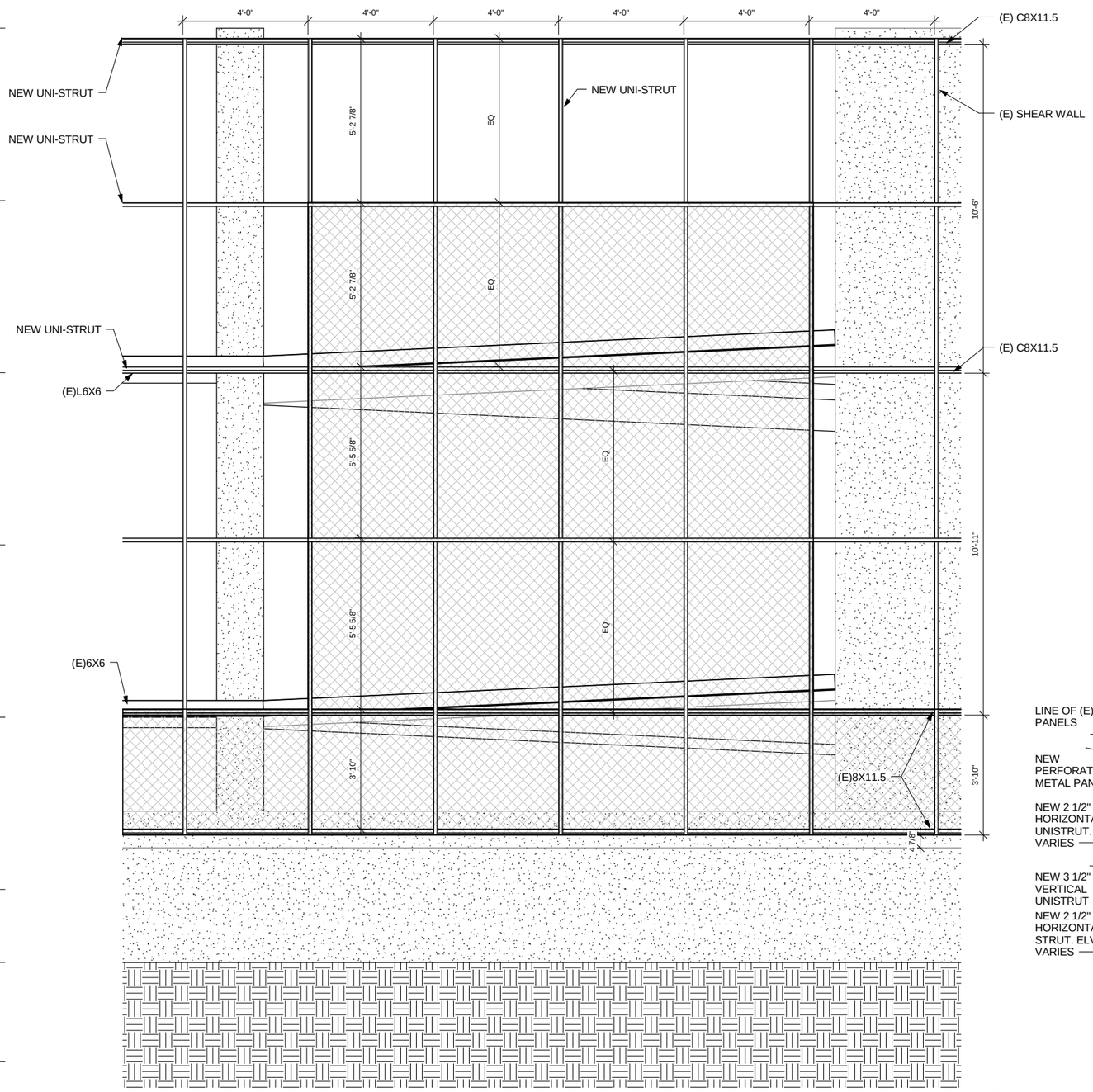
Sheet No.:
A4.1

USKH W.O. 1218306

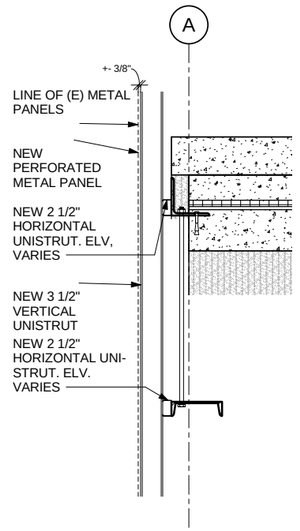
REMOVE (E) METAL PANELS AND INSULATION.



1 A4.2 NEW METAL MESH TYP. END WALL
1/2" = 1'-0"



3 A4.2 TYP. EXTERIOR ELEVATION
1/2" = 1'-0"



2 A4.2 DETAIL- NEW METAL MESH TYP.
1" = 1'-0"

DRAFT INVESTIGATIVE REPORT
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USKH
Anchorage, Alaska

Project Mgr.	LIEBL	
Drawn	AHD	
Checked	FST	
Date	07.10.2012	

Sheet Contents:

PROPOSED MESH WALL CONCEPT

Sheet No.:

A4.2

USKH W.O. 1218306

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Appendix B -
PRODUCT DATA

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McNICHOLS APPLICATION PROFILE

Mercy Medical Center
Baltimore, MD

When Baltimore's Mercy Medical Center needed a new parking garage for its growing campus, the architectural firm designing the structure cast its eyes on a simple leaf and a versatile perforated metal.

The leaf is symbolic of Mercy's Catholic based mission. The perforated metal from **McNICHOLS® Designer Metals** series is associated with other qualities: weather resistance, strong yet lightweight, allows ventilation and visibility and ability to accommodate a large-scale painted graphic.

Together they produced a magnificent 80' x 149' metal mural under the direction of international architects and urban planners. Not only does the mural mask the unsightly parking ramps, it doubles as a safety and ventilation screen and showcases a spiritually inspired image that bespeaks the principals of the Sisters of Mercy.

Hole Products Used

Anodized Aluminum Perforated Metal
- Aesthetically pleasing
- Strong yet lightweight
- Corrosion resistant
- Ventilation properties
- Light diffusion
- visibility/see through

Specifications:
- 5/16" round holes
- 3/8" staggered centers,
- 48" x 120" sheets,
- .063 anodized aluminum 3003H14

Designer Wire Mesh
- Aesthetically pleasing
- Corrosion resistant
- High percentage of open area
- visibility/see through

Specifications:
- 5/8" x 2" mesh,
- Lock crimp weave,
- .162 wire diameter

The Hole Story
McNICHOLS

McNICHOLS APPLICATION PROFILE

Mercy Medical continued

The major element of Mercy's logo is a stylized leaf that symbolizes life, growth and the "Mercy Cross". The logo was painted piece by piece on the metal panels, then put together like a jigsaw puzzle.

The 12,000 square foot screen mural was a striking addition to the urban landscape and visible from busy roadways. According to the architect, the screen/mural was the result of combining the principals of good urban design and code obligations.

Products like this and others from McNICHOLS are frequently used as an artistic element in parking garage design. Mercy's happens to be one of the largest and most inventive, merging architectural sensitivity and function.

McNICHOLS APPLICATION PROFILE

Mercy Medical continued

A second area of the parking garage, the lower two levels, needing security screens gave another opportunity to continue the theme artistry with decorative metal.

Because the openings varied in size and were near the ground level, panelized closures were created as virtual single pieces of art, each designed in a scale consistent with the street view.

Every panel incorporated **McNICHOLS® Wire Mesh** and solid metal sheets imprinted with die cut or stencil pained leaves of the logo. The wire mesh, like the perforated, allowed ventilation, visibility, security, and light diffusion that was vital to the two levels. The wire mesh also offered an additional artistic element to the special panels that coordinated with the upper levels.

Appendix C -
COST ESTIMATE

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ITEM 3 - Aesthetic and Security Improvements Related to Removing Panels

UAF CTC Parking Garage, Project No. 2012052 CTCGE

Fairbanks, Alaska

Construction Cost Estimate

Draft Investigative Report Submittal

July 9, 2012

ESTIMATIONS

1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:

USKH, Inc.
544 4th Avenue, Suite 102
Fairbanks, AK 99701
907.452.2128

ITEM 3 - Aesthetic and Security Improvements Related to Removing Panels

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Description	Estimated Cost	Estimated Cost Plus Contingency & Escalation	Div.
Basic Bid			
01 - GENERAL REQUIREMENTS	$321,682	$386,018	1
02 - SITEWORK	$59,088	$70,906	13
05 - METALS	$833,018	$999,622	14
09 - FINISHES	$40,659	$48,791	15
16 - ELECTRICAL	$113,853	$136,624	16
Total Estimated Cost - Basic Bid:	**$1,368,300**	**$1,641,960**	**<<<<<**

Estimating Contingency: 20.0%

ITEM 3 - Aesthetic and Security Improvements Related to Removing Panels
UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate
Draft Investigative Report Submittal
July 9, 2012

Documents

Investigative Report, Dated June 2012

Notes and Assumptions

1 Based on current construction costs.
2 Labor rates based on Davis Bacon, 50 hours/week.
3 Assumes open competitive bid procurement.
4 Local contractor.

ITEM 3 - Aesthetic and Security Improvements Related to Removing Panels

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
1	**01 - GENERAL REQUIREMENTS**										
2											
3	**Project Management**	1	LS	$164,200.00	$164,200					$164,200	$164,200
4											
6											
7											
8	**General Contractor Overhead**	5%									$60,541
9	**General Contractor Profit (Fee)**	5%									$63,568
10	**General Contractor Bond & Insurance**	2.5%									$33,373
11											
12	**Subtotal: 01 - GENERAL REQUIREMENTS**				$164,200					$164,200	**$321,682**
13	Average Unit Price for this division is: $3.66 per SF based on 87,942 SF										
14											
15											
16	**02 - SITEWORK**										
17											
18	Remove Insulated Metal Panels	18,684	SF			0.040	747.4	$59,088		$59,088	$59,088
19											
20											
21											
22	**Subtotal: 02 - SITEWORK**						747.4	$59,088		$59,088	**$59,088**
23	Average Unit Price for this division is: $0.67 per SF based on 87,942 SF										
24											
25											
26	**05 - METALS**										
27											
28	Perforated Metal Panel/Grille System	18,684	SF	$30.00	$560,520	0.093	1,737.6	$127,815		$688,335	$757,169
29	Girts	5,376	LF	$3.50	$18,816	0.100	537.6	$39,545		$58,361	$64,197
30	Repair Vehicle Entry Canopy Soffit	576	SF	$10.00	$5,760	0.114	65.7	$4,833		$10,593	$11,652
31											
33											
34											
35	**Subtotal: 05 - METALS**				$585,096		2,340.9	$172,193		$757,289	**$833,018**
36	Average Unit Price for this division is: $9.47 per SF based on 87,942 SF										
37											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
38											
39	**09 - FINISHES**										
40											
41	Prep Concrete & Paint	4,480	SF								
42	Light Sandblasting	4,480	SF	$0.25	$1,120	0.036	161.3	$11,865		$12,985	$14,284
43	Paint	4,480	SF	$0.25	$1,120	0.024	107.5	$7,908		$9,028	$9,931
44	Prep and Paint Insulated Metal Panels	5,848	SF								
45	Power Wash	5,848	SF	$0.10	$585	0.009	52.6	$3,869		$4,454	$4,899
46	Paint	5,848	SF	$0.25	$1,462	0.021	122.8	$9,033		$10,495	$11,545
47											
48											
49											
50											
51											
52											
53											
54	**Subtotal: 09 - FINISHES**				$4,287		444.2	$32,675		$36,962	**$40,659**
55	Average Unit Price for this division is: $0.46 per SF based on 87,942 SF										
56											
57											
58	**16 - ELECTRICAL**										
59											
60	Headend Equipment	1	LS	$25,000.00	$25,000	40.000	40.0	$3,352		$28,352	$38,275
61	Cabmeta	16	EA	$1,500.00	$24,000	8.000	128.0	$10,727		$34,727	$46,881
62	Cabling	2,400	LF	$1.65	$3,960	0.086	206.4	$17,297		$21,257	$28,697
63											
64											
65											
68											
69											
70											
71											
72	**Subtotal: 16 - ELECTRICAL**				$52,960		374.4	$31,376		$84,336	**$113,853**
73	Average Unit Price for this division is: $1.29 per SF based on 87,942 SF										
74											

ITEM 4 PAINTING AND/OR INTERIOR LIGHTING RECOMMENDATIONS

4.1 Foreword

On the interior parking deck levels, existing finishes consist of the original exposed concrete slabs, columns, beams and deck, existing unpainted galvanized steel ductwork, brightly painted hollow metal doors and frames, interior factory finished white painted liners of the insulated metal wall panels, and painted steel girt framing. With the long history of leakage in the structure, these materials have suffered years of water damage, corrosion, and laitance, as well as staining from airborne contaminants, leading to an overall dark and dreary appearance, which is extenuated by the gloomy yellow cast of the existing high pressure sodium (HPS) lighting fixtures, as shown in Figure 13.

Item 4 examines options for refurbishment and improvement of architectural elements, as well as improvements in interior lighting, which together may be employed to achieve the following goals:

- Extend the life of corroded and degraded materials.
- Provide cleaning of and restoration at water damaged areas.
- Create brighter and more reflective interior finishes, particularly at the ceiling and upper walls to more effectively reflect and distribute light.
- Create an overall more aesthetic and brighter interior appearance.
- Revise the highly dated 1970s colors used at the few areas that are painted.
- Provide interior lighting that is more energy efficient and of a more natural, aesthetic color.

