

SKAGIT COUNTY PARKS & RECREATION CXT AT HOWARD MILLER STEELHEAD PARK

SEC. 30, TWP. 34N., RGE. 04 E., W.M., SKAGIT COUNTY, WASHINGTON

SHEET INDEX

- C1 COVER SHEET & EXISTING CONDITIONS
- C2 DEMO & EROSION CONTROL PLAN
- C3 SITE PLAN
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PROJECT INFORMATION

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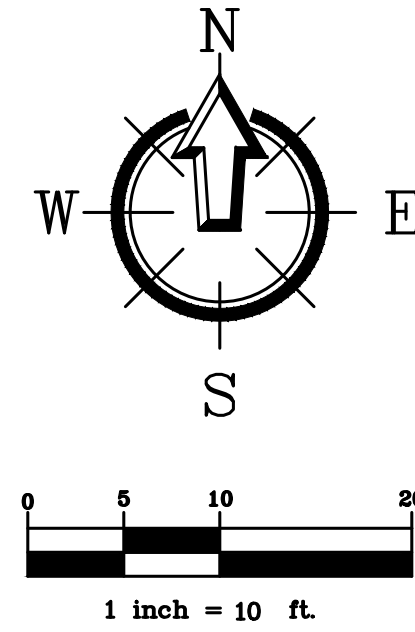
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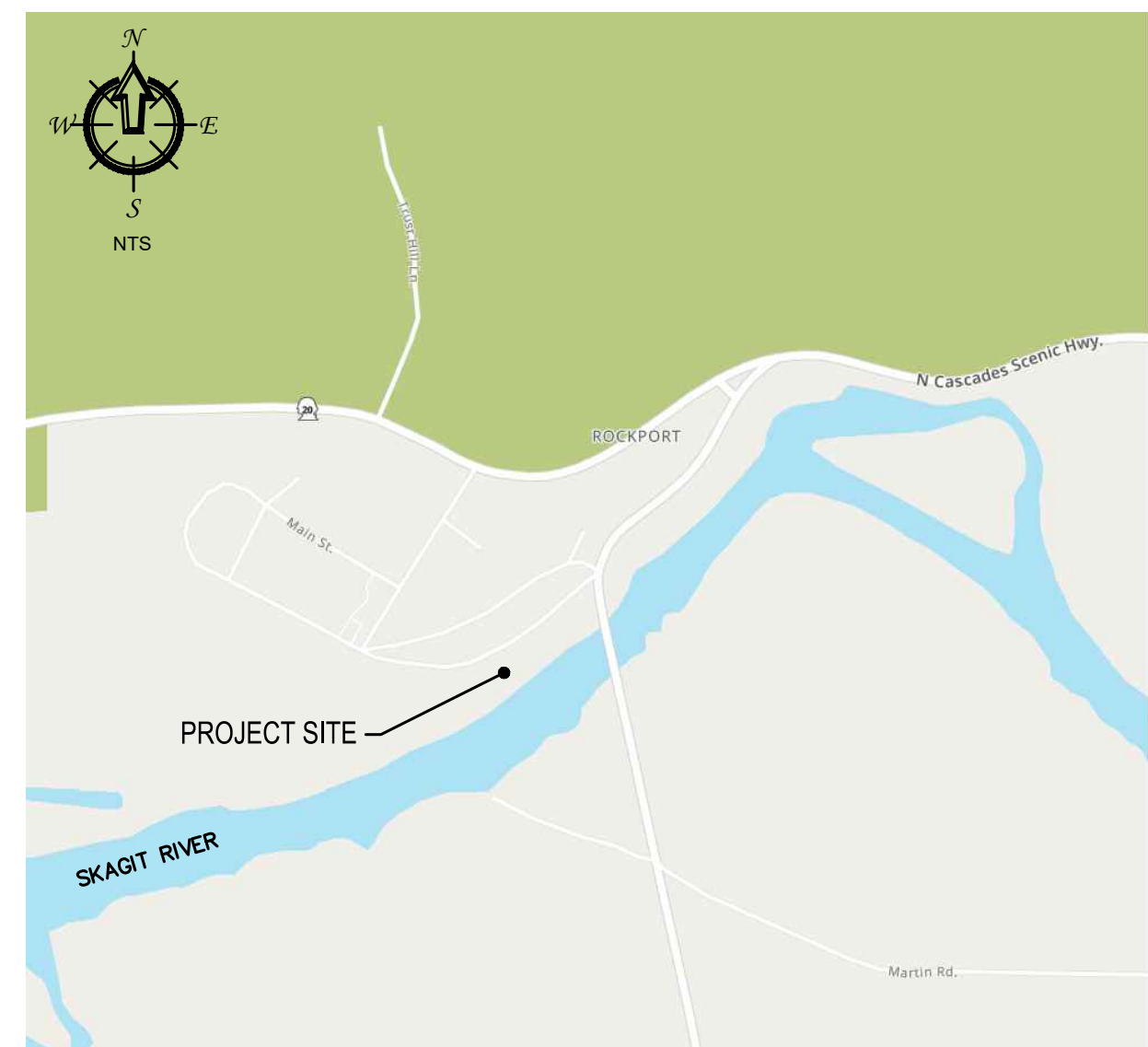
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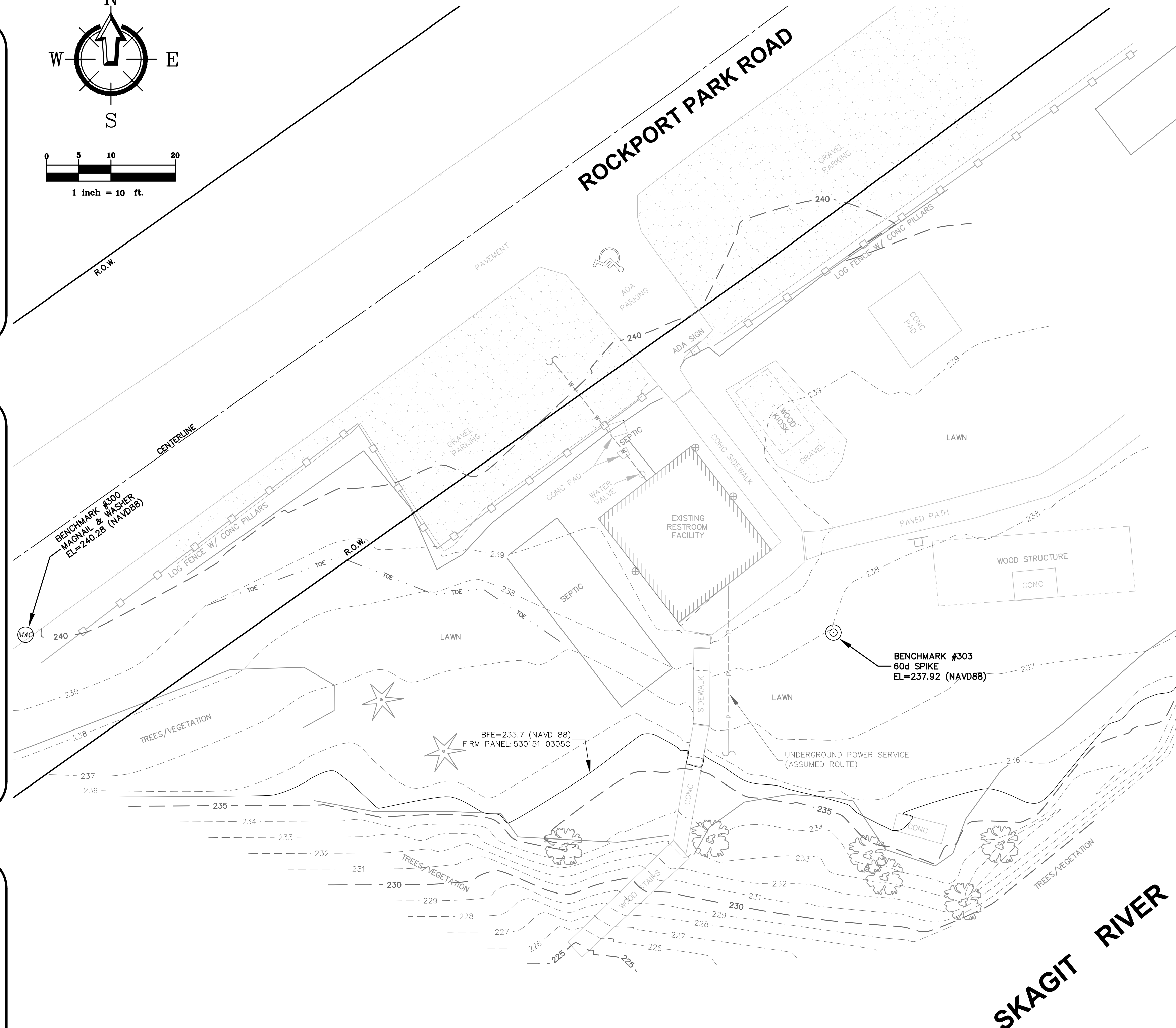


VICINITY MAP



LEGEND

- ⊙ = BENCHMARK MAGNAIL & WASHER
- ⊙ = BENCHMARK 60d SPIKE
- ⊙ = EXISTING DOWNSPOUT
- ⊙ = PROPOSED SEWER CLEANOUT
- ⊙ = EXISTING WATER VALVE
- ⊙ = PROPOSED WATER VALVE
- ⊙ = EXISTING SIGN
- ⊙ = EXISTING LANDSCAPING
- ⊙ = DETAIL CALLOUT
- OP = EXISTING OVERHEAD ELECTRIC LINES
- P = EXISTING UNDERGROUND POWER
- W = EXISTING WATER LINE
- W = PROPOSED WATER LINE
- S = EXISTING SANITARY SEWER LINE
- SS = PROPOSED SANITARY SEWER LINE
- = LOG FENCE W/ CONCRETE PILLARS
- = EXISTING TOP OF BANK
- = EXISTING TOE OF BANK
- 10 = EXISTING CONTOUR (INDEX)
- 11 = EXISTING CONTOUR (NORMAL)
- 10 = PROPOSED CONTOUR (INDEX)
- 11 = PROPOSED CONTOUR (NORMAL)
- 11 = PROPOSED SPOT ELEV
- ⊙ = TOP OF PAVEMENT
- = PROPOSED PAVEMENT REMOVAL
- = PROPOSED CONCRETE
- = PROPOSED GRAVEL SURFACING



SKAGIT COUNTY NOTES

- A. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE STATE OF WASHINGTON, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND SKAGIT COUNTY ROAD STANDARDS.
- B. INSPECTION OF THE STORM DRAIN SYSTEM MUST BE CALLED FOR BEFORE ANY BACKFILL IS PLACED FOR THE DRAIN SYSTEM.
- C. CATCH BASINS SHALL BE TYPE 1 OR TYPE 2, WSDOT STANDARD PLANS, FRAME AND GRATE UNLESS OTHERWISE NOTED. THE OUTSIDE EDGE OF THE CATCH BASIN SHALL BE PLACED AT THE INTERSECTION OF THE CURB AND GUTTER AND 0.010 TO 0.015 BELOW FINISHED GRADE, OR IN THE GUTTER LINE OF THE ROLLED EDGE SECTION.
- D. IF ADEQUATE INSPECTION IS NOT CALLED FOR BEFORE COMPLETION OF THE ROADWAY CONSTRUCTION, IT MAY BE NECESSARY FOR CORE DRILLING AND TESTING TO BE PERFORMED TO ASSURE AN ACCEPTABLE QUALITY OF ROADWAY. WHEN CORE DRILLING IS FOUND TO BE NECESSARY, THE APPLICANT WILL BE HELD RESPONSIBLE FOR ALL COSTS INCURRED.
- E. IT WILL BE THE APPLICANT'S RESPONSIBILITY TO CONTACT ALL UTILITY COMPANIES IN ORDER TO ASSURE THAT ALL LINES, PIPES, POLES AND OTHER APPURTENANCES ARE PROPERLY LOCATED AND THEIR INSTALLATION IS COORDINATED WITH THE ROAD CONSTRUCTION. ALL UTILITY RELOCATION WORK SHALL BE AT THE EXPENSE OF THE APPLICANT AND MUST BE IN ACCORDANCE WITH SKAGIT COUNTY ROAD STANDARDS PRIOR TO ROAD ACCEPTANCE.
- F. CULVERT PIPE SHALL BE CONCRETE, ALUMINUM OR PLASTIC 12-INCH DIAMETER MINIMUM PIPE WITH BEVELED ENDS UNLESS OTHERWISE NOTED. BEVELED ENDS SHALL BE A MINIMUM OF 3:1 IN THE DITCH LINE OR MATCH THE SLOPE IN A CUT OR FILL SECTION.
- G. BURIED UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATION. THE APPLICANT SHALL HAVE THE UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION.
- H. ONSITE EROSION CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE APPLICANT AND BE IN PLACE PRIOR TO CONSTRUCTION. ANY PROBLEMS OCCURRING BEFORE FINAL ACCEPTANCE BY SKAGIT COUNTY AND WITHIN 24 MONTHS THEREAFTER SHALL BE CORRECTED BY THE APPLICANT.
- I. ANY REVISIONS TO PLANS MUST BE MADE BY THE PROJECT ENGINEER AND APPROVED BY THE ENGINEER PRIOR TO ANY IMPLEMENTATION IN THE FIELD.
- J. ALL PAVEMENT MARKINGS SHALL CONFORM TO THE REQUIREMENTS OF THE MUTCD.
- K. BEFORE STRIPING TAKES PLACE THE APPLICANT SHALL CONTACT THE SKAGIT COUNTY TRAFFIC OFFICE FOR COORDINATION OF THE STRIPING.
- L. A COPY OF THE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- M. SKAGIT COUNTY SHALL BE NOTIFIED 72 HOURS BEFORE CONSTRUCTION IS STARTED. THE APPLICANT SHALL BE RESPONSIBLE FOR SCHEDULING A PRE-CONSTRUCTION CONFERENCE WITH THE COUNTY, OTHER JURISDICTIONS, PROJECT ENGINEER, UTILITY COMPANIES, SUBCONTRACTORS AND OTHER NECESSARY PARTIES TO THE PROJECT SHALL BE PRESENT AT THE PRE-CONSTRUCTION CONFERENCE.
- N. SLOPES SHALL BE STABILIZED TO PREVENT EROSION. IN CASE EROSION OCCURS IN DITCHES, DITCH LINING IS TO BE PROVIDED AS REQUESTED AND SPECIFIED BY THE COUNTY.
- O. WHERE NEWLY CONSTRUCTED PAVING MEETS EXISTING PAVING, THE APPLICANT SHALL OVERLAY AND FEATHER NEW PAVEMENT TO PROVIDE A SMOOTH TRANSITION FROM EXISTING TO PROPOSED PAVING. APPLICATION OF A THIN PAINT COAT OF EMULSIFIED ASPHALT SHALL BE APPLIED TO INSURE PROPER BONDING.
- P. THE COMPLETED SURFACE OF ALL COURSES SHALL BE OF UNIFORM TEXTURE, SMOOTH, UNIFORM AS TO CROWN AND GRADE, AND FREE FROM DEFECTS OF ALL KINDS. THE COMPLETED SURFACE OF THE WEARING COURSE SHALL NOT VARY MORE THAN 1/8 INCH FROM THE LOWER EDGE OF A 10-FOOT STRAIGHTEDGE PLACED ON THE SURFACE PARALLEL TO THE CENTERLINE. THE TRANSVERSE SLOPE OF THE COMPLETED SURFACE OF THE WEARING COURSE SHALL VARY NOT MORE THAN 1/4 INCH IN 10-FOOT FROM THE RATE OF TRANSVERSE SLOPE SHOWN ON THE PLANS.
- Q. MATERIALS SAMPLING AND TESTING SHALL BE AT A FREQUENCY AND MAGNITUDE AS SPECIFIED IN THE STANDARD SPECIFICATIONS OR DETERMINED BY THE COUNTY ENGINEER. IN THE CASE OF PLAT ROADS, A PRIVATE TESTING LABORATORY SHALL PERFORM TESTING AND SAMPLING. CERTIFIED TEST REPORTS SHALL BE FURNISHED FOR ALL TESTS PERFORMED BY PRIVATE TESTING LABORATORIES.
- R. ALL UTILITY WORK WITHIN EXISTING PAVEMENT REQUIRES A MINIMUM ROADWAY RECONSTRUCTION FROM THE CENTERLINE, TO INCLUDE GRINDING THE EXISTING PAVEMENT AND REPLACING IT WITH A MINIMUM 0.17 PAVEMENT.



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FREELAND & ASSOCIATES

REV.	DATE	DESCRIPTION

CLIENT: SKAGIT COUNTY PARKS & RECREATION
1730 CONTINENTAL PLACE
MOUNT VERNON, WA 98273
CALL BEFORE YOU DIG FOR BURIED UTILITY LOCATIONS
1-800-424-5655

PROJECT LOCATION: CXT AT HOWARD MILLER STEELHEAD PARK
52888 ROCKPORT PARK ROAD
ROCKPORT, WA 98283
DRAWN BY: MPM
CHECKED BY: HAF
DESIGNED BY: MPM

SHEET CONTENTS: COVER SHEET & EXISTING CONDITIONS



CALL BEFORE YOU DIG FOR BURIED UTILITY LOCATIONS
1-800-424-5655

JOB #: 24157 DATE: 10/25/2024
SHEET: C1

CONSTRUCTION SCHEDULING NOTE

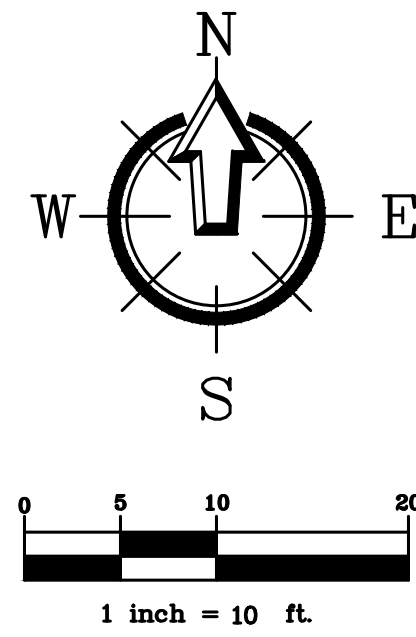
1. CONTRACTOR SHALL MONITOR WEATHER CONDITIONS AND FORECASTS DURING CONSTRUCTION. THE AMOUNT OF SOIL THAT MAY BE EXPOSED AT ANY TIME DEPENDS ON THE CONTRACTOR'S AVAILABLE CREW, MATERIALS, AND EQUIPMENT. CONTRACTOR SHALL SCHEDULE WORK SO THAT ALL EXPOSED SOIL (INCLUDING TRENCHES AND STOCKPILES) CAN BE COMPLETELY COVERED AND STABILIZED PRIOR TO ANY SIGNIFICANT RAINFALL EVENT ON SITE.
2. THIS TEMPORARY EROSION AND SEDIMENT CONTROL PLAN IS THE CONSIDERED THE MINIMUM TO SUCCESSFULLY MAINTAIN THE SITE DURING IDEAL CONDITIONS. IT IS THE CONTRACTOR AND CESCL'S RESPONSIBILITY TO AMEND THIS PLAN AS NECESSARY TO ENSURE COMPLIANCE WITH COUNTY AND STATE REQUIREMENTS. THIS INCLUDES, BUT IT NOT LIMITED TO, ADDITION OF SETTLING PONDS, BAKER TANKS, ETC.

TESC CONTRACTOR RESPONSIBILITY

1. TEMPORARY EROSION CONTROL BMPs SHOWN IN THESE PLANS ARE THE MINIMUM NECESSARY FOR PERMIT APPROVALS. ADDITIONAL BMPs MAY BE REQUIRED DURING THE COURSE OF CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR ADDITIONAL BMPs OR BMP MAINTENANCE THAT MAY BE REQUIRED DURING CONSTRUCTION.
2. NO ADDITIONAL COMPENSATION WILL BE MADE FOR BMP MAINTENANCE OR REPAIRS THAT RESULT FROM COMPLIANCE WITH THE COUNTY PERMITS. LIKEWISE, ANY ADDITIONAL BMPs THAT MAY BE REQUIRED FOR COMPLIANCE DURING CONSTRUCTION SHALL BE IMPLEMENTED AT THE CONTRACTOR'S EXPENSE.

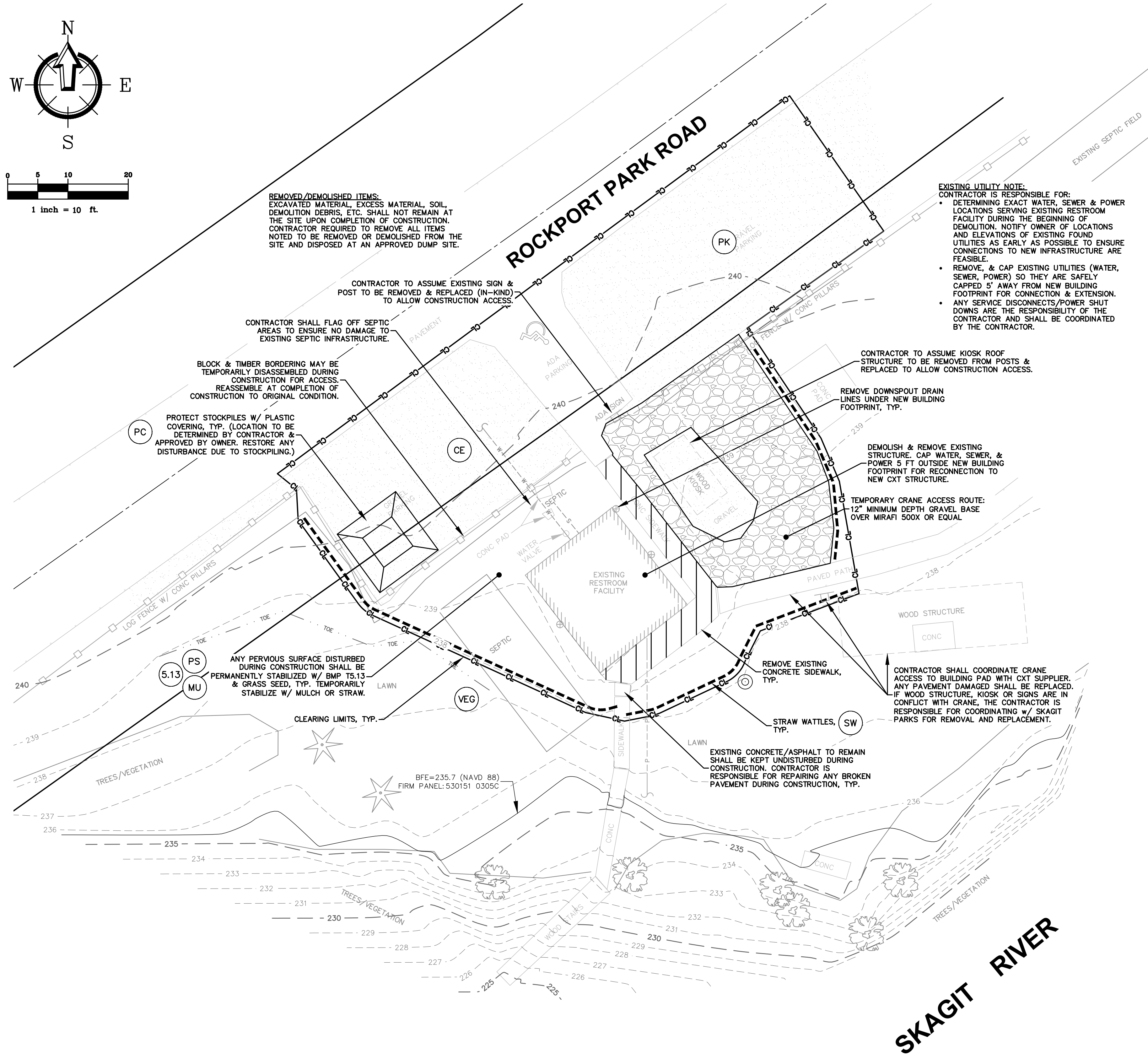
TESC LEGEND

- VEG WSDOE BMP C101 PRESERVING NATURAL VEGETATION
- CE WSDOE BMP C105 STABILIZED CONSTRUCTION EXIT
- PK WSDOE BMP C107 PARKING AREA STABILIZATION
- PS WSDOE BMP C120 TEMPORARY AND PERMANENT SEEDING
- MU WSDOE BMP C121 MULCHING
- PC WSDOE BMP C123 PLASTIC COVERING
- 5.13 WSDOE BMP T5.13 SOIL AMENDMENT
- SW WSDOE BMP C235 STRAW WATTLES
- CL WSDOE BMP C103 OR BMP C104 CLEARING LIMITS



EROSION CONTROL NOTES

1. A COPY OF THE APPROVED TESC PLAN MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
2. APPROVAL OF THIS TEMPORARY EROSION & SEDIMENTATION CONTROL (TESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STRUCTURES, DRIVEWAYS OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
3. THE IMPLEMENTATION OF THIS TESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT AND UPGRADING OF THESE TESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED.
4. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING CONSTRUCTION, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE CONSTRUCTION.
5. TESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, UNLESS REVISED BY A CERTIFIED EROSION AND SEDIMENT CONTROL LEAD. TESC FACILITIES SHALL BE INSTALLED IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER DRAINAGE SYSTEM OR VIOLATE APPLICABLE WATER STANDARDS.
6. THE TESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE TESC FACILITIES SHALL BE UPGRADED (E.G., ADDITIONAL SUMPS, RELOCATION OF DITCHES AND SILT FENCES, ETC.) AS NEEDED FOR UNEXPECTED STORM EVENTS.
7. THE TESC FACILITIES SHALL BE INSPECTED DAILY BY THE CESCL AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTION.
8. ANY AREA NEEDING TESC MEASURES, NOT REQUIRING IMMEDIATE ATTENTION, SHALL BE ADDRESSED WITHIN FIFTEEN (15) DAYS.
9. THE TESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 24 HOURS FOLLOWING A STORM EVENT THAT PRODUCES RUNOFF FROM THE SITE.
10. WASH PADS MAY BE NECESSARY TO ENSURE PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
11. MULCHING OF ANY TYPE SHALL BE INSTALLED PER THE RATES AND STANDARDS PRESENTED IN VOL. II, TABLE II-3.6 OF THE STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON, 2019 EDITION BY DEPARTMENT OF ECOLOGY.
12. ALL WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.
13. EROSION & SEDIMENTATION CONTROL FACILITIES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DETAILS ON THIS PLAN. LOCATIONS MAY BE MOVED TO SUIT FIELD CONDITIONS, SUBJECT TO APPROVAL BY THE CONTRACTOR'S CESCL OR ENGINEER OF RECORD.
14. COVER ALL DIRT/TOPSOIL PILES WITH PLASTIC SHEETING (BMP C123) DURING CONSTRUCTION WHEN NOT IN USE.
15. NETS AND/OR EROSION CONTROL BLANKETS (BMP C122) MAY BE USED IN LIEU OF TEMPORARY MULCHING.
16. CONSTRUCTION SCHEDULE- PENDING APPROVAL OF PLANS FROM JURISDICTIONS.
17. ADDITIONAL BMPs MAY BE USED OR REQUIRED AS CONDITIONS WARRANT. BMPs SHALL BE INSTALLED PER RECOMMENDATIONS IN THE DOE STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON, CURRENT EDITION.



EXISTING UTILITY NOTE:
 CONTRACTOR IS RESPONSIBLE FOR:
 • DETERMINING EXACT WATER, SEWER & POWER LOCATIONS SERVING EXISTING RESTROOM FACILITY DURING THE BEGINNING OF DEMOLITION. NOTIFY OWNER OF LOCATIONS AND ELEVATIONS OF EXISTING FOUND UTILITIES AS EARLY AS POSSIBLE TO ENSURE CONNECTIONS TO NEW INFRASTRUCTURE ARE FEASIBLE.
 • REMOVE, & CAP EXISTING UTILITIES (WATER, SEWER, POWER) SO THEY ARE SAFELY CAPPED 5' AWAY FROM NEW BUILDING FOOTPRINT FOR CONNECTION & EXTENSION.
 • ANY SERVICE DISCONNECTS/POWER SHUT DOWNS ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE COORDINATED BY THE CONTRACTOR.



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REV.	DATE	DESCRIPTION

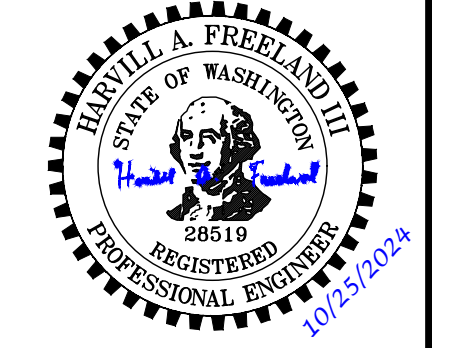
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PROJECT LOCATION:
CXT AT HOWARD MILLER STEELHEAD PARK
 5288B ROCKPORT PARK ROAD
 ROCKPORT, WA 98283

DRAWN BY: MPM
CHECKED BY: HAF

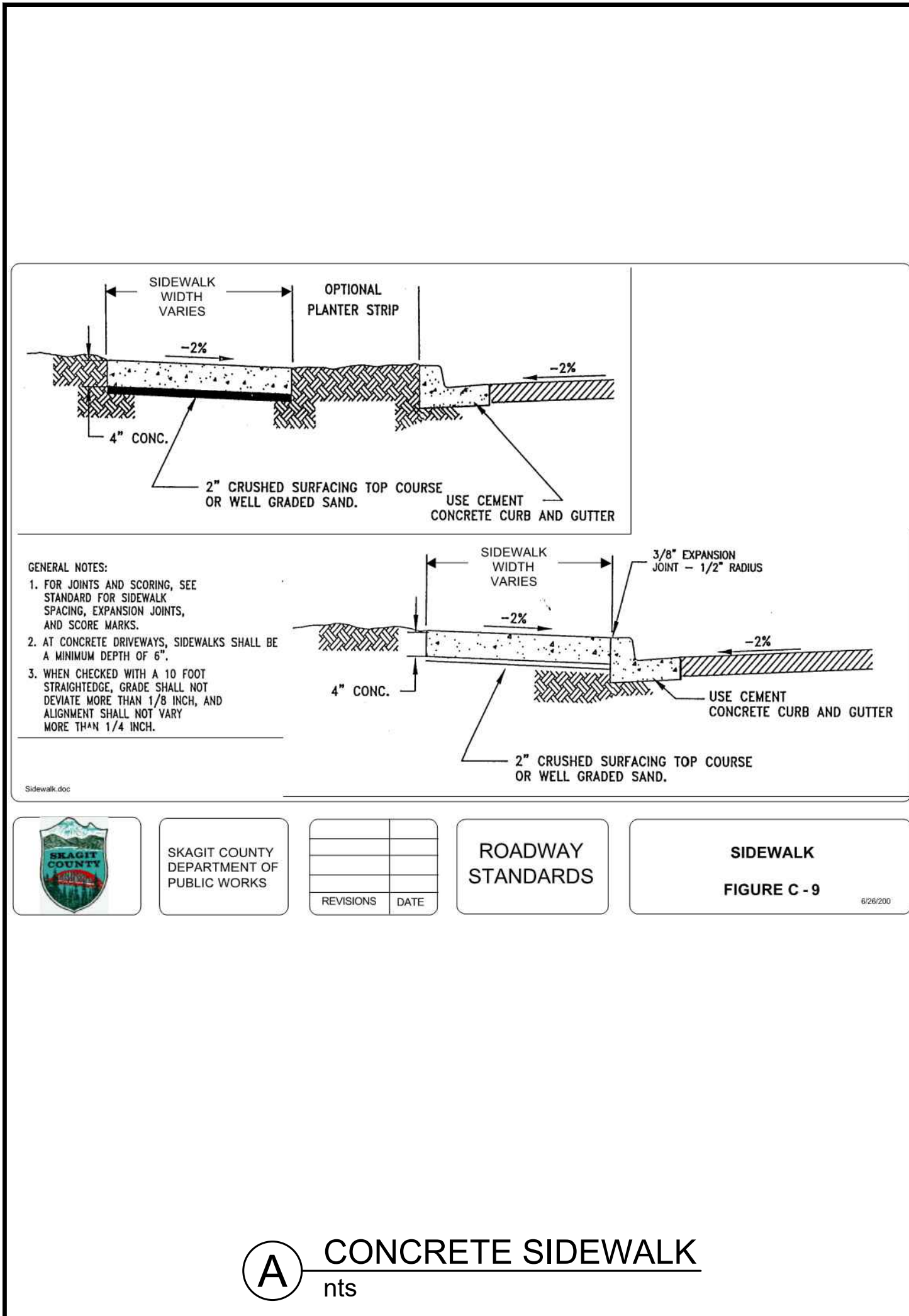
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SHEET CONTENTS:
DEMO & EROSION CONTROL PLAN



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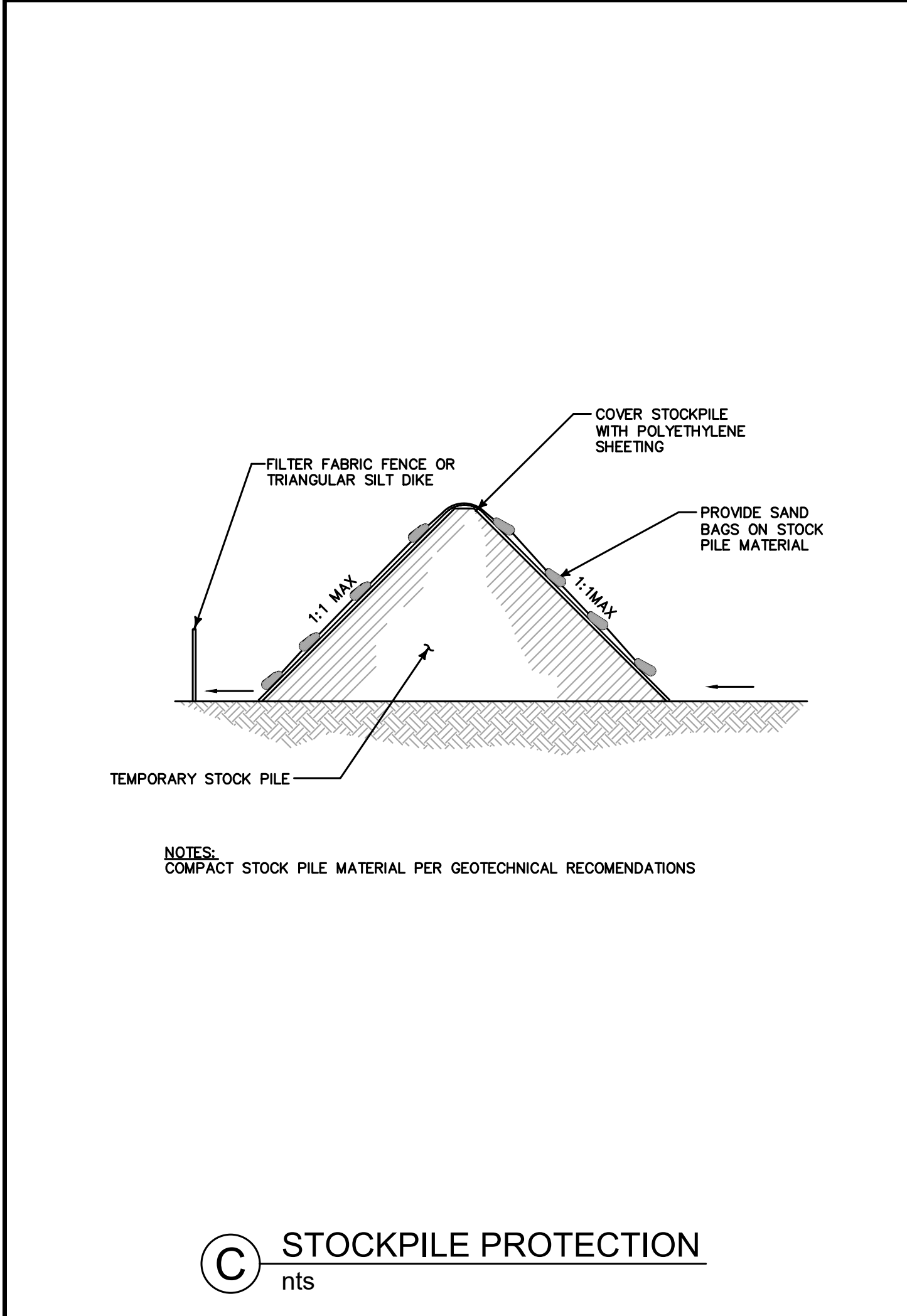
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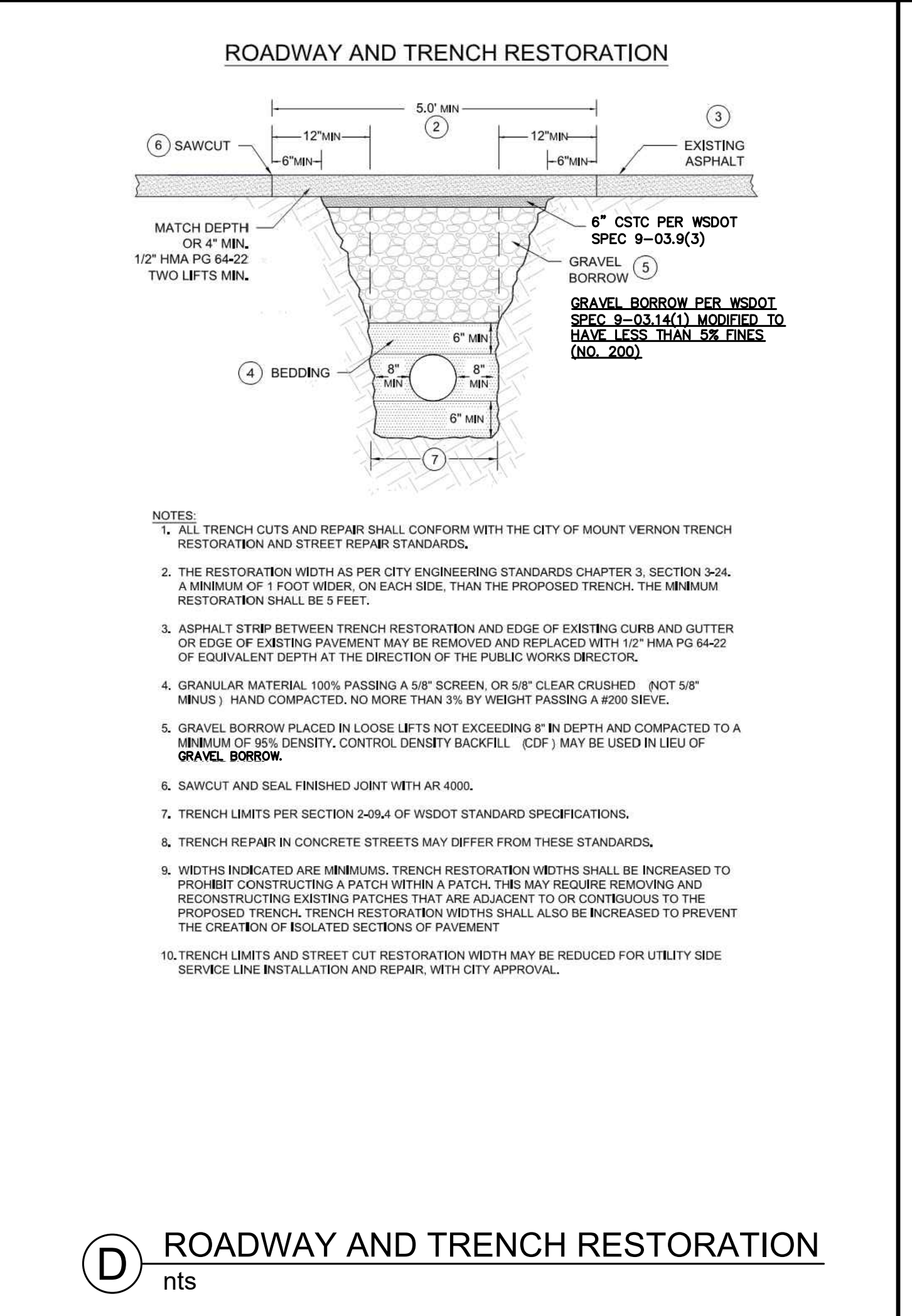
A CONCRETE SIDEWALK
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- BMP 15.13 GENERAL NOTES**
- ESTABLISHING A MINIMUM SOIL QUALITY AND DEPTH IS NOT THE SAME AS PRESERVATION OF NATURALLY OCCURRING SOIL AND VEGETATION. HOWEVER, ESTABLISHING A MINIMUM SOIL QUALITY AND DEPTH WILL PROVIDE IMPROVED ON-SITE MANAGEMENT OF STORMWATER FLOW AND WATER QUALITY. SOIL ORGANIC MATTER CAN BE ATTAINED THROUGH NUMEROUS MATERIALS SUCH AS COMPOST, COMPOSTED WOODY MATERIAL, BIOSOLIDS, AND FOREST PRODUCT RESIDUALS. IT IS IMPORTANT THAT THE MATERIALS USED TO MEET THE SOIL QUALITY AND DEPTH BMP BE APPROPRIATE AND BENEFICIAL TO THE PLANT COVER TO BE ESTABLISHED. LIKEWISE, IT IS IMPORTANT THAT IMPORTED TOPSOILS IMPROVE SOIL CONDITIONS AND DO NOT HAVE AN EXCESSIVE PERCENT OF CLAY FINES. THIS BMP CAN BE CONSIDERED INFEASIBLE ON TILL SOIL SLOPES GREATER THAN 3% PERCENT.
- DESIGN GUIDELINES**
- SOIL RETENTION: RETAIN, IN AN UNDISTURBED STATE, THE DUFF LAYER AND NATIVE TOPSOIL TO THE MAXIMUM EXTENT PRACTICABLE. IN ANY AREAS REQUIRING GRADING REMOVE AND STOCKPILE THE DUFF LAYER AND TOPSOIL ON SITE IN A DESIGNATED, CONTROLLED AREA, NOT ADJACENT TO PUBLIC RESOURCES AND CRITICAL AREAS, TO BE REAPPLIED TO OTHER PORTIONS OF THE SITE WHERE FEASIBLE.
- SOIL QUALITY:** ALL AREAS SUBJECT TO CLEARING AND GRADING THAT HAVE NOT BEEN COVERED BY IMPERVIOUS SURFACE, INCORPORATED INTO A DRAINAGE FACILITY OR ENGINEERED AS STRUCTURAL FILL OR SLOPE SHALL, AT PROJECT COMPLETION, DEMONSTRATE THE FOLLOWING:
- A TOPSOIL LAYER WITH A MINIMUM ORGANIC MATTER CONTENT OF 10% DRY WEIGHT IN PLANTING BEDS, AND 5% ORGANIC MATTER CONTENT IN TURF AREAS, AND A PH FROM 6.0 TO 8.0 OR MATCHING THE PH OF THE UNDISTURBED SOIL. THE TOPSOIL LAYER SHALL HAVE A MINIMUM DEPTH OF EIGHT INCHES EXCEPT WHERE TREE ROOTS LIMIT THE DEPTH OF INCORPORATION OF AMENDMENTS NEEDED TO MEET THE CRITERIA. SUBSOILS BELOW THE TOPSOIL LAYER SHOULD BE SCARIFIED AT LEAST 4 INCHES WITH SOME INCORPORATION OF THE UPPER MATERIAL TO AVOID STRATIFIED LAYERS, WHERE FEASIBLE.
 - MULCH PLANTING BEDS WITH 2 INCHES OF ORGANIC MATERIAL.
 - USE COMPOST AND OTHER MATERIALS THAT MEET THESE ORGANIC CONTENT REQUIREMENTS:
 - THE ORGANIC CONTENT FOR "PRE-APPROVED" AMENDMENT RATES CAN BE MET ONLY USING COMPOST MEETING THE COMPOST SPECIFICATION FOR BIORETENTION (BMP 17.30), WITH THE EXCEPTION THAT THE COMPOST MAY HAVE UP TO 35% BIOSOLIDS OR MANURE. THE COMPOST MUST ALSO HAVE AN ORGANIC MATTER CONTENT OF 40% TO 65%, AND A CARBON TO NITROGEN RATIO BELOW 25:1. THE CARBON TO NITROGEN RATIO MAY BE AS HIGH AS 35:1 FOR PLANTINGS COMPOSED ENTIRELY OF PLANTS NATIVE TO THE PUGET SOUND LOWLANDS REGION.
 - CALCULATED AMENDMENT RATES MAY BE MET THROUGH USE OF COMPOSTED MATERIALS MEETING (A) ABOVE, OR OTHER ORGANIC MATERIALS AMENDED TO MEET THE CARBON TO NITROGEN RATIO REQUIREMENTS, AND MEETING THE CONTAMINANT STANDARDS OF GRADE A COMPOST.
- THE RESULTING SOIL SHOULD BE CONDUCTIVE TO THE TYPE OF VEGETATION TO BE ESTABLISHED.
- IMPLEMENTATION OPTIONS:** THE SOIL QUALITY DESIGN GUIDELINES LISTED ABOVE CAN BE MET BY:
- IMPORT TOPSOIL MIX OF SUFFICIENT ORGANIC CONTENT AND DEPTH TO MEET THE REQUIREMENTS.
- GRASS SEED MIX**
- GRASS SEED SHALL BE 3-WAY RYEGRASS SEED MIX OR EQUAL W/ RATE OF 10 LBS PER 1,000 SF.

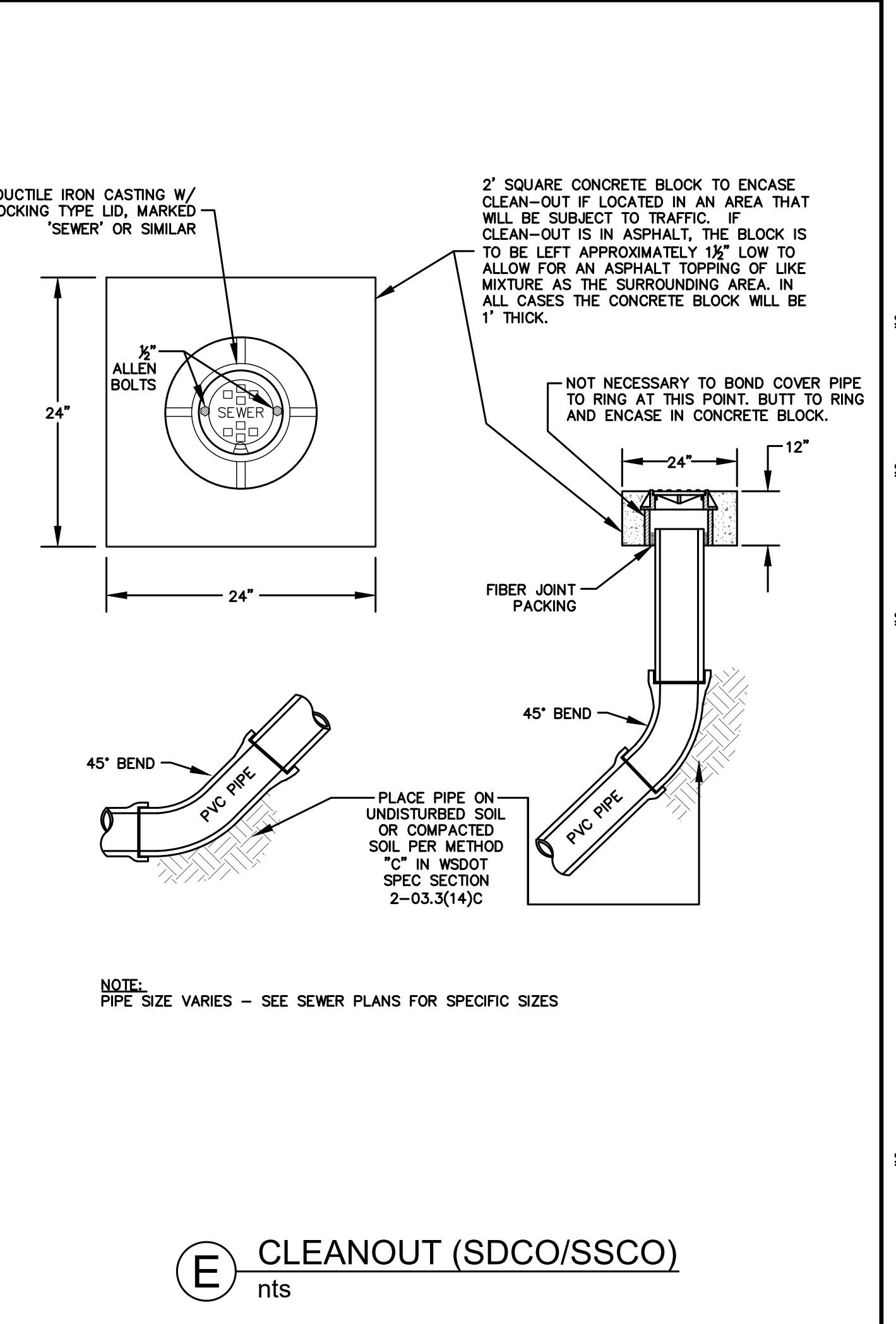
B LAWN RESTORATION (TOPSOIL & GRASS SEED MIX)
nts



