TOWN OF MARATHON

NEW PUBLIC WORKS FACILITY

2 PENN LAKE ROAD, MARATHON, ONTARIO

2208

NEW PUBLIC WORKS FACILITY

ISSUED FOR PERMIT AND TENDER - JULY 28, 2022

DRAWING INDEX

CIVIL

ARCHITECTURAL

STRUCTURAL

MECHANICAL

ELECTRICAL

CONSULTANTS:

CIVIL: TBT ENGINEERING LTD.
1918 YONGE STREET
Thunder Bay, Ontario, P7E 6T9
T 807 624 5160 . F 807 624 5161

MECHANICAL: TBT ENGINEERING LTD.
1918 YONGE STREET
Thunder Bay, Ontario, P7E 6T9
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ELECTRICAL: TBT ENGINEERING LTD.
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STRUCTURAL: TBT ENGINEERING LTD.
1918 YONGE STREET
Thunder Bay, Ontario, P7E 6T9
T 807 624 5160 . F 807 624 5161

CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

PLAN - SITE GRADING

SCALE: 1:300

LEGEND

- FINISHED GRADE ELEVATION
- EXISTING ELEVATION
- SLOPE DIRECTION
- REMOVAL
- NEW ASPHALT (DETAIL 'A')
- NEW ASPHALT (DETAIL 'B')
- NEW CONCRETE
- REINSTATE ASPHALT (DETAIL 'F')
- NEW GRAVEL SURFACE
- TOP OF CUT
- DITCH WITH FLOW DIRECTION
- CHAINLINK FENCE
- FIRE HYDRANT
- CATCH BASIN
- MANHOLE
- WATER VALVE
- 0.2m CONTOUR (DESIGN)
- EXISTING STORM SEWER
- NEW STORM SEWER
- NEW CATCH BASIN
- NEW MANHOLE
- NEW FIRE HYDRANT
- NEW WATER MAIN
- SANITARY SEWER
- NEW WATER VALVE AND BOX
- PROPERTY LINE
- ROOF DRAINS

NORTH

GENERAL NOTES:

1. ALL DRAWING DIMENSIONS AND ELEVATIONS ARE METRES OR MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ANY TEMPORARY DISRUPTION TO EXISTING SERVICES SHALL BE COORDINATED WITH THE TOWN OF MARATHON.
3. THE CONTRACTOR SHALL OBTAIN PERMITS FROM TOWN OF MARATHON PRIOR TO CONSTRUCTING ANY STORM, SANITARY OR WATER INFRASTRUCTURE.
4. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATION FOR CONSTRUCTION PROJECTS.
5. ALL CONSTRUCTION, MATERIALS AND WORKMANSHIP IS TO BE CARRIED OUT IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE.
6. EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. PRIOR TO COMMENCING ANY EXCAVATION, THE EXCAVATOR MUST OBTAIN UTILITY LOCATES FOR THE ENTIRE WORK AREA BY CONTACTING ONTARIO ONE CALL. IN SOME CASES 3RD PARTY INSPECTION MAY BE REQUIRED BY THE UTILITY OWNER, E.G. HIGH PRESSURE GAS LINES.
7. ANY MODIFICATION REQUIRED TO LIGHTING, HYDRO, OR TELECOMMUNICATIONS CABLES, MANHOLES AND POLES MUST BE COMPLETED BY THE UTILITY OWNER. CONTRACTOR TO CO-OPERATE WITH UTILITY COMPANIES DURING CONSTRUCTION WITH ATTENTION GIVEN TO SCHEDULE OF WORK.
8. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY GROUNDS, FENCES, BUILDINGS OR EQUIPMENT DAMAGED DURING EXECUTION OF WORK RESTORE TO EXISTING CONDITIONS OR BETTER.
9. ELEVATIONS PROVIDED AT CURB AND ASPHALT INTERFACE REPRESENT TOP OF ASPHALT SURFACE ELEVATION.
10. ALL GRANULAR TO BE COMPACTED AS PER OPSS MUNI 501 NOV 2017.

SANITARY SEWER NOTES:

1. CONTRACTOR TO CONFIRM INVERTS OF EXISTING SEWERS AND WATER MAINS PRIOR TO CONSTRUCTION.

NOT FOR CONSTRUCTION

Revision	Date
A	07/29/2022
ISSUED FOR TENDER & PERMIT	

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. C. BOWES
100145093
07-28-2022
PROVINCE OF ONTARIO

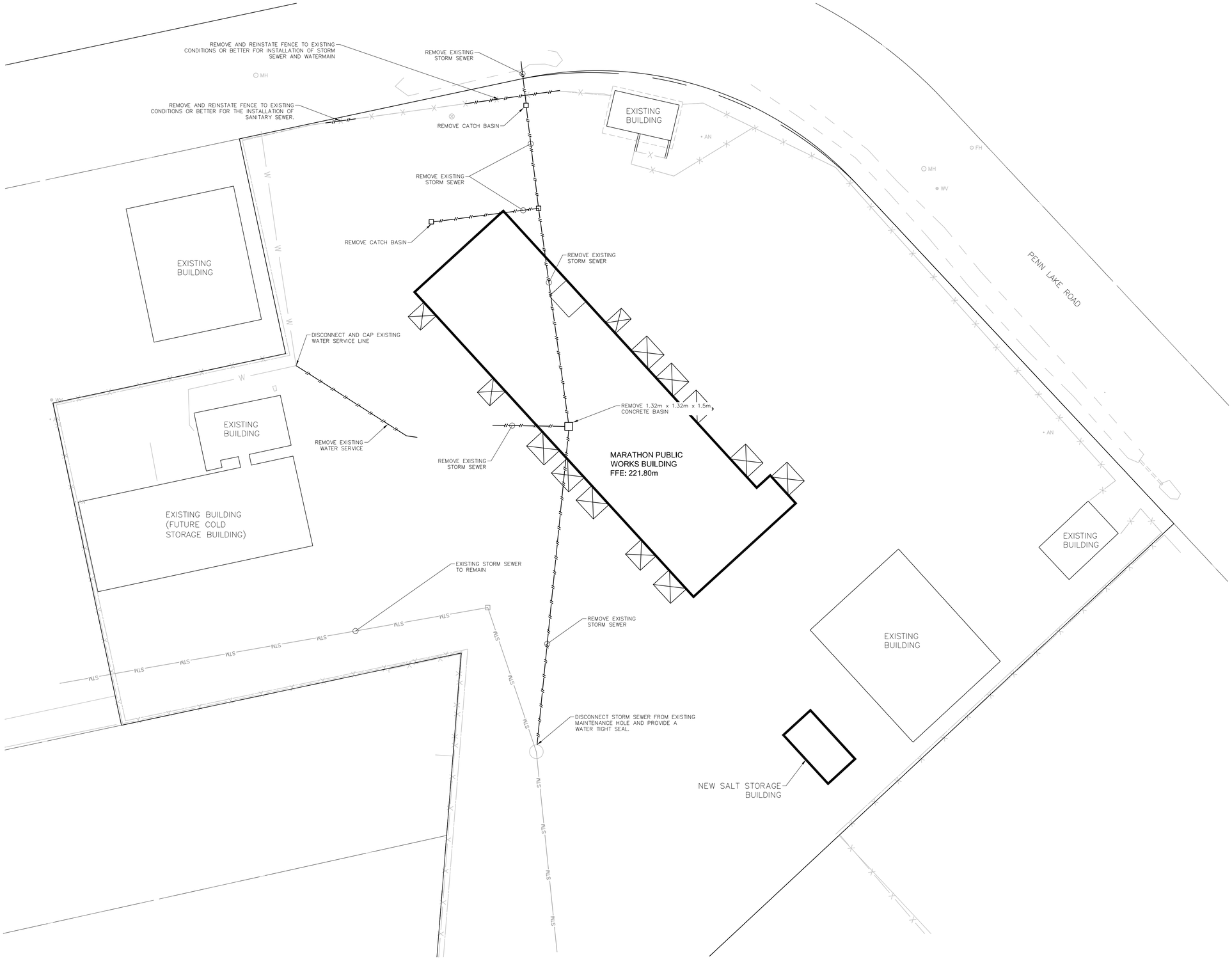
CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
MARATHON, ON

Drawing Title:
SITE GRADING AND DRAINAGE PLAN

Drawn By:	Checked By:
BS	MP
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 28, 2022	
Drawing No: C1	



PLAN REMOVALS
SCALE: 1:300

LEGEND

- FINISHED GRADE ELEVATION
- EXISTING ELEVATION
- SLOPE DIRECTION
- REMOVAL
- NEW ASPHALT (DETAIL 'A')
- NEW ASPHALT (DETAIL 'B')
- NEW CONCRETE
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- NEW GRAVEL SURFACE
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- DITCH WITH FLOW DIRECTION
- CLF CHAINLINK FENCE
- FH FIRE HYDRANT
- CB CATCH BASIN
- MH MANHOLE
- WV WATER VALVE
- 260.0 0.2m CONTOUR (DESIGN)
- STM EXISTING STORM SEWER
- STM NEW STORM SEWER
- CB NEW CATCH BASIN
- MH NEW MANHOLE
- FH NEW FIRE HYDRANT
- W WATER MAIN
- SAN SANITARY SEWER
- NEW WATER VALVE AND BOX
- PROPERTY LINE
- ROOF DRAINS

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07-28-2022
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ARCHITECTURE

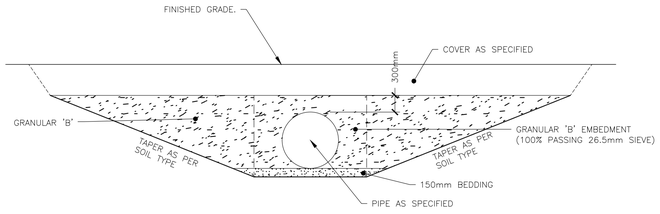
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
MARATHON, ON

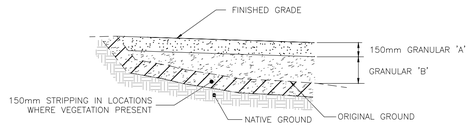
Drawing Title:
REMOVALS

Drawn By:	Checked By:
BS	MP
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 28, 2022	

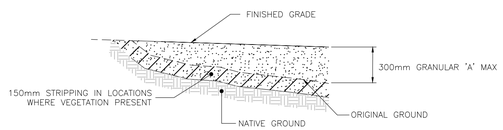
Drawing No:
C2



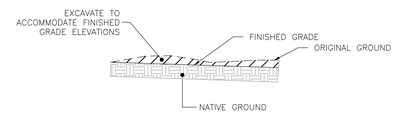
SANITARY, STORM AND WATERMAIN TRENCH REINSTATEMENT
N.T.S.



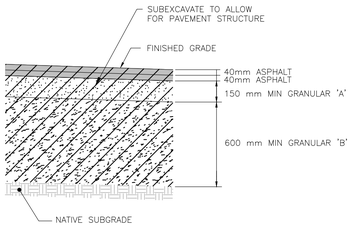
TYPICAL – FILL GREATER THAN 300mm
N.T.S.



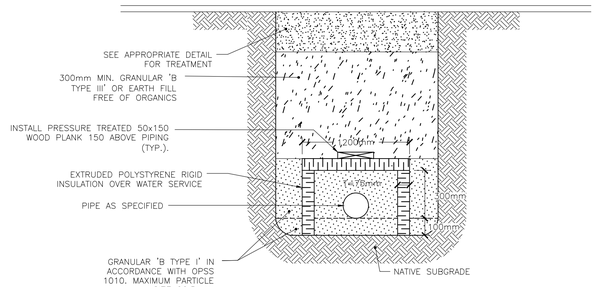
TYPICAL – FILL DEPTH LESS THAN 300mm
N.T.S.



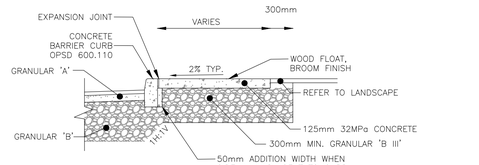
TYPICAL – CUT AREA
N.T.S.



DETAIL 'A' – PAVEMENT STRUCTURE
N.T.S.



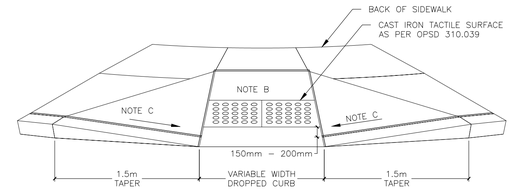
DETAIL 'B' – SERVICE INSULATION
N.T.S.



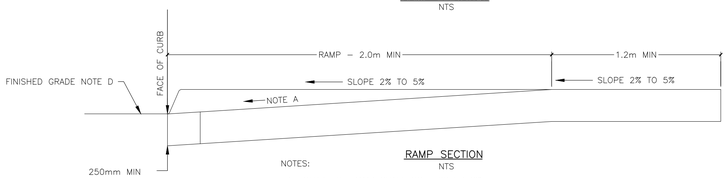
NOTES:
1. REFER TO DRAWINGS FOR JOINT LAYOUT.
2. SAWCUT WITHIN 48 HOURS OF POUR.
3. NO TOOLED EDGES

NOTES:
1. REFER TO DRAWINGS FOR JOINT LAYOUT.
2. SAWCUT WITHIN 48 HOURS OF POUR.
3. NO TOOLED EDGES

DETAIL 'D' – TYPICAL CONCRETE SIDEWALK
N.T.S.

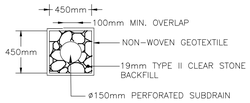


RAMP ELEVATION
NTS

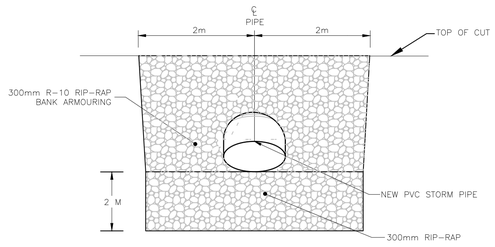


NOTES:
A. SLOPE OF RAMP SHALL NOT EXCEED 8%.
B. CROSS SLOPE OF RAMP SHALL NOT EXCEED 2% IN EITHER DIRECTION.
C. CROSS SLOPE OF FLARED SIDE OF RAMP SHALL NOT EXCEED 8%.
D. ENSURE FLUSH TRANSITION FROM ASPHALT TO RAMP.

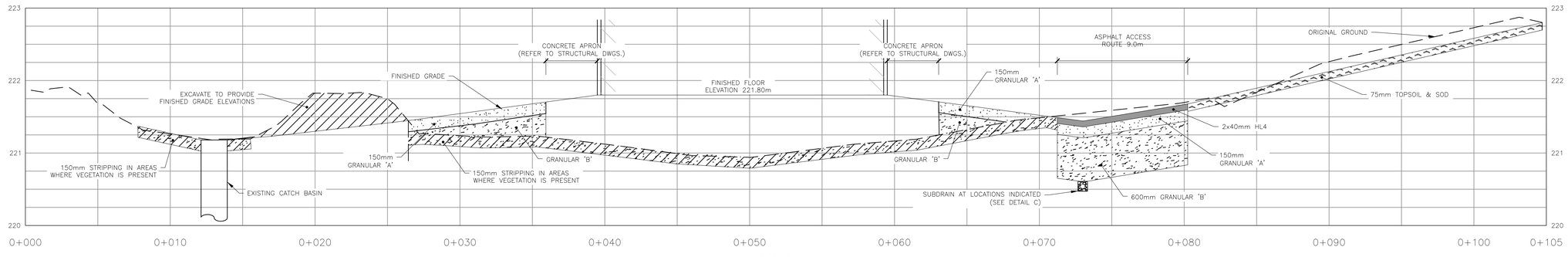
DETAIL 'E' – RAMP
N.T.S.



DETAIL 'C' SUBDRAIN
N.T.S.



DETAIL 'F'–STORM PIPE EROSION PROTECTION
N.T.S.



SECTION 1

NOT FOR CONSTRUCTION

NORTH

Revision	Date
A	07/29/2022
ISSUED FOR TENDER & PERMIT	

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07-28-2022
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ARCHITECTURE

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Drawn By:	Checked By:
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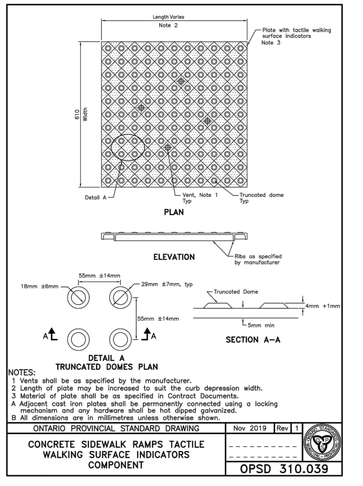
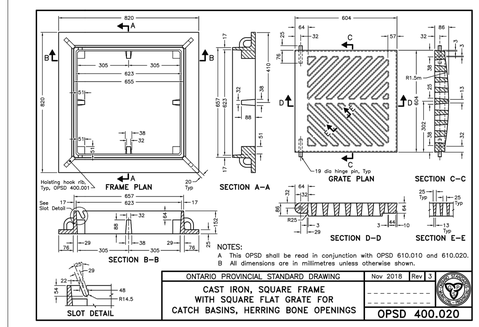
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 28, 2022	

Drawing No:
C3



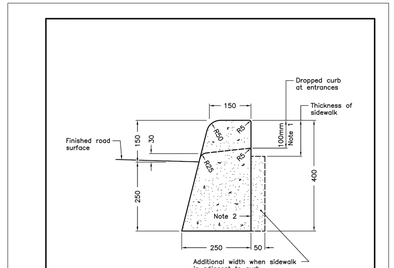
NOTES:
1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
3 Material of plate shall be as specified in Contract Documents.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dip galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 1
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT		OPSD 310.039



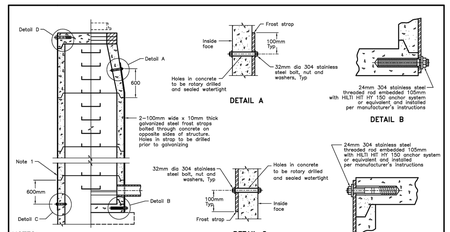
NOTES:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		OPSD 400.020



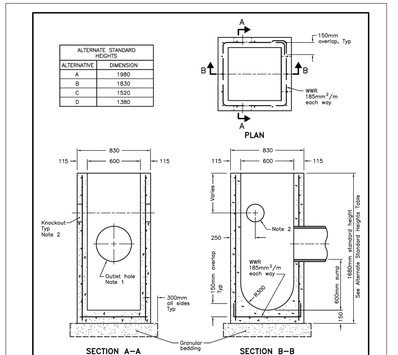
NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with gulde rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		OPSD 600.110



NOTES:
1 Depth of frost strap shall be as specified.
A Frost straps shall be placed so they do not interfere with sewer pipe openings and the steps.
B Frost straps shall be placed when specified.
C Galvanizing shall be according to CAN/CSA G164.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
FROST STRAP INSTALLATION		OPSD 701.100



NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010

NOTES:
1 Outlet hole size 525mm maximum diameter, location as required.
A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope shall be 6H:1V or flatter.
B Centre reinforcing in wall and slab ±25mm.
C Granular backfill shall be placed to a minimum thickness of 300mm all around the ditch inlet.
D Lifting devices shall be according to OPSD 403.010.
E Pipe support shall be according to OPSD 708.020.
F All dimensions are nominal.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE DITCH INLET 600 x 600mm		OPSD 705.030

SOILS WITH TYPICAL BEARING STRENGTH OF 100 TO 199 kPa

PIPE DIA	Dimensions a	b	c	d'
100	150	250	200	200
150	250	400	250	300
200	400	550	300	450
250	550	650	400	500
300	650	800	450	650
350	700	900	550	700
400	900	1050	650	850

SOILS WITH TYPICAL BEARING STRENGTH OF 200 TO 299 kPa

PIPE DIA	Dimensions a	b	c	d'
100	150	200	150	150
150	250	250	200	200
200	400	250	250	300
250	500	450	300	350
300	650	500	350	400
350	700	600	400	500
400	900	750	450	600

SOILS WITH TYPICAL BEARING STRENGTH OF 300 kPa AND OVER

PIPE DIA	Dimensions a	b	c	d'
100	150	150	150	150
150	250	200	200	200
200	400	300	200	250
250	550	400	250	300
300	650	450	300	300
350	700	550	350	350
400	900	650	350	450

NOTES:
A Concrete shall be placed to within 50mm of the face of the bell.
B Bond breaker shall be used between concrete and fittings.
C The above thrust block dimensions meet or exceed the MECP Watermain Design Criteria for Future Alterations Authorized Under a Drinking Water Works Permit.
D The assumptions made for the above calculations are:
– Maximum operating pressure of 690 kPa,
– Maximum surge pressure with a flow velocity change of 0.6 m/s of 790 kPa for Class 52 DI pipe and 240 kPa for PVC pipe.
E The tables apply to both ductile iron and PVC pipe. When one length exceeded the other, the longer length was used.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CONCRETE THRUST BLOCKS FOR TEES, PLUGS, AND HORIZONTAL BENDS		OPSD 1103.010

NOTES:
A Concrete shall be placed to within 50mm of the face of the bell.
B Bond breaker shall be used between concrete and fittings.
C This blocking is for bends up to 45° for up–thrust and 90° for down–thrust.
D This OPSD shall be read in conjunction with OPSD 1103.021.
E All stainless steel to be type 316.
F Stainless steel rods and nuts to be designed based on actual watermain diameter and surge pressure.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 4
CONCRETE THRUST BLOCKS FOR VERTICAL BENDS		OPSD 1103.020

SOILS WITH TYPICAL BEARING STRENGTH OF 100 TO 199 kPa

PIPE DIA	Note 1 a	b	c	d'	e
100	450	600	750	13	150
150	600	900	900	13	300
200	600	900	1500	13	450
250	900	900	1500	20	600
300	1200	900	1650	20	800
350	1200	1200	1650	25	1000
400	1300	1300	1750	30	1000

SOILS WITH TYPICAL BEARING STRENGTH OF 200 TO 299 kPa

PIPE DIA	Note 1 a	b	c	d'	e
100	450	600	750	13	150
150	600	900	900	13	300
200	600	900	1500	13	450
250	900	900	1500	20	600
300	1200	900	1650	20	800
350	1200	1200	1650	25	1000
400	1300	1300	1750	30	1000

SOILS WITH TYPICAL BEARING STRENGTH OF 300 kPa AND OVER

PIPE DIA	Note 1 a	b	c	d'	e
100	450	600	750	13	150
150	600	900	900	13	300
200	600	900	1500	13	450
250	900	900	1500	20	600
300	1200	900	1650	20	800
350	1200	1200	1650	25	1000
400	1000	1300	1750	30	1000

NOTES:
1 The dimensions are as specified in OPSD 1103.020.
A The above thrust block dimensions meet or exceed the MECP Watermain Design Criteria for Future Alterations Authorized Under a Drinking Water Works Permit.
B The assumptions made for the above calculations are as follows:
– Maximum operating pressure of 690 kPa,
– Maximum surge pressure with a flow velocity change of 0.6 m/s of 790 kPa for Class 52 DI pipe and 240 kPa for PVC pipe.
C The tables apply to both ductile iron and PVC pipe. When one length exceeded the other, the longer length was used.
D This OPSD shall be read in conjunction with OPSD 1103.020.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 1
DIMENSION TABLES FOR CONCRETE THRUST BLOCKS FOR VERTICAL BENDS		OPSD 1103.021

NOTES:
1 All concrete thrust blocks shall be poured against undisturbed ground.
2 When specified, for watermains 400mm and less, locate valve within 1.0m of centreline of watermain. Retaining and restraining devices shall be utilized. For watermains 600mm and over, bolt valve with flanged end directly to flanged tee.
3 Retaining and restraining devices shall be as specified.
A Bond breaker shall be used between the concrete and the fittings and appurtenances.
B Bolts and nuts for buried flange to flange connections shall be stainless steel.
C When required, flange of standpipe extensions shall not be in frost zone.
D This OPSD shall be read in conjunction with OPSD 1103.010 and 1103.020.
E Backfill material within 500mm of service box shall be native or imported, as specified.
F Tracer wire shall be installed as specified.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
HYDRANT INSTALLATION		OPSD 1105.010

NOTES:
1 Anode shall be placed at least 1.0m away from the water system pipe and appurtenances and as deep as the bottom of the pipe and appurtenances. Minimum distance between anodes shall be 1.0m.
2 Anode connecting wire shall be loosely wrapped around pipes and fittings and knotted.
3 Protective coating shall be applied to all thermite welds.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS		OPSD 1109.011

NOT FOR CONSTRUCTION

NORTH

No.	Date	Revision
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CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

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TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
MARATHON, ON

Drawing Title:
SITE GRADING AND DRAINAGE PLAN

Drawn By:	Checked By:
BS	MP
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 28, 2022	
Drawing No: C4	

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3. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS, INVERTS AND ELEVATIONS ON SITE PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE CONSULTANT.
4. CONTRACTOR TO OBTAIN AND PAY FOR ALL REQUIRED PERMITS.
5. THE CONTRACTOR SHALL PROVIDE QUALIFIED PERSONNEL TO LAYOUT AND ESTABLISH ALL LINES AND GRADES NECESSARY FOR CONSTRUCTION. HORIZONTAL AND VERTICAL CONTROL SHALL BE ESTABLISHED USING THE INDICATED CONTROL POINTS.
6. PRIOR TO COMMENCING ANY EXCAVATION, THE EXCAVATOR MUST OBTAIN UTILITY LOCATES FOR THE ENTIRE WORK AREA.
7. CONTRACTOR TO MAINTAIN CLEAN WORK AREA AND PREVENT MATERIAL AND DEBRIS FROM BEING TRACKED ONTO ROADS.
8. CONTRACTOR TO MAKE GOOD ANY DAMAGE TO EXISTING FEATURES.
9. TRAFFIC RESTRICTIONS REQUIRED FOR PUBLIC THOROUGHFARES SHALL BE APPROVED BY THE ROAD AUTHORITY. PROVIDE AT LEAST SEVEN DAYS NOTICE PRIOR TO ANY TRAFFIC RESTRICTIONS. ALL TRAFFIC CONTROL IN ACCORDANCE TO ONTARIO TRAFFIC MANUAL BOOK 7.
10. DISPOSE AND MANAGE SURPLUS MATERIALS IN ACCORDANCE WITH OPSS 180 AND O. REG 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT.

ROADS & TRAFFIC CONTROL NOTES:

1. WHEN PUBLIC THOROUGHFARES ARE TO BE CLOSED, OR TRAFFIC RESTRICTED, NOTIFY THE ROAD AUTHORITY, THE FIRE DEPARTMENT, THE POLICE DEPARTMENT, THE TRANSIT AUTHORITY AND AMBULANCE SERVICE, GIVING AT LEAST SEVEN DAYS NOTICE OF THE CLOSING OR RESTRICTION.
2. CLOSE THOROUGHFARES OR RESTRICT NORMAL TRAFFIC FLOW ONLY WITH THE CONSENT OF THE AUTHORITIES HAVING JURISDICTION, AND IN ACCORDANCE WITH THEIR REQUIREMENTS.

EROSION AND SEDIMENT CONTROL

1. PROVIDE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES TO PREVENT SOIL EROSION AND DISCHARGE OF SOIL-BEARING WATER RUNOFF OR AIRBORNE DUST TO ADJACENT PROPERTIES AND WALKWAYS.
2. IMPLEMENTATION, INSPECTION, MAINTENANCE AND REMOVAL OF EROSION AND SEDIMENT CONTROLS MEASURES SHALL BE IN ACCORDANCE WITH OPSS 805. ALTERNATIVE MATERIALS OR METHODS ARE ACCEPTABLE PROVIDED THEY MEET INDUSTRY STANDARDS AND PROTECT THE ENVIRONMENT FROM THE IMPACTS OF EROSION AND SEDIMENTATION.
3. INSPECT, REPAIR, AND MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION UNTIL PERMANENT VEGETATION HAS BEEN ESTABLISHED.
4. REMOVE EROSION AND SEDIMENTATION CONTROLS AND RESTORE AND STABILIZE AREAS DISTURBED DURING REMOVAL.

DEMOLITION/REMOVALS

1. INFRASTRUCTURE DESIGNATED FOR REMOVALS SUCH AS UNDERGROUND PIPES/UTILITIES, BUILDINGS, AND STORM INFRASTRUCTURE SHALL BE BACKFILLED WITH GRANULAR B TYPE I AND CAPPED WITH 150mm OF GRANULAR 'A'.
2. GRANULARS SHALL BE IN ACCORDANCE WITH OPSS 1010.
3. COMPACT EACH LAYER FULL WIDTH IN ACCORDANCE WITH OPSS 501. COMPACT GRANULAR MATERIAL TO 98% SPMDD. GRANULAR MATERIAL SHALL BE PLACED IN MAXIMUM COMPACTED LIFT THICKNESS OF 300 MM.

STORM SEWER:

1. SUPPLY AND INSTALL STORM SEWER PIPE AS SPECIFIED. ALL WORK MUST BE SUPERVISED BY A LICENSED PLUMBER.
2. ALL STORM SEWER MATERIAL AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE TYPE PSM POLY VINYL CHLORIDE (PVC): TO CSA-B182.2.
   .1 STANDARD DIMENSIONAL RATIO (SDR): 35.
   .2 LOCKED-IN GASKET AND INTEGRAL BELL SYSTEM.
   .3 NOMINAL LENGTHS: 4 – 6 M.
3. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO THE CONSULTANT FOR REVIEW.
4. GRANULAR MATERIALS SUPPLIED IN ACCORDANCE WITH OPSS 1010 TABLE 2. GRANULAR MATERIAL SHALL BE KEPT FREE FROM CLAY AND OTHER TYPES OF DELETERIOUS MATERIAL.
5. EXCAVATE TO PROVIDE INVERT ELEVATIONS SHOWN.
6. BEDDING AND PIPE SURROUND MATERIAL SHALL BE GRANULAR B TYPE III WITH A MAXIMUM PARTICLE SIZE OF 26.5MM
7. MAXIMUM DRY DENSITY (MDD) SHALL BE DETERMINED USING LS-706 OR ASTM D698. GRANULAR MATERIALS SHALL BE COMPACTED TO A DENSITY OF 98% OF THE MDD.
8. CONTRACTOR SHALL SUPPLY AND CONSTRUCT MAINTENANCE HOLES AND CATCH BASINS WITH HEIGHTS THAT ACHIEVE FINISHED GRADES SPECIFIED. CATCH BASINS REQUIRING ADDITIONAL RISER SECTIONS SHALL BE DESIGNED WITH FROST STRAPS OR BE SUPPLIED AS SINGLE PRECAST UNITS. LOCATION AND ANGLE OF INLET AND OUTLET HOLE TO SUIT NOTED INVERTS. NEW CATCH BASINS TO BE INSTALLED WITH GRATES AS PER OPSD 400.020 UNLESS SPECIFIED OTHERWISE. DITCH INLET CATCH BASINS TO BE INSTALLED WITH GRATES AS PER OPSD 403.010.
9. ENSURE ALL CONNECTIONS TO CATCH BASINS ARE WATERTIGHT AND AS PER OPSS 407.
10. CONTRACTOR SHALL REMOVE AND REINSTATE FENCE ALONG PENN LAKE ROAD TO FACILITATE STORM SEWER INSTALLATION.
11. CONTRACTOR SHALL PAY FOR AND OBTAIN PLUMBING PERMITS FROM THE TOWN OF MARATHON BUILDING SERVICES DIVISION FOR INSTALLATION OF ON-SITE CATCH BASINS AND STORM SEWER WORKS.
12. CONTRACTOR SHALL CONTACT THE TOWN OF MARATHON FOR CONSULTATION AND SCHEDULE INSPECTIONS PRIOR TO BACKFILL OF STORM SEWER.

PIPE CULVERTS

1. CORRUGATED STEEL PIPE (CSP) PRODUCTS SHALL BE ACCORDING TO CSA G401. COATING SHALL BE GALVANIZED. MINIMUM WALL THICKNESS 2.0 mm. CERTIFIED CORRUGATED STEEL PIPE SHALL BE MARKED ACCORDING TO CSA G401, ALONG WITH THE LOGO OF THE CERTIFICATION BODY AND NAME OF THE PIPE MANUFACTURER.
2. MANUFACTURER'S RECOMMENDATIONS FOR TRANSPORTING, UNLOADING, STORING, AND HANDLING OF PIPE, SHALL BE FOLLOWED.
3. GRANULAR BEDDING, EMBEDMENT SHALL BE GRANULAR A OR GRANULAR B WITH 100% PASSING THE 26.5MM SIEVE ACCORDING TO OPSS 1010. GRANULAR TO BE PLACED IN UNFROZEN CONDITION.
4. THE CONTRACTOR SHALL FIELD FIT CULVERT INVERTS TO REFLECT ON SITE CONDITIONS. THE CONTRACT ADMINISTRATOR SHALL APPROVE THE INSTALLATION PRIOR TO BACKFILLING.
5. DEWATER THE EXCAVATION, AS NECESSARY, TO ALLOW PLACEMENT OF CULVERT BEDDING IN DRY CONDITION. PLACE MINIMUM THICKNESS OF 150 mm OF GRANULAR A MATERIAL ON BOTTOM OF EXCAVATION AND COMPACT. SHAPE BEDDING TO FIT LOWER SEGMENT OF PIPE EXTERIOR SO THAT WIDTH OF AT LEAST 50% OF PIPE DIAMETER IS IN CLOSE CONTACT WITH BEDDING.
6. BEGIN PIPE PLACING AT DOWNSTREAM END. ENSURE BOTTOM OF PIPE IS IN CONTACT WITH SHAPED BED OR COMPACTED FILL THROUGHOUT ITS LENGTH. LAY PIPE WITH OUTSIDE CIRCUMFERENTIAL LAPS FACING UPSTREAM AND LONGITUDINAL LAPS OR SEAMS AT SIDE OR QUARTER POINTS. DO NOT ALLOW WATER TO FLOW THROUGH PIPES DURING CONSTRUCTION EXCEPT AS PERMITTED BY CONTRACT ADMINISTRATOR.
7. CORRUGATED STEEL PIPE SECTIONS SHALL BE JOINED BY MEANS OF STEEL COUPLERS. THE COUPLERS SHALL BE INSTALLED TO LAP APPROXIMATELY EQUAL PORTIONS OF THE PIPE BEING CONNECTED SO THAT THE CORRUGATIONS OR PROJECTIONS OF THE COUPLER PROPERLY ENGAGE THE PIPE CORRUGATIONS. AS THE COUPLER IS BEING TIGHTENED, IT SHALL BE TAPPED WITH A MALLET TO TAKE UP THE SLACK. REPAIR SPOTS WHERE DAMAGE HAS OCCURRED TO GALVANIZED COATING BY APPLYING TWO COATS OF ZINC RICH PAINT.
8. PLACE AND COMPACT GRANULAR A EMBEDMENT AND COVER IN 150 mm LAYERS TO FULL WIDTH, ALTERNATELY ON EACH SIDE OF CULVERT, SO AS NOT TO DISPLACE IT LATERALLY OR VERTICALLY.
9. GRANULAR BACKFILL SHALL BE PLACED AND COMPACTED IN UNIFORM LAYERS NOT EXCEEDING 300 mm IN THICKNESS, LOOSE MEASUREMENT, FOR THE FULL WIDTH OF THE TRENCH
10. PROTECT INSTALLED CULVERT WITH MINIMUM 300 mm COVER OF COMPACTED FILL BEFORE HEAVY EQUIPMENT IS PERMITTED TO CROSS.

SANITARY SEWER NOTES:

1. SUPPLY AND INSTALL 150MM DIAMETER PVC SANITARY SEWER SERVICE TO EXTENTS SHOWN.
2. INVERT OF EXISTING SANITARY MAINTNENANCE HOLE AT CONNECTION POINT IS APPROXIMATE.
3. CONFIRM INVERT AT EXISTING SANITARY MAINTENANCE HOLE PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL SUPPLY AND CONSTRUCT MAINTENANCE HOLES WITH HEIGHTS THAT ACHIEVE FINISHED GRADES SPECIFIED. LOCATION AND ANGLE OF INLET AND OUTLET HOLE TO SUIT NOTED INVERTS.
5. CONNECTION TO EXISTING SANITARY SANITARY MAINTENANCE HOLE TO BE WATERTIGHT AND AS PER OPSS 407.
10. THE MINIMUM DEPTH OF COVER IS 2.5M. WHERE THIS DEPTH IS NOT ACHIEVED THE SANITARY SHALL BE INSULATED AS PER DETAIL 'B'.
11. TYPE PSM POLYVINYL CHLORIDE (PVC): TO CSA_B182.2.
   -- STANDARD DIMENSIONAL RATIO (SDR): 28.
   -- LOCKED_IN GASKET AND INTEGRAL BELL SYSTEM.
   -- NOMINAL LENGTHS: 4 – 6 M.
12. PIPE BEDDING AND SURROUND GRANULAR B TO OPSS 1010 WITH MAXIMUM PARTICLE SIZE OF 26.5MM.
13. COMPACT EACH LAYER FULL WIDTH OF BED IN ACCORDANCE WITH OPSS 501. COMPACT GRANULAR MATERIAL TO 98% SPMDD.
14. TIE INS TO EXISTING SANITARY MAINTENANCE HOLE WILL BE COMPLETED BY THE CONTRACTOR AND SHALL BE COORDINATED WITH THE TOWN OF MARATHON.
15. CONTRACTOR SHALL REINSTATE ROADWAY GRANULAR, FENCE AND ASPHALT TO COMPLETE TIE IN WORK.

WATERMAIN NOTES:

1. PIPE SHALL BE INSTALLED AS PER OPSS 441
2. INSTALL THRUST BLOCKS AS NECESSARY IN ACCORDANCE WITH OPSS 441.
3. CONTRACTOR TO PERFORM CHLORINATION, PRESSURE TEST AND FLUSH NEW PIPING AS PER REQUIREMENTS OF OPSS 441.
4. CONNECTION TO EXISTING WATERMAIN TO BE APPROVED SADDLE OR TEE.
5. PIPE BEDDING AND SURROUND GRANULAR B TO OPSS 1010 WITH MAXIMUM PARTICLE SIZE OF 26.5MM.
6. COMPACT EACH LAYER FULL WIDTH OF BED IN ACCORDANCE WITH OPSS 501. COMPACT GRANULAR MATERIAL TO 98% SPMDD.
7. TIE INS TO EXISTING WATERMAIN WILL BE COMPLETED BY THE CONTRACTOR AND SHALL BE COORDINATED WITH THE TOWN OF MARATHON.
8. MUELLER VALVE AND VALVE BOX APPROVED BY THE TOWN OF MARATHON AND CONSULTANT.
9. FIRE HYDRANT SHALL BE AS IN ACCORDANCE WITH AWWA C502 AND BE APPROVED BY THE TOWN OF MARATHON AND CONSULTANT.
10. THE MINIMUM DEPTH OF COVER IS 2.15M. WHERE THIS DEPTH IS NOT ACHIEVED THE WATER SERVICE SHALL BE INSULATED AS PER DETAIL 'B'.
11. PVC PIPE: ANSI/AWWA C900 DR18. FLEXIBLE ELASTOMERIC SEALS FOR BELL AND SPIGOT JOINTS SHALL BE ACCORDING TO ASTM D3139.
12. POLYVINYL CHLORIDE PRESSURE PIPE FITTINGS: INJECTION MOULDED POLYVINYL CHLORIDE, BLUE IN COLOUR AND ACCORDING TO AWWA C907 AND CSA B137.2
13. THAW/TRACER WIRE SHALL BE FOURTEEN (14) GAUGE TW SOLID COPPER LIGHT COLOURED PLASTIC COATED.
14. INSTALL THAW / TRACER WIRE ALONG ALL NON-METALLIC WATER DISTRIBUTION PIPING. SECURE WIRE TO PIPELINE WITH ELECTRICAL TAPE AT 3 METRE INTERVALS. CADWELD WIRE TO HYDRANT BOOTS. TEST CONDUCTIVITY FOLLOWING BACKFILL OF TRENCHES.
15. ANCHORAGE AND THRUST BLOCKS: CONTRACTOR TO SUPPLY AND INSTALL CONCRETE THRUST BLOCKS AND M20 STAINLESS STEEL CLAMP, TIE RODS AND BOLTS OR APPROVED EQUAL.

EXCAVATION

1. THE WORK SHALL INCLUDE EXCAVATING, HAULING, HANDLING, SHAPING, COMPACTING, STRIPPING AND TRIMMING OF EARTH MATERIAL AND THE MANAGEMENT OF EXCAVATED MATERIAL FOR NEW CONSTRUCTION AREAS.
2. 150mm STRIPPING DEPTH IN AREAS WHERE VEGETATION IS PRESENT.
3. CONTRACTOR SHALL MANAGE EXCESS MATERIAL IN ACCORDANCE WITH O. REG. 406/19: ON-SITE AND EXCESS SOIL MANAGEMENT
4. CONTRACTOR TO CO-ORDINATE WITH THE UTILITY AUTHORITIES HAVING JURISDICTION PRIOR TO EXCAVATION OPERATIONS WITHIN CLOSE PROXIMITY OF ANY UTILITY INFRASTRUCTURE & POLES.
5. SAW CUT ASPHALT AT LATERAL REMOVAL LIMITS TO PRODUCE STRAIGHT CLEAN VERTICAL FACE.
6. STRIP TOPSOIL OVER AREAS TO BE COVERED BY GRANULAR BASE, OVER AREAS WHERE GRADE CHANGES ARE REQUIRED, AND SO THAT EXCAVATED MATERIAL MAY BE STOCKPILED WITHOUT COVERING TOPSOIL.
7. EXCAVATE TO LINES, GRADES, ELEVATIONS AND DIMENSIONS AS INDICATED FOR DITCHING AND SUBGRADE FOR ASPHALT PAVING AND GRANULAR BASE.
8. PROOF-ROLL SUBGRADE WITH FULLY LOADED TANDEM AXLE TRUCK TO DETECT SOFT AREAS OR SILT. SOFT AREAS OR SILT SHALL BE REPAIRED AS DIRECTED BY THE CONSULTANT.
9. EXCAVATION SHALL BE COMPLETED USING AN EXCAVATOR WITH A SMOOTH BLADED BUCKET AND OPERATING FROM THE EDGE OF THE EXCAVATION TO MINIMIZE DISTURBANCE TO THE EXPOSED SUBGRADE.
10. GRADE SO THAT WATER WILL DRAIN AWAY FROM BUILDINGS, WALLS AND PAVED AREAS, TO DISPOSAL AREAS INDICATED. DITCHING SHALL BE COMPLETED IN ADVANCE OF CONSTRUCTION OF GRANULAR BASE.
11. WHERE OVER EXCAVATION OCCURS, IT SHALL BE BACKFILLED WITH GRANULAR B TYPE I AND COMPACTED. WITH THE EXCEPTION OF WHERE BOULDERS ARE ENCOUNTERED IN THE EXCAVATED SLOPES, BACKFILLING SHALL NOT BE PERMITTED TO OBTAIN REQUIRED SLOPES FOR EXCAVATIONS. WHEN BOULDERS ARE ENCOUNTERED IN THE EXCAVATED SLOPES, THE BOULDERS SHALL BE REMOVED WHEN DIRECTED BY THE CONTRACT ADMINISTRATOR AND THE CAVITY BACKFILLED WITH APPROVED MATERIAL AND COMPACTED.
12. NOTIFY CONSULTANT WHEN EXCAVATIONS ARE COMPLETE AND DO NOT COMMENCE BACKFILLING UNTIL FILL MATERIAL AND SUBGRADE HAS BEEN INSPECTED AND APPROVED BY THE CONTRACT ADMINISTRATOR.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT ALL QUALITY CONTROL GRADE CHECKS TO ENSURE HORIZONTAL AND VERTICAL GRADING TOLERANCES ARE MET.
    a. VERTICAL GRADING TOLERANCE FOR TOP OF EARTH SUBGRADE: +/– 30 MM
    b. HORIZONTAL GRADING TOLERANCE FOR VERTICAL FACES OF EXCAVATIONS TO BE BACKFILLED: + 100 MM, – 0 MM
    c. VERTICAL GRADING TOLERANCE FOR DITCHING: +/– 30 MM
    d. HORIZONTAL GRADING TOLERANCE FOR DITCH INVERTS AND BACK SLOPES: +/– 300 MM

SUBDRAINS

1. HDPE PERFORATED SUBDRAIN AND PIPE FITTINGS TO OPSS 1840.
2. NON-WOVEN GEOTEXTILE TO OPSS 1860, CLASS II, FOS 75-150 MICRONS.
3. PLACE HPDE PERFORATED SUBDRAINS AS SPECIFIED AND PER OPSS 405.
4. PLACE CLASS II NON-WOVEN GEOTEXTILE AS SPECIFIED.
5. 19MM TYPE II CLEAR STONE MATERIAL AS PER OPSS 1004.