Figure 13: Typical Existing Interior Level Finish Appearance

4.2 Architectural

Architecturally, extensive cleaning and preparation of surfaces to receive new paint finish systems will be required throughout the facility. Preparation and finish system of each surface should be based on the recommendations of the Master Painter Institute. Following are general preliminary recommendations for the types of substrates to be painted and repainted.

Table 1: Substrate Painting Schedule

Substrate	Existing Condition	MPI Recommended Preparation	MPI Recommended Finish Options
Vertical Concrete	Natural concrete with laitance and stains	Power wash and remove laitance; excessive areas will require acid etch	INT 3.1A: Latex gloss level 4 finish over alkali-resistant primer
Concrete Ceiling	Natural concrete with laitance and stains	Power wash and remove laitance; excessive areas will require acid etch	INT 3.1A: Latex gloss level 4 finish over alkali-resistant primer
Steel Girt Framing	Existing alkyd paint in poor condition, some rust	DSD-3 “severe” surface degradation: Remove paint, rust and scale and reprime	INT 5.1T: Alkyd gloss level 4 finish over surface tolerant primer
Hollow Steel Doors and Miscellaneous Metals	Existing alkyd paint, possibly lead containing, in poor condition	DSD-2 “moderate” surface degradation: Spot repair, prep and priming	RIN 5.1E: Alkyd gloss level 5 finish over spot primer
Metal Panel Interiors	Factory finish with stains and some deterioration	DSD-1 to DSD-3: Most areas require cleaning only; repaint only at spots that are damaged; remove rust stains with oxalic acid	RIN 5.1E: Alkyd gloss level to match existing panel finish at touch up areas, blend to nearest panel joint

Colors for the concrete and steel girt framing should be white or light colored, except lower vertical concrete areas subject to impact and marring may be painted with a darker wainscot.

Hollow metal doors and frames should be painted with a color to establish a new aesthetic theme and may tie into the palette of colors at the CTC Center across Barnette Street.

Interior metal panels are already a light color, and should be cleaned and painted where damaged to match existing panel color and sheen. Care should be taken to blend repair paint to the existing panels.

The University may want to consider using environmentally friendly paint systems, although the completed project will be fully ventilated via natural air openings around the perimeter, and indoor air quality is not a critical issue.

4.3 Electrical

4.3.1 Interior Parking Area LED Lighting Upgrade

Demolition

The existing interior pendant mounted high pressure sodium (HPS) lighting fixtures will be removed. The conductors serving these fixtures will be removed back to their serving panelboard. Both 277/480 volt panelboards 101 and 102 located in mechanical rooms 200U1 and 200U2 that proved power for the high pressure sodium light fixtures are at the end of their useful life and will be removed.

Lighting

Energy efficient LED type fixtures will be utilized to replace the current HPS lighting fixtures. The new LED fixtures will be installed at the same locations as the current fixtures to utilize the existing concrete encased conduit system. The new LED fixtures will include built in motion and photocell sensors for increased energy efficiency. A lighting control contactor will be provided so the lights can be turned off completely when the building is not utilized such as nights and weekends.

Distribution System

Two new 225 amp, 277/480 volt, 3-phase, 4-wire, 42 circuit panelboards, 101 and 102, will be installed to service the new LED lighting circuits. These panelboards will be located in approximately the same location as the current panelboards. Panelboard 101 is located in mechanical room 200U1 and panelboard 102 is located in mechanical room 200U2. New LED light fixtures will be provided with new conductors from the device all the way back to the new panelboard.

4.3.2 Rooftop Parking LED Lighting Upgrades

Demolition

The existing outdoor high pressure sodium (HPS) light fixtures will be removed from the exterior walls and penthouses in the roof top parking area. The three pole mounted HPS light fixtures with their poles, located in the roof top parking area, will be removed. The conduit, panelboard and conductors serving these fixtures will be removed.

Lighting

Energy efficient LED type fixtures will be utilized to replace the current HPS lighting fixtures. The new fixtures will be placed on the underside of deck on the newly installed roof. The new LED fixtures will include built in motion and photocell sensors for increased energy efficiency. New emergency light fixtures will be installed at the entrance to the three emergency exit doors. New LED exit signs will be installed at the entrance to each of the emergency exit doors. These emergency lights and exit signs will be wired to the generator backed up electrical panel.

Distribution System

All non-emergency new roof top LED light fixtures will be connected with new conductor routed, as much as practical, in the existing conduit system to the new panelboards in mechanical rooms 200U1 and 200U2.

Appendix A -
PRODUCT DATA

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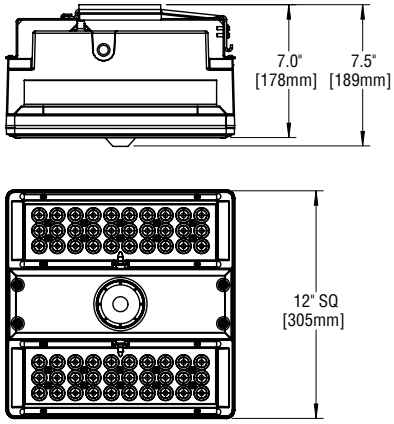
PKG-304-5M-PD 304 Series LED Parking Structure – Type V Medium

Rev. Date: 2/2/12

BetaLED Catalog #: PKG - 304 - 5M - PD - - D - - - - -



Notes:

Product	Family	Optic	Mounting	# of LEDs (x 10)	LED Series	Voltage	Color Options	Drive Current	Factory-Installed Options
PKG	304	5M[1]	PD[2]	☐ 04 ☐ 06	D	☐ UL Universal 120–277V ☐ UH Universal 347–480V	☐ SV Silver ☐ BZ Bronze ☐ BK Black ☐ WH White ☐ PB Platinum Bronze	☐ 700 700mA (Standard) ☐ 525 525mA ☐ 350 350mA	☐ 40K 4000K Color Temperature[3] ☐ DIM 0–10V Dimming[4–6] ☐ F Fuse[7,8] ☐ ML 75/525mA Multi-Level Option[9]

Please type additional options in manually on the lines provided above.

Footnotes

1. IESNA Type V Medium distribution
2. Pendant mount
3. Color temperature per fixture; 5700K standard; minimum 70 CRI
4. Control by others
5. Can't exceed specified drive current
6. Refer to dimming spec sheet for availability and additional information
7. When code dictates fusing use time delay fuse
8. Not available with all multi-level options. Refer to 304 series multi-level spec sheet for availability and additional information
9. Refer to 304 series multi-level spec sheet for availability and additional information

LED PERFORMANCE SPECS

# of LEDs	Initial Delivered Lumens – Type V Medium @ 5700K	B	U	G	Initial Delivered Lumens – Type V Medium @ 4000K	B	U	G	System Watts 120–480V	Total Current @ 120V	Total Current @ 208V	Total Current @ 240V	Total Current @ 277V	Total Current @ 347V	Total Current @ 480V	L_{70} Hours* @ 25° C (77° F)	50K Hours Lumen Maintenance Factor @ 15° C (59° F)
		Rating**				Rating**											
350mA Fixture Operating at 25° C (77° F)																	
40	4,113 (04)	3	0	1	3,791 (04)	2	0	1	47	0.39	0.24	0.21	0.19	0.15	0.11	>150,000	94%
60	6,126 (06)	3	0	2	5,646 (06)	3	0	2	68	0.59	0.35	0.30	0.27	0.20	0.15	>150,000	
525mA Fixture Operating at 25° C (77° F)																	
40	5,758 (04)	3	0	2	5,307 (04)	3	0	2	68	0.58	0.34	0.30	0.27	0.21	0.16	148,000	93%
60	8,576 (06)	3	0	2	7,904 (06)	3	0	2	105	0.91	0.53	0.46	0.40	0.33	0.22	144,000	
700mA (Standard) Fixture Operating at 25° C (77° F)																	
40	6,992 (04)	3	0	2	6,444 (04)	3	0	2	94	0.81	0.47	0.41	0.36	0.28	0.20	128,000	91%
60	10,414 (06)	4	0	2	9,598 (06)	3	0	2	141	1.26	0.72	0.59	0.54	0.39	0.28	122,000	

* For recommended lumen depreciation data see TD-13

** For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit www.iesna.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf

9201 Washington Ave • Racine, WI 53406-3772 • 800-236-6800 • www.BetaLED.com

Made in the U.S.A. of U.S. and imported parts.
Meets Buy American requirements within the ARRA.

PKG-304-5M-PD 304 Series LED Parking Structure – Type V Medium

Rev. Date: 2/2/12

General Description

Slim, low profile design. Fixture is constructed from rugged die-cast and extruded aluminum components. LED driver is mounted in a sealed weather-tight center chamber that allows for access from below the fixture. High performance aluminum heatsinks specifically designed for LED parking structure application. Pendant mount includes 36" cord out of fixture and is intended to be mounted by 3/4 IP pendant (by others). Five year limited warranty on fixture.

Electrical

Modular design accommodates varied lighting output from high power, white, 5700K (+/- 500K per full fixture), minimum 70 CRI, long life LED sources. Optional 4000K (+/-300K per full fixture) also available. 120–277V 50/60 Hz, Class 1 LED drivers are standard. LED drivers have power factor >90% and THD <20% of full load. Units provided with integral 10kV surge suppression protection standard. Surge protection tested in accordance with IEEE C62.41.2 and ANSI standard 62.41.2.

Testing & Compliance

UL listed in the US and in Canada for wet locations. Enclosure classified IP66 per IEC 529 when ordered without the ML options. Consult factory for CE Certified products. Dark Sky Friendly. IDA Approved. RoHS Compliant.

Finish

Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable silver powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Bronze, black, white and platinum bronze powder topcoats are also available. The finish is covered by our 10 year limited warranty.

Fixture and finish are endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117.

Patents

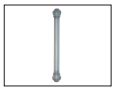
U.S. and international patents granted and pending. BetaLED is a division of Ruud Lighting, Inc. For a listing of Ruud Lighting, Inc. patents, visit www.uspto.gov.

Field-Installed Accessories

Leveler
☐ XA-PNDTLVL
For 0–13° sloped ceilings

12" (305mm) Pendant Kit
☐ XA-PS12KIT
Pendant height from ceiling surface to bottom fixture; mounting accessory or surface boxes will add overall height.

18" (457mm) Pendant Kit
☐ XA-PS18KIT
Pendant height from ceiling surface to bottom fixture; mounting accessory or surface boxes will add overall height.

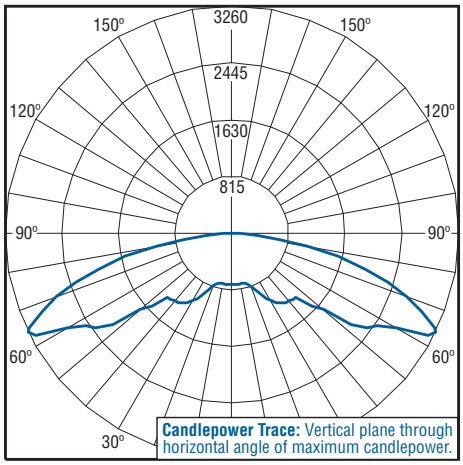


22" (559mm) Pendant Kit
☐ XA-PS22KIT
Pendant height from ceiling surface to bottom fixture; mounting accessory or surface boxes will add overall height.

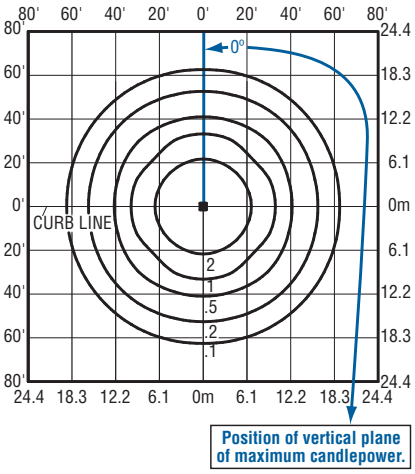
Pendant Fitting
☐ XA-PSFTG

Bird Guard
☐ XA-XCPBRDGRD

Photometrics



Independent Testing Laboratories certified test. Report No. ITL66638. Candlepower trace of 6000K, 60 LED Type V Medium luminaire with 10,893 initial delivered lumens operating at 700mA. **All published luminaire photometric testing performed to IESNA LM-79-08 standards.**



Isofootcandle plot of 5700K, 60 LED Type V Medium 304 series parking structure luminaire at 15' A.F.G. Luminaire with 10,414 initial delivered lumens operating at 700mA. Initial FC at grade.

9201 Washington Ave • Racine, WI 53406-3772 • 800-236-6800 • www.BetaLED.com

Made in the U.S.A. of U.S. and imported parts.
Meets Buy American requirements within the ARRA.

Appendix B -
COST ESTIMATE

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ITEM 4 - Painting and/or Interior Lighting Recommendations

UAF CTC Parking Garage, Project No. 2012052 CTCGE

Fairbanks, Alaska

Construction Cost Estimate

Draft Investigative Report Submittal

July 9, 2012

ESTIMATIONS

1225 E. International Airport Road, Suite 205

Anchorage, Alaska 99518

907.561.0790

Prepared for:

USKH, Inc.

544 4th Avenue, Suite 102

Fairbanks, AK 99701

907.452.2128

ITEM 4 - Painting and/or Interior Lighting Recommendations

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Description	Estimated Cost	Estimated Cost Plus Contingency & Escalation	Div.
01 - GENERAL REQUIREMENTS	$297,876	$357,451	1
09 - FINISHES	$657,573	$789,088	9
16 - ELECTRICAL	$500,102	$600,122	16
Total Estimated Cost - Basic Bid:	**$1,455,551**	**$1,746,661**	**<<<<<**

Estimating Contingency: 20.0%

ITEM 4 - Painting and/or Interior Lighting Recommendations
UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate
Draft Investigative Report Submittal
July 9, 2012

Documents

Investigative Report, Dated June 2012

Notes and Assumptions

1 Based on current construction costs.
2 Labor rates based on Davis Bacon, 50 hours/week.
3 Assumes open competitive bid procurement.
4 Local contractor.