C STOCKPILE PROTECTION
nts



D ROADWAY AND TRENCH RESTORATION
nts



E CLEANOUT (SDCO/SSCO)
nts

- SWPPP ELEMENT 1: MARK CLEARING LIMITS.**
- THE PROJECT SITE IS CONTAINED WITHIN A DEVELOPED COMPLEX. LIMITS OF DISTURBANCE ARE MARKED AS CLEARING LIMITS ON THE PLANS. EXISTING VEGETATION AND GRASS SHALL BE MAINTAINED IN AN UNDISTURBED STATE TO THE MAXIMUM EXTENT POSSIBLE. THERE ARE NO AREAS AND WATER QUALITY TO BE RETAINED OR REMOVED WITHIN THE PROJECT LIMITS. MARK LIMITS OF DISTURBANCE WITH HIGH VISIBILITY ORANGE SAFETY BARRIER FENCING.
- SWPPP ELEMENT 2: ESTABLISH CONSTRUCTION ACCESS.**
- A STABILIZED CONSTRUCTION ENTRANCE WILL BE INSTALLED AT LOCATIONS IDENTIFIED ON THE PLAN FOR ACCESS. ALL CONSTRUCTION TRAFFIC, SUCH AS PERSONAL VEHICLES, WORK TRUCKS, ETC. THAT WILL ROUTINELY LEAVE THE SITE SHALL REMAIN ON EXISTING PAVED SURFACES AS MUCH AS POSSIBLE. CONSTRUCTION PERSONNEL, VEHICLES, AND EQUIPMENT SHALL NOT BLOCK OR OBSTRUCT ACCESS IN THE PARKING LOT. CONSTRUCTION TRAFFIC MAY ONLY LEAVE THE EXISTING STABILIZED SURFACES IF NECESSARY. MATERIAL TRANSPORTERS AS LOW AS POSSIBLE. DISTURBANCE IS REPAIRED TO ORIGINAL CONDITION. PAVED ROADS WILL BE CLEANED AT THE END OF EACH DAY AND SEDIMENT TRANSPORTED TO ROADS WILL BE SWEEP AND DISPOSED OF AT A CONTROLLED DISPOSAL AREA. BMPs CONSIDERED FOR THIS ELEMENT INCLUDE: HOUSEKEEPING/MAINTENANCE BMP; DAILY STREET SWEEPING AND BMP C105: STABILIZED CONSTRUCTION ENTRANCE.
- SWPPP ELEMENT 3: CONTROL FLOW RATES.**
- THE PROPOSED PROJECT IS CONTAINED WITHIN A COMPLETELY DEVELOPED COMPLEX. CONSTRUCTION WILL BE LOCATED WITHIN AREA THAT IS ALREADY PAVED. PEAK FLOWS DURING CONSTRUCTION ARE NOT EXPECTED TO EXCEED EXISTING FLOW RATES. THIS PROJECT DOES NOT REQUIRE STORMWATER DETENTION. NO ADDITIONAL DOWNSTREAM ANALYSIS IS NECESSARY SINCE THE PROJECT WILL REPLACE AN EXISTING DEVELOPMENT. PROPOSED FACILITIES WILL MIMIC EXISTING FLOWS FROM THE SITE. NO SEDIMENT LADEN WATER SHALL DISCHARGE TO THE DRAINAGE SYSTEM. NO STORMWATER INFILTRATION FACILITIES WILL BE INSTALLED AS A PART OF THIS PROJECT.
- SWPPP ELEMENT 4: INSTALL SEDIMENT CONTROLS.**
- SEDIMENT CONTROLS WORK IN CONJUNCTION WITH BMPs IN ELEMENT #5: SOIL STABILIZATION TO RETAIN SEDIMENT ON SITE TO THE MAXIMUM AMOUNT FEASIBLE. EXISTING SOIL SHALL BE EXPOSED AND UNWORKED SOIL SHALL BE MAINTAINED IN AN UNDISTURBED STATE TO THE MAXIMUM EXTENT PRACTICABLE. STRAW WATTLES WILL BE INSTALLED ALONG THE DOWNSTREAM END OF THE WORK LIMITS IF NECESSARY. ALSO, IF EXCAVATED MATERIAL OR FILL MATERIAL IS PLACED WITHIN THE PROJECT SITE SUCH THAT RUNOFF FROM THE MATERIAL WOULD FLOW OFF SITE, THEN SEDIMENT CONTROLS, SUCH AS 12" X 12" STOCKPILES THAT BE INSTALLED DOWNHILL FROM THE EXCAVATED MATERIAL. ANY TEMPORARY DRAINAGE CHANNELS THAT MAY BE REQUIRED DURING CONSTRUCTION WILL BE STABILIZED WITH LININGS AND CHECK DAMS. BMPs CONSIDERED FOR THIS ELEMENT INCLUDE: BMP C231: BRUSH BARRIER, BMP C232: GRAVEL FILTER BERM, BMP C233: SILT FENCE AND BMP C235: STRAW WATTLES.
- SWPPP ELEMENT 5: STABILIZE SOILS.**
- EXISTING SOIL AND GROUND COVER SHALL BE RETAINED AND SHALL REMAIN UNDISTURBED TO THE MAXIMUM EXTENT PRACTICABLE. ANY BMPs THAT CANNOT BE INSTALLED PRIOR TO GRADING OR SOIL DISTURBANCE SHALL BE INSTALLED AND MADE OPERABLE IMMEDIATELY AFTER THE DISTURBANCE. DISTURBED SOILS WILL BE PERMANENTLY STABILIZED ON SITE WITH PAVEMENT OR PERMANENT PLANTINGS AND SEEDING. ALL EXPOSED AND UNWORKED SOIL WILL BE TEMPORARILY STABILIZED WITH SEEDING, MULCH, STRAW, NETS AND BLANKETS, OR PLASTIC COVERING PER DOE STANDARDS. NO SOIL WILL BE EXPOSED AND UNWORKED FOR MORE THAN SEVEN DAYS BETWEEN MAY 1 AND SEPTEMBER 30. NO SOIL WILL BE EXPOSED AND UNWORKED FOR MORE THAN TWO DAYS BETWEEN OCTOBER 1 AND FEBRUARY 28. SOIL STOCKPILES MUST BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES. PLASTIC COVERING SHOULD BE INSTALLED ON ALL STOCKPILES THAT ARE NOT IN IMMEDIATE USE. STRAW WATTLES AND/OR SILT FENCE SHOULD ALSO BE INSTALLED AROUND THE PERIMETER OF SUCH STOCKPILES. AS RECOMMENDED IN ELEMENT 4, EXCAVATED SOIL MATERIAL SHOULD BE PLACED UPHILL FROM THE EXCAVATED AREAS. PROPOSED WORK IS LINEAR AND WILL BE UNDER THE CONTROL OF ONE GENERAL CONTRACTOR. THE CONTRACTOR SHALL ENSURE THAT APPROPRIATE CREWS AND MATERIALS ARE AVAILABLE ON SITE TO COMPLETELY STABILIZE THE SITE PRIOR TO FOUW WEATHER OR SITE CONDITIONS. BMPs CONSIDERED FOR THIS ELEMENT INCLUDE: BMP C120: TEMPORARY AND PERMANENT SEEDING, BMP C121: MULCHING, BMP C122: NETS AND BLANKETS AND BMP C123: PLASTIC COVERING.
- SWPPP ELEMENT 6: PROTECT SLOPES.**
- THE SITE IS FLAT WITH GENTLE GRADES ON SITE. NO SIGNIFICANT CUT OR FILL SLOPES ARE PROPOSED AS A PART OF THIS PROJECT.
- SWPPP ELEMENT 7: PROTECT DRAIN INLETS.**
- ALL DRAINAGE INLETS MADE OPERABLE DURING CONSTRUCTION WILL BE PROTECTED SO THAT NO STORMWATER MAY ENTER THE DRAINAGE SYSTEMS WITHOUT FILTRATION OR TREATMENT. IN ADDITION, EXISTING DRAINAGE INLETS NEAR THE PROJECT SITE WILL ALSO BE FITTED WITH TEMPORARY FILTER INSERTS OR OTHER APPLICABLE INLET PROTECTION. EXISTING INLETS THAT REQUIRE PROTECTION ARE IDENTIFIED ON THE CIVIL PLANS. ADDITIONAL INLET PROTECTIONS MAY BE REQUIRED IF SEDIMENT IS TRACKED ONTO PAVEMENT BEYOND THE CATCH BASINS THAT ARE IDENTIFIED ON THE PLANS. ALL APPROACH ROADS SHALL BE KEPT CLEAN AND ALL SEDIMENT AND STREET WASH WATER SHALL NOT BE ALLOWED TO ENTER STORM DRAINS WITHOUT PRIOR AND ADEQUATE TREATMENT UNLESS TREATMENT IS PROVIDED BEFORE THE STORM DRAIN DISCHARGES TO WATERS OF THE STATE. BMPs CONSIDERED FOR THIS ELEMENT INCLUDE: BMP C220: STORM DRAIN INLET PROTECTION.
- SWPPP ELEMENT 8: STABILIZE CHANNELS AND OUTLETS.**
- NO TEMPORARY OR PERMANENT CHANNELS ARE PROPOSED FOR THIS PROJECT. IF TEMPORARY CHANNELS BECOME NECESSARY DURING CONSTRUCTION, THEY SHALL BE DESIGNED AND BUILT WITH MINIMAL SLOPES (APPROXIMATELY 0.5%). SIDE SLOPES WILL BE LIMITED TO 2:1 AND WILL BE INSTALLED WITH ROLLED EROSION CONTROL PRODUCTS, PLASTIC, OR CLEAN GRAVEL.
- SWPPP ELEMENT 9: CONTROL POLLUTANTS.**
- ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS, THAT OCCUR ON SITE SHALL BE DISPOSED OF IN A MANNER THAT DOES NOT CONTAMINATE STORMWATER. DEMOLITION MATERIALS THAT WILL BE GROUND AND REUSED ON SITE SHALL BE COVERED AND ISOLATED FROM CONTACT WITH STORMWATER. COVER, CONTAINMENT, AND PROTECTION FROM VANDALISM SHALL BE PROVIDED FOR ALL CHEMICALS, LIQUID PRODUCTS, PETROLEUM PRODUCTS, AND NON-INERT WASTES PRESENT ON THE SITE. IF POSSIBLE, POTENTIAL STORMWATER POLLUTANTS SHOULD BE STORED INDOORS, IN LOCKABLE TRAILERS, OR IN SEALED SHIPPING CONTAINERS. MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES INVOLVING OIL CHANGES, HYDRAULIC SYSTEM DRAIN DOWN, SOLVENT AND DE-GREASING CLEANING OPERATIONS, FUEL TANK DRAIN DOWN AND REMOVAL, AND OTHER ACTIVITIES WHICH MAY RESULT IN DISCHARGE OR SPILLAGE OF POLLUTANTS TO THE GROUND OR INTO STORMWATER RUNOFF MUST BE CONDUCTED USING SPILL PREVENTION MEASURES, SUCH AS DRIP PANS. CONTAMINATED SURFACES SHALL BE CLEANED IMMEDIATELY FOLLOWING ANY DISCHARGE OR SPILL INCIDENT. EMERGENCY REPAIRS MAY BE PERFORMED ON-SITE USING TEMPORARY PLASTIC PLACED BENEATH AND, IF RAINING, OVER THE VEHICLE. IF WHEEL WASHES OR TIRE BATHS ARE INSTALLED, WASTEWATER FROM THESE BMPs SHALL BE DISCHARGED TO A SEPARATE ON-SITE TREATMENT SYSTEM OR TO THE SANITARY SEWER. SPECIAL PERMISSION FROM THE CITY OF BLAINE MUST BE GRANTED PRIOR TO DISCHARGING STORMWATER RUNOFF TO THE SEWER. AGRICULTURAL CHEMICALS WILL NOT BE APPLIED AT THIS SITE. WASHOUT OF CONCRETE TRUCKS AND HAND TOOLS (E.G. SCREEDS, RAKES, SHOVELS, FLOATS, OR TROWELS) WILL ONLY BE ALLOWED WITHIN FORMED AREAS AWAITING INSTALLATION OF CONCRETE OR WITHIN A DESIGNATED WASHOUT AREA ON SITE. IF POSSIBLE, ANY UNUSED CONCRETE IN THE TRUCK SHOULD BE RETURNED TO THE BATCH PLANT FOR RECYCLING.
- SWPPP ELEMENT 10: CONTROL DE-WATERING.**
- GROUNDWATER IS ASSUMED TO BE LOWER THAN THE PROPOSED UTILITIES. AS SUCH, NO DEWATERING IS ANTICIPATED AS A PART OF THIS PROJECT. IF DEWATERING DOES BECOME NECESSARY DURING CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A DEWATERING PLAN IN ACCORDANCE WITH CITY STANDARDS AND DEPT. OF ECOLOGY REQUIREMENTS. AS A PART OF THE PLAN, ALL DEWATERING WATER SHALL BE DISCHARGED TO A CONTROLLED CONVEYANCE SYSTEM FOR TREATMENT. CLEAN, NON-TURBID DEWATERING WATER SHOULD BE ROUTED DIRECTLY TO TRIBUTARIES OR WATERS OF THE STATE. HIGHLY-TURBID DEWATERING WATER SHALL BE HANDLED SEPARATELY FROM STORMWATER AND MAY BE PUMPED TO VEGETATED AREAS ON SITE OR TRUCKED OFF SITE FOR TREATMENT AND DISPOSAL.
- SWPPP ELEMENT 11: MAINTAIN BMPs.**
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPs SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL MAINTENANCE AND REPAIR SHALL BE CONDUCTED IN ACCORDANCE WITH BMP SPECIFICATIONS.
- SWPPP ELEMENT 12: MANAGE THE PROJECT.**
- PHASING OF CONSTRUCTION:
- THIS PROJECT WILL BE BUILT IN ONE PHASE. TO THE EXTENT PRACTICABLE, SITE DISTURBANCE, CLEARING, AND CONSTRUCTION WILL BE SCHEDULED APPROPRIATELY TO MINIMIZE THE TIME THAT SOIL MAY BE EXPOSED. CLEARING AND GRADING ACTIVITIES WILL OCCUR AFTER THE APPLICABLE PERMITS HAVE BEEN OBTAINED. WHEN ESTABLISHING CLEARING AND GRADING AREAS, CONSIDERATION WILL BE GIVEN TO MINIMIZING REMOVAL OF EXISTING VEGETATION AND MINIMIZING DISTURBANCE AND COMPACTION OF NATIVE SOILS EXCEPT AS NEEDED FOR BUILDING PURPOSES.
- SEASONAL WORK LIMITATIONS:
- FROM OCTOBER 1 THROUGH APRIL 30, SOIL WILL NOT REMAIN EXPOSED AND UNWORKED FOR MORE THAN 2 DAYS. FROM MAY 1 THROUGH SEPTEMBER 30, SOIL WILL NOT REMAIN EXPOSED AND UNWORKED FOR MORE THAN 7 DAYS. IN ADDITION, WEATHER CONDITIONS SHALL BE CONTINUALLY MONITORED (INCLUDING BEFORE HOLIDAYS AND WEEKENDS) FOR PURPOSES OF PREPARING THE SITE FOR PREDICTED WEATHER CONDITIONS. BMPs THAT ARE EFFECTIVE IN STABILIZING SOILS AND PROTECTING THEM FROM EXPOSURE TO RAIN AND WIND OR OTHER CLIMATIC CONDITIONS WILL BE IMPLEMENTED THROUGHOUT THE PROJECT. INSPECTION AND EVALUATION OF THE EFFECTIVENESS OF THE BMPs WILL OCCUR ON A DAILY BASIS. IN THE EVENT OF A FORECASTED PRECIPITATION EVENT, THE CONTRACTOR SHALL EVALUATE EXISTING BMPs ON SITE AND SHALL IMPLEMENT ADDITIONAL BMPs IF THE EXISTING SITE CONDITIONS ARE INADEQUATE TO PREVENT RAINFALL FROM CONTACTING UNSTABILIZED SURFACES.
- INSPECTION AND MONITORING:**
- AS PREVIOUSLY MENTIONED, ALL BMPs WILL BE INSPECTED, MAINTAINED, AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. IN THE EVENT THAT INSPECTION AND/OR MONITORING REVEALS THAT THE BMPs IDENTIFIED IN THIS CONSTRUCTION SWPPP ARE INADEQUATE DUE TO THE ACTUAL DISCHARGE OF OR POTENTIAL TO DISCHARGE A SIGNIFICANT AMOUNT OF ANY POLLUTANT, THIS SWPPP SHALL BE APPROPRIATELY MODIFIED IN A TIMELY MANNER. A CESL IS NOT REQUIRED, BUT IS RECOMMENDED TO PERFORM EROSION CONTROL INSPECTIONS AND TO PROVIDE RECOMMENDATIONS FOR THIS PROJECT DURING CONSTRUCTION.
- MAINTENANCE OF THE CONSTRUCTION SWPPP:**
- THE CONSTRUCTION SWPPP WILL BE RETAINED ON SITE AND WILL BE UPDATED ON A REGULAR BASIS. A LOG WILL BE ATTACHED TO THE CONSTRUCTION SWPPP TO FACILITATE REGULAR UPDATES. MODIFICATIONS TO THE CONSTRUCTION SWPPP WILL BE MADE WHENEVER THERE IS A SIGNIFICANT CHANGE IN THE DESIGN, CONSTRUCTION, OPERATION, OR MAINTENANCE OF ANY BMP. IF THE CONTRACTOR DOES NOT IMPLEMENT BMPs SPECIFIED ON THESE PLANS AND IF SITE CONDITIONS DO NOT REQUIRE THE BMPs, THE CONTRACTOR SHALL PROVIDE WRITTEN JUSTIFICATION IN THE SWPPP FOR WHY THE BMP IS UNNECESSARY.
- SWPPP ELEMENT 13: PROTECT LOW IMPACT DEVELOPMENT BMPs.**
- LOW IMPACT DEVELOPMENT BMPs TO BE PROTECTED DURING CONSTRUCTION INCLUDE SOIL QUALITY AND DEPTH: BMP 15.13. CONSTRUCTION TRAFFIC MUST KEEP OFF PROPOSED LAWN AREAS TO BE TREATED WITH SOIL AMENDMENTS.

FREELAND & ASSOCIATES

2500 Elm Street, Suite 1
Bellevue, WA 98225
T: 360.650.1408
F: 360.650.1401

BY:	
DATE:	
DESCRIPTION:	
REV:	
DATE:	

SKAGIT COUNTY PARKS & RECREATION

1730 CONTINENTAL PLACE
MOUNT VERNON, WA 98273

CALL BEFORE YOU DIG
FOR BURIED UTILITY LOCATIONS
1-800-424-5655

CXT AT HOWARD MILLER STEELHEAD PARK

52888 ROCKPORT PARK ROAD
ROCKPORT, WA 98283

DRAWN BY: MPM
CHECKED BY: HAF

DESIGNED BY: MPM

DETAILS & NOTES

SHEET CONTENTS:

REGISTERED PROFESSIONAL ENGINEER

10/25/2024

JOB #: 24157
DATE: 10/25/2024
SHEET: C4

NOTES

- BUILDING IS DESIGNED TO COMPLY TO WITH THE 2021 INTERNATIONAL BUILDING CODE (IBC).
- DESIGN COMPLIES WITH THE PROVISIONS OF THE 2021 IBC FOR THE FOLLOWING LOADS:
 GROUND SNOW LOAD = 250 PSF
 ROOF SNOW LOAD = 210 PSF
 FLOOR LOAD = 400 PSF
 IBC DESIGN SPECTRAL RESPONSE $S_s = 1.527$, $S_1 = 0.748$
 SITE CLASS D
 RISK CATEGORY: II
 SEISMIC DESIGN CATEGORY: D
 BEARING WALL SYSTEM $R = 4.0$
 A-5 INTERMEDIATE PRECAST SHEARWALLS
 WIND - $V = 150$ MPH
 WIND - $V_{ASD} = 116$ MPH
 WIND EXPOSURE: C
 OCCUPANT LOAD: 3
 ***BUILDING IS NOT TO BE PLACED IN A LOCATION WHERE LOADS EXCEED THE VALUES ABOVE
 ***BUILDING IS NOT TO BE PLACED IN A WIND BORNE DEBRIS REGION
- CONSTRUCTION TYPE: V-B
 OCCUPANCY: B
 EXTERIOR WALLS: 1-HR RATED PER IBC TABLE 721.1(2), ITEM 4-1.1
 MINIMUM FIRE SEPARATION DISTANCE: 10' PER IBC TABLE 705.8
 MAXIMUM UNPROTECTED OPENING AREA: 3.04% (WALL W3, W4, W8 & W9)
- CONCRETE STRENGTH $f'_{ci} = 2500$ PSI INITIAL $f'_{c} = 5000$ PSI
 FINAL AIR ENTRAINMENT $6\% \pm 1 \frac{1}{2}\%$ IN PLASTIC CONCRETE.
 REINFORCING STEEL: ASTM A615 #3 GRADE 40, #4 AND LARGER GRADE 60
 $F_y=60$ KSI MINIMUM LAP 18" AT SPLICES. TIE BARS WITH DOUBLE ANNEALED 16 GA IRON WIRE. REINFORCING TO BE PLACED IN CENTER OF PANEL UNO.
 REINFORCING STEEL SHALL BE ACCURATELY PLACED, WELDED WIRE FABRIC (W.W.F.): ASTM A1064 GRADE 80, 4x4xW6.7xW6.7, $F_y=80$ KSI (OR EQUIVALENT), SMOOTH WIRE, MIN. LAP 2 SQUARES.
- EMBEDDED ITEMS IDENTIFIED ON DRAWINGS (i.e. PS-2, R301) REFER TO CXT STANDARD EMBEDMENT CATALOG.
- BACK OF PANELS TO HAVE SMOOTH TROWEL FINISH U.N.O. ALL SURFACES TO BE TEXTURED ARE NOTED ON PANEL DWG'S
- REFER TO SEPARATE CXT INCORPORATED SPECIFICATIONS COVERING DESIGN, MATERIALS, PRODUCTION, AND INSTALLATION CRITERIA FOR SPECIFIC STYLE OF BUILDING.
- ALL REBAR BENDS TO HAVE A MINIMUM RADIUS OF 6x THE BAR DIAMETER. ALL EMBEDDED CONDUIT TO HAVE THE MINIMUM OF 6" BEND RADIUS.
- INSTALLATION TO MEET APPLICABLE LOCAL, STATE & FEDERAL CODES, BY OTHERS.
- ADEQUATE PLUMBING FACILITIES MUST BE PROVIDED IN ACCORDANCE WITH 2021 IBC 2902.3.2 (NOT BY CXT).
- BUILDING IS UNCONDITIONED. SEASONAL USE ONLY. PLUMBING SYSTEM IS PROTECTED FROM FREEZING BY WINTERIZATION IN ACCORDANCE WITH CXT INSTRUCTIONS.
- BUILDING NOT TO BE LOCATED IN FLOOD ZONE
- SPECIAL INSPECTIONS REQUIRED BY 2021 IBC TABLE 1705 FOR CONCRETE, REBAR AND WELDING HAVE BEEN REVIEWED AND PER 2021 IBC 1704.2.5.1 ARE COVERED UNDER CXT INC'S PCI CERTIFICATION. CXT INC. HAS BEEN CERTIFIED BY THE PRECAST/PRE-STRESSED CONCRETE INSTITUTE (PCI), WITH A SCOPE OF C1 AND CERTIFICATION NUMBER 231589, TO BE AN APPROVED FABRICATOR. THIS CERTIFICATION EXPIRES ON 06/30/25.
- PAPER TOWEL DISPENSER TO BE PROVIDED ON-SITE BY OTHERS. NOT BY CXT, AND APPROVED BY LOCAL AHJ.

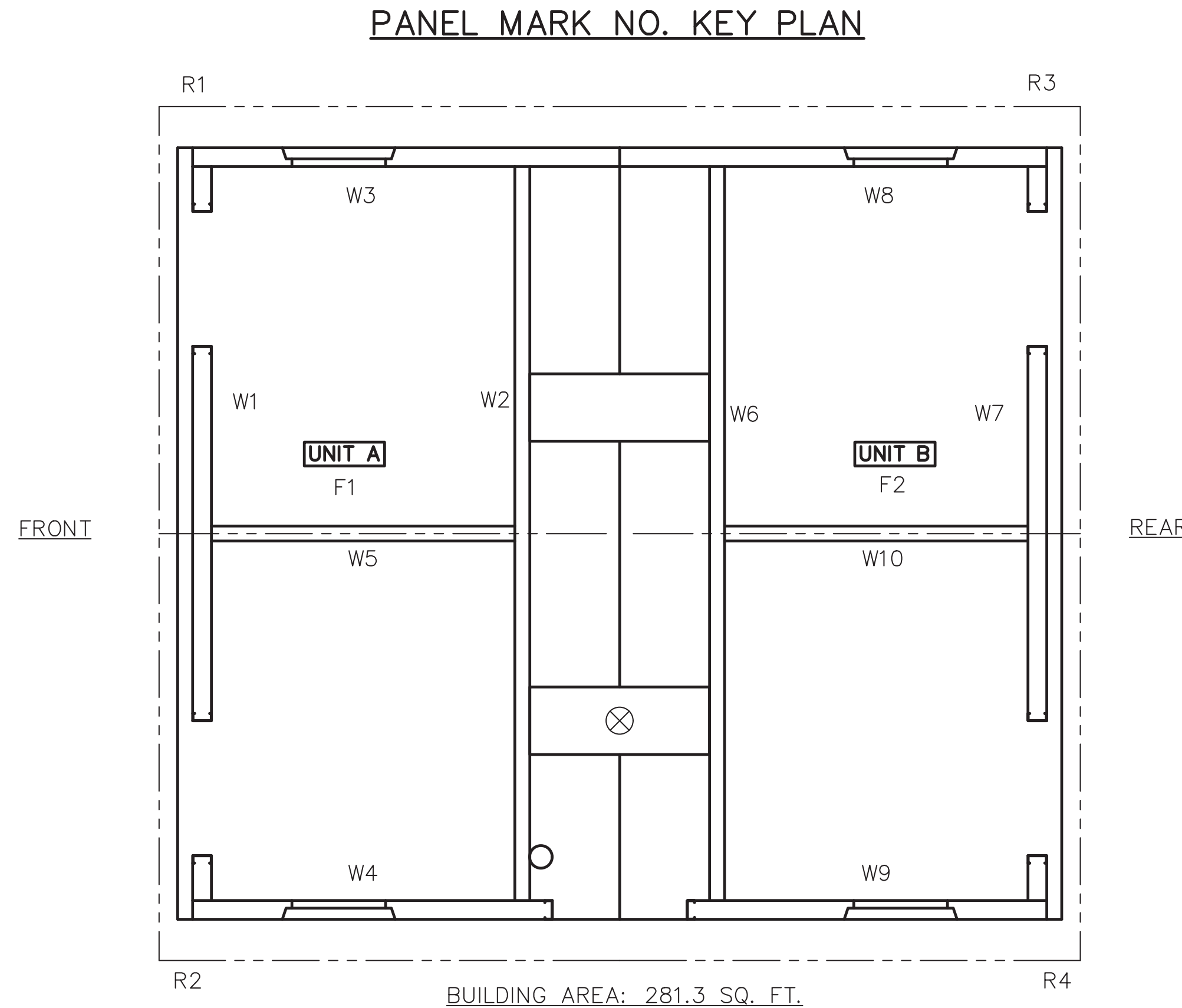
DENALI SECTIONAL

MANUFACTURED BY:
 CXT INC. (ID)
 6701 E. FLAMINGO AVE BLDG 300
 NAMP, ID 83687

SITE ADDRESS:
 HOWARD MILLER STEELHEAD PARK
 52804 ROCKPORT PARK ROAD
 ROCKPORT, WA 98283

INDEX OF DRAWINGS

NO.	TITLE
DNS-01	COVER SHEET
DNS-02	RIGGING DETAILS
DNS-03	FLOOR PLAN
DNS-04	BUILDING ELEVATIONS
DNS-05	INTERIOR ELEVATIONS
DNS-06	CASTING DETAILS
DNS-07	WALL PANEL W1
DNS-08	WALL PANEL W2
DNS-09	WALL PANEL W3
DNS-10	WALL PANEL W4
DNS-11	WALL PANEL W5
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DNS-20	ROOF SLAB R2
DNS-21	ROOF SLAB R3
DNS-22	ROOF SLAB R4
DNS-23	FOUNDATION DETAIL
DNS-24	FLOOR DRAIN LOCATIONS & BELOW FLOOR PIPING
DNS-25	WATER, WASTE & VENT PIPING PLANS & NOTES
DNS-26	PLUMBING SCHEDULE, DIAGRAMS & NOTES
DNS-27	ELECTRICAL NOTES & SCHEDULES
DNS-28	ELECTRICAL PLAN, LEGEND & NOTES
DNS-29	EMBEDDED MATERIALS



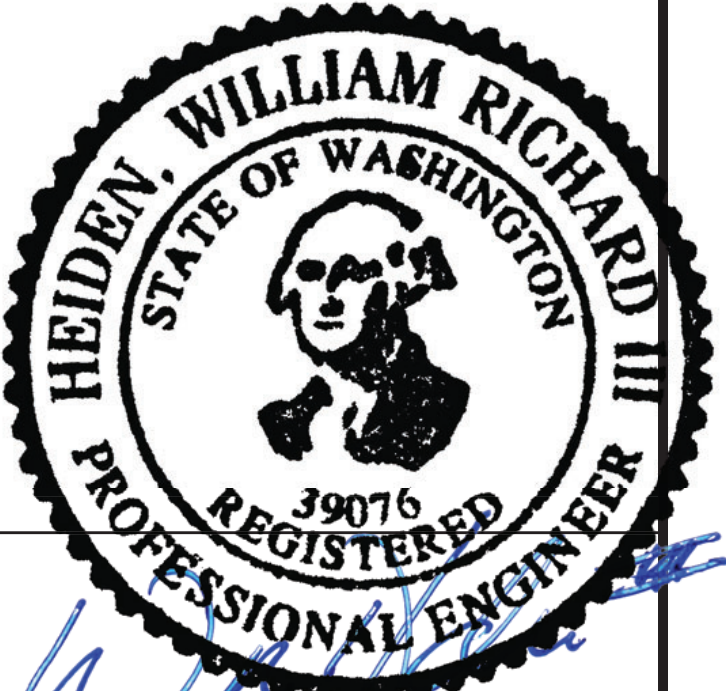
**UNDERGROUND PLUMBING TEST
 UPC 712.2**
 All underground plumbing shall be inspected and be under test with not less than a 10 foot head of water.

APPLICABLE CODES

- 2021 INTERNATIONAL BUILDING CODE W/ STATEWIDE AMENDMENTS
- 2017 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES, W/ STATEWIDE AMENDMENTS
- 2021 INTERNATIONAL FIRE CODE W/ STATEWIDE AMENDMENTS
- 2021 UNIFORM PLUMBING CODE W/ STATEWIDE AMENDMENTS
- 2023 NATIONAL ELECTRICAL CODE (NEC) W/ STATEWIDE AMENDMENTS
- 2021 INTERNATIONAL MECHANICAL CODE W/ STATEWIDE AMENDMENTS
- 2021 WASHINGTON STATE ENERGY CODE (2021 IECC)

SPECIAL CONDITIONS AND/OR LIMITATIONS

ACCESSIBILITY TO THIS BUILDING, INCLUDING PARKING, IS TO BE PROVIDED BY OTHER AND CONSTRUCTED IN ACCORDANCE WITH ALL LOCAL BUILDING CODES



EXPIRES April 23, 2025

August 9, 2024



6701 E Flamingo Ave Bldg 300 Nampa, ID 83687
 801 N. Highway 77 Hillsboro, TX 76645
 362 Waverly Road Williamstown, WV 26187

PROJECT TITLE
DENALI SECTIONAL
 BUILDING NUMBER DNS-057

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 CXT Incorporated

REV.	DESCRIPTION	APPROVAL	DATE
SCALE	N/A	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	N/A

COVER SHEET

DWG NO.	SHEET	REV.
DNS-01	1 29	0

CASTING TOLERANCES:

OVERALL LENGTH OR WIDTH	10 FT OR UNDER = ± 1/8"
10 TO 20 FT	= ± 1/8" -3/16"
20 TO 40 FT	= ± 1/4"
EDGE REINFORCEMENT TO BE NO MORE THAN 4" FROM FORM	
TOTAL THICKNESS	= -1/8, +1/4
VARIATION FROM SQUARE	= ± 1/8 PER 6 FT OF DIAGONAL
LOCAL SMOOTHNESS	= 1/4" IN 10 FT
SWEEP	= ± 1/4"
POSITION OF TENDONS	= ± 1/4"
POSITION OF BLOCKOUTS	= ± 1/4"
SIZE OF BLOCKOUTS	= ± 1/4"
POSITION OF EMBEDS	= ± 1/4"
TIPPING AND FLUSHNESS OF PLATES	= +1/16, -1/4
BOWING	= LENGTH/360
END SQUARENESS	= ± 1/8"

WASHINGTON STATE APPROVAL, TAG, & PE DRAWINGS (ECC ONLY) REQUIRED

WALL TEXTURE UPPER: BOARD & BATT
 WALL TEXTURE LOWER: FLAGSTONE
 WALL COLOR UPPER: JAVA BROWN
 WALL COLOR LOWER: MOUNTAIN BLEND

ROOF TEXTURE: CEDAR SHAKE
 ROOF COLOR: EVERGREEN

TRIM COLOR: DTM ALKYD ENAMEL BROWN

SEALER: STANDARD
 PACKAGE: STANDARD

Skagit County Planning & Development Services
REVIEWED FOR CODE COMPLIANCE 2021 IBC
 Permit # **BP24-0466**
 Occupancy Type **U - Park Bathrooms**
 Date **10/03/2024**
 Plans Examiner *[Signature]*

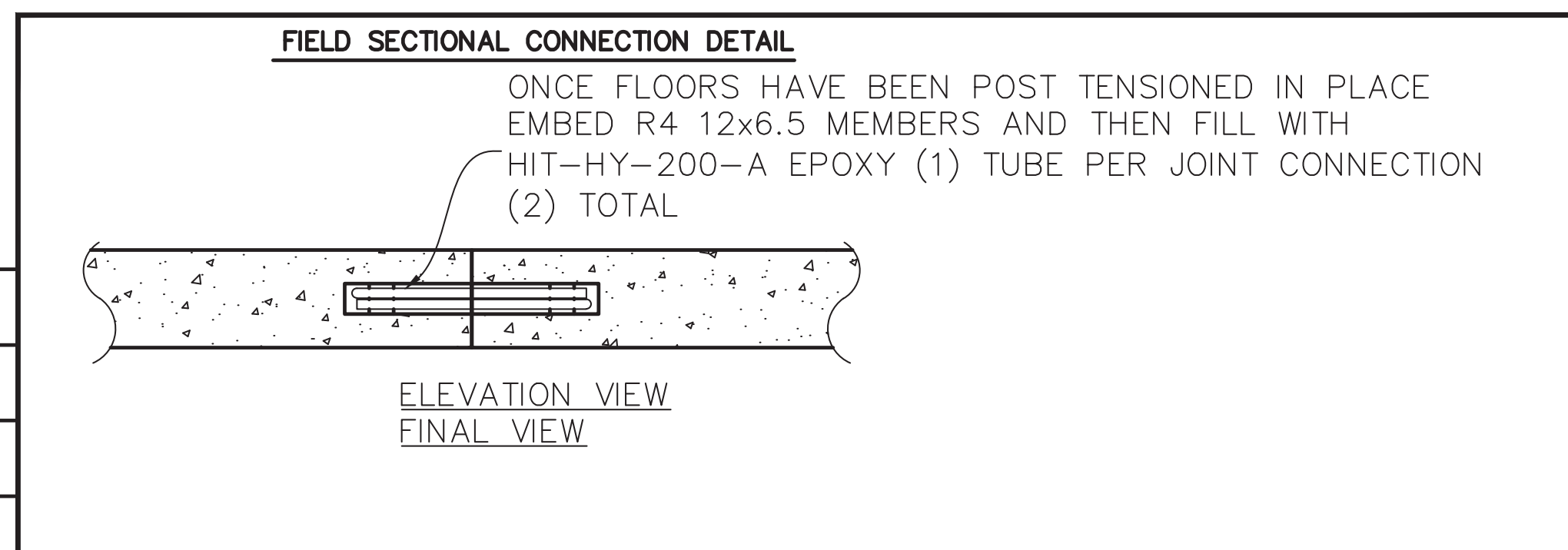
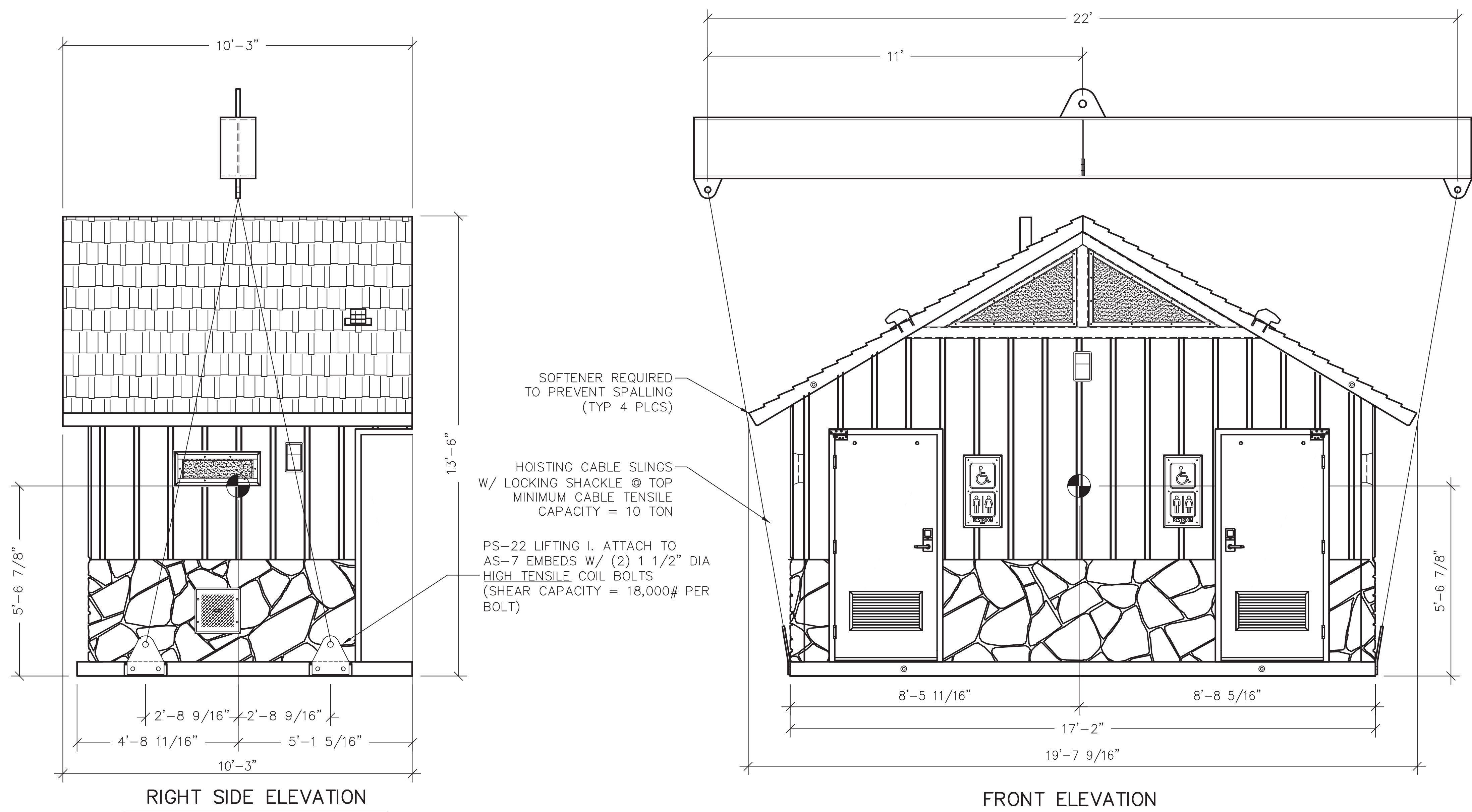
SPECIAL INSPECTIONS
 This Project was noted as needing Special Inspections. In accordance to Section 1704 of the International Building Code the Owner or registered professional is required to hire an independent testing agency to perform required special inspection and provide needed documentation to Skagit County that the inspection was preformed and compliant to the International Building Code.
 Compaction test for sub grade base for building

NOTES:

1. THE DENALI SECTIONAL STYLE BUILDING CONSISTS OF TWO SEPARATE UNITS TO BE PLACED AND JOINED AT THE PROJECT SITE. PROPER SITE PREPARATION AND HANDLING IS ESSENTIAL FOR THE SAFE AND PROPER INSTALLATION OF THE BUILDING.
2. PROVIDE SHALLOW TRENCH WITH ROLLED EDGES ALONG BUILDING JOINT LINES TO PREVENT TRAPPING MATERIAL BETWEEN UNITS BEING DRAWN TOGETHER.
3. PLACE UNITS AS CLOSE TO ONE ANOTHER AS POSSIBLE. SPACE BETWEEN UNITS SHOULD NOT EXCEED 1" AT INITIATION OF POST-TENSIONING. MAXIMUM ALLOWABLE FINISH JOINT SPACE BETWEEN UNITS SHALL BE 1/2".
4. POST-TENSIONING TO DRAW UNITS INTO CONTACT SHALL BE ACCOMPLISHED WITH EQUIPMENT PROVIDED BY CXT BY PROPERLY TRAINED PERSONNEL. INSTRUCTIONS PROVIDED BY CXT SHALL BE CAREFULLY ADHERED TO. ALL NECESSARY SAFETY PRECAUTIONS SHALL BE TAKEN BY INSTALLATION PERSONNEL. STRESS TENDONS TO DRAW UNITS TOGETHER AND TO RETAIN A MINIMUM EFFECTIVE FORCE IN EACH TENDON OF 2 KIPS AFTER ALL LOSSES.
5. AFTER COMPLETION OF BUILDING PLACEMENT, BLOCKOUTS AT POST-TENSIONING ANCHORAGE POINTS SHALL BE FILLED WITH NON-METALLIC, NON-SHRINK GROUT. PROVIDE SMOOTH, NEAT FINISH COMPATIBLE WITH SURROUNDING CONCRETE SURFACES. MATCH CONCRETE COLOR.
6. PROVIDE UTILITY CONNECTIONS (PLUMBING & ELECTRICAL) AS REQUIRED AND/OR AS CALLED FOR ON THE DRAWINGS.
7. FILL FLOOR BLOCKOUTS AFTER COMPLETION OF UTILITY HOOKUPS WITH CONCRETE. SLOPE TO DRAIN.

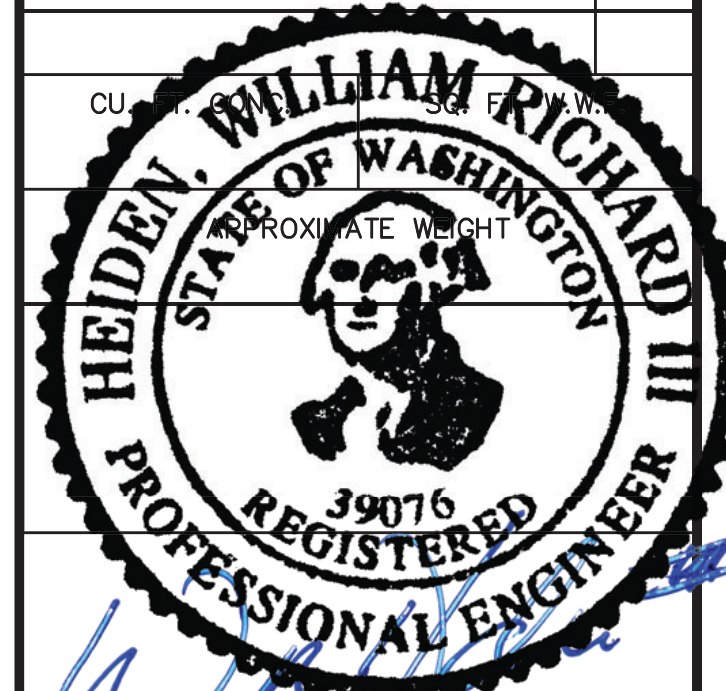
DENALI SECTIONAL

RECOMMENDED RIGGING AND INSTALLATION INSTRUCTIONS



SHIPPING WEIGHTS AND DIMENSIONS DNS-051				
SECTION	WEIGHT	LENGTH	WIDTH	HEIGHT
UNIT A	51,500	19'-8"	10'-3"	13'-6"
UNIT B	51,600	19'-8"	10'-3"	13'-6"

MATERIALS LIST	
ITEM	QTY
P.T. CABLE 23'-0"	4
CHUCKS & WEDGES	8
GROUT (BAGS)	4
HILTI HIT HY 200-a EPOXY	2
#4 REBAR 6.5"x12"	4



EXPIRES April 23, 2025
August 9, 2024



6701 E Flamingo Ave Bldg 300 Nampa, ID 83687
901 N. Highway 77 Hillsboro, TX 76645
362 Waverly Road Williamstown, WV 26187

PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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CXT Incorporated

REV.	DESCRIPTION	APPROVAL	DATE
SCALE	N/A	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	N/A

RIGGING DETAILS		
DWG NO.	SHEET	REV.
DNS-02	2 29	0

- NOTES:**
1. C.G. IS APPROXIMATE
 2. WEIGHT IS APPROXIMATE
 3. CHASE DOOR SHIPPED LOOSE & FIELD INSTALLED

LIGHTING AND VENTILATION REQUIREMENTS		
AREA	RESTROOM	CHASE
REQUIRED VENTILATION	54.00 SQ.FT	65.33 SQ.FT
PROVIDED VENTILATION	2.16 SQ.FT	2.61 SQ.FT
REQUIRED NATURAL LIGHTING	20.87 SQ.FT	20.00 SQ.FT
PROVIDED NATURAL LIGHTING	4.32 SQ.FT	5.23 SQ.FT
PROVIDED ARTIFICIAL LIGHTING	8.38 SQ.FT	0.00 SQ.FT ***

***ARTIFICIAL LIGHTING PROVIDED TO MEET REQUIRED FOOT CANDLES.

WINDOW & VENT SCHEDULE

SYMBOL	DESCRIPTION
A	MS-2 EMBED
B	MS-4 EMBED
C	MS-14 EMBED

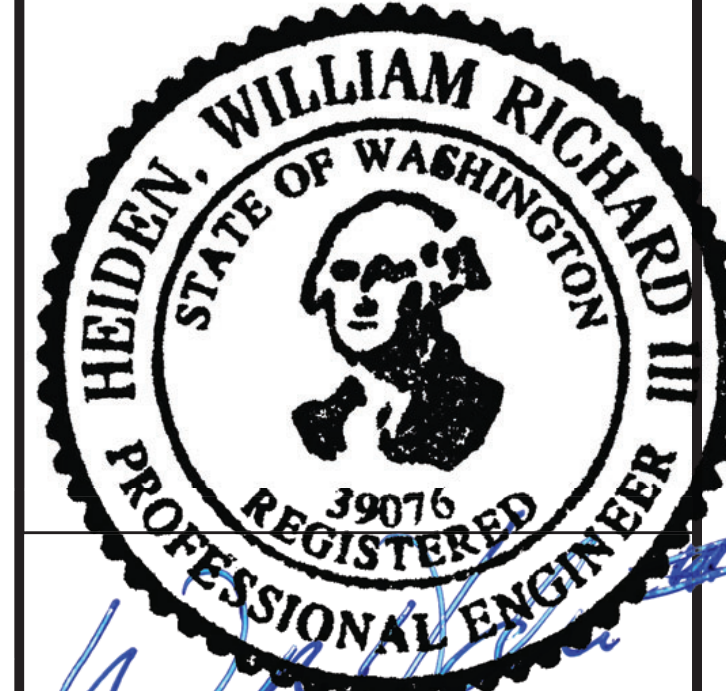
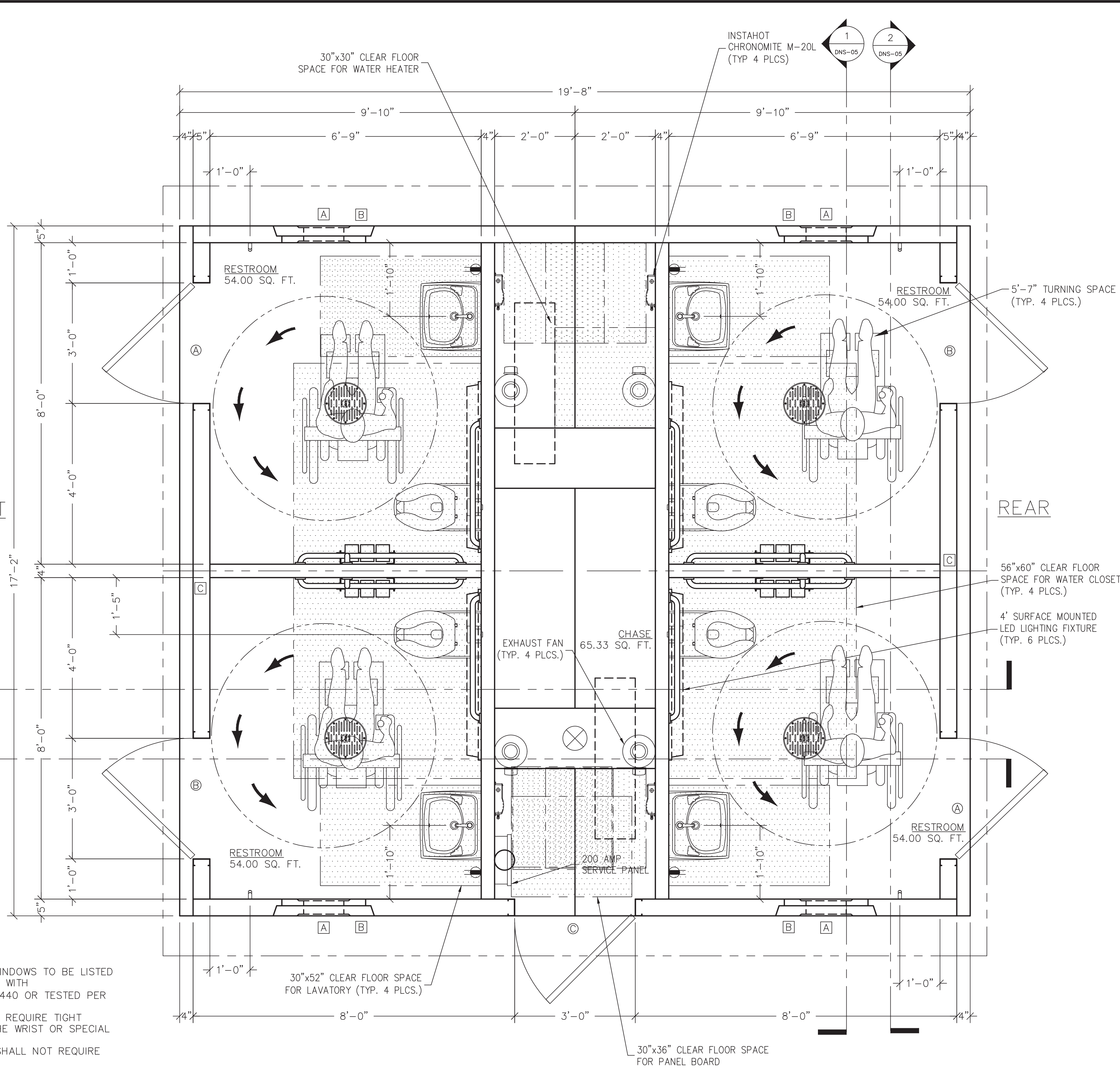
LEXAN SELF-IGNITION > 1000, SMOKE DENSITY < 75, CLASS CCI.

DOOR SCHEDULE		DOOR SIZE	MATERIAL	DOOR TYPE	LATCH	LOCK
A	GLAZING	3/0 x 6/8 x 1-3/4"	GALVANIZED STOP	LH REVERSE SWEEP	TRILGY DL4100 THRESHOLD	N/A
	FRAME	3/0 x 6/8 x 3-3/4"	NORTON DOOR CLOSER	3"	3' x 4" x 1/4"	LOUVER
B	GLAZING	3/0 x 6/8 x 1-3/4"	GALVANIZED STOP	RH REVERSE SWEEP	TRILGY DL4100 THRESHOLD	N/A
	FRAME	3/0 x 6/8 x 3-3/4"	NORTON DOOR CLOSER	3"	3' x 4" x 1/4"	LOUVER
C	GLAZING	3/0 x 6/8 x 1-3/4"	GALVANIZED STOP	RH REVERSE SWEEP	MORTISE THRESHOLD	N/A
	FRAME	3/0 x 6/8 x 3-3/4"	NORTON DOOR CLOSER	3"	3' x 4" x 1/4"	N/A

- ALL EXTERIOR DOORS AND WINDOWS TO BE LISTED AND LABELED AS COMPLIANT WITH AAMA/WDMA/CSA101/I.S.2/A440 OR TESTED PER ASTM E330.
- DOOR HARDWARE SHALL NOT REQUIRE TIGHT PINCHING OR TWISTING OF THE WRIST OR SPECIAL KNOWLEDGE TO OPERATE.
- UNLATCHING OF ANY DOOR SHALL NOT REQUIRE MORE THAN ONE OPERATION.

FRONT

REAR



EXPIRES April 23, 2025

August 9, 2024



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362 Waverly Road Williamstown, WV 26187

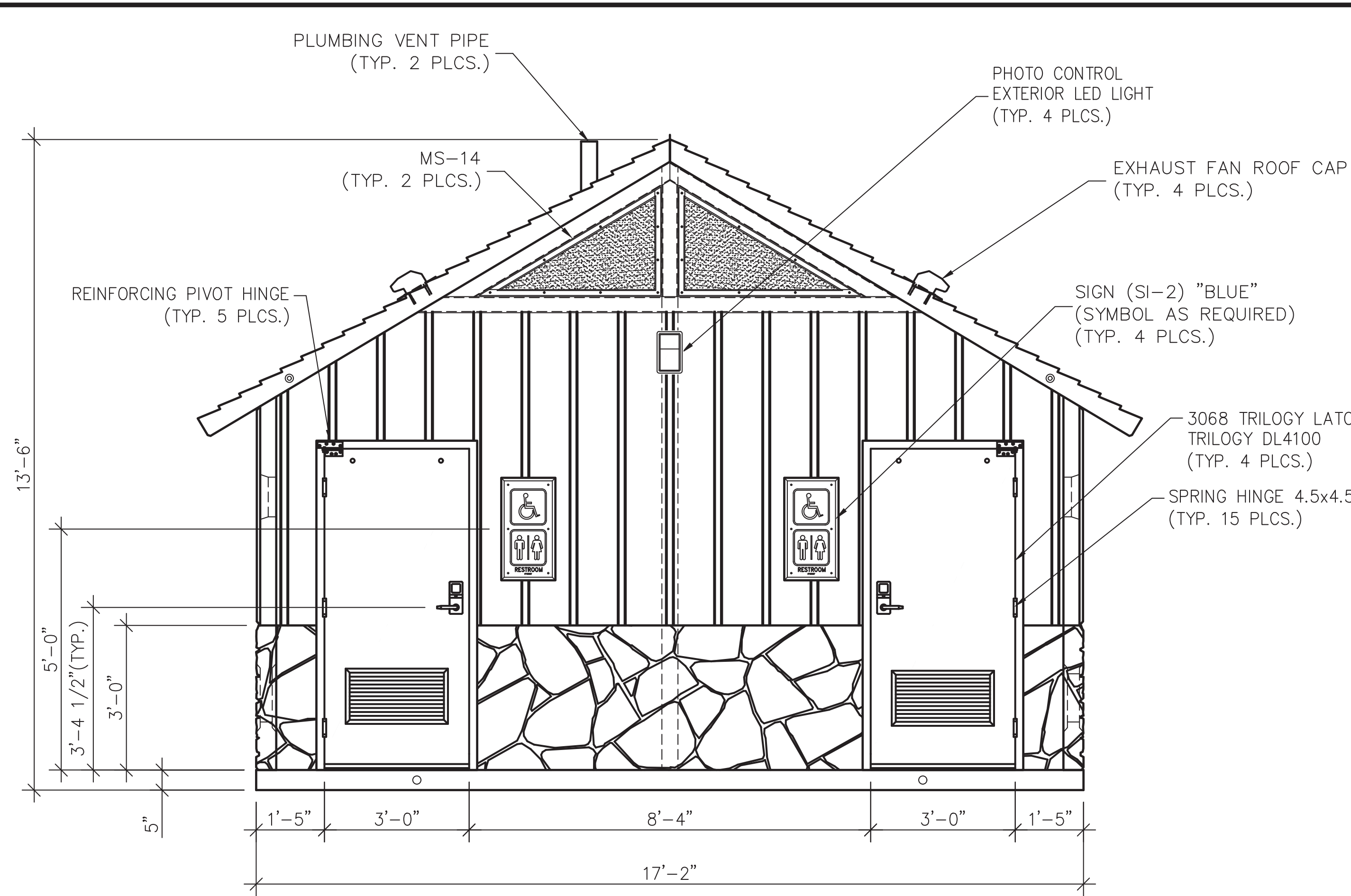
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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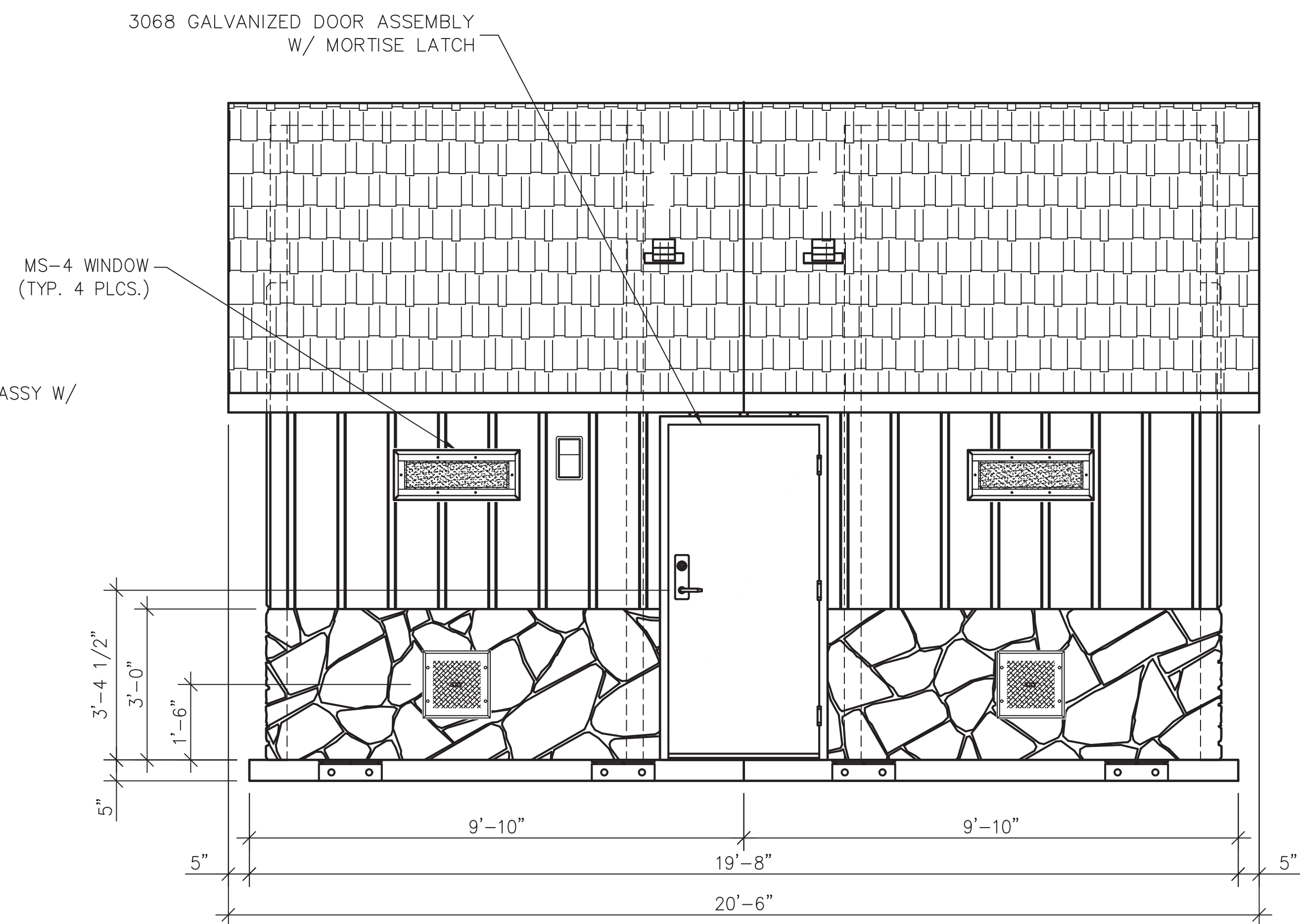
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	32

FLOOR PLAN

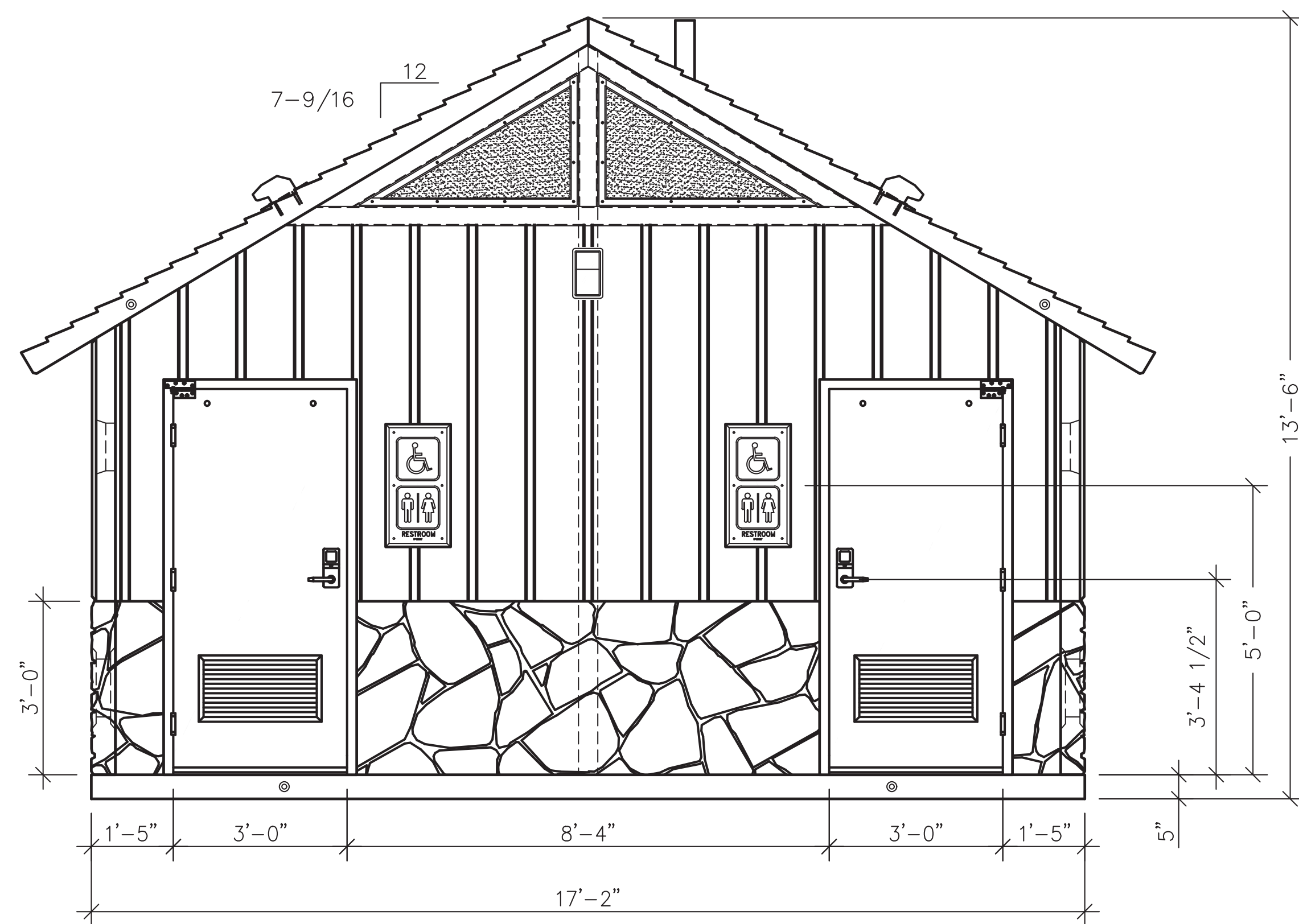
DWG NO.	SHEET	REV.
DNS-03	3	0
	29	



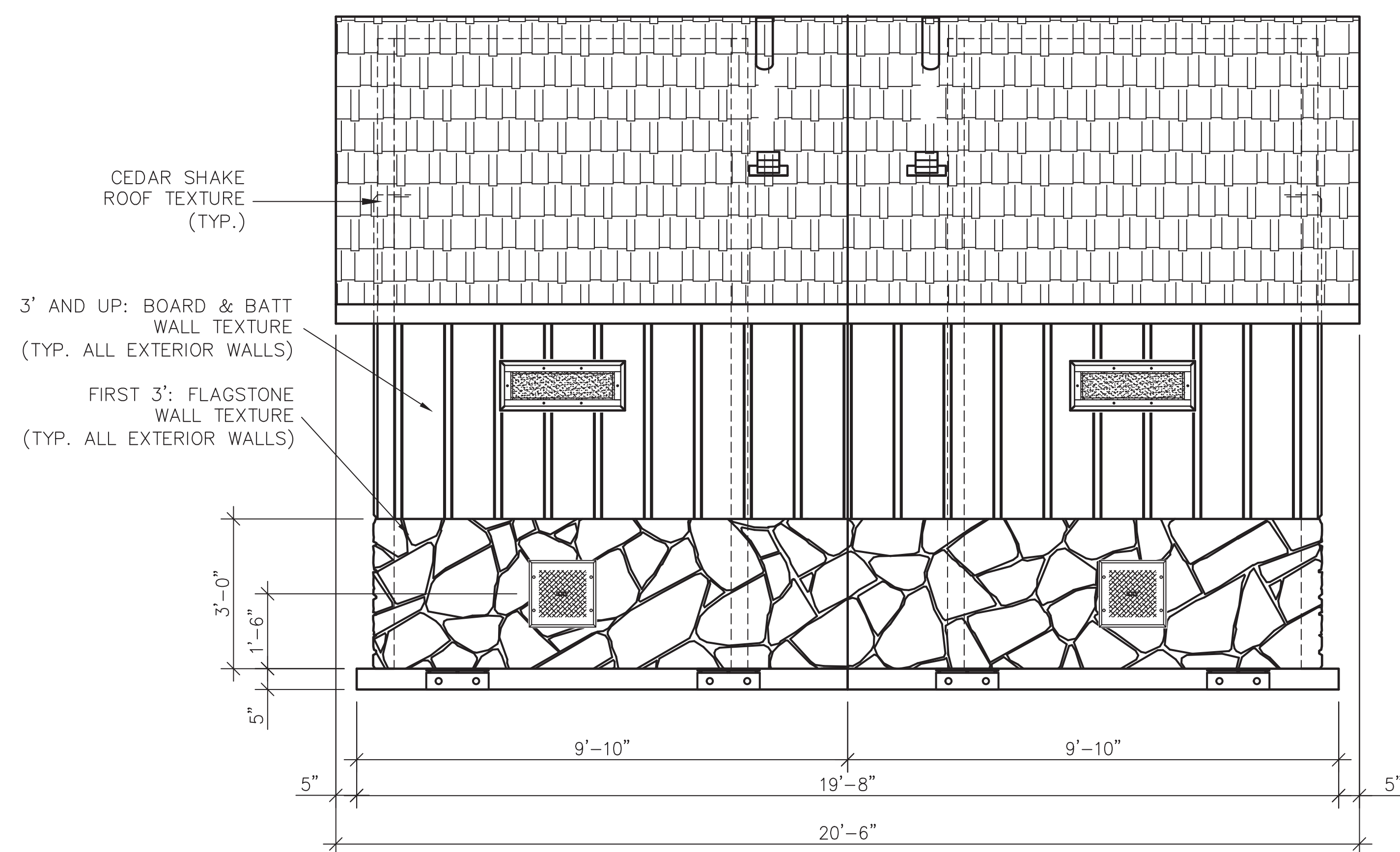
FRONT ELEVATION



RIGHT SIDE ELEVATION

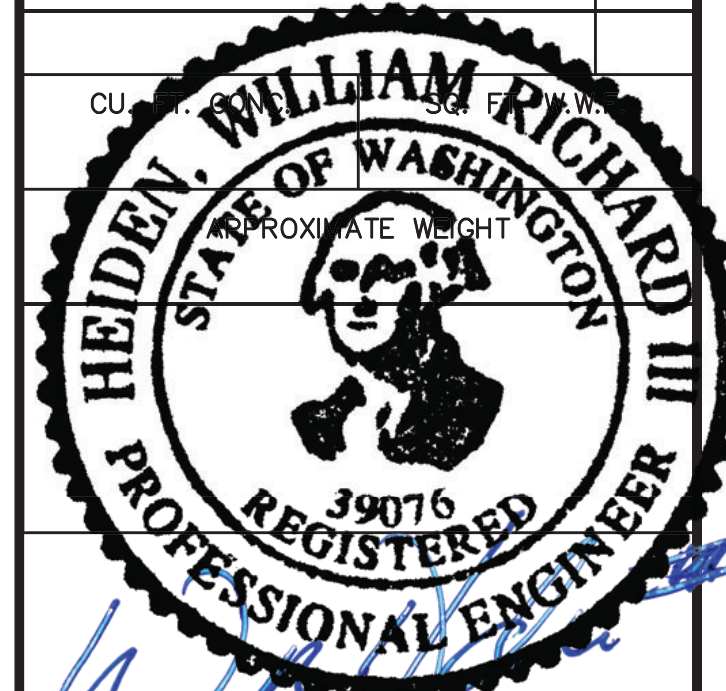


REAR ELEVATION



LEFT SIDE ELEVATION

MATERIALS LIST	
ITEM	QTY
3068 LVR DOOR ASSEMBLY	1
SPRING HINGE 4.5x4.5	15
MS-14	2
SI-2 BLUE	4
3068 TRILOGY DOOR ASSY	4
REINFORCING PIVOT HINGE	5
MS-4 WINDOW	4