GRANULAR BASE

1. THE WORK SHALL INCLUDE THE SUPPLY, TRANSPORTATION, HAULING, PLACING, GRADING AND COMPACTION OF GRANULAR SUB-BASE AND GRANULAR BASE.
2. GRANULAR A AND GRANULAR B TYPE I ACCORDING TO OPSS 1010. MATERIAL SHALL BE KEPT FREE FROM CLAY AND OTHER TYPES OF DELETERIOUS MATERIAL. THE CONTRACTOR'S OPERATIONS SHALL NOT DISTURB UNDERLYING WORK.
3. STOCKPILE MATERIAL IN AREAS APPROVED BY THE CONSULTANT.
4. BACKFILLING AND CONSTRUCTION OF GRANULAR SUB-BASE AND BASE SHALL NOT COMMENCE UNTIL GRANULAR MATERIAL HAS BEEN APPROVED BY THE CONTRACT ADMINISTRATOR.
5. BACKFILLING AND CONSTRUCTION OF GRANULAR BASE SHALL NOT COMMENCE UNTIL SUBGRADE IS CONSTRUCTED, INSPECTED AND APPROVED BY CONSULTANT.
6. CONSTRUCT GRANULAR BASE TO DEPTH AND GRADE IN AREAS INDICATED. ENSURE NO FROZEN MATERIAL IS PLACED. PLACE MATERIAL ONLY ON CLEAN UNFROZEN SURFACE, FREE FROM SNOW AND ICE. PLACE MATERIAL USING METHODS WHICH DO NOT LEAD TO SEGREGATION OR DEGRADATION OF AGGREGATE.
7. SHAPE EACH LAYER TO SMOOTH CONTOUR AND COMPACT TO SPECIFIED DENSITY BEFORE SUCCEEDING LAYER IS PLACED. GRANULAR MATERIAL PLACED IN MAXIMUM LIFT THICKNESS OF 300 MM.
8. REMOVE AND REPLACE THAT PORTION OF LAYER IN WHICH MATERIAL BECOMES SEGREGATED DURING SPREADING.
9. FINISHED BASE SURFACE TO BE WITHIN PLUS OR MINUS 25 MM OF ESTABLISHED GRADE AND CROSS SECTION BUT NOT UNIFORMLY HIGH OR LOW. HORIZONTAL GRADING TOLERANCE FOR EXTENTS OF GRANULAR BASE: + 100 MM, – 0 MM.
10. NOTIFY CONSULTANT WHEN CONSTRUCTION OF GRANULAR BASE IS COMPLETE AND DO NOT COMMENCE PAVING UNTIL GRADES & LIMITS HAVE BEEN INSPECTED AND APPROVED BY THE CONTRACT ADMINISTRATOR.
11. SEE QUALITY CONTROL SECTION FOR TESTING REQUIREMENTS.

HOTMIX PAVING

1. THE MATERIALS USED IN THE PRODUCTION OF THE HMA SHALL BE ACCORDING TO OPSS 1150.
2. ASPHALT PAVING SHALL CONSIST HL4 COURSES AS SPECIFIED. ASPHALT CEMENT SHALL BE PGAC 52-34.
3. CONTRACTOR TO SUBMIT MIX DESIGN MINIMUM 7 DAYS PRIOR TO PAVING.
4. EQUIPMENT IN ACCORDANCE TO OPSS 310.06.
5. PRIOR TO PLACING ANY COURSE OF HMA ON A GRANULAR GRADE, A CLASS S ROLLER OF A MINIMUM OF 7 TONNES OR AN EQUIVALENT CLASS V ROLLER WITH A DRUM WIDTH OF AT LEAST 1.2 METRES SHALL BE USED TO FINISH ROLL THE GRADE AHEAD OF THE PAVER TO ENSURE A COMPACTED, SMOOTH, AND FLOAT-FREE SURFACE. ANY DISTORTION THAT WILL IMPACT THE SPECIFIED THICKNESS OF THE PAVEMENT TO BE PLACED SHALL BE REPAIRED.
6. THE TEMPERATURE OF THE HMA PRIOR TO PLACEMENT SHALL BE WITHIN THE TEMPERATURE RANGE THAT CORRESPONDS TO THE PGAC MANUFACTURER'S RECOMMENDED MIX TEMPERATURE. THE TEMPERATURE OF THE HMA IMMEDIATELY AFTER SPREADING AND PRIOR TO INITIAL ROLLING SHALL NOT BE LESS THAN 120 °C.
7. PAVING SHALL NOT BE CARRIED OUT IF THE GRANULAR BASE IS FROZEN. THE GRANULAR GRADE SHALL BE FREE OF STANDING WATER AT THE TIME OF HMA PLACEMENT.
8. PLACING OF HOT MIX ASPHALT IN ACCORDANCE TO OPSS 310.07.06.02.
9. USE OF PAVING EQUIPMENT IN ACCORDANCE TO OPSS 310.07.07.
10. LONGITUDINAL AND TRAVERSE JOINTS IN ACCORDANCE TO OPSS 310.07.11.
11. COMPACTION IN ACCORDANCE TO OPSS 310.07.12
12. EACH COURSE AFTER FINAL COMPACTION SHALL BE OF UNIFORM TEXTURE AND SHALL BE FREE OF DEFECTS SUCH AS SEGREGATION, FAT SPOTS, OIL SPILLS, AND ROLLER MARKS. DEFECTIVE AREAS SHALL BE REMOVED AND REPLACED WITH ASPHALT OF THE SAME TYPE AND COMPACTED TO NO COST TO THE OWNER AND TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
13. FINISHED GRADES SHALL BE WITHIN 25 MM OF SPECIFIED GRADES BUT NOT UNIFORMLY HIGH OR LOW.
14. SEE QUALITY CONTROL SECTION FOR TESTING REQUIREMENTS.

COMPACTION

1. THE TYPE OF COMPACTION EQUIPMENT USED SHALL BE SUITED TO THE MATERIAL TO BE COMPACTED, DEGREE OF COMPACTION REQUIRED, AND SPACE AVAILABLE.
2. GRANULAR SUBBASE MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD). GRANULAR BASE MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 98% SPMDD. THE SPMDD SHALL BE DETERMINED USING LS-706 OR ASTM D 698.
4. WATER SHALL BE APPLIED, AS NECESSARY, TO ACHIEVE THE DEGREE OF COMPACTION REQUIRED.
5. HOT MIX ASPHALT SHALL BE COMPACTED TO A MINIMUM DENISTY OF 92% BASED ON THE MAXIMUM RELATIVE DENSITY.

CONCRETE WALKS & CURBS

1. NEW SIDEWALKS AND CURB TO BE CONSTRUCTED TO ELEVATIONS INDICATED.
2. PROVIDE MINIMUM 300mm COMPACTED GRANULAR B TYPE I BENEATH CONCRETE CURBS AND SIDEWALK
3. MINIMUM 28-DAY COMPRESSIVE STRENGTH: 32 MPA
4. CONCRETE MIXES AND MATERIALS IN ACCORDANCE WITH OPSS 1350. SUBMIT PERFORMANCE BASED CONCRETE MIX DATA.
5. JOINT FILLER MATERIAL SHALL BE ASPHALT IMPREGNATED FIBREBOARD HAVING A MINIMUM OF 12 MM THICKNESS AND SHALL BE ACCORDING TO OPSS 1308, TYPE A.
6. HOT RUBBERIZED ASPHALT JOINT SEALING COMPOUND IN ACCORDANCE TO OPSS 1212.
7. CURING COMPOUND IN ACCORDANCE TO OPSS 1315.
8. CONCRETE PLACEMENT, JOINTS, FINISHING AND CURING FOR CONCRETE SIDEWALKS IN ACCORDANCE TO OPSS 351.
9. CONCRETE PLACEMENT, JOINTS, FINISHING AND CURING FOR CONCRETE CURB, GUTTERS AND SPILLWAYS AND GUTTER OUTLETS IN ACCORDANCE TO OPSS 353.
10. ALLOW CONCRETE TO CURE FOR 7 DAYS PRIOR TO BACKFILLING.
11. SEE QUALITY CONTROL FOR TESTING REQUIREMENTS.

TOPSOIL & SOD

1. EXCAVATED AND DISTURBED GRASS AREAS SHALL BE REPLACED WITH 75mm TOPSOIL AND SOD. TOPSOIL AND SOD TO BE PLACED IN ACCORDANCE WITH OPSS 802 AND OPSS 803. MAKE GOOD ALL SOFT LANDSCAPING OUTSIDE EXTENT OF CONTRACT AS REQUIRED DUE TO NEW WORK WITH NEW 75mm TOPSOIL AND SOD. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL TOPSOIL AND SOD LIMITS, NOTES AND DETAILS.

PAVEMENT MARKINGS

1. THE SCOPE OF WORK INCLUDES THE APPLICATION OF PAVEMENT MARKINGS ONTO BITUMINOUS PAVEMENT.
2. PAINT IN ACCORDANCE TO CGSB 1-GP-71. ORGANIC SOLVENT BASED TRAFFIC PAINT SHALL BE HOMOGENEOUS, AND SHALL BE WELL GROUND TO A UNIFORM SMOOTH CONSISTENCY. IT SHALL BE FREE FROM SKIN, DIRT AND OTHER FOREIGN PARTICLES, AND SHALL BE CAPABLE OF BEING SPRAYED AT THE TEMPERATURE INTENDED FOR APPLICATION. THE ORGANIC SOLVENT BASED TRAFFIC PAINT SHALL FLOW EVENLY AND SMOOTHLY AND COVER SOLIDLY WHEN APPLIED TO PAVEMENTS.
3. PAINT COLOUR: CGSB 1-GP-12C YELLOW 505-308, CGSB 1-GP-12C WHITE 513 – 301, BLUE.
4. THE EQUIPMENT TO BE USED FOR APPLICATION OR INSTALLATION OF PAVEMENT MARKINGS SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE RESPECTIVE PAVEMENT MARKING MATERIAL.
5. THE PAVEMENT SURFACE MUST BE CLEAN AND DRY. CONTAMINANTS SUCH AS DIRT, LOOSE ASPHALT PARTICLES AND OILY RESIDUE SHALL BE REMOVED PRIOR TO APPLICATION OF PAVEMENT MARKING.
6. UNLESS OTHERWISE APPROVED BY CONSULTANT, APPLY PAINT ONLY WHEN AIR TEMPERATURE IS ABOVE 5°C, WIND SPEED IS LESS THAN 40 KM/H AND NO RAIN IS FORECAST WITHIN NEXT 4 HOURS.
7. PAINT LINES TO BE OF UNIFORM COLOUR AND DENSITY WITH SHARP EDGES.
   DO NOT THIN PAINT UNLESS APPROVED BY CONSULTANT.

QUALITY CONTROL

1. ALL MATERIALS AND WORKMANSHIP SUBJECT TO THE INSPECTION AND APPROVAL OF THE CONSULTANT.
2. CONTRACTOR TO RETAIN A CCIL CERTIFIED LAB FOR QUALITY CONTROL TESTING (QC) . QC MATERIAL TESTS SHALL BE USED FOR THE PURPOSE OF ACCEPTANCE.
3. CONTRACTOR IS RESPONSIBLE FOR COSTS ASSOCIATED WITH ADDITIONAL TESTING DUE TO FAILED RESULTS. MATERIAL REPRESENTED BY FAILED TESTS MAY BE REJECTED AND REMOVED FROM SITE AT NO COST TO THE OWNER.
4. CONTRACTOR TO OBTAIN SAMPLES AND PROVIDE CLEAN SAMPLE BAGS. ALL SAMPLING SHALL BE WITNESSED BY THE CONSULTANT.
5. QUALITY CONTROL (QC) DENSITY TESTING TO ENSURE GRANULAR MATERIALS ARE COMPACTED ACCORDING TO THE REQUIREMENTS. COMPACTION TESTING SHALL BE DONE FOR EACH LIFT OF GRANULAR A & GRANULAR B. MINIMUM OF FOUR LOTS PER LIFT OF MATERIAL. MINIMUM FOUR TESTS PER LOT.
6. A MINIMUM OF FOUR SAMPLES OF GRANULAR B AND TWO OF GRANULAR A TO BE TAKEN AT RANDOM FOR TESTING GRADATION REQUIREMENTS IN ACCORDANCE WITH OPSS 1010. SAMPLE SIZES AS PER OPSS 1010.
7. ONE LOOSE MIX ASPHALT SAMPLE (QC & REF) TO BE TAKEN FOR EACH DAY OF PAVING FOR TESTING ASPHALT CEMENT CONTENT AND GRADATION. SAMPLING AS PER OPSS 310.
8. ONE 7 DAY CYLINDER, TWO 28 DAY CYLINDERS AND A HOLD TO BE TAKEN PER DAY OF CONCRETE POURING FOR TESTING COMPRESSIVE STRENGTH. ADDITIONAL SET TO BE TAKEN IF DAILY POURED QUANTITY EXCEEDS 100 M3. QC CONCRETE FIELD TESTING AND FREQUENCY TO BE DONE IN ACCORDANCE TO OPSS 1350.
9. ALL TEST RESULTS SHALL BE PROVIDED TO THE CONSULTANT WITHIN 24 HOURS.

OPSS REFERENCES

OPSS 180 GENERAL SPECIFICATION FOR THE MANAGEMENT OF EXCESS MATERIALS NOVEMBER 2016

OPSS 310 CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT NOVEMBER 2017

OPSS 441 CONSTRUCTION SPECIFICATION FOR WATERMAIN INSTALLATION IN OPEN CUT NOVEMBER 2021

OPSS 501 CONSTRUCTION SPECIFICATION FOR COMPACTING NOVEMBER 2017

OPSS 802 CONSTRUCTION SPECIFICATION FOR TOPSOIL NOVEMBER 2019

OPSS 803 CONSTRUCTION SPECIFICATION FOR SODDING APRIL 2018

OPSS 805 CONSTRUCTION SPECIFICATION FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES NOVEMBER 2021

OPSS 1010 MATERIAL SPECIFICATION FOR AGGREGATES-BASE, SUBBASE, SELECT SUBGRADE AND BACKFILL MATERIAL NOVEMBER 2013

OOPSS 1150 MATERIAL SPECIFICATION FOR HOT MIX ASPHALT NOVEMBER 2020

OTHER STANDARDS REFERENCED IN THE ABOVE SHALL ALSO APPLY TO THIS CONTRACT.

NOT FOR CONSTRUCTION

NORTH

Revision	Date
A ISSUED FOR TENDER & PERMIT	07/29/2022

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. C. BOWES
100145093
07-28-2022
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
MARATHON ON

Drawing Title:
SITE GRADING AND DRAINAGE PLAN

Drawn By:	Checked By:
BS	MP
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 28, 2022	

Drawing No:
C5

GENERAL NOTES PARTITION AND FURRING SCHEDULES

1. ALL NON–LOADBEARING CONCRETE MASONRY UNITS (CMU) ON THIS PROJECT WILL BE CONCRETE TYPE 'LIGHT–WEIGHT' (L2 20S) IN ORDER TO ACHEIVE THE REQUIRED FIRE RESISTANCE RATINGS. REFER TO STRUCTURAL DRAWINGS FOR SPECIFICATIONS OF ALL LOADBEARING MASONRY.
2. FOR LOCATION AND EXTENT OF ALL INTERIOR PARTITIONS AND FURRING REFER TO FLOOR PLANS, A2 SERIES OF DRAWINGS.
3. ALL CONCRETE UNIT MASONRY PARTITIONS NOT TAGGED ON FLOOR PLANS SHALL BE ASSUMED TO BE PARTITION TYPE 'P1'.
4. COORDINATE ALL REQUIRED CONCRETE UNIT MASONRY BETWEEN ARCHITECTURAL AND STRUCTURAL ENGINEERING DRAWINGS. ANY DISCREPANCIES BETWEEN THE ARCHITECTURAL AND STRUCTURAL DRAWINGS BETWEEN BLOCK SIZES THE STRUCTURAL DRAWINGS SHALL GOVERN.
5. THIS SCHEDULE IS TO BE READ IN CONJUNCTION WITH THE FIRE SEPARATION DRAWINGS. ALL PARTITIONS THAT COMPOSE A FIRE SEPARATION SHALL BE CONSTRUCTED AND SEALED IN ACCORDANCE TO DETAILS IN LIEU OF DETAILS THIS SCHEDULE. COMPLETE ASSEMBLY OF ALL PARTITIONS FORMING PART OF A FIRE SEPARATION SHALL EXTEND TO THE UNDERSIDE OF THE STRUCTURAL DECK ABOVE.
6. CAULK ALL JOINTS BETWEEN FINISHED MASONRY AND GYPSUM FINISHES.
7. WHERE STRUCTURE INTERFERES WITH STUD PARTITIONS AND NON STRUCTURAL MASONRY, PREVENTING IT FROM RUNNING TO UNDERSIDE OF FLOOR/ROOF DECK, CONTINUE PARTITION AS DETAILED ON THIS DRAWING SHEET.
8. GYPSUM BOARD AS NOTED ON THE INTERIOR PARTITION AND FURRING SCHEDULE SHALL ASSUME TO BE 16MM TYPE 'X'. REFER TO THE INTERIOR ELEVATIONS SERIES A6 AND THE ROOM FINISH SCHEDULE FOR LOCATION OF ABUSE RESISTANT GYPSUM (ABG), GLAS MAT GYPSUM (GMG) AND TILE BACKER BOARD (TBB) TO BE INSTALLED IN LIEU TYPE 'X'.
9. AT ALL PARTITIONS FORMING PART OF A FIRE SEPARATION ABUSE RESISTANT GYPSUM BOARD, GLAS MAT GYPSUM AND TILE BACKER BOARD SHALL BE SUBSTITUTED FOR ULC FIRE RATED OF SAME TYPE IN LIEU OF SPECIFIED. COORDINATE WITH FIRE SEPARATION DRAWINGS.
10. ALL SOUND ATTENUATION PARTITIONS, INSTALL ACOUSTICAL SEALANT BETWEEN TOP AND BOTTOM OF PARTITIONS AND DECKING EACH SIDE OF WALL AT JUNCTION OF FLOOR SLAB OR STRUCTURE ABOVE. INSTALL ACOUSTICAL SEALANT AROUND ALL WALL PENETRATIONS INCLUDING BUT NOT LIMITED TO CUT–OUTS FOR ELECTRICAL BOXES, DUCTS, AND MISC. STRUCTURE.
11. ALL EXPOSED CONCRETE UNIT MASONRY TO COME WITH BULLNOSE OUTSIDE CORNERS INCLUDING AT ALL WALL OPENINGS.
12. REFER TO SPECIFICATION SECTIONS 09110 AND 09250 FOR ALL OTHER NOTES REGARDING STEEL STUD AND GYPSUM PARTITIONS.
13. ENSURE MINIMUM OF 100MM CONCRETE UNIT MASONRY CLEAR BEHIND ALL MECHANICAL AND ELECTRICAL EQUIPMENT RECESSED INTO MASONRY WALLS REQUIRING A RATED FIRE SEPARATION TO MAINTAIN CONTINUITY OF FIRE SEPARATION.
14. ALL MECHANICAL AND ELECTRICAL DEVICES REQUIRED IN MASONRY WALL 190MM OR WIDER TO BE INSTALLED SO HEAD OF DEVICE IS SET TO FULL BLOCK COURSING. COORDINATE WORK WITH MECHANICAL AND ELECTRICAL SUBTRADES.
15. ALL HOLLOW METAL FRAMES TO BE INSTALLED IN ACOUSTICALLY RATED PARTITIONS SHALL BE FILLED WITH ACOUSTIC BATT INSULATION AS SPECIFIED.

INTERIOR PARTITION / FURRING SCHEDULE

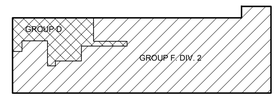
TYPE	DETAIL	CONSTRUCTION	NOTES
P1	STRUCTURE; T/O WALL @ 2600; NOTE 2; NOTE 1; FINISHED CEILING; FLOOR SLAB	CONCRETE MASONRY UNIT PARTITION – WALL FINISH – 140 CONCRETE MASONRY UNITS – WALL FINISH NOTE: SEE PLAN DETAIL ON DRAWING A2.03 FOR 'P1' TYPE WHERE T/O WALL TERMINATES AT 2800.	1. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR ALL GROUTING AND REINFORCING AS REQUIRED. 2. TOP OF WALL TO BE KNOTCHED TO ACCOMODATE INSTALL OF DUCTWORK.
P1a	STRUCTURE; NOTE 1; NOTE 3; NOTE 2; FINISHED CEILING; FLOOR SLAB	CONCRETE MASONRY UNIT PARTITION – WALL FINISH – 140 CONCRETE MASONRY UNITS – WALL FINISH	1. DEFLECTION GAP AND LATERAL SUPPORT AS PER STRUCTURAL ENGINEERING DEFLECTION GAP TO BE MINIMUM 25MM OR AS PER STRUCTURAL REQUIREMENTS 2. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR ALL GROUTING AND REINFORCING AS REQUIRED 3. CONTINUOUS COMPRESSIBLE MINERAL WOOL BATT INSULATION FILLER BETWEEN STRUCTURE AND TOP OF BLOCK. REFER ALSO TO FIRE SEPARATION DIAGRAM AND DETAILS.
P2	STRUCTURE; T/O WALL @ 2800; NOTE 2; NOTE 1; FINISHED CEILING; FLOOR SLAB	CONCRETE MASONRY UNIT PARTITION – WALL FINISH – 190 CONCRETE MASONRY UNITS – WALL FINISH	1. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR ALL GROUTING AND REINFORCING AS REQUIRED. 2. TOP OF WALL TO BE KNOTCHED TO ACCOMODATE INSTALL OF DUCTWORK, WHERE REQUIRED.

INTERIOR PARTITION / FURRING SCHEDULE

TYPE	DETAIL	CONSTRUCTION	NOTES
P2a	STRUCTURE; NOTE 1; NOTE 3; NOTE 2; FINISHED CEILING; FLOOR SLAB	CONCRETE MASONRY UNIT PARTITION – WALL FINISH – 190 CONCRETE MASONRY UNITS – WALL FINISH	1. DEFLECTION GAP AND LATERAL SUPPORT AS PER STRUCTURAL ENGINEERING DEFLECTION GAP TO BE MINIMUM 25MM OR AS PER STRUCTURAL REQUIREMENTS 2. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR ALL GROUTING AND REINFORCING AS REQUIRED 3. CONTINUOUS COMPRESSIBLE MINERAL WOOL BATT INSULATION FILLER BETWEEN STRUCTURE AND TOP OF BLOCK. REFER ALSO TO FIRE SEPARATION DIAGRAM AND DETAILS.
P3	STRUCTURE; NOTE 1; NOTE 2; FINISHED CEILING; FLOOR SLAB	CONCRETE MASONRY UNIT PARTITION – WALL FINISH – 240 CONCRETE MASONRY UNITS – WALL FINISH	1. REFER TO STRUCTURE FOR BEARING. 2. REFER TO STRUCTURAL ENGINEERING DRAWINGS FOR ALL GROUTING AND REINFORCING AS REQUIRED
F1	STRUCTURE; 100; FINISHED CEILING; FLOOR SLAB	– WALL FINISH – 16 GYPSUM BOARD TO 100MM ABOVE FINISHED CEILING – 92 STEEL STUDS @ 405 OC	1. TERMINATE GYPSUM BOARD / FURR–OUT ABOVE FINISHED CEILING, AS INDICATED. 2. KEEP BOTTOM EDGE OF GYPSUM BOARD 13MM ABOVE THE SLAB. 3. PROVIDE CONTINUOUS SILL GASKET UNDER BOTTOM TRACK.

GENERAL NOTES

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE TO THE LATEST ADDITION OF THE ONTARIO BUILDING CODE AND ALL LOCAL MUNICIPAL BI–LAWS HAVING JURISDICTION.
2. DO NOT SCALE ANY DRAWING. ALL NOTES AND DIMENSIONS TAKE PRECEDENCE OVER ANY SCALE. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED ON SITE. REPORT ALL DISCREPANCIES TO THE CONSULTANT PRIOR TO PROCEEDING WITH WORK.
3. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR REVIEWING ALL DRAWINGS AND SPECIFICATIONS AND REPORTING ANY DISCREPANCIES OR INTERFERENCE TO THE CONSULTANT PRIOR TO PROCEEDING WITH THE WORK. ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS AS A COMPLETE PACKAGE. UNLESS OTHERWISE SPECIFICALLY NOTED WITHIN THE DRAWINGS, IN THE EVENT OF ANY DISCREPANCIES BETWEEN DRAWINGS THE ARCHITECTURAL DRAWINGS SHALL GOVERN.
4. THE GENERAL CONTRACTOR SHALL REVIEW ALL SPECIFIED FINISHED CEILING HEIGHTS WITH SPACE ABOVE REQUIRED TO INSTALL MECHANICAL AND ELECTRICAL SERVICES AND REPORT DISCREPANCIES AS PER ABOVE.
5. ALL MECHANICAL, ELECTRICAL, STRUCTURAL AND CIVIL ENGINEERING WORK INDICATED ON THE ARCHITECTURAL DRAWINGS ARE STRICTLY FOR THE GENERAL COORDINATION BETWEEN TRADES ONLY. NOT ALL WORK OR DEVICES / FIXTURES / EQUIPMENT OF ENGINEERING DRAWINGS ARE INDICATED ON THE ARCHITECTURAL. REFER TO THE ENGINEERING DRAWINGS FOR FULL EXTENT AND LOCATIONS OF ALL WORK IN CONJUNCTION WITH NOTE NO. 3 ABOVE.
6. ALL ITEMS NOTED AS 'NIC' SHALL BE OWNER SUPPLIED ITEM, EQUIPMENT OR FIXTURE. SUPPLY AND INSTALLATION SHALL NOT BE INCLUDED IN THE SCOPE OF WORK BUT ALL RELATED WORK SHALL BE FULLY COORDINATED WITH THE ARCHITECT PRIOR TO FABRICATION OR INSTALLATION TO ENSURE PROPER FIT.



GENERAL SYMBOL LEGEND

- P1 — INTERIOR PARTITION, SEE INTERIOR PARTITION SCHEDULE
- F1 — WALL FURRING, SEE INTERIOR FURRING SCHEDULE
- INTERIOR CONCRETE UNIT MASONRY PARTITION, SEE PARTITION SCHEDULE
- NEW DOOR
- D000 — DOOR NUMBER, SEE DOOR AND FRAME SCHEDULE
- BARRIER FREE TURNING RADIUS
- 1 / 2.02 PLAN 1:100 — DRAWING #, DRAWING TITLE, DRAWING SCALE
- SHEET #
- 1 / 2.07 — DRAWING #, SHEET #
- ELEVATION DRAWING #
- A / B 1/A6.02 — DRAWING AND SHEET #
- SECTION DRAWING #
- 1 / A4.02 — SHEET #
- WB — WHITEBOARD
- EP — ELECTRICAL PANEL (SEE ELECTRICAL DRAWINGS)
- FEC — FIRE EXTINGUISHER CABINET (SEE MECHANICAL DRAWINGS)
- PB — POWER DOOR OPERATOR PUSH BUTTON
- RADIANT IN SLAB MANIFOLD CABINET (SEE MECHANICAL DRAWINGS)
- RWL / DSN — RAINWATER LEADER AND DOWN SPOUT NOZEL OUTLET (SEE MECHANICAL DRAWINGS)
- HB — HOSE BIBB (SEE MECHANICAL)

BUILDING ENVELOPE ASSEMBLIES

WALL ASSEMBLIES

W1

–'PREFINISHED INSULATED METAL PANEL' (IMP) BY METL–SPAN OR APPROVED EQUAL –SEE ELEVATIONS
–150 WINDBEARING GALVANIZED STEEL STUDS @ 405 OC
–16 GYPSUM BOARD
–INTERIOR FINISH

W2

–'PREFINISHED INSULATED METAL PANEL' (IMP) BY METL–SPAN OR APPROVED EQUAL –SEE ELEVATIONS
–150 WINDBEARING GALVANIZED STEEL STUDS @ 405 OC
–22 HORIZONTAL GALVANIZED STEEL HAT CHANNELS @ 610 OC
–PREFINISHED METAL LINER PANEL (CL 508, BY VIC WEST, OR APPROVED EQUAL)

W3

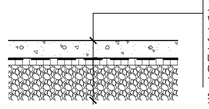
–'PREFINISHED INSULATED METAL PANEL' (IMP) BY METL–SPAN OR APPROVED EQUAL –SEE ELEVATIONS
–STEEL GIRTS & SAG RODS (SEE STRUCTURAL)
–PREFINISHED METAL LINER PANEL (CL 508, BY VIC WEST, OR APPROVED EQUAL), SEAL ALL GAPS, JOINTS, TRANSITIONS AND PENETRATIONS

W4

–'PREFINISHED INSULATED METAL PANEL' (IMP) BY METL–SPAN OR APPROVED EQUAL –SEE ELEVATIONS
–STEEL GIRTS & SAG RODS (SEE STRUCTURAL)

SLAB ON GRADE ASSEMBLIES

SOG1

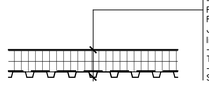


–FLOOR FINISH
–CONCRETE SLAB ON GRADE (THICKNESS VARIES), WITH IN SLAB HEAT
–10MIL POLY VAPOUR BARRIER, LAP AND SEAL ALL JOINTS, TRANSITIONS AND PENETRATIONS
–50 RIGID XPS INSULATION (SHIPLAPPED). PROVIDE 1 LAYER VERTICAL AT FOUNDATION PERIMETER (UNDERSIDE OF SLAB TO TOP OF FOOTING).
–COMPACTED SUBSLAB GRANULAR FILL MATERIAL

SEE ALTERNATE PRICES IN SUPPLEMENTARY TENDER TENDER FORM FOR USE OF SPRAY FOAM INSULATION IN LIEU OF XPS AND VAPOUR BARRIER.

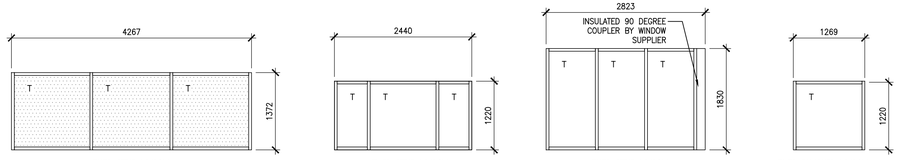
ROOF ASSEMBLIES

R1



–FULLY ADHERED EPDM ROOF MEMBRANE
–2 LAYERS RIGID POLYISO INSULATION, 100MM ON 100MM RIGID POLYISO INSULATION. BOTTOM LAYER MECHANICALLY FASTENED, TOP LAYER FULLY ADHERED. STAGGER ALL JOINTS (PROVIDE RIGID SLOPED INSULATION WHERE INDICATED)
–FULLY ADHERED VAPOUR BARRIER, SEAL ALL JOINTS, TRANSITIONS AND PENETRATIONS
–STRUCTURAL STEEL DECK AND STEEL STRUCTURE PER STRUCTURAL DRAWINGS

EXTERIOR WINDOW SCHEDULE



GENERAL NOTES:

1. THE GENERAL CONTRACTOR SHALL SITE MEASURE ALL ROUGH OPENINGS PRIOR TO FABRICATION OF ALL WINDOW UNITS TO ENSURE PROPER FIT.
2. ALL GLAZING TO BE TRIPLE GLAZED INSULATING GLASS UNITS PER SPECIFICATIONS. ALL GLAZING SHALL BE SUPPLIED BY THE WINDOW FABRICATOR. WINDOWS SHALL BE PREGLAZED.

LEGEND:

- T — TEMPERED GLAZING
- OPAQUE FILM

OBC DATA MATRIX

Firm Name: Critchley Hill Architecture Inc.
Certificate of Practice Number: 5887
Ian Critchley Hill
123 McIntyre Street West
North Bay, On
P1B 2Y5

Name of Project:
Town of Marathon -New Public Works Facility

Location:
2 Penn Lake Road
Marathon, Ontario

The architect noted above has exercised responsible control with respect to design activities. The architect's seal number is the architect's BCDN.

Item	Ontario Building Code Data Matrix Parts 3 & 9			OBC Reference	
1	Project Description:	(•) New ☐ Addition ☐ Alteration ☐ Change of Use	☐ Part 11 11.1 to 11.4	(•) Part 3 2.1.1	☐ Part 9 2.1.1 9.10.1.3
2	Major Occupancy(s)	Group F, Division 2, Industrial Occupancy		3.1.2.1.(1)	9.10.2
3	Building Area(m²)	Existing N/A	New 1396 Total 1396	1.1.3.2	1.1.3.2
4	Gross Area(m²)	Existing N/A	New 1652 Total 1652	1.1.3.2	1.1.3.2
5	Number of Storeys	Above Grade 2	Below Grade 0	3.2.1.1 & 1.1.3.2	2.1.1.3
6	Number of Streets/Access Routes	2		3.2.2.10 & 3.2.5.5	9.10.19
7	Building Classification	OBC 3.2.2.70		3.2.2.20.-.83	9.10.4
8	Sprinkler System Proposed	☐ entire building ☐ basement only ☐ in lieu of roof rating (•) not required		3.2.2.20.-.83 3.2.1.5 3.2.2.17	9.10.8
9	Standpipe required	☐ Yes (•) No		3.2.9	N/A
10	Fire Alarm required	☐ Yes (•) No		3.2.4	9.10.7.2
11	Water Service/Supply is Adequate	(•) Yes ☐ No		3.2.5.7	N/A
12	High Building	☐ Yes (•) No		3.2.6	N/A
13	Permitted Construction Actual Construction	☐ Combustible (•) Non-combustible ☐ Both ☐ Combustible (•) Non-combustible ☐ Both		3.2.2.20.-.83	9.10.6
14	Mezzanine(s) Area m²	128 (Open Mezzanine)		3.2.1.1.(3)-(8)	9.10.4.1
15	Occupant load based on	☐ m²/person (•) design of building		3.1.16	9.9.1.3
	Basement:	Occupancy N/A	Load N/A persons		
	1st Floor	Occupancy N/A	Load 20 persons		
	2nd Floor	Occupancy N/A	Load 0 persons		
	3rd Floor	Occupancy N/A	Load N/A persons		
16	Barrier-free	(•) Yes ☐ No (Explain)		3.8	9.5.2
17	Hazardous Substances	(•) Yes ☐ No		3.3.1.2 & 3.3.1.19	9.10.1.3(4)
18	Required Fire Resistance Rating (FRR)	Horizontal Assemblies FRR (Hours)	Listed Design No. or Description (SG-2)	3.2.2.20.-.83 & 3.2.1.4	9.10.8 9.10.9
		Floors 3/4 Hour (Note 1)	200 Precast Concrete Slabs		
		Roof N/A Hours	N/A		
		Mezzanine N/A Hour	Non-Combustible		
		FRR of Supporting Members	Listed Design No. or Description (SG-2)		
		Floors 3/4 Hour (Note 1)	240 CMU		
		Roof N/A Hours	N/A		
		Mezzanine N/A Hour	Non-Combustible		
19	Spatial Separation - Construction of Exterior Walls			3.2.3	9.10.14
	Limiting distance of all exposed building faces to property lines are set back adequatly to allow for 100% unprotected openings as per OBC 3.2.3. There is no fire resistance rating required for any exposed building face.				

Note 1: Floor for Trades Shop Mezzanine will require a 2 hour fire separation, as it separates the Repair Garage portion of the building from the remainder of the building.

No.	Date	Revision
0	07.28.2022	Issued For Permit and Tender

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE 5282

CRITCHLEY HILL ARCHITECTURE INC.
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO. 705.995.2391 CRITCHLEYHILL.CA.

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
OBC MATRIX
GENERAL NOTES
INTERIOR PARTITION SCHEDULE
INTERIOR FURRING SCHEDULE

Drawn By:	Checked By:
KSH	ICH
Scale: N/A	Project No: 2208

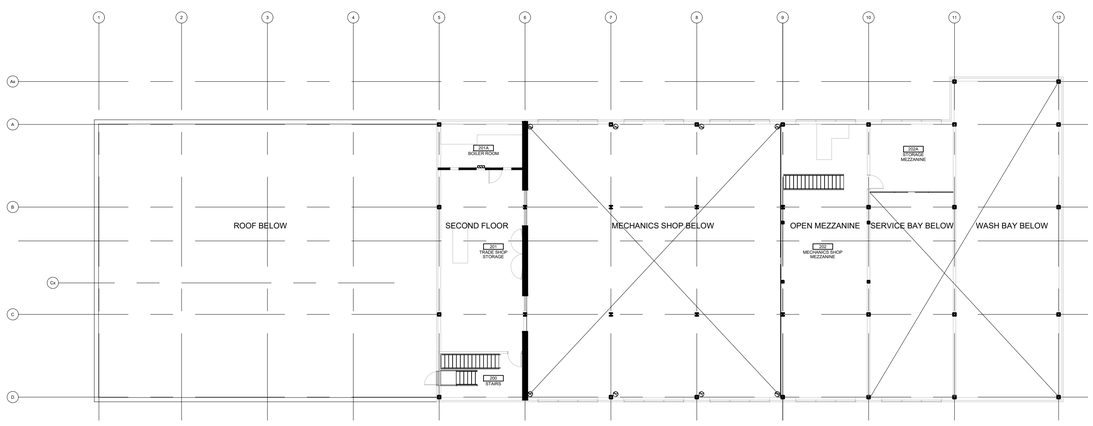
Date Plotted: August 12, 2022

Date Revised:

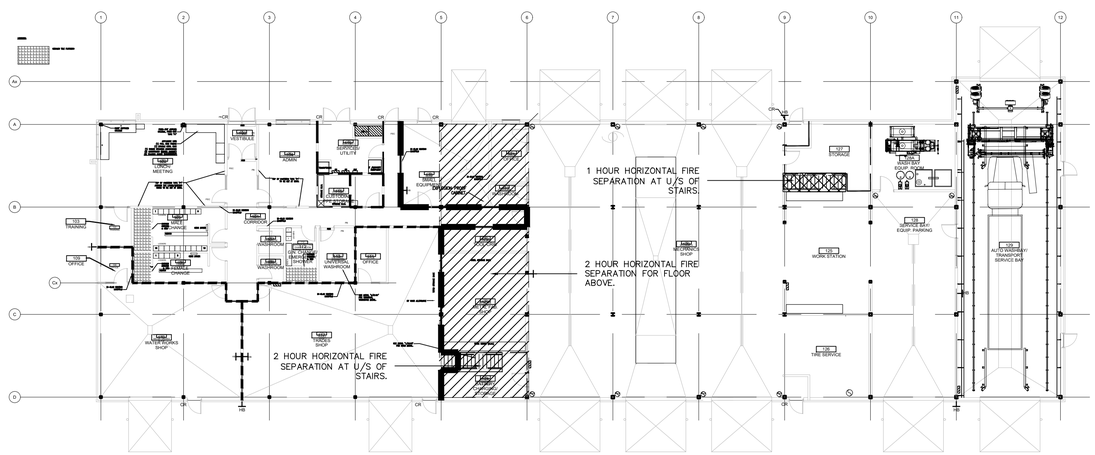
Drawing No:
A0.01

FIRE SEPARATION LEGEND:

- 1 HOUR FIRE SEPARATION.
- 1.5 HOUR FIRE SEPARATION.
- 2 HOUR FIRE SEPARATION.
- 2 HOUR HORIZONTAL FIRE SEPARATION (TRADES MEZZANINE FLOOR). ALL EXPOSED STRUCTURAL STEEL (BEAMS -LINTELS) SUPPORTING THIS ASSEMBLY TO BE SPRAYED WITH INTUMESCANT PAINT.
- 1 HOUR HORIZONTAL FIRE SEPARATION



2 / A0.02 SECOND FLOOR FIRE SEPARATION PLAN
SCALE 1:200



1 / A0.02 MAIN FLOOR FIRE SEPARATION PLAN
SCALE 1:200

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.895.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Lake Road
Marathon, ON

Drawing Title:
FIRE SEPARATION PLAN

Drawn By:	Checked By:
KSH	ICH
Scale: AS NOTED	Project No: 2208

Date Plotted: August 12, 2022

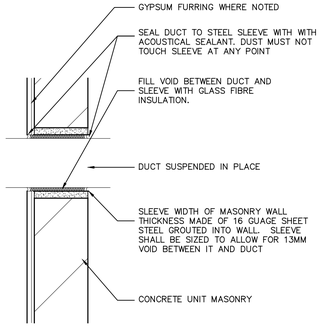
Date Revised:

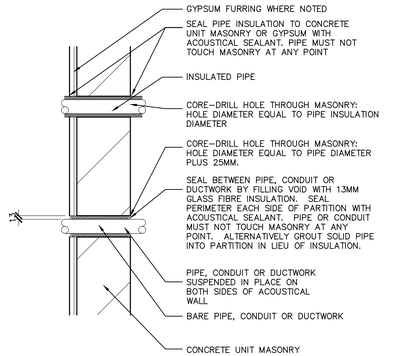
Drawing No:
A0.02

L:\PROJECTS\2022\2208 Town of Marathon New Maintenance Building\2.0 Design-Contract Documents\2.5 Design Drawings\2.5.5 Working Drawings\2208_General Info.dwg

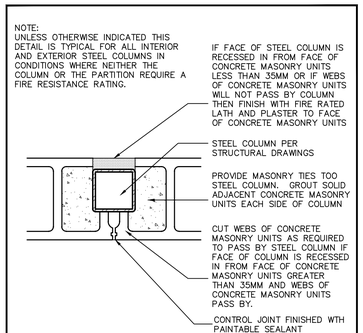
GENERAL NOTES

1. DETAILS DRAWN ON THIS SHEET ARE FOR ALL TYPICAL CONDITIONS THROUGHOUT THE THE WORK. NOT ALL CONDITIONS ARE DRAWN. REVIEW FULL SET OF DRAWINGS AND SPECIFICATIONS FOR ALL OTHER DETAILS AND NOTES INFLUENCING INTERIOR PARTITION WORK.
2. THESE DETAILS SHALL BE READ IN CONJUNCTION WITH THE FLOOR PLANS, INTERIOR PARTITION AND FURRING SCHEDULES ALONG WITH THE FIRE SEPARATION PLANS.
3. ALL ACOUSTICAL CAULKING INDICATED ON THESE DETAILS SHALL BE SUBSTITUTED FOR ULC RATED FIRE SEALANT ALL PARTITIONS FORMING PART OF A FIRE SEPARATION.
4. ALL INSULATION AS NOTED IN THESE DRAWINGS SHALL BE MINERAL WOOL WHEN PARTITION FORMS PART OF A FIRE SEPARATION.
5. ALL FIRE RATED DETAILS THIS SHEET ARE BASED ON A 25MM MAXIMUM ANNULAR SPACE AROUND WALL PENETRATION. SHOULD ACTUAL ON SITE CONDITIONS GENERATE A LARGER ANNULAR SPACE THAN GENERAL CONTRACTOR SHALL PROVIDE CONSULTANT WITH DOCUMENTATION INDICATING ULC PROVEN METHODS TO PROVIDE PROPER SEAL.