ITEM 4 - Painting and/or Interior Lighting Recommendations

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
1	**01 - GENERAL REQUIREMENTS**										
2											
3	**Project Management**										
4	Project Manager, 16 Hour/Week	19	WEEKS			16.000	304.0	$29,640		$29,640	$29,640
5	Supervisor, 50 Hour/Week	17	WEEKS			50.000	850.0	$69,020		$69,020	$69,020
6	Time Keeper/Cost Control, 8 Hour/Week	17	WEEKS			8.000	136.0	$3,155		$3,155	$3,155
7	**Small Tools & Consumables**										
8	Consumables	1	LS	$900.00	$900					$900	$900
9	Small Tools	1	LS	$2,910.00	$2,910					$2,910	$2,910
10	**Mobilization**										
11	Mobilization/Demob - Allow	1	LS	$1,500.00	$1,500	40.000	40.0	$3,155		$4,655	$4,655
12	**Equipment**										
13	Pickup (2 Ea)	17	WEEKS						$6,375	$6,375	$6,375
14	**Other Requirements**										
15	Project Meetings	16	EA			4.000	64.0	$2,598		$2,598	$2,598
16	Project Schedule	4	MTHS	$500.00	$2,000					$2,000	$2,000
17	**Temporary Facilities**										
18	Project Office Trailer	4	MTHS						$2,800	$2,800	$2,800
19	Office Equipment/Supplies	4	MTHS	$500.00	$2,000					$2,000	$2,000
20	Project Tool Sheds	4	MTHS						$800	$800	$800
21	Project Safety Equipment	1	LS	$1,460.00	$1,460					$1,460	$1,460
22	Chemical Toilets	4	MTHS	$250.00	$1,000					$1,000	$1,000
24	Cleaning	112	MSF	$2.00	$224	1.143	128.0	$10,097	$224	$10,545	$10,545
25	Traffic Control - Flagmen	1	LS	$25,000.00	$25,000					$25,000	$25,000
26	Record Documents	1	LS	$6,000.00	$6,000					$6,000	$6,000
27	Operations and Maintenance Manuals	1	LS	$2,500.00	$2,500					$2,500	$2,500
28	Contract Closeout and Training	1	LS	$2,500.00	$2,500					$2,500	$2,500
29	Certified Payroll Fee	1	LS	$5,000.00	$5,000					$5,000	$5,000
31	**General Contractor Overhead**	3%									$40,156
32	**General Contractor Profit (Fee)**	3%									$41,361
33	**General Contractor Bond & Insurance**	2.5%									$35,501
34											
35	**Subtotal: 01 - GENERAL REQUIREMENTS**				$52,994		1,522.0	$117,665	$10,199	$180,858	**$297,876**
36											
37											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
38											
39	**09 - FINISHES**										
40											
41	**09910 Painting**										
42	**Clean and Prep**										
43	Vertical Concrete	71,320	SF			0.013	927.2	$73,138		$73,138	$73,138
44	Concrete Ceilings	112,410	SF			0.013	1,461.3	$115,267		$115,267	$115,267
45	Steel Girts	8,244	LF			0.036	296.8	$23,412		$23,412	$23,412
46	HM Doors & Misc Metal	40	EA			0.025	1.0	$79		$79	$79
47	Panel Interior Surface	21,984	SF			0.008	175.9	$13,875		$13,875	$13,875
48											
49	**Paint**										
50	Vertical Concrete	71,320	SF	$0.25	$17,830	0.020	1,426.4	$112,514		$130,344	$130,344
51	Concrete Ceilings	112,410	SF	$0.25	$28,103	0.024	2,697.8	$212,802		$240,905	$240,905
52	Steel Girts	8,244	LF	$0.20	$1,649	0.040	329.8	$26,015		$27,664	$27,664
53	HM Doors & Misc Metal	40	EA	$15.00	$600	1.000	40.0	$3,155		$3,755	$3,755
54	Panel Interior Surface - Assume 25% Of Surface	5,496	SF	$0.20	$1,099	0.021	115.4	$9,103		$10,202	$10,202
55											
56	**Masking and Covering**	1	LS			120.000	120.0	$9,466		$9,466	$9,466
57											
58	**Cleanup**	1	LS			120.000	120.0	$9,466		$9,466	$9,466
59											
60											
61											
62											
63											
64											
67											
68											
69											
70											
71	**Subtotal: 09 - FINISHES**				$49,281		7,711.6	$608,292		$657,573	**$657,573**
72											
73											

ITEM 4 - Painting and/or Interior Lighting Recommendations

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
74											
75	**16 - ELECTRICAL**										
76											
77	**16010 Basic Electrical Requirements**										
78	Field Engineering: Submittals, Shop & Record										
79	Dwgs, Operating Instructions, O&M Manuals	40	HRS	$5.00	$200	1.000	40.0	$1,624		$1,824	$1,824
80	Permits, Tests, Inspections	1	LS	$100.00	$100	40.000	40.0	$3,155		$3,255	$3,255
81	Supervision	5	WEEKS			20.000	100.0	$8,120	$313	$8,433	$8,433
82	Materials Control	5	WEEKS			20.000	100.0	$2,320	$344	$2,664	$2,664
83	Bond and Insurance	1	LS	$5,000.00	$5,000					$5,000	$5,000
84	Small Tools	1	LS						$3,600	$3,600	$3,600
85	Equipment	1	LS						$5,400	$5,400	$5,400
86											
87	**16055 Electrical Demolition**										
88	Demo Pole Mtd HID	3	EA			1.000	3.0	$251		$251	$314
	Demo Roof HID Fixtures	10	EA			1.000	10.0	$838		$838	$1,048
89	Demo Light Fixture HID	149	EA			0.750	111.8	$9,369		$9,369	$11,711
90	Demo Light Fixture Fluorescent	24	EA			4.000	96.0	$8,045	$3,000	$11,045	$13,806
91	Demo Wiring	30,715	LF			0.004	122.9	$10,300		$10,300	$12,875
92	Demo Panelboards	2	EA			4.000	8.0	$670		$670	$838
94	**16111 Conduit and Fittings**										
95	1" RGS For Top Floor Under New Roof	5,760	LF	$4.25	$24,480	0.123	708.5	$59,376		$83,856	$104,820
96	**16120 Wire and Cable**										
97	XHHW #10	30,715	LF	$0.50	$15,357	0.010	307.1	$25,737		$41,094	$51,368
98	**16442 Panelboards**										
99	Panelboards, 277/480V, 3 Phase, 4 Wire, 225A, MLO, 42 Circuit, W/ Breakers	2	EA	$2,800.00	$5,600	10.000	20.0	$1,676		$7,276	$9,095
101	**16521 Exterior Lighting**										
103	LED Garage Fixtures	221	EA	$724.00	$160,004	2.500	552.5	$46,302		$206,306	$257,883
104	Exit Sign, LED	9	EA	$156.00	$1,342	1.000	8.6	$721		$2,063	$2,579
105	Emergency Lights	9	EA	$250.00	$2,150	1.000	8.6	$721		$2,871	$3,589
106											
107	**Subtotal: 16 - ELECTRICAL**				$214,233		2,237.0	$179,225	$12,656	$406,114	**$500,102**
108											
109											

ITEM 5 DETERMINE IF LOWER LEVEL UTILITY PATHWAY CAN BE REMOVED

5.1 Structural

Visual observation of the concrete masonry telecom duct, as well as review of as built information, found that the telecom duct walls were built on the building slab on grade. The existing slab will be saw cut and removed, approximately 24 inches in width as required per electrical, to install the new telecom conduit. The new slab will be dowelled to existing and cast flush with the existing slab encasing the conduit.

5.2 Mechanical

Field observation concludes that there are no mechanical systems in the utility pathway that USKH was able to discover. According to all sources, we were able to find that the utility pathway only contains the electrical comm lines that can be relocated as further described below.

5.3 Electrical

Telecom Duct Removal

The current set of two telecom ducts that are encased in a concrete wall and run East to West through the middle of the basement of the parking garage will be removed. The concrete wall will also be removed from the basement mechanical room. Removal of this wall will allow vehicular traffic to drive through the basement area without having to turn around. Removal of this wall will also allow for the removal of the extra exit door located north east wall of the basement level that goes directly outdoors.

Craig Amburg of Alaska Communication Systems (ACS), contact telephone number (907) 459-6476, has stated that ACS will allow UAF to remove the existing telecom duct. ACS has stated that a new small conduit will need to be installed in approximately the same location as the existing telecom duct to provide telecom service to the parking garage. It will probably be best to install this conduit underground since ACS asked that large radius turns be used for the conduit. ACS has also stated that there will be a small cost of under $10,000 for them to rewire connections for the parking garage in an underground vault located East of the parking garage. After removal of the telecom duct ACS will need some space in the basement mechanical room to re-install the telecom service cabling for the parking garage. The back of the current telecom plywood boards will work for this requirement after the concrete wall in the mechanical room has been removed.

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Appendix A -
COST ESTIMATE

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University of Alaska Fairbanks

CTC Parking Garage Item 5 - Removal of Utility Path

Project No. 2012052 CTCGE

Budgetary Cost Estimate

Date: July 10, 2012

USKH
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701

USKH WO#: 1218306

Building Area 75 LF

Line	Description	Total	Cost/SF
1	Division 1 - General Requirements	$6,350.00	$84.67
2	Division 2 - Sitework	$0.00	$0.00
3	Division 3 - Concrete	$18,000.00	$240.00
4	Division 4 - Masonry	$0.00	$0.00
5	Division 5 - Metals	$0.00	$0.00
6	Division 6 - Wood and Plastics	$0.00	$0.00
7	Division 7 - Thermal & Moisture Protection	$0.00	$0.00
8	Division 8 - Doors and Windows	$0.00	$0.00
9	Division 9 - Finishes	$0.00	$0.00
10	Division 10 - Specialties	$0.00	$0.00
11	Division 11 - Equipment	$0.00	$0.00
12	Division 12 - Furnishings	$0.00	$0.00
13	Division 13 - Special Construction	$0.00	$0.00
14	Division 14 - Conveying Systems	$0.00	$0.00
15	Division 15 - Mechanical	$0.00	$0.00
16	Division 16 - Electrical	$5,500.00	$73.33
17	Subtotal Divisions 1 - 16	$29,850.00	$398.00
18	Overhead & Profit @ 15%	$4,477.50	
19	Subtotal	$34,327.50	
20	Estimating Contingency @ 20%	$6,865.50	
21	Total Divisions 1 - 16 Construction Cost	$41,193.00	$549.24
	Total Project Cost	$41,193.00	

Notes

University of Alaska Fairbanks

CTC Parking Garage Item 5 - Removal of Utility Path
Project No. 2012052 CTCGE

USKH
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701

Budgetary Cost Estimate USKH WO#: 1218306
Date: July 10, 2012 Building Area 75 LF

Line	Description	Quantity	Unit	Rate	Total	Notes
1	**Division 1 - General Requirements**					
2	Mob/Demob, General	1.0	Allowance	$700.00	$700.00	
3	Submittals/O&M Manuals/As-builts	1.0	Allowance	$700.00	$700.00	
4	Enclosures and barricades	1.0	Allowance	$250.00	$250.00	
5	Vehicles and Equipment	1.0	Months	$700.00	$700.00	
6	Temporary Controls	1.0	Months	$700.00	$700.00	
7	Superintendent	1.0	Months	$700.00	$700.00	
8	Project Layout	8.0	Hours	$150.00	$1,200.00	
9	Testing and QC	1.0	Allowance	$700.00	$700.00	
10	Instructions to Owner	1.0	Allowance	$700.00	$700.00	
11	Division 1 Total				$6,350.00	$84.67
12	**Division 2 - Sitework**					
13	Not used					
14	Division 2 Total				$0.00	$0.00
15	**Division 3 - Concrete**					
16	Demo Existing CMU Wall	1.0	Allowance	$11,000.00	$11,000.00	
17	Demo Existing Slab	1.0	Allowance	$3,000.00	$3,000.00	
18	Excavation & Backfill	1.0	Allowance	$1,000.00	$1,000.00	
19	New Slab	1.0	Allowance	$3,000.00	$3,000.00	
20	Miscellaneous	1.0	Allowance	$0.00	$0.00	
21	Division 3 Total				$18,000.00	$240.00
22	**Division 4 - Masonry**					
23	Not used					
24	Division 4 Total				$0.00	$0.00
25	**Division 5 - Metals**					
26	Not used					
27	Division 5 Total				$0.00	$0.00
28	**Division 6 - Wood and Plastics**					
29	Not used					
30	Division 6 Total				$0.00	$0.00
31	**Division 7 - Thermal & Moisture Protection**					
32	Not used					
33	Division 7 Total				$0.00	$0.00
34	**Division 8 - Doors and Windows**					
35	Not used					
36	Division 8 Total				$0.00	$0.00
37	**Division 9 - Finishes**					
38	Not used					
39	Division 9 Total				$0.00	$0.00
40	**Division 10 - Specialties**					
41	Not used					
42	Division 10 Total				$0.00	$0.00
43	**Division 11 - Equipment**					
44	Not used					
45	Division 11 Total				$0.00	$0.00
46	**Division 12 - Furnishings**					
47	Not used					
48	Division 12 Total				$0.00	$0.00

University of Alaska Fairbanks

CTC Parking Garage Item 5 - Removal of Utility Path
Project No. 2012052 CTCGE

USKH
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701

Budgetary Cost Estimate USKH WO#: 1218306
Date: July 10, 2012 Building Area 75 LF

Line	Description	Quantity	Unit	Rate	Total	Notes
49	**Division 13 - Special Construction**					
50	Not used					
51	Division 13 Total				$0.00	$0.00
52	**Division 14 - Conveying Systems**					
53	Not used					
54	Division 14 Total				$0.00	$0.00
55	**Division 15 - Mechanical**					
56	Not used				$0.00	
57	Division 15 Total				$0.00	$0.00
58	**Division 16 - Electrical**					
59	New Telecom Conduit	1.0	Allowance	$500.00	$500.00	
60	Rewire by Alaska Communications	1.0	Allowance	$5,000.00	$5,000.00	
61	Not used				$0.00	
62	Division 16 Total				$5,500.00	$73.33
63	Subtotal Divisions 1 - 16				$29,850.00	$398.00
64	Overhead, & Profit @ 15%				$4,477.50	
65	Subtotal				$34,327.50	
66	Estimating Contingency @ 20%				$6,865.50	
67	Total Divisions 1 - 16				$41,193.00	$549.24

Notes

1 Cost includes fabrication, freight, delivery, and installation.

ITEM 6 CONDUCT A SOLAR POWER STUDY

6.1 Structural

For structural consideration, the solar array was assumed to add approximately 15 psf of addition load to the roof . Using this assumption it was found that the roof structure would require approximately 40,000 pounds of additional steel with impact cost of $80,000 to support the additional load. This assumption took into account a ballasted solar array over the entire length of the roof.