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PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

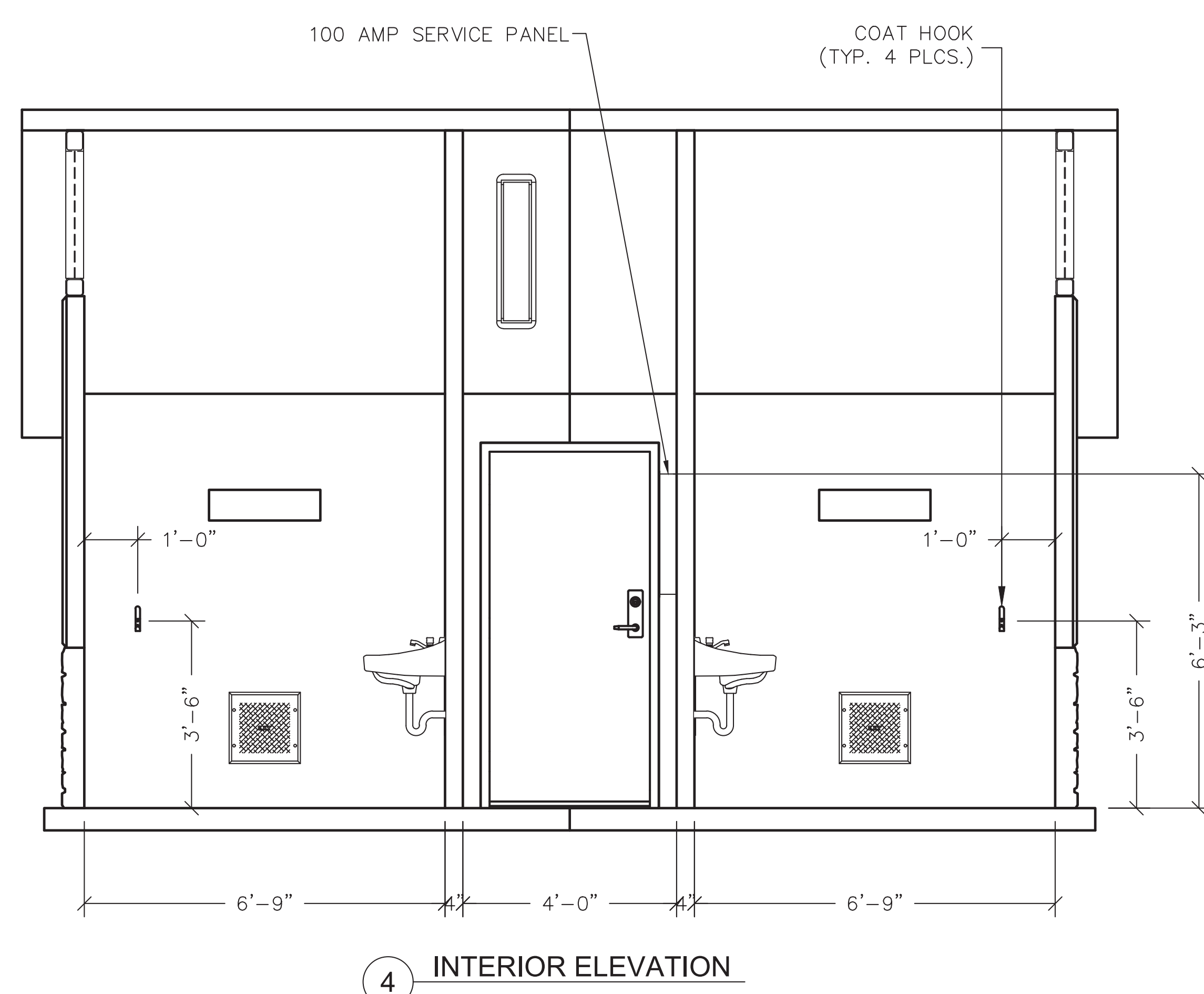
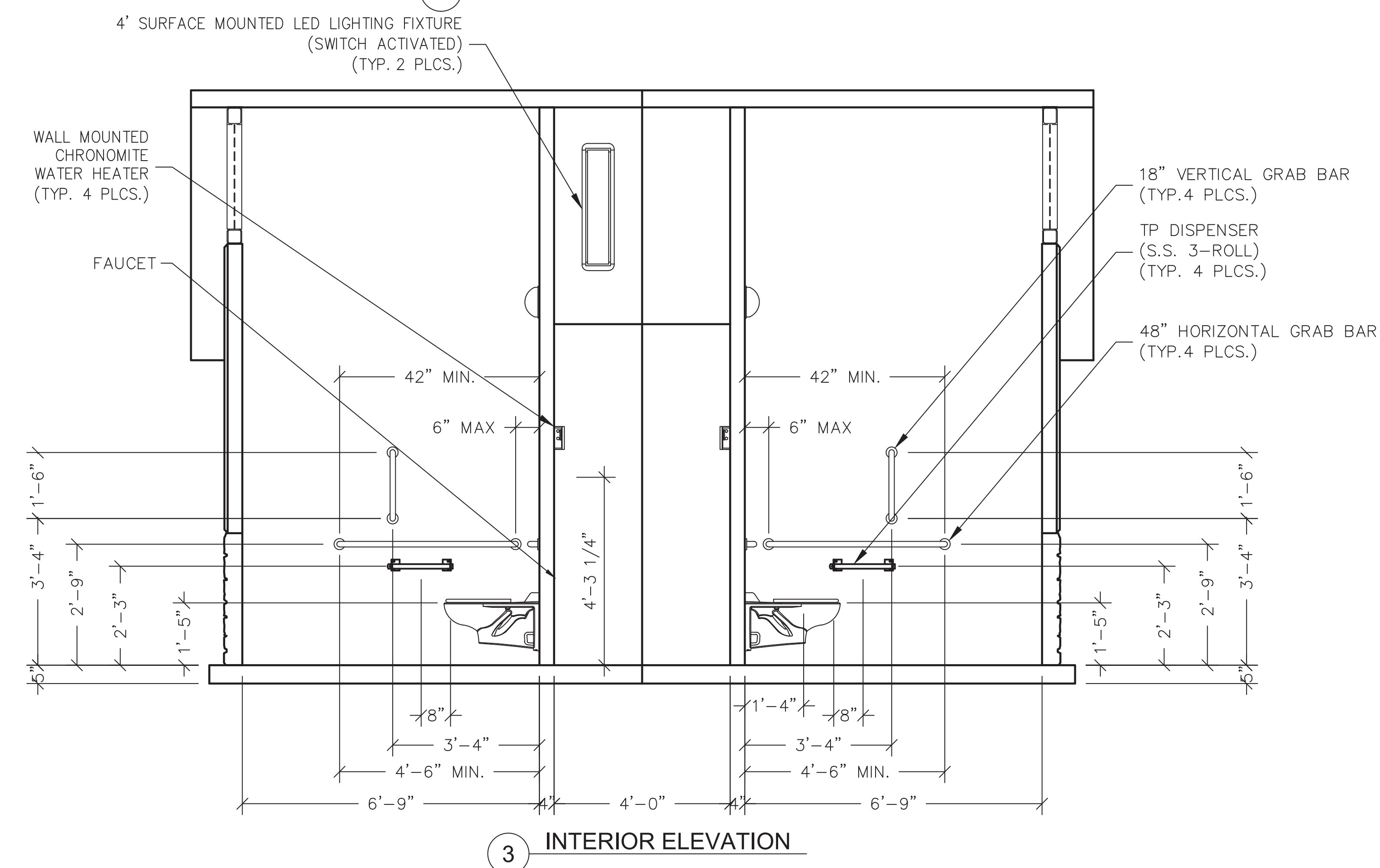
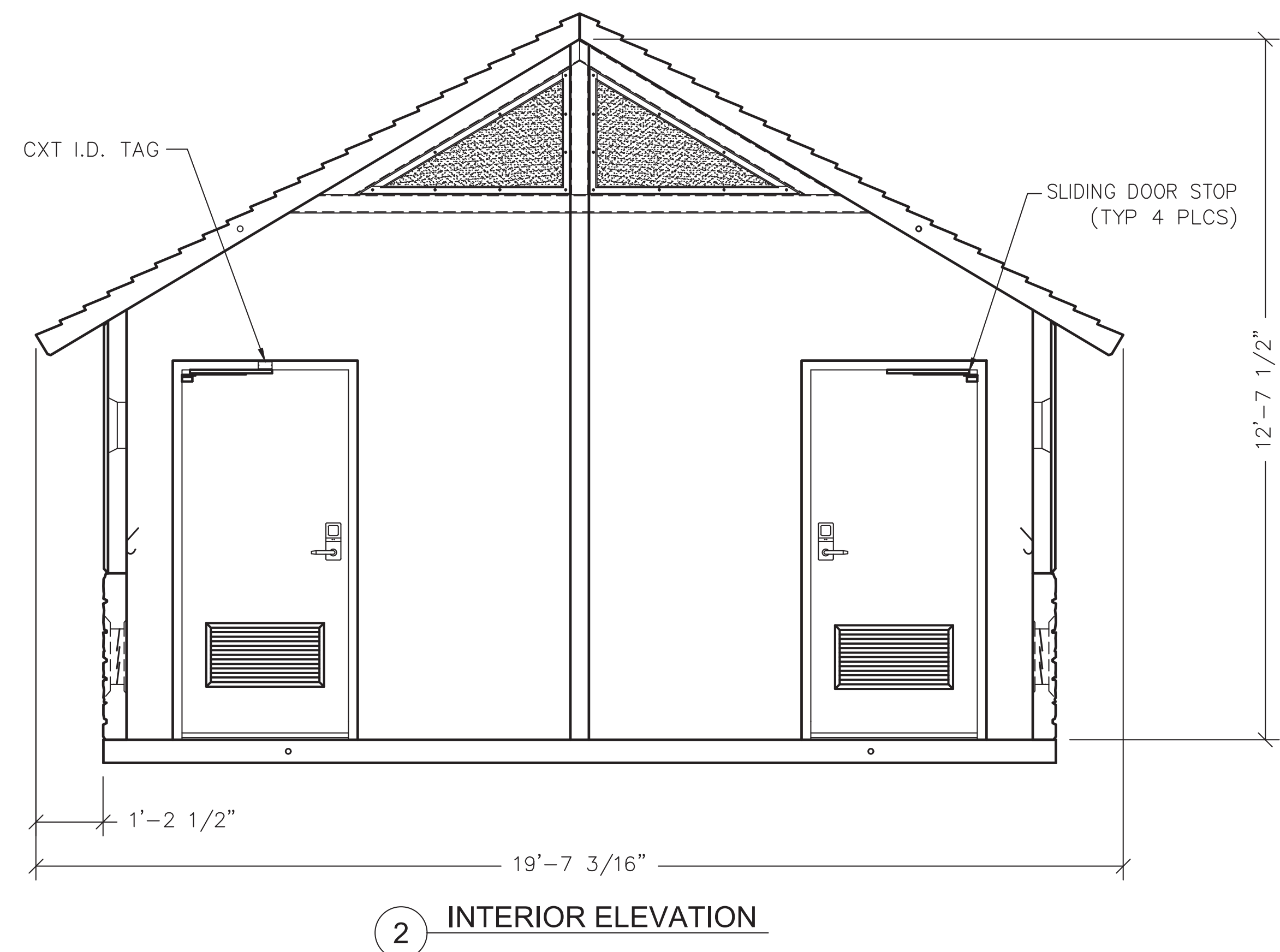
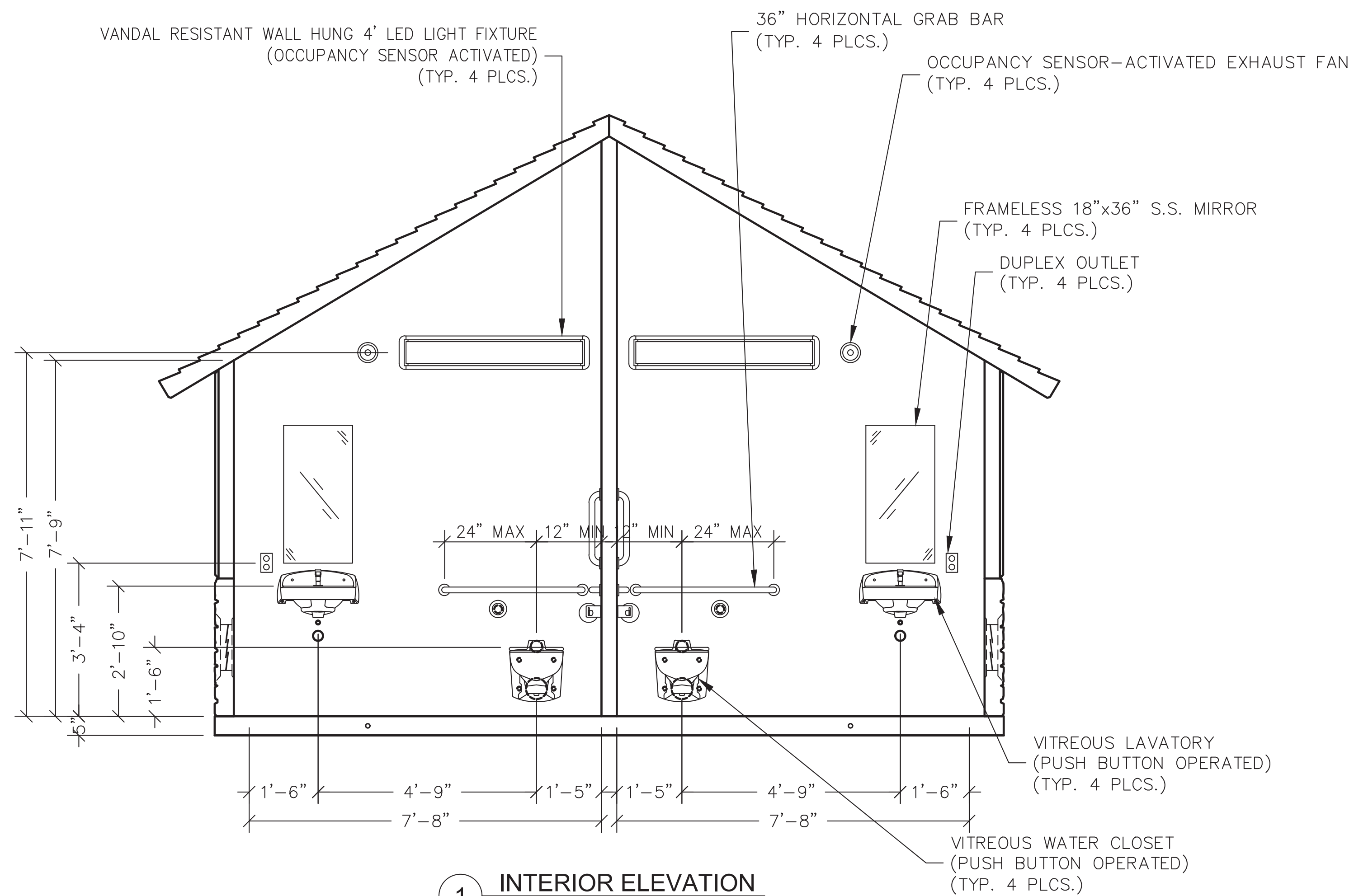
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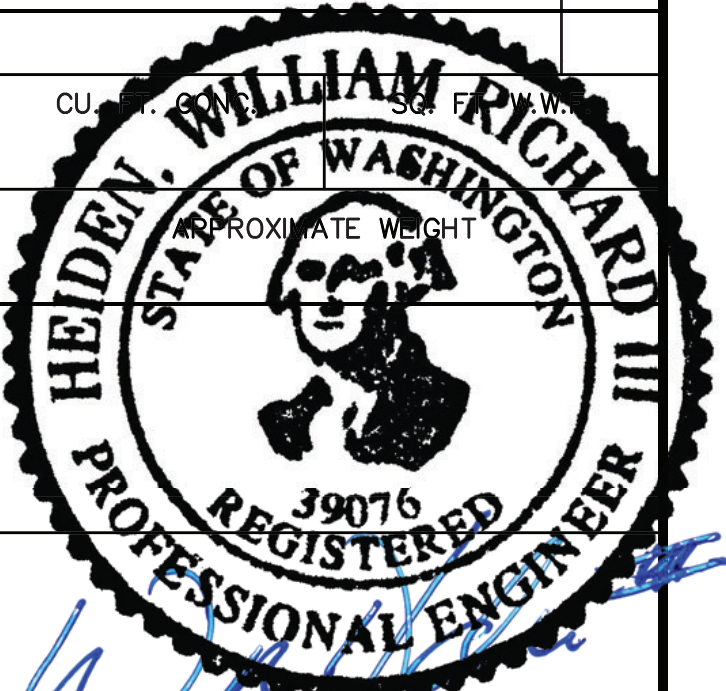
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SCALE	1/4"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	48

BUILDING ELEVATIONS

DWG NO.	SHEET	REV.
DNS-04	4	0
	29	



MATERIALS LIST	
ITEM	QTY
CXT I.D. TAG	1
18" GRAB BAR	4
3-ROLL TP DISPENSER	4
TOILET PAPER ROLL	12
COAT HOOK	4
FRAMELESS 18" X 36" MIRROR	4
36" GRAB BAR	4
48" GRAB BAR	4



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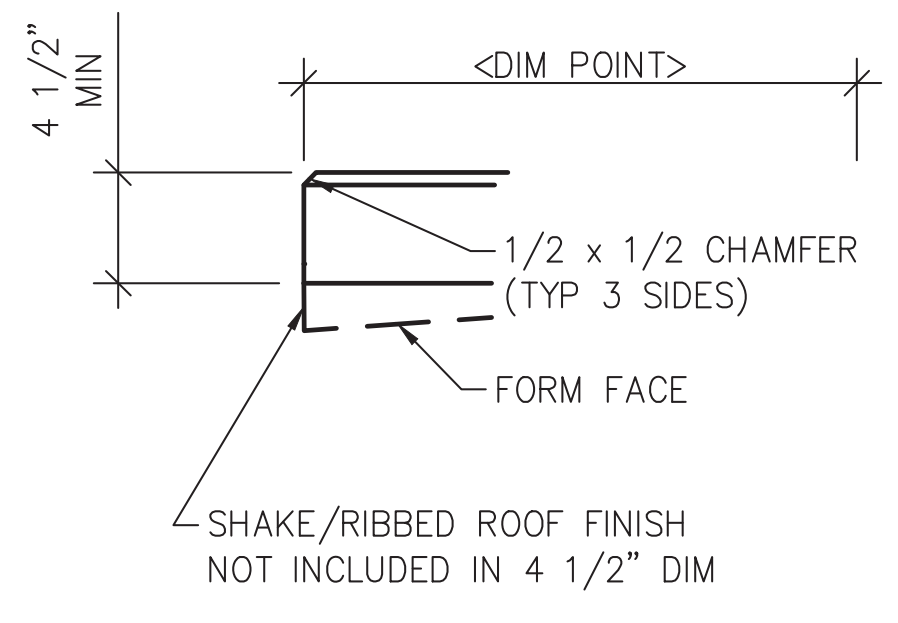
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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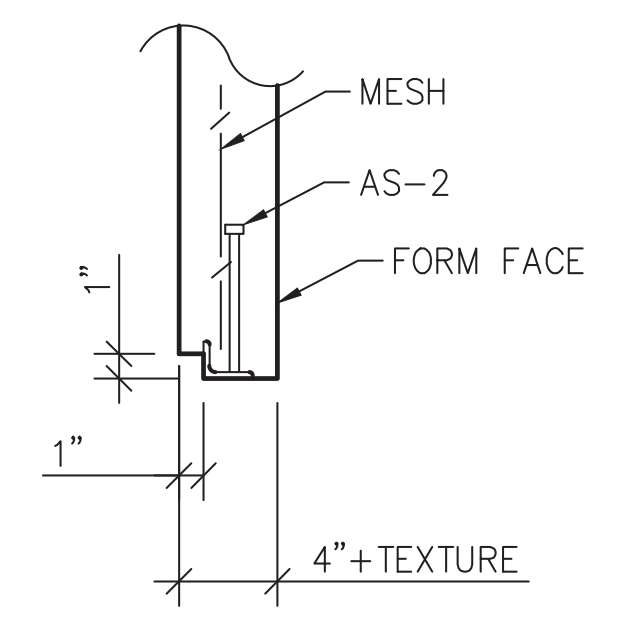
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	1"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	12

INTERIOR ELEVATIONS

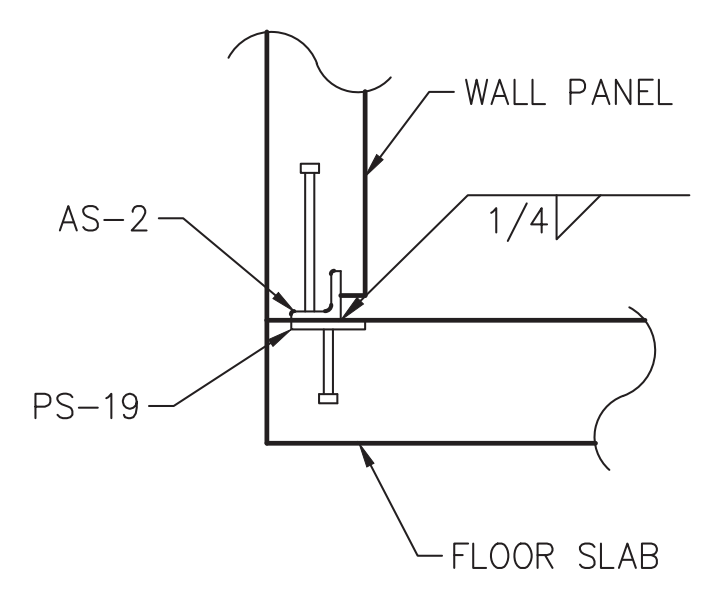
DWG NO.	SHEET	REV.
DNS-05	5	0
	29	



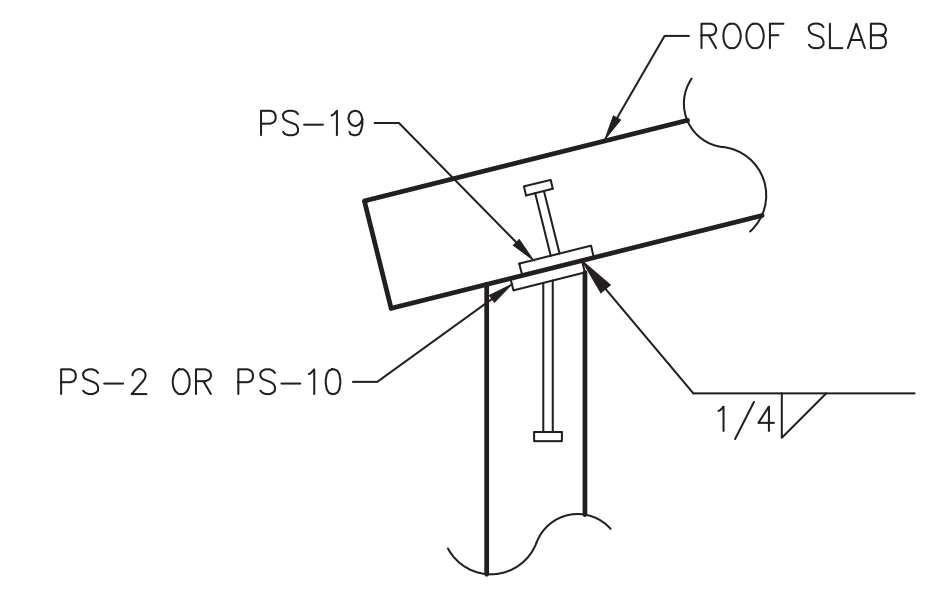
1 TYPICAL ROOF SLAB EDGE
SCALE: 3/4"=1'-0"



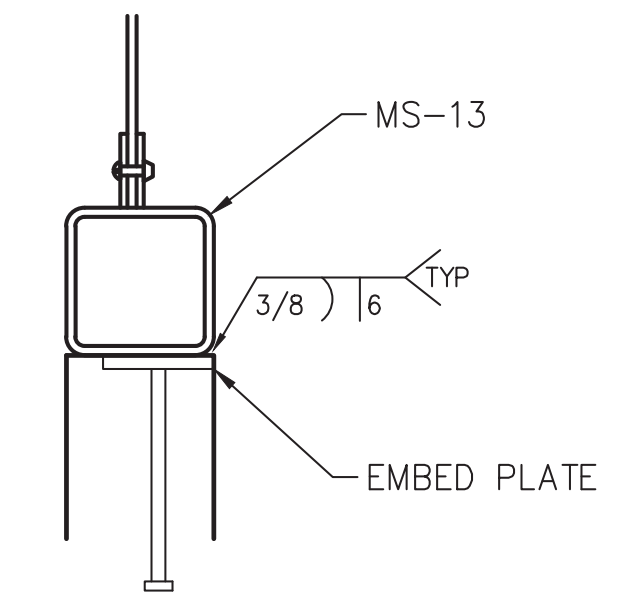
2 AS-2 CAST DETAIL
SCALE: 3/4"=1'-0"



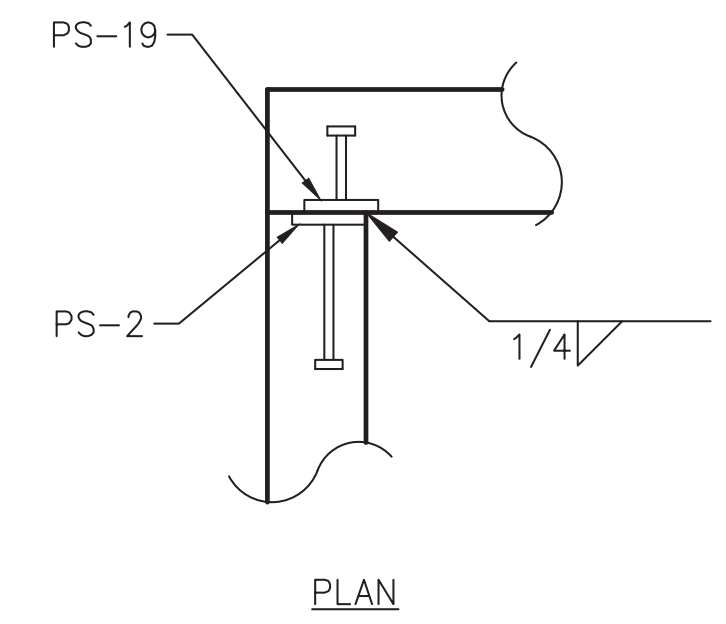
3 TYPICAL WALL TO FLOOR SLAB WELDED CONNECTION
SCALE: 3/4"=1'-0"



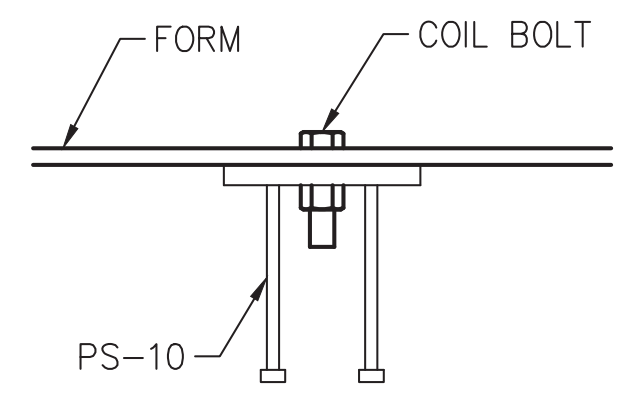
4 TYPICAL WALL TO ROOF SLAB WELDED CONNECTION
SCALE: 3/4"=1'-0"



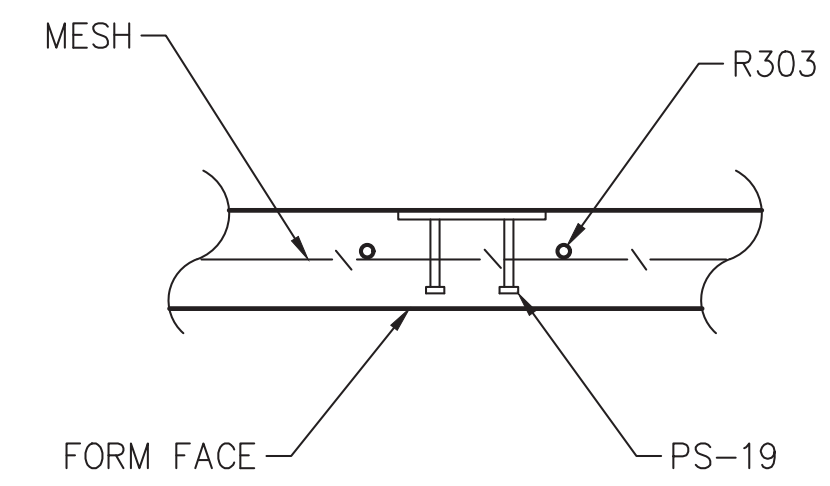
5 MS-13 WELD DETAIL
SCALE: 3/4"=1'-0"



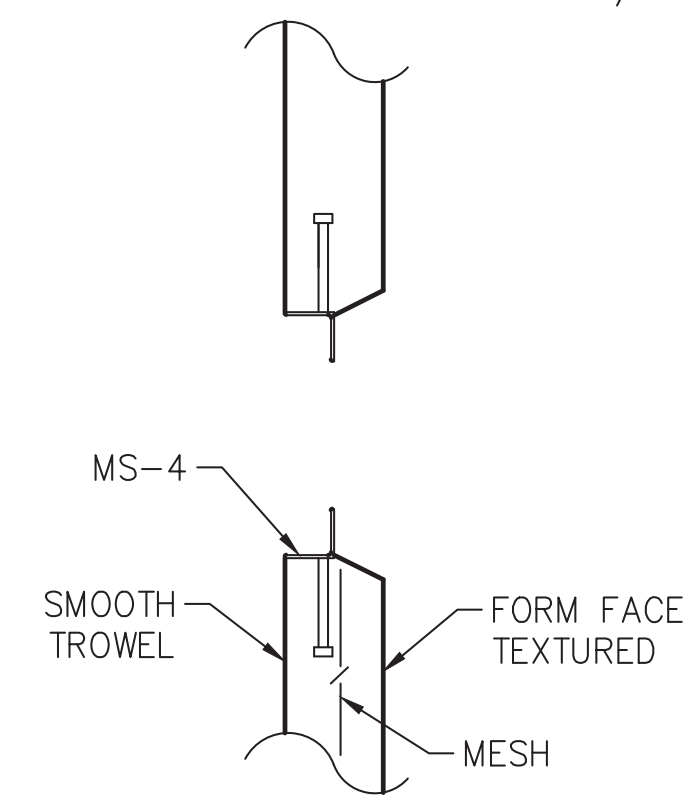
6 TYPICAL WALL TO WALL PANEL WELDED CONNECTION
SCALE: 3/4"=1'-0"



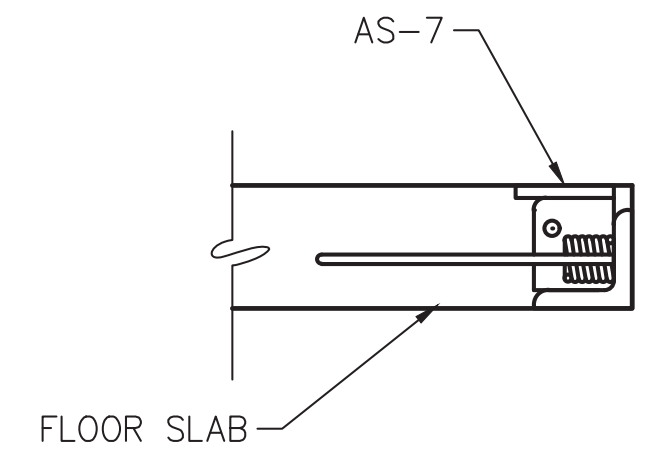
7 PS-10 CASTING DETAIL
SCALE: 1"=1'-0"



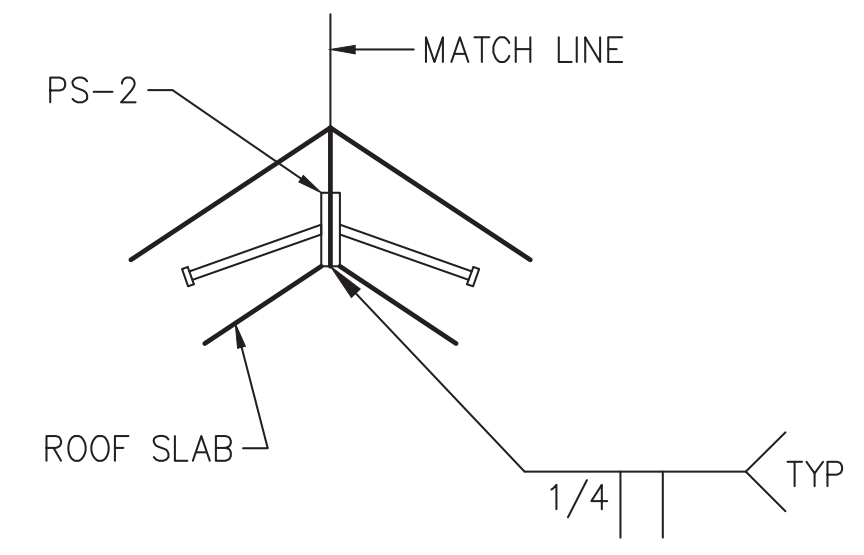
8 PS-19 CASTING DETAIL
SCALE: 3/4"=1'-0"



9 MS-4 EMBED CASTING DETAIL
SCALE: 3/4"=1'-0"



10 FLOOR LIFT PLATE DETAIL
SCALE: 3/4"=1'-0"



11 ROOF PEAK WELDMENT DETAIL
SCALE: 3/4"=1'-0"



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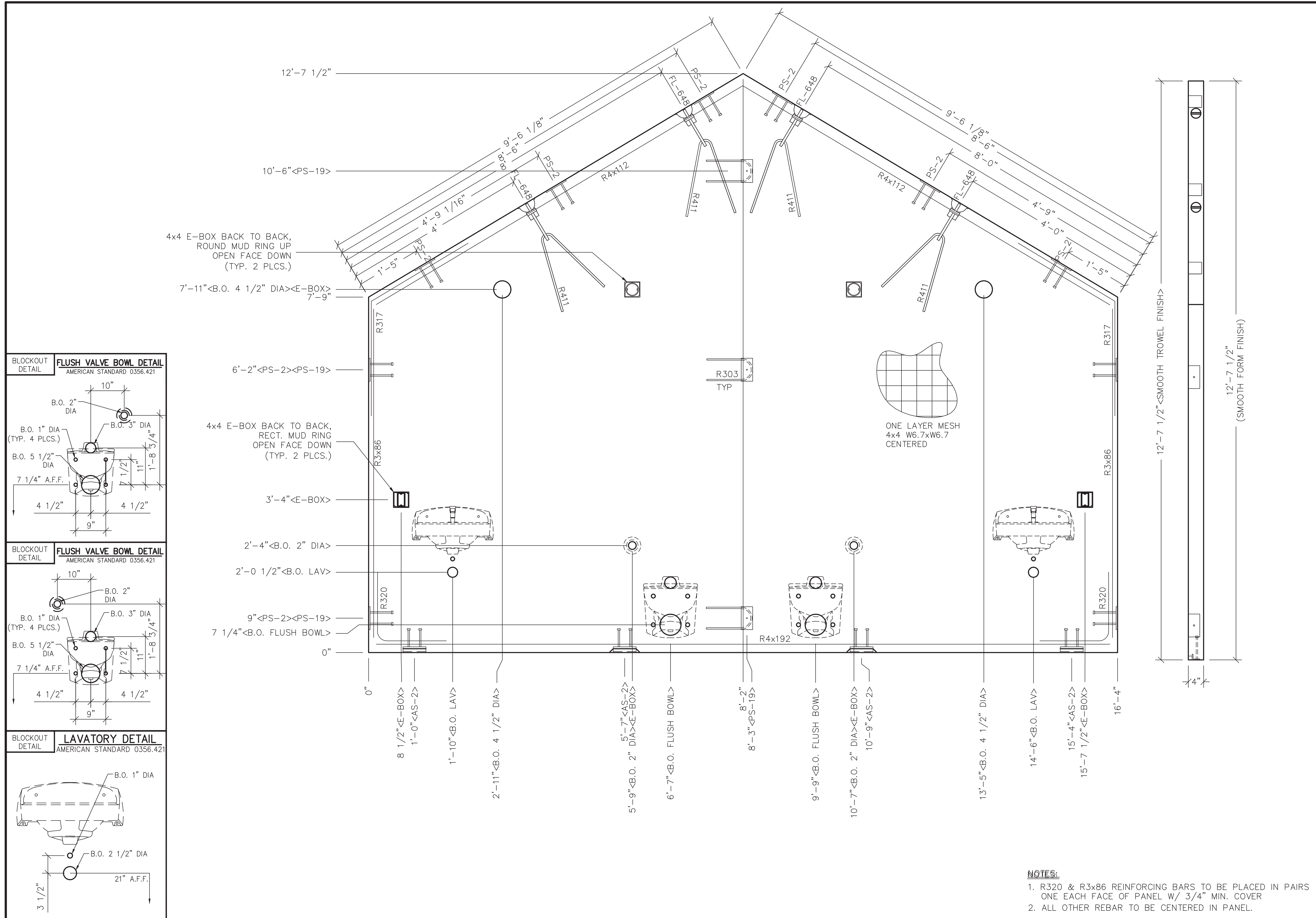
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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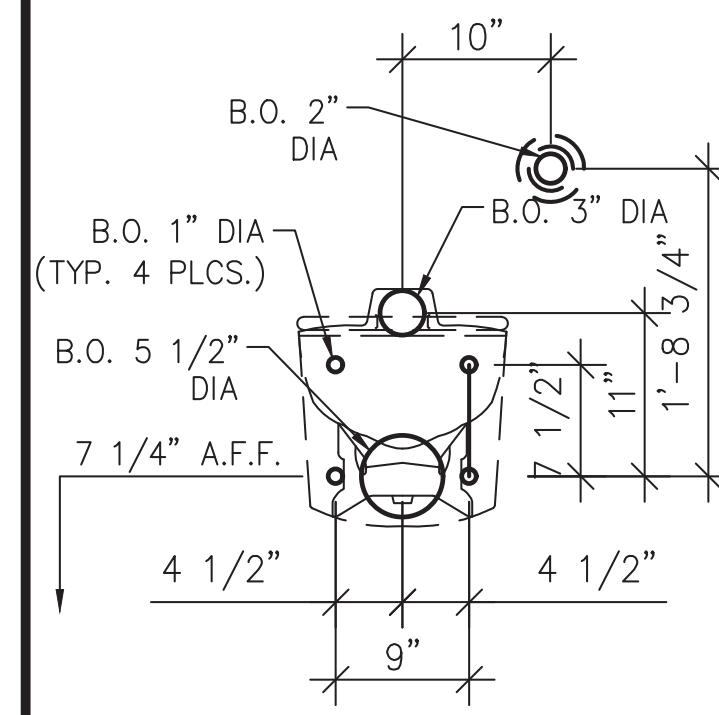
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	AS NOTED	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	16

CASTING
DETAILS

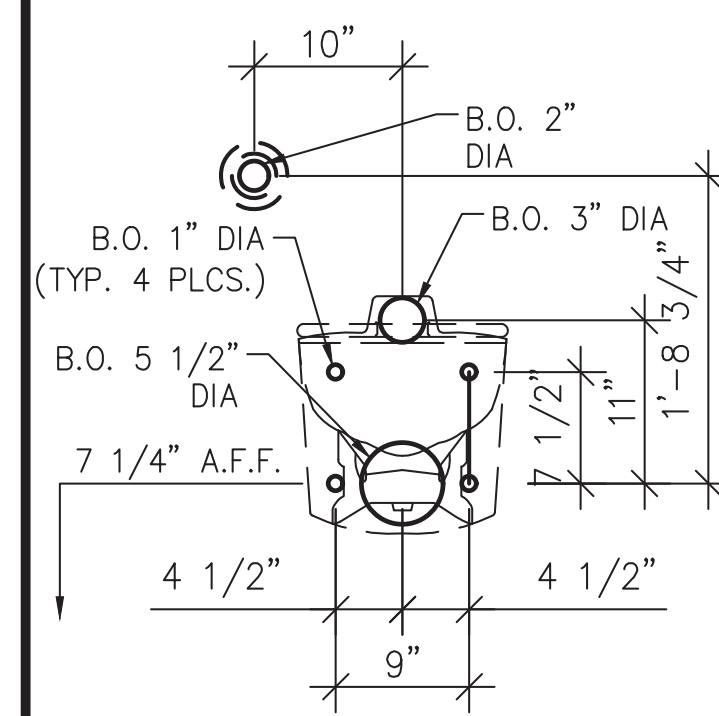
DWG NO.	SHEET	REV.
DNS-06	6	0
	29	



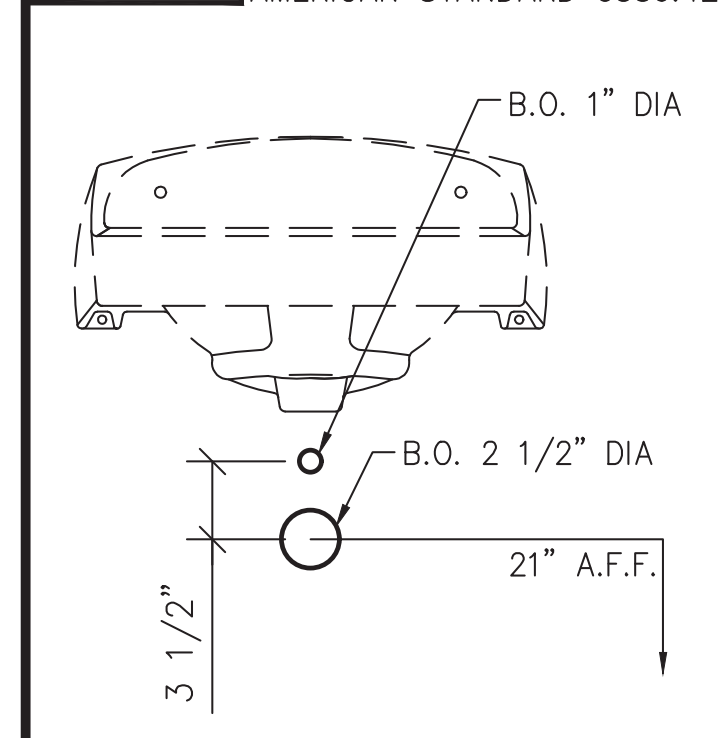
BLOCKOUT DETAIL FLUSH VALVE BOWL DETAIL
AMERICAN STANDARD 0356.421



BLOCKOUT DETAIL FLUSH VALVE BOWL DETAIL
AMERICAN STANDARD 0356.421

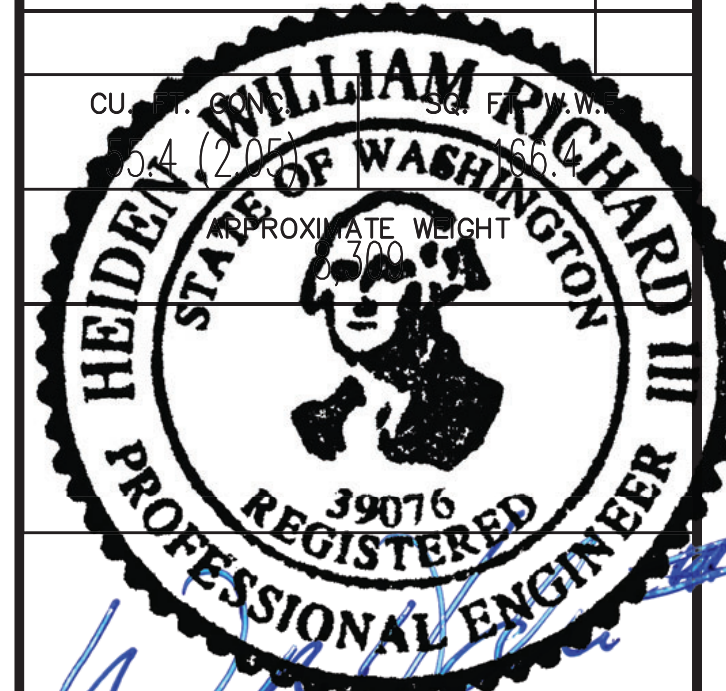


BLOCKOUT DETAIL LAVATORY DETAIL
AMERICAN STANDARD 0356.421



- NOTES:**
- R320 & R3x86 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
 - ALL OTHER REBAR TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
AS-2	4
PS-2	10
PS-19	3
FL-648	4
R411	4
R303	3
R3x86	4
R320	4
R4x192	1
R317	2
R4x112	2
B.O. 4 1/2" DIA	2
B.O. 2" DIA	2
B.O. LAV	2
RECT MUD RING	2
4x4 E-BOX	8
B.O. FLUSH BOWL	2
ROUND MUD RING	2



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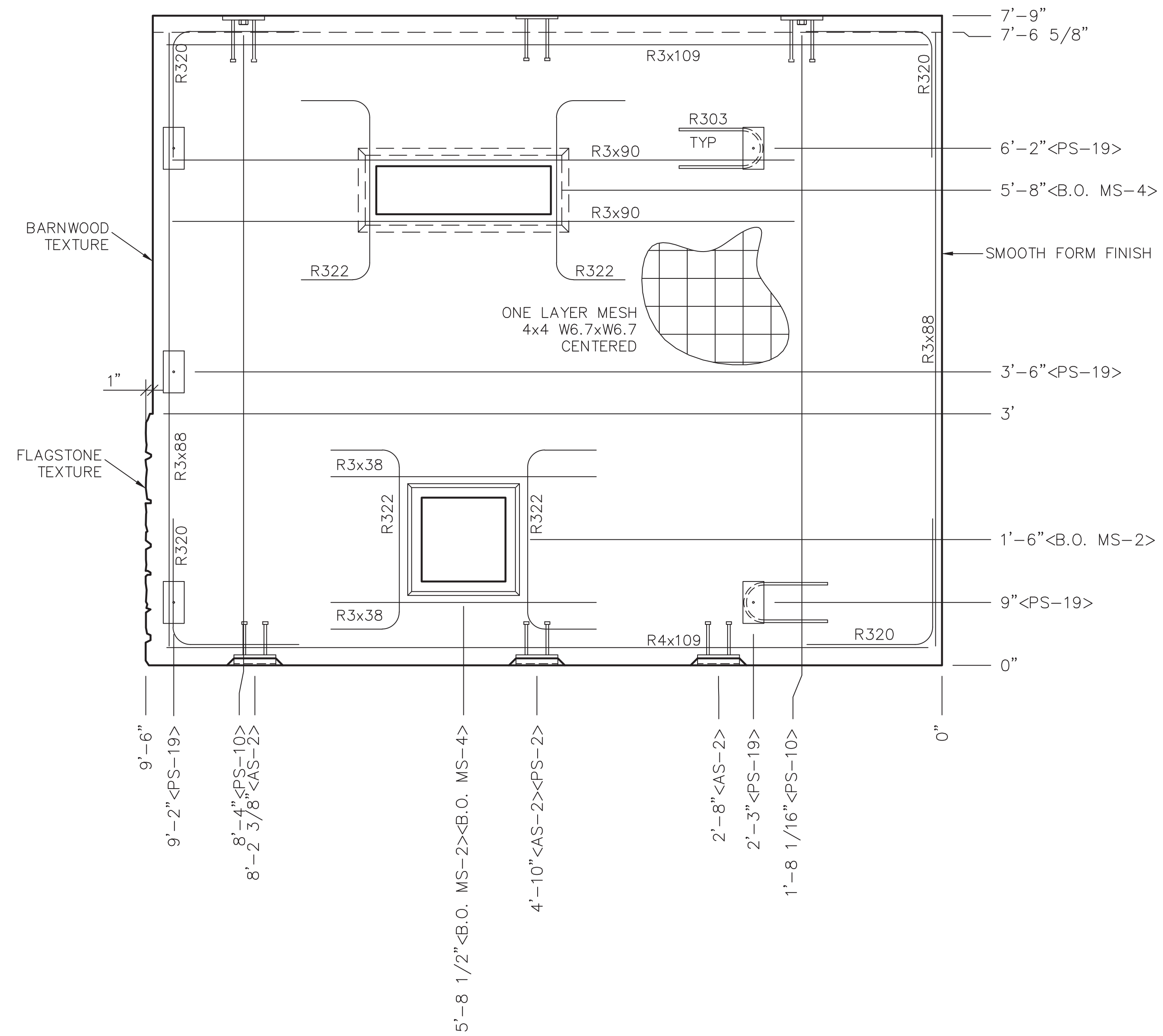
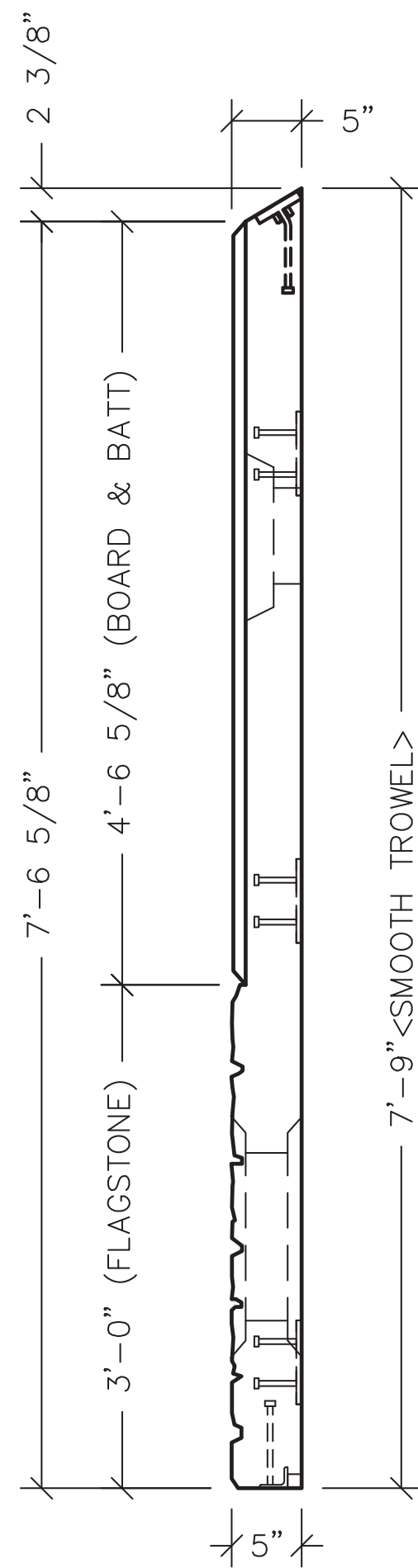
PROJECT TITLE
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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

WALL PANEL
MARK W2

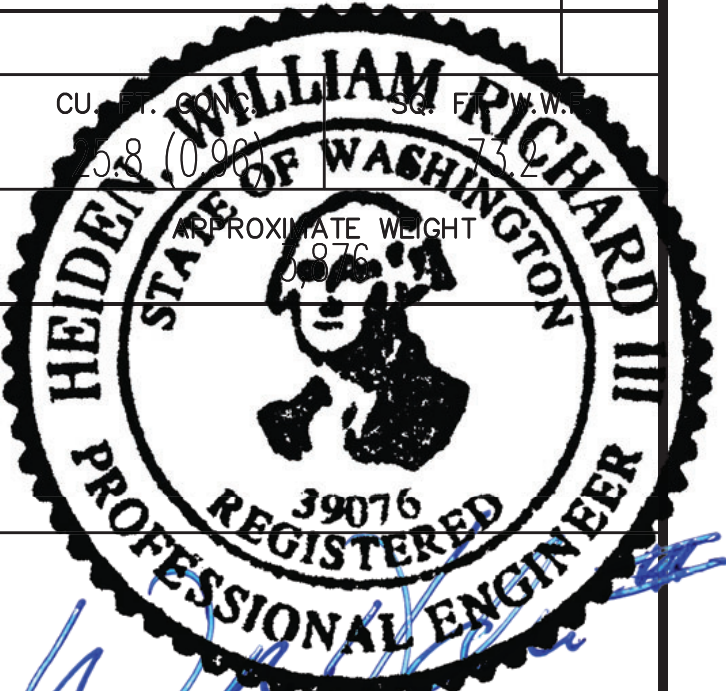
DWG NO. **DNS-08** SHEET **8** REV. **0**
29



NOTES:

1. R320, R3x88 & R3x109 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
2. ALL OTHER REBAR TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
AS-2	3
PS-2	1
PS-10	2
PS-19	5
R303	2
R3x109	2
R3x90	2
R4x109	1
R3x88	4
B.O. MS-4	1
R320	8
R3x38	2
R322	4
B.O. MS-2	1
B.O. 6"x6"	1
PARTIAL TEXTURE BLOCKOUT	1