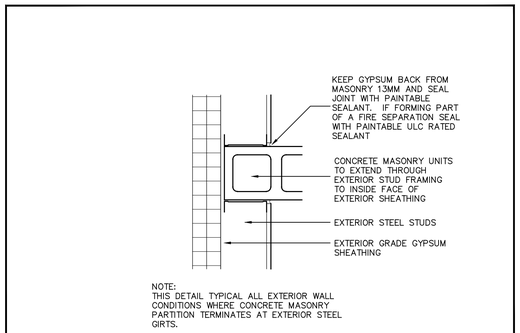




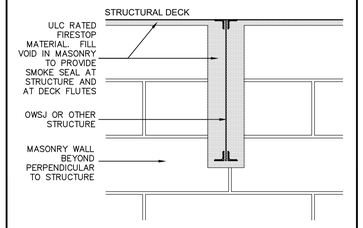
2 A0.04 TYPICAL DETAILS - RATED PARTITION PENETRATIONS
SCALE 1:10



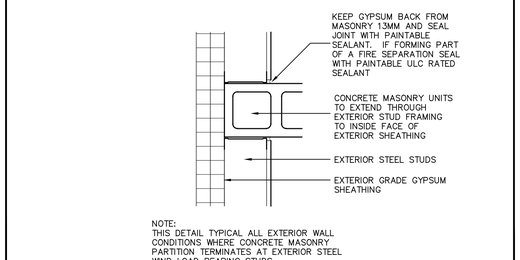
8 A0.04 TYPICAL COLUMN DETAIL
SCALE 1:10



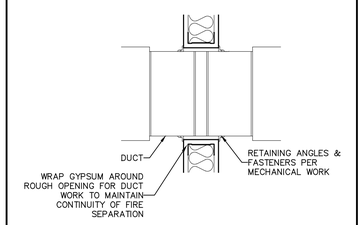
5 A0.04 TYPICAL DETAIL - PLAN DETAILS
SCALE 1:10



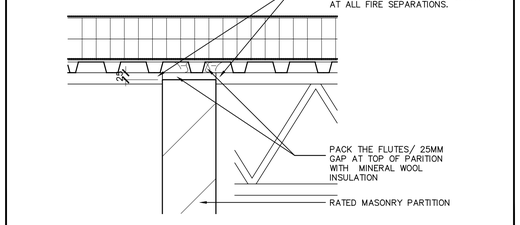
7 A0.04 TYPICAL DETAIL - PLAN DETAIL
SCALE 1:10



4 A0.04 TYPICAL DETAIL - PLAN DETAIL
SCALE 1:10

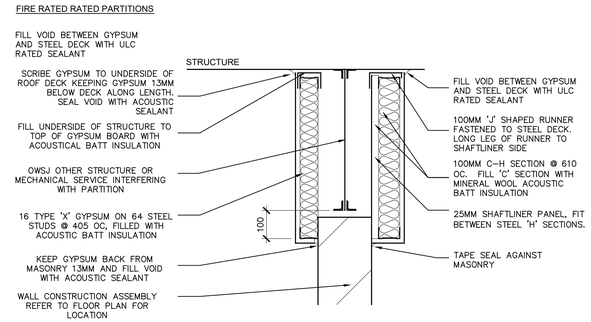


6 A0.04 TYPICAL PARTITION AT FIRE DAMPER DETAIL
SCALE 1:10



3 A0.04 TYPICAL DETAIL - HEAD OF ACOUSTICAL PARTITION
SCALE 1:10

FIRE RATED RATED PARTITIONS



CONCRETE UNIT MASONRY WALL

1 A0.04 TYPICAL DETAIL - INTERFERENCE TOP OF PARTITIONS
SCALE 1:10

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.895.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Pearl Lake Road
Marathon, ON

Drawing Title:
TYPICAL DETAILS FOR
FIRE RATED PARTITIONS

Drawn By:	Checked By:
KSH	ICH
Scale: 1:100	Project No: 2208

Date Plotted: August 12, 2022

Date Revised: July 13, 2022

Drawing No:
A0.03

SITE PLAN LEGEND:

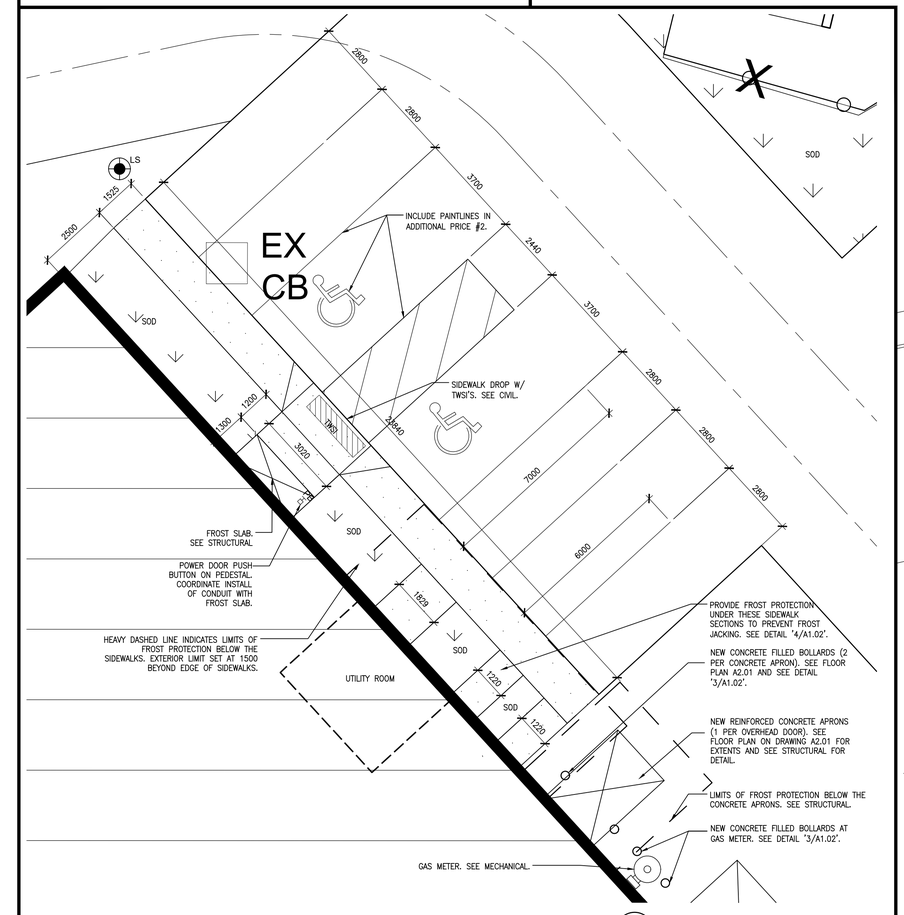
- BH2 — BOREHOLE ID. REFER TO SOILS REPORT.
- EX LS — EXISTING LIGHT STANDARDS
- LS — NEW LIGHT STANDARDS C/W CONCRETE BASE. SEE ELECTRICAL.
- EX FH — EXISTING FIRE HYDRANT
- FH — NEW FIRE HYDRANT
- EX HP — EXISTING HYDRO POLE
- HB — NEW HOSE BIB. SEE MECHANICAL.
- EX CB — EXISTING CATCH BASIN
- CB — NEW CATCH BASIN. REFER TO CIVIL DOCUMENTS.
- EX MH — EXISTING SANITARY MANHOLE
- TWSI — NEW 'TACTILE WALKING SURFACE INDICATORS'. REFER TO CIVIL DOCUMENTS.
- EXISTING FENCELINE.
- NEW FENCE C/W AUTOMATIC GATES (ADDITIONAL PRICE). SEE TENDER FORM.
- PROPERTY LINE/BOUNDARY.
- EXTENT OF SITE CONTRACT.
- REMOVALS. SEE ALSO CIVIL AND ELECTRICAL DOCUMENTS FOR ADDITIONAL REMOVALS.
- NEW CONCRETE SIDEWALKS. SEE CIVIL DOCUMENTS.
- NEW ASPHALT SURFACE, C/W PAINTLINES (ADDITIONAL PRICE). SEE CIVIL DOCUMENTS AND TENDER FORM.
- NEW SOD ON TOPSOIL. SEE CIVIL DOCUMENTS.

NOTE: BASE TOPO SURVEY INFORMATION PROVIDED BY TBTE.

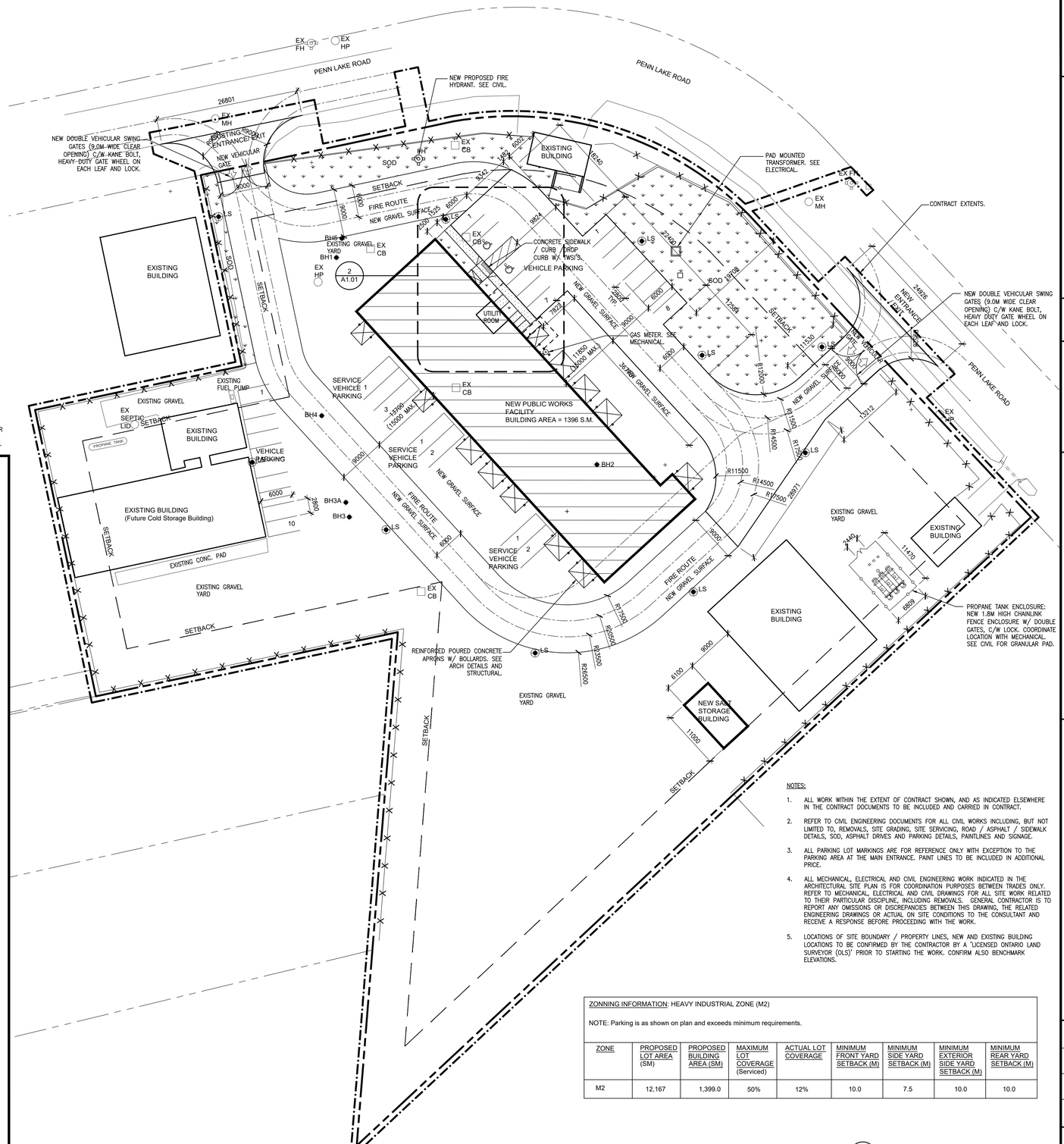
NOTE: REFER TO CIVIL, STRUCTURAL, ELECTRICAL AND MECHANICAL DOCUMENTS.

NOTE: FOR SITE REMOVALS, REFER TO ARCHITECTURAL, CIVIL AND ELECTRICAL DOCUMENTS.

NOTE: UNLESS OTHERWISE INDICATED, ALL SITE FEATURES, ELEMENTS, ETC. SHOWN ON THE ARCHITECTURAL SITE PLANS ARE SHOWN FOR COORDINATION PURPOSES ONLY. FOR ACTUAL LOCATIONS, QUANTITIES, ETC. REFER TO CIVIL AND ELECTRICAL DOCUMENTS. DIMENSIONING SHOWN ON ARCHITECTURAL SITE PLANS WILL GOVERN OVER ALL OTHERS.



2 / A1.01 PARKING DETAIL
SCALE 1:100



1 / A1.01 OVERALL SITE PLAN
SCALE 1:400

NOTES:

1. ALL WORK WITHIN THE EXTENT OF CONTRACT SHOWN, AND AS INDICATED ELSEWHERE IN THE CONTRACT DOCUMENTS TO BE INCLUDED AND CARRIED IN CONTRACT.
2. REFER TO CIVIL ENGINEERING DOCUMENTS FOR ALL CIVIL WORKS INCLUDING, BUT NOT LIMITED TO, REMOVALS, SITE GRADING, SITE SERVICING, ROAD / ASPHALT / SIDEWALK DETAILS, SOD, ASPHALT DRIVES AND PARKING DETAILS, PAINTLINES AND SIGNAGE.
3. ALL PARKING LOT MARKINGS ARE FOR REFERENCE ONLY WITH EXCEPTION TO THE PARKING AREA AT THE MAIN ENTRANCE. PAINT LINES TO BE INCLUDED IN ADDITIONAL PRICE.
4. ALL MECHANICAL, ELECTRICAL AND CIVIL ENGINEERING WORK INDICATED IN THE ARCHITECTURAL SITE PLAN IS FOR COORDINATION PURPOSES BETWEEN TRADES ONLY. REFER TO MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS FOR ALL SITE WORK RELATED TO THEIR PARTICULAR DISCIPLINE, INCLUDING REMOVALS. GENERAL CONTRACTOR IS TO REPORT ANY OMISSIONS OR DISCREPANCIES BETWEEN THIS DRAWING, THE RELATED ENGINEERING DRAWINGS OR ACTUAL ON SITE CONDITIONS TO THE CONSULTANT AND RECEIVE A RESPONSE BEFORE PROCEEDING WITH THE WORK.
5. LOCATIONS OF SITE BOUNDARY / PROPERTY LINES, NEW AND EXISTING BUILDING LOCATIONS TO BE CONFIRMED BY THE CONTRACTOR BY A 'LICENSED ONTARIO LAND SURVEYOR (OLS)' PRIOR TO STARTING THE WORK. CONFIRM ALSO BENCHMARK ELEVATIONS.

ZONNING INFORMATION: HEAVY INDUSTRIAL ZONE (M2)

NOTE: Parking is as shown on plan and exceeds minimum requirements.

ZONE	PROPOSED LOT AREA (SM)	PROPOSED BUILDING AREA (SM)	MAXIMUM LOT COVERAGE (Serviced)	ACTUAL LOT COVERAGE	MINIMUM FRONT YARD SETBACK (M)	MINIMUM SIDE YARD SETBACK (M)	MINIMUM EXTERIOR SIDE YARD SETBACK (M)	MINIMUM REAR YARD SETBACK (M)
M2	12,167	1,399.0	50%	12%	10.0	7.5	10.0	10.0

PROJECT NORTH

Date	Revision
07.28.2022	Issued For Permit and Tender

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

CRITCHLEY HILL ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

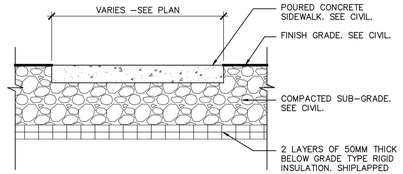
Drawing Title:
SITE PLAN
LEGEND, NOTES, DETAILS

Drawn By:	Checked By:
KSH	ICH
Scale: As Noted	Project No: 2208

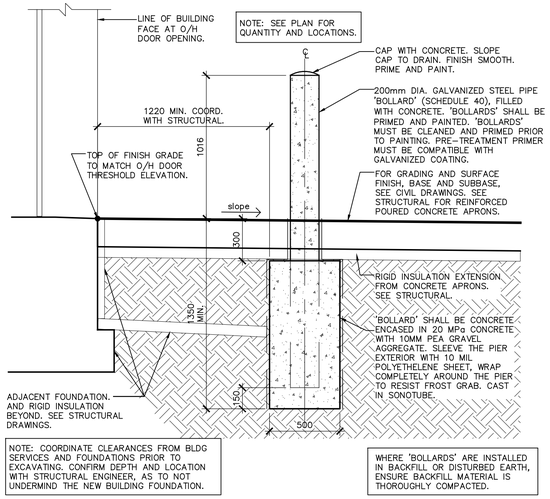
Date Plotted: August 12, 2022

Date Revised:

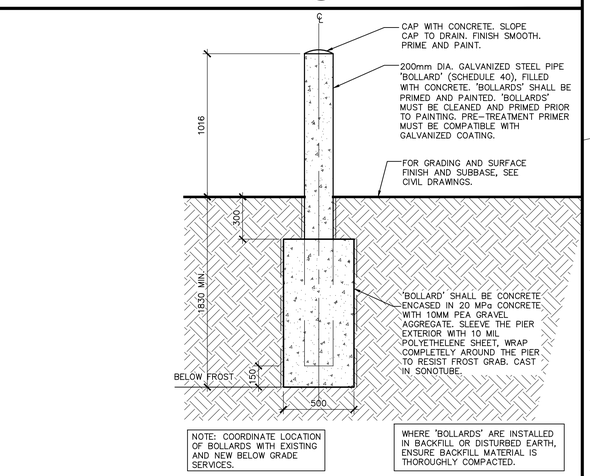
Drawing No:
A1.01



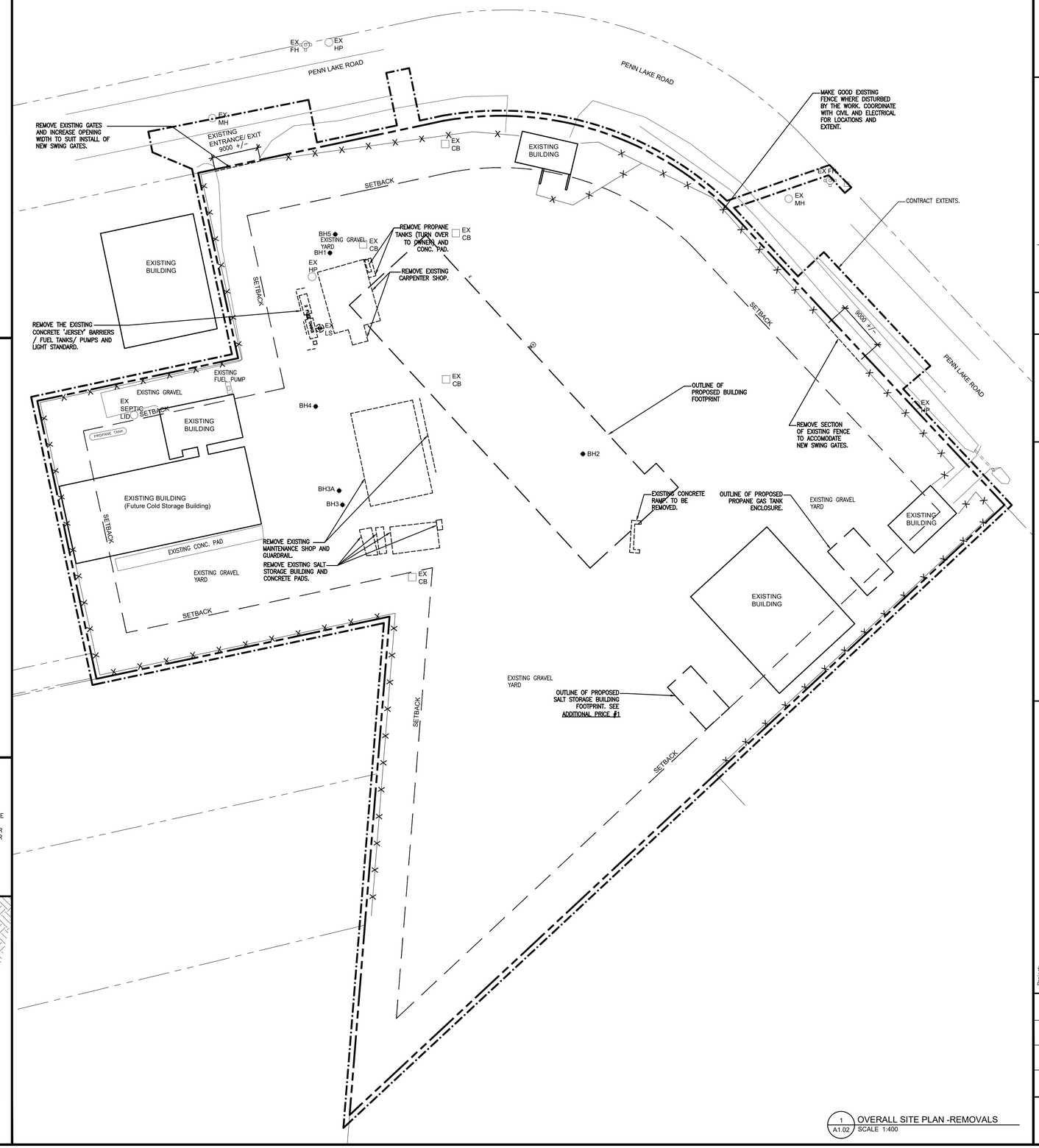
4 A1.02 SIDEWALK INSULATION
SCALE 1:20



3 A1.02 BOLLARDS AT O/H DOOR APRONS
SCALE 1:20



2 A1.02 BOLLARDS AT FUEL TANKS
SCALE 1:20



1 A1.02 OVERALL SITE PLAN -REMOVALS
SCALE 1:400

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

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LICENCE 5282

CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY, ONTARIO 705.895.2391 CRITCHLEYHILL.CA

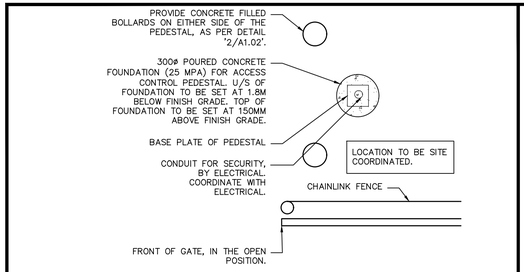
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
21 Penn Lake Road
Marathon, ON

Drawing Title:
SITE PLAN -REMOVALS
DETAILS

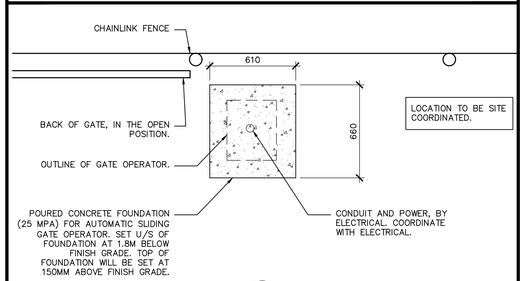
Drawn By:	Checked By:
KSH	ICH
Scale: As Noted	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A1.02

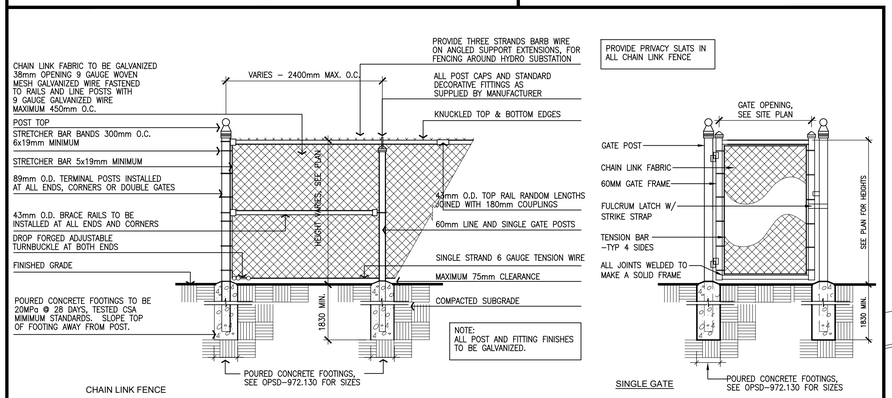
L:\PROJECTS\2022\2208 Town of Marathon New Maintenance Building\2.0 Design-Contract Documents\2.5 Design Drawings\2.5.5 Working Drawings\2208_Site Plan.dwg



4 A1.03 PEDESTAL FOUNDATION
SCALE 1:20



3 A1.03 OPERATOR FOUNDATION
SCALE 1:20



2 A1.03 TYPICAL FENCE DETAIL
SCALE 1:30

SITE PLAN LEGEND:

- BH2 — BOREHOLE ID. REFER TO SOILS REPORT.
- EX LS — EXISTING LIGHT STANDARDS
- LS — NEW LIGHT STANDARDS C/W CONCRETE BASE. SEE ELECTRICAL.
- EX FH — EXISTING FIRE HYDRANT
- FH — NEW FIRE HYDRANT
- EX HP — EXISTING HYDRO POLE
- HB — NEW HOSE BIB. SEE MECHANICAL.
- EX CB — EXISTING CATCH BASIN
- CB — NEW CATCH BASIN. REFER TO CIVIL DOCUMENTS.
- EX MH — EXISTING SANITARY MANHOLE
- TWSI — NEW 'TACTILE WALKING SURFACE INDICATORS'. REFER TO CIVIL DOCUMENTS.
- EXISTING FENCELINE.
- NEW FENCE C/W AUTOMATIC GATES (ADDITIONAL PRICE). SEE TENDER FORM.
- PROPERTY LINE/BOUNDARY.
- EXTENT OF SITE CONTRACT.
- REMOVALS. SEE ALSO CIVIL AND ELECTRICAL DOCUMENTS FOR ADDITIONAL REMOVALS.
- NEW CONCRETE SIDEWALKS. SEE CIVIL DOCUMENTS.
- NEW ASPHALT SURFACE, C/W PAINTLINES (ADDITIONAL PRICE). SEE CIVIL DOCUMENTS AND TENDER FORM.
- NEW SOD ON TOPSOIL. SEE CIVIL DOCUMENTS.

NOTE: BASE TOPO SURVEY INFORMATION PROVIDED BY TBTE.

NOTE: REFER TO CIVIL, STRUCTURAL, ELECTRICAL AND MECHANICAL DOCUMENTS.

NOTE: FOR SITE REMOVALS, REFER TO ARCHITECTURAL, CIVIL AND ELECTRICAL DOCUMENTS.

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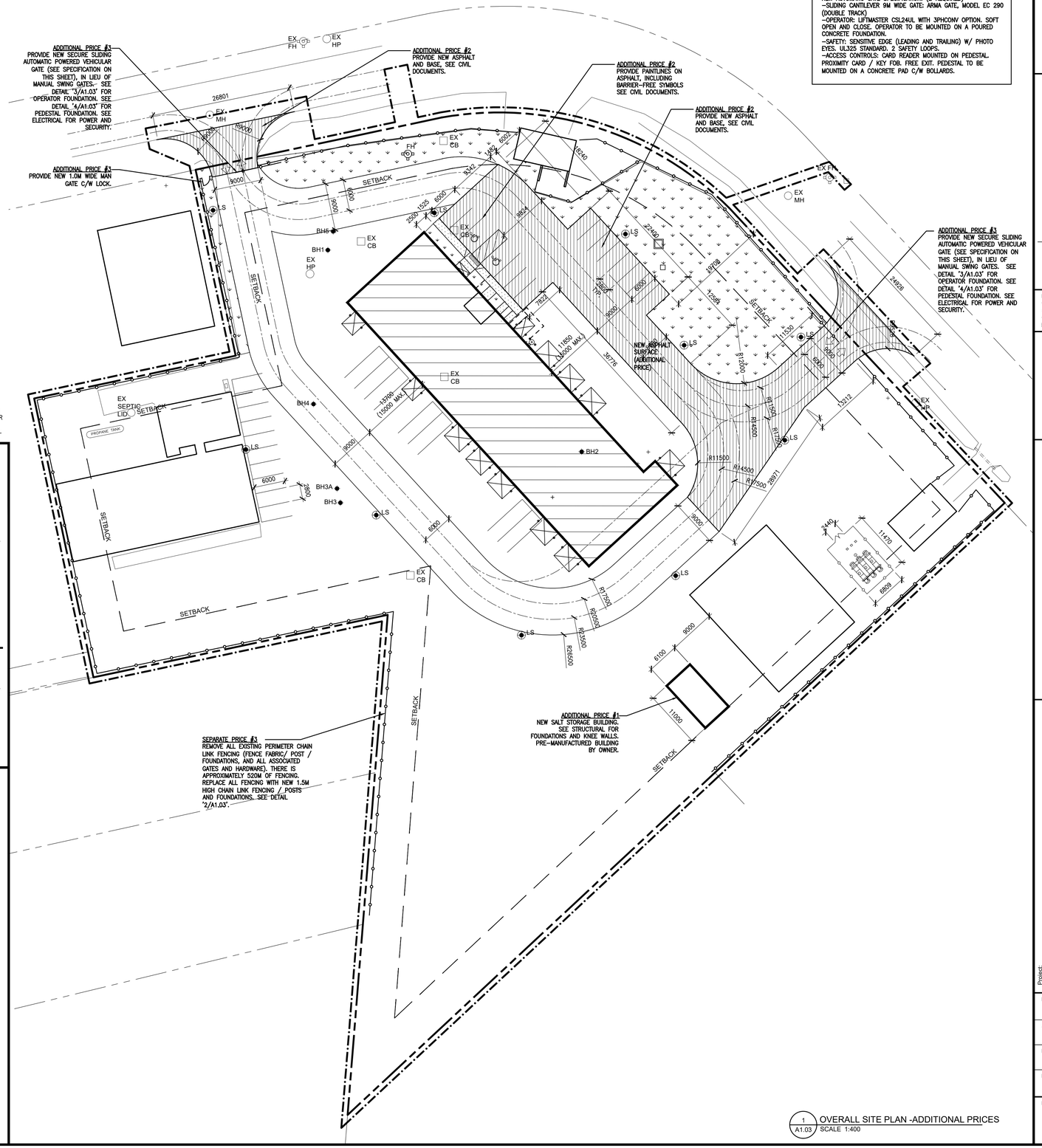


1 A1.03 OVERALL SITE PLAN -ADDITIONAL PRICES
SCALE 1:400

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE 5282

CRITCHLEY HILL ARCHITECTURE INC.
CRITCHLEY HILL ARCHITECTURE
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

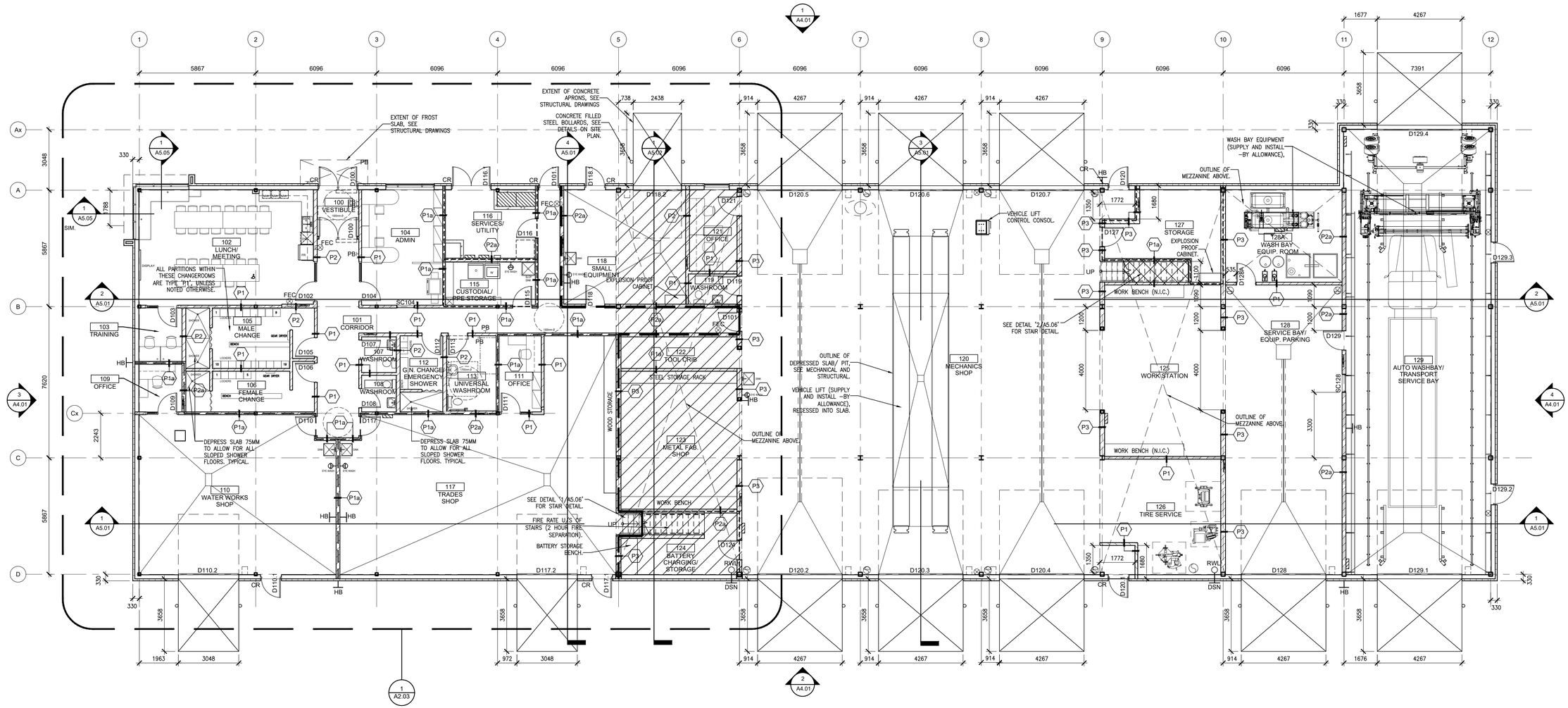
Drawing Title:
SITE PLAN
ADDITIONAL PRICES

Drawn By:	Checked By:
KSH	ICH
Scale: As Noted	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A1.03

FIRE SEPARATION LEGEND:

- 1 HOUR FIRE SEPARATION.
- 1.5 HOUR FIRE SEPARATION.
- 2 HOUR FIRE SEPARATION.
- 2 HOUR HORIZONTAL FIRE SEPARATION (TRADES MEZZANINE FLOOR).
- 1 HOUR HORIZONTAL FIRE SEPARATION



1 MAIN FLOOR PLAN
A2.01 SCALE 1:100

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

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ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

CRITCHLEY HILL ARCHITECTURE INC.
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY, ONTARIO 705.995.2391, CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Lake Road
Marathon, ON

Drawing Title:
MAIN FLOOR PLAN

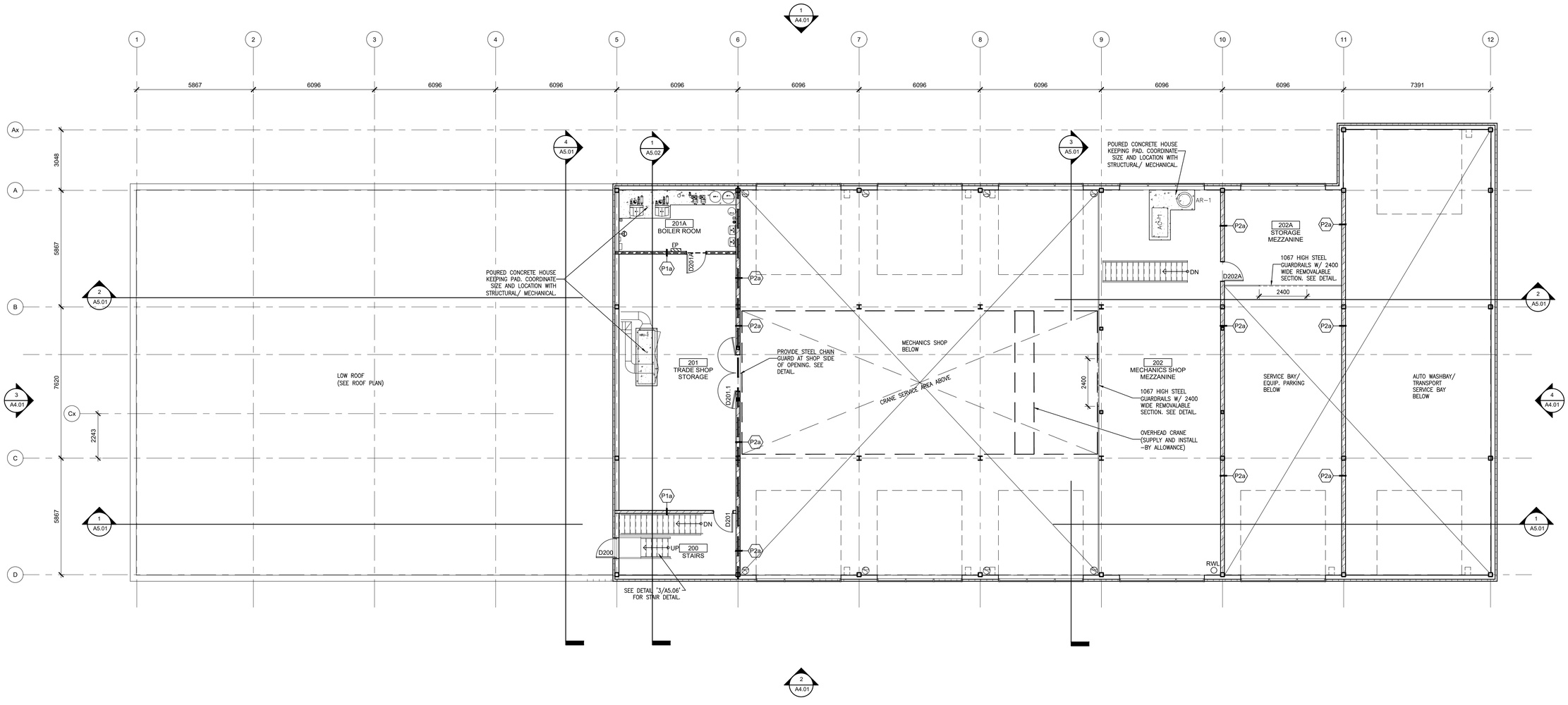
Drawn By:	Checked By:
KSH	ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A2.01

L:\PROJECTS\2022\2208 Town of Marathon New Maintenance Building\2.0 Design-Contract Documents\2.5 Design Drawings\2.5.5 Working Drawings\2208_Floor Plan.dwg

FIRE SEPARATION LEGEND:

- 1 HOUR FIRE SEPARATION.
- 1.5 HOUR FIRE SEPARATION.
- 2 HOUR FIRE SEPARATION.
- 2 HOUR HORIZONTAL FIRE SEPARATION (TRADES MEZZANINE FLOOR).
- 1 HOUR HORIZONTAL FIRE SEPARATION



1 A2.02 MEZZANINE FLOOR PLAN
SCALE 1:100

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.28.2022

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ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

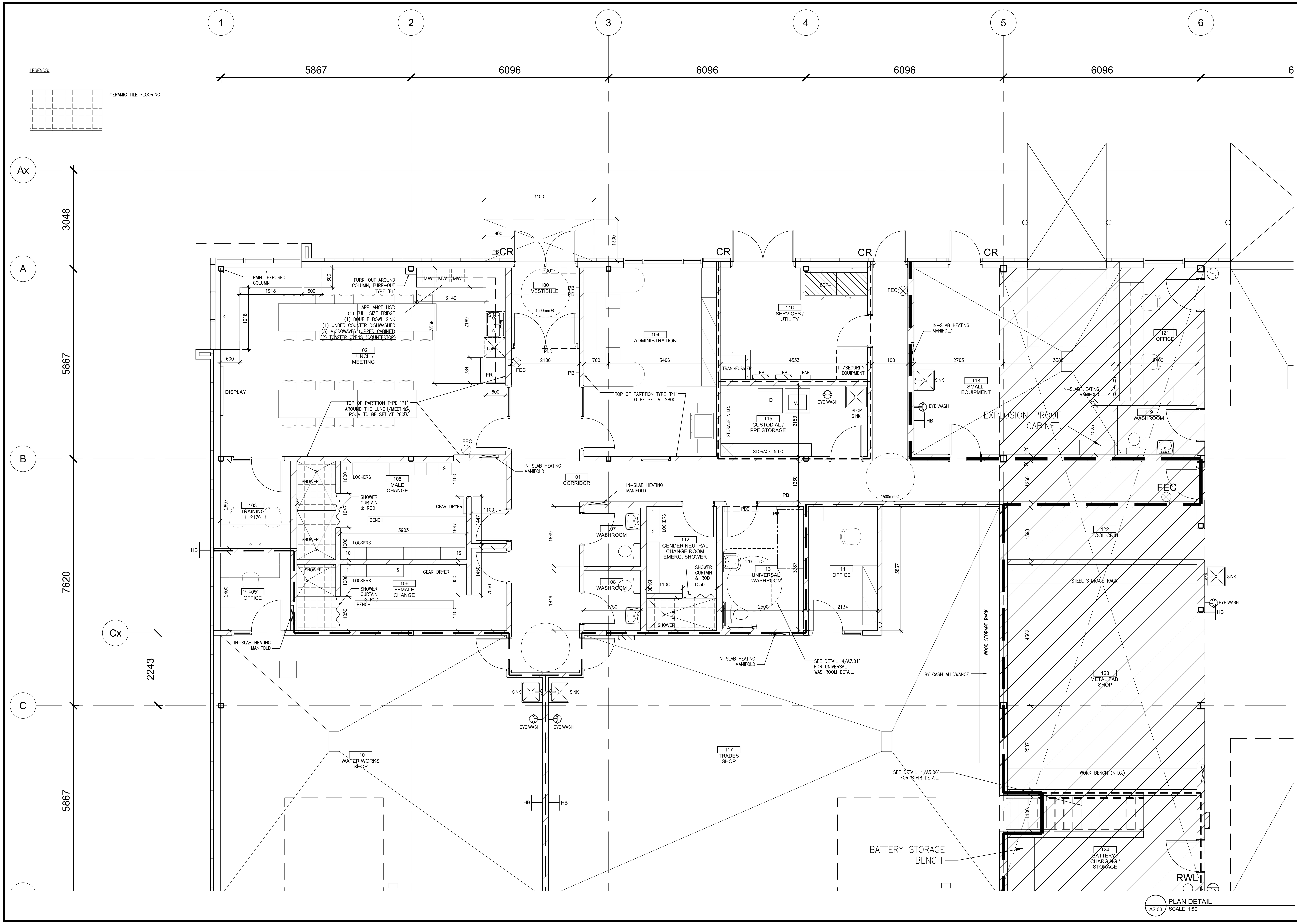
CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peninsular Road
Marathon, ON