6.2 Electrical

Solar Panel Installation

The proposed solar array will be roof mounted. The array will be mounted indirectly to the roof and held in place with ballasts. With a ballasted solar array the roof structure would be sized for the added load and the need for roof penetration for the solar array structural supports would be eliminated.

The size and orientation of the roof will support a photovoltaic system of up to 126 kilowatts. The bottom of the solar array would be nearly flush with the top of the parapet and then rise at a 50 degree angle. The estimate to install roof mounted, ballasted, 126 kW photovoltaic system is $819,000.00 which is $6.50 per watt. This estimate includes the cost of the solar panels, their mounting hardware, UL 1741 listed grid tie inverters, electrical connection equipment, and the labor to install the photovoltaic system. A solar array of this size would produce 119,870 kWh of energy per year. The simple payback on this system is about 20 years depending on the future cost of electricity.

Distribution System

A 480/277 volt 3-phase inverter would be used to connect the solar panels to the main distribution panel located in the roof top parking area. The inverter will be a commercial grade UL1741 listed lineman safe grid tie inverter rated for outdoor use.

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Appendix A - DRAWINGS

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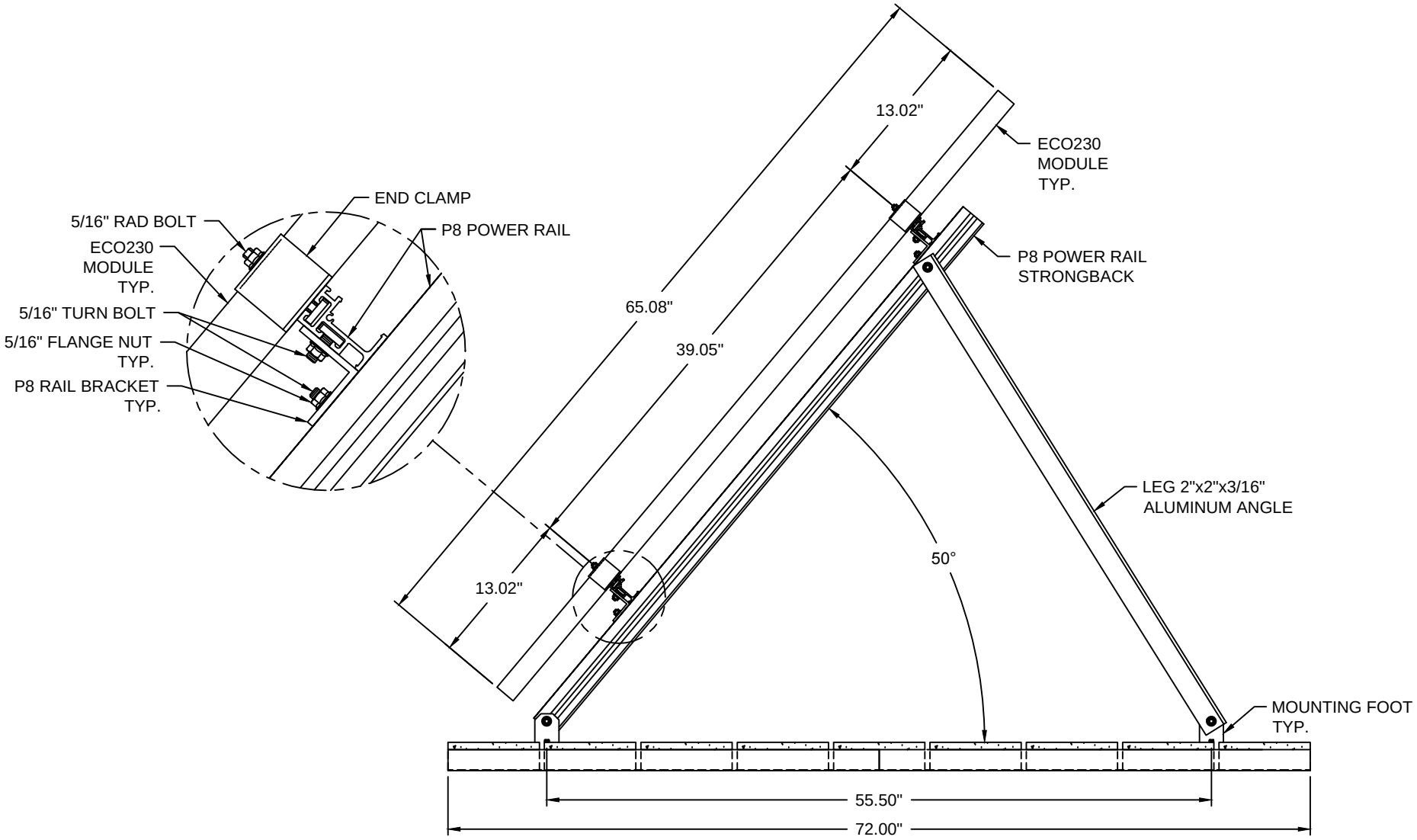


SIDE VIEW

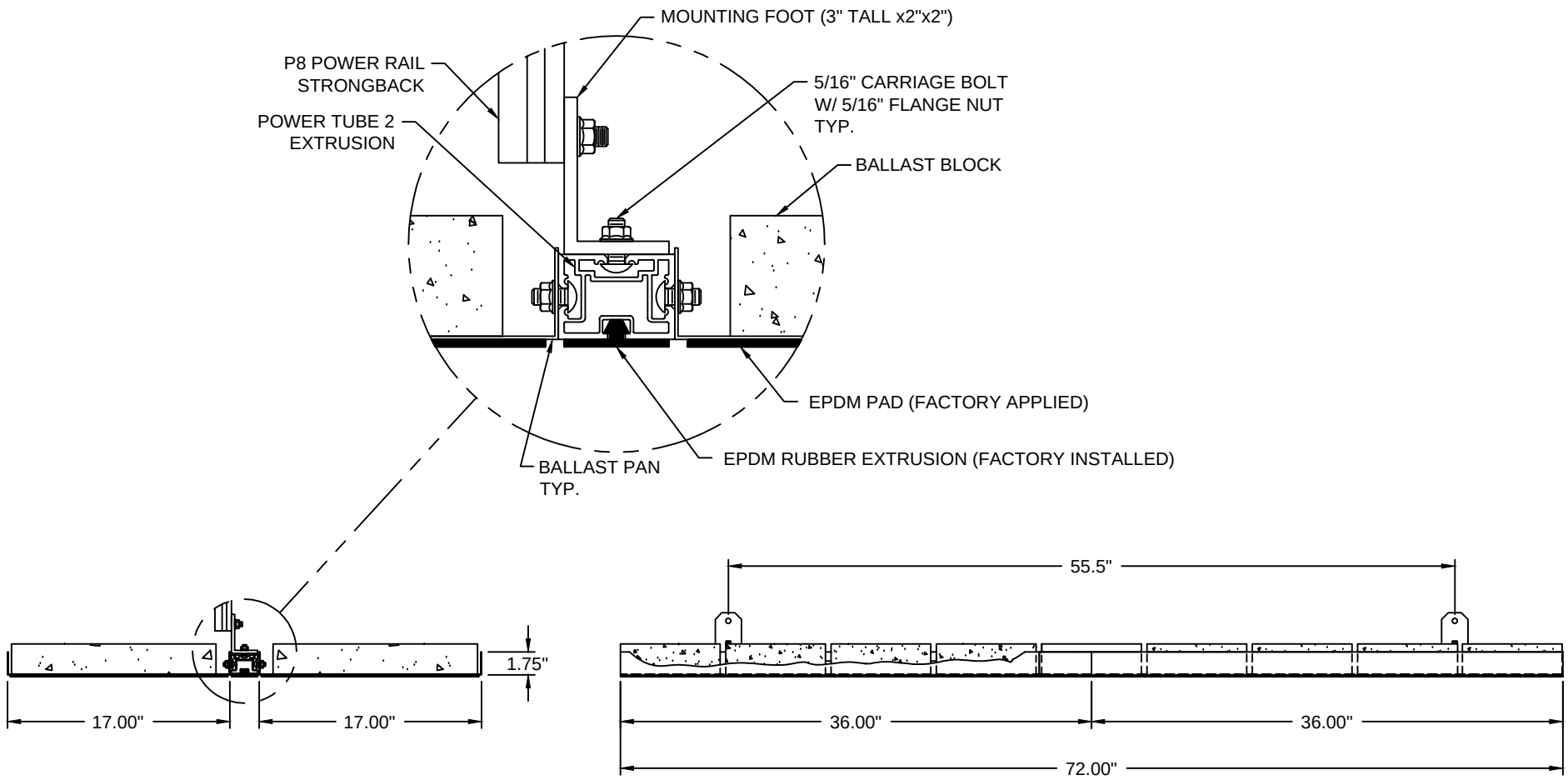
DESIGNED AND WARRANTED TO WITHSTAND __ MPH WINDS
AT ENCLOSURE _, WHEN EACH BALLAST TRAY IS FILLED WITH
CAP BLOCKS WEIGHING __ LBS. EACH

DPW SOLAR

DIRECT POWER AND WATER
4000 VASSAR DRIVE NE
ALBUQUERQUE, NEW MEXICO 87107

TITLE: (19) BRM14/15-ECO230-OP-50°

CUSTOMER: USKH	DRAWN BY: ACRG	DATE: 6-19-12
	ENGINEER: TY	SHEET: 1
PROJECT: UAF PARKING GARAGE		



FRONT VIEW

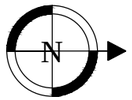
SIDE VIEW

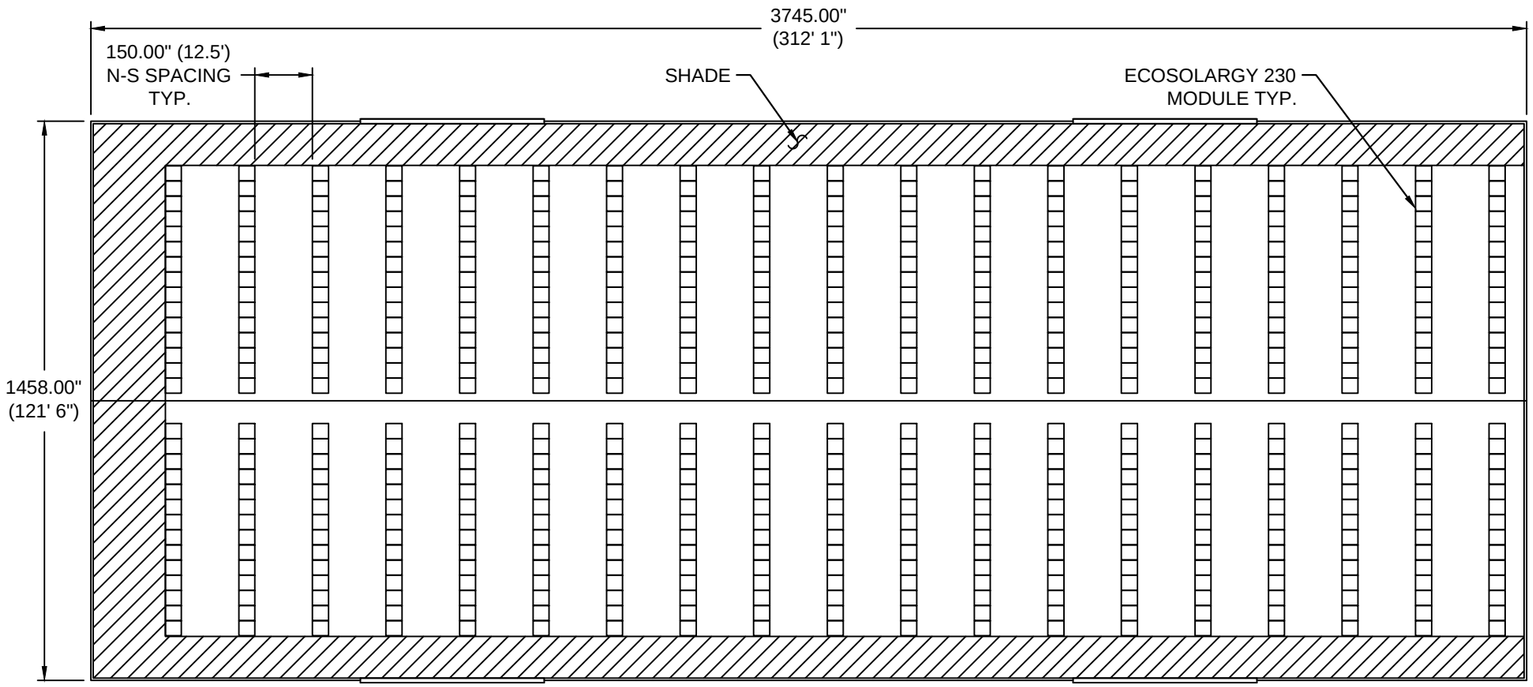
DPW SOLAR

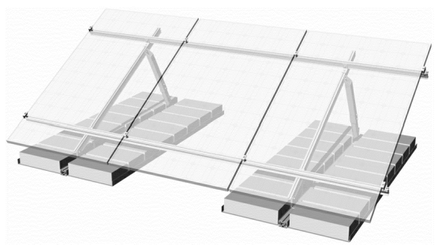
DIRECT POWER AND WATER
4000 VASSAR DRIVE NE
ALBUQUERQUE, NEW MEXICO 87107

TITLE: (19) BRM14/15-ECO230-OP-50°

CUSTOMER: USKH	DRAWN BY: ACRG	DATE: 6-19-12
	ENGINEER: TY	SHEET: 3
PROJECT: UAF PARKING GARAGE		







P8 POWER RAIL - BALLASTED RAIL MOUNT

(589)
ECOSOLARGY
230 WATT
MODULES

GENERAL INFORMATION AND SYSTEM DETAILS

SYSTEM TYPE: DPW BRM
(BALLASTED ROOF MOUNT)
SYSTEM SIZE: 126.73KW
PANEL MANUFACTURER:
ECOSOLARGY - NEPTUNE SERIES
PANEL MODEL: TWES-(230)60P
TOTAL # OF MODULES: 551
MODULE TILT: 50°
AZIMUTH: ____
ROOF HEIGHT: ___