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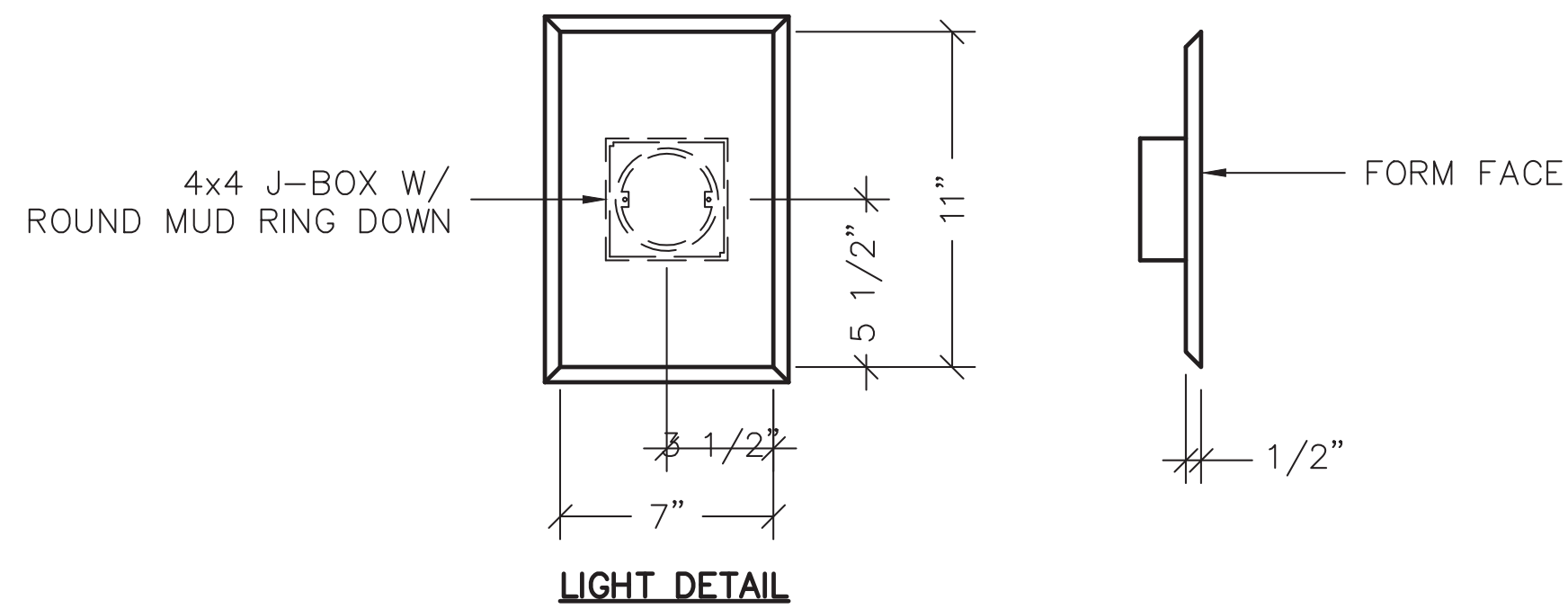
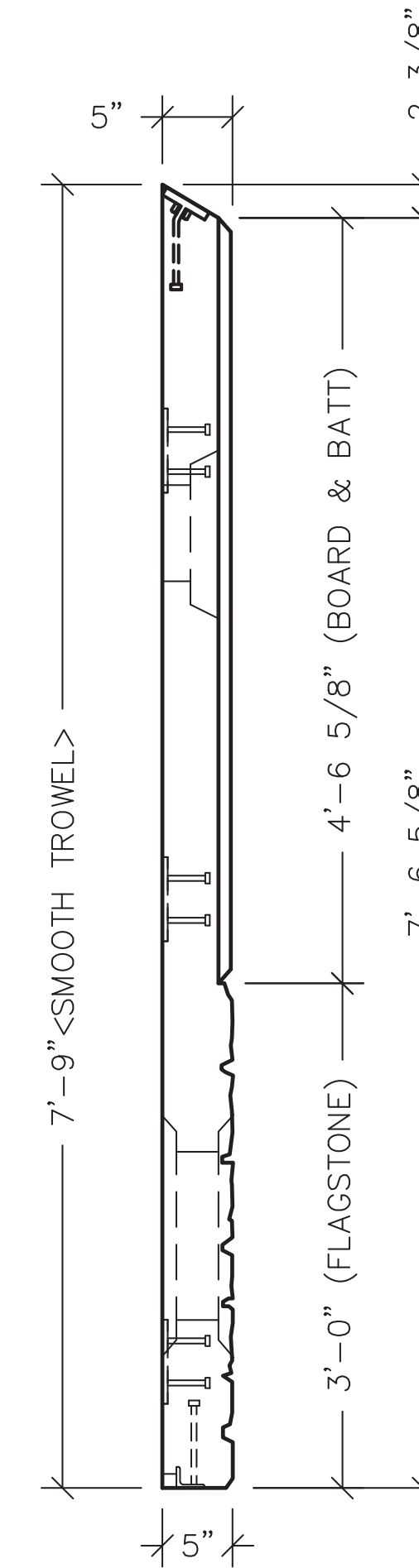
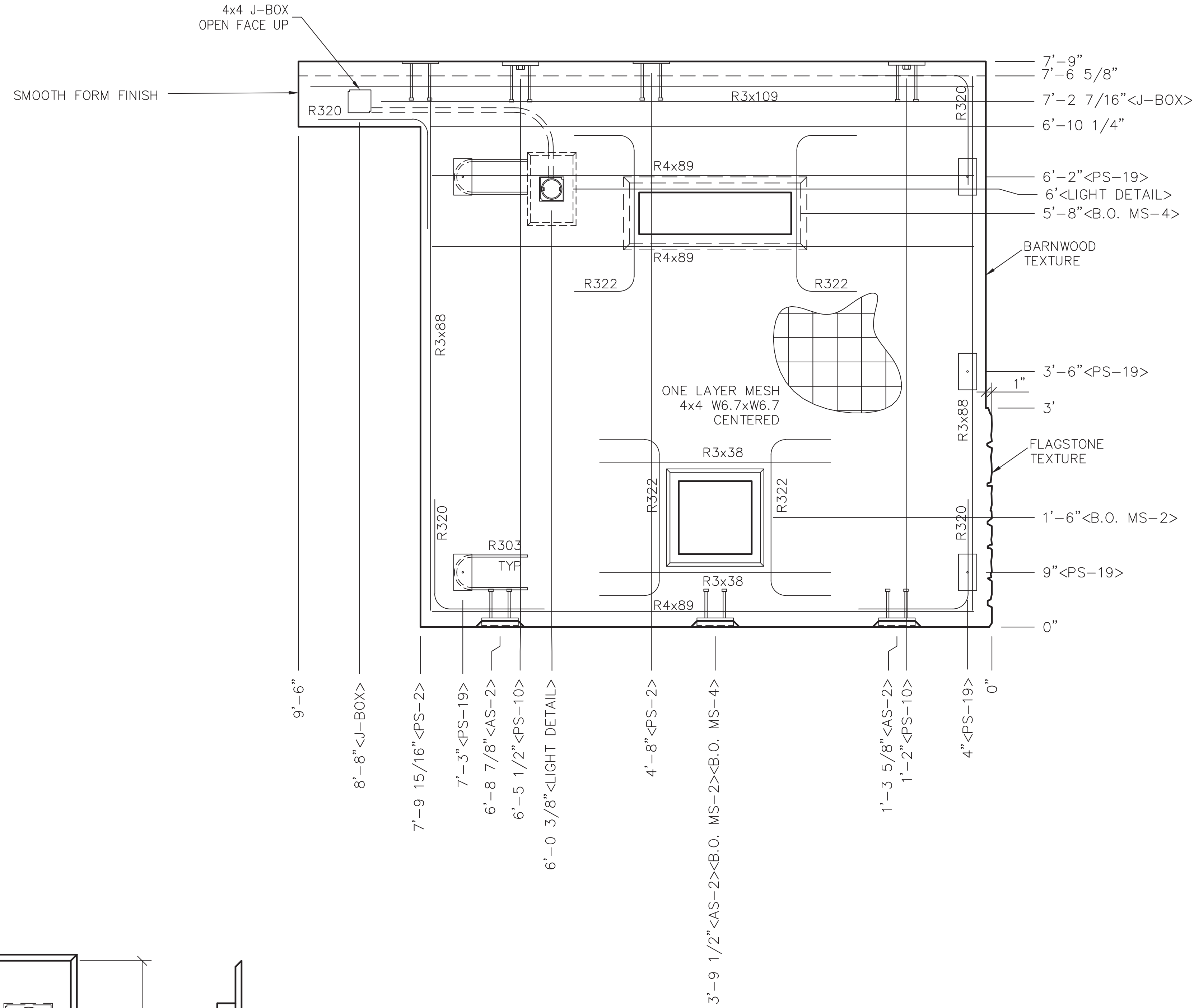
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PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

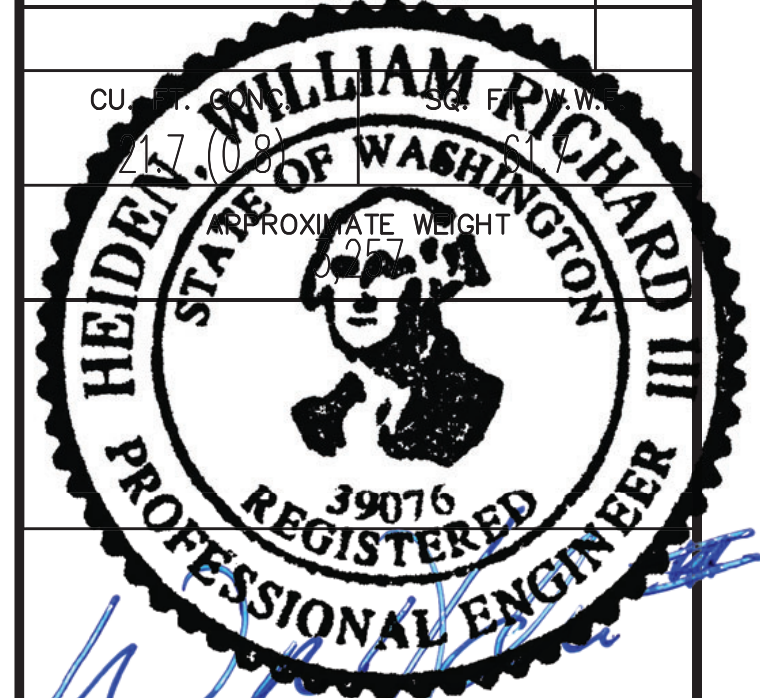
WALL PANEL MARK W3		
DWG NO. DNS-09	SHEET 9 29	REV. 0



NOTES:

1. R320, R3x88 & R3x109 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
2. ALL OTHER REBAR TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
AS-2	3
PS-2	2
PS-10	2
PS-19	5
R303	2
R3x109	2
R4x89	3
R3x88	4
R322	4
R3x38	2
R320	8
B.O. MS-2	1
4x4 J-BOX	2
ROUND MUD RING	1
B.O. MS-4	1



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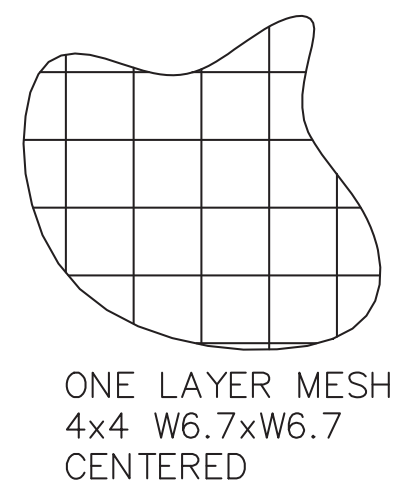
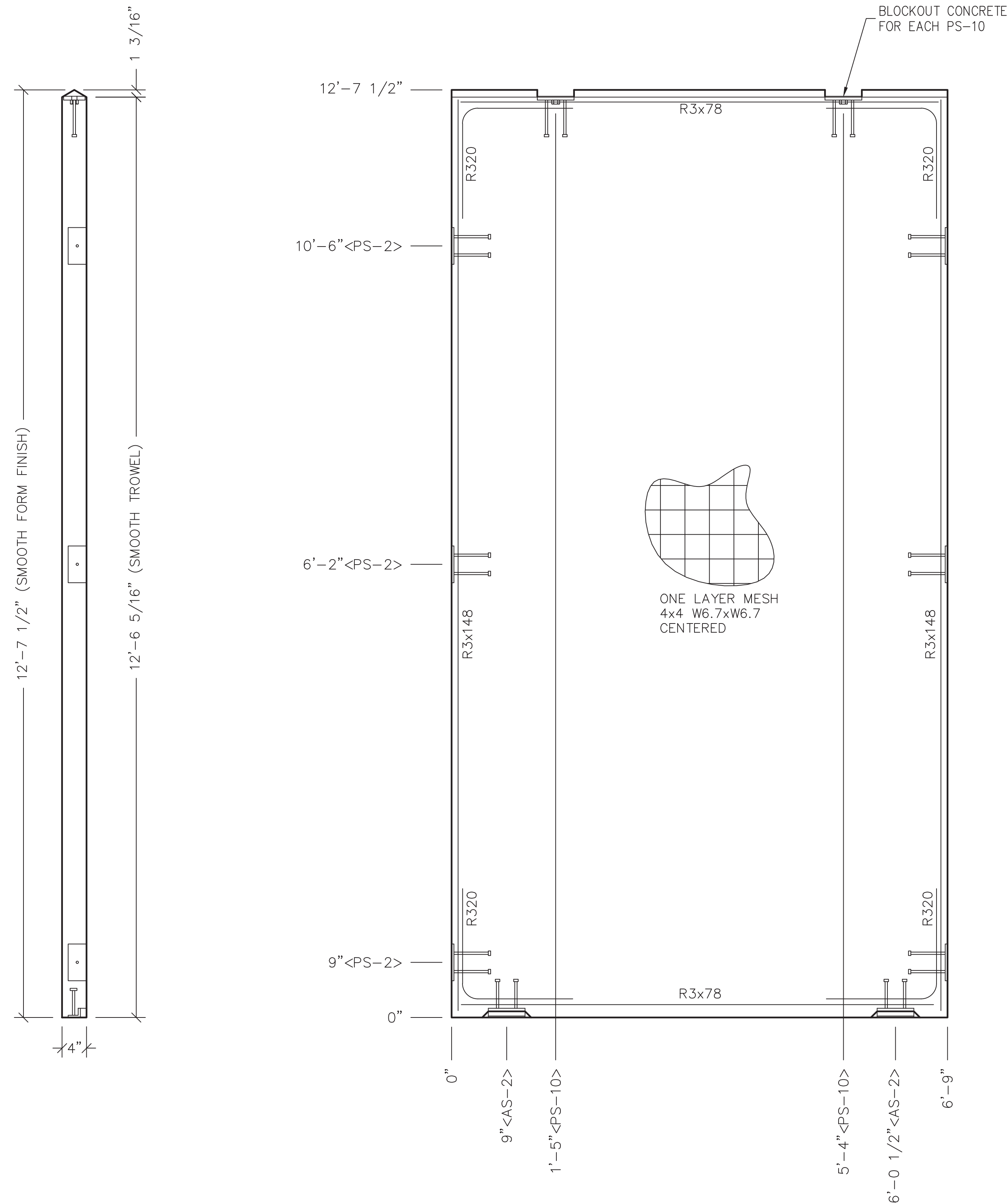
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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	32

WALL PANEL
MARK W4

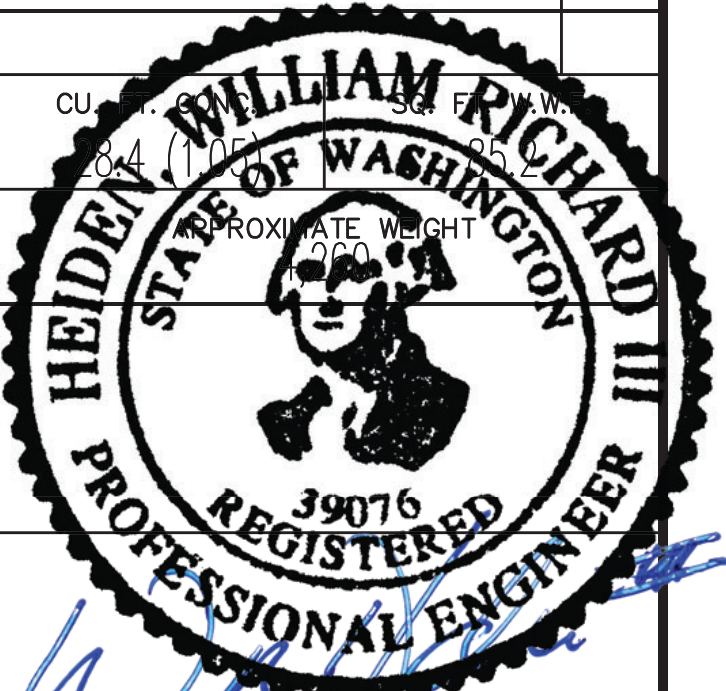
DWG NO.	SHEET	REV.
DNS-10	10	0
	29	



NOTES:

1. REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER

MATERIALS LIST	
ITEM	QTY
AS-2	2
PS-2	6
PS-10	2
R320	8
R3x78	4
R3x148	4



EXPIRES April 23, 2025

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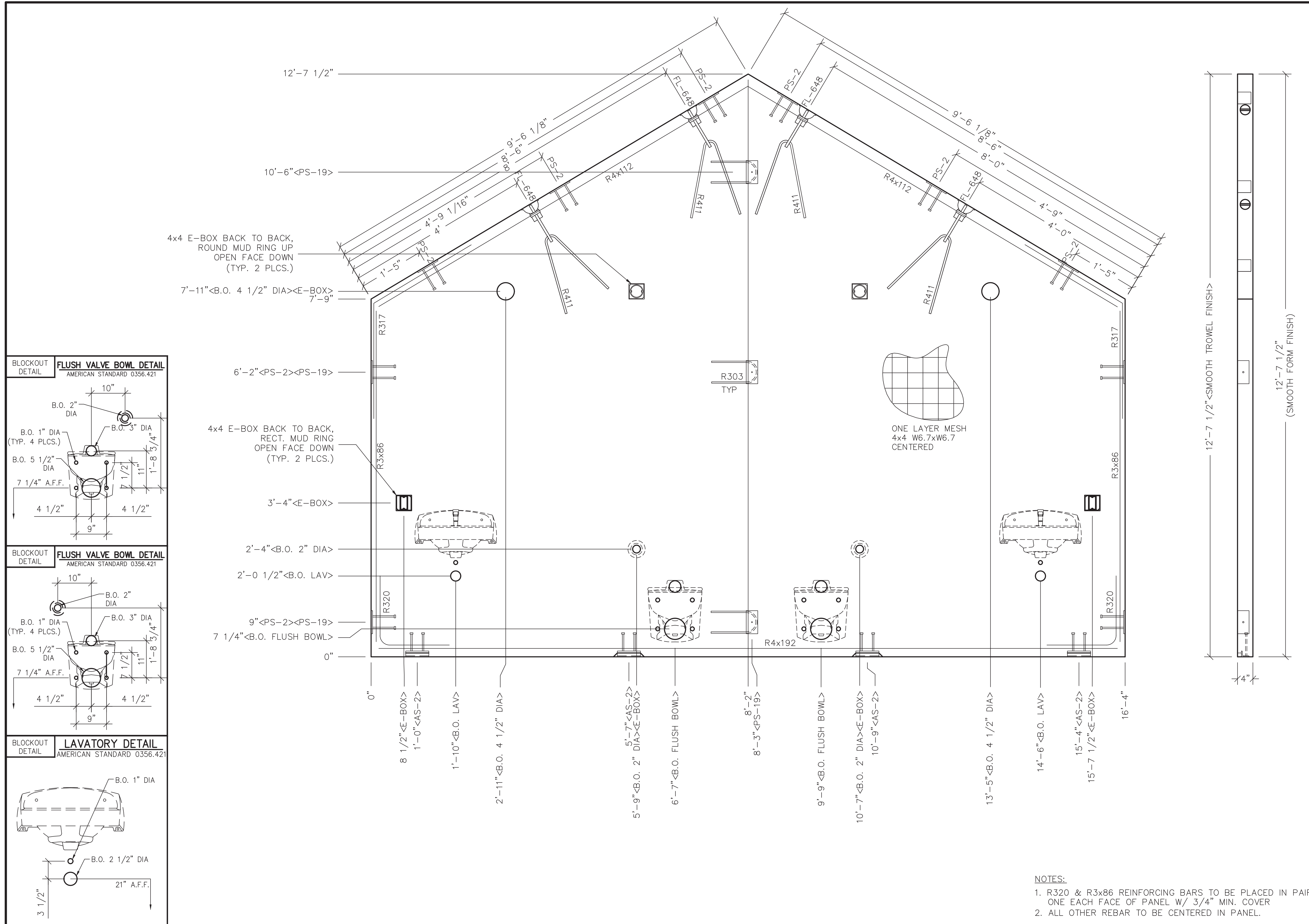
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801 N. Highway 77 Hillsboro, TX 76645
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PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

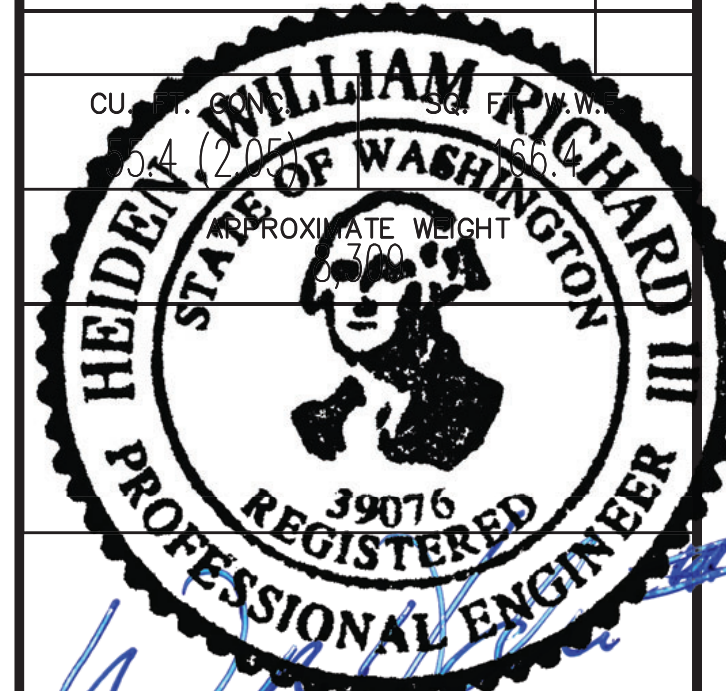
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SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

WALL PANEL MARK W5		
DWG NO.	SHEET	REV.
DNS-11	11 29	0



MATERIALS LIST	
ITEM	QTY
AS-2	4
PS-2	10
PS-19	3
FL-648	4
R411	4
R303	3
R3x86	4
R320	4
R4x192	1
R317	2
R4x112	2
B.O. 4 1/2" DIA	2
B.O. 2" DIA	2
B.O. LAV	2
RECT MUD RING	2
4x4 E-BOX	8
ROUND MUD RING	2
B.O. FLUSH BOWL	2



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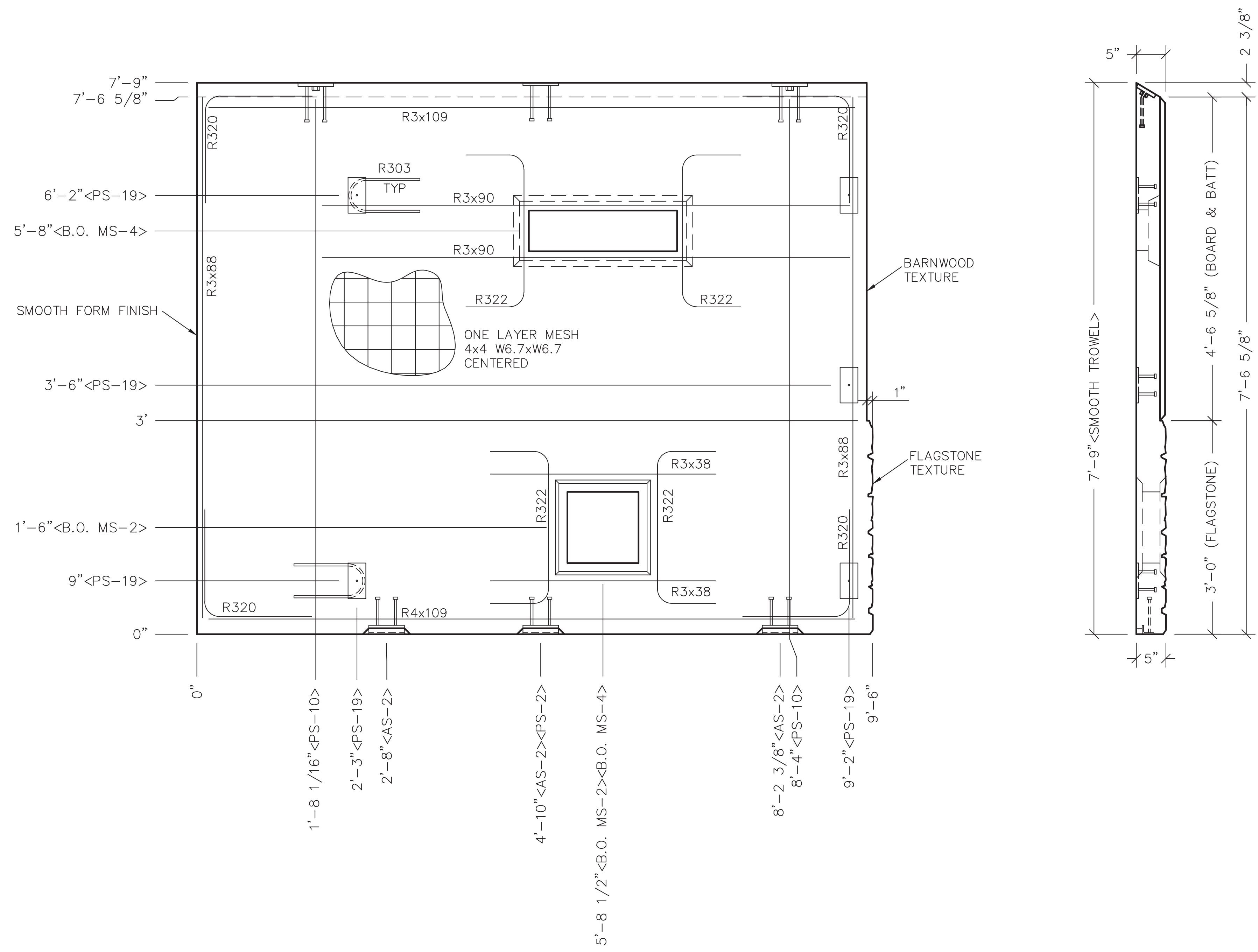
PROJECT TITLE
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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

WALL PANEL MARK W6		
DWG NO.	SHEET	REV.
DNS-12	12/29	0

- NOTES:
- R320 & R3x86 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
 - ALL OTHER REBAR TO BE CENTERED IN PANEL.



- NOTES:
1. R320, R3x88 & R3x109 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
 2. ALL OTHER REBAR TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
AS-2	3
PS-2	1
PS-10	2
PS-19	5
R303	2
R3x109	2
R3x90	2
R4x109	1
R3x88	4
B.O. MS-4	1
R320	8
R3x38	2
R322	4
B.O. MS-2	1



EXPIRES April 23, 2025

August 9, 2024

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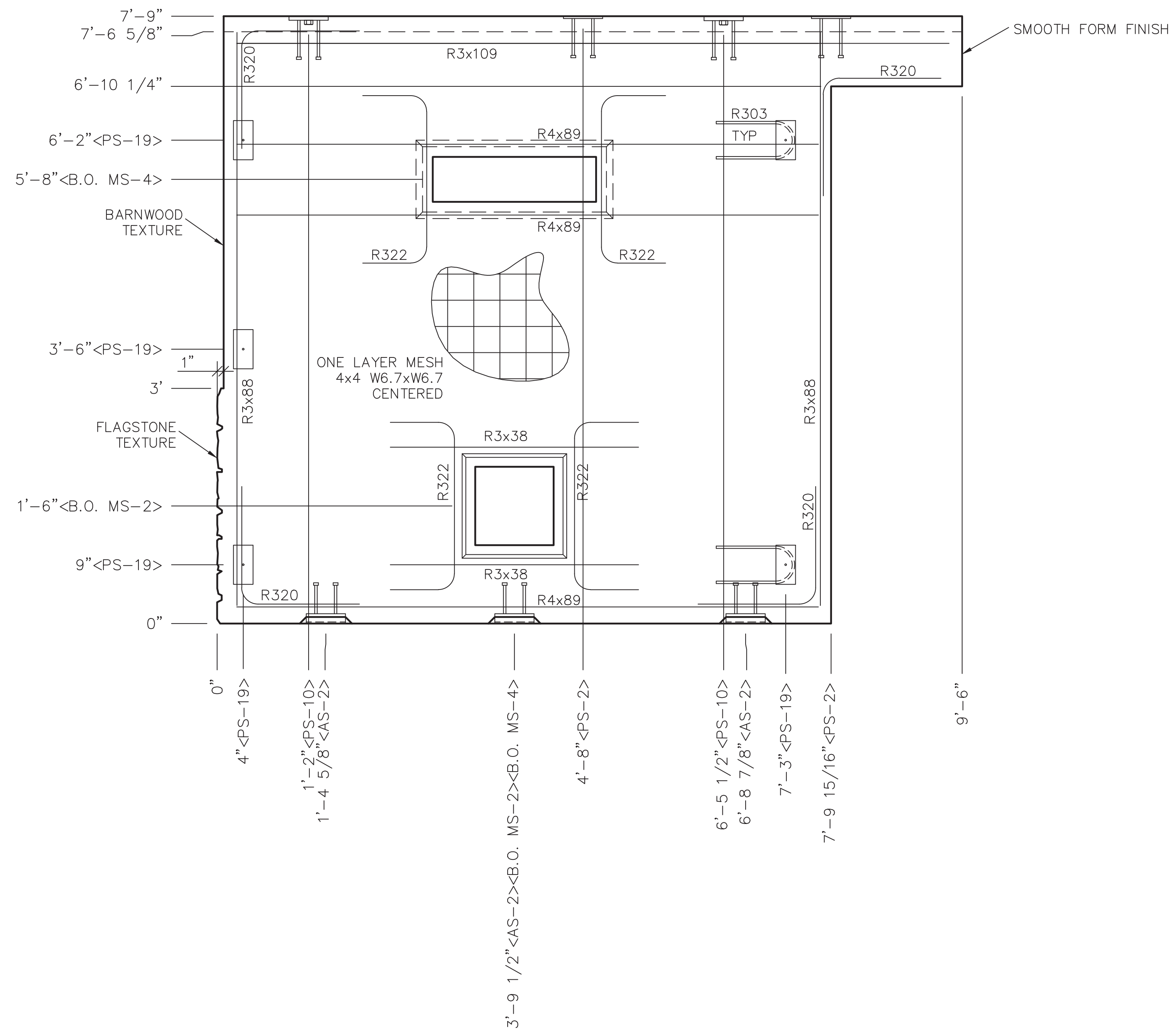
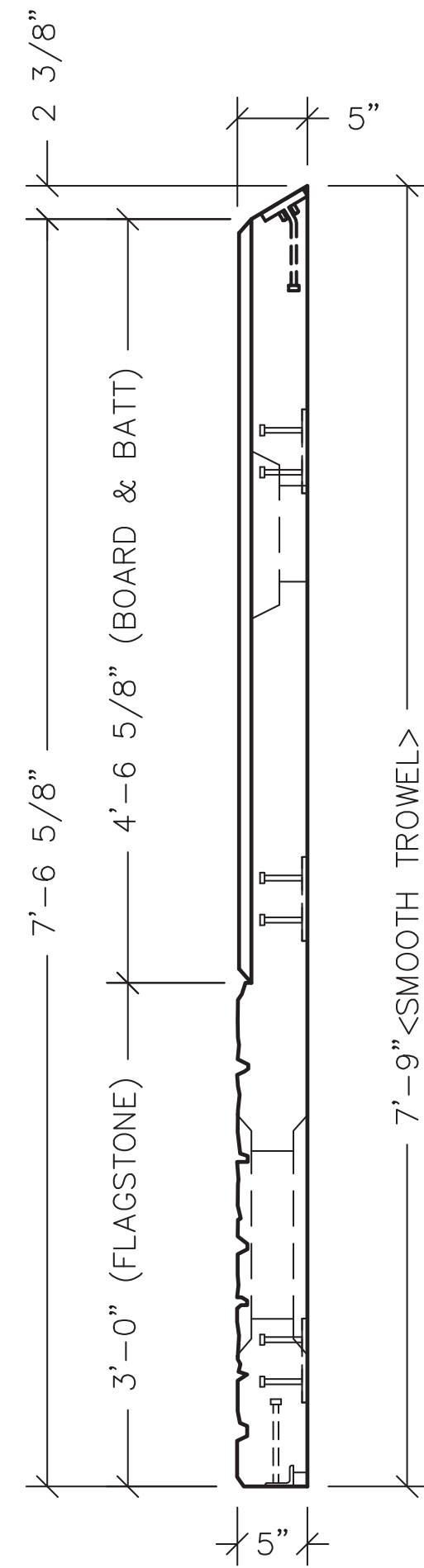
6701 E Flamingo Ave Bldg 300 Nampa, ID 83687
901 N. Highway 77 Hillsboro, TX 76645
362 Waverly Road Williamstown, WV 26187

PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

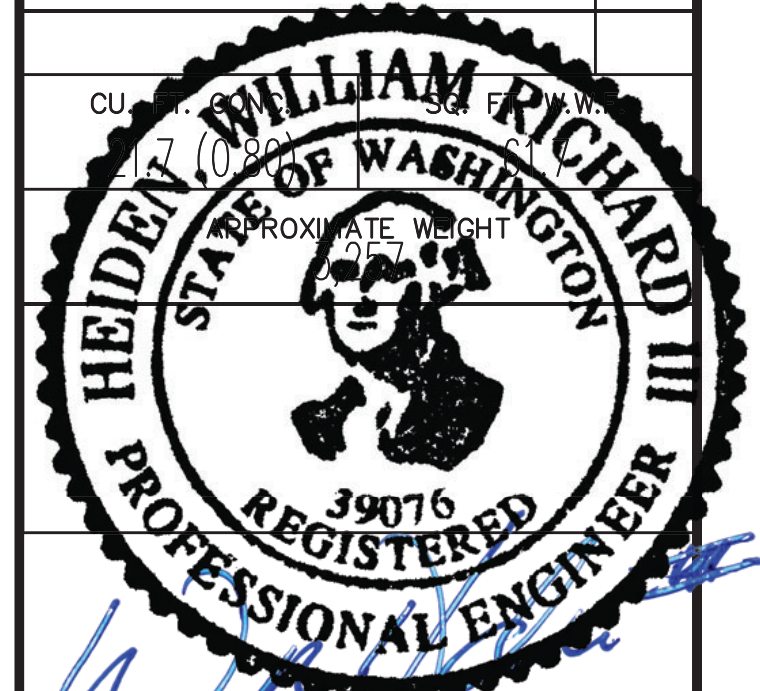
WALL PANEL MARK W8		
DWG NO. DNS-14	SHEET 14 29	REV. 0



NOTES:

- R320, R3x88 & R3x109 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER
- ALL OTHER REBAR TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
AS-2	3
PS-2	2
PS-10	2
PS-19	5
R303	2
R3x109	2
R4x89	3
R3x88	4
R322	4
R3x38	2
R320	8
B.O. MS-2	1
B.O. MS-4	1



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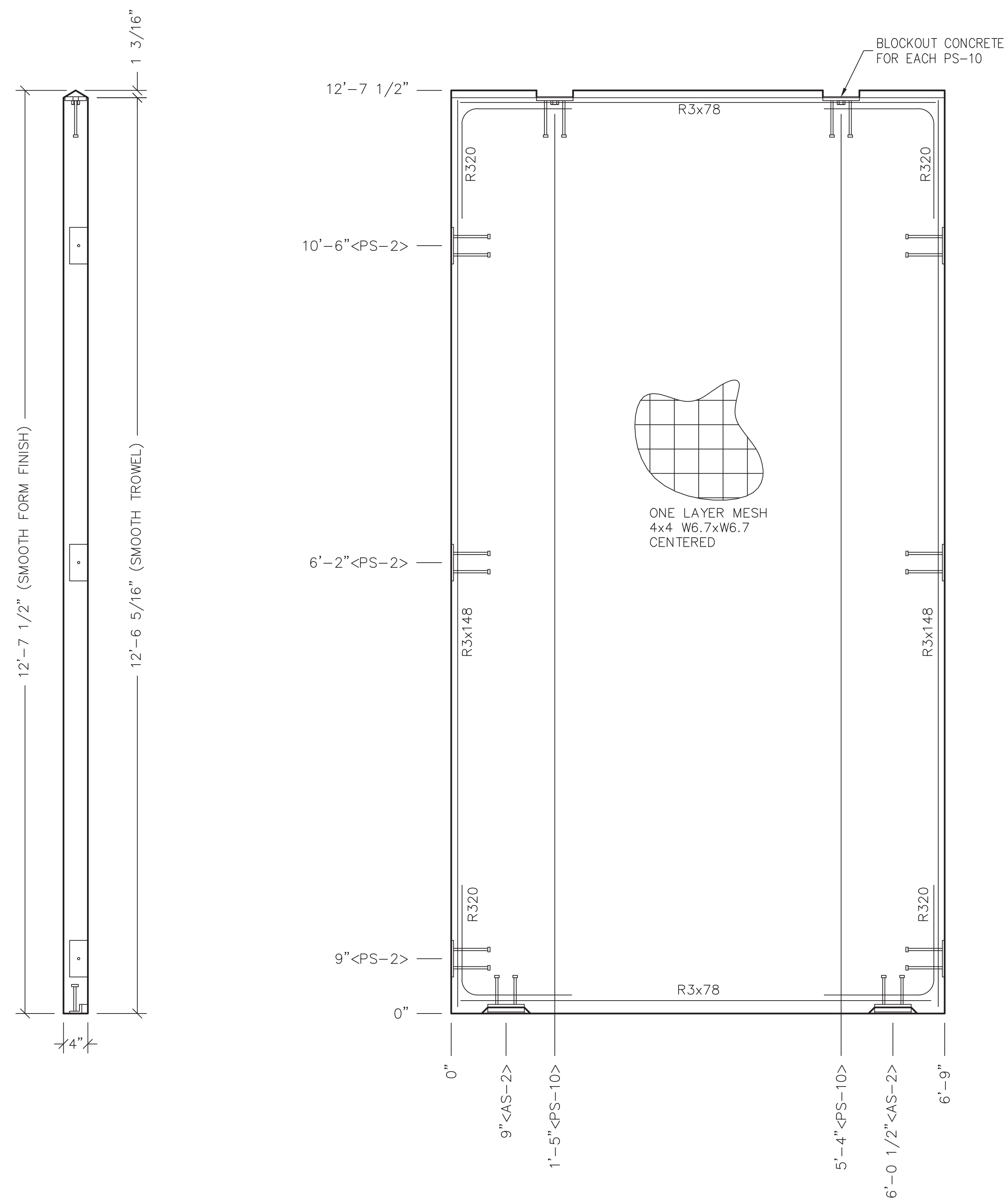
PROJECT TITLE
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BUILDING NUMBER DNS-057

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SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

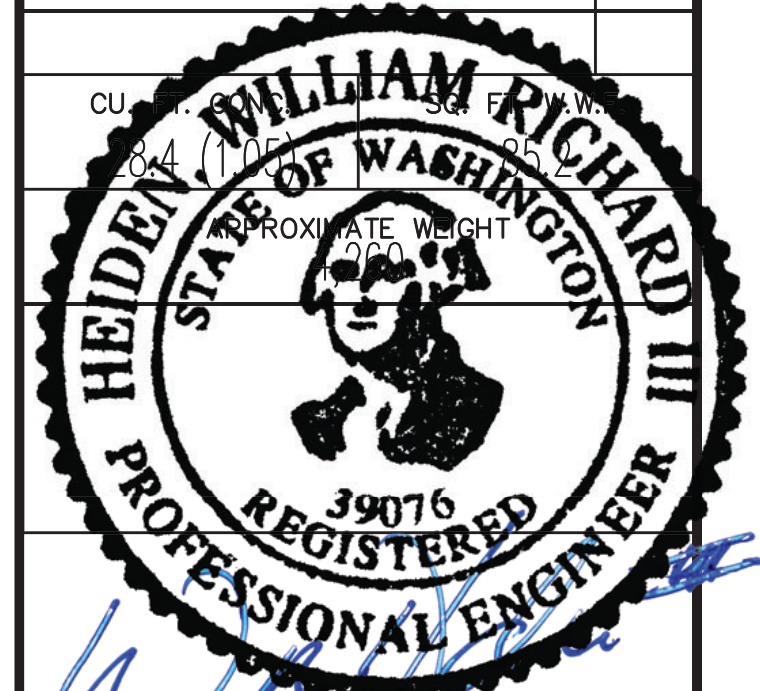
WALL PANEL
MARK W9

DWG NO.	SHEET	REV.
DNS-15	15	0
	29	



- NOTES:
1. REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 3/4" MIN. COVER

MATERIALS LIST	
ITEM	QTY
AS-2	2
PS-2	6
PS-10	2
R320	8
R3x78	4
R3x148	4



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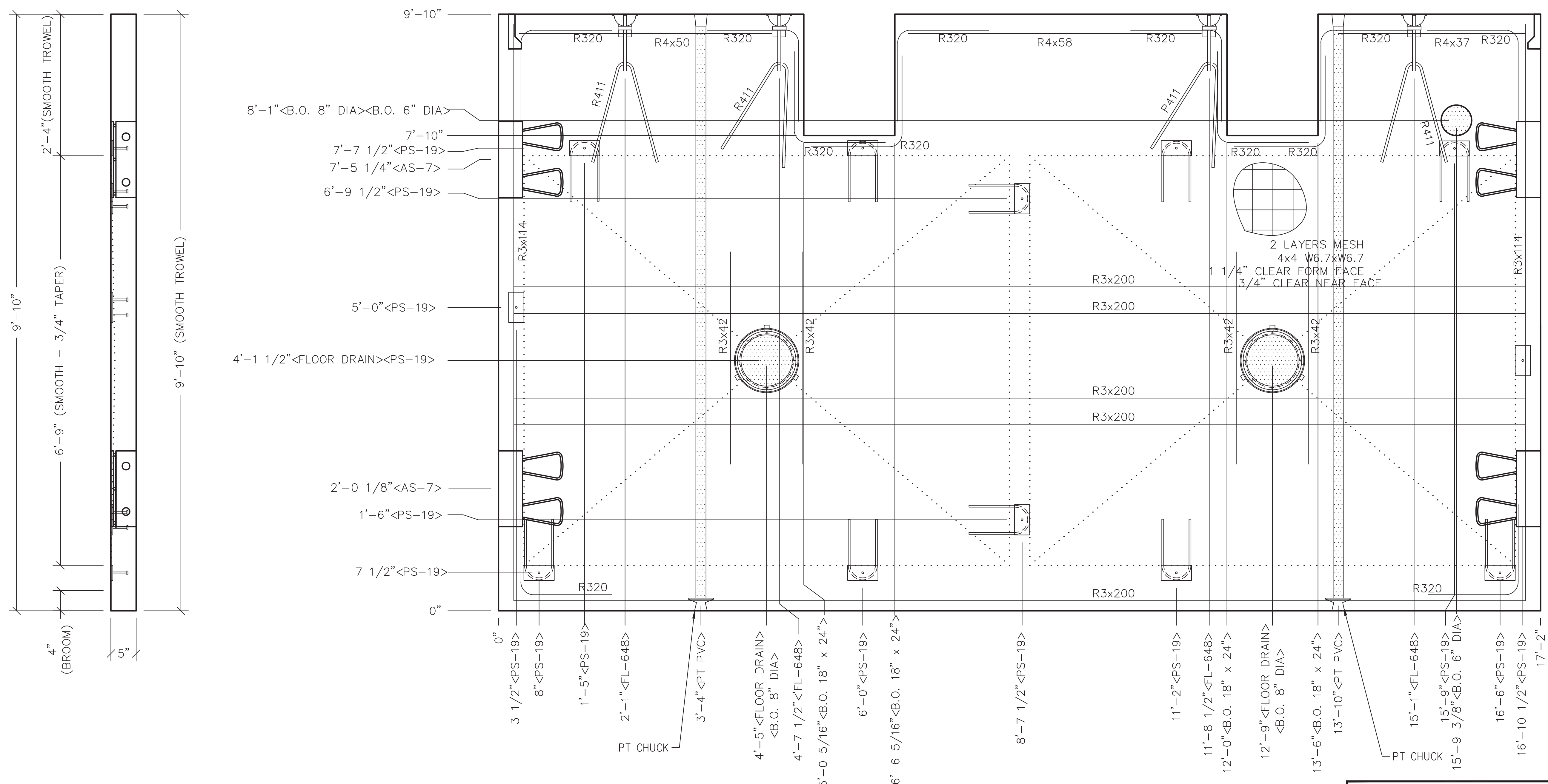
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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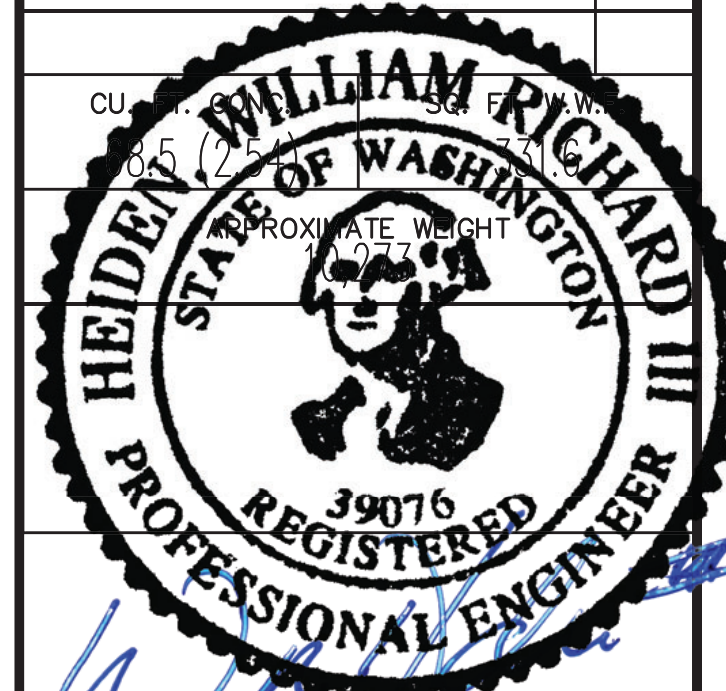
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

WALL PANEL
MARK W10

DWG NO.	SHEET	REV.
DNS-16	16	0
	29	



MATERIALS LIST		
ITEM		QTY
AS-7		4
PS-19		12
R303		10
R320		16
R4x50		4
R3x114		4
R3x200		10
R3x42		8
R411		4
FL-648		4
FLOOR DRAIN		2
B.O. 18" x 24"		2
R4x58		2
B.O. 6" DIA		1
1" PVC SCHED40 x 9'-5"		2
PT CHUCK		2