Drawing Title:
MEZZANINE PLAN

Drawn By: KSH	Checked By: ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A2.02



LEGENDS:
CERAMIC TILE FLOORING
100 VESTIBULE
101 CORRIDOR
102 LUNCH / MEETING
103 TRAINING
104 ADMINISTRATION
105 MALE CHANGE
106 FEMALE CHANGE
107 WASHROOM
108 WASHROOM
109 OFFICE
110 WATER WORKS SHOP
111 OFFICE
112 GENDER NEUTRAL CHANGE ROOM EMERG. SHOWER
113 UNIVERSAL WASHROOM
115 CUSTODIAL / PPE STORAGE
116 SERVICES / UTILITY
117 TRADES SHOP
118 SMALL EQUIPMENT
119 WASHROOM
121 OFFICE
122 TOOL CRIB
123 METAL FAB SHOP
124 BATTERY / CHARGING / STORAGE
APPLIANCE LIST:
(1) FULL SIZE FRIDGE
(1) DOUBLE BOWL SINK
(1) UNDER COUNTER DISHWASHER
(3) MICROWAVES (UPPER CABINET)
(2) TOASTER OVENS (COUNTERTOP)
PAINT EXPOSED COLUMN
FURR-OUT AROUND COLUMN, FURR-OUT TYPE "F1"
TOP OF PARTITION TYPE "P1" AROUND THE LUNCH/MEETING ROOM TO BE SET AT 2800.
TOP OF PARTITION TYPE "P1" TO BE SET AT 2800.
IN-SLAB HEATING MANIFOLD
EXPLOSION PROOF CABINET
SEE DETAIL "4/A7.01" FOR UNIVERSAL WASHROOM DETAIL.
SEE DETAIL "1/A5.06" FOR STAIR DETAIL.
BY CASH ALLOWANCE
WOOD STORAGE RACK
STEEL STORAGE RACK
WORK BENCH (N.I.C.)
BATTERY STORAGE BENCH.
STORAGE N.I.C.
TRANSFORMER
IT / SECURITY EQUIPMENT
SHOWER CURTAIN & ROD
GEAR DRYER
LOCKERS
BENCH
DISPLAY
EYE WASH
SINK
SLOP SINK
FEC
CR
RWL
1 PLAN DETAIL A2.03 SCALE 1:50

Issued For Permit and Tender — 07.28.2022 — Revision 0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS — IAN HILL — LICENCE 5282

CRITCHLEY HILL ARCHITECTURE

CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

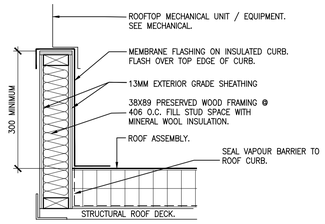
Drawing Title:
PLAN DETAILS

Drawn By:	Checked By:
KSH	ICH
Scale: 1:50	Project No: 2208

Date Plotted: August 12, 2022

Date Revised:

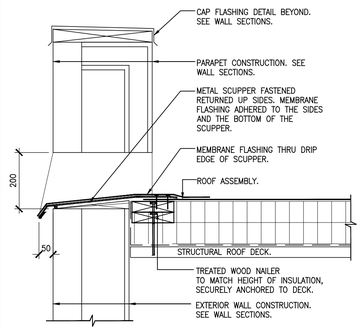
Drawing No: **A2.03**



BUILT-UP CURB /FLASHING DETAIL

SCALE: 1:10

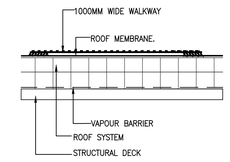
12 A2.04 DETAIL SCALE 1:10



TYPICAL ROOF OVERFLOW SCUPPER DETAIL

SCALE: 1:10

11 A2.04 DETAIL SCALE 1:10



NOTES:

1. VAPOUR BARRIER SHALL BE SEALED AT ALL EDGES/ PENETRATIONS.

WALKWAY DETAIL

SCALE: 1:10

10 A2.04 DETAIL SCALE 1:10

PROJECT NORTH

No.	Revision	Date
0	Issued For Permit and Tender	07.29.2022

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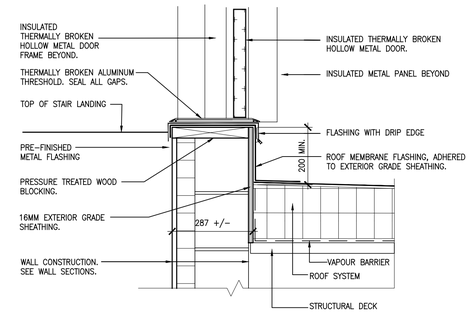
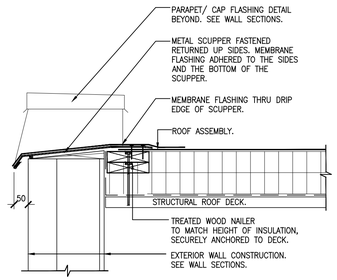


DOOR THRESHOLD DETAIL

SCALE: 1:10

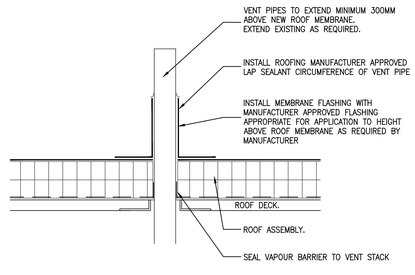
9 A2.04 DETAIL SCALE 1:10



TYPICAL ROOF OVERFLOW SCUPPER DETAIL

SCALE: 1:10

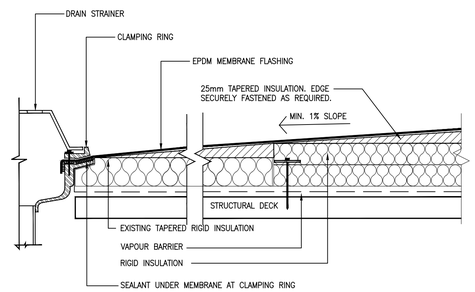
8 A2.04 DETAIL SCALE 1:10



TYPICAL PIPE PENETRATION FLASHING DETAIL

SCALE: 1:10

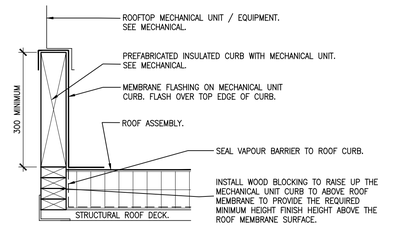
7 A2.04 DETAIL SCALE 1:10



TYPICAL ROOF DRAIN DETAIL

SCALE: 1:5

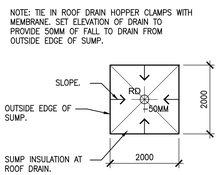
6 A2.04 DETAIL SCALE 1:5



TYPICAL CURB FLASHING DETAIL

SCALE: 1:10

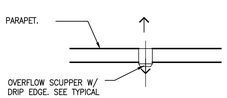
5 A2.04 DETAIL SCALE 1:10



TYPICAL ROOF DRAIN / SUMP DETAIL

SCALE: 1:50

NOTE: TIE IN ROOF SCUPPER W/ MEMBRANE FLASHING. SEAL / ADHERE MEMBRANE TO SCUPPER INLET AND THRU TO DRIP EDGE. PROVIDE SPLASH PAD ON ROOF AT ALL SCUPPER LOCATIONS. SEE ROOF PLAN FOR LOCATIONS.



4 A2.04 ROOF DRAIN SUMP/ SCUPPER DETAIL SCALE 1:50

NOTE: TIE IN ROOF DRAIN HOPPER CLAMPS WITH MEMBRANE. SET ELEVATION OF DRAIN TO PROVIDE 50MM OF FALL TO DRAIN FROM OUTSIDE EDGE OF SUMP.

GENERAL NOTES:

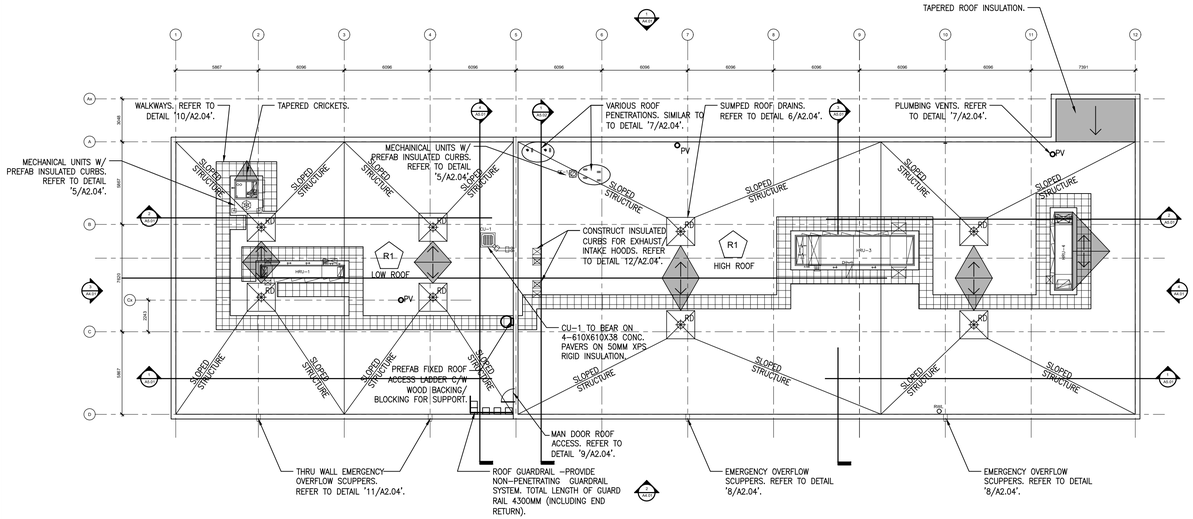
1. DRAWINGS & DETAILS SHOWN HEREIN ARE INTENDED TO CONVEY SCOPE & GENERAL INTENT OF PERFORMANCE & WORK. IT IS THE RESPONSIBILITY OF THE BIDDING CONTRACTOR TO READ / COORD. THESE DRAWINGS IN CONJUNCTION WITH ALL DOCUMENTS, INCLUDING THAT OF ALL OTHER DISCIPLINES (STRUCTURAL / MECHANICAL / ELECTRICAL) IN THIS CONTRACT.
2. FOR ROOF CONSTRUCTION REFER TO 'BUILDING ENVELOPE ASSEMBLIES' SCHEDULE ON DRAWING AX.0X. SEE ALSO BUILDING ELEVATIONS, WALL SECTIONS AND DETAILS FOR PARAPET AND OTHER ROOF TRANSITIONS.
3. FLASH ALL CURBS AND ROOF PENETRATIONS AS NOTED AND DETAILED. REFER ALSO TO MECHANICAL / ELECTRICAL DOCUMENTS FOR ADDITIONAL ROOF DETAILS AND INFORMATION NOT SHOWN ON THIS DRAWING.
4. LOCATIONS OF ALL ROOFTOP MECHANICAL UNITS, CONDENSER LINES, VENTS, ROOF DRAINS, ETC. ARE SHOWN IN GENERAL LOCATIONS. IT IS THE FULL RESPONSIBILITY OF THE BIDDING CONTRACTOR TO CONFIRM ALL DIMENSIONS, QUANTITIES AND LAYOUT PRIOR TO COMMITTING TO THE WORK. CONTRACTOR WILL ASSUME ALL RISKS OF ADDITIONAL WORK AS A RESULT OF NOT CONFIRMING THE ABOVE.
5. ALL CONDUITS AND PIPE PENETRATIONS NOT OTHERWISE INDICATED SHALL BE SEALED WITH ROOF MANUFACTURES PENETRATION / PITCH POCKET COMPLETE WITH POURABLE SEALER. INSTALL AS PER MANUFACTURERS INSTRUCTIONS.
6. ALL CURBS FOR MECHANICAL UNITS WILL BE PREFABRICATED, SUPPLIED BY MECHANICAL.
7. ROOF GUARDRAILS TO BE NON-PENETRATING ROOF BARRIER GUARDRAIL 5001 SERIES, MANUFACTURED BY 'SKYLINE GROUP' OR APPROVED EQUAL. MUST BE COMPLIANT WITH THE OBC AND OHSA. PROVIDE ENGINEERED SHOP DRAWINGS FOR REVIEW-APPROVAL, C/W ENGINEERS STAMP. ENGINEER MUST HAVE A CURRENT LICENSE TO PRACTICE IN THE PROVINCE OF ONTARIO AND BE IN GOOD STANDING WITH THE OPEO.
8. FIXED ROOF ACCESS LADDER, 7001 SERIES, MANUFACTURED BY 'SKYLINE GROUP' OR APPROVED EQUAL. MUST BE COMPLIENT WITH THE OBC AND OHSA. PROVIDE ENGINEERED SHOP DRAWINGS FOR REVIEW-APPROVAL, C/W ENGINEERS STAMP. ENGINEER MUST HAVE A CURRENT LICENSE TO PRACTICE IN THE PROVINCE OF ONTARIO AND BE IN GOOD STANDING WITH THE OPEO.

3 A2.04 GENERAL NOTES SCALE 1:200

LEGEND:

- ROOF MEMBRANE WALKWAY. DO NOT PLACE WALKWAY WITHIN 2000MM OF ROOF EDGE, UNLESS GUARDRAIL SYSTEM IS IN PLACE.
- AREA OF TAPERED ROOF INSULATION. MIN. SLOPE IS 1.0 % OR AS NOTED.
- RD — ROOF HOPPER AND SUMP. SEE TYPICAL DETAIL.
- SC — 'EMERGENCY' RELEASE OVERFLOW SCUPPER. SEE TYPICAL DETAIL.
- DIRECTION OF SLOPE OF STRUCTURE / TAPERED INSULATION .
- PV — PLUMBING VENT. SEE TYPICAL DETAIL.
- CONTROL JOINT
- R# — NEW ROOF IDENTIFICATION TAG. REFER TO 'BUILDING ASSEMBLIES SCHEDULE' ON DRAWING 'AX.0X.'

2 A2.04 LEGEND SCALE 1:200



1 A2.04 ROOF PLAN SCALE 1:200

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IAN HILL
LICENCE 5282

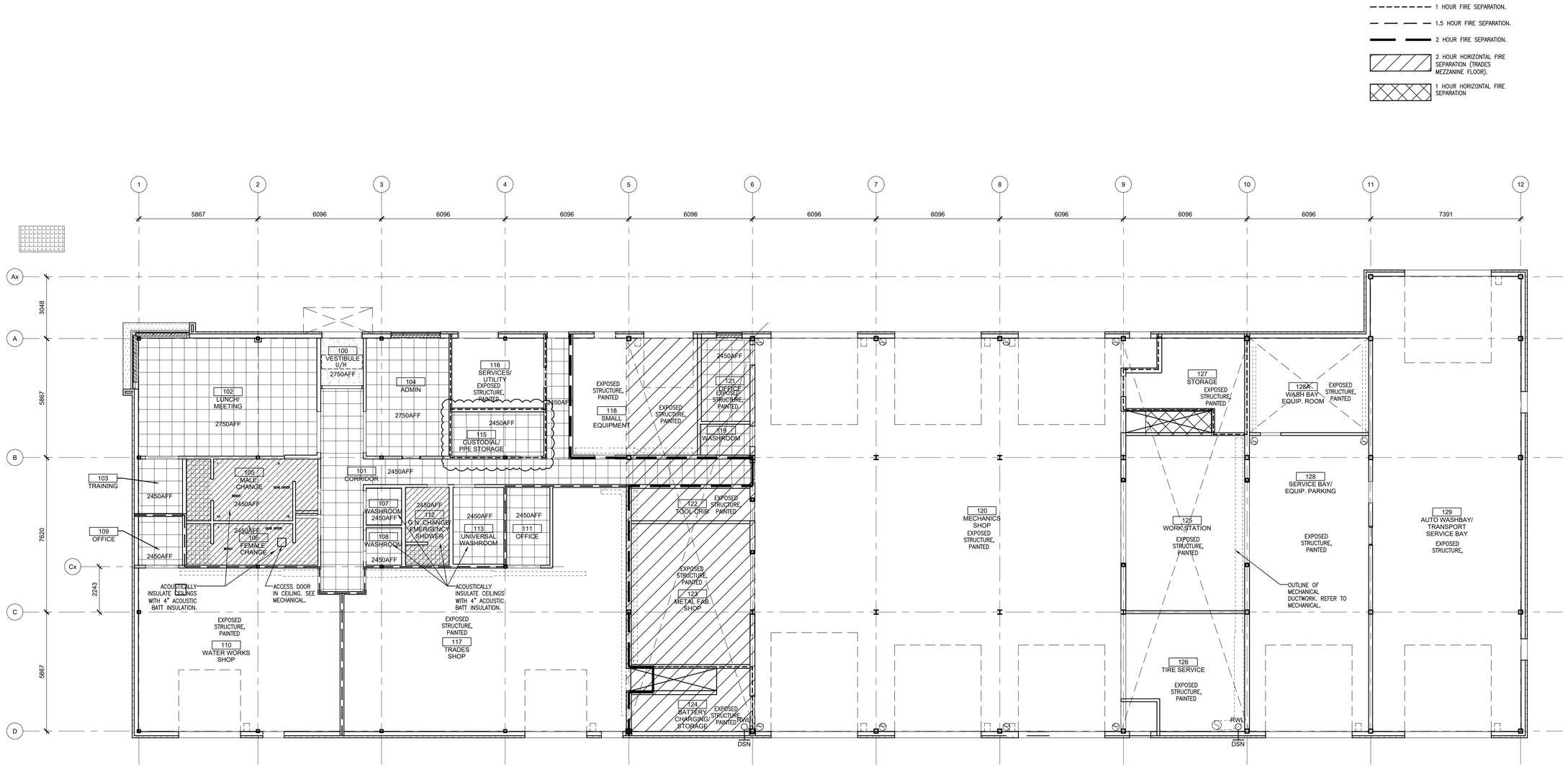
CRITCHLEY HILL ARCHITECTURE
ARCHITECTURE INC.
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
ROOF PLAN
LEGEND, NOTES, DETAILS

Drawn By:	Checked By:
KSH	ICH
Scale: AS NOTED	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A2.04



LEGEND: REFLECTED CEILING PLAN			
	ACT-1 610 X 610 ACOUSTICAL CEILING TILE	2750AFF	CEILING HEIGHT
	16MM TYPE X GYPSUM		SUN SCREEN BLIND @ WINDOW HEAD
	16MM MOISTURE RESISTANT GYPSUM		CEILING FAN SEE MECHANICAL DRAWINGS
	EXPOSED STRUCTURE. PAINT PER ROOM FINISH SCHEDULE AND NOTES HEREIN.		LIGHT FIXTURES SEE ELECTRICAL DRAWINGS
	INSULATED METAL PANEL (IMP) SOFFIT		MECHANICAL FIXTURES SEE MECHANICAL DRAWINGS

NOTES:

1. MECHANICAL AND ELECTRICAL FIXTURES ARE SHOWN ON THESE DRAWINGS FOR THE PURPOSE OF COORDINATION BETWEEN TRADES ONLY. ANY DISCREPANCIES WITH MECHANICAL / ELECTRICAL FIXTURES BETWEEN THE ARCHITECTURAL AND MECHANICAL / ELECTRICAL DRAWINGS THE MECHANICAL AND ELECTRICAL DRAWINGS SHALL COVERN. THE GENERAL CONTRACTOR SHALL REPORT ALL DISCREPANCIES BETWEEN THE REFLECTED CEILING PLAN AND MECHANICAL / ELECTRICAL DRAWINGS TO THE CONSULTANT AND RECEIVE A RESPONSE BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURE INDICATED ON THESE DRAWINGS ARE FOR COORDINATION PURPOSES ONLY. REFER TO STRUCTURAL DRAWINGS FOR ALL STRUCTURAL WORK.
3. UNLESS OTHERWISE NOTED, WHERE EXPOSED STRUCTURE PAINTED IS INDICATED, ASSUME ALL STRUCTURAL DECK, JOISTS, BEAMS, ALL OTHER MISC. STRUCTURE TO BE PAINTED ALONG WITH ALL ELECTRICAL ITEMS SHALL BE PAINTED THE SAME COLOUR. DO NOT PAINT DUCTWORK.
4. REFER TO ROOM FINISH SCHEDULE FOR ALL OTHER NOTES.

1 / A3.01 MAIN FLOOR REFLECTED CEILING PLAN
SCALE 1:100

PROJECT NORTH

Revision	Date
Issued For Permit and Tender	07.28.2022

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

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Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Leo Road
Marathon, ON

Drawing Title:
MAIN FLOOR REFLECTED CEILING PLAN

Drawn By:	Checked By:
KSH	ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A3.01

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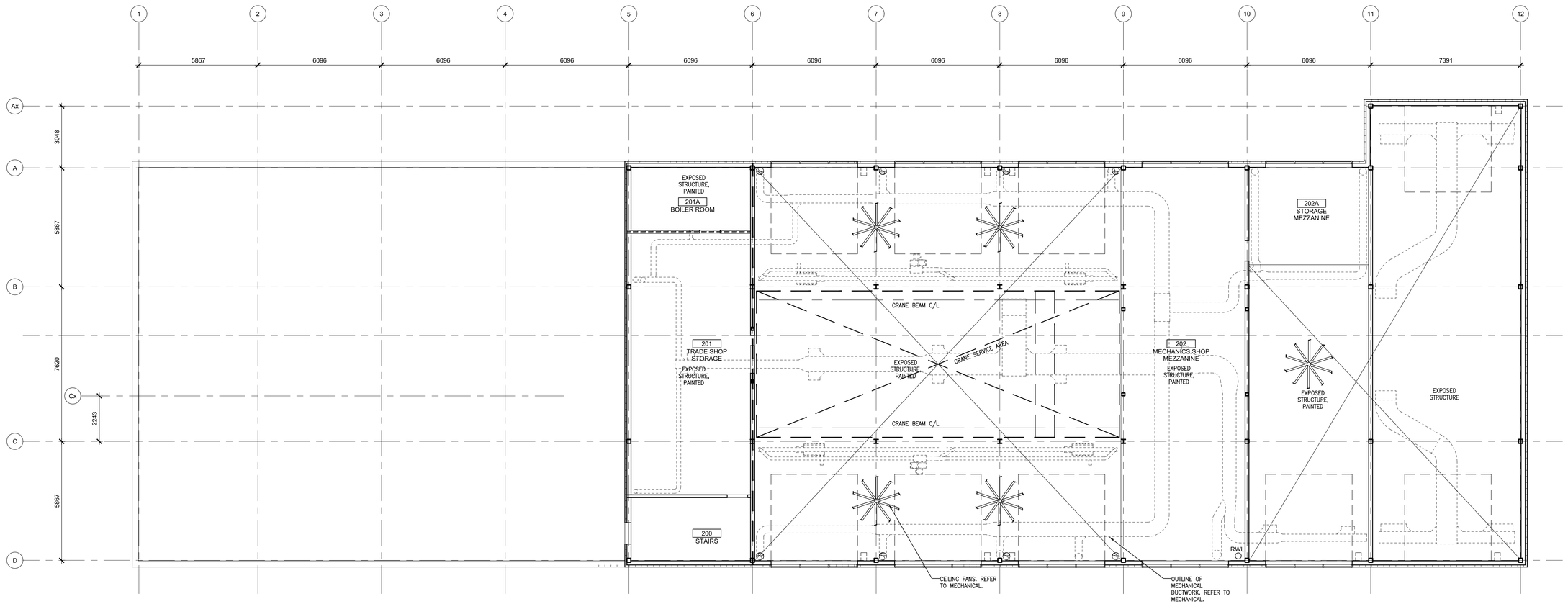
1 HOUR FIRE SEPARATION.

1.5 HOUR FIRE SEPARATION.

2 HOUR FIRE SEPARATION.

2 HOUR HORIZONTAL FIRE SEPARATION (TRADES MEZZANINE FLOOR).

1 HOUR HORIZONTAL FIRE SEPARATION



1 / A3.02 MEZZANINE REFLECTED CEILING PLAN
SCALE 1:100

PROJECT NORTH

Revision	Date
Issued For Permit and Tender	07.28.2022

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Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Lake Road
Marathon, ON

Drawing Title:
MEZZANINE REFLECTED CEILING PLAN

Drawn By:	Checked By:
KSH	ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A3.02

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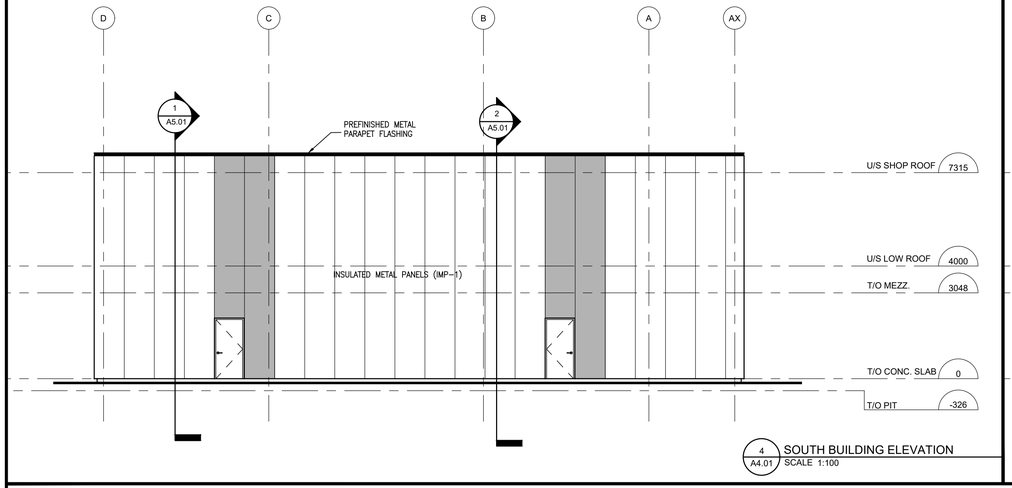
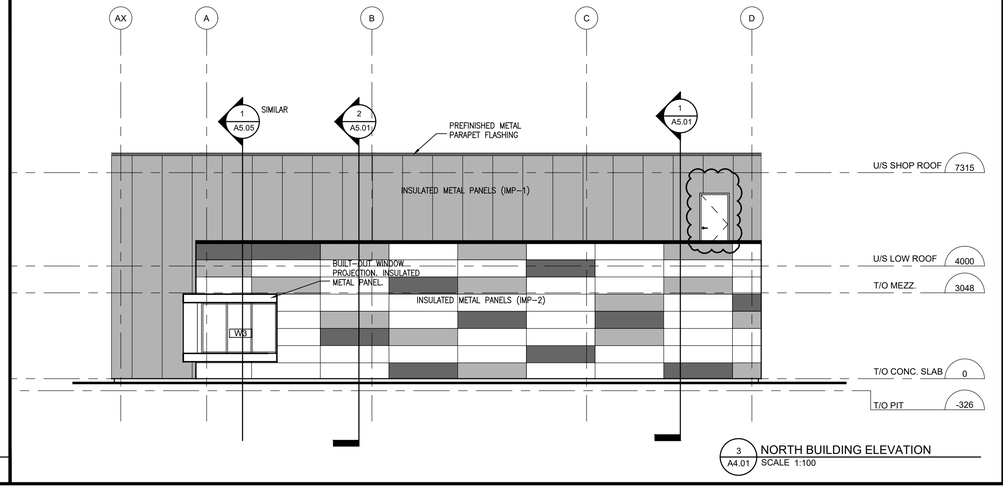


4 A4.01 SOUTH BUILDING ELEVATION
SCALE 1:100



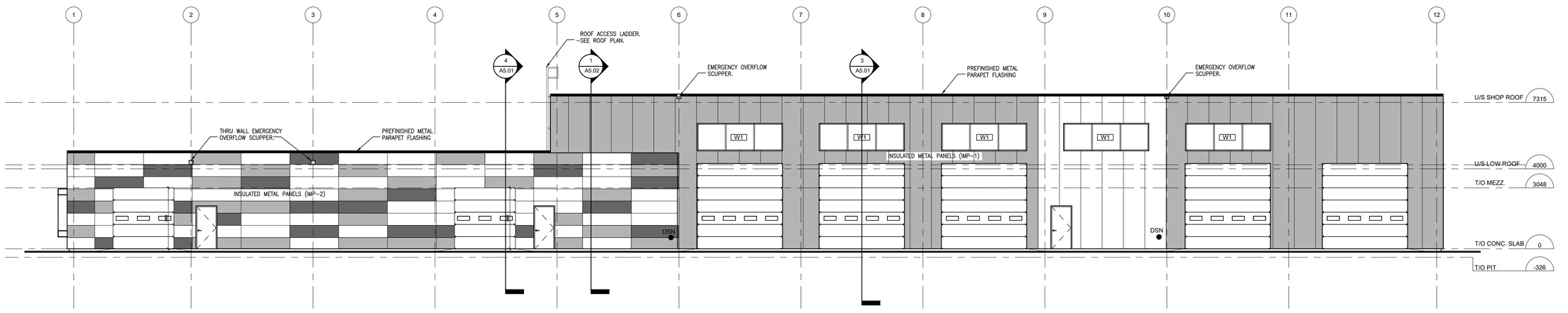
3 A4.01 NORTH BUILDING ELEVATION
SCALE 1:100

LEGEND:

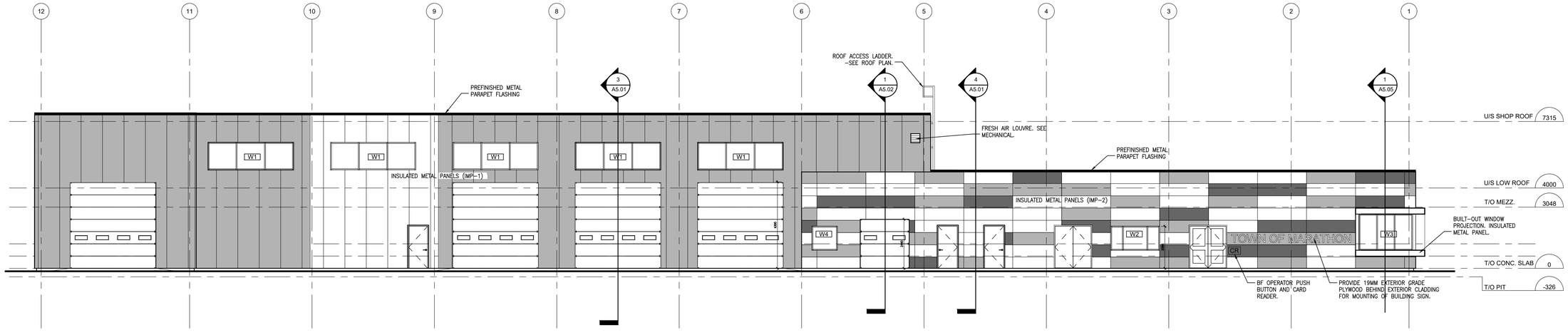
- INSULATED METAL PANEL — IMP-1 VERTICAL -1220 WIDE X 102 THICK 'CF MESA' WALL PANEL. R-VALUE: 32.79 COLOUR: ARCHITECT TO SELECT.
- INSULATED METAL PANEL — IMP-2 HORIZONTAL -610 X 2440 X 102 THICK 'CF ARCHITECTURAL HORIZONTAL' WALL PANEL. R-VALUE: 32.79 COLOUR: ARCHITECT TO SELECT.
- IMP COLOUR-1
- IMP COLOUR-2
- IMP COLOUR-3
- W1 — WINDOW TYPE ID TAG: REFER TO ELEVATION ON THIS SHEET.
- L — WALL MOUNTED LIGHT, SEE ELECTRICAL DRAWINGS
- C — WALL MOUNTED SECURITY CAMERA, SEE ELECTRICAL DRAWINGS
- DSN — DOWNSPOUT NOZZLE, SEE MECHANICAL DRAWINGS
- HB — HOSE BIBB, SEE MECHANICAL DRAWINGS
- CR — CARD READER, SEE ELECTRICAL DRAWINGS
- LOUVRE, SEE MECHANICAL DRAWINGS

NOTES:

1. UNLESS NOTED OR DETAILED OTHERWISE, CAULK JOINTS OF ALL DISSIMILAR EXTERIOR FINISHES.



2 A4.01 WEST BUILDING ELEVATION
SCALE 1:100



1 A4.01 EAST BUILDING ELEVATION
SCALE 1:100

No.	Date	Revision
0	07.28.2022	Issued For Permit and Tender

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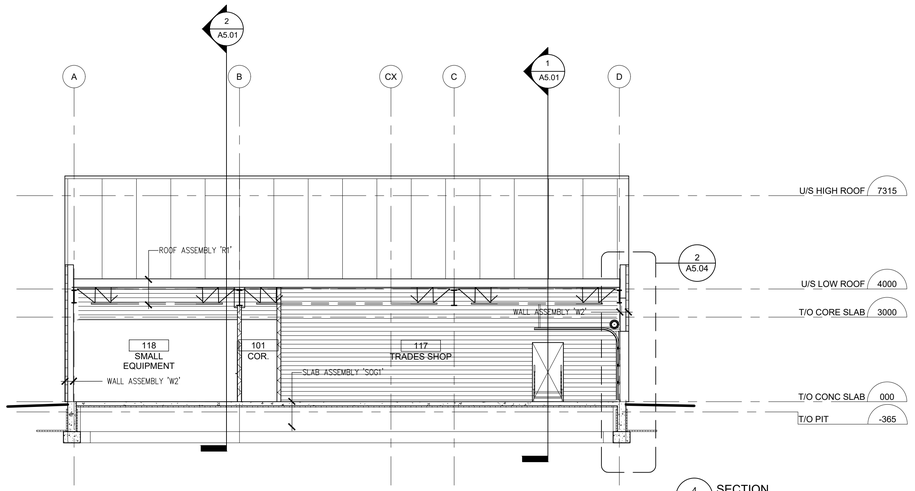
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Lake Road
Marathon, ON

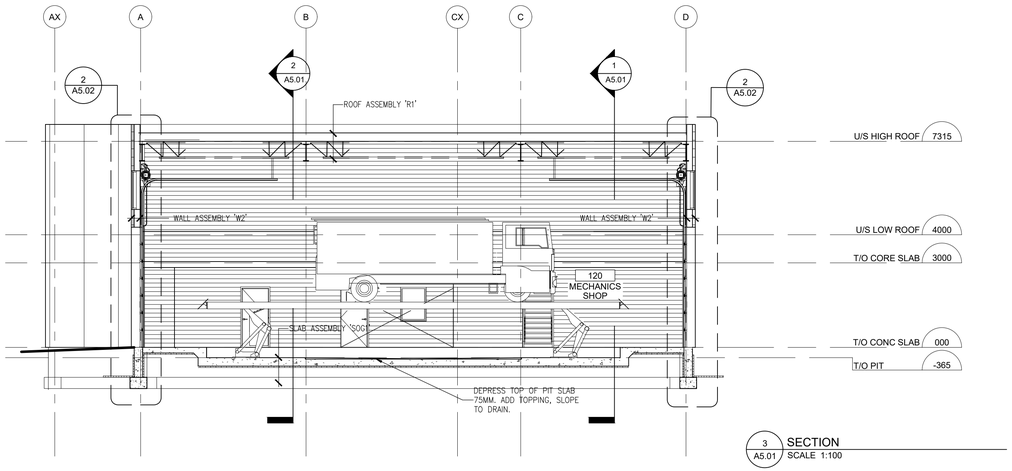
Drawing Title:
BUILDING ELEVATIONS

Drawn By:	Checked By:
KSH	ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A4.01



4 A5.01 SECTION
SCALE 1:100



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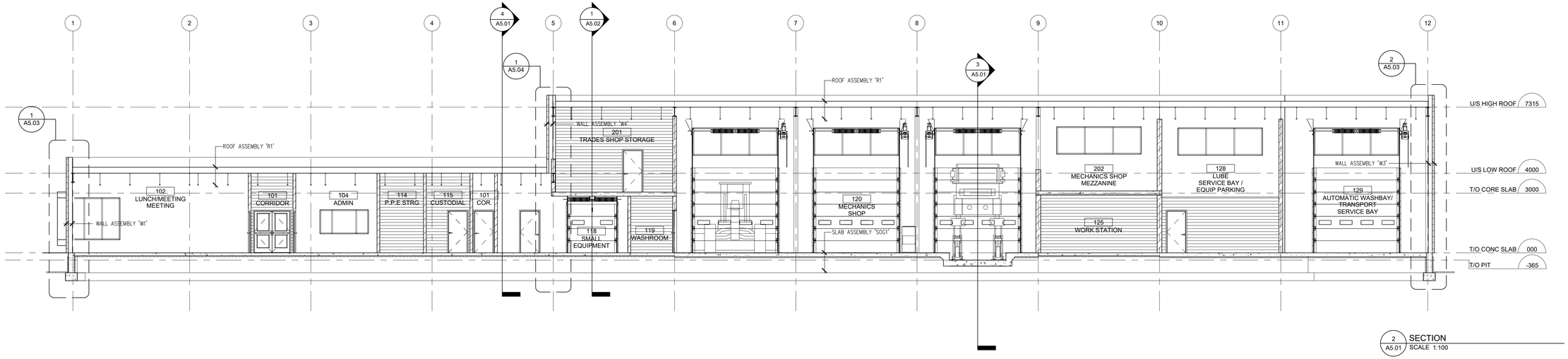

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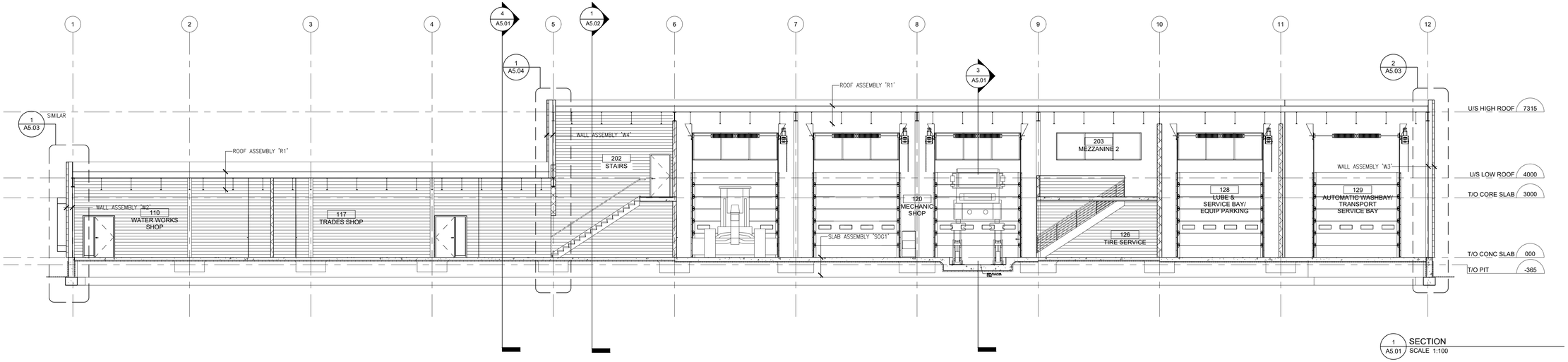

1 A5.01 SECTION
SCALE 1:100

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	Revision	Date

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Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
BUILDING SECTIONS

Drawn By: KSH	Checked By: ICH
Scale: 1:100	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A5.01

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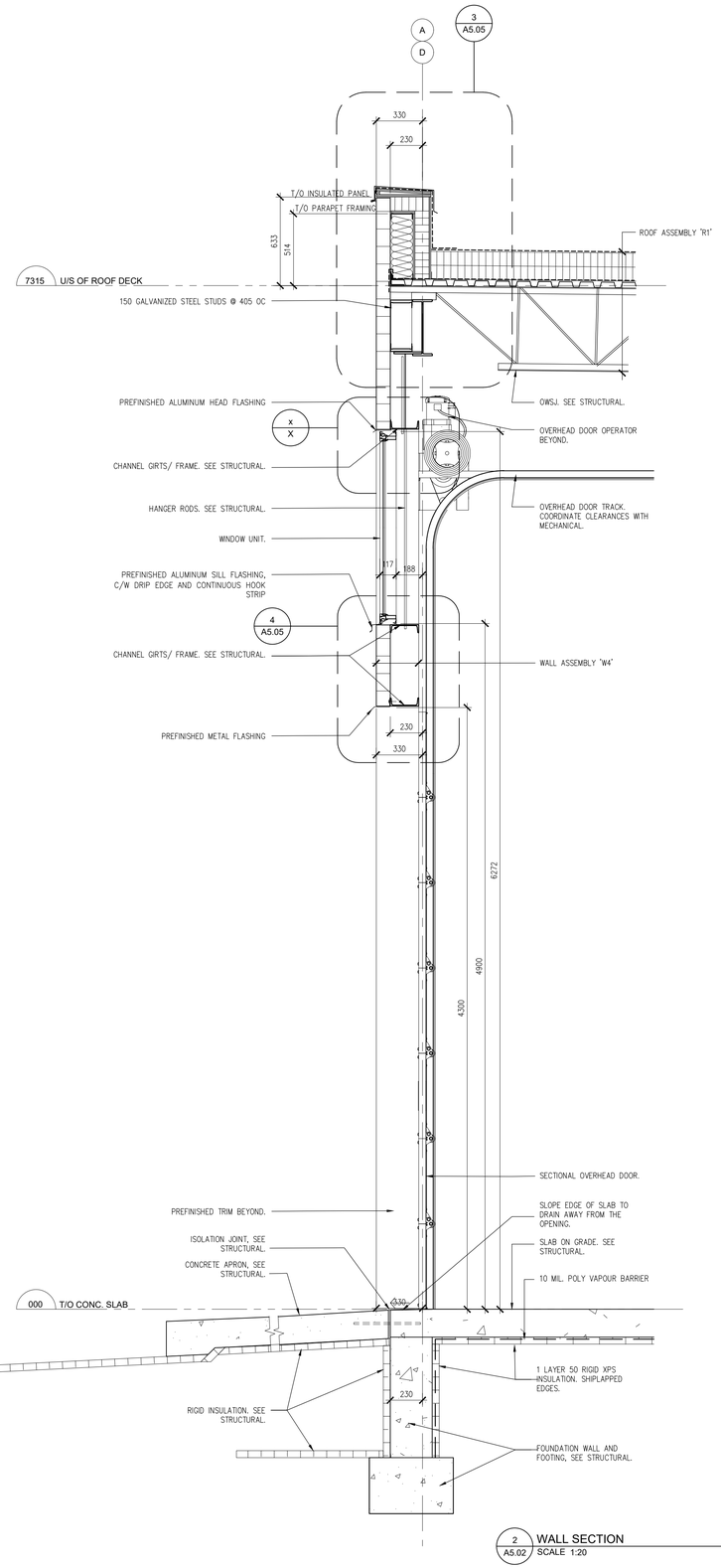
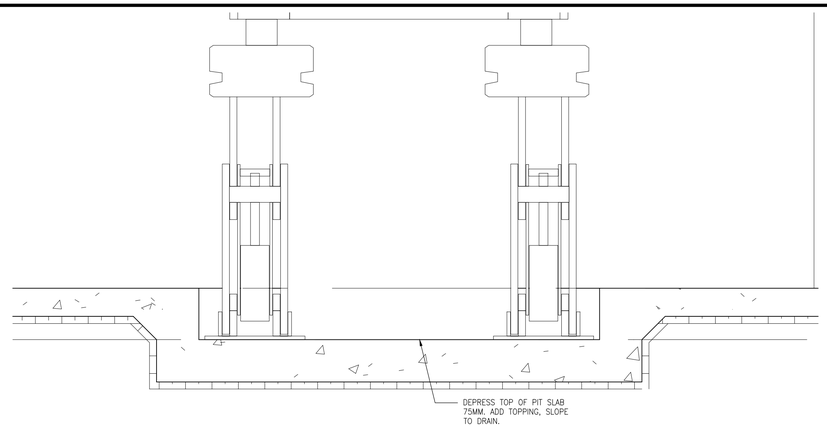