MODULE INFORMATION

MODULE SIZE: 65.08"x39.17"x1.77"
MODULE WEIGHT: 44.1LBS.
MODULE OUTPUT: 230 WATTS

REVISION:	

DPW | SOLAR
PREFORMED LINE PRODUCTS
POWER-FAB
Quality Hardware for the PV Industry

4000 VASSAR DRIVE NE
ALBUQUERQUE, NM 87107
1-(505)-889-3585

CUSTOMER:
USKH

PROJECT:
UAF PARKING
GARAGE - V2

DRAWN BY:	ENGINEER:
ACRG	TY
DATE: 6-11-12	SHEET: PV-101
SCALE: N.T.S.	

Appendix B -
COST ESTIMATE

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University of Alaska Fairbanks

CTC Parking Garage Item 6 - Solar Panel Study

Project No. 2012052 CTCGE

USKH

544 4th Avenue, Suite 102

Fairbanks, Alaska 99701

Budgetary Cost Estimate USKH WO#: 1218306

Date: July 10, 2012 Building Area 1 SF

Line	Description	Total	Cost/SF
1	Division 1 - General Requirements	$6,350.00	$6,350.00
2	Division 2 - Sitework	$0.00	$0.00
3	Division 3 - Concrete	$0.00	$0.00
4	Division 4 - Masonry	$0.00	$0.00
5	Division 5 - Metals	$80,000.00	$80,000.00
6	Division 6 - Wood and Plastics	$0.00	$0.00
7	Division 7 - Thermal & Moisture Protection	$0.00	$0.00
8	Division 8 - Doors and Windows	$0.00	$0.00
9	Division 9 - Finishes	$0.00	$0.00
10	Division 10 - Specialties	$0.00	$0.00
11	Division 11 - Equipment	$0.00	$0.00
12	Division 12 - Furnishings	$0.00	$0.00
13	Division 13 - Special Construction	$0.00	$0.00
14	Division 14 - Conveying Systems	$0.00	$0.00
15	Division 15 - Mechanical	$0.00	$0.00
16	Division 16 - Electrical	$819,000.00	$819,000.00
17	Subtotal Divisions 1 - 16	$905,350.00	$905,350.00
18	Overhead & Profit @ 15%	$135,802.50	
19	Subtotal	$1,041,152.50	
20	Estimating Contingency @ 20%	$208,230.50	
21	Total Divisions 1 - 16 Construction Cost	$1,249,383.00	$1,249,383.00
	Total Project Cost	$1,249,383.00	

Notes

University of Alaska Fairbanks

CTC Parking Garage Item 6 - Solar Panel Study
Project No. 2012052 CTCGE

USKH
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701

Budgetary Cost Estimate USKH WO#: 1218306
Date: July 10, 2012 Building Area 1 SF

Line	Description	Quantity	Unit	Rate	Total	Notes
1	**Division 1 - General Requirements**					
2	Mob/Demob, General	1.0	Allowance	$700.00	$700.00	
3	Submittals/O&M Manuals/As-builts	1.0	Allowance	$700.00	$700.00	
4	Enclosures and barricades	1.0	Allowance	$250.00	$250.00	
5	Vehicles and Equipment	1.0	Months	$700.00	$700.00	
6	Temporary Controls	1.0	Months	$700.00	$700.00	
7	Superintendent	1.0	Months	$700.00	$700.00	
8	Project Layout	8.0	Hours	$150.00	$1,200.00	
9	Testing and QC	1.0	Allowance	$700.00	$700.00	
10	Instructions to Owner	1.0	Allowance	$700.00	$700.00	
11	Division 1 Total				$6,350.00	$6,350.00
12	**Division 2 - Sitework**					
13	Not used					
14	Division 2 Total				$0.00	$0.00
15	**Division 3 - Concrete**					
16	Not used					
17	Division 3 Total				$0.00	$0.00
18	**Division 4 - Masonry**					
19	Not used					
20	Division 4 Total				$0.00	$0.00
21	**Division 5 - Metals**					
22	Steel Framing	40000.0	Pound	$2.00	$80,000.00	
23	Division 5 Total				$80,000.00	$80,000.00
24	**Division 6 - Wood and Plastics**					
25	Not used					
26	Division 6 Total				$0.00	$0.00
27	**Division 7 - Thermal & Moisture Protection**					
28	Not used					
29	Division 7 Total				$0.00	$0.00
30	**Division 8 - Doors and Windows**					
31	Not used					
32	Division 8 Total				$0.00	$0.00
33	**Division 9 - Finishes**					
34	Not used					
35	Division 9 Total				$0.00	$0.00
36	**Division 10 - Specialties**					
37	Not used					
38	Division 10 Total				$0.00	$0.00
39	**Division 11 - Equipment**					
40	Not used					
41	Division 11 Total				$0.00	$0.00
42	**Division 12 - Furnishings**					
43	Not used					
44	Division 12 Total				$0.00	$0.00
45	**Division 13 - Special Construction**					
46	Not used					
47	Division 13 Total				$0.00	$0.00

University of Alaska Fairbanks

CTC Parking Garage Item 6 - Solar Panel Study
Project No. 2012052 CTCGE

USKH
544 4th Avenue, Suite 102
Fairbanks, Alaska 99701

Budgetary Cost Estimate USKH WO#: 1218306
Date: July 10, 2012 Building Area 1 SF

Line	Description	Quantity	Unit	Rate	Total	Notes
48	**Division 14 - Conveying Systems**					
49	Not used					
50	Division 14 Total				$0.00	$0.00
51	**Division 15 - Mechanical**					
52	Not used				$0.00	
53	Division 15 Total				$0.00	$0.00
54	**Division 16 - Electrical**					
55	Solar Panel System	1.0	Allowance	$819,000.00	$819,000.00	
56	Division 16 Total				$819,000.00	$819,000.00
57	Subtotal Divisions 1 - 16				$905,350.00	$905,350.00
58	Overhead, & Profit @ 15%				$135,802.50	
59	Subtotal				$1,041,152.50	
60	Estimating Contingency @ 20%				$208,230.50	
61	Total Divisions 1 - 16				$1,249,383.00	$1,249,383.00

Notes

1 Cost includes fabrication, freight, delivery, and installation.

UAF Parking Garage Solar Power Study

126 KW DC Solar Array with 90% DC to AC Deration Factor

YEAR	Solar Panel Degradation	Energy Capture (kWh)	Electrical Rate Assumed 8% Inflation	Value of Energy Captured	Lifetime Total:
1	1.000	113400	$0.17	$19,278.00	$19,278.00
2	0.995	112833	$0.18	$20,716.14	$39,994.14
3	0.990	112269	$0.20	$22,261.56	$62,255.70
4	0.985	111707	$0.21	$23,922.28	$86,177.98
5	0.980	111149	$0.23	$25,706.88	$111,884.85
6	0.975	110593	$0.25	$27,624.61	$139,509.46
7	0.970	110040	$0.27	$29,685.41	$169,194.87
8	0.966	109490	$0.29	$31,899.94	$201,094.81
9	0.961	108943	$0.31	$34,279.67	$235,374.48
10	0.956	108398	$0.34	$36,836.94	$272,211.42
11	0.951	107856	$0.37	$39,584.97	$311,796.39
12	0.946	107317	$0.40	$42,538.01	$354,334.40
13	0.942	106780	$0.43	$45,711.35	$400,045.74
14	0.937	106246	$0.46	$49,121.41	$449,167.16
15	0.932	105715	$0.50	$52,785.87	$501,953.03
16	0.928	105186	$0.54	$56,723.70	$558,676.72
17	0.923	104660	$0.58	$60,955.28	$619,632.01
18	0.918	104137	$0.63	$65,502.55	$685,134.55
19	0.914	103616	$0.68	$70,389.04	$755,523.59
20	0.909	103098	$0.73	$75,640.06	$831,163.65

ITEM 7 CONCEPTUALIZE A SKY BRIDGE ACROSS BARNETTE STREET

The CTC Parking Garage is located directly across Barnette Street from the four-story UAF Community & Technical College (CTC) building. While there is a traffic light controlled intersection and crosswalk at the intersection of Barnette Street and 7th Avenue, parking garage users must first go south across 7th, then west across Barnette, and finally north across 7th to access the CTC Building. This is a circuitous route across a relatively busy street; both safety and convenience must be considered.

This Item investigates the potential alignment, design and cost of a sky bridge between the CTC Parking Garage and the CTC Building to allow safe and convenient pedestrian movement for CTC staff and students. Key design parameters include:

- A minimum of at least 13'-6" vertical clearance must be provided from the maximum road elevation (crown) below.
- Visibility both within the bridge enclosure and from the exterior into the bridge must provide safety and clear sightlines.
- Ideally, the bridge will be heated on the interior for user comfort and thermal stability. However, it can be designed for unheated use, and this analysis is based on an unheated bridge.
- The roof structure of the bridge must be designed to retain snow and drain snow melt and rain in a controlled manner and not shed onto road traffic.

7.1 Architectural

7.1.1 Bridge Configuration

In review of various possible configurations, it was determined that the optimal configuration provides a direct perpendicular alignment across Barnette Street from the third level of the CTC Parking Garage to the second floor of the stair tower of the CTC Building. This provides the minimal lengths of both travel distance and structural span. Including a reasonable allowance for depth of floor structure, this configuration will also allow approximately 16 feet of vertical clearance over Barnette Street. Given the 4 to 5 foot elevation change from the garage to the CTC the bridge will be ramped 1:20 in sections to provide ADA access.

In considering the connection of the bridge at the top deck of the CTC Parking Garage, it is important to note that the existing elevator *does not access* the third parking level. Therefore, a portion of the required handicap parking should be located at this level immediately adjacent to the sky bridge with the balance on the first level where direct street access is possible, or the installation of a new three level elevator to replace the existing elevator could be considered.

7.1.1 Bridge Construction

The superstructure of the bridge would essentially consist of a large box truss supported on concrete pylons at each end. The architectural envelop systems would be attached to the bridge structure as follows:

- Floor: The underside soffit over the street would be covered with prefinished metal soffit panels suspended from the floor structure, and the walking surface would be non-slip concrete finish on 3 inch cellular steel deck.

- Exterior Walls: Structural framing would be trimmed out top and bottom with prefinished metal wall panels, and perforated metal panel openings providing large areas of visibility and natural light.
- Roof: A continuous parapet will be provided along the lengths of the bridge, and the roof will consist of 75 mil EPDM roofing fully adhered to gypsum board substrate on 3 inch cellular steel roof deck. Roof drainage will be accommodated at the lower west end via roof drain and overflow scupper.
- Interior Finishes: Structural elements will be exposed and painted with a high build industrial paint coating, with metal panel trim employed to finish out the interior. The concrete floor will be provided with an integral concrete color admixture. An interior prefinished acoustical (perforated with insulation batts) metal soffit panel will be installed beneath the roof deck to provide sound control, aesthetics, and conceal conduits for interior lighting.
- Specialties: A continuous stainless steel handrail will be provided on each side the bridge, and seismic joints will be provided at both ends where connection is made to the CTC Parking Garage and CTC Building.

7.2 Structural

The proposed sky bridge would span from large 36 inch thick concrete abutments approximately 60 feet apart. The sky bridge structure would then cantilever over each abutment. The sky bridge would not connect to the existing structure; a seismic joint will be installed at the threshold between the parking garage and the CTC lower roof. At the CTC lower roof, a second floor addition would be constructed over the existing lower roof for a transition area between the sky bridge and the building's second floor. The structure of the existing roofing will be demolished as required to make room for the new floor structure.

The structure of the sky bridge would consist of an 8-foot deep steel truss on each side of the sky bridge supported by the large concrete buttresses on each end. The floor of the sky bridge would be a 4 inch concrete slab on metal deck spanning to the bottom chord steel beam of the steel truss. The roof the sky bridge would consist of metal deck spanning to support roof loads; with horizontal web members forming a horizontal truss for lateral considerations. Between the top and bottom of the sky bridge truss chords there will be diagonal steel web members.