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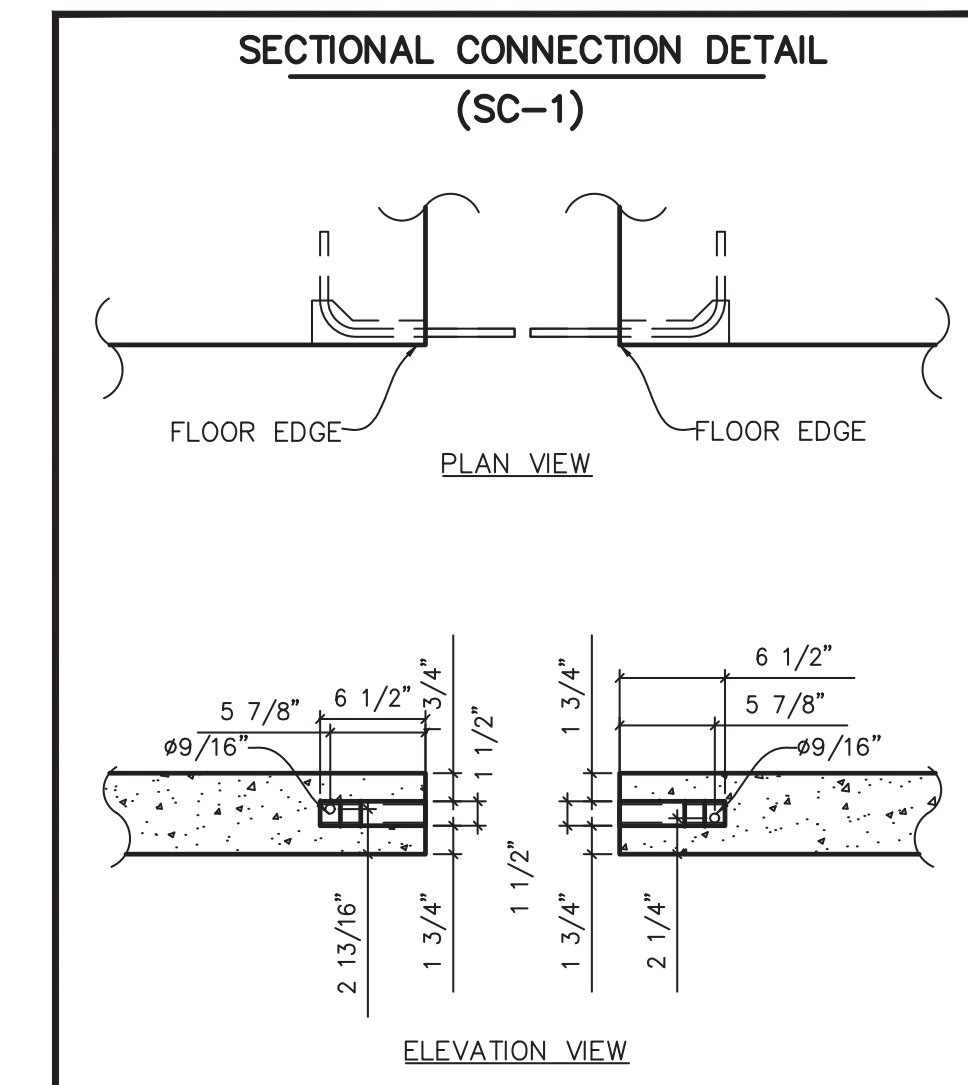
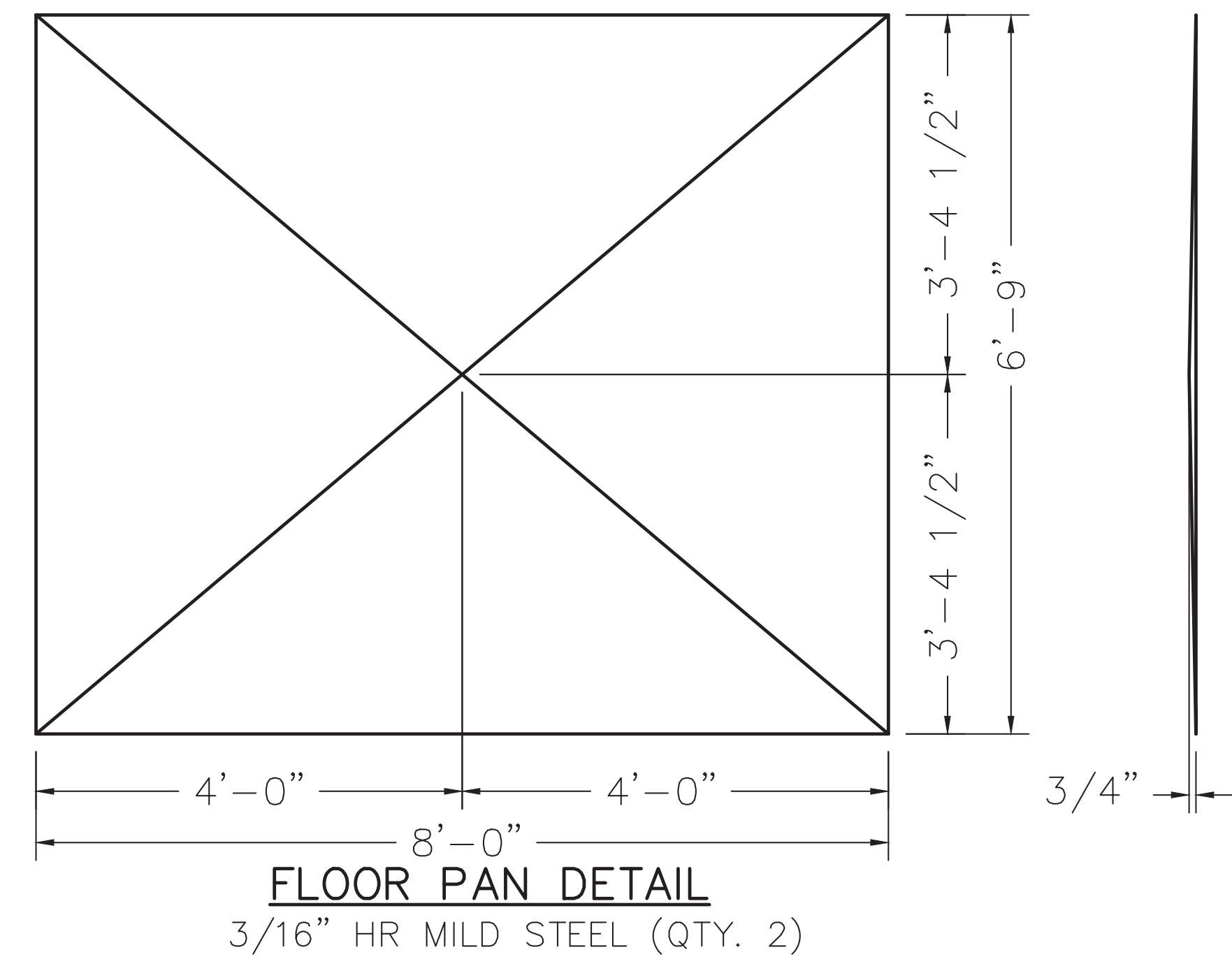
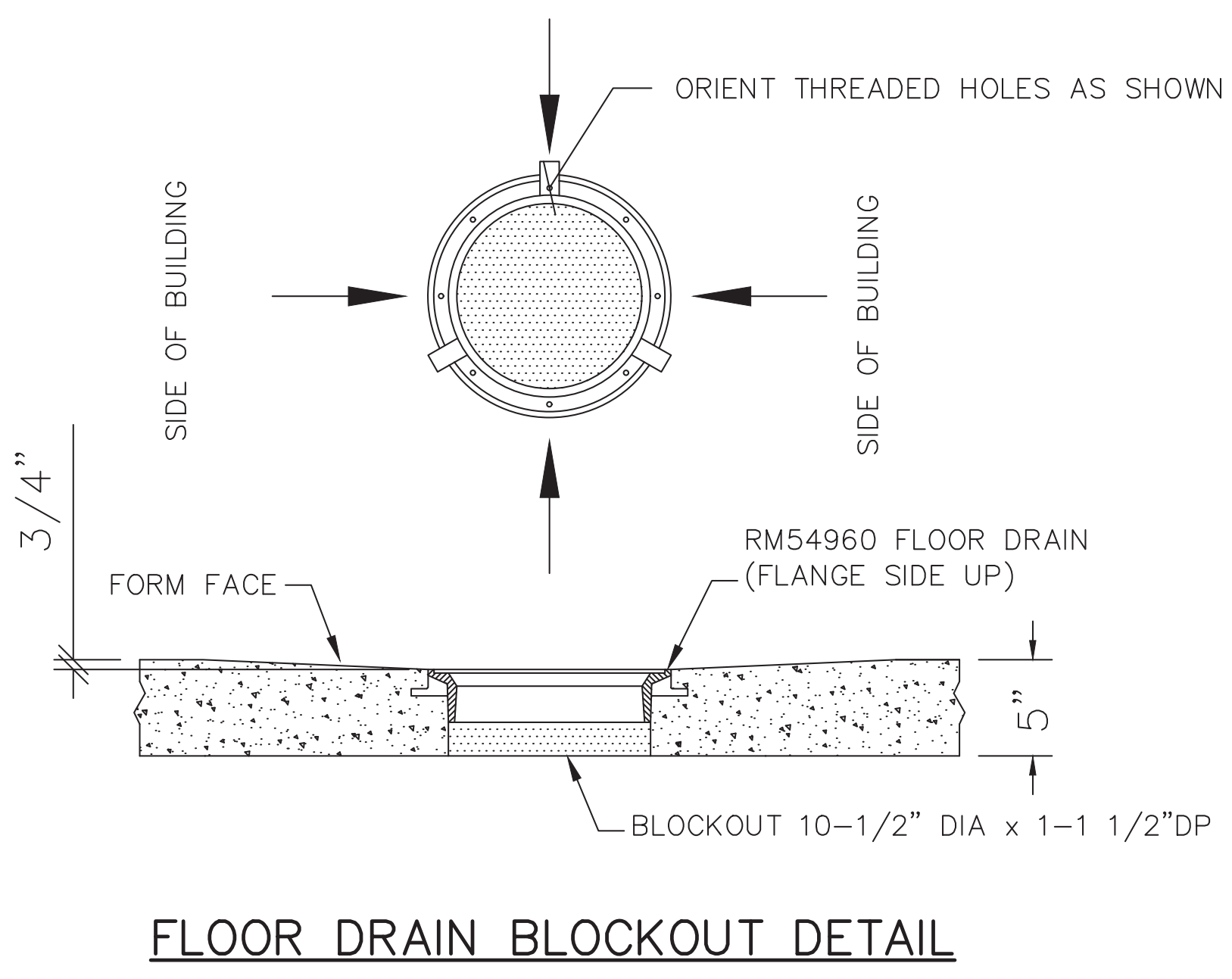
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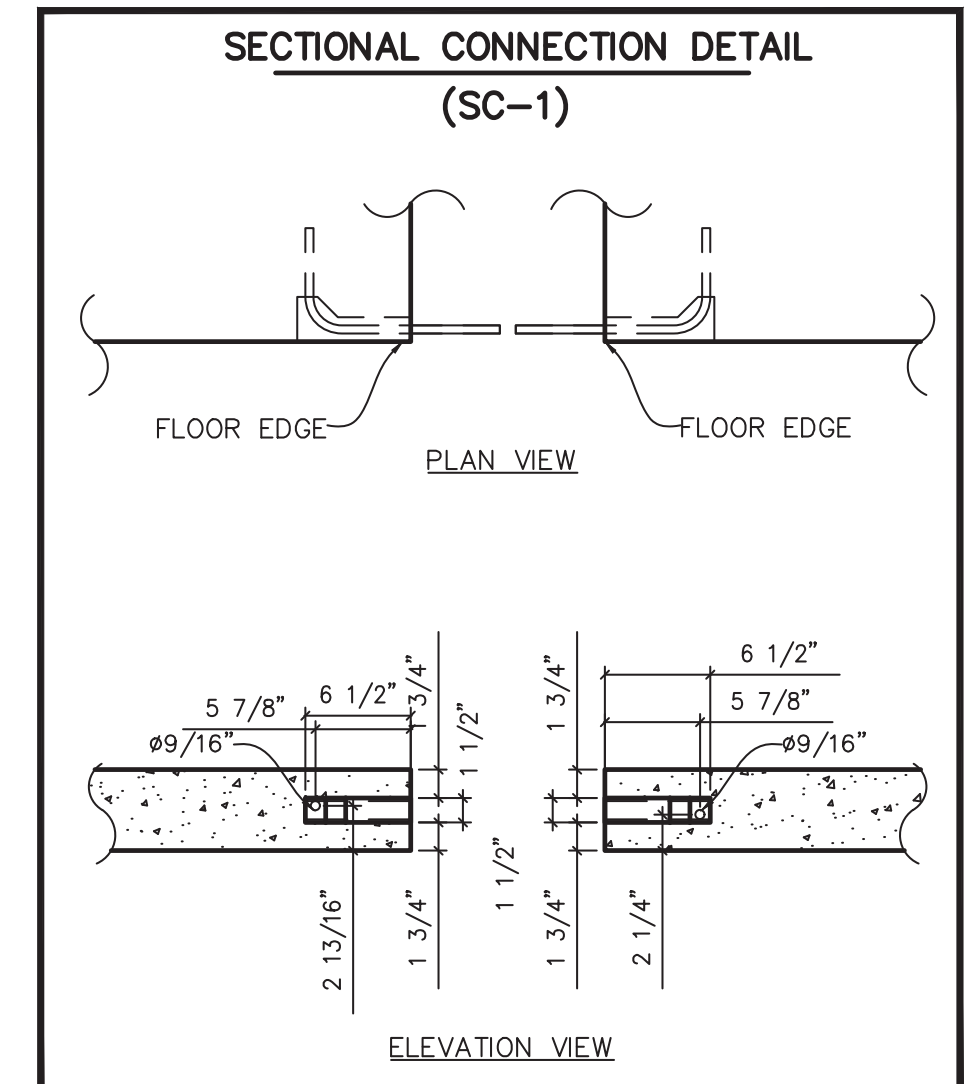
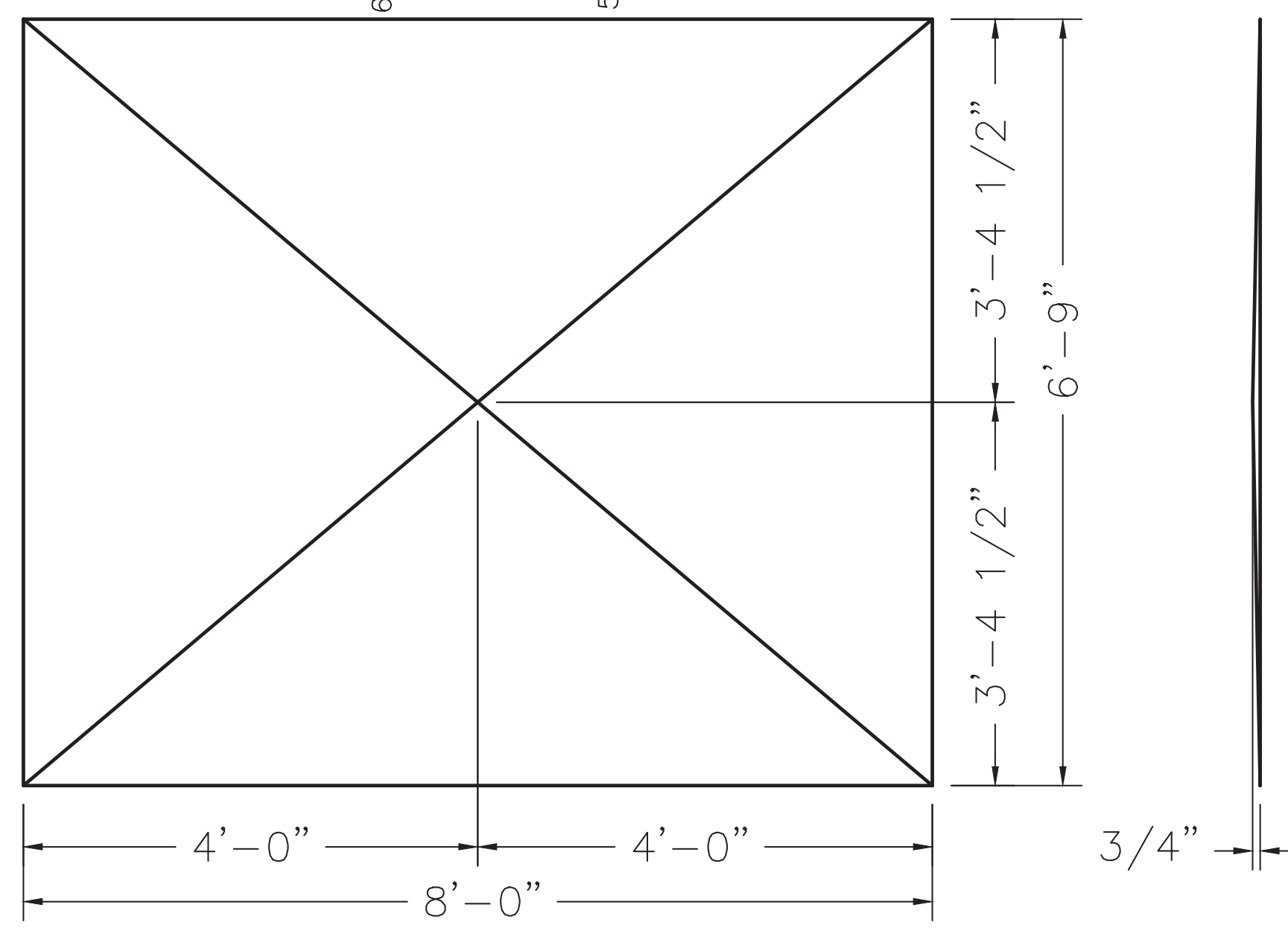
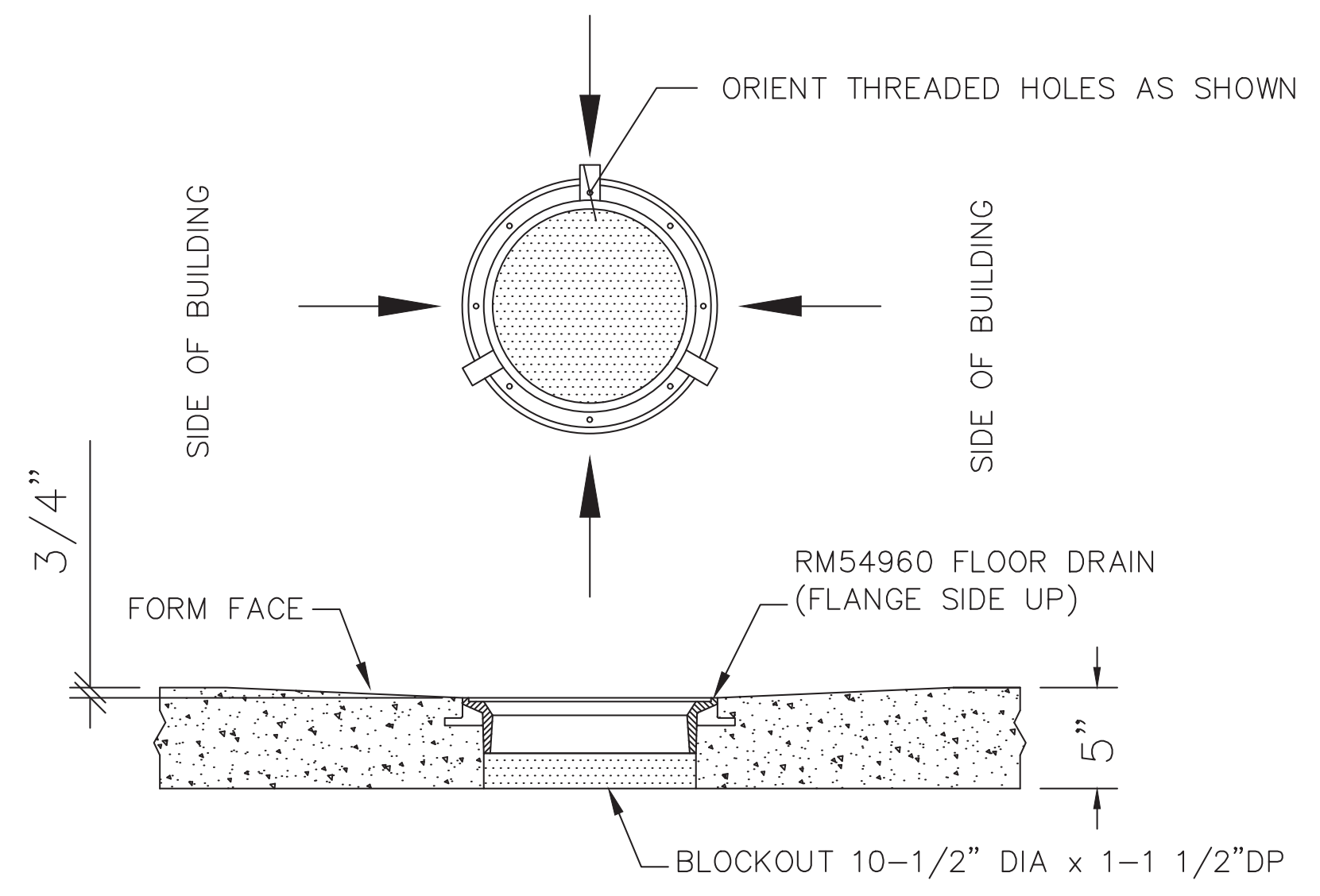
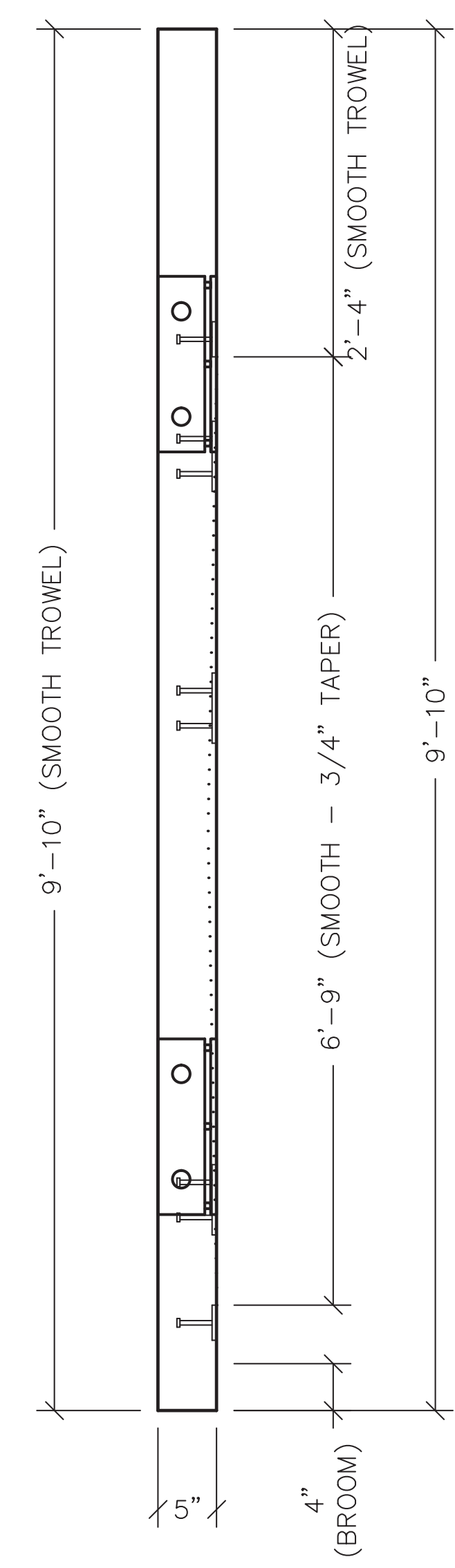
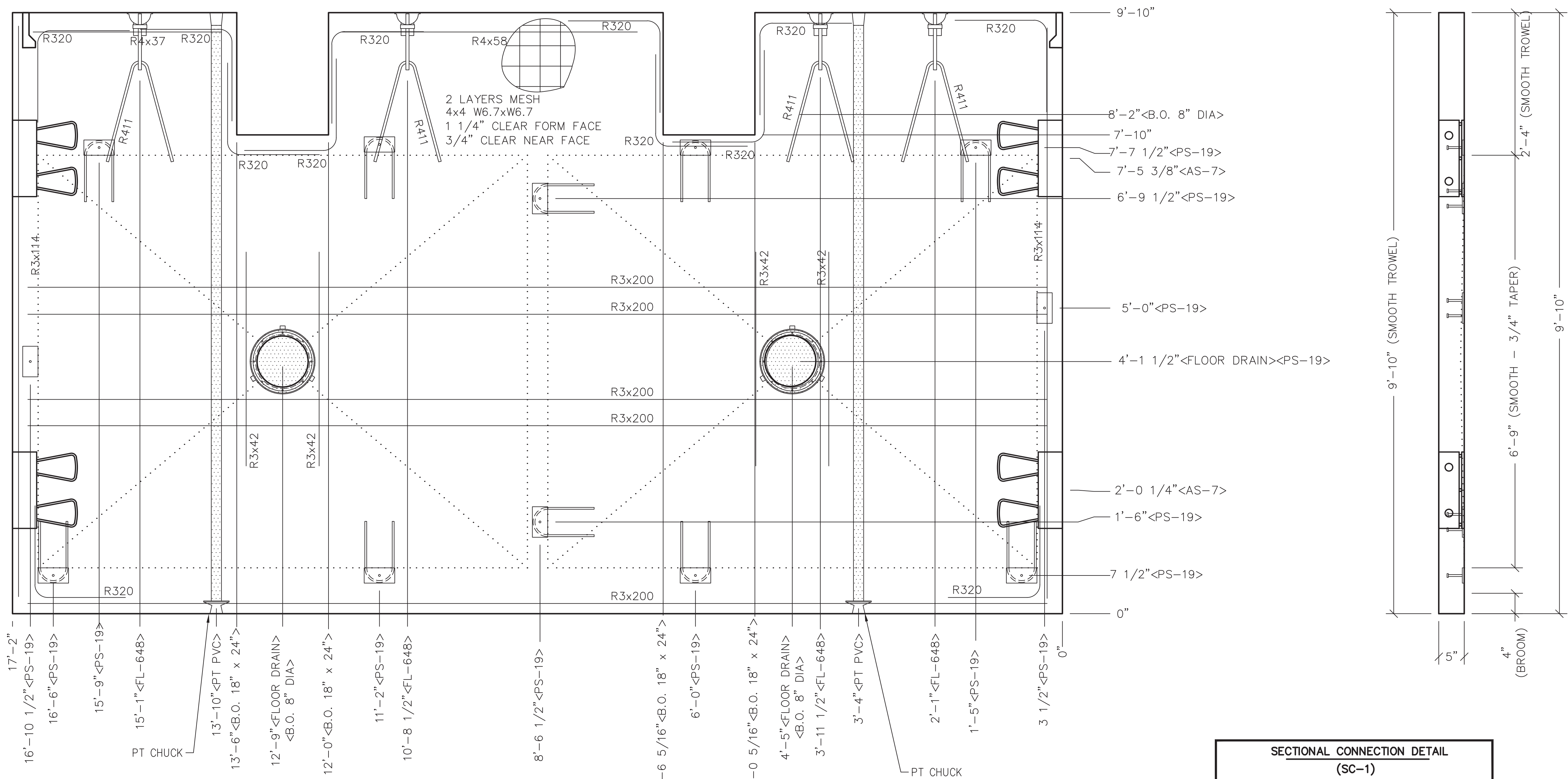
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

FLOOR SLAB
MARK F1

DWG NO. DNS-17 SHEET 17 REV. 0

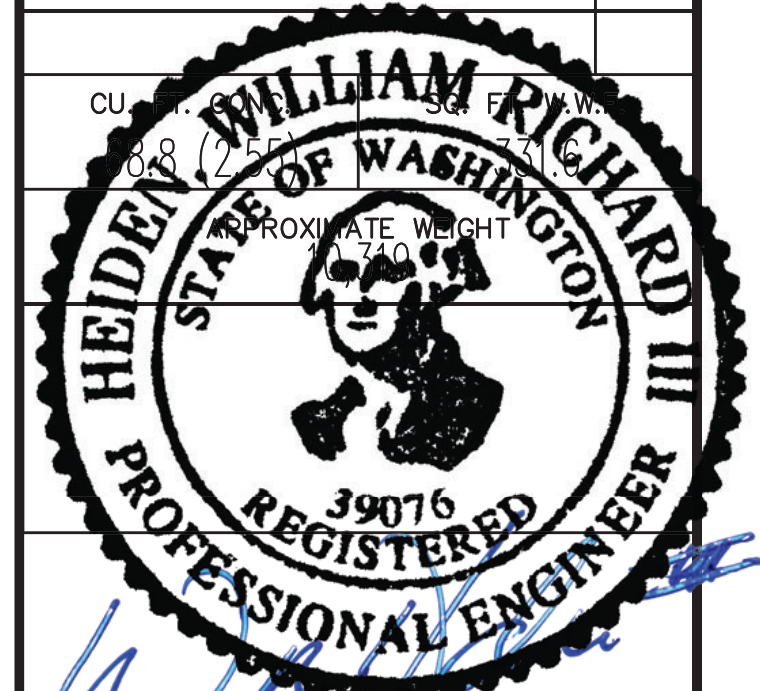


- NOTES:
- FLOOR TO BE CAST RIGHT SIDE UP
 - PAN DEPTH = 3/4"
 - EXCEPT R303, R411, & R3x90 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 1-1/4" MIN. COVER



- NOTES:**
- FLOOR TO BE CAST **RIGHT SIDE UP**
 - PAN DEPTH = 3/4"
 - EXCEPT R303, R411, & R3x90 REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 1-1/4" MIN. COVER

MATERIALS LIST	
ITEM	QTY
AS-7	4
PS-19	12
R303	10
R320	16
R3x90	2
R3x114	4
R3x200	10
R3x42	8
R411	4
FL-648	4
FLOOR DRAIN	2
B.O. 18"x24"	1
B.O. 8" DIA	2
PT CHUCK	2
1" PVC SCHED40 x 9'-5"	2



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August 9, 2024

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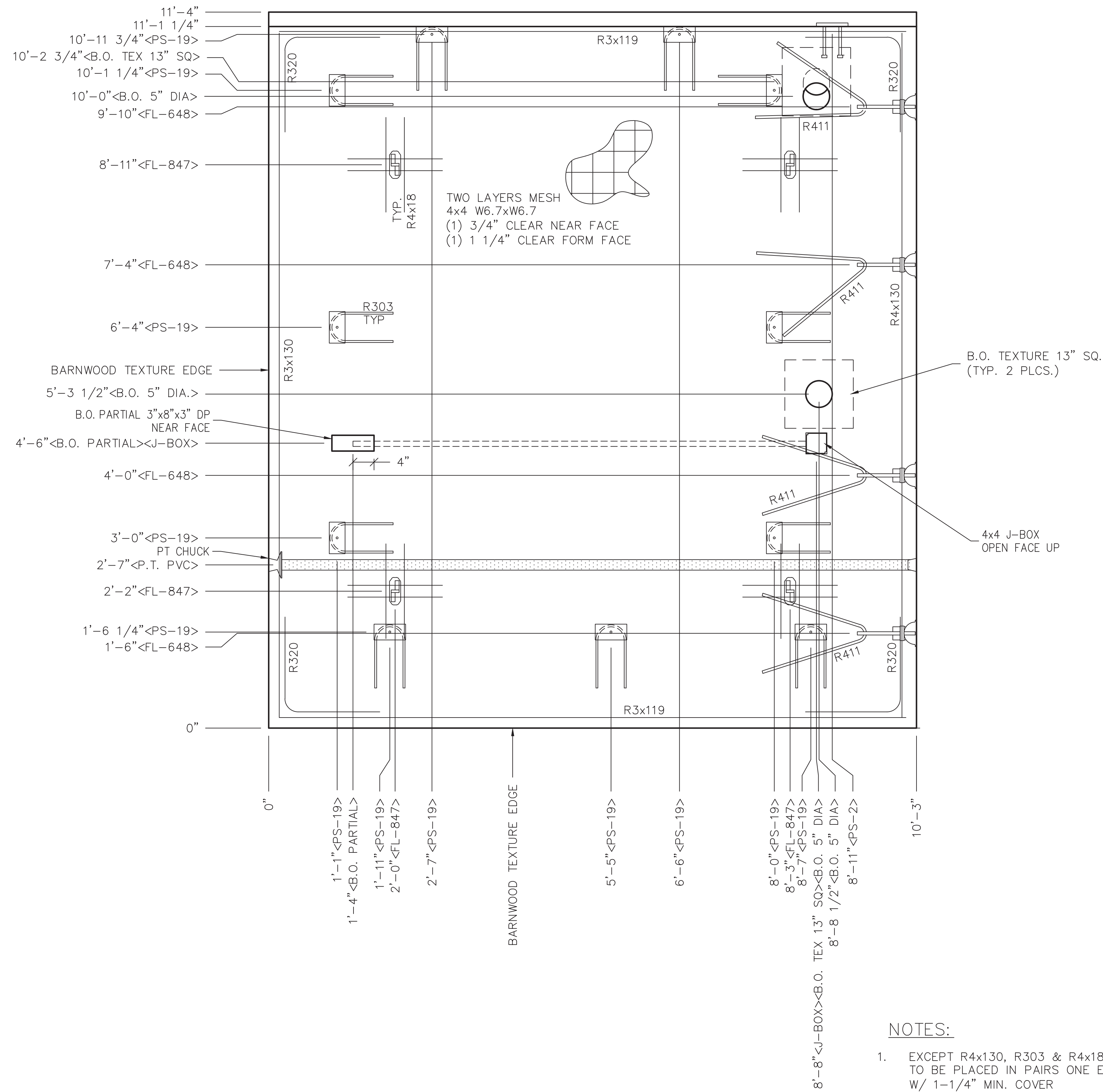
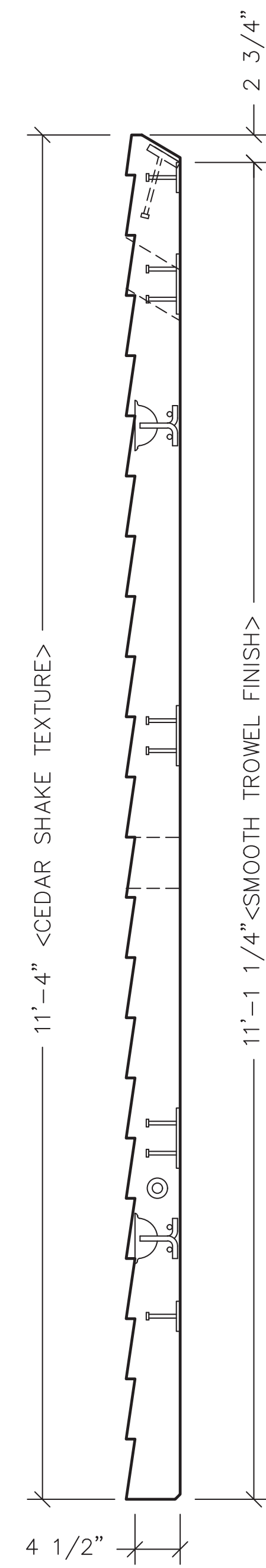
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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REV.	DESCRIPTION	APPROVAL	DATE
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DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

FLOOR SLAB
MARK F2

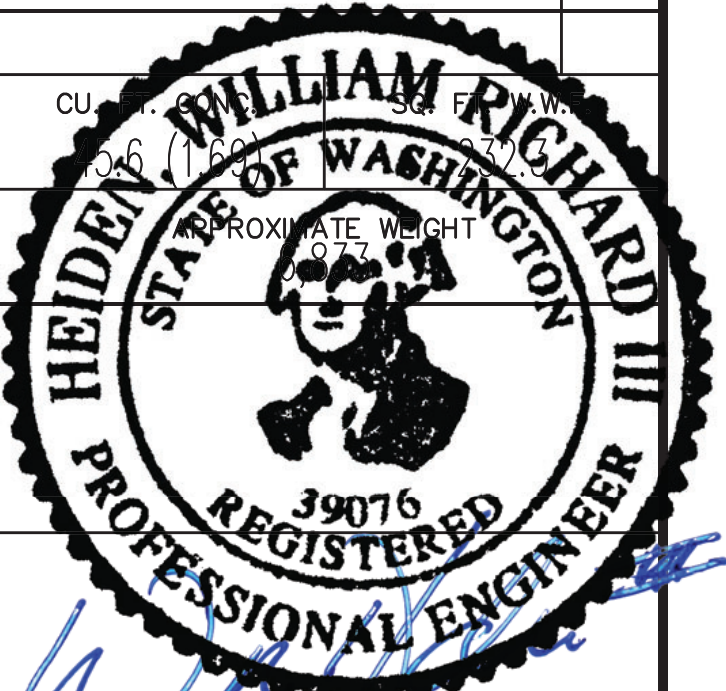
DWG NO. DNS-18 SHEET 18 REV. 0
29



NOTES:

- EXCEPT R4x130, R303 & R4x18, REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 1-1/4" MIN. COVER
- BARS R4x18 ARE TO BE PLACED AT NEAR FACE W/ 1" COVER.
- ALL OTHER BARS TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
PS-19	11
PS-2	1
FL-847	4
R320	8
R303	11
R3x119	4
R3x130	2
R4x130	1
R4x18	16
R411	4
B.O. 5" DIA	2
1" PVC SCHED40 x 9'-10"	1
P.T. CHUCK	1
FL-648	4
B.O. TEXTURE 13" SQ.	2
4x4 J-BOX	1
B.O. PARTIAL 3"x8"x3" DP	1



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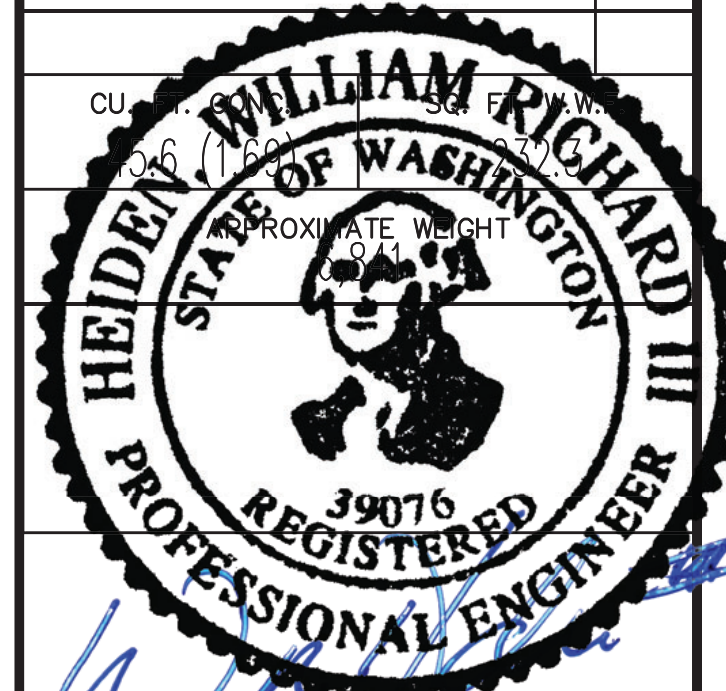
PROJECT TITLE
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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/8"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	32

ROOF SLAB MARK R1		
DWG NO.	SHEET	REV.
DNS-19	19 29	0

MATERIALS LIST	
ITEM	QTY
PS-19	11
PS-2	1
FL-847	4
R320	8
R303	12
R3x119	4
R3x130	2
R4x130	1
R4x18	16
R411	4
B.O. TEXTURE 13" SQ.	1
FL-648	4
P.T. CHUCK	1
1" PVC SCHED40 x 9'-10"	1
B.O. 5" DIA	1



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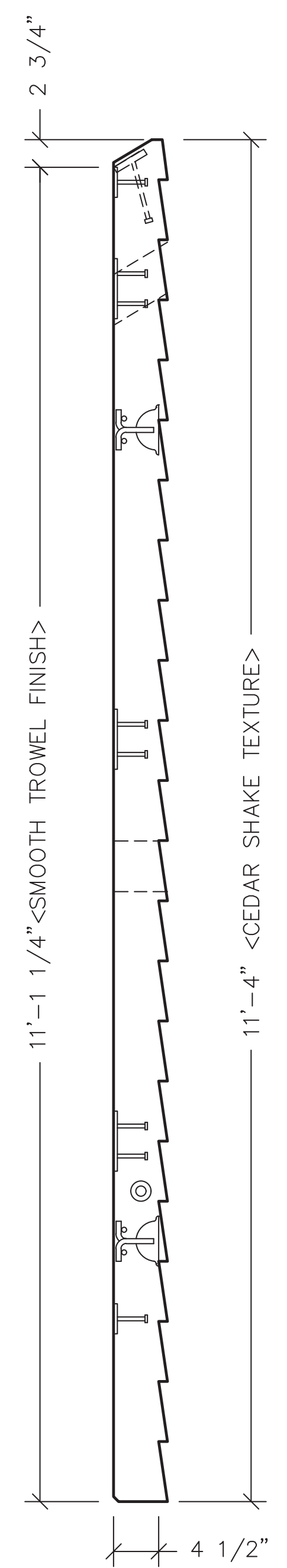
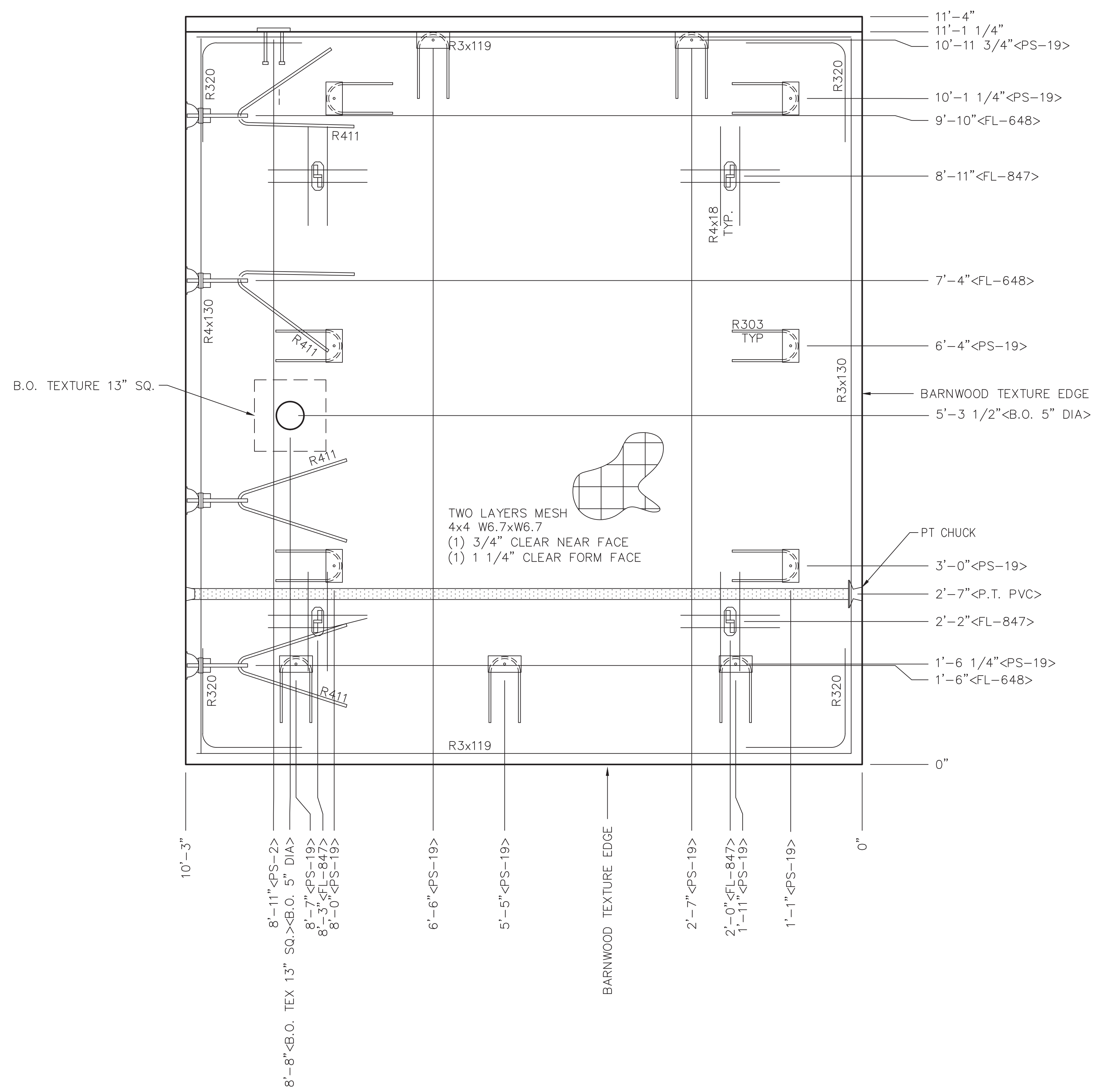
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CHECKED	N.PENNER	PLOT	32

ROOF SLAB
MARK R2

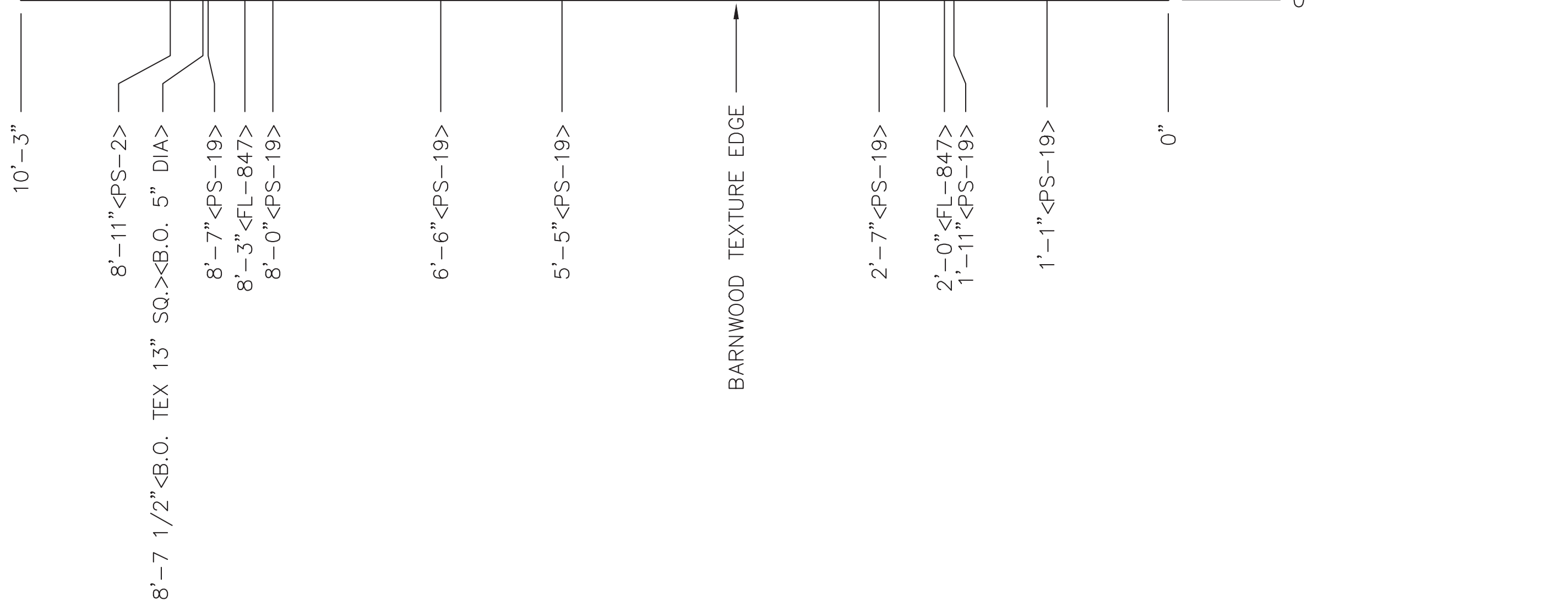
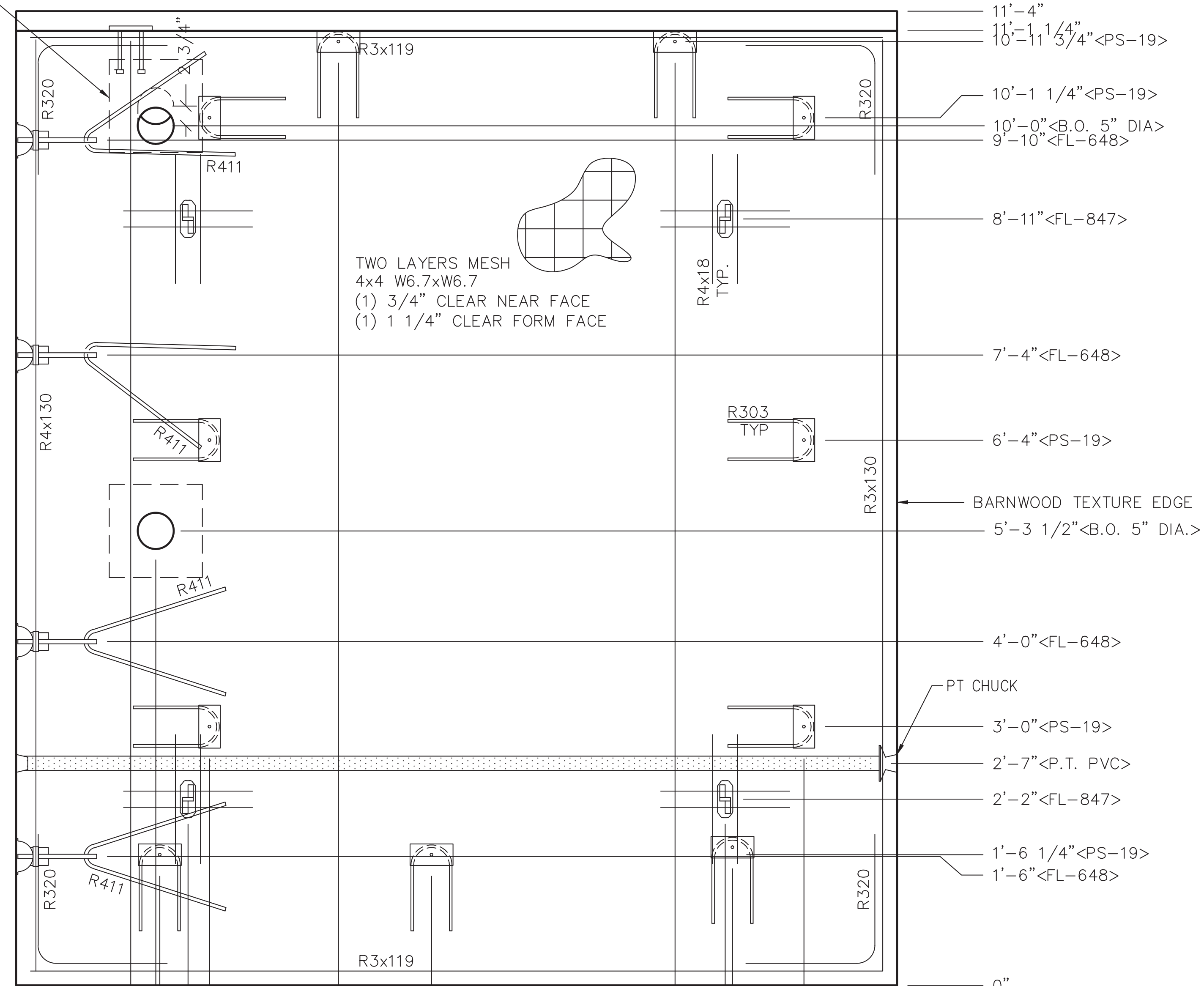
DWG NO.	SHEET	REV.
DNS-20	20	0
	29	



NOTES:

- EXCEPT R4x130, R303 & R4x18, REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 1-1/4" MIN. COVER
- BARS R4x18 ARE TO BE PLACED AT NEAR FACE W/ 1" COVER.
- ALL OTHER BARS TO BE CENTERED IN PANEL.

B.O. TEXTURE 13" SQ.
(TYP. 2 PLCS.)



NOTES:

- EXCEPT R4x130, R303 & R4x18, REINFORCING BARS TO BE PLACED IN PAIRS ONE EACH FACE OF PANEL W/ 1-1/4" MIN. COVER
- BARS R4x18 ARE TO BE PLACED AT NEAR FACE W/ 1" COVER.
- ALL OTHER BARS TO BE CENTERED IN PANEL.

MATERIALS LIST	
ITEM	QTY
PS-19	11
PS-2	1
FL-847	4
R320	8
R303	11
R3x119	4
R3x130	2
R4x130	1
R4x18	16
R411	4
B.O. 5" DIA	2
1" PVC SCHED40 x 9'-10"	1
P.T. CHUCK	1
B.O. TEXTURE 13" SQ.	2
FL-648	4



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CHECKED	N. PENNER	PLOT	32

ROOF SLAB
MARK R3

DWG NO.	SHEET	REV.
DNS-21	21	0
	29	

NOTE:

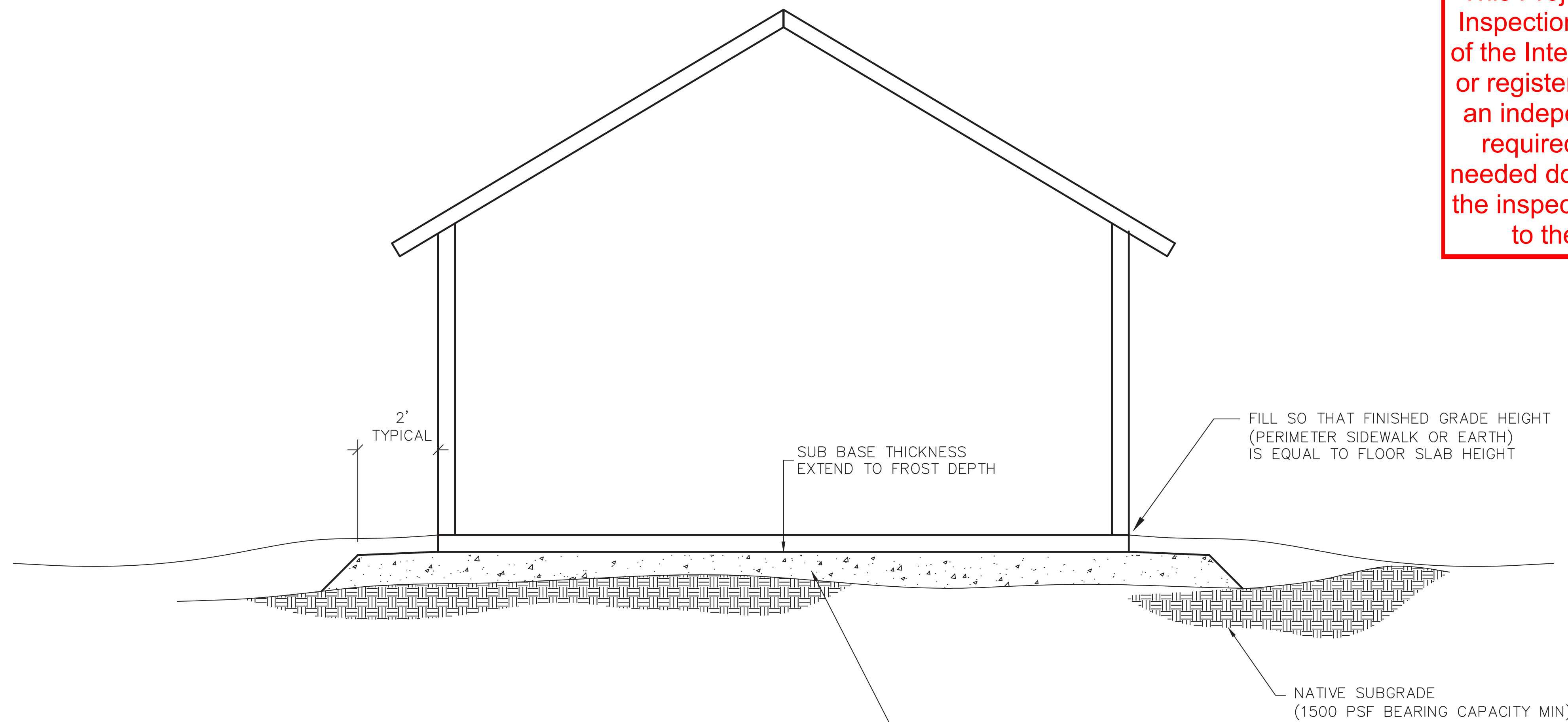
THIS FACTORY ASSEMBLED BUILDING, AS CONSTRUCTED, PROVIDES A RIGID BOX TYPE STRUCTURAL SYSTEM. VERTICAL LOADS ARE TRANSFERRED PRIMARILY THROUGH BEARING WALLS TO THE STRUCTURAL SLAB FLOOR OF THE BUILDING. THE VERTICAL LOADS ARE THEN DISTRIBUTED THROUGH THE REINFORCED CONCRETE FLOOR TO THE PREPARED GRANULAR, NON-FROST SUSCEPTIBLE (NFS) SUB-BASE WHICH DISTRIBUTES THE VERTICAL LOADS IN RELATIVELY UNIFORM FASHION TO THE NATIVE SUB-GRADE. AS WITH MOST CONSTRUCTION, THIS DOES REQUIRE THE NATIVE SUB-GRADE TO BE STRIPPED OF VEGETATION AND TOP SOIL PRIOR TO PLACEMENT OF THE PREPARED GRANULAR SUB-BASE. DUE TO THE INHERENT STIFFNESS OF THE BUILDING, IT WILL REMAIN SAFE AND STRUCTURALLY SOUND IN THE UNLIKELY EVENT OF FREEZING ACTION BELOW THE BUILDING REGARDLESS OF NATURAL FREEZE/ THAW CYCLES ANTICIPATED TO BE ENCOUNTERED IN WASHINGTON.

LATERAL LOADS ARE TRANSFERRED TO THE GROUND THROUGH FRICTIONAL RESISTANCE WITHOUT SLIDING OR SHIFTING BETWEEN THE BUILDING FLOOR SLAB AND THE PREPARED SOIL AND GRAVEL SUB-BASE ON WHICH THE BUILDING RESTS. SEISMIC ANALYSES ARE BASED ON LOADS DETERMINED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE USING PARAMETERS, WHICH MEET OR EXCEED THE CODE PRESCRIBED REQUIREMENTS FOR THIS INSTALLATION.

THIS BUILDING AS DESIGNED, RESTING ON A PROPERLY PREPARED GRANULAR SUB-BASE WILL BE SAFE AND STRUCTURALLY SOUND FOR VERTICAL AND LATERAL LOADS AS DISCUSSED ABOVE. A FULL DEPTH FOUNDATION WALL AT THE BUILDING PERIMETER AND AN ANCHORAGE SYSTEM, TYPICAL FOR OTHER TYPES OF BUILDING CONSTRUCTION, ARE NOT REQUIRED FOR THIS BUILDING.

THE "FOUNDATION" FOR THIS STRUCTURE IS ESSENTIALLY THE COMBINATION OF THE COMPACTED SUB-BASE MATERIAL AND THE BUILDING'S REINFORCED SLAB. THE COMBINATION OF THE COMPACTED SUB-BASE MATERIAL AND THE BUILDING'S REINFORCED SLAB NEED TO BE AT LEAST 12" THICK AND THE COMPACTED SUB-BASE MATERIAL SHALL EXTEND BELOW THE LOCAL FROST DEPTH

SPECIAL INSPECTIONS
 This Project was noted as needing Special Inspections. In accordance to Section 1704 of the International Building Code the Owner or registered professional is required to hire an independent testing agency to preform required special inspection and provide needed documentation to Skagit County that the inspection was preformed and compliant to the International Building Code.



PRIOR TO PLACEMENT OF BUILDING A PROPERLY PREPARED SUB-BASE SHALL BE PROVIDED. SUB-BASE SHALL EXTEND TO FROST DEPTH AND CONSIST OF 3/4" MINUS CRUSHED ROCK (ROAD BASE MATERIAL) COMPACTED TO 95% OF OPTIMUM DENSITY IN ACCORDANCE WITH ASTM D 1557. FINISHED SURFACE OF SUB-BASE SHALL BE FLAT AND LEVEL, WITH A MAXIMUM DEVIATION OF -1/2", +0" FROM A TRUE HORIZONTAL PLANE. REFER TO BUILDING HANDLING SHEET FOR SUB-BASE REQUIREMENTS DURING BUILDING PLACEMENT. (PREPARED SUB-BASE NOT BY CXT).



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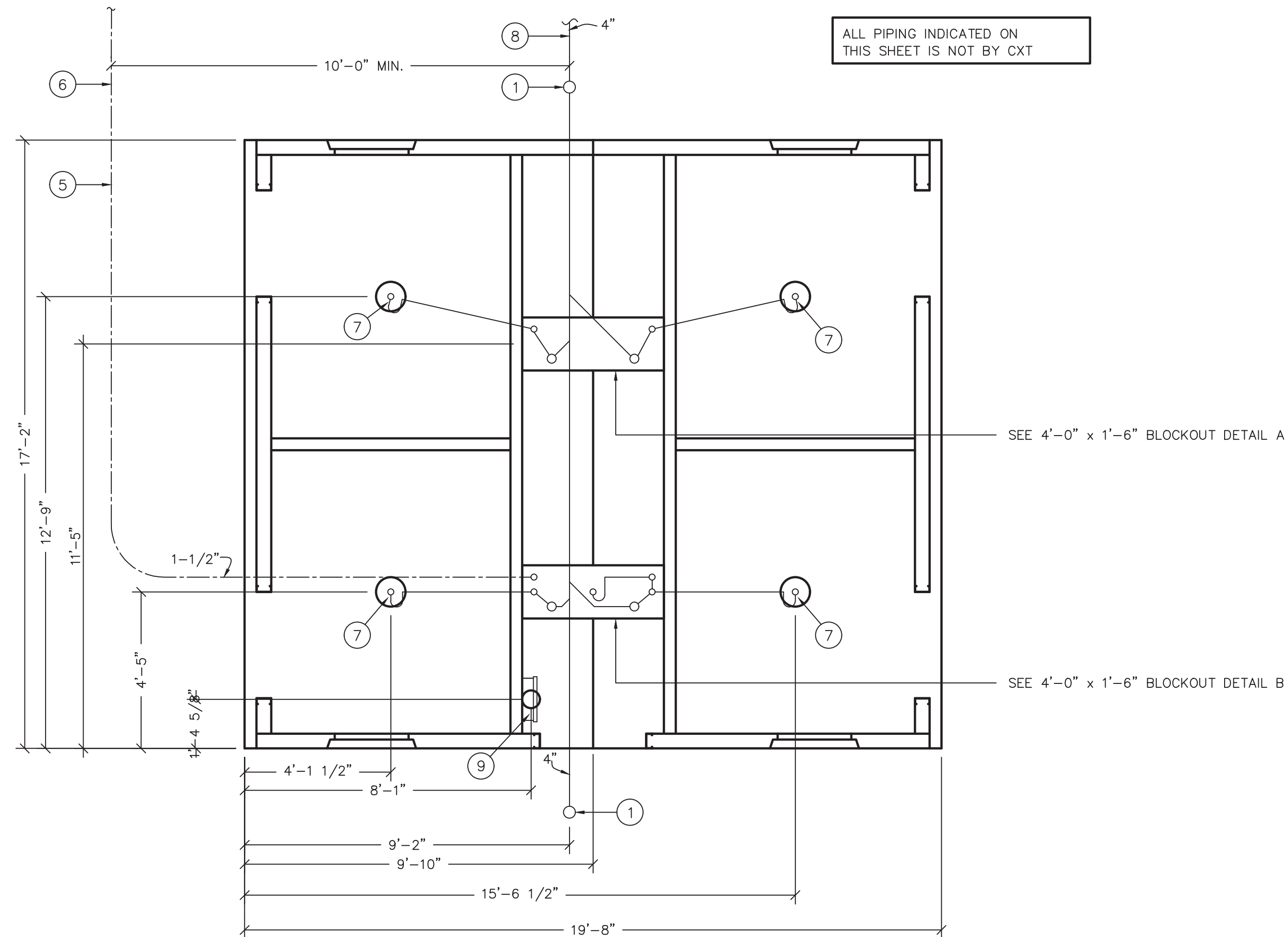
PROJECT TITLE
DENALI SECTIONAL
 BUILDING NUMBER DNS-057

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SCALE	N/A	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	N/A

**FOUNDATION
 DETAIL**

DWG NO.	SHEET	REV.
DNS-23	23 29	0



FLOOR DRAIN BLOCKOUTS & BELOW FLOOR PIPING

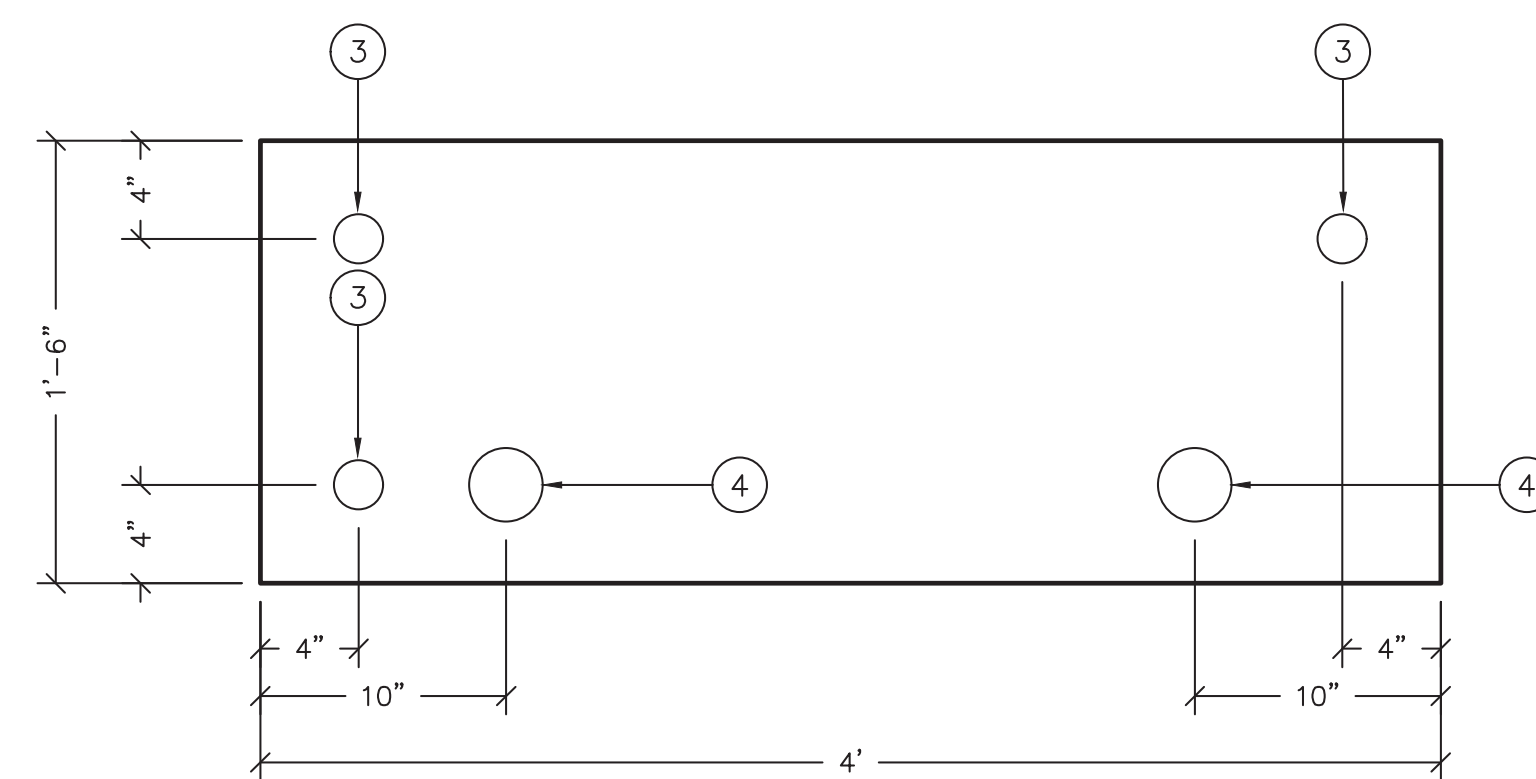
BELOW FLOOR PIPING — KEY NOTES

1. 4" CLEAN OUT TO GRADE.
2. 2" FLOOR DRAIN. FIELD INSTALLED TRAP SEAL SYSTEM (4'-0" x 1'-6" BLOCKOUT)
3. 2" VENT PIPES EXTENDED 12" ABOVE FINISHED FLOOR LEVEL, PROVIDE TEST PLUG. (4'-0" x 1'-6" BLOCKOUT)
4. 3" WASTE PIPE EXTENDED 12" ABOVE FINISHED FLOOR LEVEL, PROVIDE TEST PLUG. (4'-0" x 1'-6" BLOCKOUT)
5. 1-1/2" TYPE K OR L ANNEALED "SOFT" COPPER WATER SERVICE EXTENDED 12" ABOVE FINISHED FLOOR LEVEL, PROVIDE CAP AT END. (4'-0" x 1'-6" BLOCKOUT)
6. MIN. BURY PER LOCAL REQUIREMENTS TO PROTECT AGAINST FREEZING AND DAMAGE.
7. 2" FLOOR DRAIN. FIELD INSTALLED w TRAP SEAL SYSTEM (10" DIA BLOCKOUT)
8. 30" MIN. BURY, PROVIDE TRACER TAPE.
9. ELECTRICAL STUB UP, (6" DIA BLOCKOUT)
10. 10" DIA BLOCKOUT FOR FLOOR MOP SINK.