2 A5.02 WALL SECTION
SCALE 1:20



3 A5.02 PIT SECTION
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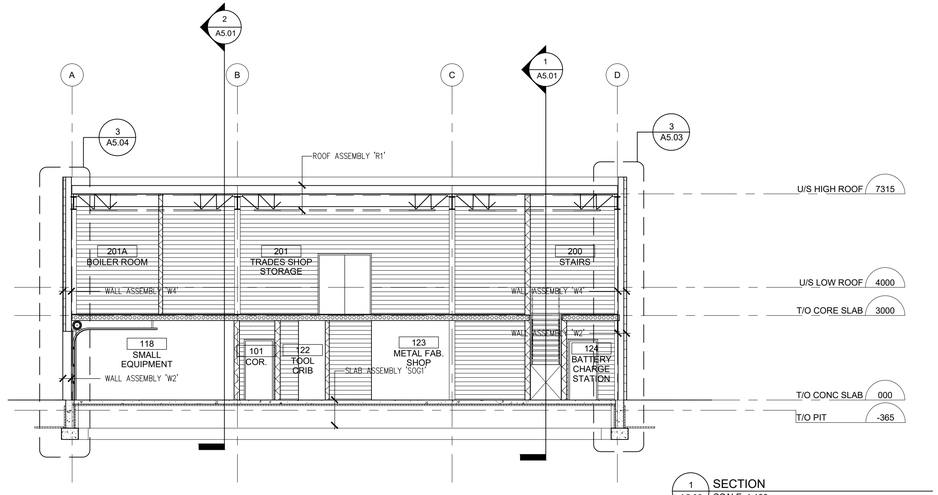

1 A5.02 SECTION
SCALE 1:100

No	Revision	Date
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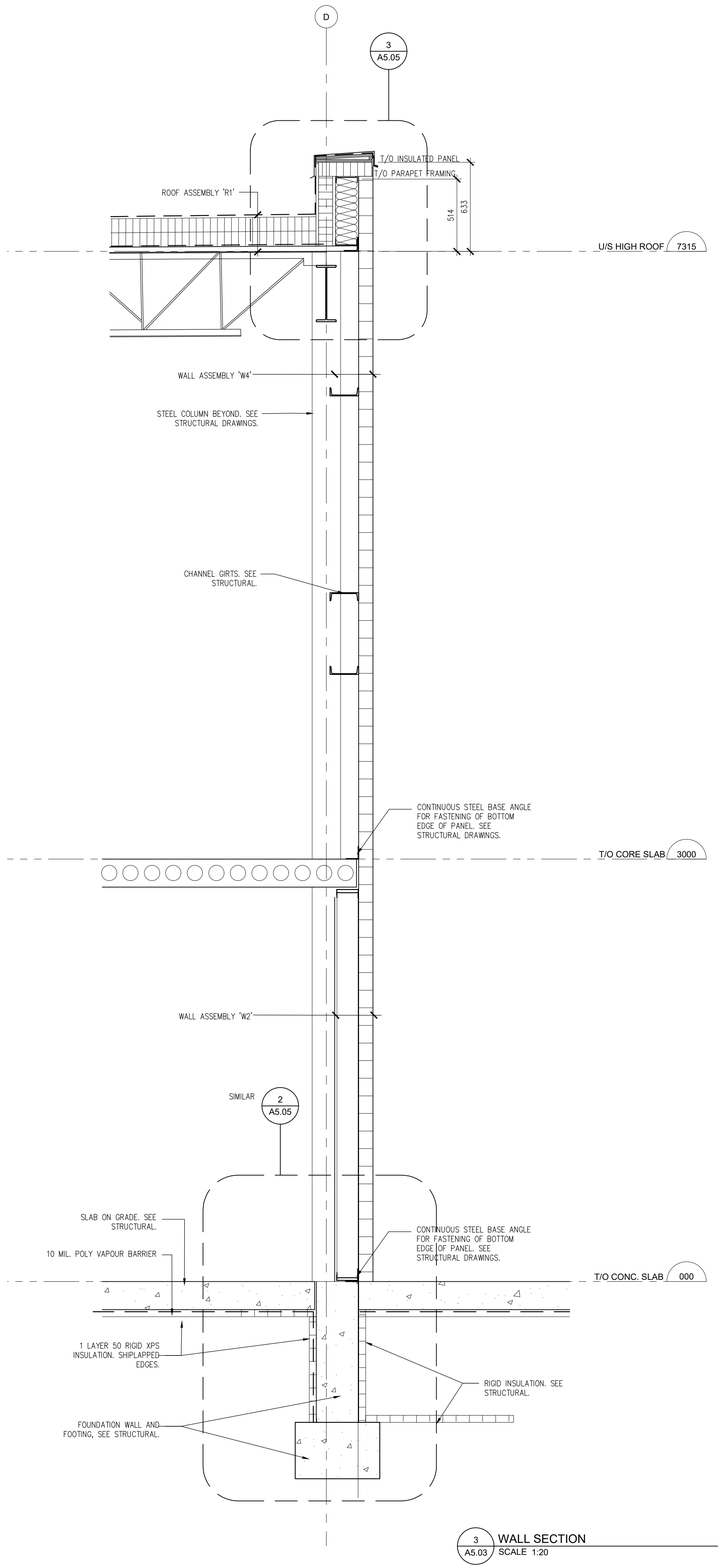
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
BUILDING SECTION
WALL SECTIONS

Drawn By:	Checked By:
KSH	ICH
Scale: AS NOTED	Project No: 2208

Date Plotted:
August 12, 2022
Date Revised:

Drawing No:
A5.02



3 A5.03 WALL SECTION
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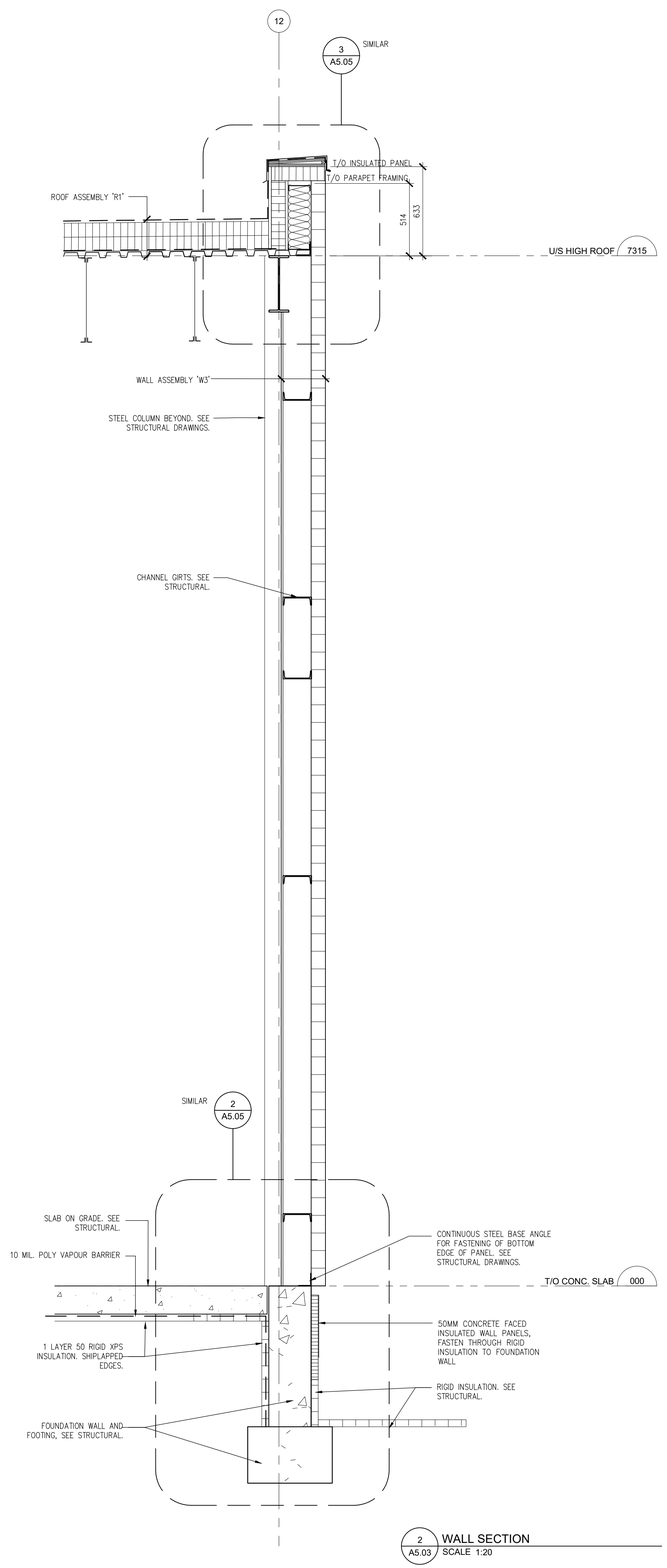

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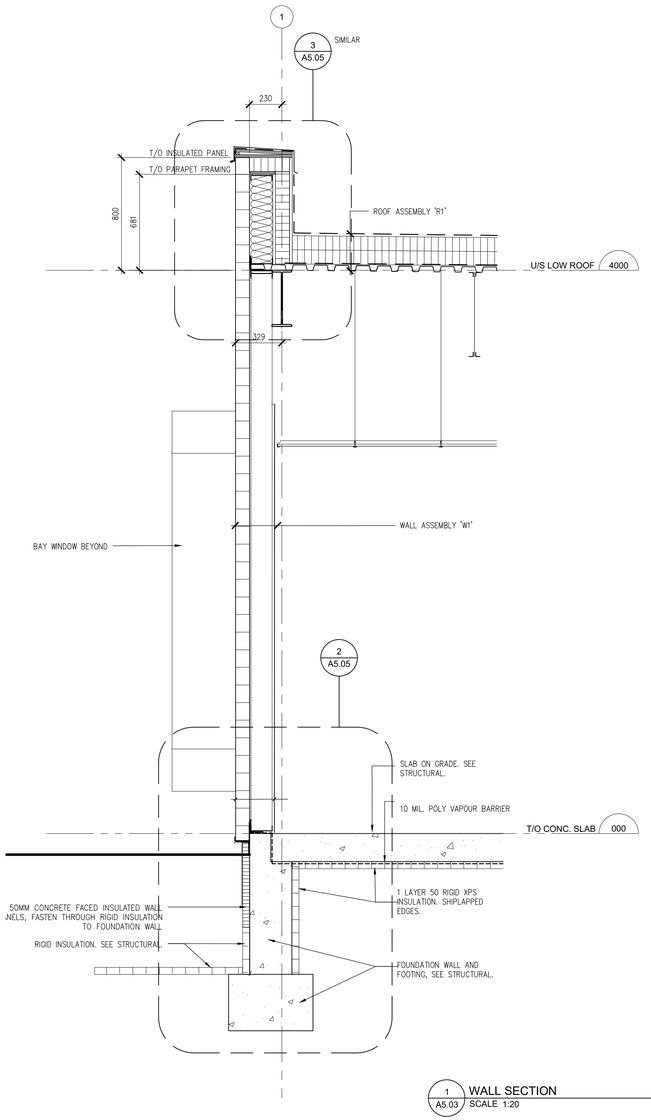

1 A5.03 WALL SECTION
SCALE 1:20

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Revision		Date

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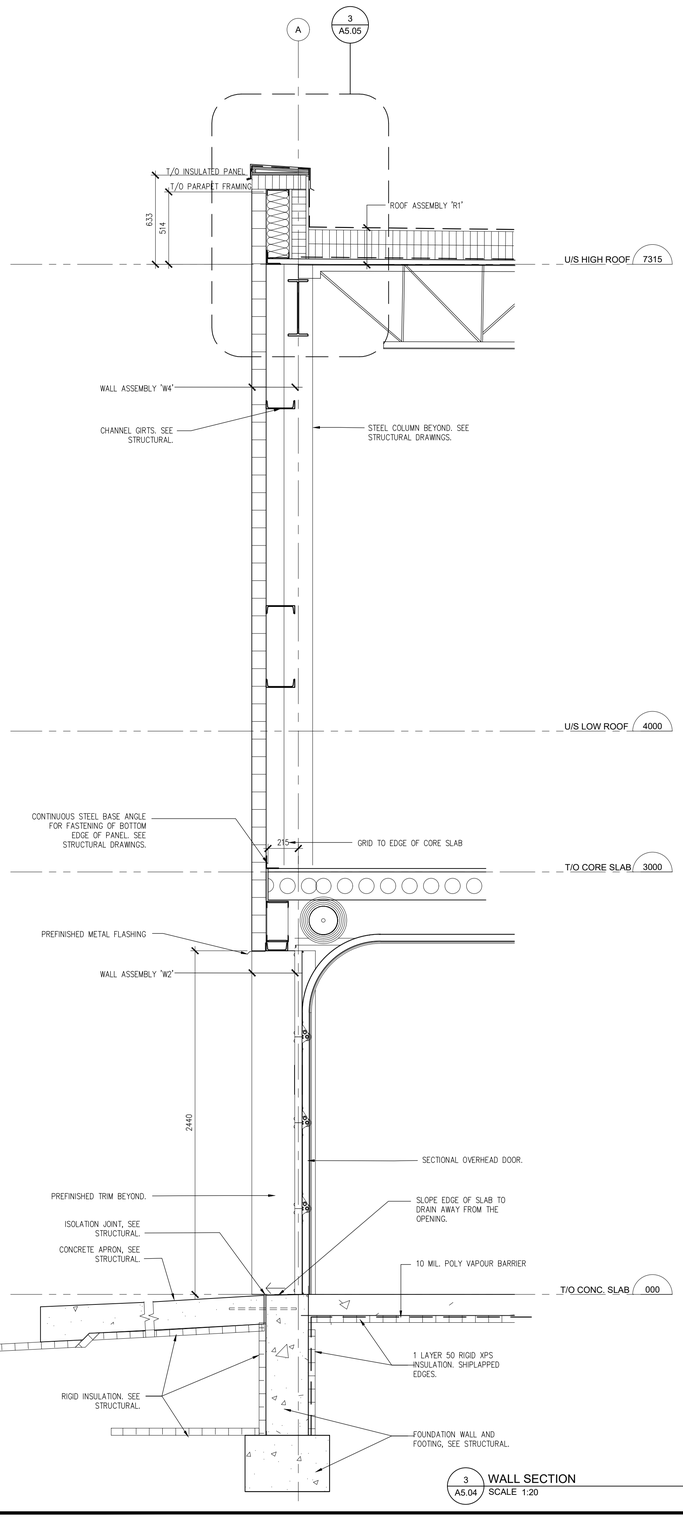
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

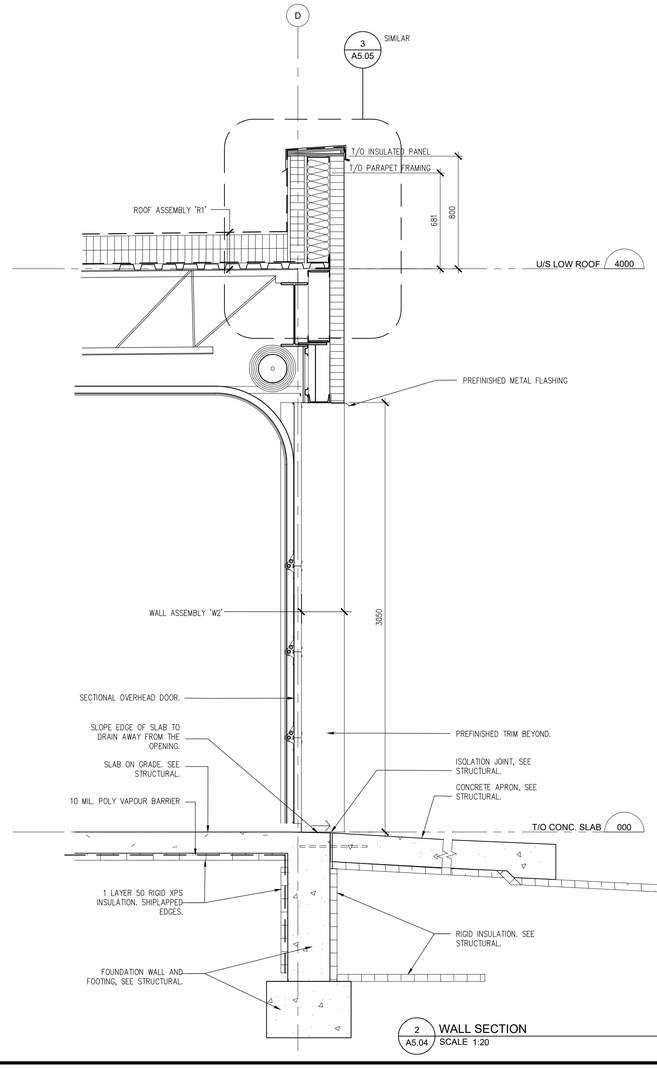
Drawing Title:
WALL SECTIONS

Drawn By: KSH	Checked By: ICH
Scale: 1:20	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A5.03



3 A5.04 WALL SECTION
SCALE 1:20



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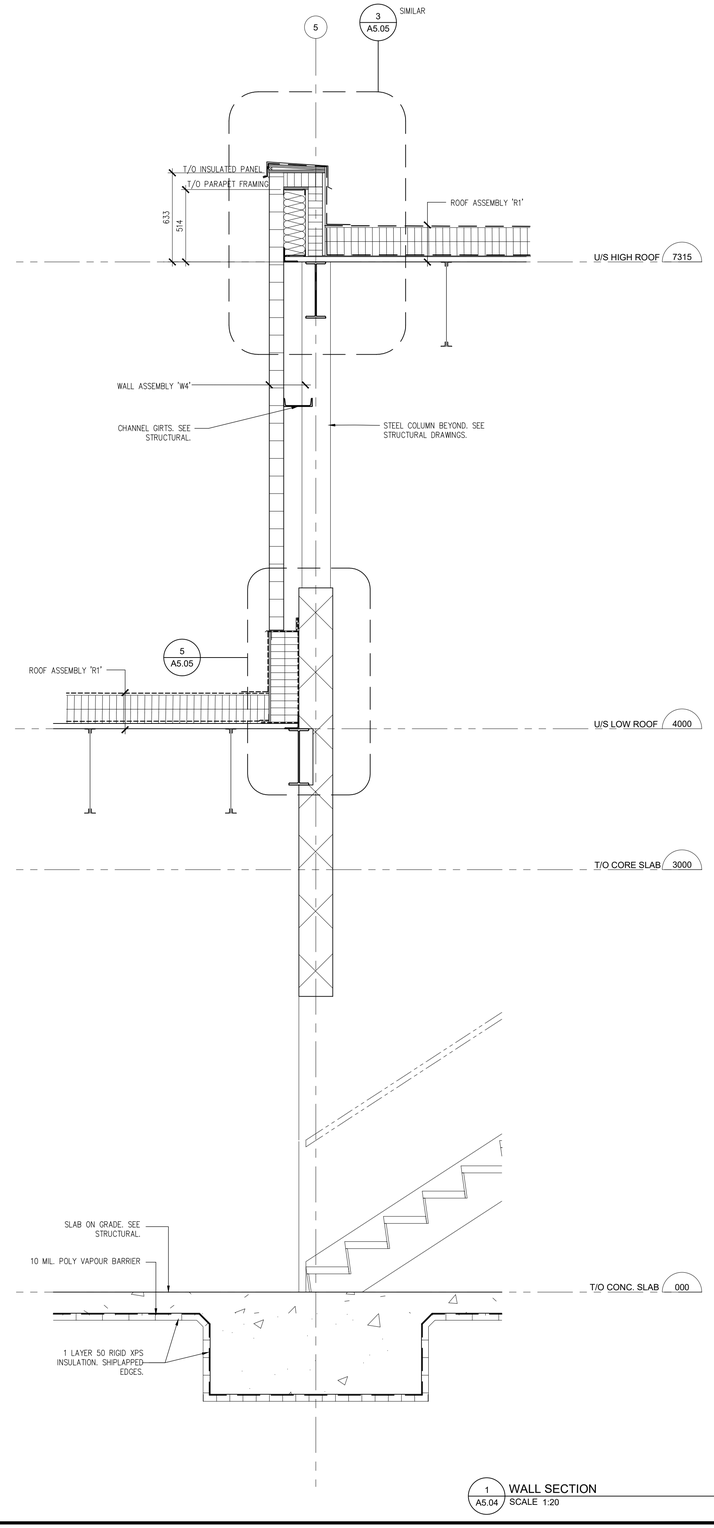

1 A5.04 WALL SECTION
SCALE 1:20

0	Issued For Permit and Tender	
07.28.2022	Date	Revision

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Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
WALL SECTIONS

Drawn By: KSH	Checked By: ICH
Scale: 1:20	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A5.04

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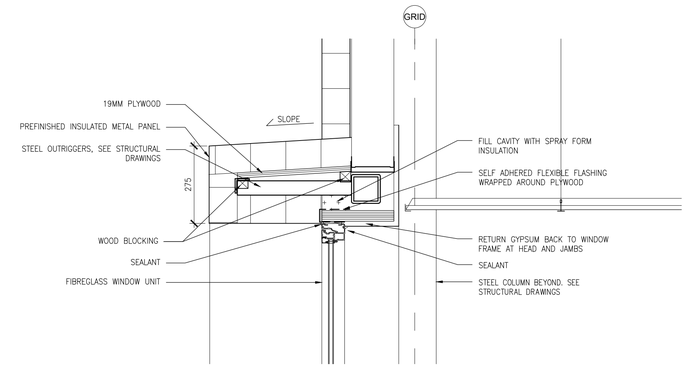
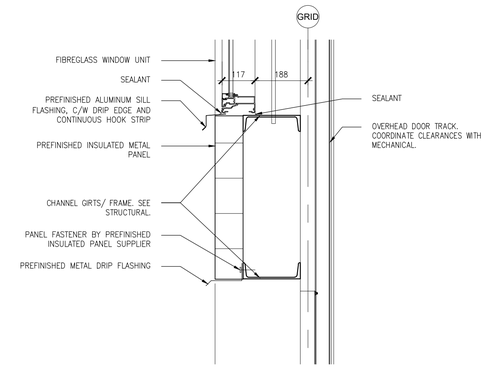
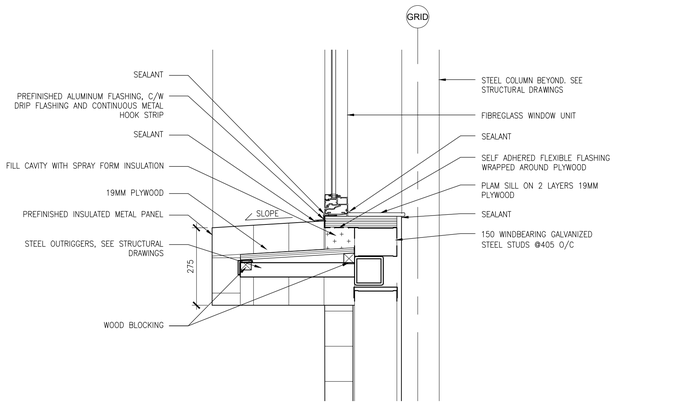


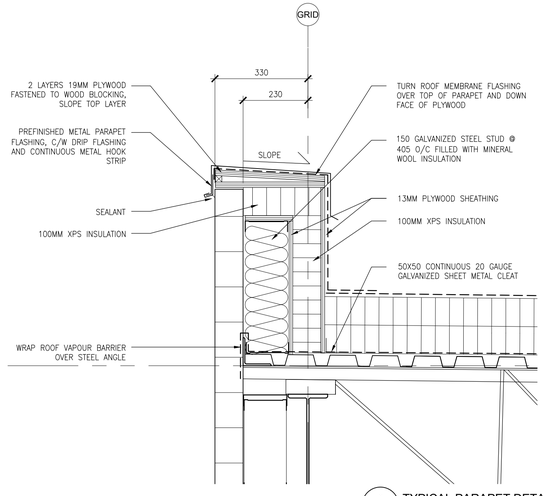
7 A5.05 BAY WINDOW HEAD DETAIL
SCALE 1:10



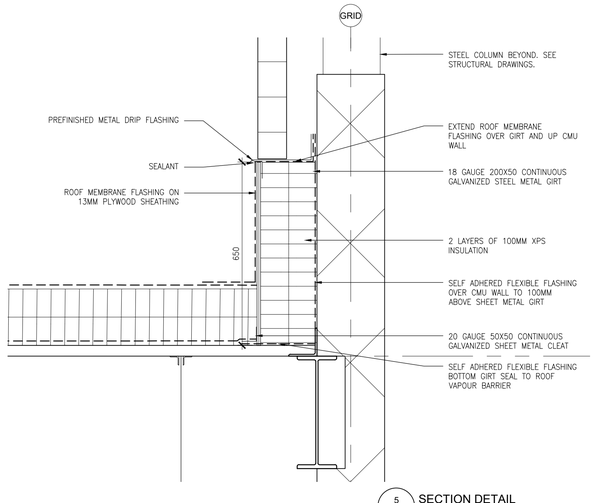
4 A5.05 SECTION DETAIL
SCALE 1:10



6 A5.05 BAY WINDOW SILL DETAIL
SCALE 1:10



3 A5.05 TYPICAL PARAPET DETAIL
SCALE 1:10



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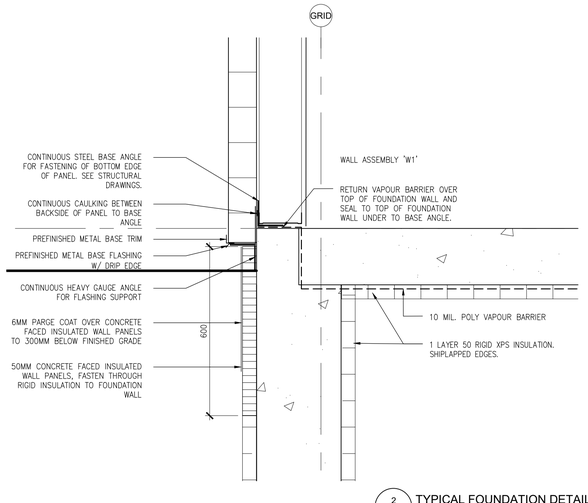
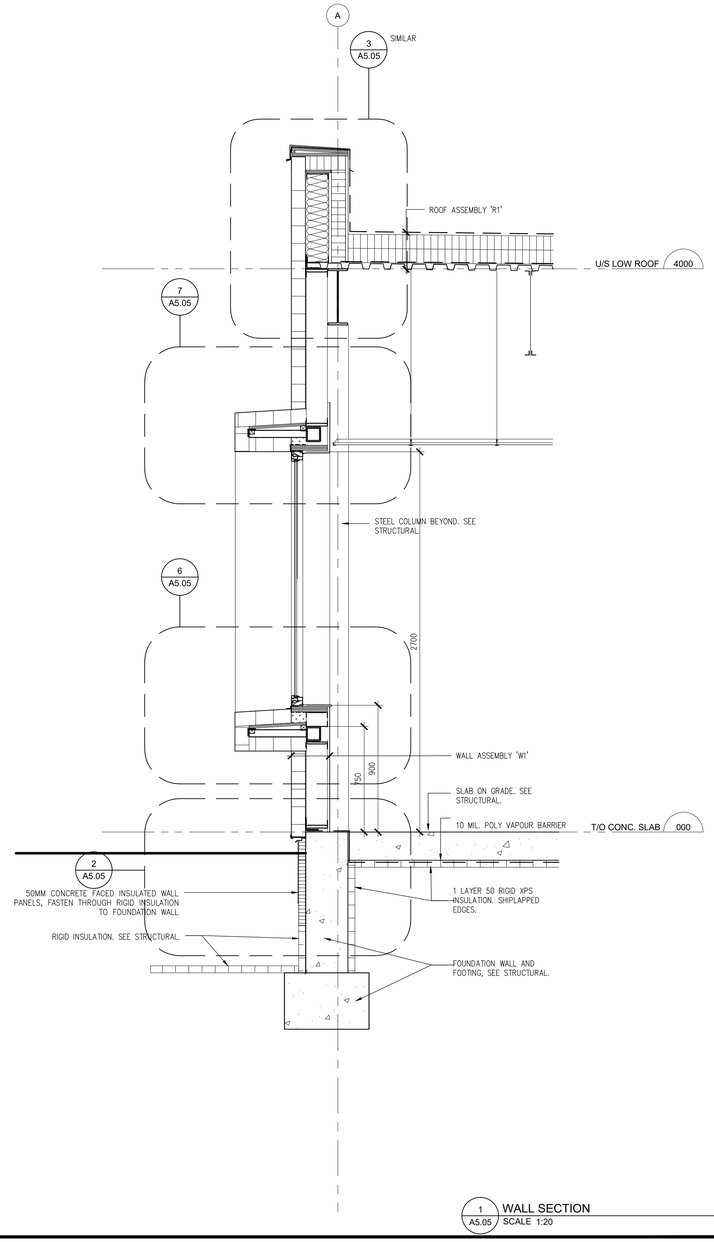


2 A5.05 TYPICAL FOUNDATION DETAIL
SCALE 1:10



1 A5.05 WALL SECTION
SCALE 1:20

0	Issued For Permit and Tender	07.28.2022
Revision		Date

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

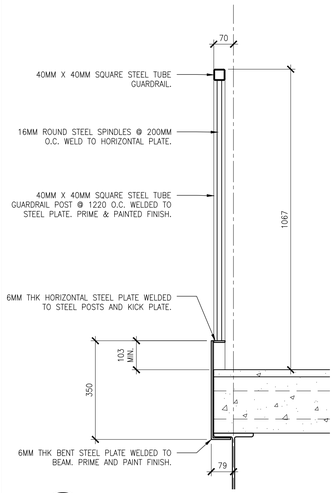
CRITCHLEY HILL
ARCHITECTURE
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

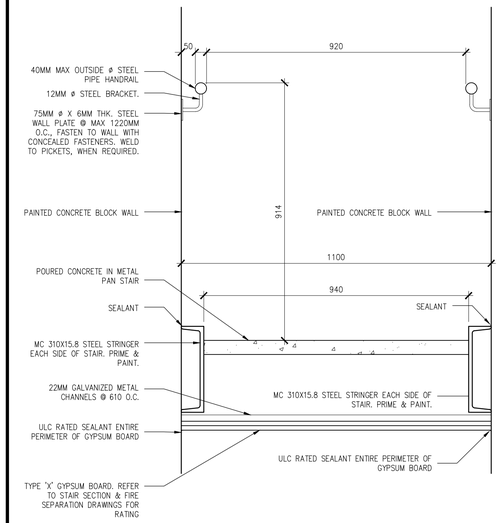
Drawing Title:
WALL SECTION
SECTION DETAILS

Drawn By:	Checked By:
KSH	ICH
Scale: AS NOTED	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

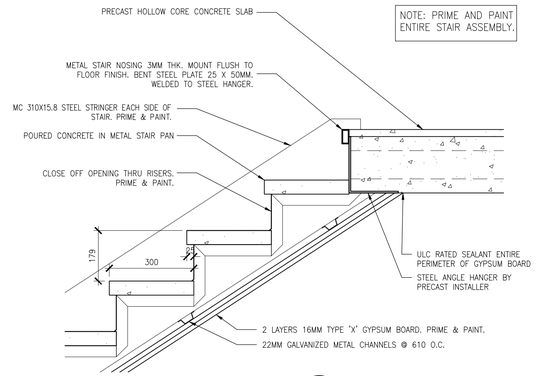
Drawing No:
A5.05



6 A5.06 TYPICAL GUARDRAIL DETAIL
SCALE 1:10



5 A5.06 TYPICAL STAIR DETAIL
SCALE 1:10



4 A5.06 TYPICAL STAIR DETAIL
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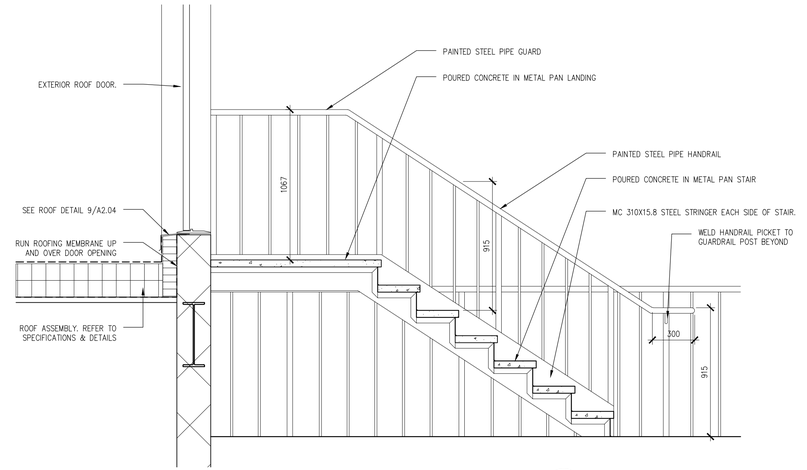
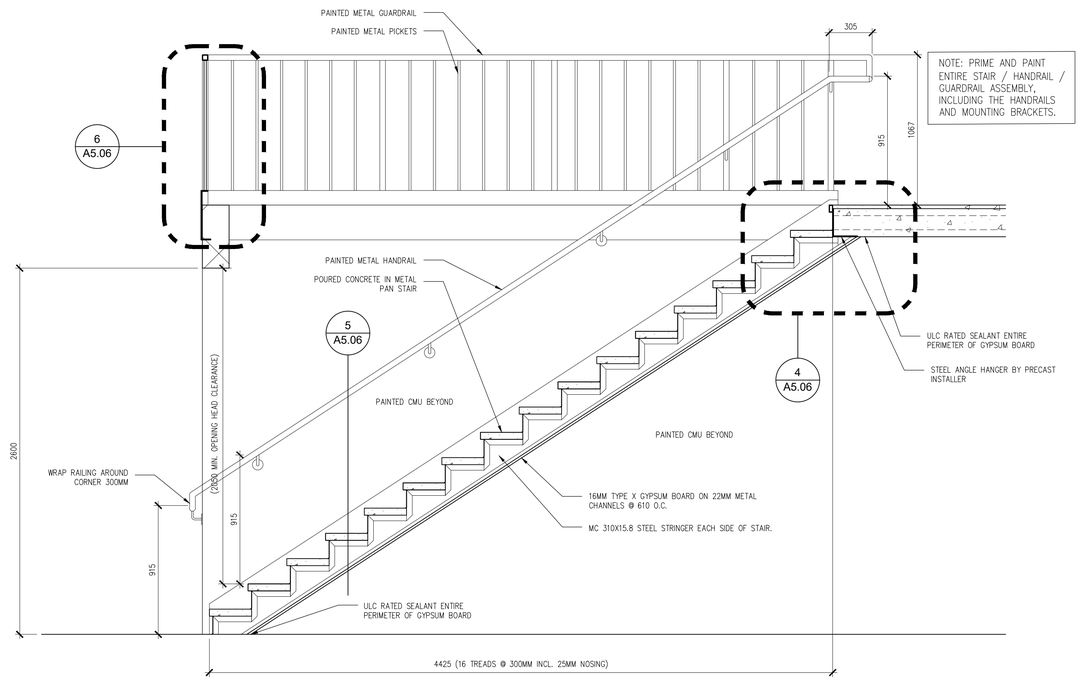
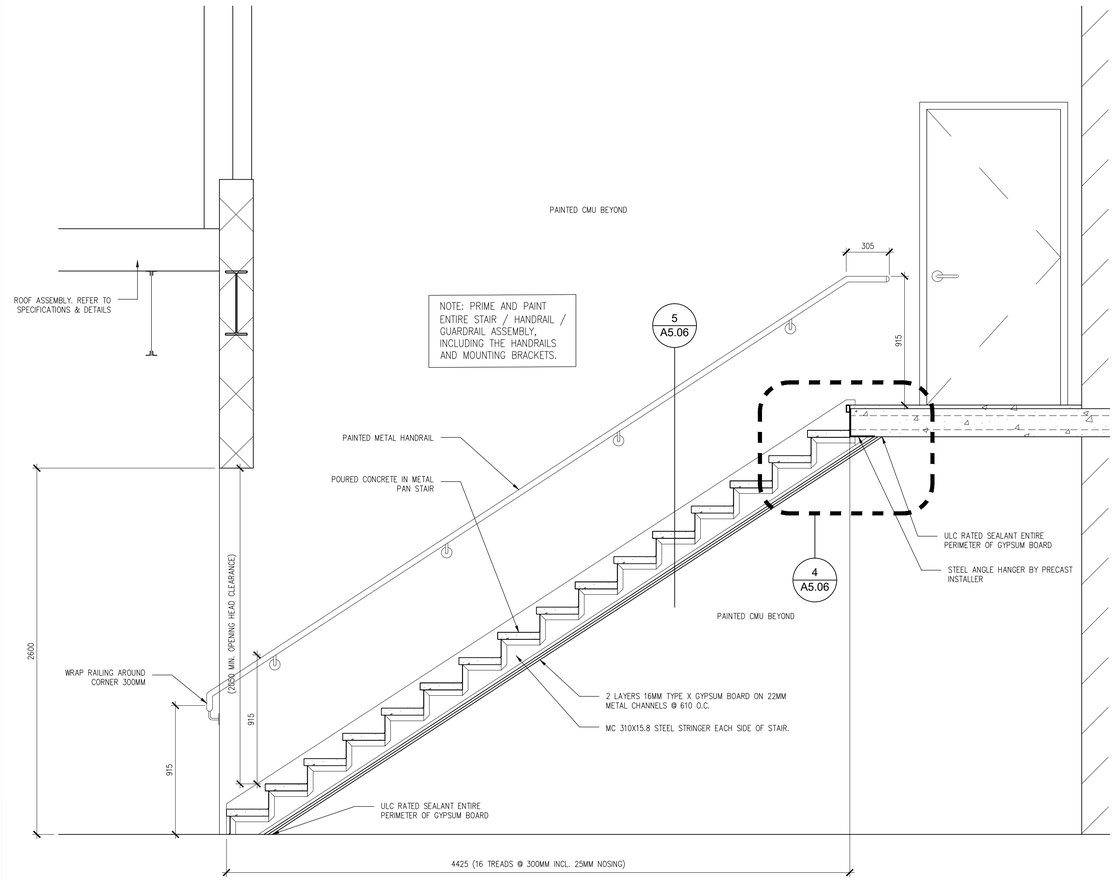


3 A5.06 STAIRS 200
SCALE 1:20



2 A5.06 STAIR - STORAGE 127
SCALE 1:20



1 A5.06 STAIR - BATTERY CHARGING/STORAGE 124
SCALE 1:20

0	Issued For Permit and Tender	07.28.2022
	Revision	Date

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
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Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
STAIR DETAILS

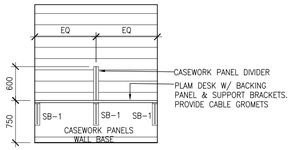
Drawn By:	Checked By:
KSH	ICH
Scale: AS NOTED	Project No: 2208
Date Plotted: August 12, 2022	
Date Revised:	

Drawing No:
A5.06

L:\PROJECTS\2022\2208 Town of Marathon New Maintenance Building\2.0 Design-Contract Documents\2.5 Design Drawings\2.5.5 Working Drawings\2208_Sections.dwg

GENERAL INTERIOR FINISH NOTES:

1. SUPPLY AND INSTALL MAGNETIC TACKBOARDS AS PER SPECIFICATIONS. SITE DIRECTED LOCATION, COORDINATE WITH OWNER.
2. SUPPLY AND INSTALL 600X900 FRAMED MIRROR OVER ALL LAVATORIES.