7.3 Mechanical

With the bridge being both unheated and open to the atmosphere via the perforated metal panels, mechanical heating and ventilation will not be required.

Roof drainage will be required and will consist of insulated and heat traced drain bowl and piping extended to the storm drainage system.

7.4 Electrical

Lighting

Energy efficient LED type fixtures will be utilized. The new LED fixtures will include built in motion and photocell sensors for increased energy efficiency.

Security

It is recommended that IP camera surveillance be provided at each end of the bridge to monitor activities and provide safety and security.

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Appendix A - DRAWINGS

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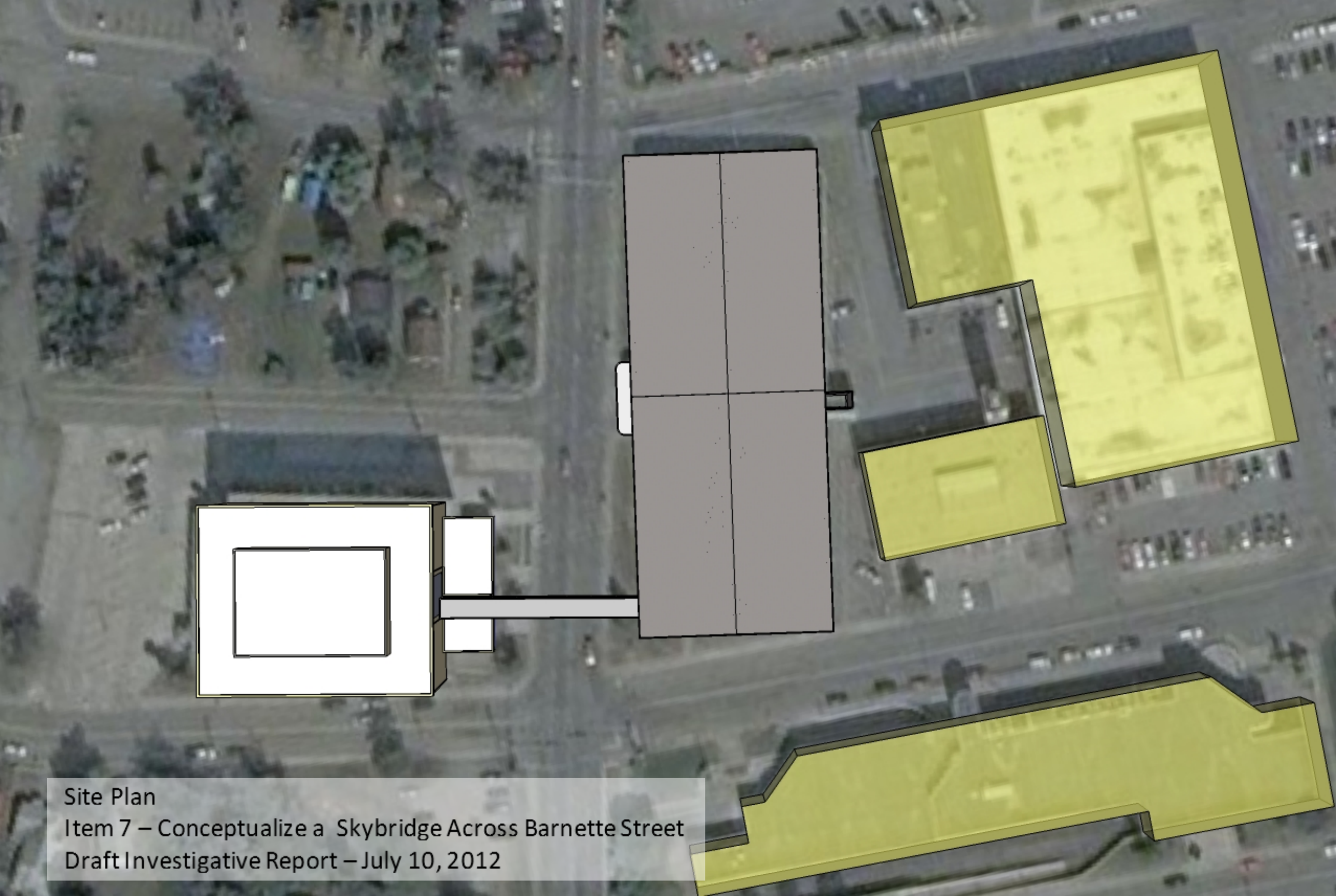
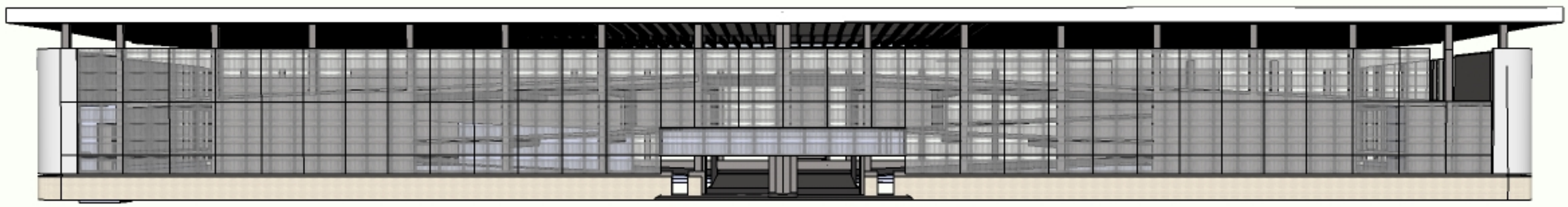


Site Plan
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

North View
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

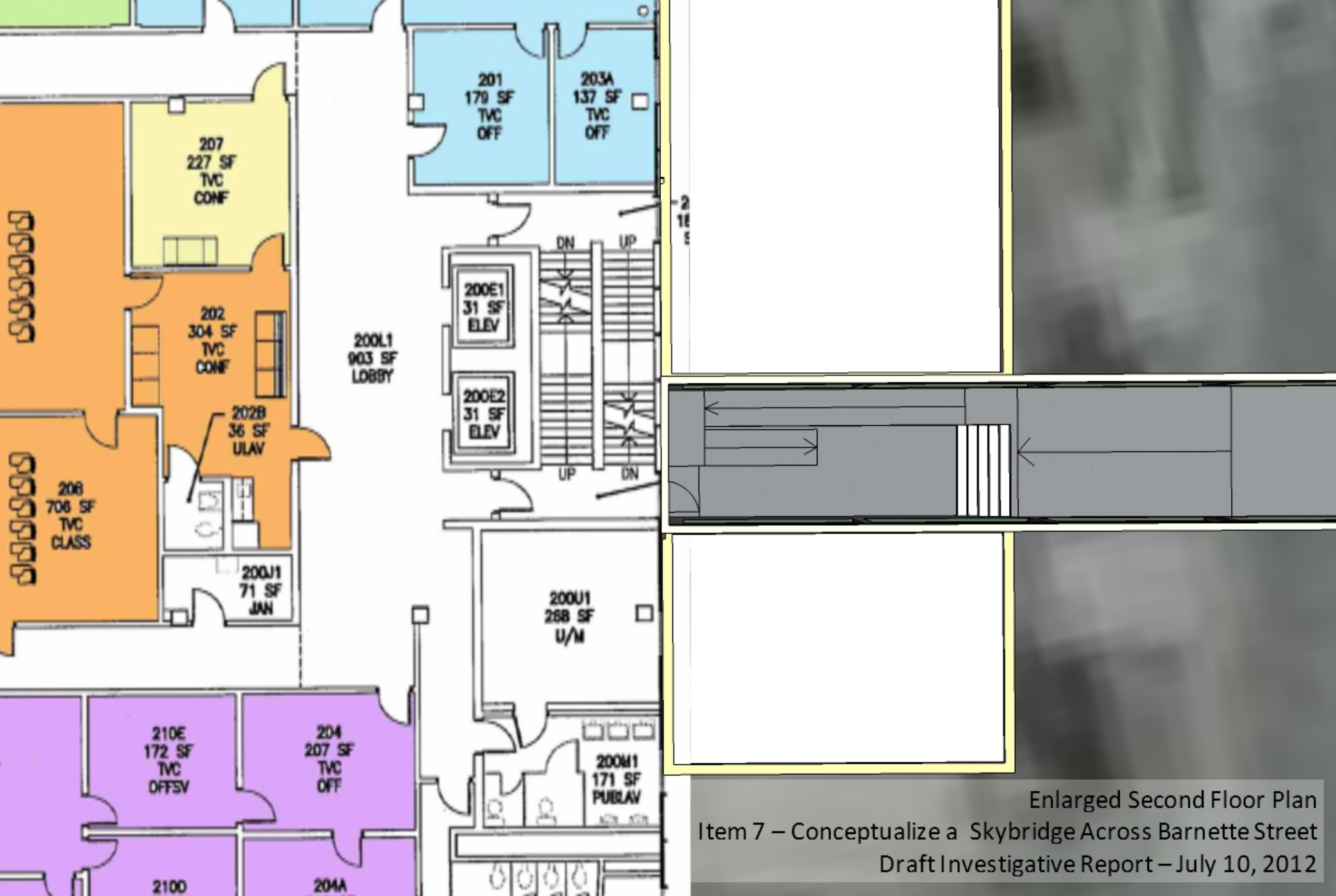


South Elevation
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

South View
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

South View
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

Second Floor Plan
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012



Enlarged Second Floor Plan
Item 7 – Conceptualize a Skybridge Across Barnette Street
Draft Investigative Report – July 10, 2012

Appendix B -
COST ESTIMATE

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ITEM 7 - Conceptualize a Sky Bridge Across Barnette Street

UAF CTC Parking Garage, Project No. 2012052 CTCGE

Fairbanks, Alaska

Construction Cost Estimate

Draft Investigative Report Submittal

July 9, 2012

ESTIMATIONS

1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:

USKH, Inc.
544 4th Avenue, Suite 102
Fairbanks, AK 99701
907.452.2128

ITEM 7 - Conceptualize a Sky Bridge Across Barnette Street

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Description	Estimated Cost	Estimated Cost Plus Contingency & Escalation	Div.
Basic Bid			
01 - GENERAL REQUIREMENTS	$264,072	$316,887	1
02 - SITEWORK	$96,339	$115,607	2
03 - CONCRETE	$103,547	$124,256	3
05 - METALS	$376,380	$451,656	5
07 - THERMAL & MOISTURE PROTECTION	$54,084	$64,901	7
09 - FINISHES	$7,500	$9,000	9
15 - MECHANICAL	$38,085	$45,702	15
16 - ELECTRICAL	$19,148	$22,978	16
Total Estimated Cost - Basic Bid:	**$959,155**	**$1,150,986**	**<<<<<**

Estimating Contingency: 20.0%

ITEM 7 - Conceptualize a Sky Bridge Across Barnette Street
UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate
Draft Investigative Report Submittal
July 9, 2012

Documents

Investigative Report, Dated June 2012

Notes and Assumptions

1 Based on current construction costs.
2 Labor rates based on Davis Bacon, 50 hours/week.
3 Assumes open competitive bid procurement.
4 Local contractor.