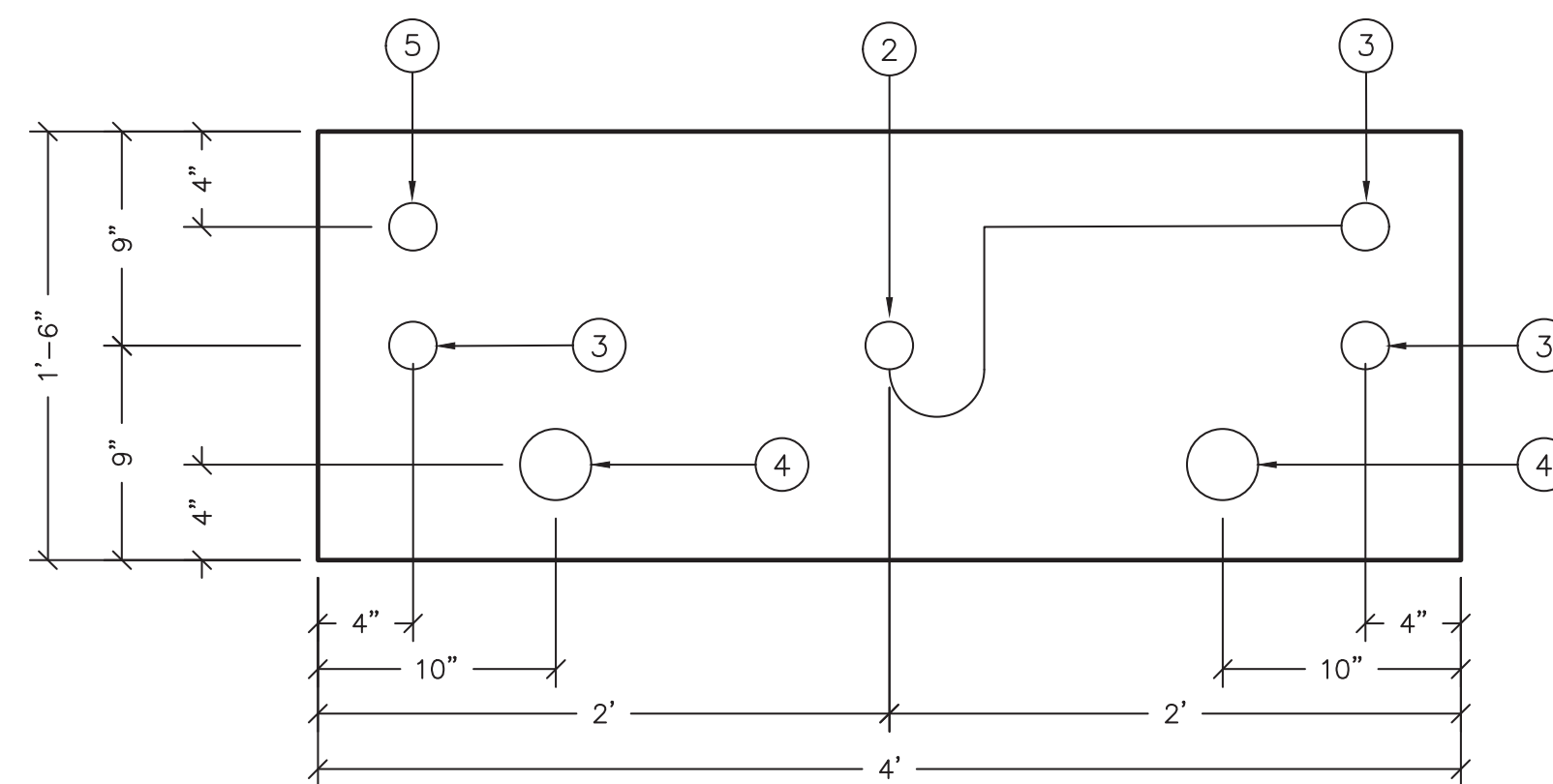
PIPING LEGEND

- 1-1/2" TYPE "K" OR "L" ANNEALED "SOFT" COPPER WATER SERVICE ASTM B88
- BELOW FLOOR WASTE PIPING SCH 40 PVC TYPE DWV ASTM D26655
- BELOW FLOOR VENT PIPING SCH 40 PVC TYPE DWV ASTM D26655

ALL PIPING INDICATED ON THIS SHEET IS NOT BY CXT



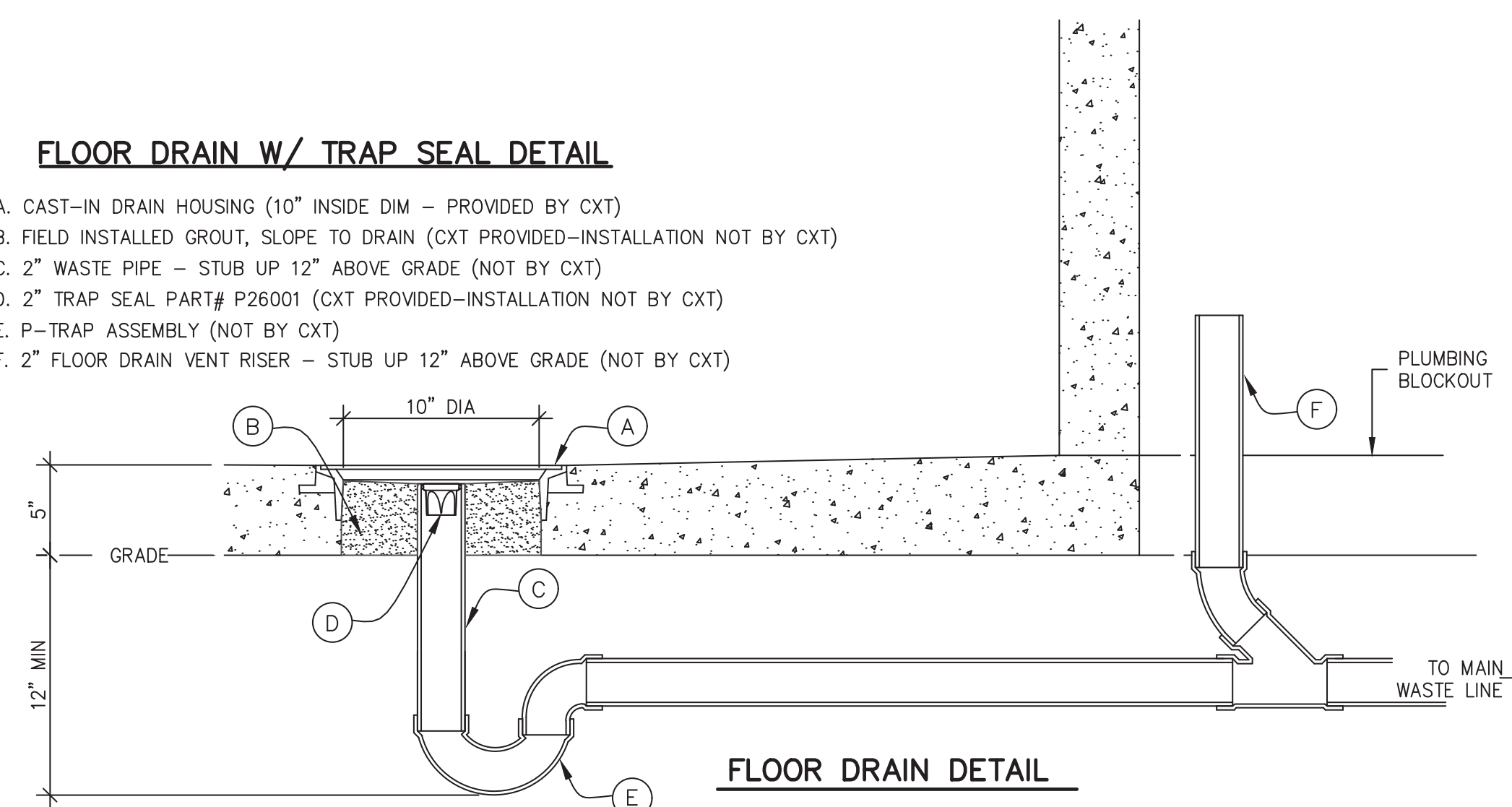
4'-0" x 1'-6" BLOCKOUT DETAIL A



4'-0" x 1'-6" BLOCKOUT DETAIL B

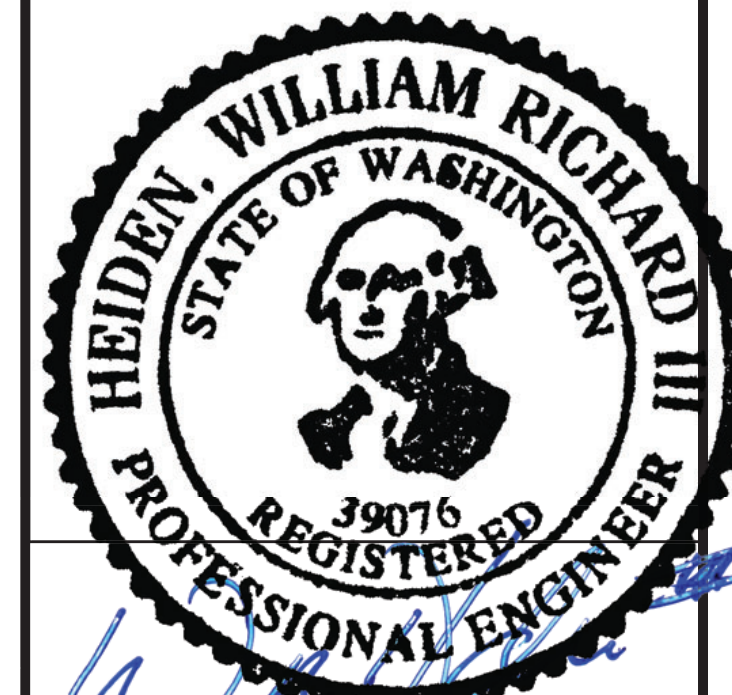
FLOOR DRAIN W/ TRAP SEAL DETAIL

- A. CAST-IN DRAIN HOUSING (10" INSIDE DIM - PROVIDED BY CXT)
- B. FIELD INSTALLED GROUT, SLOPE TO DRAIN (CXT PROVIDED-INSTALLATION NOT BY CXT)
- C. 2" WASTE PIPE - STUB UP 12" ABOVE GRADE (NOT BY CXT)
- D. 2" TRAP SEAL PART# P26001 (CXT PROVIDED-INSTALLATION NOT BY CXT)
- E. P-TRAP ASSEMBLY (NOT BY CXT)
- F. 2" FLOOR DRAIN VENT RISER - STUB UP 12" ABOVE GRADE (NOT BY CXT)



FLOOR DRAIN DETAIL

**UNDERGROUND PLUMBING TEST
UPC 712.2**
All underground plumbing shall be inspected and be under test with not less than a 10 foot head of water.



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August 9, 2024

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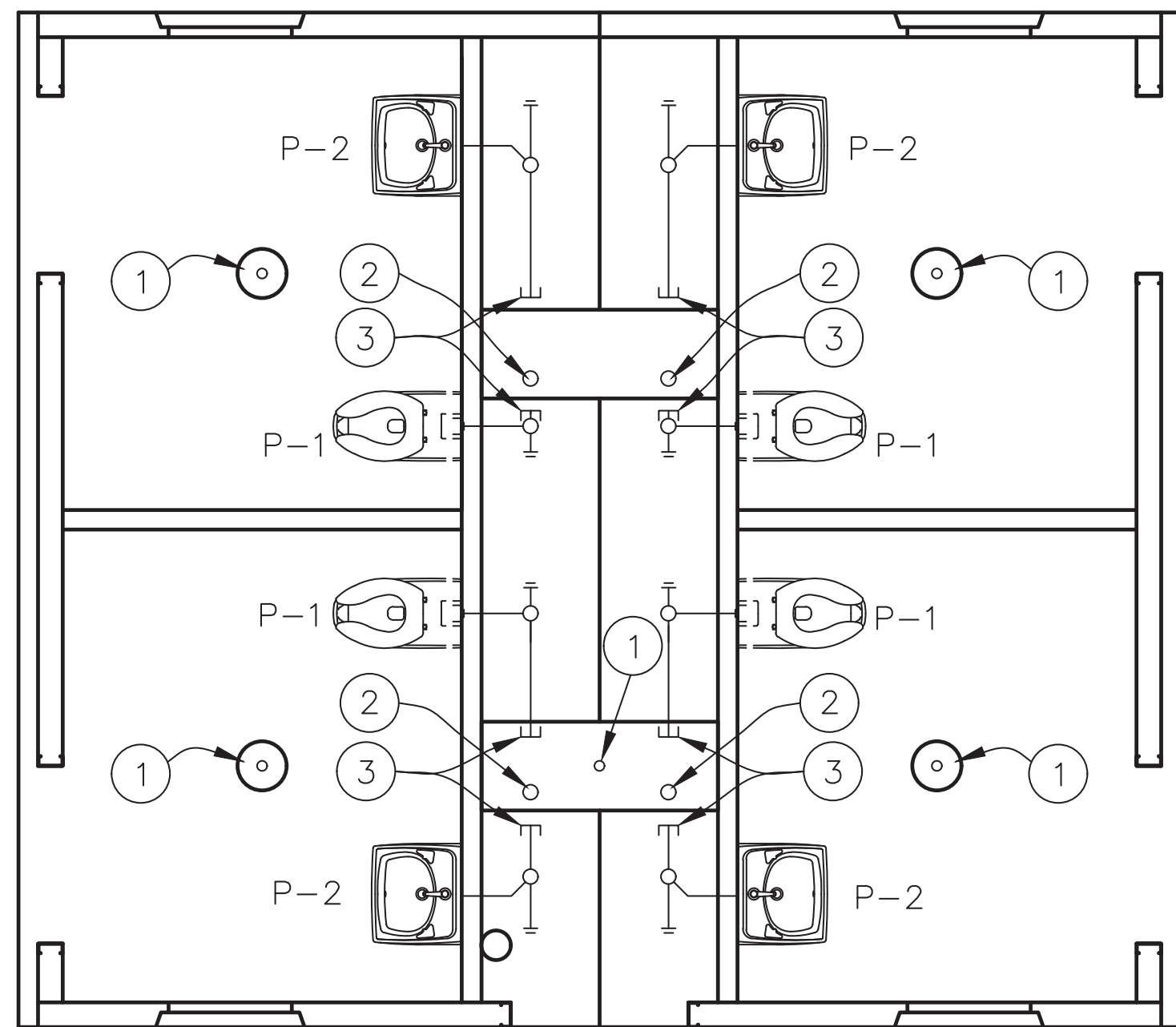
PROJECT TITLE
DENALI SECTIONAL
BUILDING NUMBER DNS-057

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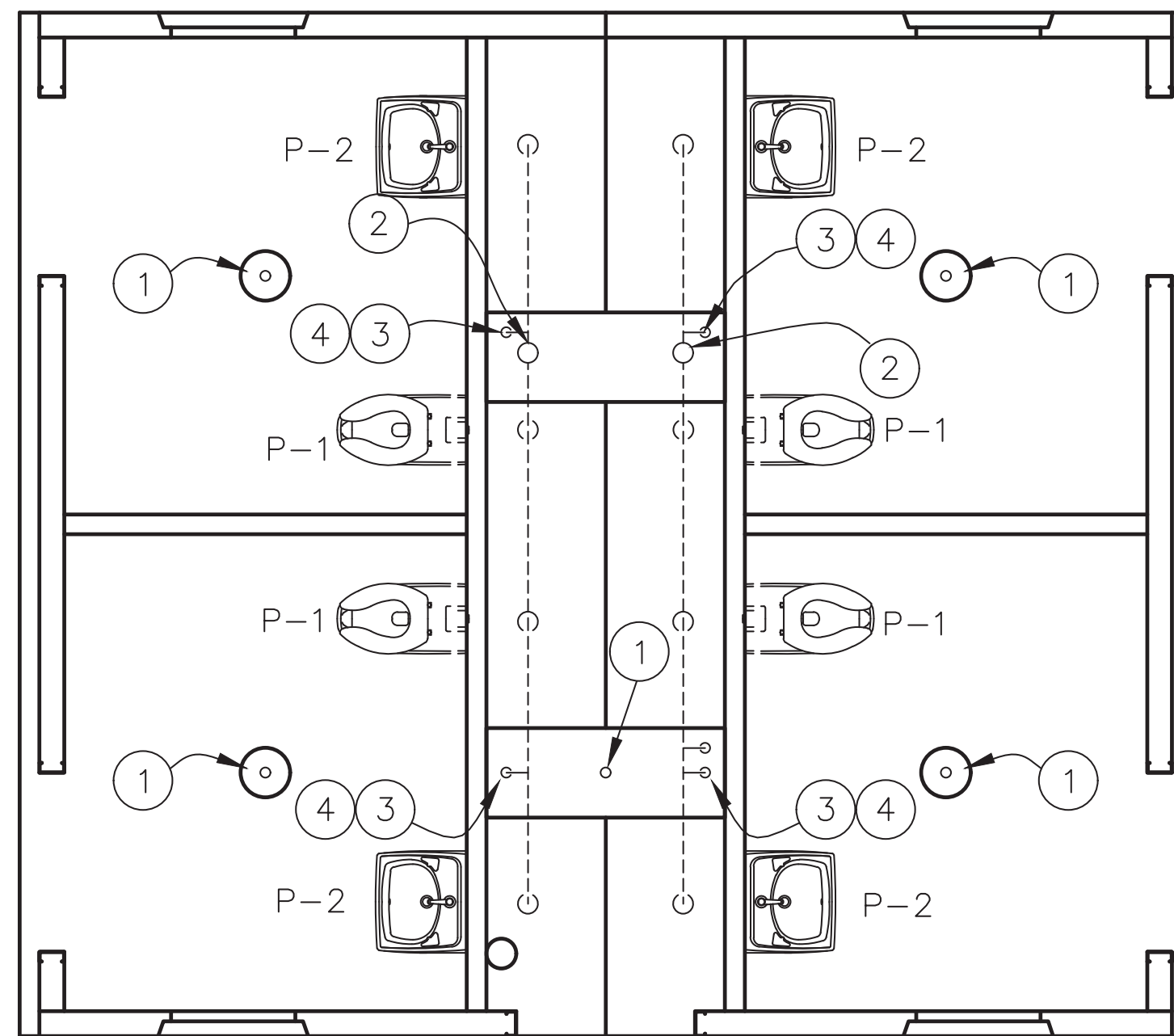
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/16"=1'-0"	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	64

FLOOR DRAIN LOCATIONS
& BELOW FLOOR PIPING

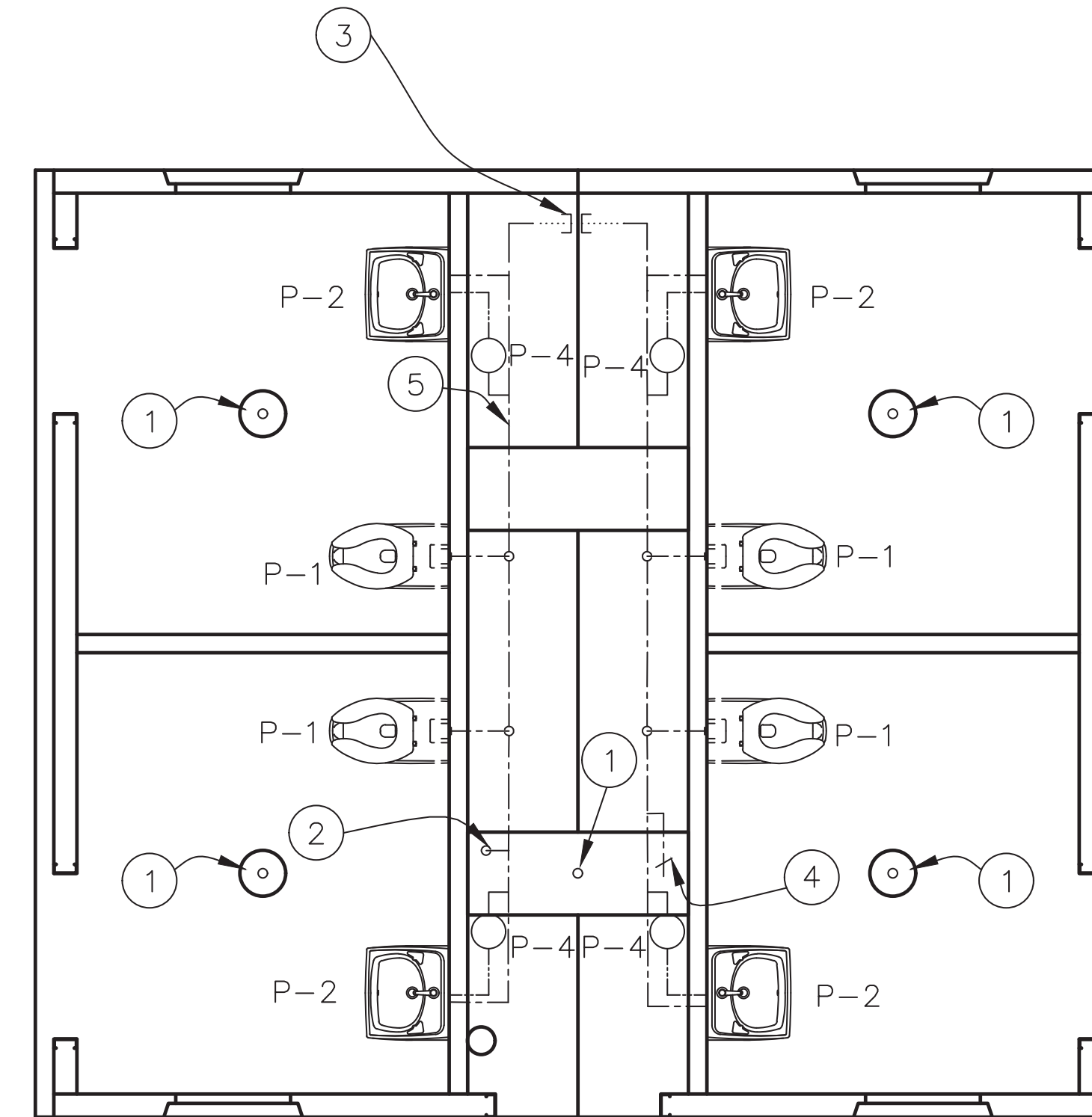
DWG NO.	SHEET	REV.
DNS-24	24	0
	29	



WASTE PIPING



VENT PIPING



WATER PIPING

WASTE PIPING – KEY NOTES

- 2" FLOOR DRAIN, FIELD INSTALLED (NOT BY CXT)
- 4" WASTE THROUGH FLOOR, FIELD INSTALLED (NOT BY CXT)
- PROVIDE TEST PLUG IN END OF WASTE PIPE. CONTINUATION OF PIPING IS FIELD INSTALLED & NOT BY CXT.

VENT PIPING – KEY NOTES

- 2" FLOOR DRAIN, FIELD INSTALLED (NOT BY CXT)
- 3" VENT THROUGH ROOF.
- 2" VENT WITH TEST PLUG.
- FIELD INSTALLED 2" VENT PIPING FROM FLOOR DRAINS. (NOT BY CXT)

WATER PIPING – KEY NOTES

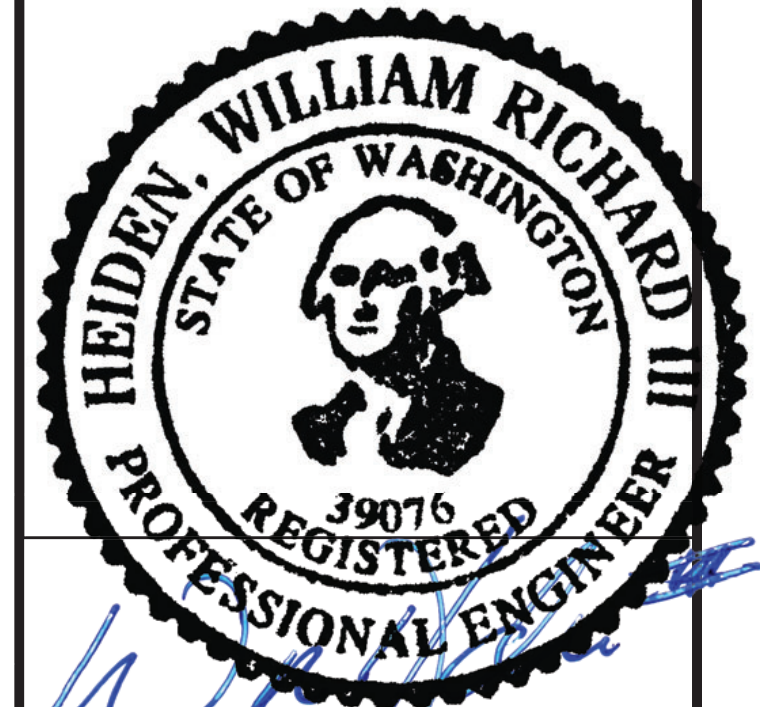
- 2" FLOOR DRAIN, FIELD INSTALLED (NOT BY CXT)
- FIELD INSTALLED 1-1/2" WATER SUPPLY WITH SHUT-OFF VALVE NEAR FLOOR. (NOT BY CXT)
- CAPPED CW LINE. CONNECTION BETWEEN SIDES IS TO BE FIELD INSTALLED. (NOT BY CXT)
- 3/4" HOSE BIBB WITH VACUUM BREAKER AND WHEEL HANDLE.
- WATER PIPING ALONG WALL, SEE DIAGRAM DNS-26.

PIPING LEGEND

- — — — — COLD WATER COPPER
ASTM B88 TYPE K OR L
- — — — — HOT WATER COPPER
ASTM B88 TYPE K OR L
- — — — — VENT PIPING PVC, ASTM
D2665, SCHED. 40
- — — — — WASTE PIPE: PVC, ASTM
D2665, SCHED. 40
- - - - - FIELD PIPING (NOT BY CXT)

SPECIAL NOTES:	
1.	TOTAL FIXTURE COUNT: (12)
2.	FLOWING PRESSURE: 45 PSI MIN, 80 PSI MAX
3.	TOTAL DEVELOPED LENGTH = 25'-0"*

*APPROXIMATE DISTANCE FROM THE SOURCE TO THE FARTHEST FIXTURE



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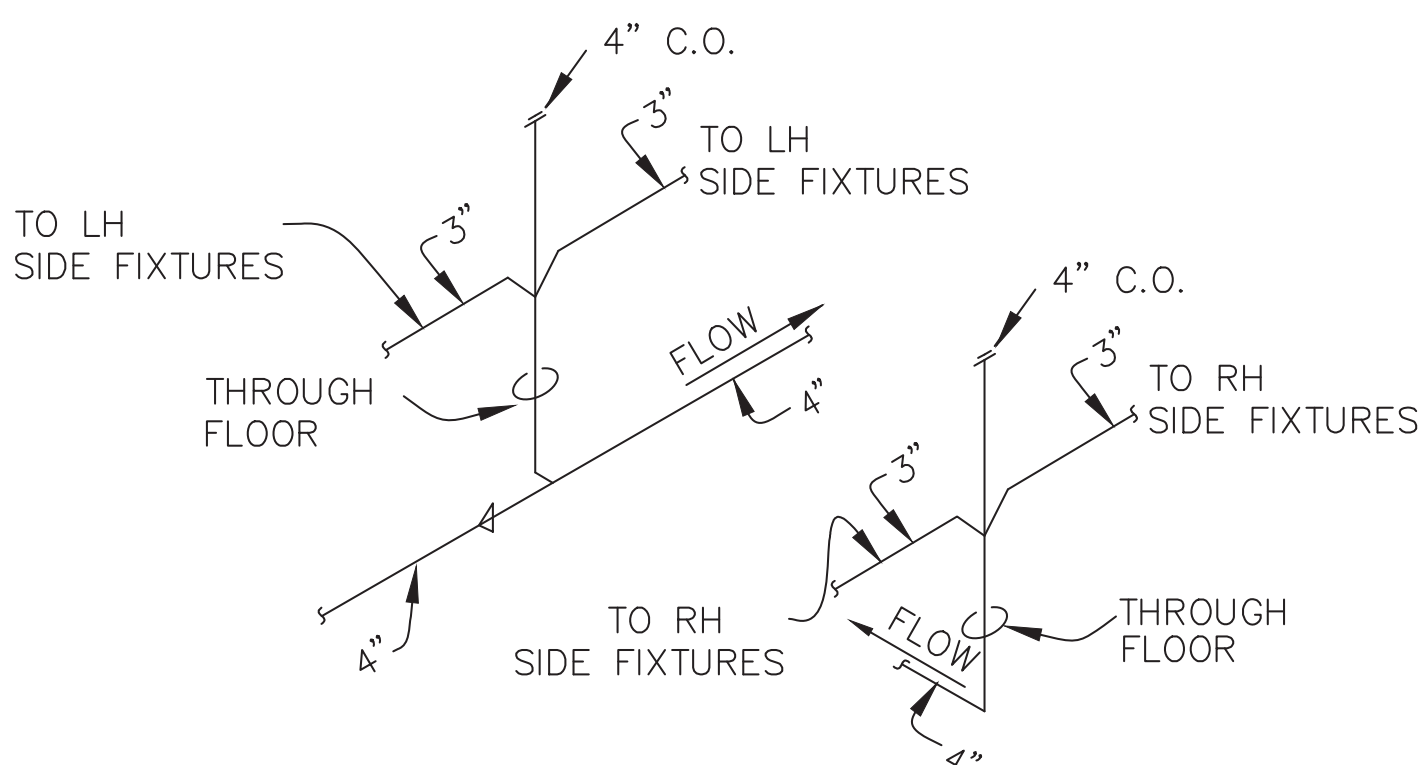
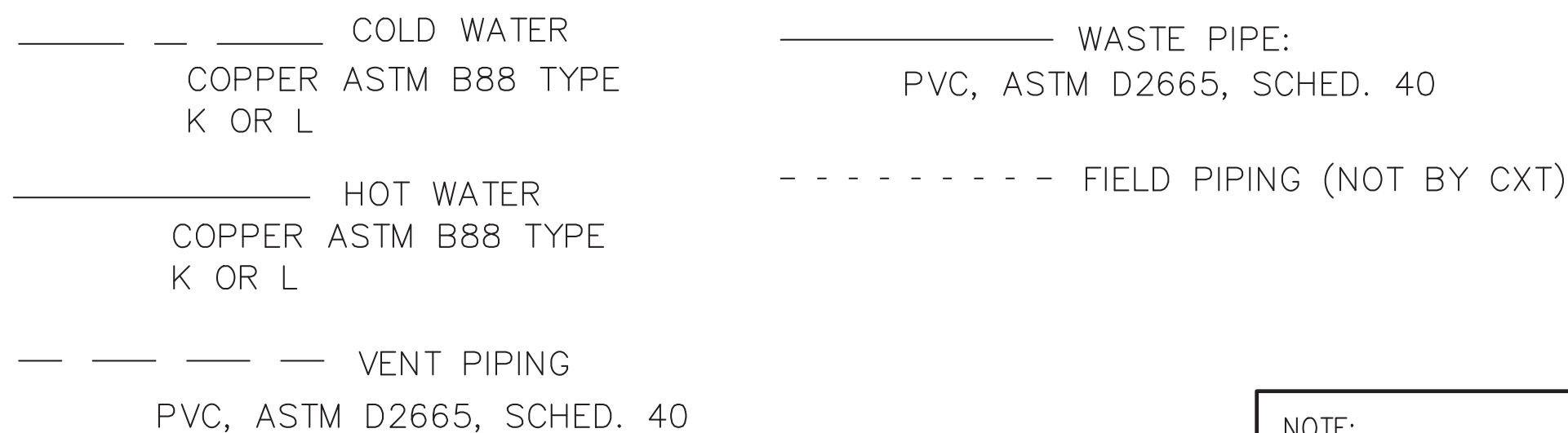
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DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N. PENNER	PLOT	64

**WATER, WASTE, & VENT
PIPING PLANS & NOTES**

DWG NO.	SHEET	REV.
DNS-25	25	0
	29	

PIPING LEGEND

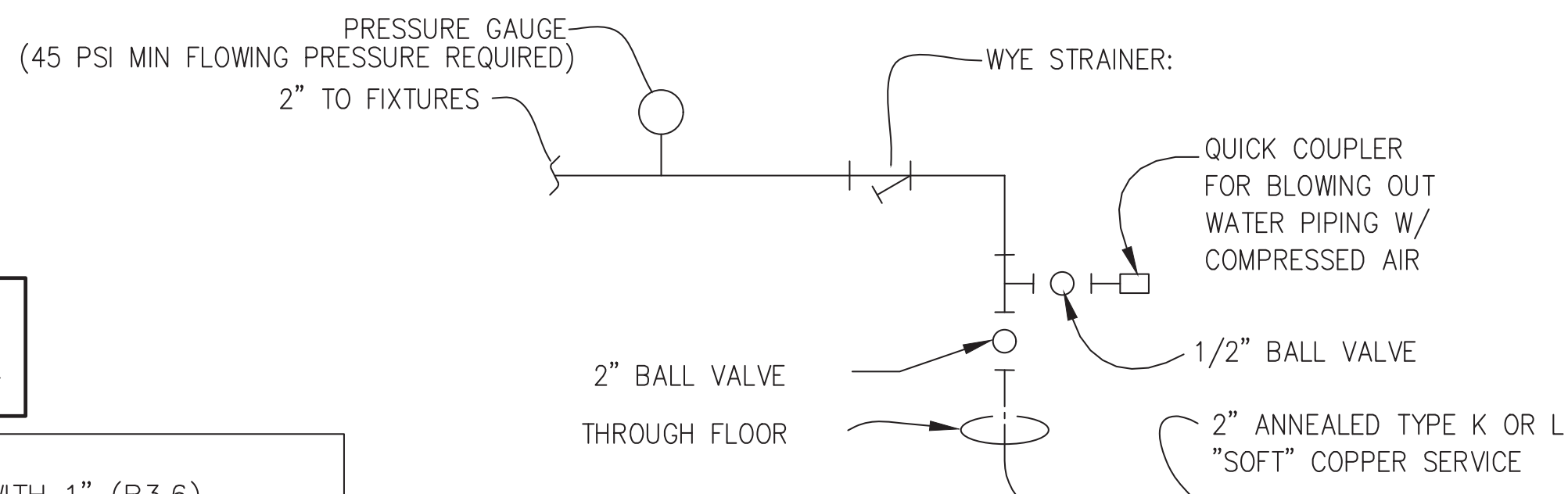


DETAIL OF FIELD INSTALLED WASTE CONNECTION

NTS

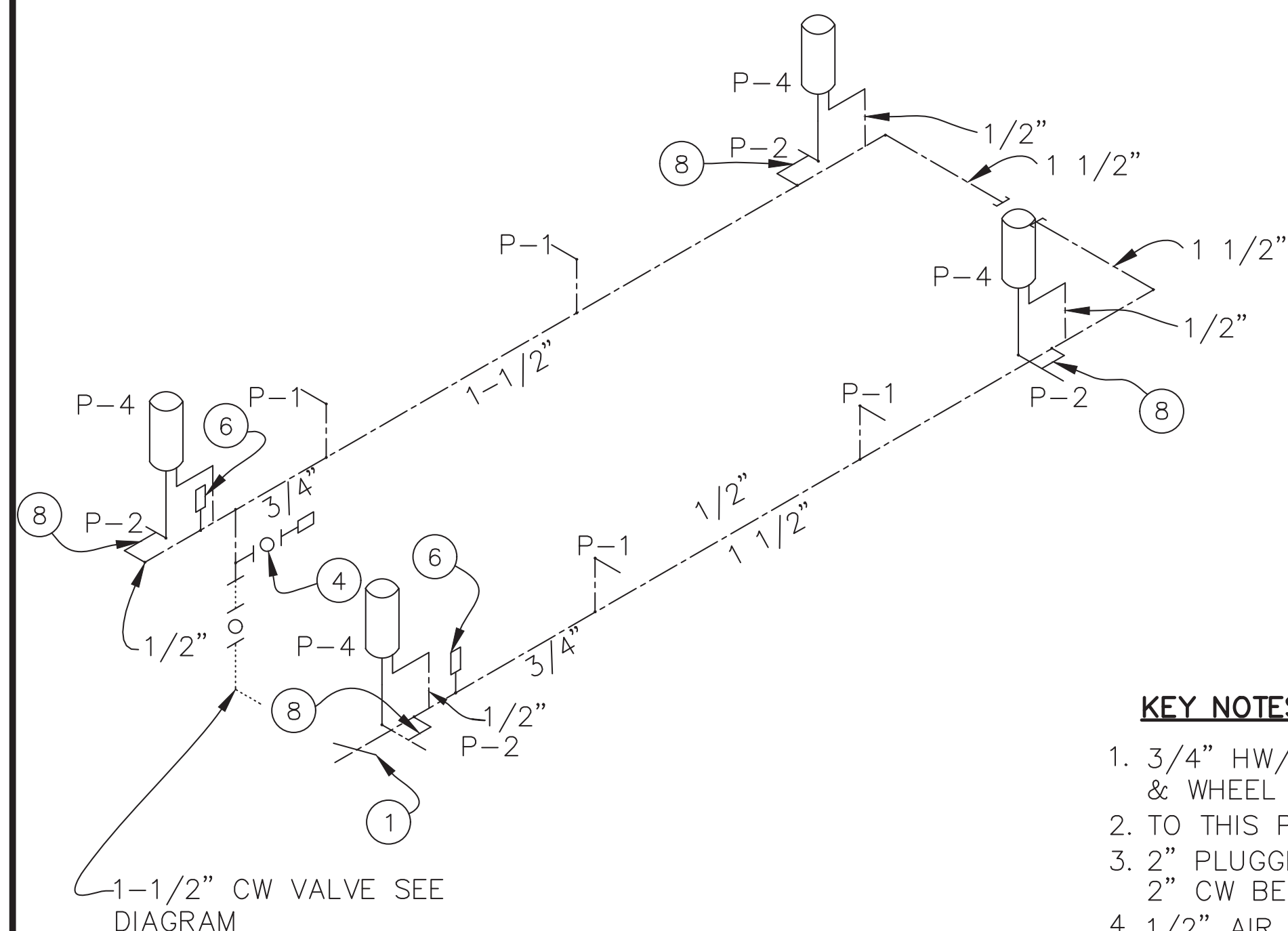
NOTE:
THIS PIPING IS FIELD INSTALLED & NOT BY CXT

NOTE:
INSULATE HW PIPING WITH 1" (R3.6) PRE-MOLDED PIPE INSULATION WITH ASJ



WATER SERVICE DETAIL

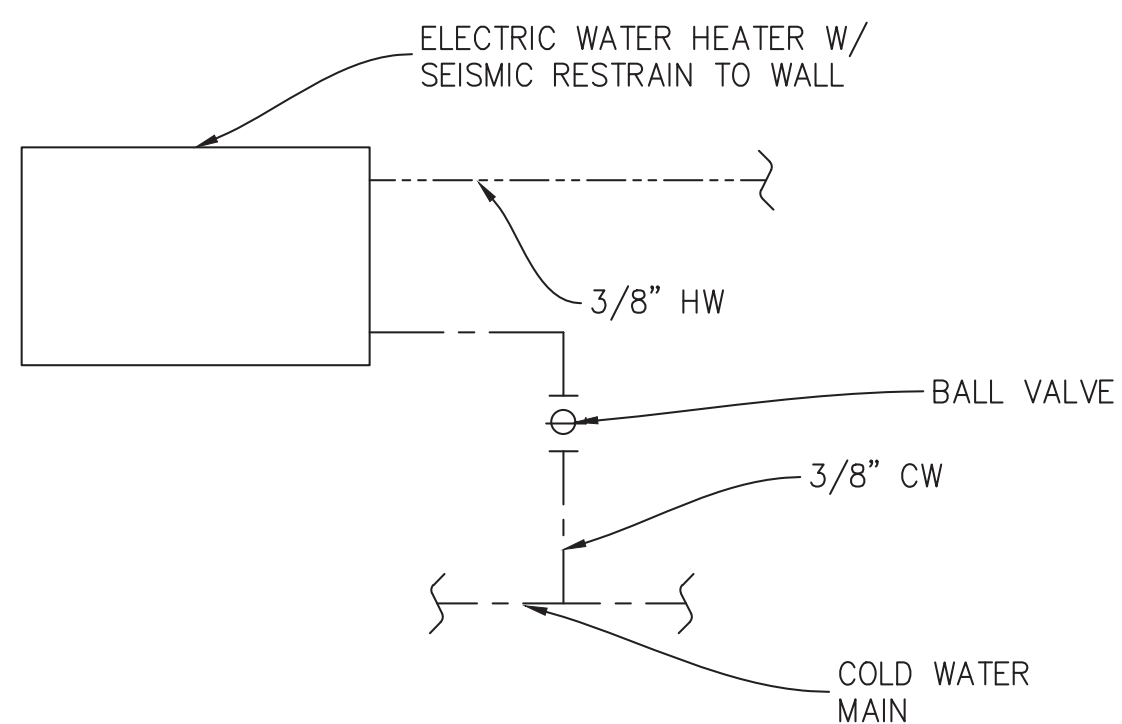
NTS



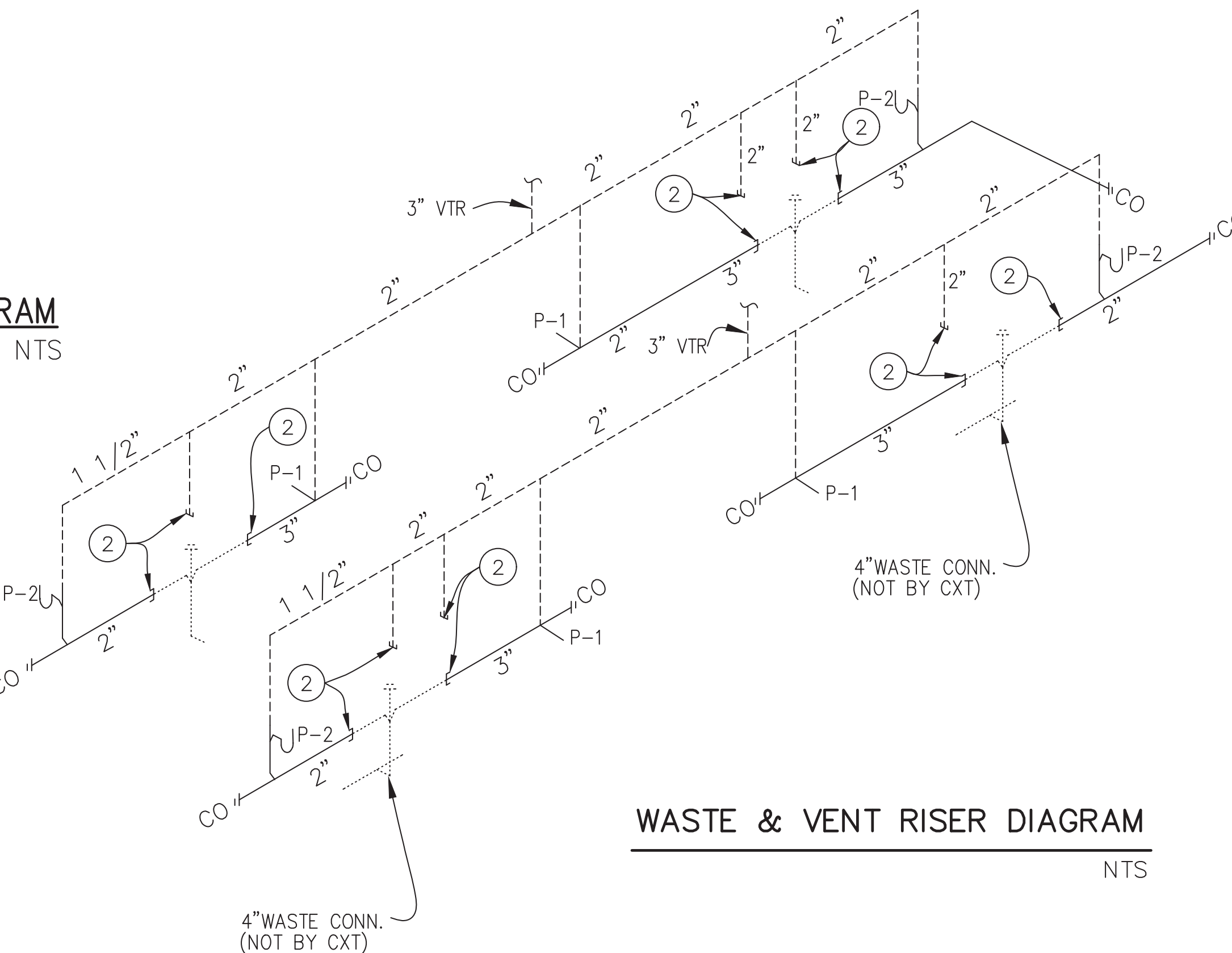
WATER PIPING RISER DIAGRAM

KEY NOTES

- 3/4" HW/CW HOSE BIB WITH VACUUM BREAKER. & WHEEL HANDLE
- TO THIS POINT BY CXT.
- 2" PLUGGED CW LINE TO THIS POINT, BY CXT. 2" CW BETWEEN THESE POINTS, NOT BY CXT.
- 1/2" AIR QUICK CONNECTION W/ BALL VALVE FOR BLOWING OUT WATER PIPING.
- 2" FLOOR DRAIN WITH FIELD INSTALLED TRAP SEAL (10" DIA BLOCKOUT)
- ASSE 1010 WATER HAMMER ARRESTOR
- ELECTRIC WATER HEATER
- ASSE 1070 WATER TEMPERATURE LIMITING DEVICE
- PROVIDE SHUT-OFF VALVES ON HOT AND COLD WATER SUPPLY FOR EACH FIXTURE.



CHRONOMITE WATER HEATER PIPING DIAGRAM

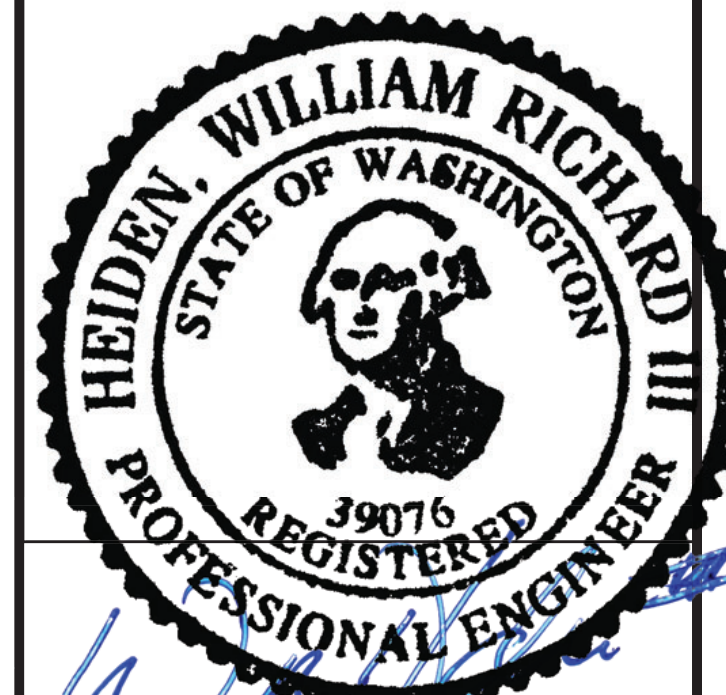


WASTE & VENT RISER DIAGRAM

NTS

PLUMBING FIXTURE SCHEDULE

SYM	DESCRIPTION	MANUFACTURER	CXT PART NUMBER	FLUSH VL/FAUCET	SUPPLIES	QTY	HW	CW	WASTE	VENT	SUPPLIES / NOTES
P-1	WATER CLOSET (PUSH BUTTON)	AMERICAN STANDARD	2634.101 (W.C.) 5905.100 (W.C. SEAT)	SLOAN "ROYAL" #952-1.6 L-3 W=4"	SLOAN HY33A	4		1-1/4"	3"	2"	1. OFFSET FLUSH VALVE TAILPIECE PER ADA, RIGHT OR LEFT HAND, AS REQUIRED. PROVIDE FLUSH VALVE FOR 3" WALL THICKNESS. 2. MOUNT RIM AT 17" ABOVE FLOOR. 3. USE CLOSET GASKET JG13534 AND Z1203 FINISH KIT
P-2	LAVATORY (PUSH BUTTON)	AMERICAN STANDARD	0356.421 (LAV)	SYMMONS SLS-7000		4		1/2"	1-1/2"	1-1/2"	1. 1/2X15 COMP ANG LAV BSCR1915AC 2. 3 PC COVER SET PF202WH.
P-3	FLOOR DRAIN	TRAVIS	54960-CXT			4			2"	2"	1. 2" TRAP SEAL PART# P26001 (CXT PROVIDED-INSTALLATION NOT BY CXT)
		SIoux CHIEF	840-2A			1					
P-4	WATER HEATER	CHRONOMITE	M-20L			4	1/2"	1/2"	-	-	1. 4800 WATTS, 220 VOLTS, 20 AMPS WITH INLINE FLOW REDISTRICTOR



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BUILDING NUMBER DNS-057

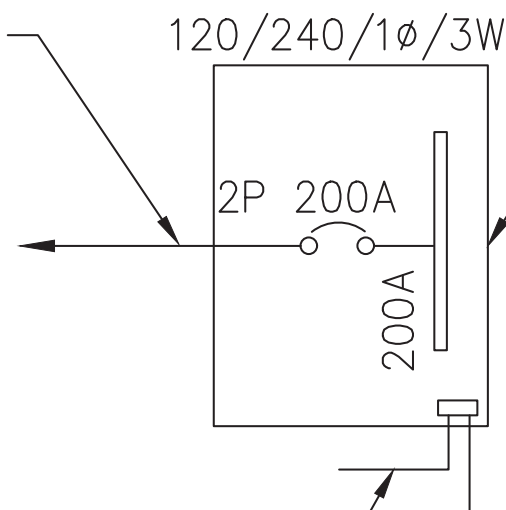
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REV.	DESCRIPTION	APPROVAL	DATE
SCALE	3/16"=1'-0"		07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	64

PLUMBING SCHEDULE, DIAGRAMS, & NOTES

DWG NO.	SHEET	REV.
DNS-26	26 29	0

CONDUIT WIRES (NOT BY CXT):
 (3) 3/0 (CU) FEEDERS
 (1) #4 (CU) GROUND
 2" CONDUIT



INTERIOR SURFACE MOUNTED LOAD CENTER WITH MAIN BREAKER AND GROUND BAR. ALL EQUIPMENT INCLUDING BRANCH BREAKERS RATED AT 22,000 AIC. BLOCK-OUT UNDER PANEL PROVIDED FOR SERVICE LATERAL.

BOND BUILDING COLD WATER PIPING TO GROUND BUS PER NEC. (BY CXT)

ONE-LINE POWER DIAGRAM
 NTS

GENERAL ELECTRICAL NOTES

- RECESSED JUNCTION BOXES FOR SINGLE DEVICES SHALL HAVE SINGLE GANG MUD RINGS CAST IN CONCRETE WALLS.
- ALL RECEPTACLES SHALL BE GFCI PROTECTED BY CIRCUIT BREAKERS, OR BY OTHER GFCI RECEPTACLES.
- ALL CONDUIT SHALL BE SIZED PER NEC. EXPOSED CONDUIT SHALL BE EMT/FMC, RECESSED SHALL BE PVC.
- INSTALL ALL WIRING IN CONDUIT OR RELATED ENCLOSURES.
- ALL ELECTRICAL INSTALLATIONS SHALL MEET THE 2023 NATIONAL ELECTRICAL CODE WITH STATEWIDE AMENDMENTS
- MINIMUM WIRE SIZE SHALL BE #12 AWG COPPER, THHN INSULATION UNLESS NOTED OTHERWISE.
- ROUTE ALL CONDUITS IN UTILITY ROOM AT CEILING OR FACE OF WALLS.
- ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE & MAY NOT SHOW EXACT LOCATIONS OF DEVICES. REFER TO WALL PANEL & OTHER DRAWINGS FOR EXACT LOCATIONS OF J-BOXES, ETC.
- ALL CONDUCTORS AND CABLES MUST BE PROPERLY TERMINATED IN APPROVED BOXES, BEFORE CONNECTING THE CIRCUIT TO THE BREAKER AND BEFORE RECEIVING FINAL INSPECTION APPROVAL IN THE FACTORY.
- PROVIDE EACH WATER HEATER WITH A 100 AMP DISCONNECT AND DEDICATED 2 POLE 30 AMP CIRCUIT WIRED WITH #10 COPPER AWG.

PANEL SCHEDULE																			
AMP 100		PANEL		TOTAL CONNECTED VA LOAD		10,980													
SURFACE MOUNT		120/240V, 1P, 3W		TOTAL CALCULATED VA LOAD		11,003													
CIRCUIT					LOAD					CIRCUIT					LOAD				
NO.	DESCRIPTION	OCP	TYPE	(VA)	(A)	PH.	NO.	DESCRIPTION	OCP	TYPE	(VA)	(A)	NO.	DESCRIPTION	OCP	TYPE	(VA)	(A)	
1	LIGHTS AND FANS RESTROOM UNIT A	1P/20A	N	194	1.6	A	2	LIGHTS AND FANS RESTROOM UNIT B	1P/20A	N	194	1.6	A	3	RECEPTACLES UNIT A	1P/20A	N	360	3.0
3	RECEPTACLES UNIT A	1P/20A	N	360	3.0	B	4	RECEPTACLES UNIT B	1P/20A	N	360	3.0	B	5	EXTERIOR & CHASE LIGHTS	1P/20A	C	92	0.8
5	EXTERIOR & CHASE LIGHTS	1P/20A	C	92	0.8	A	6	CHASE RECEPTACLE	1P/20A	R	180	1.5	B	7	CHRONOMITE CM-20L/240 #1	1P/30A*	N	2,400	20.0
7	CHRONOMITE CM-20L/240 #1	1P/30A*	N	2,400	20.0	B	8	CHRONOMITE CM-20L/240 #2	1P/30A*	N	2,400	20.0	A	9	CHRONOMITE CM-20L/240 #2	1P/30A*	N	2,400	20.0
9	CHRONOMITE CM-20L/240 #2	1P/30A*	N	2,400	20.0	B	10	CHRONOMITE CM-20L/240 #2	1P/30A*	N	2,400	20.0	B	11					
11						B	12						A	13					
13						A	14						B	15					
15						B	16						A	17					
17						A	18						B	19					
19						B	20												

NOTE: MAXIMUM ALLOWABLE AIC IS 22K AMPS, PANEL MODIFICATIONS WILL BE REQUIRED (NOT BY CXT) IF TRANSFORMER CAPACITY EXCEEDS 175 KVA.
 * PROVIDE LOCKOUT BREAKER (LO) CONFORMING TO NEC 110.25

LOAD	CONNECTED	CALCULATED
(C)ONTINUOUS	92 x1.25	115 VA
(R)EC (1ST 10KVA)	180 x1.00	180 VA
(N)ON-CONTINUOUS	10,708 x1.00	10,708 VA
(L)ARGEST MOTOR	0 x1.25	0 VA
TOTAL LOAD	10,980	11,003 VA 45.8 AMPS

LIGHTING FIXTURE SCHEDULE				
FIXTURE NUMBER	VOLTAGE	WATTS	DESCRIPTION	
A	120	25	LUMINAIRE VPF84 INTERIOR LIGHT FIXTURE, VPF8 4FT NODIM 25W 40K MV CLP WHT WL 20CC SURFACE MOUNTED, LED LAMP 4 FT, WRAP AROUND LENS, LOW TEMPERATURE DRIVER, BUILT IN OCCUPANCY SENSOR ACTIVATED W/ ADDITIONAL OCCUPANCY SENSOR FOR FAN CONTROL	
B	120	14	SWOOP 610 LED EXTERIOR LIGHT, YWP610-14W HP-3500K-120-CP-BRZ-CAB/PC EXTERIOR, VANDAL RESISTANT, WALL MOUNTED, 14 WATT, CLEAR PRISMATIC LENS, BUILT IN PHOTOELECTRIC CONTROL	
C	120	25	LUMINAIRE VPF84 INTERIOR LIGHT FIXTURE, VPF8 4FT NODIM 25W 40K MVOLT CLP WHT WL SURFACE MOUNTED, LED LAMP 4 FT, WRAP AROUND LENS, LOW TEMPERATURE DRIVER, SWITCH ACTIVATED	

NOTE: THE SOURCE OF EFFICACY OF EXTERIOR LIGHTING IS TO BE A MINIMUM OF 45 LUMENS PER WATT

EXHAUST FAN SCHEDULE								
SYM	MFR	MODEL #	CFM	SONES	VOLTS	AMPS	WATTS	NTS.
EF-1	FANTECH	FG-4XL	150	6.0	120	0.75	72	1,2,3

- NOTES:
- WITH SPEED CONTROL MOUNTED IN CHASE.
 - FANS LISTED FOR WET LOCATION, CONTROL VIA OCCUPANCY SENSOR. LOCATE OPEN FACE J-BOX ON EXTERIOR SIDE OF PANEL.
 - SET FAN SPEED LIMIT CONTROL BETWEEN 70 AND 105 CFM.