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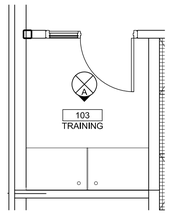
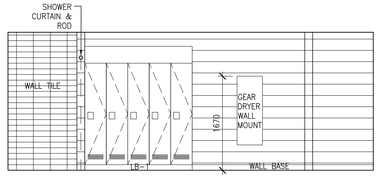


6 / A7.01 103 TRAINING
SCALE 1:50



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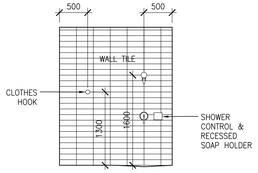

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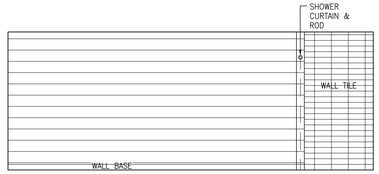

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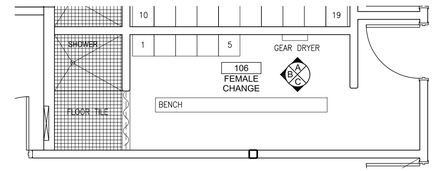
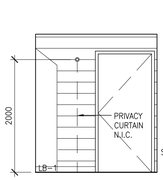


3 / A7.01 106 FEMALE CHANGE
SCALE 1:50



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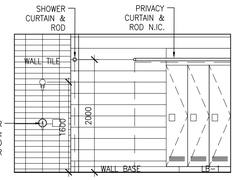

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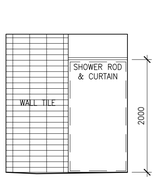

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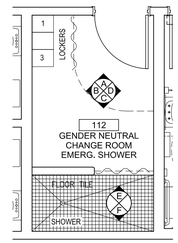

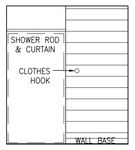

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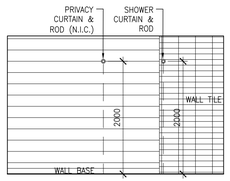
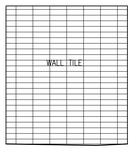
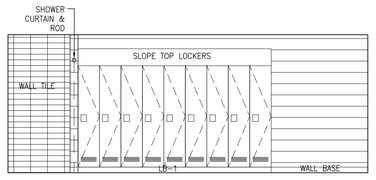


ELEVATION D



ELEVATION F

5 / A7.01 112 G.N CHANGE & EMRG. SHOWER
SCALE 1:50



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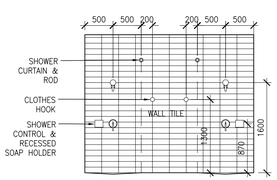

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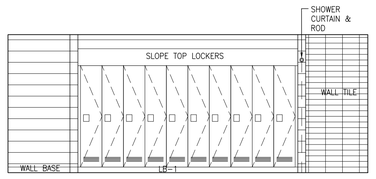

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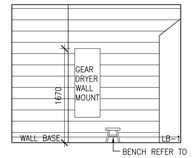

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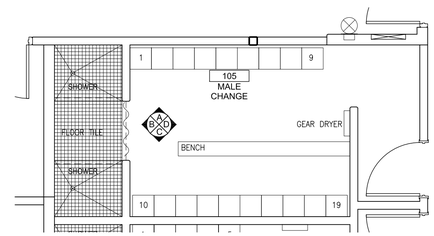
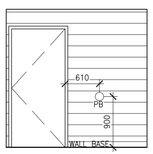


2 / A7.01 105 MALE CHANGE
SCALE 1:50



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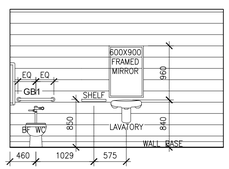

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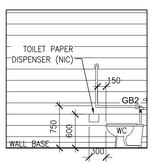

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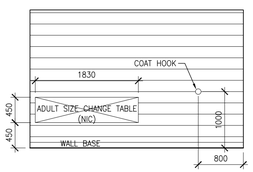

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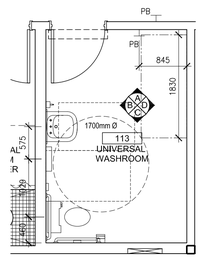
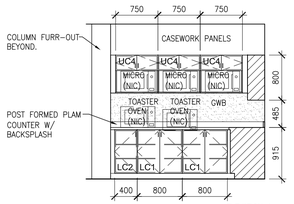


4 / A7.01 113 UNIVERSAL WASHROOM
SCALE 1:50



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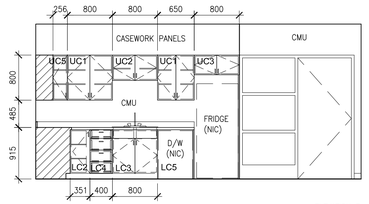

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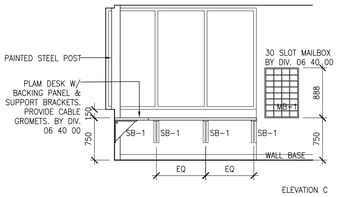

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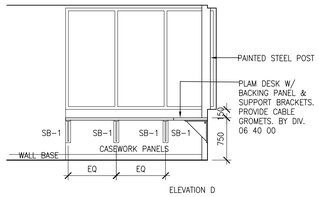

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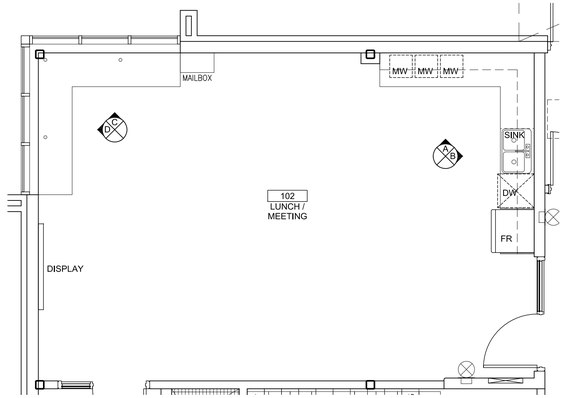


1 / A7.01 102 LUNCH / MEETING
SCALE 1:50

PROJECT NORTH

Date	Revision
08.12.2022	ISSUED FOR TENDER & PERMIT
	0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

CRITCHLEY HILL
ARCHITECTURE

CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
INTERIOR ELEVATIONS

Drawn By:	Checked By:
KSH	ICH
Scale: 1:50	Project No: 2208

Date Plotted:
August 11, 2022

Date Revised:
AUGUST 12, 2022

Drawing No:
A7.01

L:\PROJECTS\2022\2208 Town of Marathon New Maintenance Building\2.0 Design-Contract Documents\2.5 Design Drawings\2.5.5 Working Drawings\2208_Interior Elevations.dwg

CASEWORK NOTES:

1. CAULK AND SEAL ALL BACKSPLASHES. CAULK PERIMETER OF ALL CABINETS AGAINST WALLS.

2. PROVIDE +/- 25MM OR AS NOTED FILLER STRIP TO MATCH ADJACENT CASEWORK AT ALL SIDEWALLS. PROVIDE FILLER AT INSIDE CORNERS TO ALLOW FOR DOORS TO FULLY SWING OPEN. FILLERS AT INSIDE CORNERS TO BE CO-PLANAR WITH DOORS. WRAP ALL FILLERS ON UNDERSIDE OF UPPER CASEWORK BACK TO WALL.

3. UNLESS OTHERWISE NOTED ALL ENDS OF COUNTERS, CABINETS, GABLES, BACKSPLASHES, KICKPLATES, DOORS AND FILLER PANELS TO BE FINISHED TO MATCH ADJACENT CASEWORK.

4. PROVIDE ALL CUTOUTS FOR MISCELLANEOUS OPENINGS AS REQUIRED BY ALL TRADES. COORDINATE LOCATION AND SIZES FOR CUTOUTS WITH ALL TRADES BEFORE CUTTING OPENINGS. FINISH EXPOSED EDGES TO MATCH ADJACENT CASEWORK. COORDINATE WITH OTHER TRADES ALL REQUIRED ROUGH OPENINGS FOR FIXTURES BY OTHERS TO BE MOUNTED WITHIN CASEWORK.

5. ENSURE CABINETS ARE COORDINATED TO RECEIVE ALL EQUIPMENT AS PER EQUIPMENT LIST AND REQUIREMENTS. COORDINATE AS REQUIRED WITH OWNER ALL OWNER SUPPLIED EQUIPMENT TO ENSURE PROPER CLEARANCES PRIOR TO FABRICATION.

6. UNLESS OTHERWISE NOTED ON DRAWINGS ALL CASEWORK BODY MATERIALS ARE ASSUMED TO BE MELAMINE ON PARTICLE CORE BOARD (MCP). SEE SPECIFICATIONS.

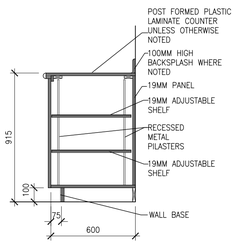
7. SEE CASEWORK DETAILS FOR CONSTRUCTION OF ALL COUNTER TOPS. IF NOT NOTED ASSUME ALL COUNTERTOPS AND DESKTOPS TO BE POST FORMED PLASTIC LAMINATE WITH 180° WRAP NOSING.

8. UNLESS OTHERWISE NOTED, CABINET BASES TO BE FINISHED WITH WALL BASE BY DIVISION 09 00 00 AS PER ROOM FINISH SCHEDULE.

9. SITE MEASURE ALL DIMENSIONS PRIOR TO FABRICATION AND REPORT ANY INCONSISTENCIES TO THE ARCHITECT.

10. ALL FASTENERS TO BE CONCEALED. IF FASTENINGS MUST OCCUR IN AN EXPOSED CONDITION COUNTERSINK FASTENER AND PLUG WITH COLOUR MATCH FASTENER PLUG SUITABLE FOR THE APPLICATION.

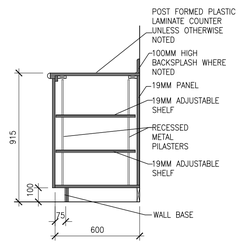
11. ANY DISCREPANCIES BETWEEN THESE NOTES AND THE SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN.



SECTION

-SOLID DOORS
-ADJUSTABLE SHELVES

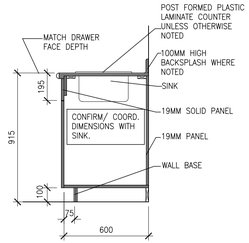
LC1



SECTION

-SOLID DOORS
-ADJUSTABLE SHELVES

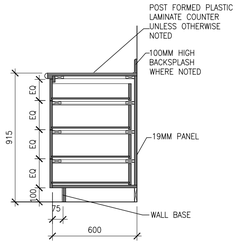
LC2



SECTION

-SOLID PANEL
-SOLID DOORS

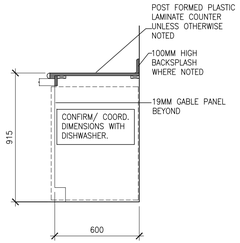
LC3



SECTION

-FOUR (4) DRAWERS
-HEAVY DUTY DRAWER SLIDES

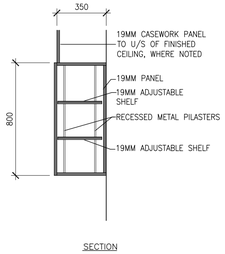
LC4



SECTION

-OPEN SPACE LOWER CABINET
-DISHWASHER (N.I.C.)

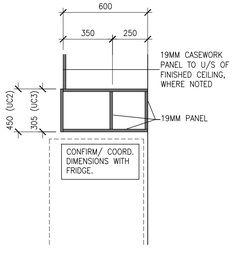
LC5



SECTION

-SOLID DOORS
-ADJUSTABLE SHELVES

UC1



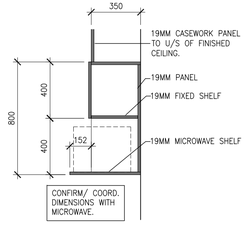
SECTION

-SOLID DOORS
-ADJUSTABLE SHELF
-ABOVE FRIDGE

UC2

UC3

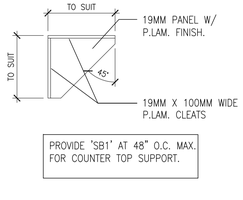
-SOLID DOORS
-ADJUSTABLE SHELVES (1)
-ABOVE SINK



SECTION

-SOLID DOORS
-MICROWAVE SHELF

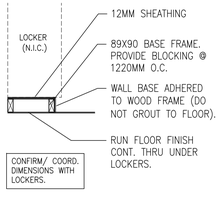
UC4



SECTION

-P.LAM. SUPPORT BRACKET

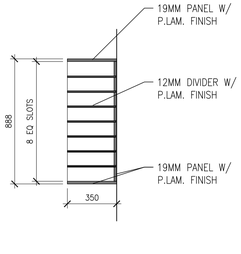
SB1



SECTION

-LOCKER BASE

LB1



MB1

CRITCHLEY HILL
ARCHITECTURE INC.
CRITCHLEY HILL ARCHITECTURE INC.
NORTH BAY ONTARIO 705.995.2391 CRITCHLEYHILL.CA

PROJECT NORTH

Date	Revision
08.12.2022	ISSUED FOR TENDER & PERMIT 0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

ONTARIO ASSOCIATION OF ARCHITECTS
IAN HILL
LICENCE
5282

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
CASEWORK DETAILS

Drawn By:	Checked By:
KSH	ICH
Scale: 1:50	Project No: 2208

Date Plotted:
August 10, 2022

Date Revised:
AUGUST 12, 2022

Drawing No:
A7.02

DESIGN NOTES:

GENERAL

1. DO NOT SCALE DRAWINGS
2. DESIGN AND CONSTRUCTION OF THIS PROJECT SHALL COMPLY WITH THE ONTARIO BUILDING CODE 2012, (ONTARIO REGULATION 413/12).
3. CONTRACTOR SHALL VISIT SITE TO BECOME FAMILIAR WITH THE FULL SCOPE OF WORK.
4. CONSTRUCTION METHODS, EQUIPMENT, AND ALL OPERATIONS SHALL CONFORM WITH ALL APPLICABLE REGULATIONS, ACTS AND BY-LAWS IN FORCE TO ENSURE THE SAFETY OF THE WORK AND THE CONTRACTOR'S PERSONNEL AND OTHERS AT ALL TIMES.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT, ELEVATIONS, AND ALIGNMENT OF THE WORK AND SHALL VERIFY ALL DIMENSIONS AND DETAILS OF ANY EXISTING STRUCTURES NECESSARY FOR THE PROPER FITTING AND CONNECTING OF THE NEW WORK TO IT. REPORT TO ENGINEER ANY DISCREPANCIES AND ALL DOUBTFUL CONDITIONS, AND WAIT FOR INSTRUCTION BEFORE PROCEEDING WITH WORK.
6. CONTRACTOR TO COORDINATE INFORMATION SHOWN ON ALL DRAWINGS AND OTHER RELATED DOCUMENTS.
7. MATERIALS AND WORKMANSHIP, EXCEPT WHERE NOTED OTHERWISE SHALL CONFORM TO ONTARIO BUILDING CODE 2012.
8. CONTRACTOR SHALL PROVIDE AND TAKE RESPONSIBILITY FOR ALL TEMPORARY BRACING AND SHORING.
9. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE PROVIDED.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIRS TO ANY DAMAGE TO THE EXISTING STRUCTURE THAT MAY OCCUR DURING WORK.
11. CONTRACTOR SOLELY RESPONSIBLE FOR THE ON-SITE HEALTH AND SAFETY.
12. SCOPE OF WORK INCLUDES HOT WORK INCLUDING WELDING WITHIN BUILDING/CONFINED SPACE. CONTRACTOR TO OBTAIN PERMITS FOR HOT WORK AND COMPLETE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF OHSA, MOL AND ALL AUTHORITIES HAVING JURISDICTION.
13. ALL DIMENSIONS TO BE COORDINATED W/ ELEVATOR SHOP DRAWINGS. REPORT ANY DISCREPANCIES TO ENGINEER.

STRUCTURAL STEEL

1. MATERIALS
   a. STRUCTURAL STEEL TO CSA CAN3 G40.20/G40.21-13, TYPE 300W AND 350W. ALL HSS 350W CLASS C.
   b. BOLTS, NUTS, AND WASHERS TO ASTM A325M.
   c. WELDING TO CSA W59-13.
   d. PRIMER TO CG.58-1GP-40M. SHOP COAT AND FIELD TOUCH-UP.
2. WORKMANSHIP, FABRICATION AND ERECTION TO CSA CAN3-S16-14.
3. PREPARE SHOP DRAWINGS FOR ALL STRUCTURAL STEEL INCLUDING OWSJ FOR REVIEW BEFORE FABRICATION.
4. PROVIDE WELDED STIFFENER PLATES ON BOTH SIDES OF THE WEB OF BEAMS AT POINTS OF CONCENTRATED LOAD AND REACTION INCLUDING BEAMS SUPPORTING COLUMNS AND RUNNING OVER TOPS OF COLUMNS. MINIMUM STIFFENER PLATE 10MM OR FLANGE THICKNESS OF COLUMNS ABOVE OR BELOW, WHICHEVER IS GREATER. MINIMUM 6MM DOUBLE FILLET WELD SIZE OR SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE STIFFENER, WHICHEVER IS GREATER.
5. OWSJ BRIDGING DESIGN IS THE RESPONSIBILITY OF THE JOIST MANUFACTURER.
6. ANCHOR RODS TO CSA G40.21 GRADE 300W. WHEN RODS ARE CAST INTO FOUNDATION WALL, LEAVE 150 MM THREADED ROD ABOVE TOP OF FOUNDATION WALL SURFACE.
7. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR COATINGS FOR ALL NEW STRUCTURAL STEEL IN THE BASEMENT AND/OR CRAWLSPACE.

STEEL DECK

1. USE TYPE AND WEIGHT OF METAL DECK AS SHOWN ON THE DRAWINGS WITH Z275 GALVANIZED COATING.
2. DESIGN, FABRICATION AND ERECTION IN ACCORDANCE WITH CSA 136.
3. INSTALL CLOSURES IN ACCORDANCE WITH MANUFACTURER'S STANDARD DETAILS.
4. OPENING LESS THAN 450 MM SHALL BE REINFORCED AS PER MANUFACTURER'S SPECIFICATIONS.
5. TOUCH-UP WELDS ON DECK WITH COMPATIBLE PRIMER.
6. PREPARE SHOP DRAWINGS FOR REVIEW BEFORE FABRICATION SHOWING TYPE AND WEIGHT OF DECK, ALL ERECTION DETAILS, AND DESIGN LOADS.

MASONRY

1. THE DESIGN AND CONSTRUCTION OF ALL WORK ON THIS PROJECT IS TO CONFORM TO CSA STANDARDS CSA-S304.1-04 (2010), CSA-A371-04 (R2009), CSA-A179-04 (R2009), AND CAN/CSA -G30.18.
2. PROVIDE TYPE S MORTAR IN ACCORDANCE WITH CSA STANDARD CSA-A179-04 (R2009).
3. CONCRETE BLOCKS TO CONFORM TO CAN/CSA - A165 - SERIES 14 'STANDARDS FOR CONCRETE MASONRY UNITS'
4. PROVIDE STANDARD, HOLLOW 20 MPa CONCRETE BLOCK UNITS U/N OTHERWISE.
5. PROVIDE 3 VERTICALLY REINFORCED CORES EACH SIDE OF OPENINGS, AT CORNERS, AT THE END OF WALLS, AND AS SHOWN ON THE DRAWINGS. USE 1-20M UNLESS NOTED OTHERWISE., LAP ALL JOINT REINFORCEMENT BY 150 MIN.
6. CONTINUE ALL VERTICAL REINFORCING THROUGH BOND BEAMS, LINTELS, ETC. TO WITHIN 50mm FROM TOP OF WALL / PARAPET.
7. REINFORCING STEEL TO BE GRADE 400.
8. PROVIDE CONTINUOUS HORIZONTAL STANDARD LADDER TYPE JOINT REINFORCEMENT @ 400mm O/C IN BOTTOM 2 BED JOINTS, TOP 2 BED JOINTS, AND FIRST BED JOINT ABOVE AND BELOW ALL WALL OPENINGS. ALL SUCH REINFORCEMENT SHALL BE SPLICED USING CLASS B TENSION LAP SPLICES (AS DEFINED IN CSA-S304.1-04). PREFABRICATED CORNER AND INTERSECTION JOINT REINFORCING PIECES SHALL BE USED.
9. COMPRESSIVE STRENGTH OF MASONRY @ 28 DAYS TO BE fm = 7.5 MPa (MIN.) U/N OTHERWISE.
10. MASONRY GROUT FILL TO BE 20 MPa.
11. MORTAR SHALL BE TYPES NOTED IN THE SPECIFICATIONS CONFORMING TO CSA A179.
12. CONCRETE BLOCK MASONRY SHALL CONFORM TO CSA A165. CLASSIFICATION SHALL CONFORM TO THE SPECIFICATIONS.
13. REINFORCE NON-LOAD BEARING BLOCK WALLS W/ 1-15M @ 1200 O/C.
14. CONTROL JOINTS TO HAVE 1-15M IN GROUTED CORE EA. SIDE, TO BE TITEWALL BY BLOK-LOK OR APPROVED EQUAL AND PLACED AT THE FOLLOWING LOCATIONS: AT INTERSECTIONS & CORNERS, ON BOTH SIDES OF WALL OPENINGS, AT INTERVALS NOT EXCEEDING 6m ALONG WALLS.
15. COLUMN TIES TO BE BLT-9A BY BLOK-LOK OR APPROVED EQUAL.

EXCAVATION

1. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATION OF ANY UNDERGROUND UTILITIES OR OTHER EXISTING SERVICES WHICH MAY INTERFERE WITH THE WORK OF THIS PROJECT AND COORDINATE WITH THE OWNER OR OTHER AUTHORITIES AS MAY BE REQUIRED FOR THEIR RELOCATION, REMOVAL OR TEMPORARY SUPPORT.
2. PROVIDE ADEQUATE MEANS OF DE-WATERING TO ENSURE EXCAVATIONS ARE DRY AT ALL TIMES. PLACEMENT OF CONCRETE SHALL ONLY BE MADE IN DRY EXCAVATIONS. THE METHOD OF DE-WATERING SHALL BE SUCH AS TO PREVENT SETTLEMENT OF, AND DAMAGE TO, ANY ADJACENT STRUCTURES.
3. THE CONTRACTOR SHALL TAKE RESPONSIBILITY FOR SHORING EXCAVATION.
4. EXCAVATE TO THE DEPTH AND FOR THE EXTENT SHOWN ON THE DRAWINGS.
5. BACKFILL AT EXTERIOR WALLS TO BE GRANULAR B COMPACTED TO 95% STANDARD PROCTOR DRY DENSITY. CONTRACTOR TO NOTIFY GEOTECHNICAL AND STRUCTURAL ENGINEER PRIOR TO BACKFILLING AND COMPACTION TO ALLOW FOR TESTING AND INSPECTION.

FOUNDATIONS

1. DESIGN BASED ON GEOTECHNICAL INVESTIGATION REPORT PREPARED BY TREK GEOTECHNICAL DATED OCT. 25, 2018, & REPORT ADDENDUM DATED NOV. 9, 2018.
2. 300MM GRANULAR B TYPE II TO OPSS 1010 COMPACTED TO 98% SPMDD BELOW ALL FOOTINGS & SLAB ON GRADE UNLESS NOTED OTHERWISE.
3. ALL EXISTING GRANULAR IN-PLACE FOR FOOTINGS AND SLAB ON GRADE TO BE PROOF-ROLLED PRIOR TO CONSTRUCTING FOOTINGS AND SLABS.
4. ALL EXTERIOR COLUMN FOOTINGS TO REST ON UNDISTURBED SOIL. CONTRACTOR MUST VERIFY SOIL CONDITION AND REPORT TO DESIGNER.
5. ALL SURFACE FILL AND ORGANIC MATERIAL SHALL BE REMOVED FROM UNDER ALL SLABS AND THE SUB-GRADE SHALL BE PROOF ROLLED TO 98% STANDARD PROTECTOR MAXIMUM DRY DENSITY.
6. THE BEARING MATERIAL AND ITS CONDITION SHALL BE INSPECTED AND APPROVED BY A REPRESENTATIVE OF THE GEOTECHNICAL COMPANY.
7. CONTINUOUSLY PROTECT THE BOTTOM OF EXCAVATIONS AND ALL SLABS AND FOUNDATIONS ON GROUND FROM DAMAGE DUE TO FROST AND GROUNDWATER PRESSURE.
8. ALL FOUNDATION INSULATION TO BE XPS TYPE IV U/N OTHERWISE.

CONCRETE

1. ALL CONCRETE MATERIALS AND METHODS OF CONSTRUCTION SHALL COMPLY WITH CAN/CSA-A23.1-09 (R2014) AND CSA-A23.2-09(R2014).
2. REINFORCEMENT SHALL BE DEFORMED BILLETS STEEL BARS AND CONFORM TO CAN/CSA G30.18-09, GRADE 400 MPa. WIRE MESH SHALL CONFORM TO CSA G30.5 YIELD POINT 385MPa.
3. FRESHLY PLACED CONCRETE TO BE CURED AND PROTECTED TO CONFORM TO CLAUSE 21 OF CSA/CAN3-A23.1-09(R2014).
4. REINFORCING STEEL SHOP DRAWINGS TO BE SUBMITTED FOR ENGINEER'S APPROVAL.
5. CONCRETE THAT HAS BEEN ON THE READY MIX TRUCK LONGER THAN 1.5 HOURS SHALL NOT BE USED.
6. CONTRACTOR NOT TO INSTALL EQUIPMENT OR BUILDING ON THE SLAB OR FOUNDATIONS UNTIL CONCRETE HAS ACHIEVED SUFFICIENT STRENGTH TO WITHSTAND THE LOADS APPLIED.
7. SLOPE ALL FLOORS AS SHOWN ON DRAWINGS.
8. CONCRETE EXPOSED TO WEATHER OR TO DEICER SALTS SHALL HAVE 4 TO 7% AIR ENTRAINMENT.
9. CONCRETE TESTING TO CSA STANDARD A23.1 FOR ALL CONCRETE WORK AS DIRECTED BY CONSULTANT.
10. NO SLEEVES, PIPES, HOLES OR NOTCHES SHALL BE PLACED THROUGH WALLS, PIERS OR SLABS EXCEPT AS SHOWN ON THE STRUCTURAL DRAWINGS APPROVED BY THE ENGINEER.
11. MINIMUM CONCRETE COVER FOR REINFORCING BARS:
    - -CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.....75mm
    - -FORMED SURFACES EXPOSED TO EARTH OR WEATHER 20M TO 55M.....50mm
    - -15M BARS OR SMALLER.....40mm
    - -FORMED SURFACE NOT EXPOSED TO EARTH OR WEATHER.....20mm
    - -TIES, STIRRUPS AND SPIRALS IN BEAMS.....40mm
    - -BARS 35M AND SMALLER IN WALLS AND SLABS.....25mm
12. ALL LAP SPLICES TO BE CLASS B TENSION SPLICES, PROVIDE 1200mm LAP SPLICES FOR ALL WALL STRIP FOOTING BARS PROVIDE 900mm LAP SPLICES FOR FOUNDATION WALL TOP BARS AND 600mm LAP SPLICES FOR FOUNDATION WALL BOTTOM BARS.
13. ALL HORIZONTAL WALL AND GRADE BEAM REINFORCING SHALL BE CONTINUOUS THROUGH PIERS. SPLICE TOP BARS AT MID-SPAN AND BOTTOM BARS AT SUPPORTS FOR ALL GRADE BEAMS.
14. WHEREVER OPENINGS INTERRUPTING ONE OR MORE REINFORCING BARS OCCUR IN SLABS OR WALLS, PROVIDE ADDITIONAL REINFORCING STEEL EQUAL TO THE REINFORCING STEEL DISPLACED BY THE OPENING UNLESS OTHERWISE SHOWN. DISTRIBUTE REINFORCING EQUALLY ON EITHER SIDE OF THE OPENING AND EXTENDING THE FULL SPAN LENGTH.
15. ALL EXISTING OPENINGS IN STRUCTURAL CONCRETE SLABS TO BE INFILLED UNLESS BEING REUSED. SEE ARCH., MECH,. ELEC. DRAWINGS FOR SLAB INFILL LOCATIONS.
16. MECHANICAL FLOOR HARDENING AS PER SIKA FLOOR -261 CA SEE PRODUCT DATA SHEET

CONCRETE PROPERTIES

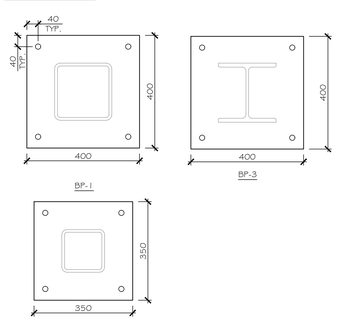
COMPONENT	28 DAY STRENGTH	CEMENT TYPE	AGGREGATE SIZE	EXPOSURE CLASS	AIR CONTENT	SLUMP +/- 10mm	W/C RATIO	COVER TO REINF.
FOOTINGS	25 MPa	10	20mm	N	N/A	80mm	.40	75mm
SLAB ON GRADE	25 MPa	10	20mm	N	N/A	80mm	.40	40mm
EXTERIOR PAVING	35 MPa	50	20mm	C-2	5-8%	80mm	.45	60mm
MASONRY GROUT FILL	20 MPa	10	10mm	N/A	N/A	180mm	.40	-
STRUCTURAL SLAB / COMPOSITE SLAB	25 MPa	10	20mm	N	N/A	80mm	.40	20mm

CRANE

Crane -10 Ton (Imperial) Capacity at 7.6m span to be installed on existing 18m length runway.

1. CMAA CLASS C, TOP RUNNING SINGLE GIRDER CRANES, STANDARD INDOOR USE
2. EACH CRANE WILL RUN ON ITS OWN RUNWAY SYSTEM
3. CRANES TO HAVE BRIDGE SLOW DOWN LIMITS
4. CRANES TO HAVE WARNING HORN, OPERATOR CONTROLLED ON PENDANT
5. CRANES TO BE NEW CONSTRUCTION, NEW STEEL, NEW MOTORS, NEW HOISTS, NEW COMPONENTS, ETC.
6. TO BE INSTALLED ONTO EXISTING RUNWAYS WITH SUITABLE WHEELS AND END TRUCKS TO ACCOMMODATE 2" X 1.5" BAR RAILS
7. 208/3/60 MAIN VOLTAGE WITH 120/1/60 CONTROL VOLTAGE
8. AS BUILT CRANE DRAWINGS TO BE STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO
9. PRE-FABRICATION DRAWINGS OF THE CRANES TO BE APPROVED FOR FIT BY SUPPLIER
10. 10 AMP, 4 BAR CONDUCTOR SYSTEM WITH TANDEM COLLECTOR ASSEMBLIES FOR EACH CRANE
11. BRIDGE AND TROLLEY CONTROLS TO BE STEPLESS VFD
12. HOISTS TO BE WIRE ROPE TYPE, CONTROLS TO BE 2-SPEED, STANDARD SPEEDS ARE FINE
13. MINIMUM 18 FEET OF AVAILABLE LIFT ON HOISTS
14. HOISTS TO HAVE HOOK OPERATED CONTROL UPPER LIMIT SWITCH
15. HOISTS TO HAVE CONDITION MONITORING FOR BRAKE, OVERLOAD, STARTS, HOURS, ETC.
16. MUST INCLUDE TRANSPORT TO SITE WITH UNLOADING FOR CRANES AND CONDUCTOR BAR SYSTEMS
17. MUST INCLUDE INSTALLATION OF CRANES AND CONDUCTOR BAR SYSTEMS
18. MUST INCLUDE START-UP, COMMISSIONING AND LOAD TESTING OF CRANES
19. MUST INCLUDE ALL REQUIRED MOBILE CRANES, FORK LIFTS, MAN LIFTS, ETC. AND TRANSPORT OF EQUIPMENT
20. MUST INCLUDE CERTIFIED TEST WEIGHTS FOR THE LOAD TESTING OF ALL THREE CRANES AT 100% AND 125% OF RATED CAPACITY.
21. MUST INCLUDE TRANSPORTATION OF TEST WEIGHTS TO AND FROM SITE
22. MUST INCLUDE ALL TRAVELING CHARGES, MILEAGE, PER DIEMS, ETC.
23. MUST PROVIDE ONE (1) OWNER'S MANUAL, INCLUDING OPERATIONS, MAINTENANCE AND PARTS FOR EACH CRANE
24. MUST PROVIDE COMPLETE DOCUMENTATION OF LOAD TESTING, START UP AND COMMISSIONING

BASE PLATE SCHEDULE:



NOTES:

1. ALL BASE PLATES 19mm THICK, ON 40mm NON-SHRINK GROUT
2. ALL ANCHOR RODS TO BE 19mmØ, 300x75, INCLUDING 150 THREADED ROD EXTENSION ABOVE TOP OF FOUNDATION WALL
3. ANCHOR RODS SUPPLIED BY STEEL MANUFACTURER, INSTALLED BY CONCRETE SUB

Date	Revision
Aug. 12, 2022	ISSUED FOR TENDER & PERMIT
JUL 27, 2022	ISSUED FOR FINAL REVIEW

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
E.S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

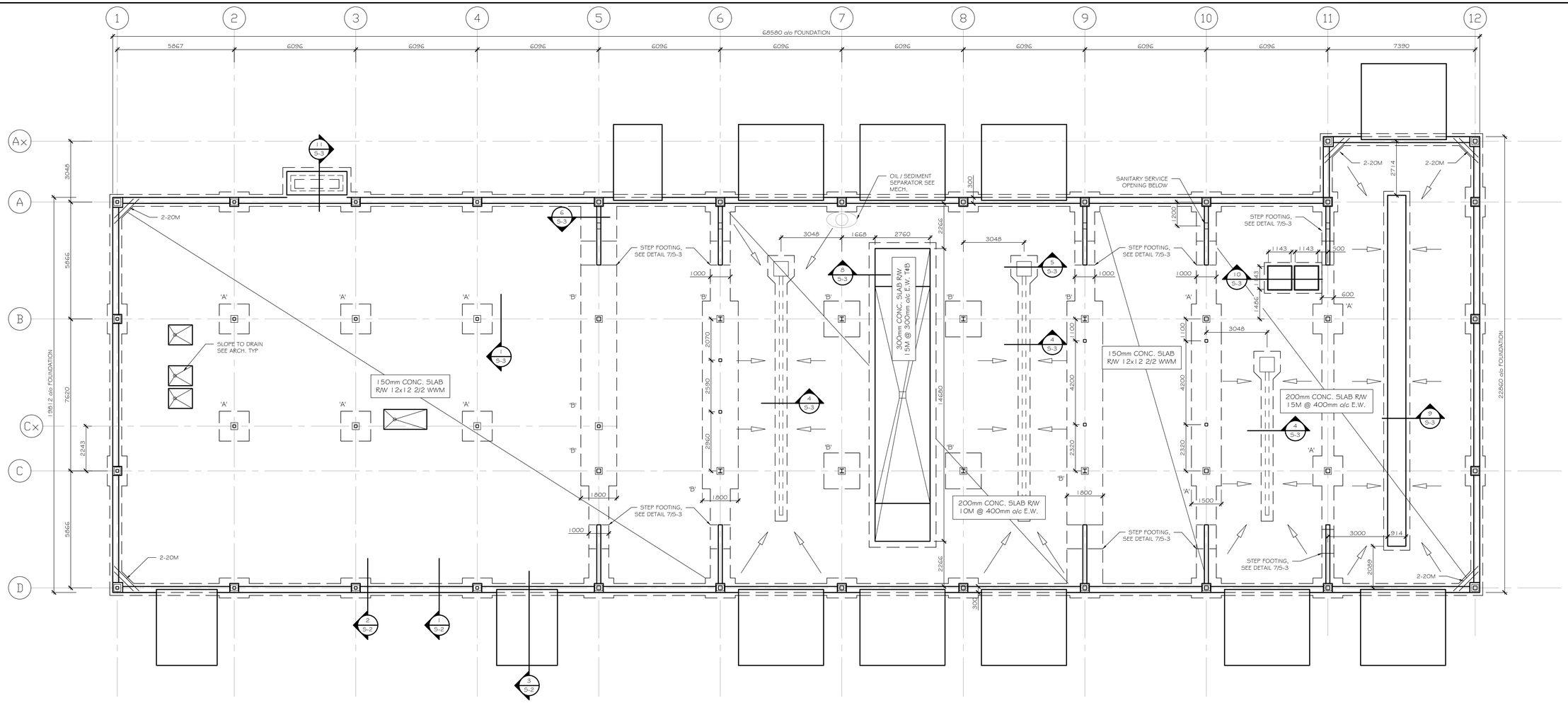
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peter Lake Road
Marathon, ON

Drawing Title:
General Notes

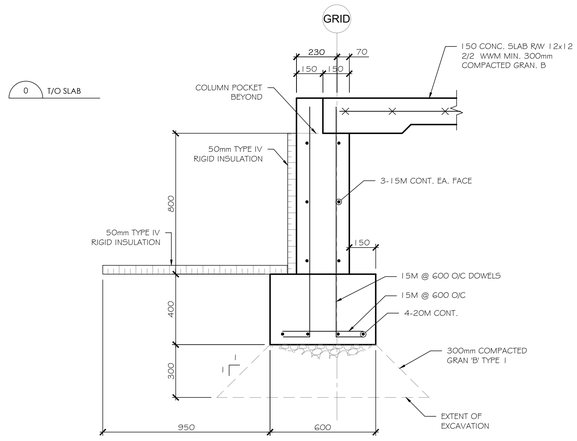
Drawn By:	Checked By:
JM	
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	

Drawing No:
S-1

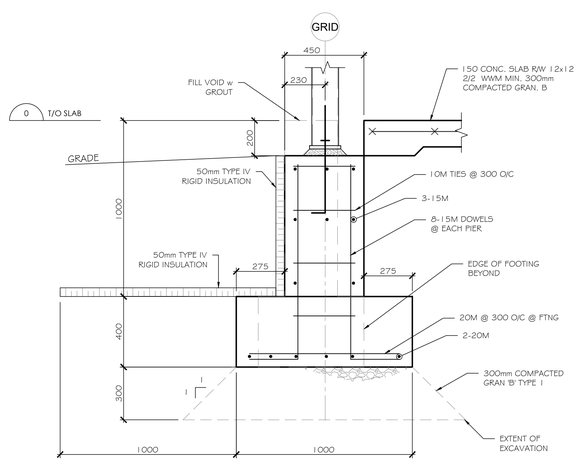


A S-2 FOUNDATION PLAN
1:100

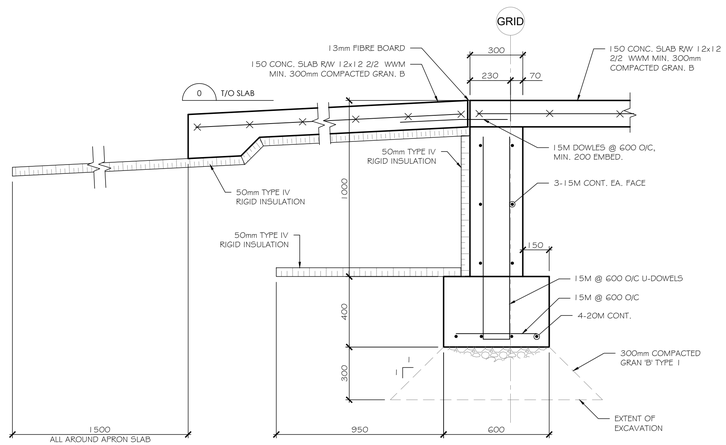
SAW CUT @ EACH GRID



1 S-2 FOUNDATION SECTION
1:16



2 S-2 FOUNDATION SECTION @ PIER
1:16



3 S-2 FOUNDATION SECTION @ APRON
1:16

No.	Revision	Date
1	ISSUED FOR TENDER & PERMIT	Aug. 12, 2022
2	ISSUED FOR FINAL REVIEW	JUL. 27, 2022

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LICENSED PROFESSIONAL ENGINEER
E. S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

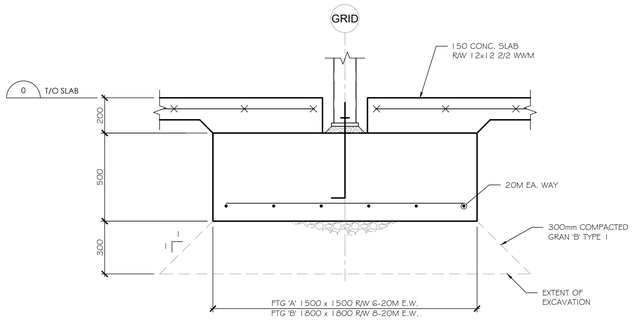
CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

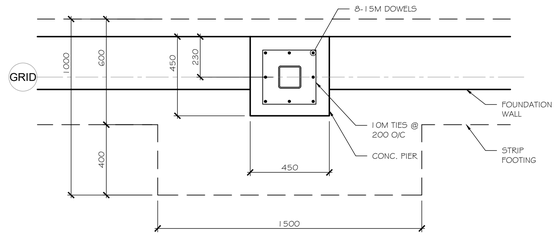
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
21 Penn Lake Road
Marathon, ON

Drawing Title:
Foundation Plan

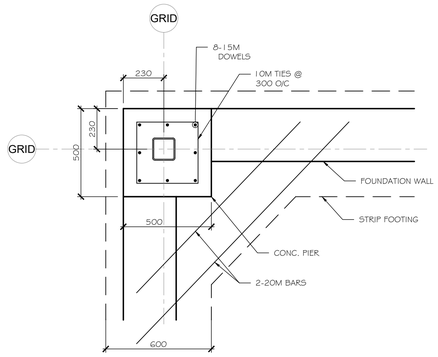
Drawn By: MS	Checked By:
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	
Drawing No: **S-2**	



1 S-3 FOUNDATION SECTION @ INTERIOR PIER
1:16



2 S-3 PIER PLAN
1:16



3 S-3 PIER PLAN @ CORNER
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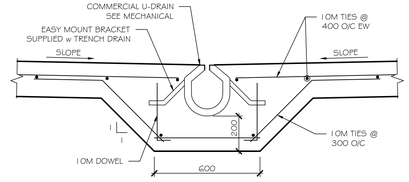

4 S-3 TRENCH DRAIN SECTION
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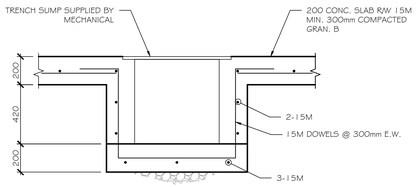

5 S-3 TRENCH PIT SECTION
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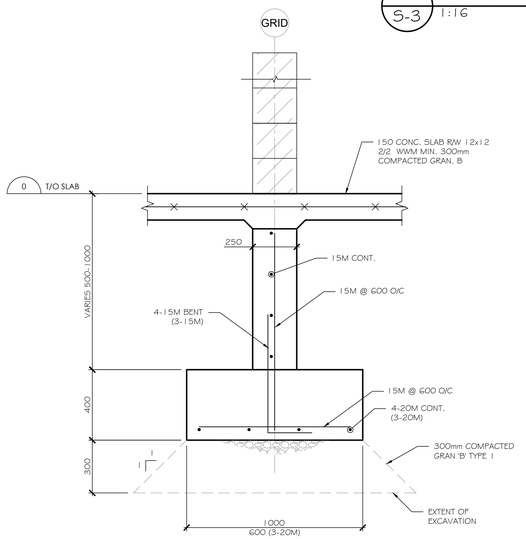
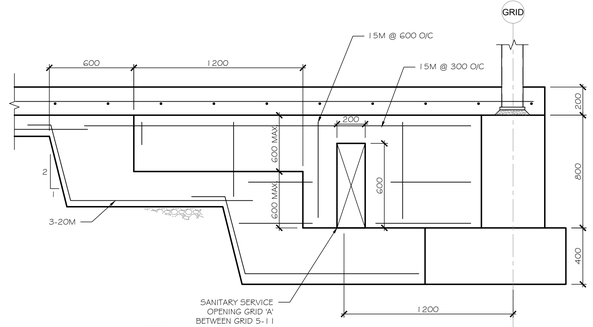
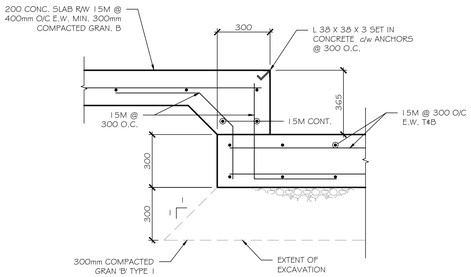


6 S-3 STEP FOOTING SECTION
1:16



7 S-3 STEP FOOTING DETAIL
1:20



8 S-3 LIFT BAY SECTION
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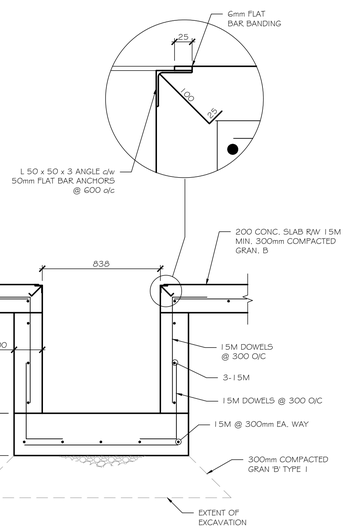

9 S-3 TRENCH PIT SECTION
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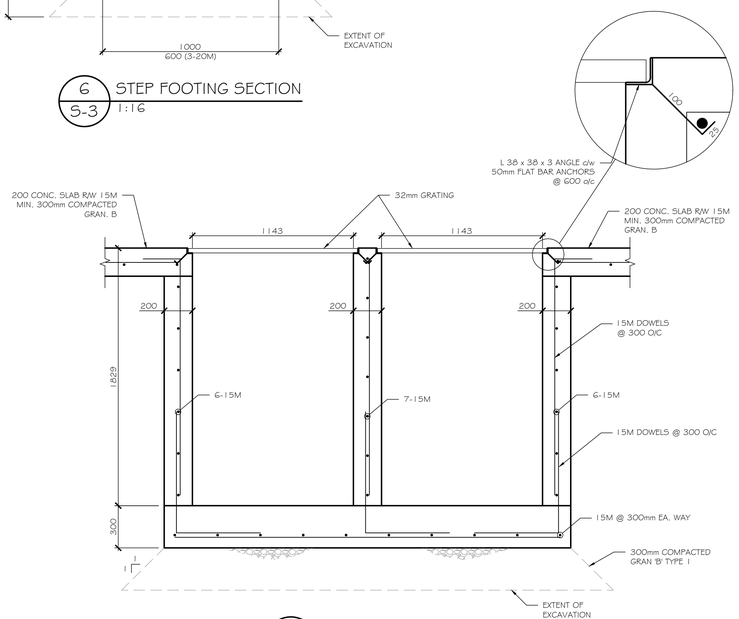
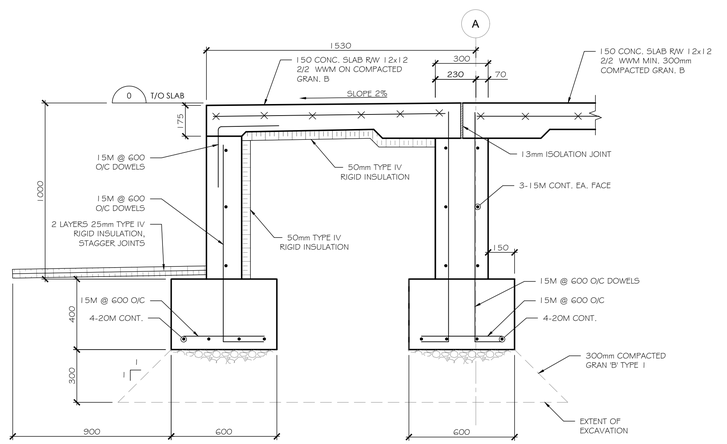


10 S-3 WASH PIT SECTION
1:20



11 S-3 FROST SLAB SECTION
1:16

No.	Revision	Date
1	ISSUED FOR TENDER & PERMIT	Aug. 12, 2022
2	ISSUED FOR FINAL REVIEW	JUL. 27, 2022

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LICENSED PROFESSIONAL ENGINEER
E. S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

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ARCHITECTURE

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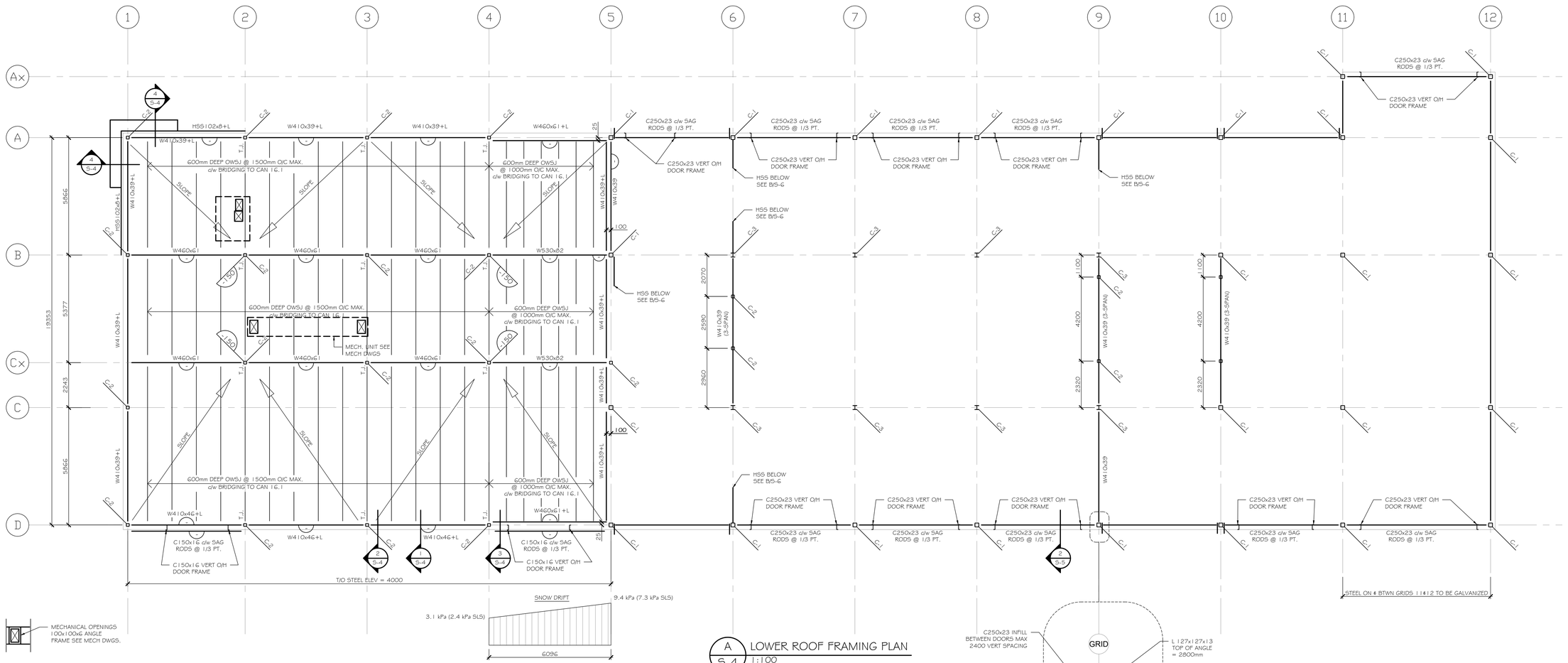
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Peninn Lake Road
Marathon, ON

Drawing Title:
Foundation Sections & Details

Drawn By: MS	Checked By:
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	

Drawing No:
S-3



A S-4 LOWER ROOF FRAMING PLAN 1:100

+L - + L102x102x6 TRIMMER L U/N
MC - MOMENT CONNECTION
CANT. - CANTILEVER BEAM / O.W.S.J.
CONT. - CONTINUOUS
- do - DITTO
KB - KNEE BRACE
T.J. - TIE JOIST

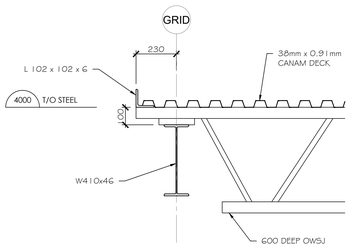
DESIGN LOADS (kPa)

DEAD LOAD = 1.5
SNOW LOAD = 3.3

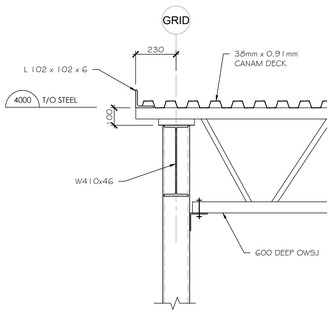
C-1
HSS203x203x9.5 COL.
C-2
HSS152x152x9.5 COL.
C-3
W 200 x 59 COL.