ITEM 7 - Conceptualize a Sky Bridge Across Barnette Street

UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate

Draft Investigative Report Submittal
July 9, 2012

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
1	**01 - GENERAL REQUIREMENTS**										
2											
3	**Project Management**	1	LS	$115,100.00	$115,100					$115,100	$115,100
4											
5											
6											
7	**General Contractor Overhead**	5%									$40,509
8	**General Contractor Profit (Fee)**	10%									$85,069
9	**General Contractor Bond & Insurance**	2.5%									$23,394
10											
11	**Subtotal: 01 - GENERAL REQUIREMENTS**				$115,100					$115,100	**$264,072**
12	Average Unit Price for this division is: $26.41 per SF based on 10,000 SF										
13											
14											
15	**02 - SITEWORK**										
16											
17	**02050 Demolition**										
18	Modification at CTC Building	160	SF	$75.00	$12,000	4.000	640.0	$55,896		$67,896	$74,686
19											
20	**02300 Earthwork**										
21	Rough Grading	1,250	SF			0.010	12.5	$967	$75	$1,042	$1,250
22	Foundation Excavation	178	CY			0.057	10.1	$781	$711	$1,492	$1,791
23	Haul Exc To Waste	178	CY	$5.00	$889	0.029	5.2	$402	$533	$1,824	$2,189
24	Backfill Foundations	338	TONS	$6.00	$2,027	0.091	30.7	$2,375	$1,284	$5,686	$6,823
25											
26	**02741 Hot-Mix Asphalt Paving**										
27	Roadway Asphalt 2" W/ 4" Base	267	SY	$30.00	$8,000					$8,000	$9,600
28											
29											
30											
31											
32											
33	**Subtotal: 02 - SITEWORK**				$22,916		698.5	$60,421	$2,603	$85,940	**$96,339**
34	Average Unit Price for this division is: $9.63 per SF based on 10,000 SF										
35											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
36											
37	**03 - CONCRETE**										
38											
39	**03300 Cast-In-Place Concrete**										
40	**Column Footings 16 Ft x 16 Ft x 3 Ft**	**2**	**EA**								
41	Forms	384	SF	$2.40	$922	0.150	57.6	$4,554		$5,476	$5,476
42	Re-steel	7,467	LBS	$0.75	$5,600	0.019	141.9	$11,218		$16,818	$16,818
43	Concrete	60	CY	$125.00	$7,467	1.286	76.8	$6,072	$896	$14,435	$14,435
44											
45	**Buttress Wall 3'x8'x25'**	**2**	**EA**								
46	Forms	1,100	SF	$3.00	$3,300	0.214	235.4	$18,610	$1,100	$23,010	$23,010
47	Re-steel	5,556	LBS	$0.75	$4,167	0.019	105.6	$8,349		$12,516	$12,516
48	Concrete	44	CY	$125.00	$5,556	1.286	57.2	$4,522	$667	$10,745	$10,745
49	Finish - Sack/Rub	1,100	SF	$0.20	$220	0.040	44.0	$3,479		$3,699	$3,699
50											
51	**Supported Floor Slabs 4"**	**1,088**	**SF**								
52	WWF	1,088	SF	$0.20	$218	0.006	6.5	$514		$732	$732
53	Concrete	13	CY	$125.00	$1,625	1.575	20.5	$1,621	$195	$3,441	$3,441
54	Finish Concrete	1,088	SF	$1.65	$1,795					$1,795	$1,795
55	Color and Polish	1,088	SF	$10.00	$10,880					$10,880	$10,880
56											
57											
58											
59											
60											
61											
62											
63											
64											
65											
66											
67											
68	**Subtotal: 03 - CONCRETE**				$41,750		745.5	$58,939	$2,858	$103,547	**$103,547**
69	Average Unit Price for this division is: $10.35 per SF based on 10,000 SF										
70											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
71											
72	**05 - METALS**										
73											
74	**05120 Structural Steel**										
75	Trusses	55,000	LBS	$2.00	$110,000	0.021	1,155.0	$100,875	$19,250	$230,125	$253,138
76	Floor Joists	4,352	LBS	$1.20	$5,222	0.007	30.5	$2,664	$348	$8,234	$9,058
77	Allow For Plate, Anchorage, Etc.	11,870	LBS	$1.20	$14,244	0.014	166.2	$14,516		$28,760	$31,636
78											
79	**05310 Steel Deck**										
80	Roof Decking 3"	1,088	SF	$4.00	$4,352	0.013	14.1	$1,231		$5,583	$6,141
81	Floor Decking 1.5" 20Ga	1,088	SF	$2.50	$2,720	0.013	14.1	$1,231		$3,951	$4,346
82											
83	**05400 Cold-Formed Metal Framing**										
84	Metal Framing 6" 16 Ga 16" o.c.	660	SF	$2.98	$1,967	0.060	39.6	$3,459		$5,426	$5,969
85											
86	**05500 Metal Fabrications**										
87	Perforated Panels	1,540	SF	$20.00	$30,800	0.129	198.7	$17,354	$1,540	$49,694	$54,663
88											
89	**05811 Architectural Joint Systems**										
90	Exp. Joint	64	LF	$75.00	$4,800	1.000	64.0	$5,590		$10,390	$11,429
91											
92											
93											
94											
95											
96											
97											
98											
99											
100											
101											
102											
103	**Subtotal: 05 - METALS**				$174,105		1,682.2	$146,920	$21,138	$342,163	**$376,380**
104	Average Unit Price for this division is: $37.64 per SF based on 10,000 SF										
105											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
106											
107	**07 - THERMAL & MOISTURE PROTECTION**										
108	**07210 Building Insulation**										
109	Sound Insulation	880	SF	$0.40	$352	0.010	8.8	$618		$970	$1,067
110											
111	**07412 Metal Wall Panels**										
112	Metal Wall Panel, Uninsulated	660	SF	$12.00	$7,920	0.107	70.6	$5,942		$13,862	$15,248
113	Metal Ceiling Panel	880	SF	$4.00	$3,520	0.057	50.2	$4,225		$7,745	$8,520
114	Soffit Panel	880	SF	$8.00	$7,040	0.107	94.2	$7,928		$14,968	$16,465
115											
116	**07531 EPDM Membrane Roofing**										
117	**Membrane Roofing**	**880**	**SF**								
118	Tapered Insulation For Crickets	**330**	BF	$0.60	$198	0.007	2.3	$160		$358	$430
119	Dens Deck 5/8"	880	SF	$0.80	$704	0.008	7.0	$487		$1,191	$1,429
120	EPDM Membrane, Fully Adhered	880	SF	$1.20	$1,056	0.019	16.7	$1,162		$2,218	$2,662
121											
122	**07620 Sheet Metal Flashing and Trim**										
123	Misc Flashings	440	LF	$2.00	$880	0.040	17.6	$1,225		$2,105	$2,526
124	Coping	220	LF	$12.00	$2,640	0.100	22.0	$1,531		$4,171	$5,005
125											
126	**07920 Joint Sealants**	1	LS	$100.00	$100	8.000	8.0	$632		$732	$732
127											
128											
129	**Subtotal: 07 - THERMAL & MOISTURE PROTECTION**				$24,410		297.4	$23,910		$48,320	**$54,084**
130	Average Unit Price for this division is: $5.41 per SF based on 10,000 SF										
131											
132											
133	**09 - FINISHES**										
134											
135	**09910 Painting**	1	LS	$7,500.00	$7,500					$7,500	$7,500
136											
137											
138	**Subtotal: 09 - FINISHES**				$7,500					$7,500	**$7,500**
139	Average Unit Price for this division is: $0.75 per SF based on 10,000 SF										
140											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
141											
142	**15 - MECHANICAL**										
143											
144	**15080 Mechanical Insulation**										
145	**Piping Insulation**	320	LF	$3.91	$1,251	0.107	34.2	$2,808		$4,059	$6,089
146											
147	**15155 Drainage Piping Specialties**										
148	Roof Drains, Incl Overflow Drains	4	EA	$380.00	$1,520	2.300	9.2	$765		$2,285	$3,085
149											
150	**15160 Storm Drainage Piping**										
151	Rain Leader, Svc Wt Cast Iron										
152	4" Pipe	320	LF	$12.25	$3,920	0.419	134.1	$11,148		$15,068	$20,342
153	Fittings	1	LS	$294.00	$294	20.115	20.1	$1,671		$1,965	$2,653
154	Heat Trace	320	LF	$14.00	$4,480	0.057	18.2	$1,436		$5,916	$5,916
155											
156											
157											
158	**Subtotal: 15 - MECHANICAL**				$11,465		215.8	$17,828		$29,293	**$38,085**
159	Average Unit Price for this division is: $3.81 per SF based on 10,000 SF										
160											
161											
162	**16 - ELECTRICAL**										
163											
164	**16511 Interior Lighting**										
165	LED Fixtures	12	EA	$600.00	$7,200	2.000	24.0	$2,023		$9,223	$12,451
166	Exit Sign, LED	4	EA	$156.00	$624	1.000	4.0	$337		$961	$1,297
167	Wiring	288	LF	$3.00	$864	0.129	37.2	$3,136		$4,000	$5,400
168											
169											
170											
171											
172											
173	**Subtotal: 16 - ELECTRICAL**				$8,688		65.2	$5,496		$14,184	**$19,148**
174	Average Unit Price for this division is: $1.91 per SF based on 10,000 SF										
175											

ITEM 8 PERFORM MECHANICAL AND ELECTRICAL CODE/CONDITION/DECOMMISSIONING STUDY

8.1 Mechanical

USKH has been retained to review the existing UAF CTC Parking Garage and offer recommendations for modifications and upgrades to the building.

During an initial inspection USKH found that existing floor grate drains on the upper level are clogged and require cleaning before they can fulfill their original function. The piping connecting the drains together and routed down into the lower level of the garage shows signs of previous damage that has been repaired by unorthodox methods – see the example of what appears to be a cracked tee fitting that has been repaired with some type of flexible sealant. The floor drain piping appears to drain into a sump in the mechanical room at the lower level which pumps the effluent into a storm drain beneath Barnette Street.

The top level of the parking garage also supports two mechanical penthouses that house supply and exhaust fans that had been utilized to provide heated air circulation throughout the garage. The fans and their appurtenances do not appear to have been operational for many years. The equipment has been shut off at their respective disconnects or at the main breaker panels. The steam coils within the outdoor air intake louvers appear to be in good condition, however the steam supply has been disconnected and capped in the basement level mechanical rooms. There is also at least one steam trap in the second level mechanical/electrical room that appears to be cracked. The future plans for the garage appear to include removal of some of the wall panels around the exterior of the building. This would remove any need to ventilate the building mechanically so the existing supply and exhaust fans as well as the distribution duct work may be removed. The upper level mechanical penthouses where the blowers are located may need to remain as there is other equipment within that may still need to remain operational, however if this equipment could be relocated then the upper penthouses may be removed completely as well. If the upper-level mechanical penthouses are removed, the existing steam and condensate piping, heating coils, wall louvers and dampers, and existing penthouse roof drains will need to be removed before the penthouse itself is demolished. Once the equipment, ductwork and piping are remove from the two penthouses the penetrations between the penthouse floor and the lower level will need to be in-filled with concrete. The steam and condensate piping may be removed just to the penthouse floor level and capped or may be removed down into the mechanical/electrical rooms below and capped at a more easily accessed elevation. The roof drain piping will need to be removed and capped just below the penthouse floor structure.

The existing mechanical rooms, stairwells and elevator vestibule are heated by a steam-to-glycol heat exchanger located within the mechanical room in the lower-level of the garage. The existing steam entry into the mechanical room is 6-inches in diameter which is most likely much larger than needed to provide heat to the spaces that need to remain above freezing. The original 3-inch diameter condensate return pipe appears to have been removed and sleeved with some type of flexible piping to return condensate to the source. There are several pieces of large equipment and some large-diameter piping that may be removed from the mechanical spaces to make them more accessible and orderly. The existing steam heat exchanger and condensate receiver appear to be relatively old. There is little wear on a shell-and-tube heat exchanger in this type of application so its age may not affect its efficiency, however the condensate receiver may need to be inspected to ensure that the pumps and switch-gear is sized and functioning appropriately.

The existing elevator and elevator equipment is assumed to be original and thus relatively old. An in-depth inspection and evaluation of the condition of the elevator and associated equipment by a qualified elevator inspector is recommended. The current arrangement of the elevator with respect to clearances between the door openings and stairs as well as the size and shape of the existing elevator may not meet current ADA requirements. The current elevator also only accesses the ground floor and second level parking, leaving access to the third level only by stair or walking up the driving ramp. The location of the existing elevator and main access stair may provide the option for removal of the existing elevator and providing a new, three-level elevator in its place.

8.2 Electrical

8.2.1 Electrical Code, Site Condition and Decommissioning

Emergency Generator Power

Currently the 12 kW emergency generator supplies power for the emergency lighting and other non-emergency equipment through the automatic transfer switch. Current code requires the non-emergency loads be separated from the required emergency loads with a separate transfer switch.

To update the system to the current code a new transfer switch and distribution panel will need to be added the generator. This will allow one emergency transfer switch to supply power for the emergency lighting and the other standby transfer switch to supply standby power to the optional, non-emergency loads.

Emergency Egress Lighting

Currently there is no egress lighting at the exits of the building on the ground floor. Current code requires there to be emergency egress lights that are tied to back up power at all emergency egress locations. The existing interior exit door discharge area lighting consists of one or two T8 fluorescent light fixtures mounted in front of the exit doors. Inside the stairwell the same light fixtures are used for stairwell lighting. These fluorescent lights do not seem to be rated to outdoor use. The circuiting for lights that are at some of the exit doors will need to be field verified that they connected to the generator emergency power panelboard.

To bring the system up to the current code, new LED, wet location rated light fixtures will be installed at the outside exit doors. The light fixtures in the stairwells will be replaced with new LED light fixtures that utilized motion and photocell sensors for increased energy efficiency. These lights will be connected to the generator emergency power panelboard.

Elevator

Current code requires that a fire alarm activated automatic recall with shunt trip system be integrated into the control of the elevator. Upon activation of the fire alarm this system would return the elevator to the appropriate floor and then disable the use of the elevator.

To comply with this code a new elevator controller will be provided that is capable of performing the automatic recall function. The fire alarm will be tied into the new controller and elevator recall smoke detectors will be

installed at each floor lobby. To disable the elevator a shunt trip breaker will be installed for the elevator equipment and located in the elevator room or if there is insufficient space the mechanical room.

Fire Alarm System

Current code requires elevator recall from the fire alarm system.

To comply with current code for elevator recall and smoke detector placement the current conventional fire alarm panel will be replaced with a new addressable fire alarm panel. The current fire alarm panel could be upgraded but because of its age, replacement is recommended. The current annunciator panel located at the entrance to the building would be replaced as well.

Rooftop Headbolt Heater Receptacles Replacement

Demolition

The headbolt receptacles, cover plates, conductors, and their serving panelboard located in the penthouse will be removed.

Wiring Devices

The existing headbolt receptacle locations will be preserved and their receptacles replaced with new 20 ampere, 125 V, non-feed-through ground-fault circuit interrupter (GFCI) type receptacles with weather resistant covers.

Distribution System

A new panelboard for the headbolt receptacles will be provided and located near the MDP to serve receptacles on the current roof. The headbolt panelboard will be interconnected with the existing time-clock system to cycle headbolt receptacles 'On' and "Off.'

Rooftop Penthouse Removal

Demolition

All electrical equipment will be de-energized, disconnected and removed from the inside of both penthouses. Equipment to be demolished to include: motors, controllers, panelboards, light fixtures, receptacles, switches, conduit and conductors.

Generator System

Currently there are two generators inside the parking garage. One 12 kW generator is located in a mechanical room and serves as emergency backup power for the stairwell lighting and fire alarm equipment. The other much larger generator is located in a fenced area and is owned by ACS. This generator supplies power to ACS's building for use during power outages. Both of these generators will be maintained.

Removal of Unused Electrical Equipment

Unused electrical equipment will be removed. This includes unused panelboards, electrical enclosures, electrical disconnects, conductors and conduits.