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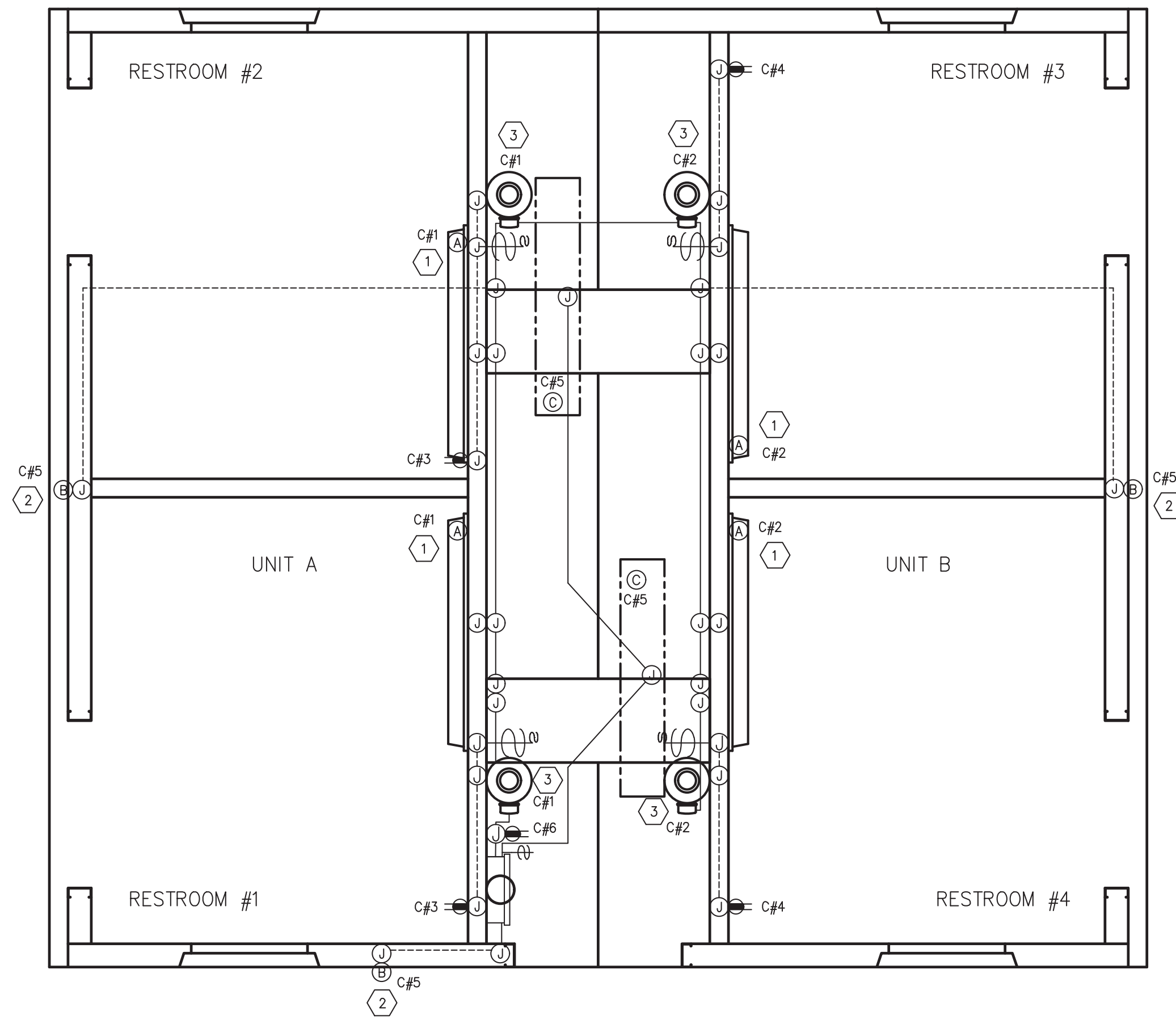
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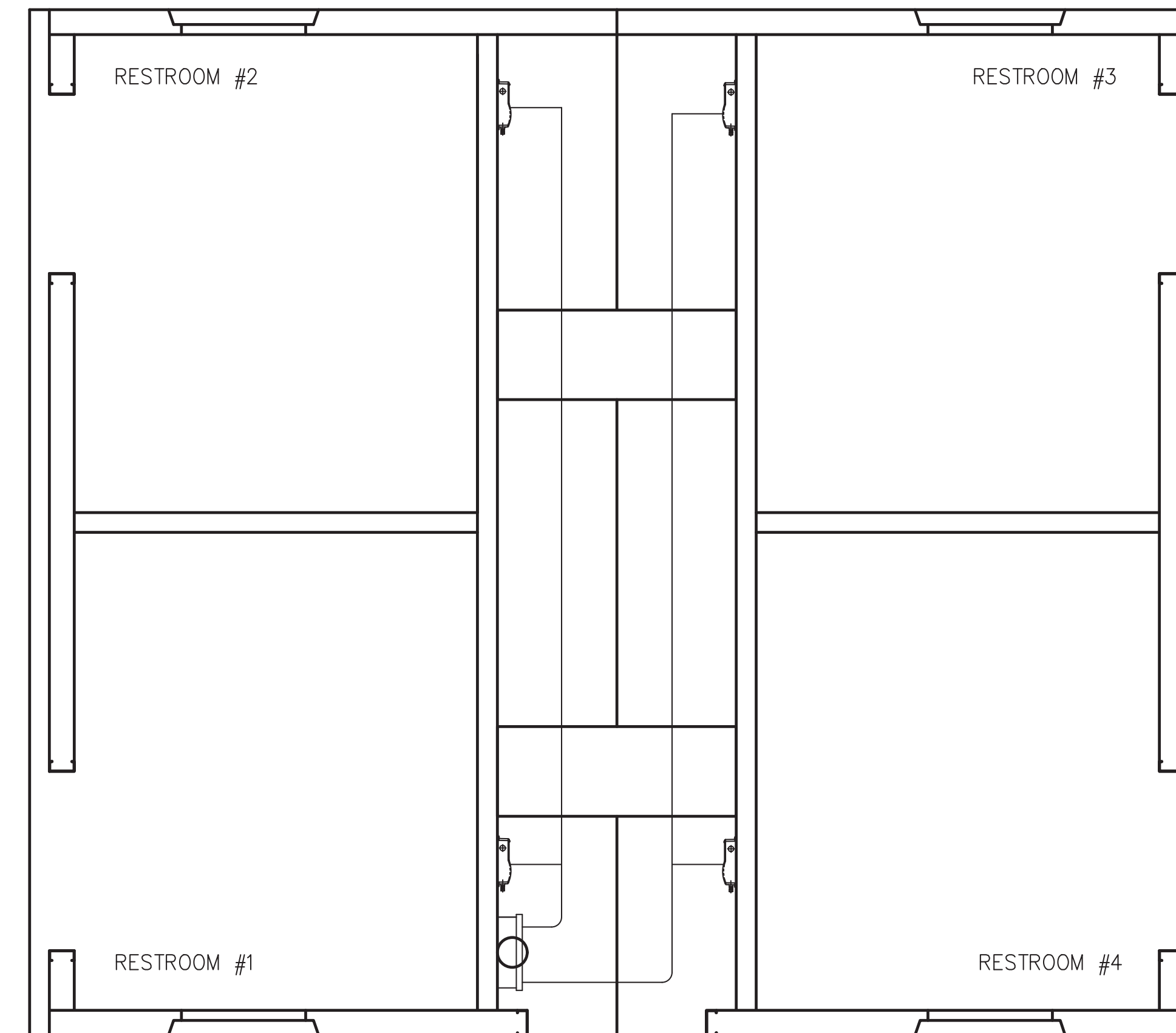
REV.	DESCRIPTION	APPROVAL	DATE
SCALE	N/A	DATE	07/18/2024
DRAWN	M. TOLMAN	FILE NO.	DNS-057
CHECKED	N.PENNER	PLOT	N/A

ELECTRICAL NOTES & SCHEDULES

DWG NO.	SHEET	REV.
DNS-27	27	0
	29	



LIGHTING, EXHAUST FAN, & RECEPTACLE PLAN



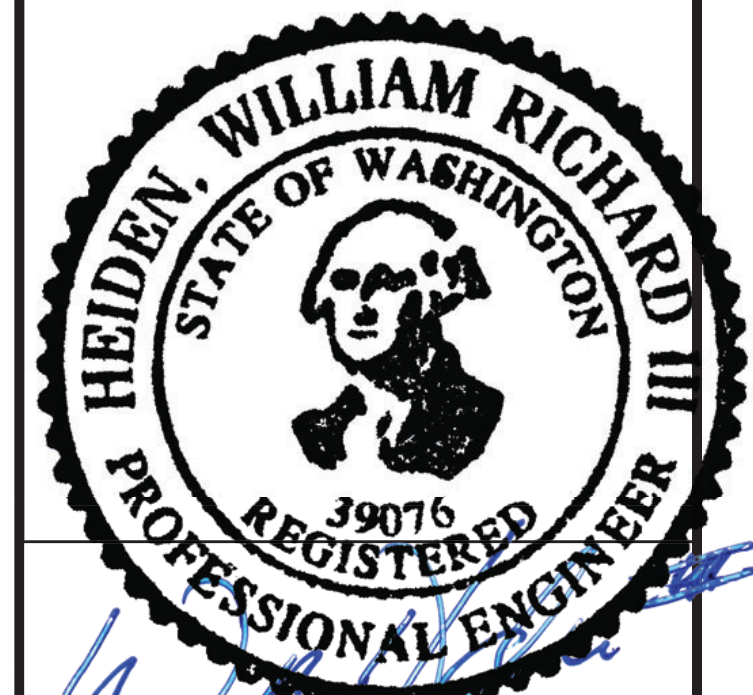
WATER HEATER PLAN

KEY NOTES

- 1 OCCUPANCY SENSOR CONTROLLED LIGHTS. EXHAUST FANS TO TURN ON WITH RESTROOM LIGHTS. SPEED SWITCH (IN CHASE) AND OCCUPANCY SENSOR.
- 2 LIGHT FIXTURE TO BE CONTROLLED BY PHOTOCCELL. ROUTE WIRING IN CONCEALED CONDUIT.
- 3 CIRCUIT AS NEEDED FOR THE LOAD OF THE EXHAUST FAN. WIRE THRU OCCUPANCY SENSOR. PROVIDE RIGID DUCTING TO EACH RESTROOM. FANS TO EXHAUST THROUGH ROOF. SPEED SWITCH CONTOL IN CHASE.
- 4 CHASE LIGHTS ARE MOTION ACTIVATED.

SYMBOLS LEGEND

	NOTE REFERENCE		EXHAUST FAN
	INTERIOR LED FIXTURE		SURFACE MOUNTED CONDUIT
	EXTERIOR LED FIXTURE		CONCEALED CONDUIT
	SWITCH		HAND DRYER
	SERVICE PANEL		C#XX CIRCUIT NUMBER
	JUNCTION BOX		GFCI
	SPEED SWITCH		



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CHECKED	N. PENNER	PLOT	64

ELECTRICAL PLAN, LEGEND, & NOTES

DWG NO.	SHEET	REV.
DNS-28	28	0
	29	

CXT Inc. (Precast Division)

Calculations

DENALI SECTIONAL DNS-057
Structural Analysis

Design Loads

400 psf Live Floor Load
250 psf Ground Snow Load
Wind Speed – 150 mph Exp. C
Seismic Design Category: D

Design Standards

2021 International Building Code
ASCE 7-16/ ACI 318-19

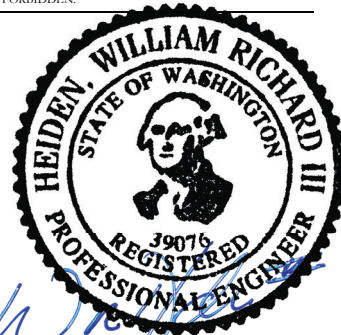
UL-752 Bullet Resistance
Classification: Level IV
Report #: 2012-647

ACCEPTED
BY SKAGIT COUNTY
REVIEWED FOR COMPLIANCE

THIS REPORT CONTAINS 31 PAGES, INCLUDING THIS COVER AND THE TABLE OF CONTENTS. ANY ADDITIONS TO, ALTERATIONS OF, OR UNAUTHORIZED USE OF EXCERPTS FROM THIS REPORT ARE EXPRESSLY FORBIDDEN.

IMPORTANT

Any alteration or revisions to these plans requires additional review and approval from Skagit County Planning & Development Services. Further details or clarification may be required by the Skagit County Building Inspector based on construction methods or site conditions



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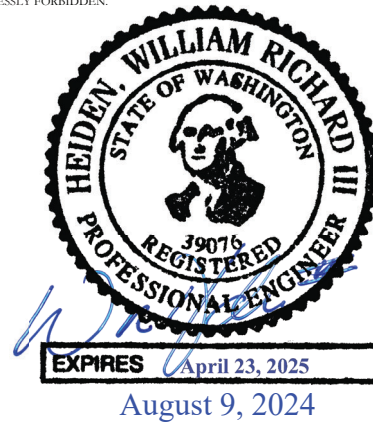
Table of Contents

<u>Description</u>	<u>Page(s)</u>
<u>2021 International Building Code</u>	
ASCE 7-16 MWFRS and C&C Wind Loads	1
ASCE 7-16 Snow Loads	2
ASCE 7-16 Seismic Loads	3-4
Roof Panel Analysis	5-6
Wall Panel Analysis	7-26
Floor Analysis	27-28
Building Analysis	29

Appendix: (Provided Upon Request) UL-752 Bullet Resistance Testing

All attached documents are for reference only and designed or approved by others.

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Main Wind Force Resisting System Loads (ASCE 7-16)

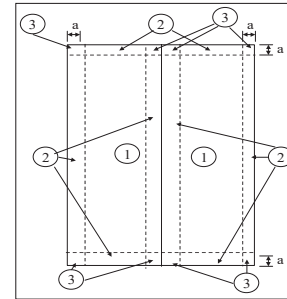
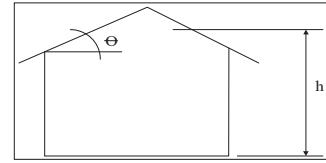
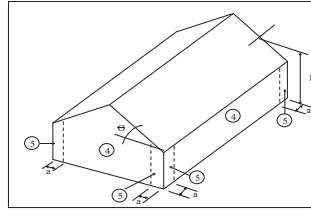
DENALI SECTIONAL DNS-057		
Category	II	IBC TABLE 1604.5: Risk Category of Buildings and Other Structures.
Exposure	C	See § 26.7.3: Exposure Categories, General.
Velocity	150 mph	See Figure 26.5-1A thru 26.5-2D: Basic Wind Speed (3 second Gust)
h.wind	7.75 ft	Windward wall height
h.lee	7.75 ft	Leeward wall height
W.building	17 ft	Width of the building
L.building	19 ft	Length of the building
H.building	13.2 ft	Height of the building (to the ridge). Enter 0 if unknown.
Roof Rise	7.1875	Roof pitch (per foot)
θ	30.92 deg	Roof Angle
Kd	0.85	Wind directionality factor. 0.85 when using load combinations, 1.0 otherwise.
K ₁	0.00	
K ₂	0.00	
K ₃	0.00	See Figure 26.8-1: Multipliers for Obtaining Topographical Factor Kzt

Kzt	1	Topographic factor
h	10.475 ft	Mean roof height
n _s	7.16	Natural frequency
Flexibility	Rigid	Building flexibility
α	9.5	Terrain factor
Z _s	900 ft	Terrain factor

Velocity Pressure Exposure Coefficient		
K(z)	0.849	at windward eave

Velocity Pressure (27.3.2)	
q _e	41.56 psf

Gable Type of Roof - Gable or Hip?



Partially Enclosed if the building meets both of the following conditions:

- Total area of openings in one wall exceeds area of openings in the balance of the building by more than 10%.
- Total area of openings in one wall exceeds 4 sq. ft. or 1% of area of that wall and the total area of openings in the balance of the building does not exceed 20% of the area in the balance of the building.

Zone	Opening Area	Gross Area	Agi	Aoi	Condition 1	Condition 2	Condition 3	Condition 4	Type:
Windward sidewall	0 sq ft	147.3 sq ft	826.4 sq ft	0 sq ft	0.00	0.00	0.00	0.00	Enclosed
Windward endwall	0 sq ft	178.1 sq ft	795.6 sq ft	0 sq ft	0.00	0.00	0.00	0.00	Enclosed
Leeward sidewall	0 sq ft	147.3 sq ft	826.4 sq ft	0 sq ft	0.00	0.00	0.00	0.00	Enclosed
Leeward endwall	0 sq ft	178.1 sq ft	795.6 sq ft	0 sq ft	0.00	0.00	0.00	0.00	Enclosed
Roof	0 sq ft	323.0 sq ft	650.7 sq ft	0 sq ft	0.00	0.00	0.00	0.00	Enclosed

Enclosed

Gust Factor - (26.9)	
G =	0.85

External Pressure Coefficients		
C _{pe}	0.8	See 27.3.3 Roof Overhangs
C _{pi}	0.8	Windward wall (Use with q _z) Fig. 27.3-1
	-0.500	Leeward wall (wind normal to ridge) (Use with q _h)
	-0.476	Leeward wall (wind parallel to ridge) (Use with q _h)
	-0.7	Sidewalls (Use with q _h) Fig. 27.4-1

L/B =	0.89
L/B =	1.12

Internal Pressures:	
Negative:	-7.48 psf
Positive:	7.48 psf

Roof Pressure Coefficients (Fig 27.3-1) Normal to Ridge when Theta >= 10degrees	Pos. Windward	Neg. Windward	Leeward
	0.214	-0.219	-0.600
Roof Pressure Coefficients (Fig 27.3-1) Normal to Ridge when Theta < 10 deg.	0 to h/2	h/2 to h	h to 2h
	-0.99	-0.85	-0.55
Roof Pressure Coefficients (Fig 27.3-1) PARALLEL to Ridge	0 to h/2	h/2 to h	h to 2h
	-0.94	-0.88	-0.52

Roof Pressures Wind Perpendicular to Ridge w/ $\theta \geq 10$ deg	
w/ Negative Internal	15.05 psf
w/ Positive Internal	-28.68 psf

*WORST CASE LOADING

Wall Pressures:	w/ Negative	w/ Positive Internal
Windward	35.74 psf	20.78 psf
Leeward (wind normal)	-16.00 psf	-25.14 psf
Leeward (wind parallel)	-16.00 psf	-24.31 psf
Side Wall	-17.25 psf	-32.21 psf

Roof Pressures: Wind Parallel to ridge for all roof slopes:	
Location	w/ Positive Internal
0 to h/2	-40.71 psf
h/2 to h	-38.55 psf
h to 2h	-25.87 psf
Over 2h	-19.53 psf

Roof Pressures: Wind Perpendicular to ridge for $\theta < 10$ deg:	
Location	w/ Positive Internal
0 to h/2	0.00 psf
h/2 to h	0.00 psf
h to 2h	0.00 psf
Over 2h	0.00 psf

Additional Overhang Pressure: 28.26 psf

Wind Speed:	150 mph	Roof Slope:	7.19 : 12	COMPONENTS & CLADDING			
Exposure:	C	Mean Roof Height:	10.48 ft				
Zone	Effective Area						
	10.0 sq ft	100.0 sq ft	500.0 sq ft				
1	-42.36 psf	36.61 psf	-34.05 psf	32.45 psf	-34.05 psf	32.45 psf	
2	-50.67 psf	36.61 psf	-42.36 psf	32.45 psf	-42.36 psf	32.45 psf	
2oh	-83.12 psf	-	-74.81 psf	-	-74.81 psf	-	
3	-50.67 psf	36.61 psf	-42.36 psf	32.45 psf	-42.36 psf	32.45 psf	
3oh	-83.12 psf	-	-74.81 psf	-	-74.81 psf	-	
4	-46.52 psf	40.76 psf	-38.21 psf	33.70 psf	-34.05 psf	28.29 psf	
5	-58.99 psf	40.76 psf	-46.52 psf	33.70 psf	-34.05 psf	28.29 psf	
a:	3.00 ft						

Higher pressures at the ridge line only applies to roof pitches > 7 degrees

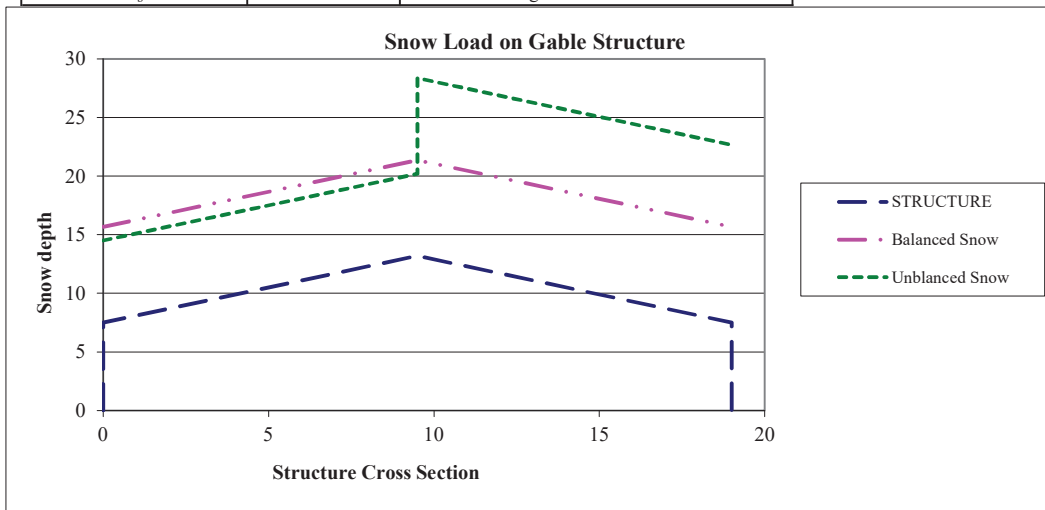
ASCE 7-16 SNOW LOAD CALCULATION

Category	II	IBC TABLE 1604.5: Risk Category of Buildings and Other Structures.
Exposure	C	See § 26.7.3: Exposure Categories, General.
P _g	250 psf	See ASCE Figure 7.2-1: Ground Snow Load
W.building	17 ft	Length of the building
L.building	19 ft	Width of the building
H.building	13.2 ft	Height of the building (to the ridge). Enter 0 if unknown.
Roof Rise (per foot)	7.1875	Roof pitch
θ	30.92 deg	Roof Angle

ASCE Table 7.3-2 - Thermal Condition:	C _t
All structures except as indicated below:	1.0
Structures kept just above freezing and others with cold, ventilated roofs in which the thermal resistance (R-value) between the ventilated space and the heated space exceeds 25*h (deg*sq ft/BTU).	1.1
Unheated and open air structures	1.2
Structures intentionally kept below freezing	1.3
Continuously heated greenhouses with a roof having a thermal resistance value (R-value) less than 2.0*h (deg*sq ft/BTU).	0.85

C _t	1.2	(Choose from table above)
I _s	1	ASCE Table 1.5-2
Surface	Unobstructed	ASCE § 7.4
Roof type	Gable	
Hor. Eave to Ridge Distance - windward	8.5 ft	
Roof Exposure	Partially exposed	ASCE Table 7.3-1
C _e	1	ASCE Table 7.3-1
C _s	0.71054815	Slope Factor from Figure 7.4-1
Low Sloped?:	No	ASCE § 7.3.4
P _f	210.00 psf	Flat Roof Snow Load
P _s	149.22 psf	Sloped Roof Snow Load
Use unbalanced?:	No	ASCE § 7.6.1
P _{windward}	210.00 psf	ASCE § 7.6.1
P _{leeward 1}	210.00 psf	ASCE § 7.6.1
P _{leeward 2}	210.00 psf	ASCE § 7.6.1
Distance from Ridge to Edge of P _{leeward 1} loading	0.0 ft	ASCE Figure 7.6-2

γ	30.00 pcf	Snow density	Eq. 7.7-1 of ASCE 7
S	1.669565217	Run per rise of 1	ASCE § 7.1
h _d	8.16 ft	Height of drifting snow on leeward side	
h _b	4.97 ft	Height of balanced snow	



Seismic Loads (ASCE 7-16)

DENALI SECTIONAL DNS-057			
Category	II	IBC TABLE 1604.5: Risk Category of Buildings and Other Structures.	
S _s	1.527 g	Max. Earthquake Ground Motion of 0.2 sec Spectral Response Acceleration	
S ₁	0.748 g	Max. Earthquake Ground Motion of 1.0 sec Spectral Response Acceleration	
Site Class	D (Default)	Site classification (Use D if unknown unless jurisdiction, or geotechnical data determines Site Class E or F.)	
T _L	16.0 sec	Long Period Transition Period	
Seismic Force Resisting System	A.5	Intermediate precast shear walls	
R	4.00	Response Modification Factor	
Ω ₀	2.5	System Over strength Factor	
C _t	0.02	Approximate period parameter	
X	0.75	Approximate period parameter	
h _m	10.68 ft	Height in feet from base to highest level of structure	

	Value 1*	Value 2*	
F _a	1.2	Interpolated Value	ASCE Table 11.4-1
F _v	1.7	Interpolated Value	ASCE Table 11.4-2

*=Used for interpolation
***1.2 used per ASCE 11.4-2

S _{ms} = F _a * S _s	1.832 g	Adjusted MCE Spectral Response Acceleration at short periods	ASCE 11.4-1
S _{ml} = F _v * S ₁	1.272 g	Adjusted MCE Spectral Response Acceleration at 1 sec period	ASCE 11.4-2

(MCE = Maximum considered earthquake)

S _{DS} = 2/3 S _{ms}	1.222 g	Design Spectral Acceleration Parameters	ASCE 11.4-3
S _{DI} = 2/3 S _{ml}	0.848 g	Design Spectral Acceleration Parameters	ASCE 11.4-4

I _e	1	Importance Factor	ASCE Table 1.5-2
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Seismic Design Category		D
Based on S _{DS}	D	Table 11.6-1
Based on S _{DI}	D	Table 11.6-2

Geotechnical Investigation Report Required? **Yes per ASCE 11.8.2 and 11.8.3, IBC 1803**

EQUIVALENT LATERAL FORCE PROCEDURE		
T _a = C _t * h _n ^{3/4}	0.12 sec	Approximate fundamental period
T _s = S _{DI} /S _{DS}	0.69 sec	
T	0.12 sec	Fundamental period of the structure (can be taken as T _a per ASCE 12.8.2)
C _s = S _{DS} /(R/I)	0.305	ASCE 12.8-2
C _{s,min}	0.094	ASCE 12.8-5 & 12.8-6
C _{s,max}	1.793	ASCE 12.8-3 & 12.8-4
C _v	0.305	
k	1.000	ASCE 12.8.3
W	114.90 kip	
V = C _v * W	87.73 kip	ASCE 12.8-1
M _o =	925.5 k-ft	Shear with snow load
V = C _s * W	75.24 kip	Overturing Moment with snow load
M _o =	790.6 k-ft	Shear without snow load
		Overturing Moment without snow load

WITH SNOW LOAD										
		12.8-12		12.8-11;11.7		12.10-1				
Level	Story Height	h _i or h _x	P _f (flat roof snow load)	w _i	w _i *h _i ^k	C _{vx}	F _x	V _x (Story shear)	M _x	F _{px} (diaphragm force)
Roof	10.48 ft	10.68 ft	210 psf	69.01 kip	737.3 k-ft	0.987	86.61 kip	86.61 kip	0.0 k-ft	33.72 kip
Walls	0.00 ft	0.00 ft								
Floor	0.21 ft	0.21 ft		45.89 kip	9.6 k-ft	0.013	1.12 kip	87.73 kip	907.2 k-ft	22.43 kip
Base	0 ft	0.00 ft	W=	114.90 kip	746.8 k-ft			M _o =	925.5 k-ft	

WITHOUT SNOW LOAD										
		12.8-12		12.8-11;11.7		12.10-1				
Level	Story Height	h _i or h _x	P _f (flat roof snow load)	w _i	w _i *h _i ^k	C _{vx}	F _x	V _x (Story shear)	M _x	F _{px} (diaphragm force)
Roof	10.48 ft	10.68 ft	0 psf	52.65 kip	562.5 k-ft	0.983	73.98 kip	73.98 kip	0.0 k-ft	25.73 kip
Walls	0.00 ft	0.00 ft								
Floor	0.21 ft	0.21 ft		45.89 kip	9.6 k-ft	0.017	1.26 kip	75.24 kip	775.0 k-ft	22.43 kip
Base	0 ft	0.00 ft	W=	98.55 kip	572.0 k-ft			M _o =	790.6 k-ft	

Center of Mass & Rigidity DENALI SECTIONAL DNS-057

Wall	Upper Left = 0.0		Lower Right		X	Y
	X Relative	Y Relative	Shear Force		Dist to CoRx	Dist to CoRy
	Stiffness	Stiffness	lbs	plf	dx (IN)	dy (IN)
W1	20.91%	0.00%	4,408	270	111,000	9,823
W2	29.09%	0.00%	6,130	375	26,000	9,812
W3	0.00%	24.37%	5,136	541	56,555	90,188
W4	0.00%	19.43%	4,095	431	66,736	109,812
W5	0.00%	6.24%	1,315	195	68,500	9,812
W6	29.09%	0.00%	6,130	375	26,000	9,812
W7	20.91%	0.00%	4,408	270	111,000	9,823
W8	0.00%	24.29%	5,120	539	56,625	90,188
W9	0.00%	19.42%	4,093	431	66,754	109,812
W10	0.00%	6.24%	1,315	195	68,500	9,812

Slab	Thickness	Weight	Left Edge		Top Edge		Right Edge		Bottom Edge		Snow/Live (psf)	Center of Gravity		Live w snow	Live w/o snow
			X	Y	X	Y	X	Y	X	Y					
R1	4.5	6833	0	0	123	114	114	210	210	210	61.5	57.0	10923	6833	
R2	4.5	6841	0	114	123	228	228	210	210	210	61.5	171.0	10931	6841	
R3	4.5	6833	123	0	246	114	210	210	210	210	184.5	57.0	10923	6833	
R4	4.5	6841	123	114	246	228	210	210	210	210	184.5	171.0	10931	6841	
F1	5	10273	5	11	123	217	217	400	400	400	64.0	114.0	10273	0	
F2	5	10319	123	11	241	217	217	400	400	400	182.0	114.0	10319	0	
Totals		50605									123.0	112.9			

Torsional Eccentricity		Wgt (w snow)	Wgt (w/o snow)	wgt (w snow)	wgt (w/o snow)
ex	ey				
0.03	8.73	114,904	98,545	roof 69,010	52,651
Center of Gravity				floor 45,895	
X	Y				
123.0	112.9				
Center of Rigidity					
X	Y				
123.0	104.2				

Wall	Wall Overturning Checks Using Weight of Adjacent Walls Force Transferred by Connections Between Walls					
	Anchorage Required to Resist Overturning From Design Moment (kip-ft)	Toward Lower Right Anchor Resistance		Toward Upper Left Anchor Resistance		Overturning status using just connection to adjacent walls
		Moment (kip-ft)	check	Moment (kip-ft)	check	
W1	46.84	121.33	OK	121.33	OK	None Required
W2	94.46	96.32	OK	96.32	OK	None Required
W3	80.15	39.97	Need More	58.03	Need More	TRY BASE ANCHORS
W4	60.94	39.97	Need More	58.03	Need More	TRY BASE ANCHORS
W5	29.93	31.00	OK	31.00	OK	None Required
W6	94.46	96.32	OK	96.32	OK	None Required
W7	46.84	121.33	OK	121.33	OK	None Required
W8	79.81	36.62	Need More	64.35	Need More	TRY BASE ANCHORS
W9	60.90	36.62	Need More	64.35	OK	TRY BASE ANCHORS
W10	29.93	31.00	OK	31.00	OK	None Required

Overturning resistance considers only the weight of the wall, the weight of the roof supported by the wall, and connection to adjacent walls. Roof weight supported by other walls has not been considered. Connection to adjacent walls is taken as the connection capacity, not to exceed that portion of the adjacent wall weight that can be reasonably attributed to the connection.

Wall	Wall Overturning Checks Using Base Anchors Only Must investigate ONLY if connection to adjacent walls is insufficient					
	Design Moment (kip-ft)	Toward Lower Right Anchor Resistance		Toward Upper Left Anchor Resistance		Required Tension Capacity per Base Anchor (lb)
		Moment (kip-ft)	check	Moment (kip-ft)	check	
W1	46.84	87.64	OK	87.64	OK	(2280)
W2	94.46	90.91	Try Both	90.91	Try Both	(57)
W3	80.15	40.20	Try Both	41.01	Try Both	2842
W4	60.94	32.83	Try Both	48.13	Try Both	1798
W5	29.93	21.63	Try Both	21.62	Try Both	(158)
W6	94.46	90.91	Try Both	90.91	Try Both	(57)
W7	46.84	87.64	OK	87.64	OK	(2280)
W8	79.81	43.38	Try Both	37.39	Try Both	2751
W9	60.90	47.59	Try Both	33.34	Try Both	1464
W10	29.93	21.63	Try Both	21.62	Try Both	(158)

Wall	Wall Overturning Checks Using Base Anchors and Connection to Adjacent Walls Must investigate ONLY if both base anchor alone and adjacent walls alone are insufficient					
	Base Anchor Shear Required (% Capacity)	Base Anchor Tension Available (% Capacity)	Available Overturning Resistance (kip-ft) From Base Anchors		Overturning Unity Check of Base Anchors	
			Lower Right	Upper Left	Lower Right	Upper Left
W1	0.0%	100.0%	208.97	208.97	OK	OK
W2	0.0%	100.0%	187.23	187.23	OK	OK
W3	0.0%	100.0%	80.17	99.05	OK	OK
W4	0.0%	100.0%	72.80	106.16	OK	OK
W5	0.0%	100.0%	52.64	52.63	OK	OK
W6	0.0%	100.0%	187.23	187.23	OK	OK
W7	0.0%	100.0%	208.97	208.97	OK	OK
W8	0.0%	100.0%	80.00	101.74	OK	OK
W9	0.0%	100.0%	84.21	97.69	OK	OK
W10	0.0%	100.0%	52.64	52.63	OK	OK

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W1

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) + Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.69 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.14 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.06 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
V1 = h/2	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
c	0.419 in
Ask	0.22 in²
len(δ)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	12
Y Coordinate	16
Direction of Wall	Y
Center of gravity X	12.000
Center of gravity Y	114.010
Wall Weight	5593.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	Yes
kip (length of opening on wall)	0 ft
H (height of wall)	110.24 in
Lh (length of wall)	16.333 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
ci (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

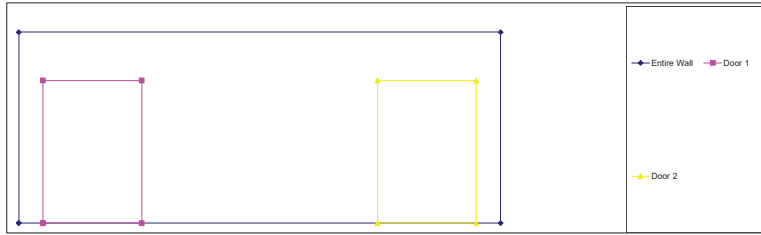
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.01 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.99 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.01 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.05 klf

Deflection	
Service Loads	
Axial	1.14 kip
Lateral	0.01 klf
Allowed service deflection	0.31 in
M	1.836 kip-in
M	1.846 kip-in
Δs	0.009 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
ci	0.012
ci	0.003
Check	Tension
φB	0.9
Mus	1.020 kip-ft
Mu	1.020 kip-ft
φMn trial = φAsf y (dt - a/2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As Addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsf y (db - a/2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	46.17%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (w _u L ² /12)
Door 1	0.82 ft	0 ft	3.35 ft	2.33 ft	1148.49	0.12 klf	0.45 klf	0.42 kip-ft
Door 2	12.16 ft	0 ft	3.35 ft	2.33 ft	1148.49	0.12 klf	0.45 klf	0.42 kip-ft

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	φMu - ΔAs req'd (b - d) ²	Check φMu > Mu
Door 1	0.9	0.004 in ²	No. 3	1	13.07 kip-ft	O.K.
Door 2	0.9	0.004 in ²	No. 3	1	13.07 kip-ft	O.K.

CONNECTIONS

Full Resistance Value								
Overturning								
Base Anchors			Lateral		Base Anchors		Wall-Wall Connection	
Quantity in Shear	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip - ft	Moment - kip - ft	Moment + kip - ft	Moment - kip - ft	
4	193	193	31.085	87.64	87.64	121.33	121.33	

Total Tension						
Label	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
Base Anchor 1	3 in	3.38	3.33	193 in	0.013 kip-ft	34.410 kip-ft
Base Anchor 2	67 in	3.64	12.21	129 in	7.057 kip-ft	26.161 kip-ft
Base Anchor 3	129 in	3.64	12.21	67 in	26.161 kip-ft	7.057 kip-ft
Base Anchor 4	193 in	3.38	3.33	3 in	34.410 kip-ft	0.013 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	1.537	5.777	39.04%	W3	0	196.000	4.593	0.000
Wall Connection 2	3	2.793	5.671	50.00%	W5	98	98.000	5.671	48.309
Wall Connection 3	3	1.537	5.535	39.04%	W4	196	0.000	4.593	75.019

Wall Shear Checks							
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design Capacity (PLF)	Wall Shear Capacity Resistance (PLF)	check	Required Shear Capacity (lb) per Base Connector	Reserve Capacity
13155	31085	17931	675	12922	OK	3289	(17931) OK

RIGIDITY

CALCULATED VALUES			63%	Final	6.80370042
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Pier	Length (inches)	Height (inches)	Fixed Top?	Usable?	Stiffness (k)	Deflection (in / 1000 kip)	
Entire Wall	196	110.24	Y	Y	10.722	0.093	
Door 1	A'	196	82.28	Y	Y	15.000	0.067
	A	9.84	82.28	Y	N	0.000	0.000
Door 2	B	145.96	82.28	Y	Y	10.694	0.094
	B'	196	82.28	Y	Y	15.000	0.067
	C	145.92	82.28	Y	Y	10.690	0.094
	D	9.88	82.28	Y	N	0.000	0.000

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Door 1	Entire Wall	A'	Aa	-	Deflection	0.027
		A	AB	++	Stiffness	10.694
Door 2		A'a	AB	+	Deflection	0.120
		A'b	B'a	-	Deflection	0.053
		C	CD	+	Stiffness	10.690
		B'a	CD	+	Deflection	0.147
			Final			

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W2

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) + Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.8 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.26 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.06 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / z	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
Trnl Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
Icr (deflection)	4.20 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (rebar reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is tension-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	97
Y Coordinate	16
Direction of Wall	Y
Center of gravity X	97.000
Center of gravity Y	114.000
Wall Weight	8309.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	Yes
kip (height of opening on wall)	0 ft
H (height of wall)	122.25 in
LH (length of wall)	16.333 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
ci (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.01 klf
Hw = W * (H⁴ / H³ + L⁴)	0.08 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.01 klf
Hw = W * (H⁴ / H³ + L⁴)	0.05 klf

Deflection	
Service Loads	
Axial	1.26 kip
Lateral	0.01 klf
Allowed service deflection	0.34 in
M	2.187 kip-in
M	2.203 kip-in
Δs	0.012 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
ci	0.012
city	0.003
Check	Tension
φB	0.9
Mus	1.115 kip-ft
Mu	1.120 kip-ft
φMn trial = φAsf * (d1 - a2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As Addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsf * (db - a2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	50.70%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pu total factorized panel load	wu total factorized load	Mu (wu*L ² /12)

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	ΔMa - ΔAsF _t (db - a/2)	Check ΔMa > Mu

CONNECTIONS

Full Resistance Value							
Base Anchors		Lateral		Base Anchors		Wall-Wall Connection	
Quantity	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip-ft	Moment - kip-ft	Moment + kip-ft	Moment - kip-ft
4	184	184	48.835	90.91	90.91	96.32	96.32

Base Anchors						
Total Tension	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
14.564	12 in	3.64	12.21	184 in	0.237 kip-ft	55.829 kip-ft
Base Anchor 1	12 in	3.64	12.21	184 in	0.237 kip-ft	55.829 kip-ft
Base Anchor 2	67 in	3.64	12.21	129 in	7.402 kip-ft	27.441 kip-ft
Base Anchor 3	129 in	3.64	12.21	67 in	27.441 kip-ft	7.402 kip-ft
Base Anchor 4	184 in	3.64	12.21	12 in	55.829 kip-ft	0.237 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	2	7.537	9.022	60.96%	W3	0	196.000	3.062	50.013
Wall Connection 2	3	2.763	5.671	50.00%	W5	86	98.000	5.671	46.309
Wall Connection 3	2	7.537	8.645	60.96%	W4	196	0.000	3.062	50.013

Wall Shear Checks						Required Shear Capacity (lb) per Base Connector	Reserve Capacity
Design Force (lb)	Shear Connections at Base Capacity (lb)	Reserve Capacity	Design (PLF)	Wall Shear Capacity Resistance (PLF)	check		
18497	48836	30339	938	20365	OK	4624	(30339) OK

RIGIDITY

CALCULATED VALUES						100%	Final	9.461532795
Pier Label	Length (inches)	Height (inches)	Fixed Top?	Useable?	Stiffness (k)	Deflection (in / 1000 kip)		
Entire Wall	196	122.25	Y	Y	9.462	0.106		

Combine Logic					
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined
Entire Wall	0	Final			9.462

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W3

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) + Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.73 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.19 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wwl * (Bw - db) / 2	0.08 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / z	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
Icr (deflection)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (rebar reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is tension-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	9
Y Coordinate	14
Direction of Wall	X
Center of gravity X	66.345
Center of gravity Y	14.000
Wall Weight	3876.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (height of opening on wall)	0 ft
H (height of wall)	93 in
LH (length of wall)	9.500 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
cl (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split	No

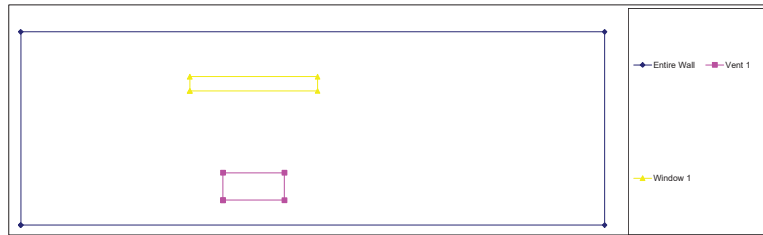
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.03 klf
Hw = W * (H⁴ / H³ + L⁴)	0.07 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.02 klf
Hw = W * (H⁴ / H³ + L⁴)	0.04 klf

Deflection	
Service Loads	
Axial	1.19 kip
Lateral	0.03 klf
Allowed service deflection	0.26 in
Mss	2.397 kip-in
M	2.406 kip-in
Δs	0.088 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
cty	0.012
cty	0.003
Check	Tension
φB	0.9
Mus	0.602 kip-ft
Mu	0.600 kip-ft
φMn trial = φAsfy(d - a2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As add'l req'd	0.00 m²
Add'l bar size	3
qty req'd	0
or spacing of	0
As add'l	0.000 kip-ft
Ast = As + As add'l	0.20 m²
φMn = φAsfy(db - a2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	27.16%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (wpa*L ² /12)
Vent 1	3.29 ft	1 ft	1 ft	5.65 ft	55.00	0.28 klf	0.61 klf	0.05 kip-ft
Window 1	2.75 ft	5.38 ft	2.08 ft	1.8 ft	59.28	0.09 klf	0.42 klf	0.15 kip-ft

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	Mu - φAs*fd*db - a/2	Check φMu > Mu
Vent 1	0.9	0 in ²	No. 3	0	0 kip-ft	O.K.
Window 1	0.9	0.002 in ²	No. 3	1	9.91 kip-ft	O.K.

CONNECTIONS

Full Resistance Value							
Overturning							
Base Anchors			Lateral	Base Anchors		Wall-Wall Connection	
Quantity	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip-ft	Moment - kip-ft	Moment + kip-ft	Moment - kip-ft
3	98	98.37	36.627	40.20	41.01	39.97	58.03

Total Tension						
10x3	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
Base Anchor 1	15.63 in	3.64	12.21	98.37 in	0.746 kip-ft	29.847 kip-ft
Base Anchor 2	36 in	3.64	12.21	58 in	9.709 kip-ft	10.376 kip-ft
Base Anchor 3	98 in	3.64	12.21	16 in	29.735 kip-ft	0.790 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to sec	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	2.703	4.910	25.00%	W1	3	111.000	4.910	45.420
Wall Connection 2	2	2.703	5.718	25.00%	W2	86	28.000	5.406	38.743

Wall Shear Checks						
Shear Connections at Base			Wall Shear Capacity		Required Shear Capacity (lb) per Base Connector	
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design (PLF)	Resistance (PLF)	check	Reserve Capacity
14321	36627	22306	1352	19702	OK	4774 (22306)

RIGIDITY

CALCULATED VALUES							
97%							
Final							
6.470665122							
Pier Label	Length (inches)	Height (inches)	Fixed Top? (Y/N)	Useable? (Y/N)	Stiffness (k) (1000 kip / IN)	Deflection (in / 1000 kip)	
Vent 1	Entire Wall	114	89	Y	Y	6.888	0.150
	A	114	13.2	Y	Y	67.320	0.017
	A	39.48	13.2	Y	Y	19.223	0.052
	B	62.52	13.2	Y	Y	31.113	0.032
Window 1	B	114	6.84	Y	Y	110.978	0.009
	C	33	6.84	Y	Y	31.710	0.032
	C	56.04	6.84	Y	Y	54.350	0.018
	D	56.04	6.84	Y	Y	54.350	0.018

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Vent 1	Entire Wall	A'	A'a	-	Deflection	0.132
	A	B	AB	+	Stiffness	50.337
	A'a	AB	A'b	+	Deflection	0.152
Window 1	A'b	B'	B'a	-	Deflection	0.143
	C	D	CD	+	Stiffness	86.060
	B'a	CD	Final	+	Deflection	0.155
	B'a	CD	Final	+	Deflection	0.155

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W4

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286626 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) ± Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.69 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.14 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wwl*(Bw-2db) / 2	0.08 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³h³)/12	64 in⁴
Ag = (b*h)	48 in²
Vt = I²/2	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Asc	0.22 in²
len(δ)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin(δ) (reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.067 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	9
Y Coordinate	214
Direction of Wall	X
Center of gravity X	56.264
Center of gravity Y	214.000
Wall Weight	3257.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (height of opening on wall)	0 ft
H (height of wall)	93 in
LH (length of wall)	9.500 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
cl (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

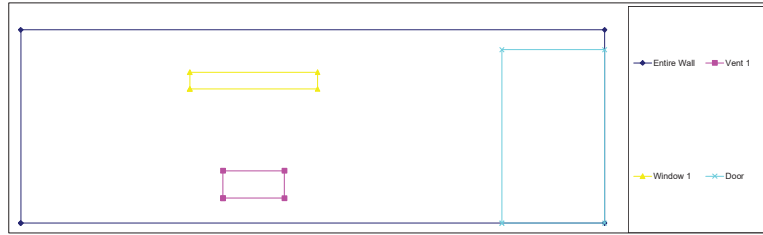
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.03 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.07 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.02 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.04 klf

Deflection	
Service Loads	
Axial	1.14 kip
Lateral	0.03 klf
Allowed service deflection	0.26 in
M	2.372 kip-in
M	2.381 kip-in
Δs	0.088 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
cl	0.012
cty	0.003
Check	Tension
φB	0.9
Mu	0.600 kip-ft
φMn trial = φAsfy(d - a/2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As add'l req'd	0.00 m²
Add'l bar size	3
qty req'd	0
or spacing of	0
As add'l	0.000 kip-ft
Ast = As + As add'l	0.20 m²
φMn = φAsfy(d - a/2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	27.16%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (w _u *L ²)/12
Vent 1	2.29 ft	1 ft	1 ft	5.65 ft	55.00	0.28 klf	0.61 klf	0.05 kip-ft
Window 1	2.75 ft	5.38 ft	2.08 ft	1.7 ft	69.68	0.09 klf	0.42 klf	0.15 kip-ft
Door	7.83 ft	0 ft	1.67 ft	0.8 ft	580.33	0.04 klf	0.37 klf	0.09 kip-ft

Opening	φb	As req'd	Bar size	qty req'd	ΔMu = ΔAs ² /(db - a/2)	Check ΔMu > Mu
Vent 1	0.9	0 in ²	No. 3	0	0 kip-ft	O.K.
Window 1	0.9	0.002 in ²	No. 3	1	9.31 kip-ft	O.K.
Door	0.9	0.003 in ²	No. 3	1	3.94 kip-ft	O.K.

CONNECTIONS

Full Resistance Value							
Base Anchors			Overturning				
Quantity	Maximum	Maximum	Lateral	Base Anchors		Wall-Wall Connection	
in Shear	R - Distance	L - Distance	Shear	Moment +	Moment -	Moment +	Moment -
			kip	kip - ft	kip - ft	kip - ft	kip - ft
3	78.875	98.38	36.627	32.83	48.13	39.97	58.03

Total Tension						
Base Anchors						
10/923	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
Base Anchor 1	15.62 in	3.64	12.21	96.38 in	0.97 kip-ft	23.850 kip-ft
Base Anchor 2	45.4 in	3.64	12.21	68.5 in	7.964 kip-ft	14.472 kip-ft
Base Anchor 3	78.875 in	3.64	12.21	35.125 in	23.932 kip-ft	3.805 kip-ft

Wall Connections								
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)
								Up Left Low Right
Wall Connection 1	3	2.703	4.910	25.00%	W1	3	111.000	4.910 4.228 45.620
Wall Connection 2	2	2.703	5.718	25.00%	W2	86	28.000	5.406 38.743 12.614

Wall Shear Checks						
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design Capacity (PLF)	Wall Shear Capacity Resistance (PLF)	check	Required Shear Capacity (lb) per Base Connector
11482	36627	25145	1078	15708	OK	3827 (25145) OK

RIGIDITY

CALCULATED VALUES			77%	Final	5.159083374
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Pier	Length (inches)	Height (inches)	Fixed Top?	Usable?	Stiffness (k) (1000 kip / ft)	Deflection (in / 1000 kip)
Entire Wall	114	93	Y	Y	6.688	0.150
Vent 1	A'	114	13.2	Y	57.320	0.017
	A	39.48	13.2	Y	19.223	0.052
	B	62.52	13.2	Y	31.153	0.032
Window 1	B'	114	8.04	Y	94.371	0.011
	C	33	8.04	Y	26.832	0.037
	D	56.04	8.04	Y	46.151	0.022
Door	C'	114	83.4	Y	7.725	0.125
	E	93.96	83.4	Y	5.949	0.168
	F	0	83.4	Y	0.000	0.000

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Vent 1	Entire Wall	A'	A'a	-	Deflection	0.132
	A	B	AB	+	Stiffness	50.337
Window 1	A'a	AB	A'b	+	Deflection	0.152
	B'	B'	B'a	-	Deflection	0.141
	C	D	CD	+	Stiffness	72.983
Door	B'a	CD	B'b	+	Deflection	0.155
	B'b	C'	C'a	-	Deflection	0.026
	E	F	EF	+	Stiffness	5.949
	C'a	EF	Final	+	Deflection	0.194

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W5

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) + Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.89 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.35 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.12 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / 2	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
Icr (deflection)	4.20 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (rebar reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	14
Y Coordinate	114
Direction of Wall	X
Center of gravity X	54.500
Center of gravity Y	114.000
Wall Weight	4260.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (length of opening on wall)	0 ft
H (height of wall)	151 in
LH (length of wall)	6.750 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
cl (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
cd (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.69 klf
Hw = W * (H⁴ / H³ + L⁴)	0.01 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.05 klf
Hw = W * (H⁴ / H³ + L⁴)	0 klf

Deflection	
Service Loads	
Axial	1.35 kip
Lateral	0.05 klf
Allowed service deflection	0.42 in
M	12.551 kip-in
M	12.699 kip-in
Δs	0.110 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
cty	0.012
cty	0.003
Check	Tension
φB	0.9
Mus	0.279 kip-ft
Mu	0.280 kip-ft
φMn trial = φAsf * (d - a)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As add'l req'd	0.00 in²
Add'l bar size	3
qty req'd	0
or spacing of	0
As add'l	0.000 kip-ft
Ast = As + As add'l	0.20 in²
φMn = φAsf * (db - a)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	12.68%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (wuL ² /2)/12

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	ΔMa = ΔAsFy(db - a/2)	Check ΔMa > Mu

CONNECTIONS

Full Resistance Value							
Overturning							
Base Anchors		Lateral		Base Anchors		Wall-Wall Connection	
Quantity	Maximum	Maximum	Shear	Moment +	Moment -	Moment +	Moment -
in Shear	R - Distance	L - Distance	kip	kip - ft	kip - ft	kip - ft	kip - ft
2	72.5	72	17.515	21.63	21.62	31.00	31.00

Base Anchors						
Total Tension	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
kip	in	kip	kip	in	kip*ft	kip*ft
Base Anchor 1	9 in	3.56	9.25	72 in	0.331 kip*ft	21.330 kip*ft
Base Anchor 2	72.5 in	3.53	8.26	8.5 in	21.303 kip*ft	0.295 kip*ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	1.537	9.821	50.00%	W1	0	81.000	4.593	0.000
Wall Connection 2	3	1.537	11.437	50.00%	W2	81	0.000	4.593	31.003

Wall Shear Checks						
Shear Connections at Base			Wall Shear Capacity		Required Shear Capacity (lb) per Base Connector	Reserve Capacity
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design (PLF)	Resistance (PLF)		
4914	17515	12601	487	20365	2457	(12601) OK

RIGIDITY

CALCULATED VALUES			100%	Final
				1.656848141

Pier Label	Length (inches)	Height (inches)	Fixed Top? (Y/N)	Useable? (Y/N)	Stiffness (k) (1000 kip / in)	Deflection (in / 1000 kip)
Entire Wall	81	151	Y	Y	1.657	0.604

Combine Logic					
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined
Entire Wall	0	Final			1.657

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W6

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	Lateral Design Loads (pressure on wall)
D (Dead load) + Ww (Wall weight)	Dead Load (DL,lat)
S (Snow Load)	Snow Load (SL,lat)
L (Live Load)	Live Load (LL,lat)
Lr (Live Roof Load)	Live Roof Load (LLR,lat)
W (Wind Load)	Wind Load (WL,lat)
E (Earthquake Load)	Earthquake Load (EL,lat)

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 S.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.8 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 pcf
Axial Pressure on Section	
PB	1.26 kip

Shear	
Factored Loading per ACI	ACI 318-19 S.3.1.c
Vu = wW * (Bw - db) / 2	0.06 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ * h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / b²	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
fral Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
Icr (deflection)	4.20 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	149
Y Coordinate	16
Direction of Wall	Y
Center of gravity X	149.000
Center of gravity Y	114.000
Wall Weight	8309.000 lbs.
Center wall?	Yes
Wall that supports 2 roof panels?	Yes
kip (height of opening on wall)	0 ft
H (height of wall)	122.25 in
LH (length of wall)	16.333 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
ci (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

Wire Mesh	
Wire Size	W6C7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 S.3.1.d
Factored Pressure on Wall Ww	94.38 pcf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.01 klf
Hw = W * (H⁴ / H³ + L⁴)	0.08 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 pcf
Lateral Pressure on Section	
Lw = W * (L⁴ / L³ + H⁴)	0.01 klf
Hw = W * (H⁴ / H³ + L⁴)	0.05 klf

Deflection	
Service Loads	
Axial	1.26 kip
Lateral	0.01 klf
Allowed service deflection	0.34 in
M	2.187 kip-in
M	2.203 kip-in
Δs	0.012 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
ci	0.012
ci	0.003
Check	Tension
φB	0.9
Mus	1.115 kip-ft
Mu	1.120 kip-ft
φMn trial = φAsf * (d - a)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As add'l req'd	0.00 m²
Add'l bar size	3
qty req'd	0
or spacing of	0
As add'l	0.000 kip-ft
Ast = As + As add'l	0.20 m²
φMn = φAsf * (db - a)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	50.70%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pu total factorized panel load	wu total factorized load	Mu

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	ΔMa - ΔAsF(db - a/2)	Check ΔMa > Mu

CONNECTIONS

Full Resistance Value							
Base Anchors		Lateral		Base Anchors		Wall-Wall Connection	
Quantity	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip-ft	Moment - kip-ft	Moment + kip-ft	Moment - kip-ft
4	184	184	48.836	90.91	90.91	96.32	96.32

Base Anchors						
Total Tension	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
14.564	12 in	3.64	12.21	184 in	0.237 kip-ft	55.829 kip-ft
Base Anchor 1	12 in	3.64	12.21	184 in	0.237 kip-ft	55.829 kip-ft
Base Anchor 2	67 in	3.64	12.21	129 in	7.402 kip-ft	27.441 kip-ft
Base Anchor 3	129 in	3.64	12.21	67 in	27.441 kip-ft	7.402 kip-ft
Base Anchor 4	184 in	3.64	12.21	12 in	55.829 kip-ft	0.237 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	2	7.537	5.783	39.04%	W8	0	196.000	3.062	50.013
Wall Connection 2	3	2.767	5.671	50.00%	W10	86	98.000	5.671	46.309
Wall Connection 3	2	7.537	5.535	39.04%	W9	196	0.000	3.062	50.013

Wall Shear Checks						Required Shear Capacity (lb) per Base Connector	Reserve Capacity
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design (PLF)	Wall Shear Capacity Resistance (PLF)	check		
18497	48836	30339	938	20365	OK	4624	(30339) OK

RIGIDITY

CALCULATED VALUES			100%	Final	9.461532795	
Pier Label	Length (inches)	Height (inches)	Fixed Top?	Useable?	Stiffness (k)	Deflection (in / 1000 kip)
Entire Wall	196	122.25	Y	Y	9.462	0.106

Combine Logic					
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined
Entire Wall	0	Final			9.462

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W7

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) ± Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.69 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.14 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.06 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
V1 = b/2	2
fr (rupture modulus)	530.30 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
len(δ)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (rebar reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	234
Y Coordinate	16
Direction of Wall	Y
Center of gravity X	234.000
Center of gravity Y	114.010
Wall Weight	5593.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	Yes
kip (height of opening on wall)	0 ft
H (height of wall)	110.24 in
LH (length of wall)	16.333 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
ci (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

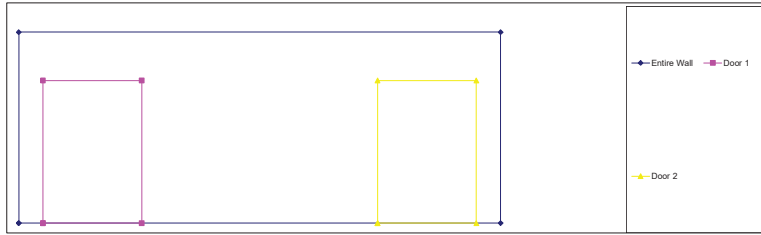
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.01 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.99 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.01 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.05 klf

Deflection	
Service Loads	
Axial	1.14 kip
Lateral	0.01 klf
Allowed service deflection	0.31 in
M	1.836 kip-in
M	1.846 kip-in
Δs	0.009 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
ci	0.012
city	0.003
Check	Tension
φB	0.9
Mus	1.020 kip-ft
Mu	1.020 kip-ft
φMn trial = φAsf'(d - a²)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As Addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsf'(db - a²)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	46.17%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (w _u L ²)/12
Door 1	0.82 ft	0 ft	3.35 ft	2.33 ft	1148.49	0.12 klf	0.45 klf	0.42 kip-ft
Door 2	12.16 ft	0 ft	3.35 ft	2.33 ft	1148.49	0.12 klf	0.45 klf	0.42 kip-ft

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	φMu - ΔAs req'd (b - d) ²	Check φMu > Mu
Door 1	0.9	0.004 in ²	No. 3	1	13.07 kip-ft	O.K.
Door 2	0.9	0.004 in ²	No. 3	1	13.07 kip-ft	O.K.