CAP ALL HSS COLUMNS w 6mm PLATE

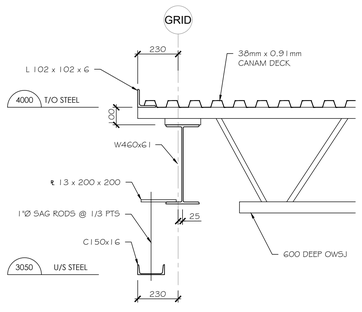
-SLOPE FOR ROOF
-100 DROP JOIST SHOE



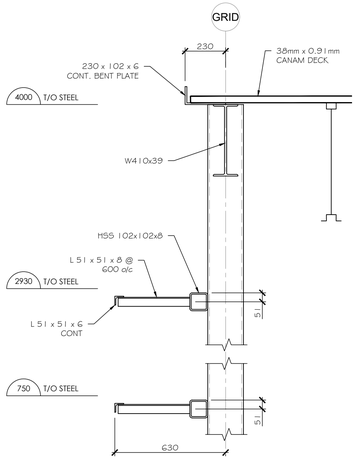
1 S-4 SECTION 1:16



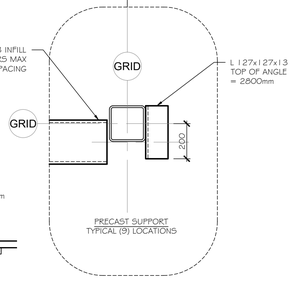
2 S-4 SECTION @ TIE JOIST 1:16



3 S-4 SECTION 1:16



4 S-4 SECTION 1:16



Date	Revision
Aug. 12, 2022	ISSUED FOR TENDER & PERMIT
JUL. 27, 2022	ISSUED FOR FINAL REVIEW

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
E. S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

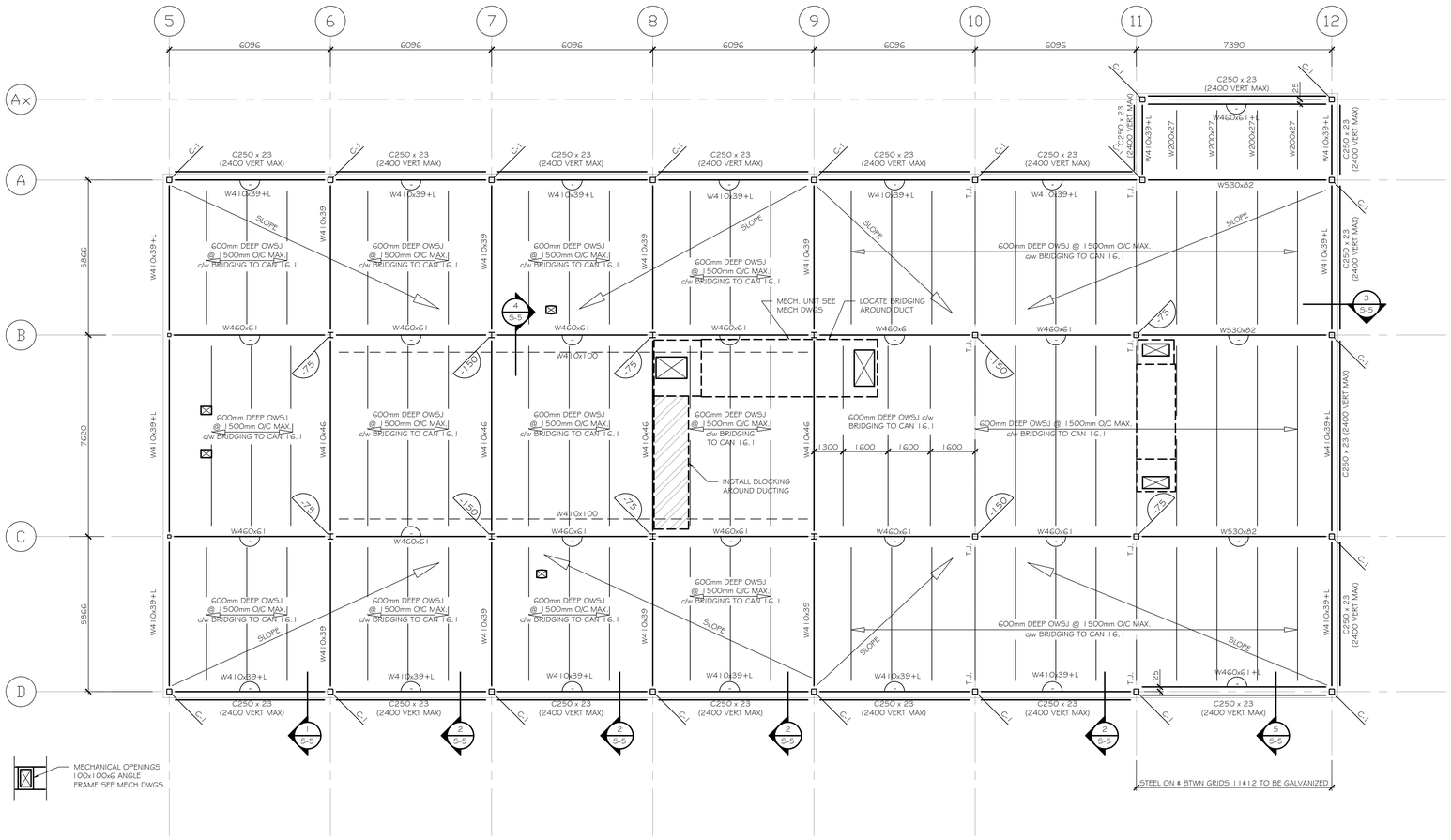
CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
Lower Roof Framing Plan and Details

Drawn By:	Checked By:
MS	
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	
Drawing No: **S-4**	



A S-4 UPPER ROOF FRAMING PLAN
1:100

+L - + L102x102x6 TRIMMER L U/N
MC - MOMENT CONNECTION
CANT. - CANTILEVER BEAM / O.W.S.J.
CONT. - CONTINUOUS
- do - DITTO
KB - KNEE BRACE
T.J. - TIE JOIST

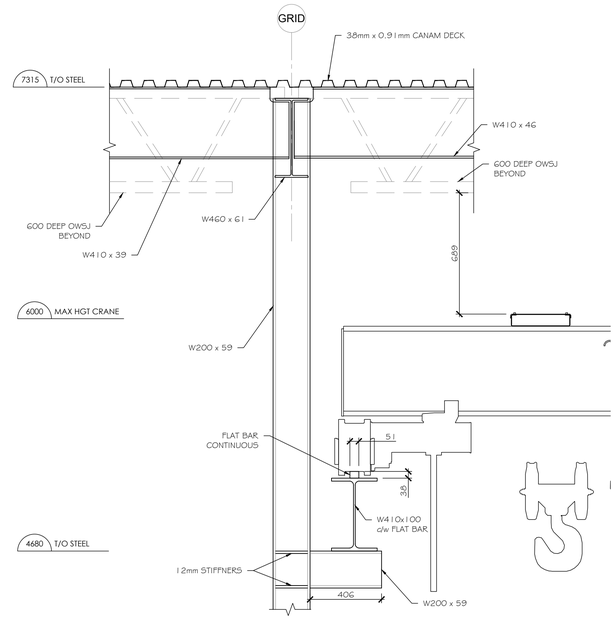
DESIGN LOADS (kPa)

DEAD LOAD = 1.5
SNOW LOAD = 3.3

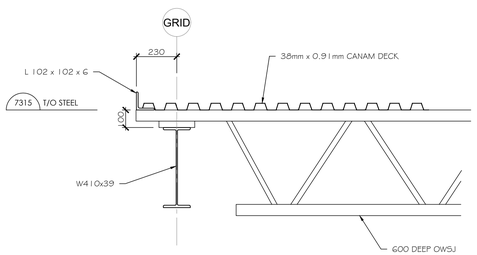
C-1
HSS203x203x9.5 COL.
C-2
HSS152x152x9.5 COL.

CAP ALL COLUMNS w 6mm PLATE

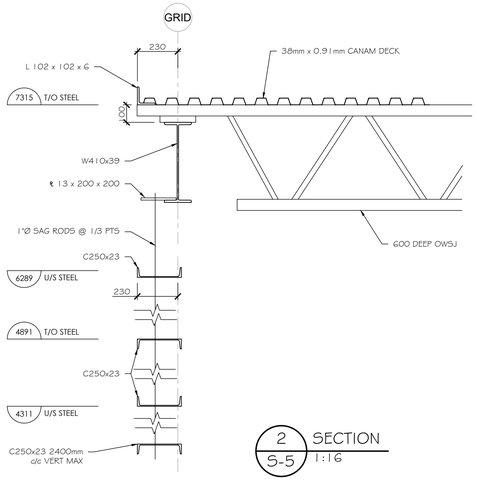
-SLOPE FOR ROOF
-100 DROP JOIST SHOE



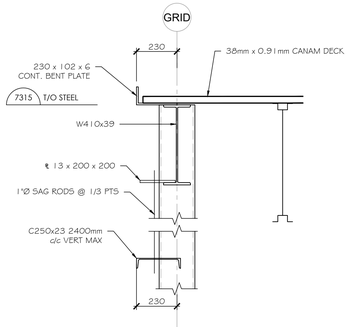
4 S-5 SECTION
1:16



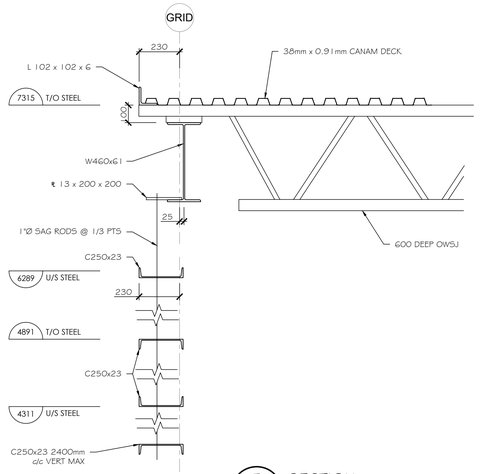
1 S-5 SECTION
1:16



2 S-5 SECTION
1:16



3 S-5 SECTION
1:16



5 S-5 SECTION
1:16

Revision	Date
ISSUED FOR TENDER & PERMIT	Aug. 12, 2022
ISSUED FOR FINAL REVIEW	JUL. 27, 2022

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LICENSED PROFESSIONAL ENGINEER
E. S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

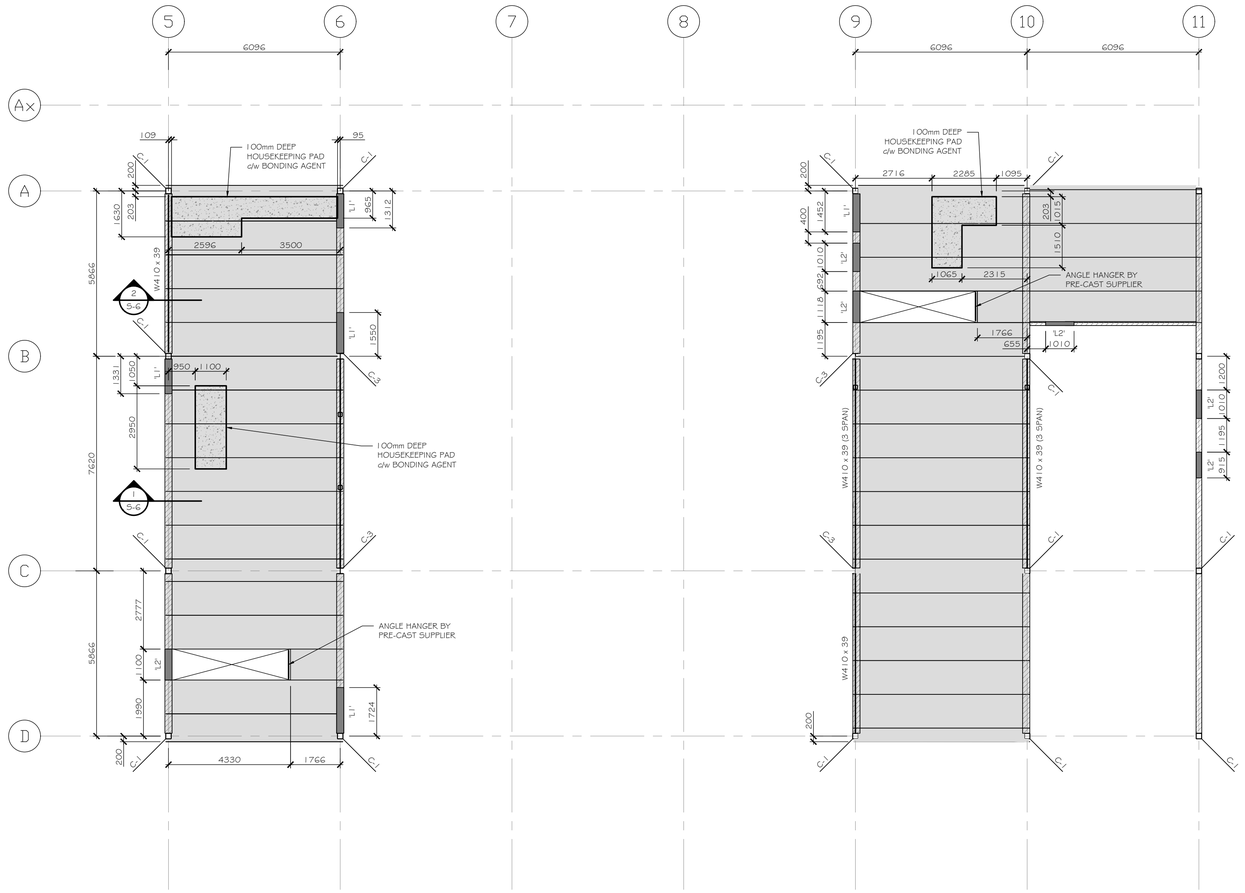
CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
Upper Roof Framing Plan and Details

Drawn By: MS	Checked By:
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	
Drawing No: **S-5**	



A S-6 MEZZANINE FRAMING PLAN
1:100

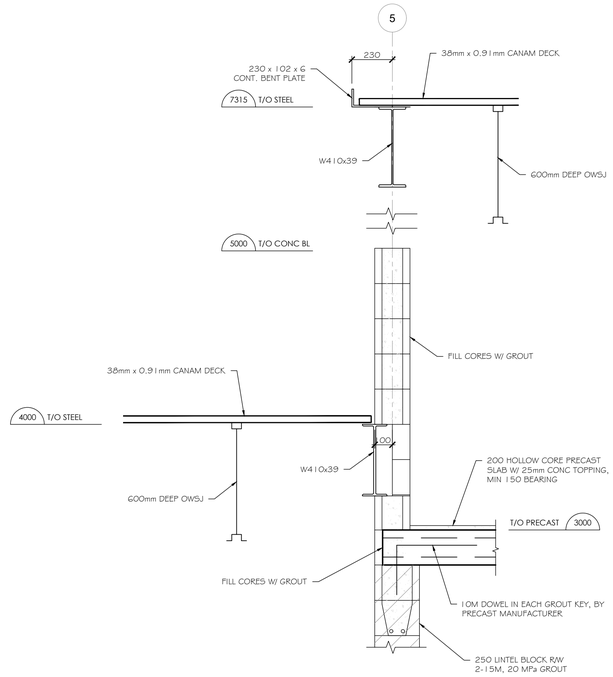
+L - + L4x4x1/4" TRIMMER L U/N
MC - MOMENT CONNECTION
CANT. - CANTILEVER BEAM / O.W.S.J.
CONT. - CONTINUOUS
- do - DITTO
KB - KNEE BRACE

DESIGN LOADS (kPa)

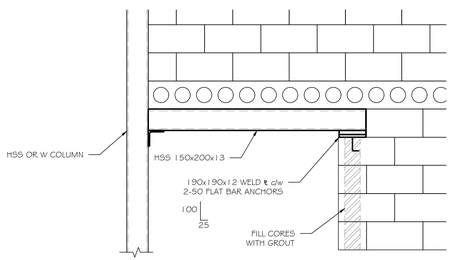
DEAD LOAD = 1.5 kPa
LIVE LOAD = 7.2 kPa

C-1
HSS203x203x9.5 COL.
C-2
HSS152x152x9.5 COL.
C-3
W 200 x 59 COL.

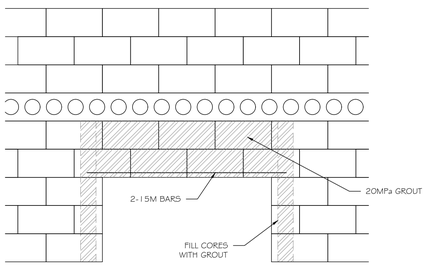
CAP ALL HSS COLUMNS w 6mm PLATE



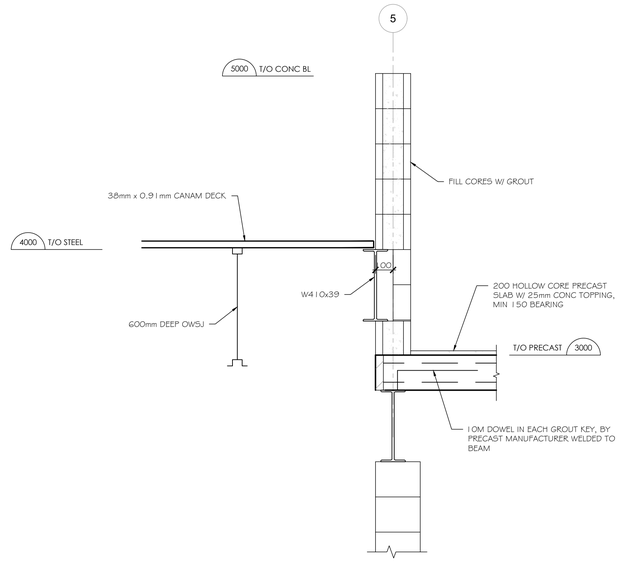
2 S-6 WALL SECTION
1:16



B S-6 LINTEL DETAIL 'L1'
1:20



C S-6 LINTEL DETAIL 'L2'
1:20



1 S-6 WALL SECTION
1:16

Date	Revision
Aug. 12, 2022	ISSUED FOR TENDER & PERMIT
JUL. 27, 2022	ISSUED FOR FINAL REVIEW

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LICENSED PROFESSIONAL ENGINEER
E.S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

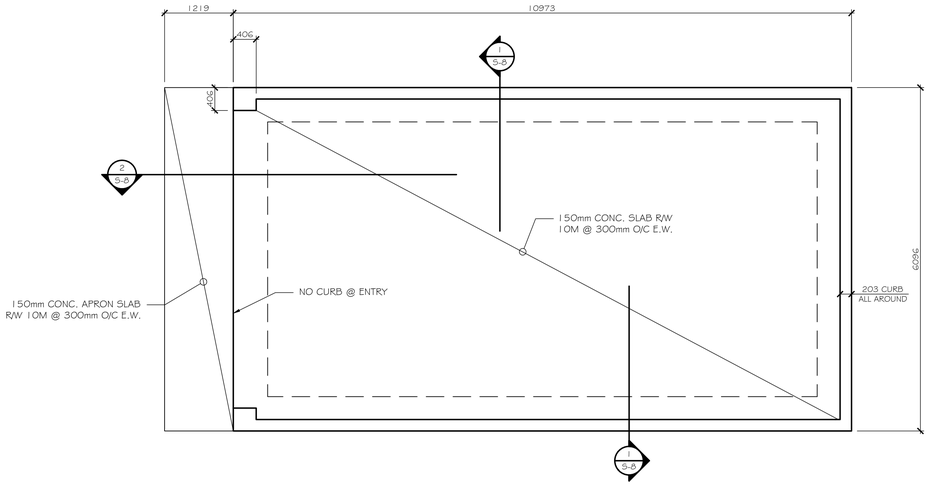
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Penn Lake Road
Marathon, ON

Drawing Title:
Mezzanine Floor Plan

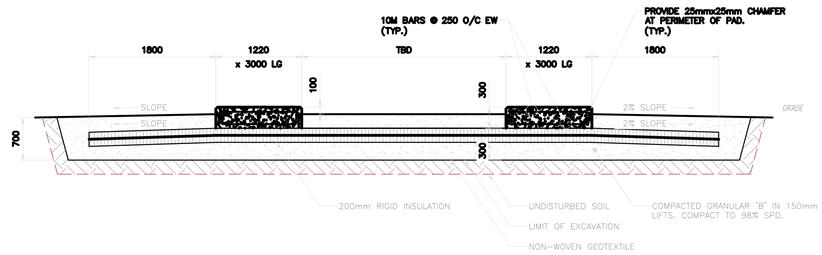
Drawn By:	Checked By:
MS	
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	

Drawing No:
S-6

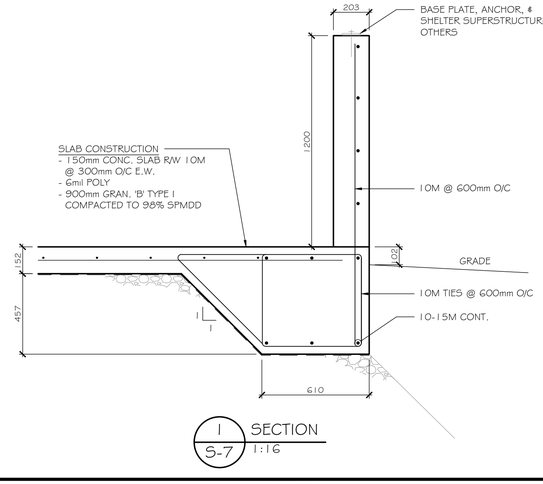
Drawing name: Y:\Projects\2022\22-098 CHAI, Marathon Public Works Building\Drawings\20-000-65 Structural\CAD\Current\22-098 Marathon Public Works.dwg



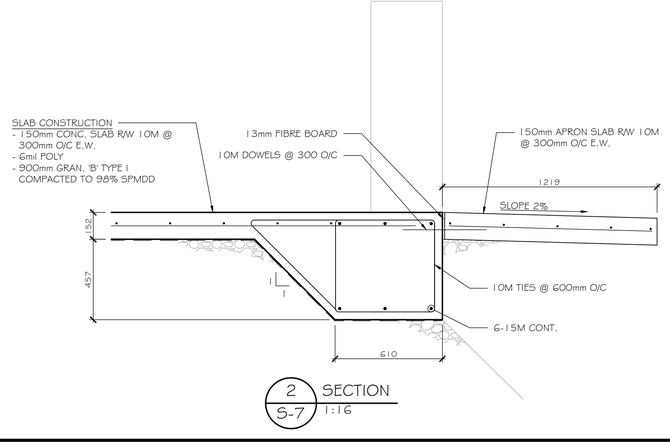
A S-7 SALT STORAGE FOUNDATION PLAN
1:50



B S-7 FUEL OIL STORAGE SECTION
N.T.S.



1 S-7 SECTION
1:16



2 S-7 SECTION
1:16

GENERAL:

1. DO NOT SCALE DRAWINGS.
2. DESIGN, CONSTRUCTION, MATERIALS AND WORKMANSHIP OF THIS PROJECT SHALL COMPLY WITH THE ONTARIO BUILDING CODE, (ONTARIO REGULATION 413/12).
3. CONTRACTOR SHALL VISIT SITE TO BECOME FAMILIAR WITH THE FULL SCOPE OF WORK PRIOR TO SUBMITTING BID.
4. CONSTRUCTION METHODS, EQUIPMENT, AND ALL OPERATIONS SHALL CONFORM WITH ALL APPLICABLE REGULATIONS, ACTS AND BY-LAWS IN FORCE TO ENSURE THE SAFETY OF THE WORK AND THE CONTRACTORS PERSONNEL AND OTHERS AT ALL TIMES.
5. PROVIDE AND TAKE RESPONSIBILITY FOR ALL TEMPORARY BRACING AND SHORING.
6. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE PROVIDED.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCY BEFORE PROCEEDING WITH THE WORK.
8. SUBMIT SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO ACCEPTING RESPONSIBILITY FOR THE DESIGN.

CONCRETE:

1. ALL CONCRETE MATERIALS AND METHODS OF CONSTRUCTION SHALL COMPLY WITH CAN/CSA-A23.1-09 (R2014) AND CSA-A23.2-09(R2014).
2. REINFORCEMENT SHALL BE DEFORMED BILLETS STEEL BARS AND CONFORM TO CAN/CSA G30.18-09, GRADE 400 MPA. WIRE MESH SHALL CONFORM TO CSA G30.5 YIELD POINT 385MPA.
3. FRESHLY PLACED CONCRETE TO BE CURED AND PROTECTED TO CONFORM TO CLAUSE 21 OF CSA/CAN3-A23.1-09(R2014).
4. REINFORCING STEEL SHOP DRAWINGS TO BE SUBMITTED FOR ENGINEERS APPROVAL.
5. DURING COLD WEATHER CONSTRUCTION ALL FOUNDATIONS SHALL BE PROTECTED BY 1200MM OF EARTH OR MATERIALS WITH AN EQUIVALENT INSULATING VALUE.
6. CONCRETE THAT HAS BEEN ON THE READY MIX TRUCK LONGER THAN 1.5 HOURS SHALL NOT BE USED.
7. CONTRACTOR NOT TO INSTALL EQUIPMENT OR BUILDING ON THE SLAB OR FOUNDATIONS UNTIL CONCRETE HAS ACHIEVED SUFFICIENT STRENGTH TO WITHSTAND THE LOADS APPLIED.
8. CONCRETE EXPOSED TO WEATHER OR TO DEICER SALTS SHALL HAVE 5 TO 8% AIR ENTRAINMENT.
9. CONCRETE TESTING TO CSA STANDARD A23.1 FOR ALL CONCRETE WORK AS DIRECTED BY CONSULTANT.
10. NO SLEEVES, PIPES, HOLES OR NOTCHES SHALL BE PLACED THROUGH WALLS, PIERS OR SLABS EXCEPT AS SHOWN ON THE STRUCTURAL DRAWINGS APPROVED BY THE ENGINEER.
11. ALL LAP SPLICES TO BE CLASS B TENSION SPLICES, PROVIDE 1200MM LAP SPLICES FOR ALL WALL STRIP FOOTING BARS PROVIDE 900MM LAP SPLICES FOR FOUNDATION WALL TOP BARS AND 600MM LAP SPLICES FOR FOUNDATION WALL BOTTOM BARS.
12. WHEREVER OPENINGS INTERRUPTING ONE OR MORE REINFORCING BARS OCCUR IN SLABS OR WALLS, PROVIDE ADDITIONAL REINFORCING STEEL EQUAL TO THE REINFORCING STEEL DISPLACED BY THE OPENING UNLESS OTHERWISE SHOWN. DISTRIBUTE REINFORCING EQUALLY ON EITHER SIDE OF THE OPENING AND EXTENDING THE FULL SPAN LENGTH.
13. SEAL CONCRETE W/ TWO COATS CONCRETE SEALER IN ACCORDANCE W/ MANUFACTURERS INSTRUCTIONS.

CONCRETE PROPERTIES

COMPONENT	28 DAY STRENGTH	CEMENT TYPE	AGGREGATE SIZE	EXPOSURE CLASS	AIR CONTENT	SLUMP +/- 10mm	W/C RATIO	COVER TO REINF.
FOUNDATION / SLAB	35 MPa	10	20mm	C-1	5-8%	80mm	.40	60mm

Date	Revision
Aug. 12, 2022	ISSUED FOR TENDER & PERMIT
JUL 27, 2022	ISSUED FOR FINAL REVIEW

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LICENSED PROFESSIONAL ENGINEER
E.S. MICKELSON
Aug. 12, 2022
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

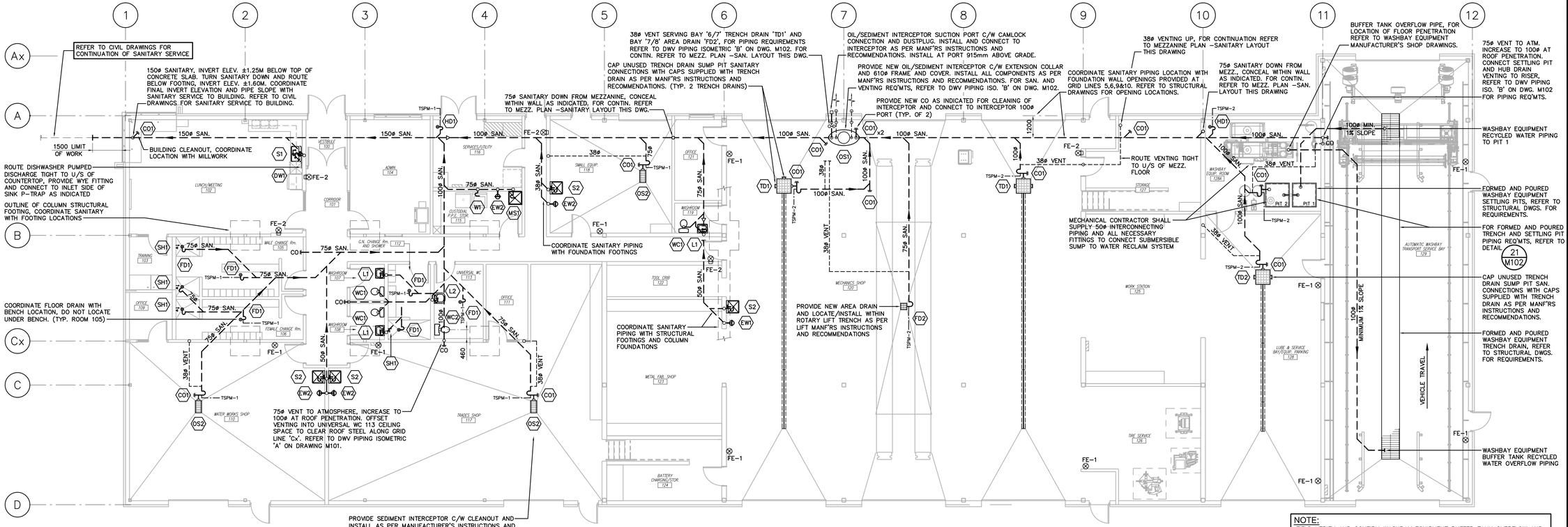
Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
2 Pann Lake Road
Marathon, ON

Drawing Title:
Salt Storage Shelter Foundations
Fuel Oil Tank Foundation

Drawn By:	Checked By:
MS	
Scale: AS SHOWN	Project No: 22-098
Date Plotted: Aug 11, 2022	
Date Revised: Aug. 12, 2022	

Drawing No:
S-7

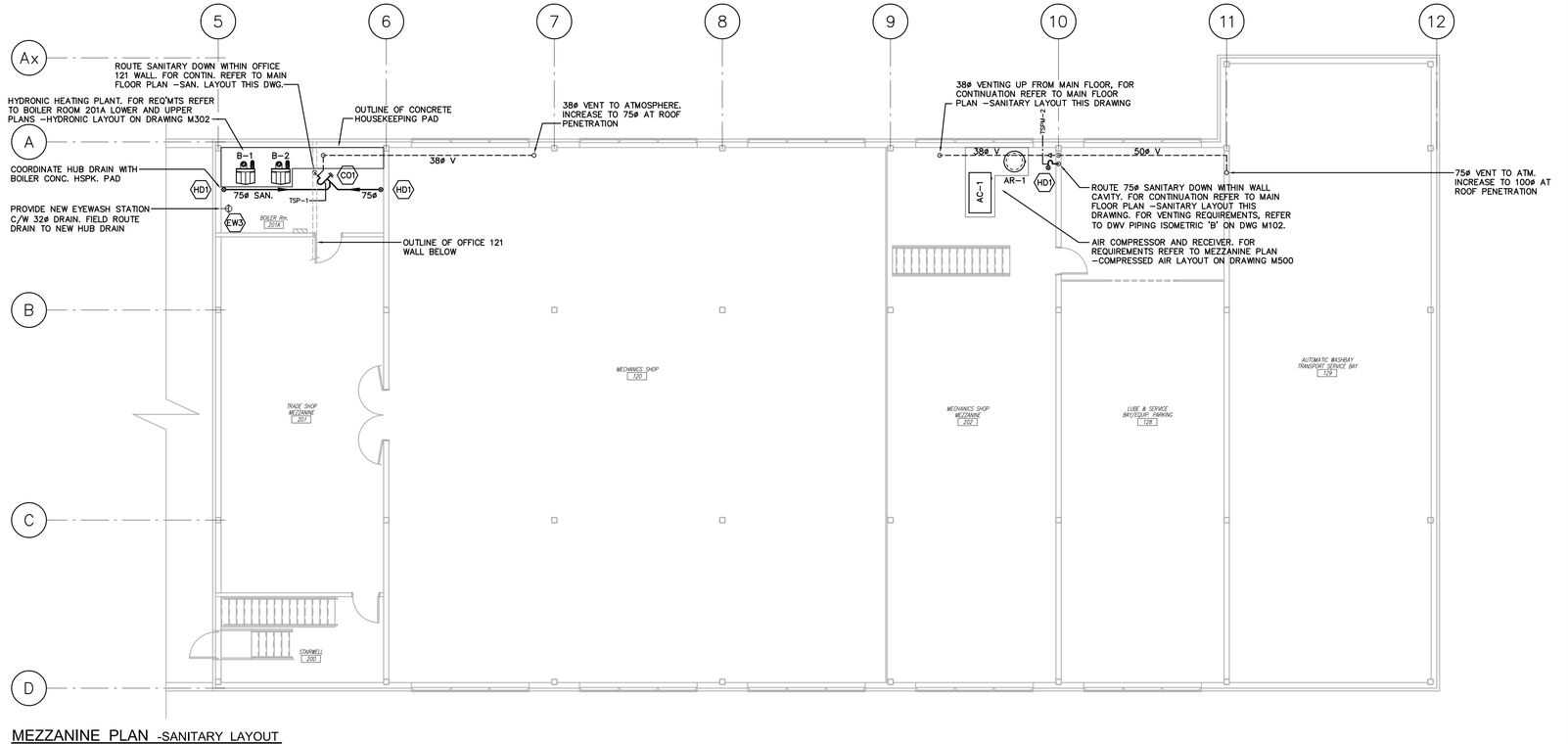
Drawing name: Y:\Projects\2022\22-098 CHAI, Marathon Public Works Building\Drawings\20-000-65 Structural\CAD\Current\22-098 Marathon Public Works.dwg



MAIN FLOOR PLAN -SANITARY LAYOUT

SCALE: 1:100

NOTE:
FIELD VERIFY AND CONFIRM WASHBAY EQUIPMENT BUFFER TANK OVERFLOW AND RECYCLED PIPING SIZES, LAYOUTS AND FLOOR/TRENCH/PIT PIPING PENETRATIONS WITH WASHBAY EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.