Electrical Design Standards

Electrical Systems General

The codes governing the electrical systems are the latest additions of the National Electric Code, NFPA 70, the National Fire Alarm Code, NFPA 72, and the Life Safety Code, NFPA 101 and the local codes and amendments. These codes will be followed through the design and construction phases of this project.

Lighting

The design of the interior lighting and controls will provide a generally glare free, high quality lighting and conform to the lighting levels recommended in the latest edition of the Illuminating Engineering Society of North America, IESNA Lighting Handbook. Photometric calculations will be performed as an integral part of the design to ensure that the recommended lighting levels are met.

Wiring Devices

The general use receptacles used on this project will be 20 ampere, 125V, grounded type, specification grade, NEMA 5-20R with impact resistant plastic device covers. Non-feed-through ground-fault circuit interrupter (GFCI) type receptacles will be used for receptacles located in exterior locations, within 6 feet of a sink or hose bib, and other locations where required by Code. Dedicated receptacles will match the proposed equipment and their device plate will be labeled to identify the device's special characteristics if it is different than the general use receptacles.

Distribution System

Panelboards will be surface or flush mounted, depending on location, with front-hinged door. The circuit breakers will be rated for 125 percent of the connect load with a minimum of 20 ampere rating on 120-volt circuits and 15 ampere rating on 208-volt circuits.

All circuits will be routed in conduit raceways. All above ground feeders will be routed in rigid steel conduit, RSC, with buried feeders routed in high-density polyethylene (HDPE) or RSC conduit. Concealed raceways will be run in electric metallic tubing, EMT, with a minimum size of 3/4-inch. Connections to vibrating equipment will be made with flexible metallic conduit with the exception that liquid tight flexible metallic conduit will be used in all locations exposed to weather, water, oil or grease. All raceways penetrating fire separation walls will be fire stopped and those penetrating thermal barriers will be thermally stopped.

All conductors will be copper and all circuits will contain an equipment-grounding conductor. The conductors for all feeders and branch circuits in unheated spaces will have insulation type XHHW, which has moisture-resistant thermoset insulation for withstanding cold temperatures. Branch circuits in continuously heated spaces will have insulation type THHN. The minimum conductor size for branch circuits will be #12 AWG for power and lighting and #14 AWG for control circuits. Circuits will be sized so that the maximum voltage drop

from the secondary side of the utility transformer to the terminal device is within the 5 percent allowed by the NEC. All circuit conductors will be identified as each panelboard, pull box and terminal device.

Separate circuits will be used for lighting and receptacle load. Equipment such as motorized equipment greater than 1/4-Hp, and other such equipment will have their own dedicated circuits. Lighting circuit breakers will be a minimum of 20-ampere. General use receptacles will be limited to a maximum of eight receptacles per circuit and protected with a 20-ampere rated circuit breaker. Special use receptacles will have a minimum of a 20-ampere rated breaker.

The entire distribution system will be grounded and bonded. After the power supply phases have been balanced, typewritten directories will be placed under plastic in frames for each and every circuit.

Emergency Lighting System

Emergency lighting fixtures will be wired to the existing emergency power generator. To minimize power consumption the exit signs will be light-emitting diode (LED) type.

Telecommunication System

The interior telecommunications will comply with EIA/TIA-568-B, 569-B, and 606 Category 6 standards and I3A, *Technical Guide for Installation Information Infrastructure Architecture*. Cabling will be plenum rated unshielded twisted pair, 24 AWG, copper.

All new data receptacle drops will contain Category 6 cables and will be home-run back to a patch panel. Device receptacle faceplates will modular type with snap-in-jacks.

8.3 Associated Structural

The existing penthouse structure consists of a metal roof deck on bar joists that span to a steel frame structure that is supported on the existing concrete shear walls and concrete columns. The penthouse shall be demolished to make way for the new roof, and new shear walls that will now extend to laterally support the new roof structure.

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Appendix A -
COST ESTIMATE

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ITEM 8 - Mechanical and Electrical Code/Condition/Decommissioning Study

UAF CTC Parking Garage, Project No. 2012052 CTCGE

Fairbanks, Alaska

Construction Cost Estimate

Draft Investigative Report Submittal

July 9, 2012

ESTIMATIONS

1225 E. International Airport Road, Suite 205
Anchorage, Alaska 99518
907.561.0790

Prepared for:

USKH, Inc.
544 4th Avenue, Suite 102
Fairbanks, AK 99701
907.452.2128

Documents

Investigative Report, Dated June 2012

Notes and Assumptions

1 Based on current construction costs.
2 Labor rates based on Davis Bacon, 50 hours/week.
3 Assumes open competitive bid procurement.
4 Local contractor.

ITEM 8 - Mechanical and Electrical Code/Condition/Decommissioning Study
UAF CTC Parking Garage, Project No. 2012052 CTCGE
Prepared for USKH, Inc. by Estimations

Construction Cost Estimate
Draft Investigative Report Submittal
July 9, 2012

Description	Estimated Cost	Estimated Cost Plus Contingency & Escalation	Div.
Basic Bid			
01 - GENERAL REQUIREMENTS	$105,181	$126,218	1
13 - SPECIAL CONSTRUCTION	$29,609	$35,531	13
14 - CONVEYING	$118,280	$141,936	14
15 - MECHANICAL	$86,615	$103,938	15
16 - ELECTRICAL	$107,616	$129,139	16
Total Estimated Cost - Basic Bid:	**$447,301**	**$536,762**	**<<<<<**

Estimating Contingency: 20.0%

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
1	**01 - GENERAL REQUIREMENTS**										
2											
3	**Project Management**	1	LS	$53,700.00	$53,700					$53,700	$53,700
4											
5											
6											
7											
8											
9	**General Contractor Overhead**	5%									$19,791
10	**General Contractor Profit (Fee)**	5%									$20,781
11	**General Contractor Bond & Insurance**	2.5%									$10,910
12											
13	**Subtotal: 01 - GENERAL REQUIREMENTS**				$53,700					$53,700	**$105,181**
14	Average Unit Price for this division is: $12.08 per SF based on 8,710 SF										
15											
16											
17	**13 - SPECIAL CONSTRUCTION**										
18											
19	**13851 Fire Alarm (Addressable)**										
20	FACP - Reconnect All ETR Devices	1	EA	$7,000.00	$7,000	40.000	40.0	$3,352		$10,352	$15,528
21	FAA	1	EA	$3,000.00	$3,000	8.000	8.0	$670		$3,670	$5,505
22	Multi-Technology Smoke Detector	6	EA	$110.00	$660	2.500	15.0	$1,257		$1,917	$2,876
23	Elevator Recall Control Module	1	EA	$500.00	$500	4.000	4.0	$335		$835	$1,253
24	FA Wiring 2 Conductors	240	LF	$0.22	$53	0.036	8.6	$721		$774	$1,161
25	Conduit 1/2"	240	LF	$0.85	$204	0.057	13.7	$1,148		$1,352	$2,028
26											
27	Demo FACP	1	EA			6.000	6.0	$503		$503	$755
28	Demo Annunciator Panel	1	EA			4.000	4.0	$335		$335	$503
29											
30											
31											
32											
33	**Subtotal: 13 - SPECIAL CONSTRUCTION**				$11,417		99.3	$8,321		$19,738	**$29,609**
34	Average Unit Price for this division is: $3.40 per SF based on 8,710 SF										
35											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
36											
37	**14 - CONVEYING**										
38											
39	**14240 Hydraulic Elevators**										
40	Demo Elevator, 2 Stop	1	EA	$15,000.00	$15,000					$15,000	$20,250
41	Cut Slab For Elevator To Level 3	1	LS			32.000	32.0	$2,530	$2,000	$4,530	$4,530
42	Hydraulic Elevator 3 Stop	1	EA	$85,000.00	$85,000					$85,000	$93,500
43											
44											
45											
46											
47											
48											
49											
50											
51											
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64											
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66											
67											
68	**Subtotal: 14 - CONVEYING**				$100,000		32.0	$2,530	$2,000	$104,530	**$118,280**
69	Average Unit Price for this division is: $13.58 per SF based on 8,710 SF										
70											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
71											
72	**15 - MECHANICAL**										
73											
74	**Mechanical Demolition**										
75	Demo Air Handlers/Blowers	2	EA			24.000	48.0	$3,962		$3,962	$5,349
76	Demo Return/Exhaust Fans	2	EA			24.000	48.0	$3,962		$3,962	$5,349
77	Remove Steam Lines	1	LS			16.000	16.0	$1,321		$1,321	$1,783
78	Demo Ductwork, > 26", Incl Hoods	3,100	LF			0.130	403.0	$33,332		$33,332	$44,998
79	Demo Fans, Small Equip	2	EA			1.000	2.0	$165		$165	$223
80	Demo Mech Penthouse	1	EA			24.000	24.0	$1,985	$1,500	$3,485	$4,705
81	Remove Unused Equipment/Pipe	1	LS			16.000	16.0	$1,323		$1,323	$1,786
82											
83	**15080 Mechanical Insulation**	1	LS	$4,000.00	$4,000					$4,000	$4,000
84											
85	**15155 Drainage Piping Specialties**										
86	Clean Floor Drains	48	EA			1.000	48.0	$3,962		$3,962	$5,349
87	Replace Tee	1	EA	$90.00	$90	2.000	2.0	$165		$255	$344
88											
89	**Steam Specialties**										
90	Replace Steam Trap	1	LS	$2,000.00	$2,000					$2,000	$2,700
91	Steam Piping	100	LF	$11.00	$1,100	0.314	31.4	$2,592		$3,692	$4,984
92											
93	**15815 Metal Ducts**										
94	New Duct, Duct Accessories	1	LS	$900.00	$900	34.286	34.3	$2,837		$3,737	$5,045
95											
96											
97											
98											
99											
100											
101											
102											
103	**Subtotal: 15 - MECHANICAL**				$8,090		672.7	$55,606	$1,500	$65,196	**$86,615**
104	Average Unit Price for this division is: $9.94 per SF based on 8,710 SF										
105											

Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
106											
107	**16 - ELECTRICAL**										
108											
109	**16010 Basic Electrical Requirements**										
110	**Electrical Demolition**										
111	Demo HBH Receptacles	51	EA			0.250	12.8	$1,073		$1,073	$1,449
112	Demo Panelboards	1	EA			4.000	4.0	$335		$335	$452
113	Demo Circuits For Above	5,200	EA			0.011	57.2	$4,794		$4,794	$6,472
114											
115	**16140 Wiring Devices**										
116	**Receptacles: Complete Assemblies**	**58**	**EA**								
117	Dedicated Receptacles	6	EA	$19.56	$117	0.250	1.5	$126		$243	$328
118	WP GFCI Receptacles HBH	52	EA	$27.01	$1,405	0.300	15.6	$1,307		$2,712	$3,661
119	Add For:										
120	3/4in. RGS	600	LF	$2.00	$1,200	0.086	51.6	$4,324		$5,524	$7,457
121	#10 THHN	17,400	LF	$0.46	$8,004	0.006	104.4	$8,749		$16,753	$22,617
122											
123	**16410 Enclosed Switches and Circuit Breakers**										
124	Shunt Trip - Elevator	1	EA	$2,000.00	$2,000	6.000	6.0	$503		$2,503	$3,379
125	Elevator Controller - Auto Recall Tie To FA System	1	EA	$2,500.00	$2,500	4.000	4.0	$335		$2,835	$3,827
126	3/4in. RGS, 3#10, Ground	600	LF	$3.50	$2,100	0.114	68.4	$5,732		$7,832	$10,573
127											
128	**16415 Transfer Switches**										
129	Generator Transfer Switch, Emerg Load	1	EA	$2,300.00	$2,300	6.000	6.0	$503		$2,803	$3,784
130											
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Line No.	Description	Qty	UNITS	Material Costs Unit	Material Costs Total	Labor Hours Units	Labor Hours Totals	Labor Cost	Equip Cost	Total Cost	Total Cost w/ OH & P
140											
141	**16442 Panelboards**										
142	Generator Power Distribution Panelboard	1	EA	$1,800.00	$1,800	10.000	10.0	$838		$2,638	$3,561
143	Headbolt Heater (HBH) Panelboard	1	EA	$4,500.00	$4,500	16.000	16.0	$1,341		$5,841	$7,885
144	Connect New HBH Panel To ETR Timeclock	1	EA			4.000	4.0	$335		$335	$452
145											
146	**Feeders & Subfeeds**										
147	100 Amp: 1-1/4" EMT, 4#2, 1#8	100	LF	$8.23	$823	0.161	16.1	$1,349		$2,172	$2,932
148	400 Amp: 3" RGS, 3#500 KCMIL, 1#3	50	LF	$63.38	$3,169	0.487	24.4	$2,045		$5,214	$7,039
149											
150	**16510 Lighting**										
151	Emerg Exit Lights Wet Location LED	4	EA	$600.00	$2,400	2.500	10.0	$838		$3,238	$4,371
152	Stairwell Light Fixtures LED	24	EA	$250.00	$6,000	1.250	30.0	$2,514		$8,514	$11,494
153	Occupancy Sensors	6	EA	$156.00	$936	1.500	9.0	$754		$1,690	$2,282
154	Photocell	1	EA	$70.00	$70	1.000	1.0	$84		$154	$208
155	Wiring: 3/4" Cond, 3-#12, Gnd	275	LF	$1.52	$418	0.091	25.0	$2,095		$2,513	$3,393
156											
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170											
171											
172	**Subtotal: 16 - ELECTRICAL**				$39,742		477.0	$39,974		$79,716	**$107,616**
173	Average Unit Price for this division is: $12.36 per SF based on 8,710 SF										
174											

PROJECT RENDERINGS

Project Renderings are to be furnished at a later date after directives are given from UAF DDC and the User.

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Appendix A - RENDERINGS

(to be furnished at a later date)

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