CONNECTIONS

Full Resistance Value							
Overturning							
Base Anchors				Base Anchors		Wall-Wall Connection	
Quantity in Shear	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip - ft	Moment - kip - ft	Moment + kip - ft	Moment - kip - ft
4	193	193	31.085	87.64	87.64	121.33	121.33

Total Tension							
Base Anchors							
Label	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -	
Base Anchor 1	3 in	3.38	3.33	193 in	0.013 kip-ft	54.410 kip-ft	
Base Anchor 2	67 in	3.64	12.21	129 in	7.057 kip-ft	26.161 kip-ft	
Base Anchor 3	129 in	3.64	12.21	67 in	26.161 kip-ft	7.057 kip-ft	
Base Anchor 4	193 in	3.38	3.33	3 in	54.410 kip-ft	0.013 kip-ft	

Wall Connections										
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)		
								Up Left	Low Right	
Wall Connection 1	3	7.537	9.031	60.96%	W8	0	196.000	4.593	0.000	75.019
Wall Connection 2	3	7.793	5.671	50.00%	W10	98	98.000	5.671	48.309	48.309
Wall Connection 3	3	7.537	8.645	60.96%	W9	196	0.000	4.593	75.019	0.000

Wall Shear Checks							
Design Force (lb)	Capacity	Reserve	Design Capacity (PLF)	Wall Shear Capacity Resistance (PLF)	check	Required Shear Capacity (lb) per Base Connector	Reserve Capacity
13155	31085	17931	675	12922	OK	3289	(17931) OK

RIGIDITY

CALCULATED VALUES				63%	Final	6.80370042
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Pier	Length (inches)	Height (inches)	Fixed Top?	Usable?	Stiffness (k)	Deflection (in / 1000 kip)	
Entire Wall	196	110.24	Y	Y	10.722	0.093	
Door 1	A'	196	82.28	Y	Y	15.000	0.067
	A	9.84	82.28	Y	N	0.000	0.000
Door 2	B	145.96	82.28	Y	Y	10.694	0.094
	B'	196	82.28	Y	Y	15.000	0.067
	C	145.92	82.28	Y	Y	10.690	0.094
	D	9.88	82.28	Y	N	0.000	0.000

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Door 1	Entire Wall	A'	Aa	-	Deflection	0.027
		A	AB	++	Stiffness	10.694
Door 2		A'a	AB	+	Deflection	0.120
		A'b	B'a	-	Deflection	0.053
		C	CD	+	Stiffness	10.690
		B'a	CD	+	Deflection	0.147

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W8

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 psi
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) ± Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.74 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.19 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wwl * (Bw - db) / 2	0.08 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / z	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
len(δ)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	123
Y Coordinate	14
Direction of Wall	X
Center of gravity X	179.625
Center of gravity Y	14.000
Wall Weight	3891.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (length of opening on wall)	0 ft
H (height of wall)	93 in
LH (length of wall)	9.500 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
ci (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
di (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

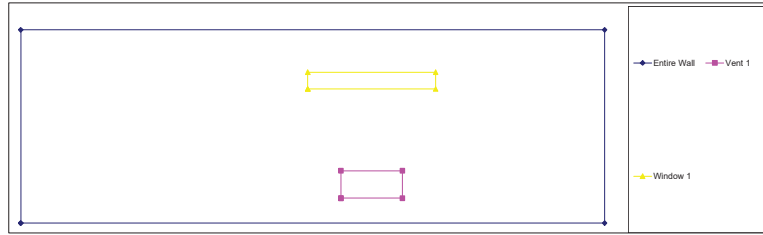
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.03 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.07 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.02 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.04 klf

Deflection	
Service Loads	
Axial	1.19 kip
Lateral	0.03 klf
Allowed service deflection	0.26 in
Mss	2.397 kip-in
M	2.406 kip-in
Δs	0.008 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
ci	0.012
ci	0.003
Check	Tension
φB	0.9
Mus	0.603 kip-ft
Mu	0.600 kip-ft
φMn trial = φAsfy(di - a2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As Addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsfy(db - a2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	27.16%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (w _u L ² /12)
Vent 1	5.21 ft	1 ft	1 ft	5.65 ft	55.00	0.28 klf	0.61 klf	0.05 kip-ft
Window 1	4.67 ft	5.38 ft	2.08 ft	1.7 ft	69.68	0.09 klf	0.42 klf	0.15 kip-ft

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	φMu = φAsfc(db - a/2)	Check φMu > Mu
Vent 1	0.9	0 in ²	No. 3	0	0 kip-ft	O.K.
Window 1	0.9	0.002 in ²	No. 3	1	9.31 kip-ft	O.K.

CONNECTIONS

Full Resistance Value							
Overturning							
Base Anchors			Lateral	Base Anchors		Wall-Wall Connection	
Quantity	Maximum R - Distance	Maximum L - Distance	Shear kip	Moment + kip-ft	Moment - kip-ft	Moment + kip-ft	Moment - kip-ft
3	98.38	82	36.627	43.38	37.39	36.62	64.35

Total Tension						
1093	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
Base Anchor 1	32 in	3.64	12.21	82 in	3.158 kip-ft	24.880 kip-ft
Base Anchor 2	38 in	3.64	12.21	56 in	10.375 kip-ft	11.604 kip-ft
Base Anchor 3	98.38 in	3.64	12.21	15.62 in	29.850 kip-ft	0.903 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to sec	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	2.703	5.718	25.00%	W6	3	111.000	5.718	1.430
Wall Connection 2	2	2.703	4.910	25.00%	W7	86	28.000	4.910	35.190

Wall Shear Checks						
Shear Connections at Base			Wall Shear Capacity		Required Shear Capacity (lb) per Base Connector	
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design Resistance (PLF)	check		Reserve Capacity
14285	36627	22342	1347	19639	OK	4762 (22342)

RIGIDITY

CALCULATED VALUES						
96%						
Final						
6.449954748						
Pier Label	Length (inches)	Height (inches)	Fixed Top? (Y/N)	Useable? (Y/N)	Stiffness (k) (1000 kip / IN)	Deflection (in / 1000 kip)
Entire Wall	114	82	Y	Y	6.888	0.150
Vent 1	A	114	13.2	Y	57.320	0.017
	A	62.52	13.2	Y	31.113	0.032
	B	39.48	13.2	Y	19.223	0.052
Window 1	B	114	8.04	Y	94.371	0.011
	C	56.04	8.04	Y	48.151	0.022
	C					
	D	33	8.04	Y	26.832	0.037

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Vent 1	Entire Wall	A'	A'a	-	Deflection	0.132
	A	B	AB	+	Stiffness	50.337
	A'a	AB	A'b	+	Deflection	0.152
Window 1	A'b	B'	B'a	-	Deflection	0.141
	C	D	CD	+	Stiffness	72.983
	B'a	CD	Final	+	Deflection	0.155

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W9

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286826 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) ± Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLR,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.69 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.14 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.08 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ h³) / 12	64 in⁴
Ag = (b * h)	48 in²
Vt = I / 2	2
fr (rupture modulus)	530.30 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
c	0.419 in
Ask	0.22 in²
len(δ)	4.19 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fmin (trial reinforcement ratio bottom)	0.0033
ρmin (reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is moment-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	123
Y Coordinate	214
Direction of Wall	X
Center of gravity X	189.754
Center of gravity Y	214.000
Wall Weight	3257.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (length of opening on wall)	0 ft
H (height of wall)	93 in
LH (length of wall)	9.500 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
cl (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split?	No

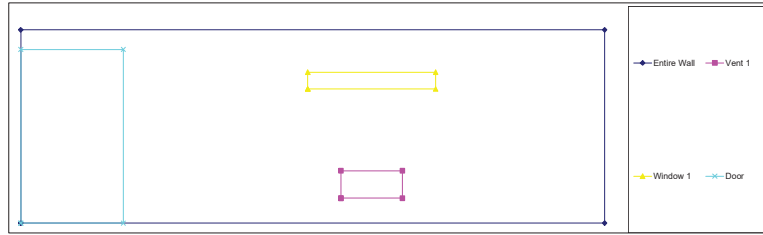
Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.03 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.07 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W*(L²/4 * L²/4 + H²/4)	0.02 klf
Hw = W*(H²/4 * H²/4 + L²/4)	0.04 klf

Deflection	
Service Loads	
Axial	1.14 kip
Lateral	0.03 klf
Allowed service deflection	0.26 in
Msa	2.372 kip-in
M	2.381 kip-in
Δs	0.088 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
cl	0.012
cty	0.003
Check	Tension
φB	0.9
Msa	0.600 kip-ft
Mu	0.600 kip-ft
φMn trial = φAsfy(d - a2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As Addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsfy(db - a2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	27.16%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L. length of opening	H height above opening	(c) Weight of Opening (LBS)	Pu total factorized panel load	wu total factorized load	Mu (w _u *L ²)/12
Vent 1	5.21 ft	1 ft	1 ft	5.65 ft	55.00	0.28 klf	0.61 klf	0.05 kip-ft
Window 1	4.67 ft	5.38 ft	2.08 ft	1.7 ft	69.68	0.09 klf	0.42 klf	0.15 kip-ft
Door	0 ft	0 ft	1.67 ft	0.79 ft	581.16	0.04 klf	0.37 klf	0.09 kip-ft

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	ΔMu = ΔAs ² /(db - a/2)	Check ΔMu > Mu
Vent 1	0.9	0 in ²	No. 3	0	0 kip-ft	O.K.
Window 1	0.9	0.002 in ²	No. 3	1	9.31 kip-ft	O.K.
Door	0.9	0.003 in ²	No. 3	1	3.88 kip-ft	O.K.

CONNECTIONS

Full Resistance Value								
Base Anchors			Lateral		Overturning		Wall-Wall Connection	
Quantity	Maximum	Maximum	Shear	Moment +	Moment -	Moment +	Moment -	
in Shear	R - Distance	L - Distance	kip	kip - ft	kip - ft	kip - ft	kip - ft	
3	97.38	80.87	36.627	47.59	33.34	36.62	64.35	

Total Tension						
Base Anchors						
10/923	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
Base Anchor 1	33.13 in	3.64	12.21	80.87 in	3.420 kip-ft	24.531 kip-ft
Base Anchor 2	68.51 in	3.64	12.21	45.49 in	14.624 kip-ft	7.764 kip-ft
Base Anchor 3	97.38 in	3.64	12.21	16.62 in	29.547 kip-ft	1.036 kip-ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	2.703	5.718	25.00%	W6	3	111.000	5.718	1.430
Wall Connection 2	2	2.703	4.910	25.00%	W7	86	28.000	4.910	35.190

Wall Shear Checks						
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design Load (PLF)	Wall Shear Capacity Resistance (PLF)	check	Required Shear Capacity (lb) per Base Connector
11476	36627	25151	1077	15700	OK	3826

RIGIDITY

CALCULATED VALUES			77%	Final	5.15641794
-------------------	--	--	-----	-------	------------

Pier	Length (inches)	Height (inches)	Fixed Top?	Usable?	Stiffness (k)	Deflection (in / 1000 kip)
Entire Wall	114	93	Y	Y	6.688	0.150
Vent 1	A'	114	13.2	Y	57.320	0.017
	A	62.52	13.2	Y	31.113	0.032
	B	39.48	13.2	Y	19.223	0.052
Window 1	B'	114	8.04	Y	94.371	0.011
	C	56.04	8.04	Y	46.151	0.022
	D	33	8.04	Y	26.832	0.037
Door	C'	114	83.52	Y	7.719	0.130
	E	0	83.52	Y	0.000	0.000
	F	93.96	83.52	Y	5.936	0.168

Combine Logic						
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined	
Vent 1	Entire Wall	A'	-	Deflection	0.132	
	A	B	+	Stiffness	50.337	
Window 1	A'a	AB	+	Deflection	0.152	
	A'b	B'a	-	Deflection	0.141	
	C	D	+	Stiffness	72.983	
Door	B'a	CD	+	Deflection	0.155	
	B'b	C'	-	Deflection	0.025	
	E	F	+	Stiffness	5.936	
	C'a	EF	+	Deflection	0.194	

ID:	DENALI SECTIONAL DNS-057
	DESIGN OF WALL MARKED W10

Notes	
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Material Properties	
f'c	5000 psi
Steel Reinforcement	Plain W-WF Grade 80
Fy wire mesh	80000 psi
Fy rebar	60000 pcf
Lightweight?	No
Concrete density	150 pcf
λ	O.K.
E (Steel)	29000000 psi
E (concrete)	4286626 psi
n (modular ratio)	6.76

Shear Parameters	
φv	0.85
Vc	3.394 kip
φVc	2.885 kip

Minimum Wall Reinforcement Requirements	
pmin.vert	0.0025
pmin.hor	0.0025
Max Vertical spacing	12 in
Max Horizontal spacing	12 in

Loading	
Axial Design Loads (pressure from roof)	
D (Dead load) + Ww (Wall weight)	110.94 psf
S (Snow Load)	210 psf
L (Live Load)	0 psf
Lr (Live Roof Load)	30 psf
W (Wind Load)	50.67 psf
E (Earthquake Load)	18.61 psf
Lateral Design Loads (pressure on wall)	
Dead Load (DL,lat)	0 psf
Snow Load (SL,lat)	0 psf
Live Load (LL,lat)	0 psf
Live Roof Load (LLr,lat)	0 psf
Wind Load (WL,lat)	58.99 psf
Earthquake Load (EL,lat)	9.78 psf

Factored Axially Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Factored Pressure on Roof Ww	434.46
Axial Pressure on Section	
PuH	1.89 kip
Assumption check	
0.067 * φ * Ag	14.4 kip
Check	O.K.

Unfactored Axially Applied Loads	
Unfactored Pressure on Roof wW	270.9375 psf
Axial Pressure on Section	
PB	1.35 kip

Shear	
Factored Loading per ACI	ACI 318-19 5.3.1.c
Vu = wW * (Bw - db) / 2	0.12 kip
φVc2	1.44 kip
Check Shear	O.K.

Allowable Capacity	
Ig = (b³ * h³) / 12	64 in⁴
Ag = (b * h)	48 in²
V1 = b/2	2
fr (rupture modulus)	530.330 psi
Mcr	16.971 kip-in
BI	0.8
trial Ast req'd	0.079 in²
B	8.829624606
kd	0.569 in
Lec	3.52 in⁴
a = As * fy / (0.85 * f'c * b)	0.33483 psi
e	0.419 in
Ask	0.22 in²
len(Deflection)	4.20 in⁴
Ic	64.00 in⁴
delta	360
fr (maximum tensile reinforcement)	0.0166
fsm (min. temperature reinforcement)	0.0018
fsm (minimum tensile reinforcement)	0.0027
fsm (trial reinforcement ratio bottom)	0.0033
ρmin (rebar reinforcement ratio provided)	0.0080
a	0.32 in

ACI's Alternate Design of Slender Walls	
Assumptions from this methodology:	
Cross section is constant over the height of the wall	
Wall is tension-controlled for out-of-plane moment effect	
φMn is at least Mcr, where Mcr is calculated using fr as provided in 19.2.3	
Pu at mid-height shall not exceed 0.06 * φ * Ag	
Wall panel shall be simply supported, axially loaded, and subject to out-of-plane uniform lateral loading where maximum moments and Concentrated gravity loads are distributed over the wall length	

Geometric Properties	
X Coordinate	151
Y Coordinate	114
Direction of Wall	X
Center of gravity X	191.500
Center of gravity Y	114.000
Wall Weight	4260.000 lbs.
Central wall?	Yes
Wall that supports 2 roof panels?	No
kip (length of opening on wall)	0 ft
H (height of wall)	151 in
LH (length of wall)	6.750 ft
Analysis will be performed as	Two-way slab
b (section width)	12 in
h (section thickness)	4 in
cl (cover top)	1.708 in
cb (cover bottom)	1.708 in
rd (assumed reinf. diameter)	0.292 in
de (effective depth top)	2 in
db (effective depth bottom)	2 in
Cs (% of DL used for Seismic)	0.196
Eccentricity - Axial Load	1 in
Is wall Split	No

Wire Mesh	
Wire Size	W6.7
spacing	4 in
Mesh Area	0.20 m²

Factored Laterally Applied Loads	
Factored Loading per ACI	ACI 318-19 5.3.1.d
Factored Pressure on Wall Ww	94.38 psf
Lateral Pressure on Section	
Lw = W * (L/4 + L/4 + H/4)	0.69 klf
Hw = W * (H/4 + H/4 + L/4)	0.01 klf

Unfactored Laterally Applied Loads	
Unfactored Pressure on Wall wW	58.99 psf
Lateral Pressure on Section	
Lw = W * (L/4 + L/4 + H/4)	0.05 klf
Hw = W * (H/4 + H/4 + L/4)	0 klf

Deflection	
Service Loads	
Axial	1.35 kip
Lateral	0.05 klf
Allowed service deflection	0.42 in
M	12.551 kip-in
M	12.699 kip-in
Δs	0.110 in
Check deflection	O.K.

Flexure	
Assumption check	
Span	Hw
city	0.012
city	0.003
Check	Tension
φB	0.9
Mus	0.279 kip-ft
Mu	0.280 kip-ft
φMn trial = φAsf * (d1 - a2)	2.210 kip-ft
ΔM - Mu - φM	0.000 kip-ft
As addl req'd	0.00 m²
Addl bar size	3
qty req'd	0
or spacing of	0
As addl	0.000 kip-ft
Ast = As + As addl	0.20 m²
φMn = φAsf * (db - a2)	2.209 kip-ft
Check φMn > Mu	O.K.
% allowed	12.68%



REINFORCEMENT AT OPENINGS

Loading	
Pu (factorized load from roof)	0.33 klf
Ww (weight of panel per sq ft)	0.05 klf

Material Properties	
db (effective depth bottom)	2 in

Factorized Moment								
Opening	Horizontal Location	Vertical Location	L length of opening	H height above opening	(c) Weight of Opening (LBS)	Pw total factorized panel load	wu total factorized load	Mu (wuL ² /2)/12

Flexure						
Opening	φb	As req'd	Bar size	qty req'd	ΔMa = ΔAsFy(db - a/2)	Check ΔMa > Mu

CONNECTIONS

Full Resistance Value							
Overturning							
Base Anchors		Lateral		Base Anchors		Wall-Wall Connection	
Quantity	Maximum	Maximum	Shear	Moment +	Moment -	Moment +	Moment -
in Shear	R - Distance	L - Distance	kip	kip - ft	kip - ft	kip - ft	kip - ft
2	72.5	72	17.515	21.63	21.62	31.00	31.00

Base Anchors						
Total Tension	Dist	Tension (kip)	Shear	L - Dist	Moment +	Moment -
kip	in	kip	kip	in	kip*ft	kip*ft
Base Anchor 1	9 in	3.56	9.25	72 in	0.331 kip*ft	21.330 kip*ft
Base Anchor 2	72.5 in	3.53	8.26	8.5 in	21.303 kip*ft	0.295 kip*ft

Wall Connections									
Quantity of Anchors	Capacity of each Anchor	Countering Dead Load from Adjoining Wall	% of wall to use	Adjoining Wall	Dist (inches)	L - Dist	Allowable Force	Overturning Moment Resistance (kip-ft)	
								Up Left	Low Right
Wall Connection 1	3	1.537	11.437	50.00%	W6	0	81.000	4.593	0.000
Wall Connection 2	3	1.537	9.821	50.00%	W7	81	0.000	4.593	31.003

Wall Shear Checks						
Shear Connections at Base			Wall Shear Capacity		Required Shear Capacity (lb) per Base Connector	Reserve Capacity
Design Force (lb)	Capacity (lb)	Reserve Capacity	Design (PLF)	Resistance (PLF)		
4914	17515	12601	487	20365	2457	(12601) OK

RIGIDITY

CALCULATED VALUES		100%	Final
			1.656848141

Pier Label	Length (inches)	Height (inches)	Fixed Top? (Y/N)	Useable? (Y/N)	Stiffness (k) (1000 kip / in)	Deflection (in / 1000 kip)
Entire Wall	81	151	Y	Y	1.657	0.604

Combine Logic					
First Segment	Second Segment	Re-Name	Combine/Subtract	Method	Combined
Entire Wall	0	Final			1.657

ID: **DENALI SECTIONAL DNS-057**

Geometric properties		Loading	
Bs (width of roof panel)	19.00 ft	Wv (weight of vault)**	0 lb
Ls (Length of roof panel)	20.50 ft	Wtr (roof panel weight)	27348 lb
Ar Area of Roof	389.50 ft ²	Ww (total walls panel weight)	50605 lb
H (height of building)	13.2 ft	Fw (floor panel weight)	20592 lb
Lb (length of building)	19 ft	We (estimated weight of building)	98545 lb
Wb (width of building)	17 ft	Wev (estimated weight of building w/ vault)	98545 lb
Ab (Area of building)	323 ft ²	PSFr (roof snow load)	210 psf
Nv (quantity of vaults)	0	PSFf (Floor Live Load)	400 psf
Avl (Area of Vault Lips)	0.00 ft ²	Pmax (Maximum allowable pressure)	1500 psf
Av (Area of Vault)	0.00 ft ²	Fupmw (MWFRS Uplift Force)	45.09 psf
Vh (Vault height)	0 ft	WLlat (MWFRS lateral wind pressure)	51.74 psf
Cab (Closed Area of building)	308.33 ft ²	γw (specific weight of water)	62.4 pcf
Hw (depth of floodwater)	1 ft	**Weight of vault is not considered in sliding resistance	
μ (sliding factor)	0.40	FS (factor of safety required)	1.00

CHECK SLIDING RESISTANCE

Shear	.7*Vseismic (from seismic analysis with snow)	24564.2 lb
	.7*Vseismic (from seismic analysis without snow)	21067.0 lb
	Vwind = WLlat * max(Wb,Lb)*H	12977.1 lb
* Load adjustment per IBC 1605.3 load combinations.		
Sliding Resistance with Snow	$P_{slide} = u*(.6*We+.75*PSFr*Ar)$	$P_{slide} = 48189.3 \text{ lb}$
Factor of Safety	$FS_{wind} = P_{slide} / V_{wind}$	$FS_{wind} = 3.7 \geq 1.0$ O.K.
	$FS_{seismic} = P_{slide} / V_{seismic}$	$FS_{seismic} = 2.0 \geq 1.0$ O.K.
Sliding Resistance with No Snow	$P_{slide} = u*.6*We$	$P_{slide} = 23650.8 \text{ lb}$
Factor of Safety	$FS_{wind} = P_{slide} / V_{wind}$	$FS_{wind} = 1.8 \geq 1.0$ O.K.
	$FS_{seismic} = P_{slide} / V_{seismic}$	$FS_{seismic} = 1.1 \geq 1.0$ O.K.

CHECK OVERTURNING RESISTANCE

Shear	.7*Oseismic (from seismic analysis with snow)	259.133 kip-ft
	.7*Oseismic (from seismic analysis without snow)	221.377 kip-ft
	Otwind = (WLlat*Lb*H ² / 2) + (Fupmw*Lb*Wb ² / 2)	209.455 kip-ft
* Load adjustment per IBC 1605.3 load combinations.		
Overturning Resistance with Snow	$O_{rsnow} = (.6*We+.75*PSFr*Ar)*(Wb/2)$	$O_{rsnow} = 520.251 \text{ kip-ft}$
Factor of Safety	$FS_{wind} = O_{rsnow} / O_{twind}$	$FS_{wind} = 2.48 \geq 1.0$ O.K.
	$FS_{seismic} = O_{rsnow} / V_{seismic}$	$FS_{seismic} = 2.01 \geq 1.0$ O.K.
Overturning Resistance with No Snow	$O_{tr} = .6*We*Wb/2$	$O_{tr} = 502.580 \text{ kip-ft}$
Factor of Safety	$FS_{wind} = O_{tr} / V_{wind}$	$FS_{wind} = 2.40 \geq 1.0$ O.K.
	$FS_{seismic} = O_{tr} / V_{seismic}$	$FS_{seismic} = 2.27 \geq 1.0$ O.K.

CHECK BEARING PRESSURE CONDITION

Net Pressure	$P_{net} = (Wev + PSFr*Ar + PSFf*Af) / Ab$	958.33 psf
Allowable	$P_{max} \geq P_{net}$	1500 psf \geq 958.33 psf O.K.

By observation, if the building is placed on a properly prepared well drained granular sub-base, the design is sufficient for lateral and vertical loads.

CHECK BUOYANCY FORCE CONDITION

Buoyant Force	$F_b = \gamma_w*Av*Hw+\gamma_w*Cab*(Hw-Vh)$	Fb = 19240.00 lb
Factor of Safety	$FS_b = We / F_b$	FSb = 5.12 \geq 1.00 O.K.

The weight of the building exceeds the buoyant force due to hydrostatic pressure acting on the horizontal surface of the vault, therefore, the design is sufficient against buoyancy.

Floor Design Information:

- 1) The referenced building is made of flood damage resistant 5000 psi reinforced concrete.
- 2) The vault system, if existing, is designed to minimize infiltration into system and can be considered water tight to a height of 17"
- 3) Flood Ventilation is available at threshold level and flood ventilation exceeding 1" per sq. ft. of floor area is provided no more than 12" A.F.F.

LIGHTING COMPLIANCE SUMMARY

2021 WSEC Compliance Forms for Commercial Buildings including Group R2, R3 & R4 over 3 stories and all R1

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Project Title		DENALI SECTIONAL DNS-057 - 2021 WSEC		For Building Department Use:		Date: Jul 30, 2024	
Project Address		52804 ROCKPORT PARK ROAD ROCKPORT, WA 98283					
Applicant Name		Nathan Penner					
Applicant Phone		208-697-6804					
Applicant Email		npenner@bfoster.com					

For questions about this report, contact WSEC Commercial Technical Support at 360-539-5300 or via email at com.techsupport@waenergycodes.com

General Occupancy	All Group R - R2, R3 & R4 over 3 stories and all R1	General Building Use Type	Office, Other	Building Cond. Floor Area	327
General Project Types	New Building	New Building or Addition Lighting Scope	Interior Lighting Exterior Lighting	Project Cond. Floor Area Floors Above Grade	1
Lighting Project Description	Four public restrooms and a mechanical plumbing chase.				

Lighting Compliance Scope and Method	Interior / Exterior (Interior includes both interior & parking)	Luminaire Replacement Scope	Compliance Method	LPA Calculation Adjustment	Compliance Verification	Compliance Verification
Additional Energy Efficiency (AEC) Measures Included	New Building	Interior Lighting	Space by space	No Calculation Adjustments selected	COMPLIES	COMPLIES
	New Building	Exterior Lighting		Not applicable to exterior	COMPLIES	COMPLIES
Reduced lighting power density - 20% lower than LPA		Load Management (LDM) Measures Included		No lighting or electrical load management measures included in project		

Project Title	DENALI SECTIONAL DNS-057 - 2021 WSEC		Date	Jul 30, 2024
Lighting Power Calculation	NEW BUILDING - INTERIOR LIGHTING		Compliance Verification	COMPLIES
Compliance Method	Space by space	LPA Calculation Adjustment	LPA x 0.8	

Interior Lighting Power Allowance - Space by Space				Total Proposed Watts (LPD + Display LPD)	Compliance Status
General Space Type	Specific Space Type	Gross Interior Area (SF)	LPA (Watts/SF)	Total Watts Allowed (SF x LPA x 0.8)	
Office	Enclosed > 250 sf	261	0.66	172	
Workshop		66	1.26	83	
Totals			Proposed Total LPD	150	
			Calculation Adjustment Applied - LPA x 0.8	150	COMPLIES

Proposed Lighting Power Density				Total Watts Proposed (#F x WpF) or (L.F. x WpLF)
Fixture Type	Fixture ID	Quantity of Fixtures (#F)	Watts or Wattage Limit per Fixture (WpF)	Compliance Status
Individual Fixtures				
Wall-mounted	C	2	25	50
Wall-mounted	A	4	25	100
			Proposed Total LPD	150



Project Title	DENALI SECTIONAL DNS-057 - 2021 WSEC		Date	Jul 30, 2024
Proposed Fixtures Details	NEW BUILDING - INTERIOR LIGHTING			

Fixture Type/Application	Fixture ID	Location in Documents	Lamp Type	New or Existing-to-Remain
Individual Fixtures				
Wall-mounted	C	DNS-27, DNS-28	LED	New
Fixture Description: Luminaire VPF84				
Do these fixtures require specific application lighting controls?: None required				
Wall-mounted	A	DNS-27, DNS-28	LED	New
Fixture Description: Luminaire VPF84				
Do these fixtures require specific application lighting controls?: None required				

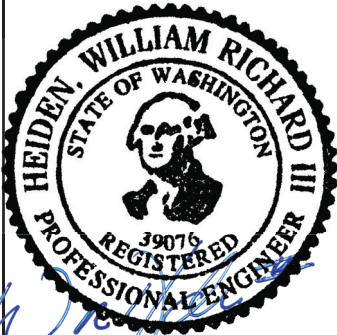
Project Title	Date
DENALI SECTIONAL DNS-057 - 2021 WSEC	Jul 30, 2024

Lighting Power Calculation	Compliance Verification
NEW BUILDING - EXTERIOR LIGHTING	COMPLIES

Exterior Lighting Zone	Base Site Allowance
ZONE 3	400

Exterior Lighting Power Allowance						
Exterior Surface	Surface Sub-Type	Surface Area (SF)	LPA (Watts/SF)	Linear Feet (LF)	LPA (Watts/LF)	Total Watts Allowed (LPA x SF) or (LPA x LF)
Building entrances and exits	Pedestrian entrances & exits			15	14	210
Base Site Allowance						
					Totals	400
					Totals	610
COMPLIES						

Proposed Exterior Lighting Power Density						
Fixture Type	Fixture ID	Exterior Surface Type	Quantity of Fixtures (#F)	Watts or Wattage Limit per Fixture (WpF)	Total Linear Feet (LF)	Total Watts Proposed (#F x WpF) or (LF x WpLF)
Individual Fixtures						
Wall-mounted	B	Building entrances and exits - Pedestrian entrances & exits	3	14		42
					Proposed Total LPD	42



EXPIRES April 23, 2025

August 9, 2024

Lighting, Motor and Electrical Requirements List, pg 1 of 13

2021 WSEC Requirements for Commercial Buildings including Group R2, R3 & R4 over 3 stories & all R1 -- Administered by ©2024 NEEA, All rights reserved

The following information is necessary to check a permit application for compliance with the lighting systems, motors and electrical system requirements in the Washington State Energy Code, Commercial Provisions.

For questions about this report, contact WSEC Commercial Technical Support at 360-539-5300 or via email at com.techsupport@waenergycodes.com

Project:
DENALI SECTIONAL DNS-057 - 2021 WSEC
52804 ROCKPORT PARK ROAD
ROCKPORT, WA 98283

Date: 2024-07-30

Applies	Code Section	Component	Compliance Information Required In Permit Documentation	Location in Documents	Building Department Notes
LIGHTING SCOPE					
NA	C103.1	Construction documents - General	For a shell & core or tenant space (first build-out) project, indicate if there is no lighting scope included in the project.		
NA	C103.1	Construction documents - General	For an alteration project, indicate if there is no lighting scope included in the project.		
NA	C405.1	Lighting in sleeping units	Indicate general compliance path for permanently installed luminaires in sleeping units - vacancy controls & luminaire efficacy; or lighting power allowance.		
INTERIOR LIGHTING CONTROLS					
YES	C405.2	Interior lighting controls, general	For all interior lighting systems, indicate lighting control method (general lighting controls requirements or luminaire level lighting controls) on plans for all spaces and lighting zone(s) served; indicate exceptions applied to eligible spaces and light	DNS-27, DNS-28	
YES	C405.2.3	Manual controls	Indicate on plans the method of manual lighting control, location of manual control device and the area or specific application it serves.	DNS-27, DNS-28	
NA	C405.2.4 C405.2.4.1	Manual interior light reduction controls	For general lighting not controlled by occupancy sensors, indicate on plans which method of manual 50% lighting load reduction is provided, or indicate applicable exception.		
YES	C405.2.1 C405.2.2	Method of automatic shut-off control	Indicate on plans the method of automatic shut-off control during unoccupied periods (occupancy sensor or time switch) for all lighting zones.	DNS-27, DNS-28	
YES	C405.2.1	Occupant sensor controls	Indicate on plans all luminaires that are controlled by occupant sensor controls; indicate controls are configured to turn luminaires 100% off when the space is unoccupied	DNS-27, DNS-28	
NA	C405.2.1 C405.2.1.1	Occupant sensor controls	Indicate if occupant sensor controls are configured to be manual on or automatic on to not more than 50% power; indicate spaces eligible for exception that allows automatic on to 100% power.		
NA	C405.2.1.2	Occupant sensor controls - warehouse storage areas & library stacks	Indicate each aisleway within a warehouse or library stack space designated as a separate zone that is independently controlled		

Lighting, Motor and Electrical Requirements List, pg 2 of 13

2021 WSEC Requirements for Commercial Buildings including Group R2, R3 & R4 over 3 stories & all R1 -- Administered by ©2024 NEEA, All rights reserved

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NA			Indicate occupant sensors are configured to automatically reduce lighting power by $\geq 50\%$ when the zone is unoccupied for over 20 minutes; indicate controls are configured to automatically restore lighting to full power when the zone or space is occupie		
NA	C405.2.1.2	Occupant sensor controls - warehouse storage areas & library stacks	Indicate method of automatic 100% shut-off (occupancy sensor or time switch)		
NA	C405.2.1.3	Occupant sensor controls - open plan office areas	For open plan office areas larger than 300 sf, indicate all general lighting control zones are ≤ 600 sf		
NA	C405.2.1.3	Occupant sensor controls - open plan office areas	Indicate all general lighting control zones are provided with vacancy controls that are configured to reduce lighting power by not less than 80% when the zone is unoccupied and turn luminaires 100% off when the control zone is unoccupied; indicate unoccup		
NA	C405.2.1.4	Occupant sensor controls - enclosed fire-rated stairwells	Indicate stairway lighting is provided with occupancy sensor controls that reduce lighting power by not less than 50% when the stairway in unoccupied and restore lighting to 100% when it is occupied.		
NA	C405.2.1.5	Occupant sensor controls - corridors	Indicate corridor lighting is provided with occupancy sensor controls that reduce lighting power by not less than 50% when the corridor is unoccupied.		
NA	C405.2.2.1	Automatic time switch controls	Indicate spaces on plans where time switch controls are configured to turn luminaires 100% off during unoccupied hours		
NA			Indicate spaces on plans where time switch controls are configured to turn on lighting to full power versus 50% power		
NA			Indicate locations of override switches on plans and the lighting zone(s) served; indicate that the area(s) served by each override switch does not exceed 5,000 sf.		
NA	C405.2.5.2 C405.2.5.4	Daylight zones - Sidelit zones	Indicate primary and secondary sidelit daylight zone floor areas on plans		
NA			For small vertical fenestration assemblies (rough opening less than 10% of primary daylight zone floor area) where daylight responsive controls are not required, provide fenestration area to daylight zone floor area calculation(s).		
NA			Indicate toplit daylight zone floor areas on plans.		
NA	C405.2.5 C405.2.5.1	Daylight responsive controls	Indicate on plans all lighting zone(s) served by daylight responsive controls; indicate that the area served by each control device does not exceed 2,500 SF		

Lighting, Motor and Electrical Requirements List, pg 3 of 13

2021 WSEC Requirements for Commercial Buildings including Group R2, R3 & R4 over 3 stories & all R1 -- Administered by ©2024 NEEA, All rights reserved

The following information is necessary to check a permit application for compliance with the lighting systems, motors and electrical system requirements in the Washington State Energy Code, Commercial Provisions.

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NA			Identify sidelit and toplit daylight zones that are not provided with daylight responsive controls and the exception(s) that apply		
NA	C405.2.5.1	Daylight responsive controls	Indicate on plans that all daylight responsive controls provide continuous dimming to ≤15% full light output		
NA	C405.2.5.1	Daylight responsive controls	Indicate that daylight responsive controls are configured to completely shut off all controlled lighting fixtures within the lighting zone.		
NA	C405.2.6	Additional controls - Specific application lighting controls	Identify spaces and lighting fixtures on plans that require specific application lighting controls per this section.		
NA	C405.2.6, Items 1.1 thru 1.6	Additional lighting controls for display, accent & supplemental task lighting	Indicate on plans that all display, accent and supplemental task lighting fixtures are controlled independently from general area lighting		
NA	C405.2.6, Items 1.1 and 1.2	Display and accent lighting	For display and accent lighting fixtures, including lighting fixtures added per the C405.2.2.1 additional interior lighting power allowance, indicate on plans the separate manual controls for these fixtures and the type of automatic off controls (occupanc		
NA			For display case lighting fixtures, indicate on plans the separate manual controls for these fixtures and the type of automatic off controls (occupancy sensor or time-switch)		
NA	C405.2.6, Item 1.4	Supplemental task lighting	For supplemental task lighting fixtures including under-shelf or under-cabinet lighting, indicate on plans the separate manual controls for these fixtures and the type of automatic off controls (occupancy sensor or time-switch)		
NA	C405.2.6, Item 1.5	Lighting equipment for sale or demonstration	For lighting equipment for sale or demonstration, indicate on plans the separate manual controls for these fixtures and the type of automatic off controls (occupancy sensor or time-switch)		
NA			For exhibit lighting fixtures in galleries, museums and monuments, indicate on plans the separate manual controls for these fixtures and the type of automatic off controls (occupancy sensor or time-switch).		
NA	C405.2.6, Item 2	Permanently installed lighting in sleeping units	Indicate method of automatic off control of all installed luminaires in sleeping units (vacancy or captive key card control); also refer to Receptacles.		

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NA	C405.2.6, Item 3	Lighting for non-visual applications	For lighting serving non-visual applications (food warming and lighting for life support of nonhuman life forms), indicate on plans that lighting fixtures are controlled independently from both general area lighting and other lighting applications within		
NA			Indicate on plans separate manual controls for non-visual lighting application fixtures and applicable automatic lighting controls; indicate that the area served by each control device does not exceed 4,000 sf.		
NA			For task lighting that serves medical & dental purposes, indicate on plans that lighting fixtures are provided with manual control that is independent from general area lighting.		
NA	C405.2.6, Item 5	Means of egress lighting	Identify all means of egress lighting fixtures on plans including fixtures that function as both normal and emergency illumination		
NA			Provide calculation for total lighting power density (LPD) of all means of egress lighting fixtures; if total LPD is ≥ 0.01 Watts/SF, indicate on plans the method of automatic shut-off control during unoccupied periods (emergency relay & occupancy sens		
NA	C405.2.8	Advanced lighting controls in open office areas	For open office areas $\geq 5,000$ sf, indicate which advanced lighting control system is provided (luminaire level lighting controls or networked lighting controls).		
NA	C405.2.8.1	Luminaire level lighting controls (LLLC)	Where LLLC are provided to comply with C405.2.8, or provided as the alternate lighting controls compliance method per C405.2, or to comply with C406.2.4.2 Enhanced digital interior lighting controls; provide sequence of operations that describes required		
NA	C405.2.8.1 C405.2.8.3	Luminaire level lighting controls (LLLC)	Indicate on plans that each LLLC luminaire is configured with occupancy sensing control functions (including C405.2.1.3 requirements for open office areas) and continuous full range dimming controls to brighten or dim lights based on occupancy and availab		
NA	C405.2.8.2	Networked lighting control (NLC)	Where NLC are provided to comply with C405.2.8, or to comply with C406.2.4.2 Enhanced digital interior lighting controls; provide sequence of operations that describes required NLC capabilities and performance parameters		
NA	C405.2.8.2 C405.2.8.3	Networked lighting control (NLC)	Indicate on plans that each NLC luminaire is individually addressable or document exception applied; Indicate on plans that each NLC luminaire is configured with occupancy sensing control functions (including C405.2.1.3 requirements for open office areas)		

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NA	C405.8.3	High end trim	Where high end trim is required, luminaires shall be initially configured to limit maximum lumen output or lighting power to 85% or to the target design lighting power.		
INTERIOR LIGHTING CONTROLS - ADDITIONAL ENERGY EFFICIENCY MEASURE					
NA	C406.2.4.2	Enhanced digital interior lighting controls	To comply with the enhanced interior lighting controls measure, provide calculations that demonstrate that lighting in $\geq 50\%$ of the project floor area is provided with LLLC (C405.2.8.1) or NLC (C405.2.8.2) controls with high end trim (C405.2.8.3)		
NA			Where LLLC is provided, indicate on plans that each LLLC controlled luminaire is configured with integral sensors; where NLC is provided, indicate on plans that each NLC controlled luminaire is configured to be independently addressable; provide sequence		
NA	C406.2.4.1	Enhanced lighting controls in Group R-2	In Group R-2 occupancies, indicate on plans a master control at the main entrance to each dwelling or sleeping unit that switches off all lights and switched receptacles (may be two controls, one for lights and the other for receptacles); indicate on plan		
INTERIOR LIGHTING CONTROLS - LIGHTING LOAD MANAGEMENT MEASURE					
NA	C406.3.1	Interior lighting DDC controls & real-time demand response	To comply with the interior lighting load management measure, indicate automatic lighting controls are connected to a central DDC system capable of activation by an external utility signal; where utility real-time demand or pricing program exists, indicat		
NA	C406.3.1	Interior lighting power reduction controls	Indicate lighting controls are configured to gradually reduce by continuous dimming the interior general area lighting power by ? 20% in response to a peak demand signal; calculate the percentage of total building floor area served by load management ligh		
NA	C406.3.1	Warehouse & retail storage interior lighting power reduction controls	For warehouse & retail storage areas, indicate method of interior general area lighting power reduction (continuous dimming by ? 20%; switching off ? 25% of lighting power).		
EXTERIOR LIGHTING CONTROLS					
YES	C405.2.9 C405.2.9.1 C405.2.9	Exterior lighting controls	For all exterior lighting, indicate on plans automatic controls (either daylight sensing or astronomic time clock) configured to turn lighting off when daylight is present; or indicate exception applied.	DNS-27, DNS-28	
NA			For exterior building facade & landscape lighting, indicate that controls are configured to turn this lighting off when daylight is present for a minimum of 6 hours per night, or from 1 hour after closing to 1 hour before opening per the occupancy schedul		

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NA			For outdoor parking area (not parking garage) luminaires that are mounted ≤ 24 feet high and are rated at ≥ 40 watts, indicate that controls are configured to turn this lighting off when daylight is present; in addition, indicate controls are config		
NA			For exterior lighting other than building facade, landscape and outdoor parking area lighting, indicate controls are configured to reduce lighting power by at least 50% from 12am-6am, or 1 hour after closing to 1 hour before opening, or when no activity i		
NA	C405.2.10	Parking garage lighting control	Indicate all interior parking garage lighting fixtures are provided with time switch controls (per C405.2.2.1) or occupancy sensor controls (per C405.2.1.1); indicate controls are configured to reduce lighting power by at least 30% when no activity is det		
NA	C405.2.10	Parking garage lighting control - Perimeter lighting zones	For parking garage lighting fixtures located within 20 feet of perimeter wall openings, indicate on plans that daylight sensing controls are configured to reduce lighting power by at least 50%, or exception applied		
NA	C405.2.10	Parking garage lighting control - Eye adaptation lighting	For lighting fixtures at vehicle entrances & exits, indicate on plans that daylight sensing controls are configured to reduce lighting power by at least 50% from sunrise to sunset.		
NA	C405.3	Lighting for plant growth and maintenance	For permanently installed lighting fixtures used specifically for plant growth and maintenance, indicate that the photosynthetic photon efficacy measured at the lamp or luminaire is ≥ 1.7 $\mu\text{mol/J}$ in greenhouses and ≥ 1.9 $\mu\text{mol/J}$ in all other indoo		
NA	C405.5.4	Exterior gas-fired lighting appliances	Indicate ignition system is a method other than continuously burning pilot light.		
INTERIOR & EXTERIOR LIGHTING CONTROL CIRCUITS					
NA	C405.2.7	Area controls - Master control switches	Indicate location(s) of lighting master control switch(es) intended to control multiple independent switches; a circuit breaker may not be used as a lighting master control switch		
NA			Verify the maximum power controlled by any single lighting control switch or automatic control device is no more than a 20 amp circuit loaded to ? 80%.		
INTERIOR LIGHTING POWER & EFFICACY					
YES	C405.4.1	Total connected interior lighting power	Include all luminaires in interior lighting fixture schedule; indicate fixture types, lamps, ballasts and rated watts per fixture; include rated wattage of lamps for luminaires with lamps connected directly to building power; include wattage limit of tran	DNS-27, DNS-28	

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NA			Identify spaces eligible for lighting power exemption on plans and in WSEC interior lighting compliance reports; indicate the exception applied		
NA			Identify lighting equipment eligible for lighting power exemption in fixture schedule and in WSEC interior lighting compliance reports; indicate the exception applied.		
NA	C405.1.1	Lighting in dwelling units	Include all permanently installed luminaires in dwelling units in interior lighting fixture schedule; include luminaire lighting power and efficacy (lumens)		
NA			Include all permanently installed luminaires in sleeping units in interior lighting fixture schedule; include luminaire lighting power or efficacy (lumens) depending on compliance path taken per C405.1		
NA			For all permanently installed luminaires, indicate in interior lighting fixture schedule that rated lamp efficacy is ≥ 65 lumens/watt or luminaire efficacy is ≥ 45 lumens/watt.		
YES	C405.4.2	Interior lighting power allowance (LPA)	Indicate which interior LPA method is applied to the entire building (Building Area Method or Space-by-Space Method); indicate LPA applied is Space-by-Space Method for partial building projects and for buildings with unfinished spaces.	WSEC	
INTERIOR LIGHTING POWER CALCULATION - INDICATE COMPLIANCE PATH TAKEN					
YES	C405.4.2.1	Building Area Method	Demonstrate that total proposed interior lighting wattage per building does not exceed the sum of the maximum allowed wattages for all building area types; identify locations of building areas on plans; provide WSEC interior lighting compliance reports.	WSEC, DNS-03	
NA	C405.4.2.2	Space-By-Space Method	Demonstrate that total proposed interior lighting wattage does not exceed the maximum allowed wattage; identify locations of space types on plans, including additional allowance retail display areas and areas with display, highlight and decorative lightin		
INTERIOR LIGHTING POWER & EFFICACY - ADDITIONAL ENERGY EFFICIENCY MEASURES					
YES	C406.2.3.1 C406.2.3.2	Reduced interior lighting power density (LPD)	To comply with the reduced interior LPD additional energy efficiency measure, demonstrate that total proposed interior LPD wattage is 10% or 20% lower than the total interior LPA wattage for the area the reduced lighting power measure is being applied to		

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NA	C406.2.3.3	Reduced interior LPD - Dwelling & sleeping unit lamp efficacy	To comply with reduced interior LPD additional energy efficiency measure for a building with dwelling units or sleeping units, indicate in interior lighting fixture schedule that all permanently installed luminaires have a rated lamp efficacy ≥ 90 lumen		
EXTERIOR LIGHTING POWER & EFFICACY					
YES	C405.5.2	Total connected exterior lighting power	Include all luminaires in exterior lighting fixture schedule; indicate fixture types, lamps, ballasts and rated watts per fixture; include rated wattage of lamps for luminaires with lamps connected directly to building power; include wattage limit of tran		
NA			Identify exterior lighting applications eligible for lighting power exemption on plans and in WSEC exterior lighting compliance reports; indicate the exception applied.		
NA	TABLE C405.5.3(1)	Exterior lighting zone	Indicate the building exterior lighting zone as specified by the AHJ.		
NA	C405.5.1	Exterior building grounds lighting	For building grounds lighting fixtures rated at greater than 25 watts, indicate in exterior lighting fixture schedule that fixtures have a rated lamp efficacy ≥ 100 lumens/watt or indicate the exception applied.		
EXTERIOR LIGHTING POWER CALCULATION					
YES	C405.5.3	Exterior lighting power allowance (LPA)	Demonstrate that total proposed exterior surface lighting wattage does not exceed the maximum allowed wattage (including base site allowance); identify locations of exterior surfaces on plans; provide WSEC exterior lighting compliance reports	WSEC	
NA			Demonstrate that total proposed wattage for each additional allowance exterior surface type does not exceed the LPA for the surface type (includes base site allowance remaining after C405.5.3 LPA calculation); identify locations of additional allowance ex		
LIGHTING SYSTEMS ALTERATIONS					
NA	C503.7.1	New lighting systems and controls	Where new interior or exterior lighting systems are installed within an existing building site, indicate new lighting controls comply with C405.2; indicate commissioning of lighting controls (C408.4) and lighting system energy end-use metering (C409.3) wi		
NA	C503.7.2	Interior lighting & parking garage lighting alteration	Include all new luminaires in interior lighting fixture schedule in plans, provide same lighting fixture information as for new construction per C405.4.1 and C405.4.2		

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NA			For alterations that add or replace $\geq 20\%$ of luminaires within an interior space or parking garage, indicate which interior lighting power allowance (LPA) method is applied to the alteration project area (Space-by-Space Method for partial building alte		
NA			Demonstrate that total proposed interior lighting wattage (including existing-to-remain lighting wattage) within the alteration project area does not exceed the maximum allowed wattage (Space-by-Space Method) or the sum of the maximum allowed wattages for		
NA	C503.7.2	Interior lighting alterations (LPA) - Add/replace	For alterations that add or replace $< 20\%$ of luminaires in an interior space or parking garage, calculate total existing interior lighting wattage within the project area prior to the alteration		
NA	C503.7.2	Interior lighting alterations (LPD) - Add/replace	Demonstrate that total proposed interior lighting wattage (including existing-to-remain lighting wattage) within the alteration project area does not exceed the total existing interior lighting wattage prior to the alteration; provide WSEC interior lighti		
NA			Include all new luminaires in exterior lighting fixture schedule in plans, provide same lighting fixture information as for new construction per C405.5.2		
NA	C503.7.2	Exterior lighting alterations (LPA) - Add/replace &ge 20%	For alterations that add or replace $\geq 20\%$ of exterior lighting wattage, indicate exterior lighting power allowance (LPA) calculated in the same manner as for new construction		
NA	C503.7.2	Exterior lighting alterations (LPD) - Add/replace &ge 20%	Demonstrate that total proposed exterior lighting wattage (including existing-to-remain lighting wattage) does not exceed the maximum allowed wattage; identify locations of surface types on plans, including additional allowance surfaces; provide WSEC exte		
NA	C503.7.2	Exterior lighting alterations (LPA) - Add/replace	For alterations that add or replace $< 20\%$ of exterior lighting wattage, calculate total existing exterior lighting wattage prior to the alteration		
NA	C503.7.2	Exterior lighting alterations (LPD) - Add/replace	Demonstrate that total proposed exterior lighting wattage (including existing-to-remain lighting wattage) does not exceed the total existing exterior lighting wattage prior to the alteration; identify locations of surface types on plans, including additio		
NA	C503.7.3	Interior lighting wiring & circuiting alterations	Where new wiring is installed to serve new interior luminaires and /or luminaires are relocated to a new circuit; indicate manual and automatic lighting controls are provided (as applicable) - manual & light reduction (C405.2.3 & C405.2.4); occupancy sens		

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NA			Where new wiring is installed to serve new exterior luminaires and /or luminaires are relocated to a new circuit; indicate circuit power area controls (C405.2.7) are provided; indicate commissioning of exterior lighting controls (C408.4) will be provided,		
NA	C503.7.4	Lighting panel alterations	Where a new interior and/or exterior lighting panel is installed or an existing panel is moved (including all new raceway and conductor wiring), indicate all of the same interior lighting controls requirements as for wiring & circuiting alterations apply,		
NA	C503.7.5	Newly-created rooms	Where interior space(s) are reconfigured (permanently installed walls or ceiling-height partitions) to create new enclosed spaces, indicate the following manual and automatic lighting controls are provided (as applicable) - manual & light reduction (C405.		
NA	C504.2	Lighting repairs	Identify existing luminaires being upgraded with bulb and / or ballast replacement; indicate fixture alteration does not increase existing fixture wattage		
NA	C505.1	Change of interior space use	Identify spaces on plans where the building area type or space use type is being changed from one type to another per Tables C405.4.2(1) or (2) including additional allowance retail display areas and areas with display, highlight and decorative lighting		
NA			Demonstrate that total proposed interior lighting wattage (including existing-to-remain lighting wattage) within the alteration project area does not exceed the maximum allowed wattage (Space-by-Space Method) or the sum of maximum allowed wattage per each		

RECEPTACLES

NA	C405.10	Automatic receptacle control	Provide schedule on electrical plans that lists the number of controlled and uncontrolled receptacles in each space where controlled receptacles are required - classrooms, enclosed offices, conference rooms, copy/print rooms, break rooms and individual wo		
NA			Identify all controlled and uncontrolled receptacles on electrical plans; indicate that ≥ 50% of all receptacles are provided with automatic controls in each space where they are required; include receptacle configuration such as spacing between contro		
NA			Indicate on plans the method of automatic control for each controlled receptacle zone (occupant sensor or programmable time-of-day control); indicate that the area served by each control device does not exceed 5,000 sf.		

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NA	C405.2.6, Item 2	Switched receptacles in sleeping units	Indicate method of automatic off control of all switched receptacles in sleeping units (vacancy or key card control).		
NA	C405.7.1	Electric receptacles at dwelling unit gas appliances	In all designated appliance locations within dwelling units (kitchen cooking appliances, laundry and domestic water heating), indicate electric receptacles or junction box & circuit within 12 inches of the appliance location with sufficient capacity to se		
NA	C503.7.7	Electrical receptacle alterations	For alteration project areas $\geq 5,000$ sf where electric receptacles are added or replaced, indicate receptacles are provided with automatic controls per C405.10, or exception applied.		

ELECTRIC MOTORS

NA	C405.8	Electric motor efficiency	Include all motors, including fractional hp motors, in electric motor schedule on electrical plans; indicate motor type, horsepower, rpm, rated efficiency, or exception applied.		
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ELEVATORS, ESCALATORS & MOVING WALKS

NA	C405.9.1	Elevator cabs	For luminaires in each elevator cab, provide calculations that demonstrate average efficacy is not less than 35 lumens per watt		
NA			For elevators that do not have an integral air conditioning system, indicate rated watts per cfm for elevator cab ventilation fans do not exceed 0.33 watts per cfm		
NA			Indicate automatic controls that de-energize lighting and ventilation fans when elevator is stopped and unoccupied for a period of 15 minutes or more.		
NA	C405.9.2	Escalators and moving walks	Indicate escalators and moving walks comply with ASME A17.1/CSA B44 and are provided with automatic controls that are configured to reduce operational speed to the minimum permitted when not in use, or exception applied.		
NA	C405.9.3	Escalator energy recovery	Indicate escalators are designed to recover electrical energy when resisting overspeed in the down direction.		

RENEWABLE ENERGY

NA	C411	Renewable Energy	For new construction, including additions, change of use, and change of occupancy, with floor area ≥ 10000 sf; provide documentation of on-site renewable energy capacity; provide calculations supporting applicable exceptions; if qualifying by exception provide an accounting for the additional Additional Energy Efficiency Credits that will be required		
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RENEWABLE ENERGY - ADDITIONAL ENERGY EFFICIENCY MEASURE

NA	C406.2.5	On-site and off-site renewable energy	To comply with the renewable energy measure, provide an accounting of on-site and any contracted off-site renewable energy capacity; for all off-site sources, indicate the C411.2 renewable energy source type, energy factor, and the rated capacity and calculated code credited kW; indicate on-site renewables used to comply with C411 or for a code exception elsewhere in the code; with the remaining renewable energy provide Equation 4-17 calculations showing the achieved credits and that the achieved credits are ? the base credits for the measure		
NA	C406.2.5	On-site and off-site renewable energy	Provide documentation that all off-site renewable energy systems comply with Sections C411.2.2 and C411.2.3 including all contracts, and the ownership and location of off-site generation		

ELECTRIC ENERGY STORAGE - LOAD MANAGEMENT MEASURE

NA	C406.3.4	Electric energy storage	To comply with the electrical energy storage load management measure, indicate automatic controls shall store electricity in electric storage devices during nonpeak periods and use stored energy during peak periods; Document the total electric storage device capacity; indicate it is ? 5 Wh/sf (58 Wh/sm) of gross building area; for proration provide the proration calculations supporting the claimed credit		
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GENERAL ELECTRICAL SYSTEMS

NA	C405.6	Electrical transformers	Include electrical transformer schedule on electrical plans; indicate transformer type, size (kVA), efficiency, or exception applied.		
NA	C405.7	Dwelling unit electrical energy consumption	Indicate on electrical plans that each dwelling unit in a Group R-2 building has a separate electrical energy meter, or exception applied.		
NA	C405.11	Voltage drop	Indicate wire conductors are sized so that the maximum voltage drop from customer service conductors to branch circuit conductors is ≤ 5%.		
NA	C405.12	Alternating current-output uninterruptible power supplies (AC-output UPS)	Indicate in plans that AC-output UPS systems serving computer rooms meet or exceed the calculation and testing requirements identified in ENERGY STAR Program Requirements for Uninterruptible Power Supplies (UPS) ? Eligibility Criteria Version 2.0.		

COMMISSIONING (CX)

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NA	C408.4	Scope of electrical power & lighting systems commissioning	Indicate that all electrical systems (receptacles, transformers, motors, vertical & horizontal transportation) for which the WSEC requires control functions and/or configuration to perform specific functions are required to be commissioned; include docume		
NA			Where total building lighting load is ≥ 10 kW or the total lighting load of luminaires requiring daylight sensing and/or occupancy control is ≥ 5 kW, indicate that all automatic lighting control systems are required to be commissioned; or provide ca		
NA	C408.1.1	Commissioning requirements in construction documents	Indicate Cx requirements in plans and specifications for all applicable electrical and lighting control systems		
NA	C408.1.2 C103.6.3	Commissioning requirements in construction documents	General summary of Cx plan shall include the following: 1) Narrative description of activities; 2) Responsibilities of the Cx team; 3) Schedule of activities including verification of project close out documentation (C103.6); 4) Conflict of interest plan		
NA	C408.1.3 C408.1.4	Commissioning requirements in construction documents	Include in general summary that a Cx project report and Cx Compliance Checklist (Figure C408.1.4.1) shall be completed by the Certified Cx Professional and provided to the owner prior to the final electrical inspection.		
NA	C408.4.1	Functional performance testing criteria	Identify in plans and specifications the intended operation of all electrical equipment and controls during all modes of operation, including interfacing between new and existing-to-remain systems.		

PROJECT CLOSE OUT

YES	C103.6.3	Documentation requirements	Indicate in plans that project close out documentation is required; indicate information shall include WSEC lighting compliance reports that document all interior lighting areas and space types, exterior lighting surface types, interior/exterior lighting	WSEC	
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If "no" is selected for any question, provide explanation.