MEZZANINE PLAN -SANITARY LAYOUT

SCALE: 1:100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

GENERAL PLUMBING NOTES:

1. PRIOR TO COMMENCING WORK, CONTRACTOR TO COORDINATE WITH SITE PLAN FOR LOCATION OF PLUMBING CONNECTIONS TO BUILDING.
2. CO-ORDINATE SANITARY, DOMESTIC WATER, STORM DRAINAGE AND GAS PIPING WITH DISTRIBUTION DUCTWORK, EQUIPMENT, HYDRONIC PIPING, LIGHTING LAYOUT, COMPRESSED AIR, REFRIGERANT PIPING, CONDENSATE PIPING, BUILDING STRUCTURE, FOUNDATION AND REQUIRED CEILING HEIGHTS.
3. FOR DOMESTIC HOT AND COLD WATER CONNECTION SIZES TO FIXTURES REFER TO CHART ON DRAWING M200. PROVIDE REDUCERS WHERE REQUIRED TO SUIT FIXTURE CONNECTIONS SIZES. PROVIDE STAINLESS STEEL BRAIDED FLEX HOSE FOR ALL FIXTURE CONNECTIONS WHERE APPLICABLE.
4. WHERE CEILING IS TO BE USED AS RA PLENUM, ALL MATERIALS USED IN CEILING SPACE TO MEET (OR EXCEED) MINIMUM SMOKE AND FLAME SPREAD RATINGS AS DEFINED IN O.B.C.
5. THERMOSTATIC MIXING VALVES (TMV-X) TO BE INSTALLED WITHIN MILLWORK UNLESS NOTED OTHERWISE. FIELD ADJUST ALL THERMOSTATIC MIXING VALVES TO 43.3°C
6. FOR MECHANICAL SPECIFICATIONS, EQUIPMENT LIST AND SEQUENCE OF OPERATIONS REFER TO M700 SERIES DRAWINGS.
7. INSULATE ALL PIPING AS PER MECHANICAL SPECIFICATIONS ON DRAWING M700.
8. REFER TO ARCHITECTURAL PLANS FOR FIRE SEPARATIONS. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER OR ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING PENETRATING REQUIRED SEPARATIONS.
9. COORDINATE SANITARY PIPING AND DOMESTIC WATER PIPING WITH EQUIPMENT, DISTRIBUTION DUCTWORK, HYDRONIC LAYOUTS, REFRIGERANT LINES AND BUILDING STRUCTURE.
10. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
11. CORE ALL OPENINGS IN NEW BUILDING CONSTRUCTION AS REQUIRED FOR ROUTING OF NEW PIPING.
12. MOUNT RECESSED TRAP SEAL PRIMER MANIFOLDS AT 305mm AFF.
13. PROVIDE ONE PIECE ESCUTCHEONS FOR ALL SANITARY AND WATER PIPING WALL AND FINISHED FLOOR AND CABINET PENETRATIONS.
14. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

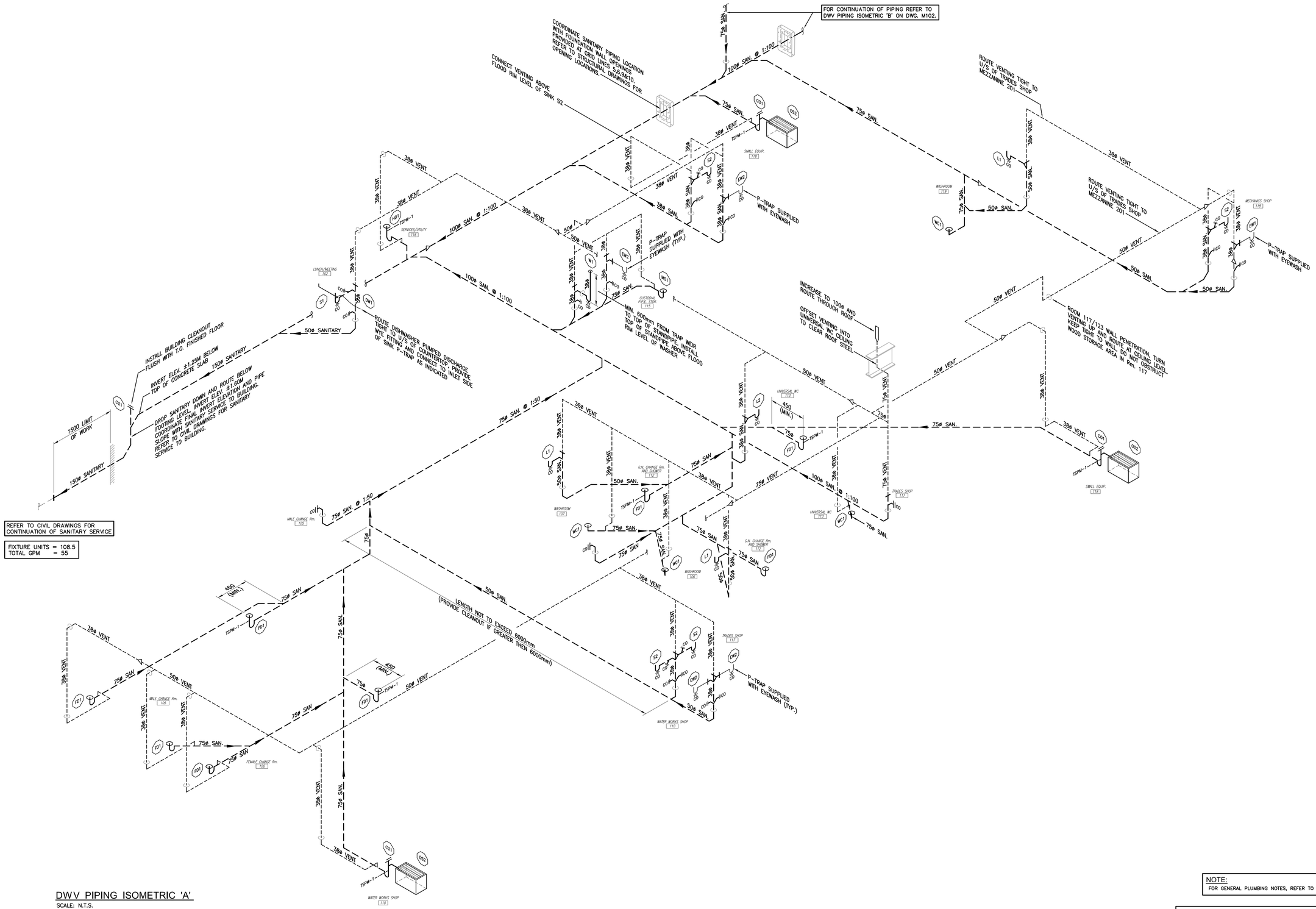
TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR AND MEZZANINE SANITARY PLANS AND GENERAL PLUMBING NOTES

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M100



DWV PIPING ISOMETRIC 'A'

SCALE: N.T.S.

NOTE:
FOR GENERAL PLUMBING NOTES, REFER TO DRAWING M100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

0	JULY 28 / 22	ISSUED FOR PERMIT AND TENDER
Revision	Date	

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

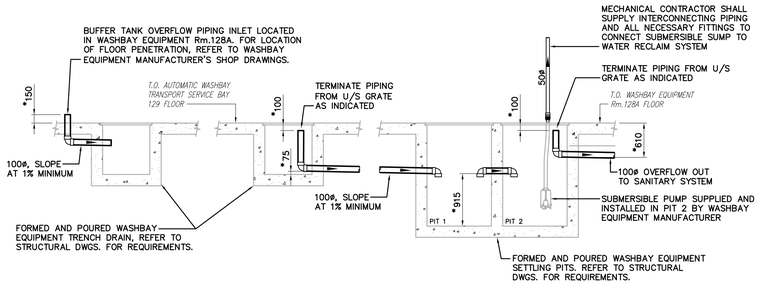
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
DWV PIPING ISOMETRIC

Drawn By: ER	Checked By: DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

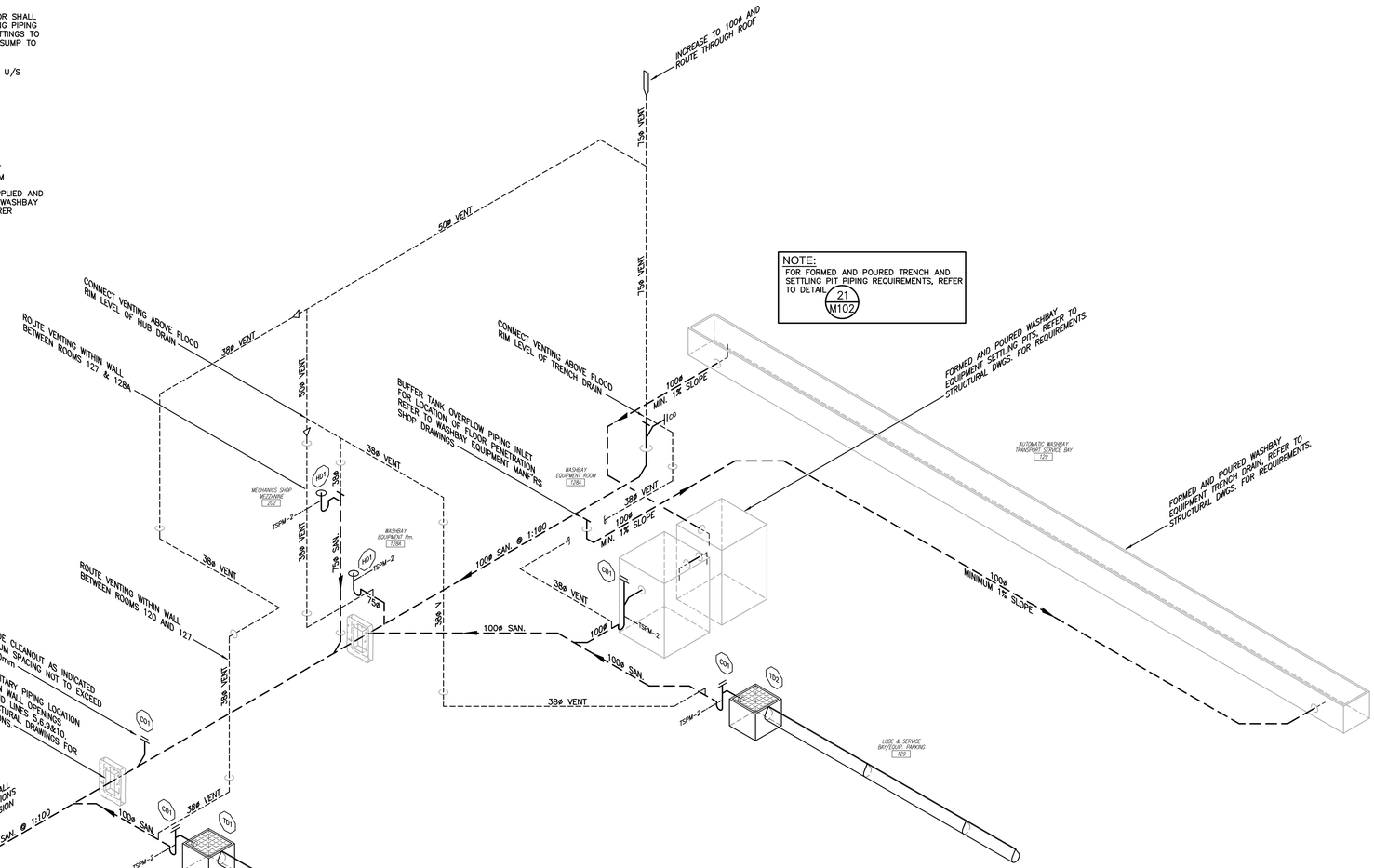
Drawing No:
M101



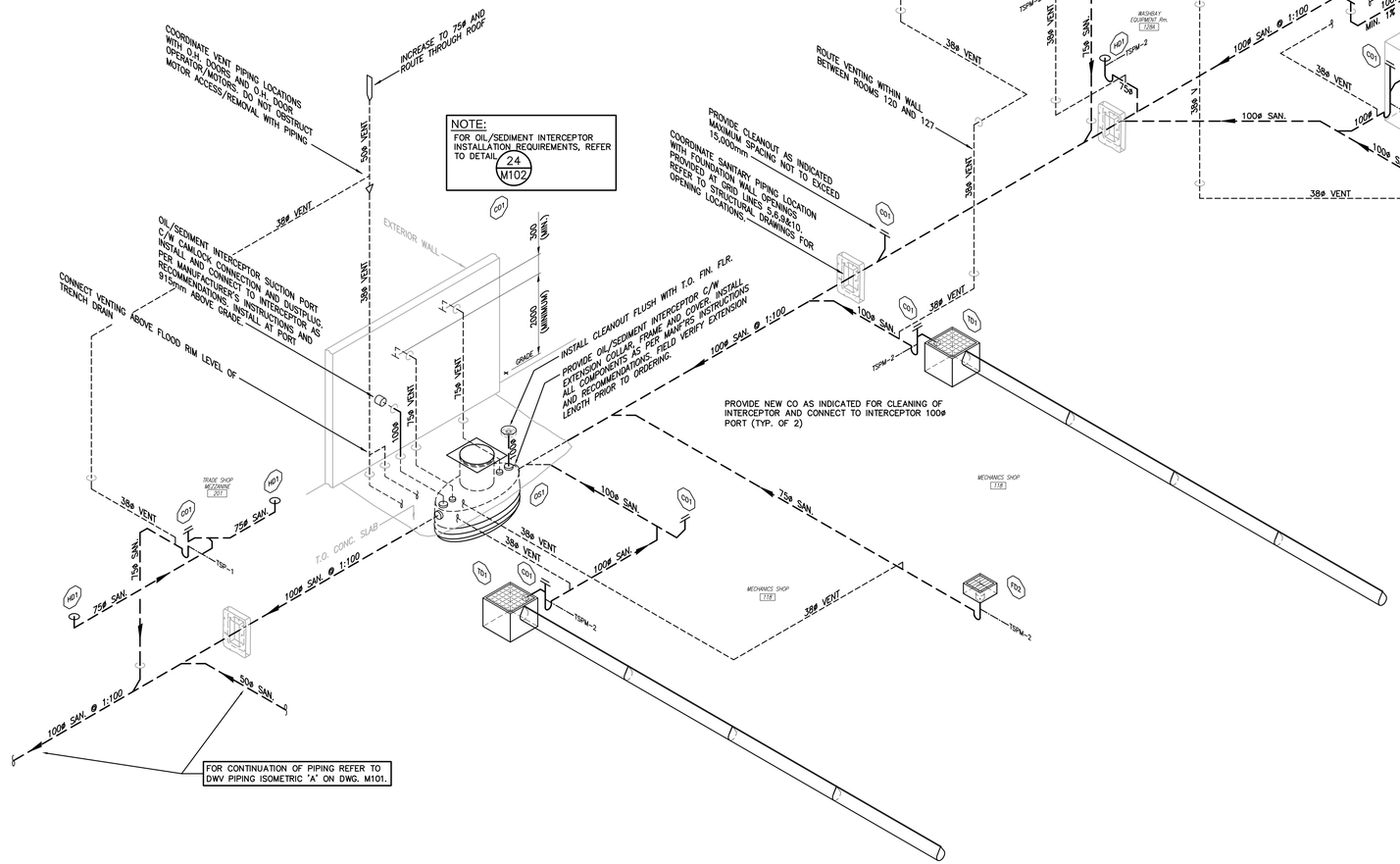
* –CONFIRM DIMENSIONS WITH WASHBAY EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.

NOTE:
FIELD VERIFY AND CONFIRM WASHBAY EQUIPMENT BUFFER TANK OVERFLOW AND RECYCLED PIPING SIZES, LAYOUTS AND FLOOR/TRENCH/PIT PIPING PENETRATIONS WITH WASHBAY EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.

21/M102 DETAIL -TRENCH AN PIT WATER RECYCLE SYSTEM
SCALE = N.T.S.



NOTE:
FOR FORMED AND POURED TRENCH AND SETTLING PIT PIPING REQUIREMENTS, REFER TO DETAIL 21/M102

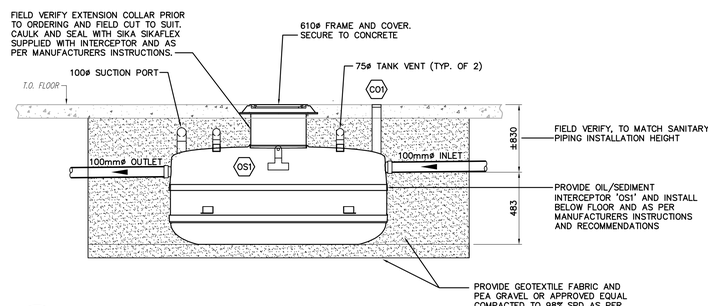


NOTE:
FOR OIL/SEDIMENT INTERCEPTOR INSTALLATION REQUIREMENTS, REFER TO DETAIL 24/M102

PROVIDE NEW CO AS INDICATED FOR CLEANING OF INTERCEPTOR AND CONNECT TO INTERCEPTOR 100ø PORT (TYP. OF 2)

FOR CONTINUATION OF PIPING REFER TO DWV PIPING ISOMETRIC 'A' ON DWG. M101.

DWV PIPING ISOMETRIC 'B'
SCALE: N.T.S.



24/M102 DETAIL -OIL / SEDIMENT INTERCEPTOR 'OS1'
SCALE = N.T.S.

NOTE:
FOR GENERAL PLUMBING NOTES, REFER TO DRAWING M100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 29/22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

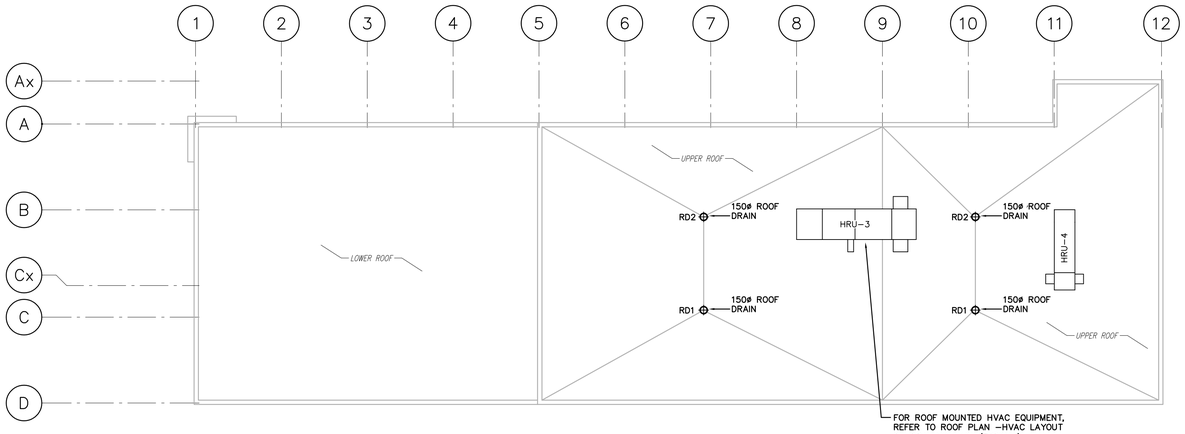
TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
DWV PIPING ISOMETRIC AND DETAILS

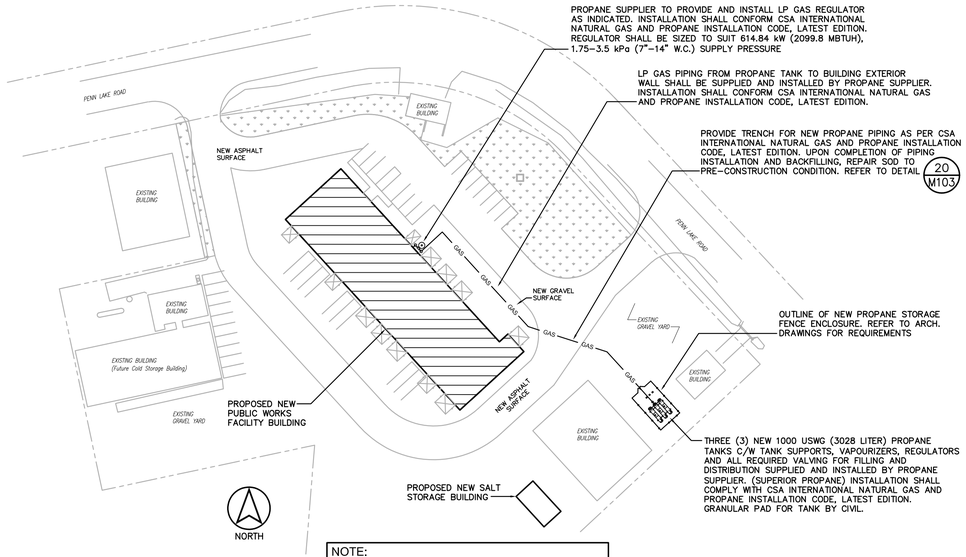
Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M102



ROOF PLAN -STORM DRAINAGE LAYOUT

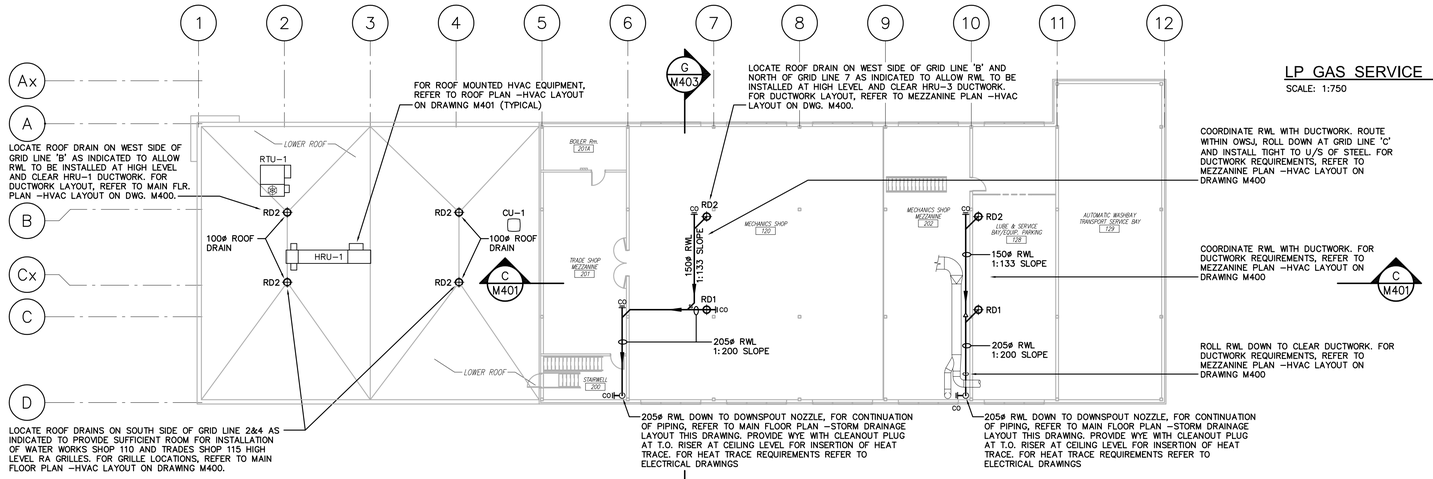
SCALE: 1:200



LP GAS SERVICE -SITE PLAN

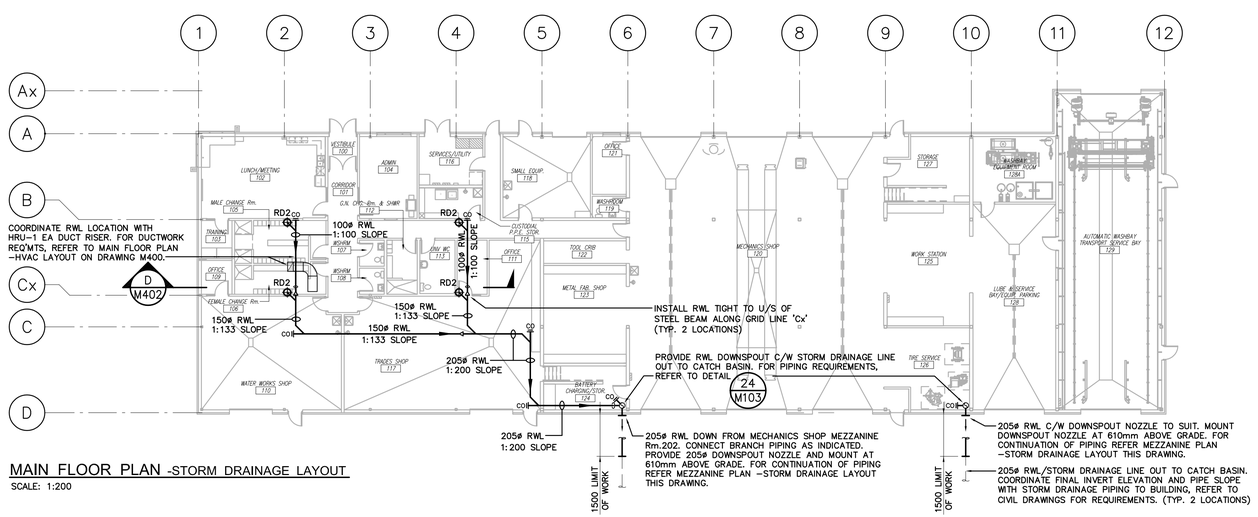
SCALE: 1:750

NOTE:
LP GAS PIPING, SUPPORTS AND CONNECTIONS TO TANK TO BE COMPLETED BY PROPANE SUPPLIER. INSTALLATION SHALL COMPLY WITH CSA INTERNATIONAL NATURAL GAS AND PROPANE INSTALLATION CODE, LATEST EDITION.



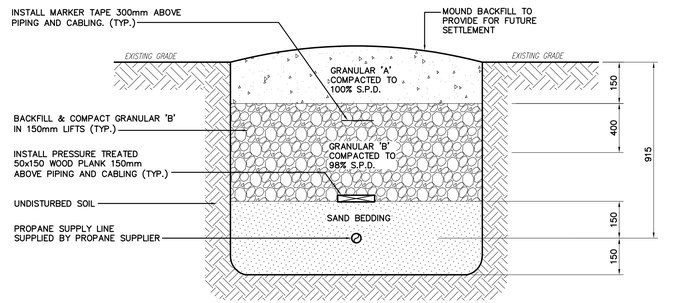
MEZZANINE PLAN -STORM DRAINAGE LAYOUT

SCALE: 1:200



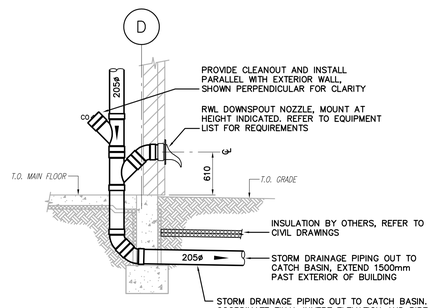
MAIN FLOOR PLAN -STORM DRAINAGE LAYOUT

SCALE: 1:200



20 M103 DETAIL -TYPICAL LP GAS PIPE BEDDING DETAIL

SCALE: N.T.S.



24 M103 DETAIL -RWL DOWNSPOUT

SCALE: N.T.S.

NOTE:
FOR GENERAL PLUMBING NOTES, REFER TO DRAWING M100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

0	ISSUED FOR PERMIT AND TENDER	Revision
	JULY 28 / 22	Date

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER D. W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

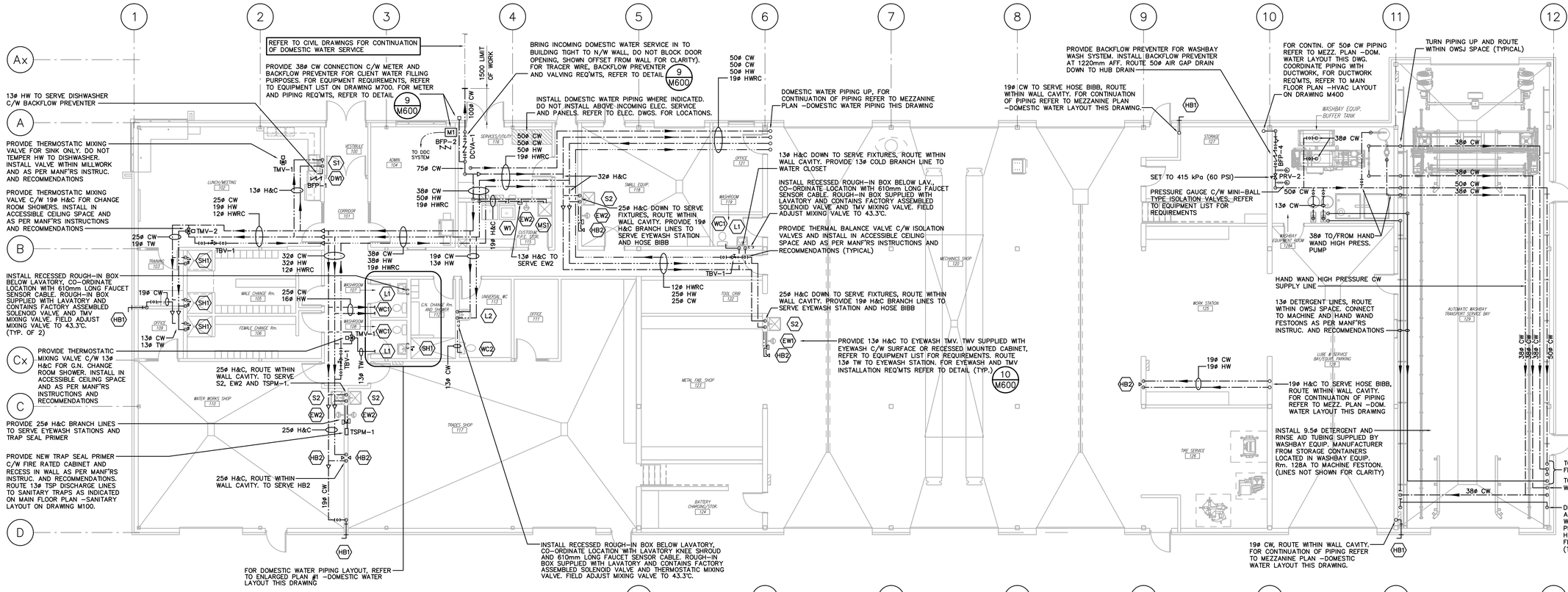
TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR, MEZZANINE AND ROOF STORM DRAINAGE PLANS.
LP GAS SERVICE SITE PLAN AND DETAILS

Drawn By: ER	Checked By: DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M103



MAIN FLOOR PLAN -DOMESTIC WATER LAYOUT

SCALE: 1:100

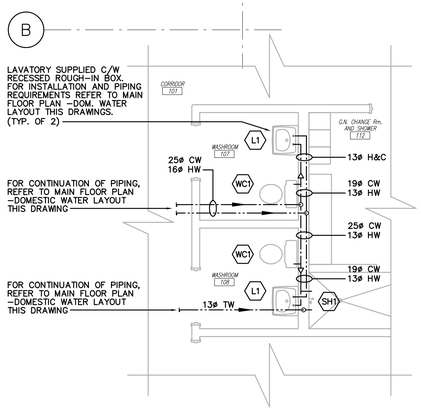
NOTE:
1. FIELD VERIFY FINAL WASHBAY EQUIPMENT LOCATIONS AND ADJUST INTERCONNECTING PIPING LENGTHS, ETC. TO SUIT FINAL LOCATIONS.
2. FIELD VERIFY AND CONFIRM WATER AND CHEMICAL PIPING SIZES TO WASHBAY EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.
3. PROVIDE ALL NECESSARY FITTINGS AND CONNECTORS TO CONNECT ALL WATER, DETERGENT AND RINSE AID PIPING TO WASHBAY EQUIPMENT AS PER EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

EQUIPMENT DOMESTIC WATER CONNECTIONS

EQUIPMENT	SIZE
DW1	13ø HW
EW1	13ø TW
EW1 -THERMOSTATIC MIXING VALVE	13ø H&C
EW2	13ø TW
EW2 -THERMOSTATIC MIXING VALVE	13ø H&C
EW3	13ø TW
EW3 -THERMOSTATIC MIXING VALVE	13ø H&C
HB1	19ø CW
HB2	19ø H&C
HB3	19ø CW
L1	13ø H&C
L2	13ø H&C
MS1	13ø H&C
S1	13ø H&C
S2	13ø H&C
SH1	13ø TW&C
TSP-1	13ø CW
TSPM-1	19ø CW
TSPM-2	19ø CW
WC1	13ø CW
WC2	13ø CW

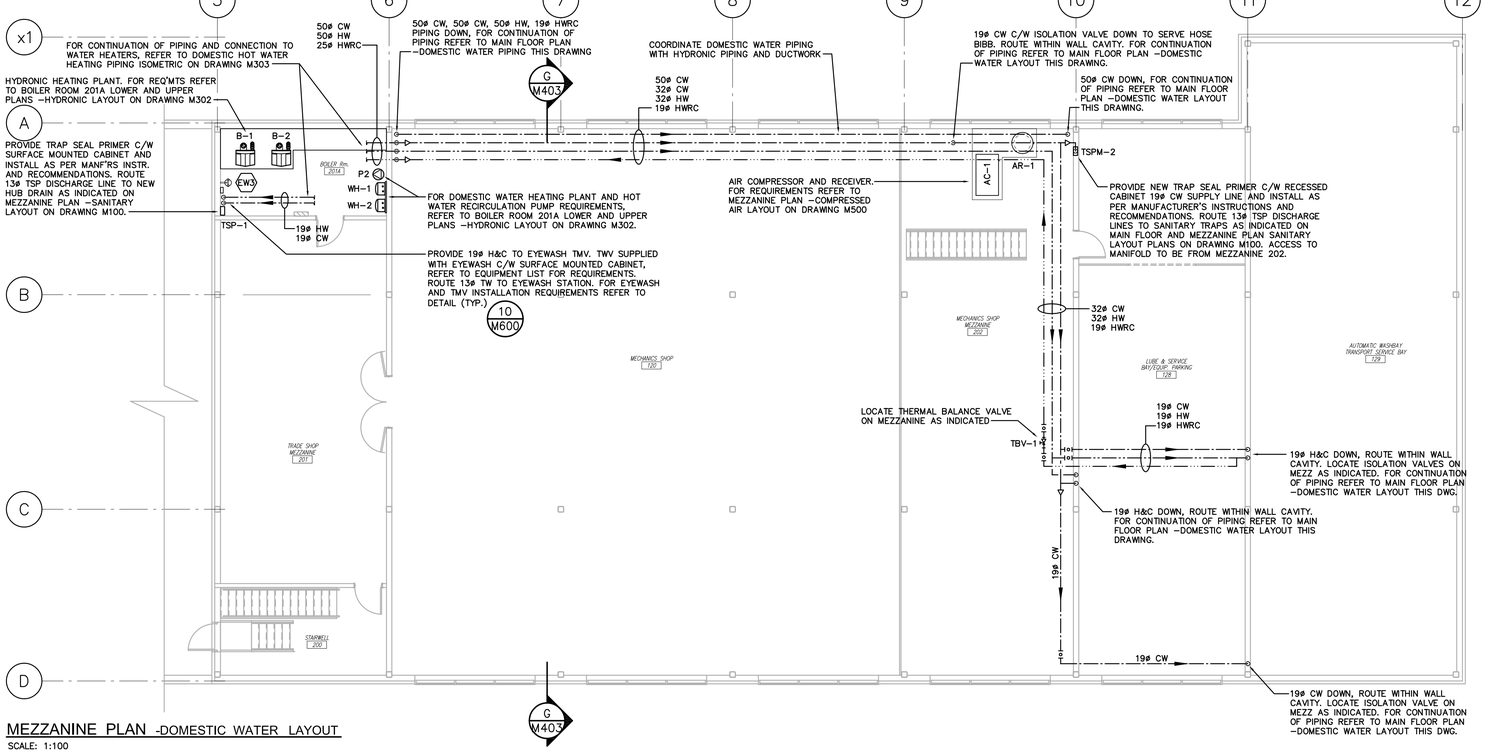
NOTE:
FOR GENERAL PLUMBING NOTES, REFER TO DRAWING M100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.



ENLARGED PLAN #1 -DOMESTIC WATER LAYOUT

SCALE: 1:50



MEZZANINE PLAN -DOMESTIC WATER LAYOUT

SCALE: 1:100

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER D. W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

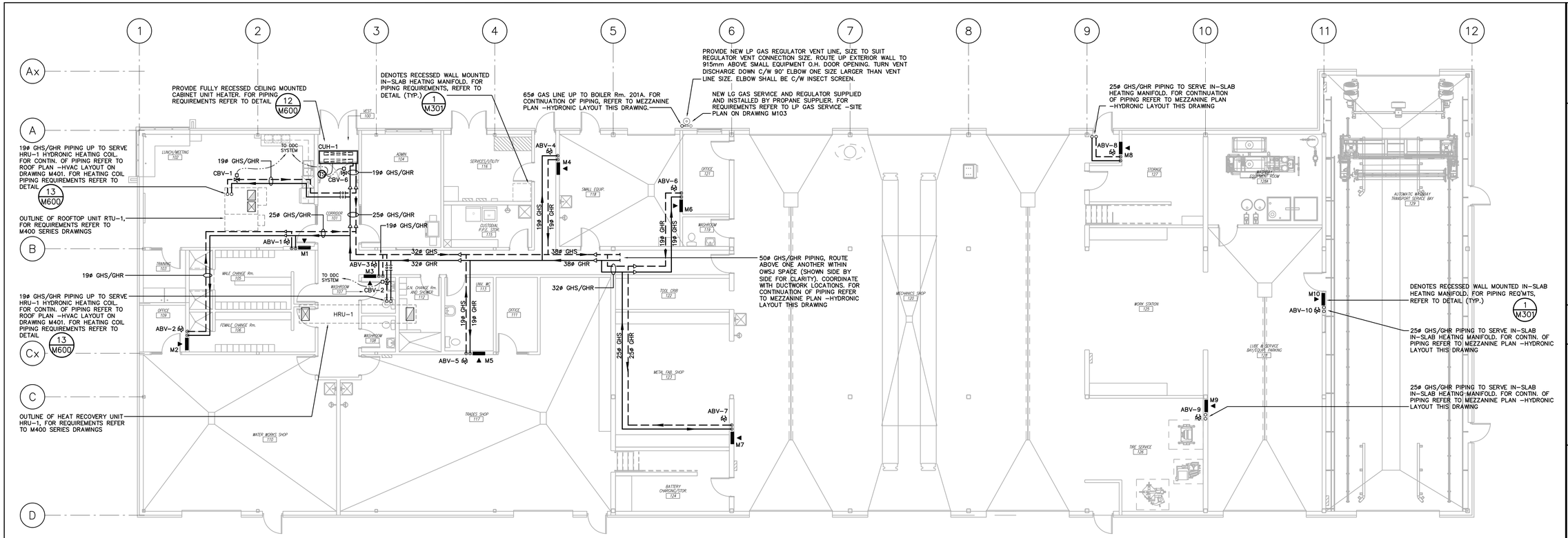
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: MAIN FLOOR AND MEZZANINE DOMESTIC WATER PLANS

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **M200**



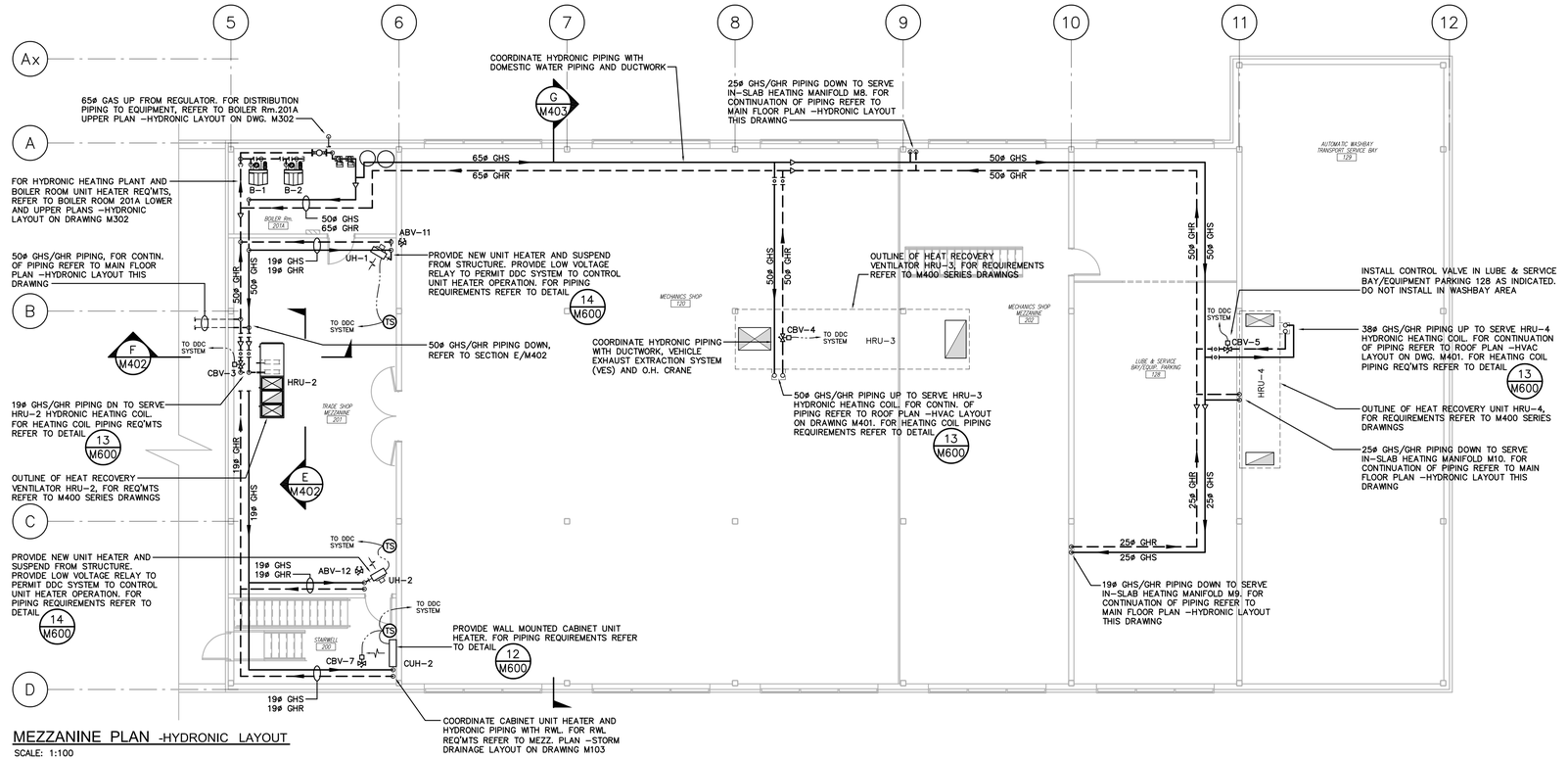
MAIN FLOOR PLAN -HYDRONIC LAYOUT

SCALE: 1:100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

GENERAL HYDRONIC NOTES:

1. FOR MECHANICAL SPECIFICATIONS, EQUIPMENT LIST AND SEQUENCE OF OPERATIONS REFER TO DRAWING M700 SERIES DRAWINGS.
2. INSULATE HYDRONIC PIPING AS PER MECHANICAL SPECIFICATIONS ON DRAWING M700.
3. FOR CIRCUIT BALANCING VALVE (ABV-X) AND CONTROL/BALANCING VALVES (CBV-X) SIZES AND FLOWS, REFER TO SCHEDULES ON DRAWING M704. PROVIDE REDUCERS TO SUIT VALVE SIZES AS REQUIRED.
4. CO-ORDINATE MANIFOLDS, HYDRONIC AND GAS PIPING WITH SANITARY, DOMESTIC WATER, STORM DRAINAGE, GAS PIPING, DISTRIBUTION DUCTWORK, EQUIPMENT, LIGHTING LAYOUT, COMPRESSED AIR, REFRIGERANT, CONDENSATE PIPING, BUILDING STRUCTURE AND REQUIRED CEILING HEIGHTS.
5. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.
6. IN-SLAB HYDRONIC HEATING SUB-TRADE MUST CO-ORDINATE WITH CONCRETE/SLAB, MASONRY AND WALL TRADES FOR MANIFOLDS AND IN-SLAB PIPING INSTALLATIONS.
7. ALL GHS/GHR PIPING TAKE-OFFS TO MANIFOLDS ARE 19ø UNLESS NOTED OTHERWISE. PROVIDE DIELECTRIC UNIONS AT CONNECTIONS OF DISSIMILAR METALS.
8. ALL MANIFOLDS ARE RECESSED. MANIFOLDS TO BE EASILY ACCESSIBLE THROUGH ACCESS DOORS ON SIDE NOTED BY SYMBOL. ACCESS DOORS TO HAVE ARCHITECTURAL FINISH TO SUIT WALL IN WHICH THEY ARE MOUNTED.
9. IN-SLAB HEATING MANIFOLD CABINETS SHALL BE PROVIDED WITH TAMPERPROOF FASTENERS. PROVIDE CONTROL VALVE OR THERMAL ACTIVATED TELESTATS FOR EACH MANIFOLD OR MANIFOLD CIRCUIT AS REQUIRED. CONNECT TO DDC SYSTEM. FOR MANIFOLD REQUIREMENTS REFER TO DETAIL '1/M301'.
10. PROVIDE MANUAL HIGH POINT AIR VENTS WHERE REQUIRED.
11. USE FT6 PLENUM RATED CABLING WHERE INSTALLED IN PLENUM SPACES. WIRING IN ACCESSIBLE CEILING SPACE TO BE SUPPORTED BY TRAY OR P-CLIPS. CABLES TO BE STRAPPED USING VELCRO, TIE STRAPS ARE NOT ACCEPTABLE. INSTALL WIRING PARALLEL TO BUILDING LINES. LABEL WIRING AT EACH END AND EQUIPMENT TO CONFORM TO CONFORM WITH INDUSTRY STANDARDS.
12. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
13. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR PIPING AND DUCTWORK PENETRATING REQUIRED SEPARATIONS.
14. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.
15. REFER TO ARCHITECTURAL PLANS FOR FIRE SEPARATIONS. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER OR ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR DUCTWORK AND PIPING PENETRATING REQUIRED SEPARATIONS.



MEZZANINE PLAN -HYDRONIC LAYOUT

SCALE: 1:100

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER D. W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

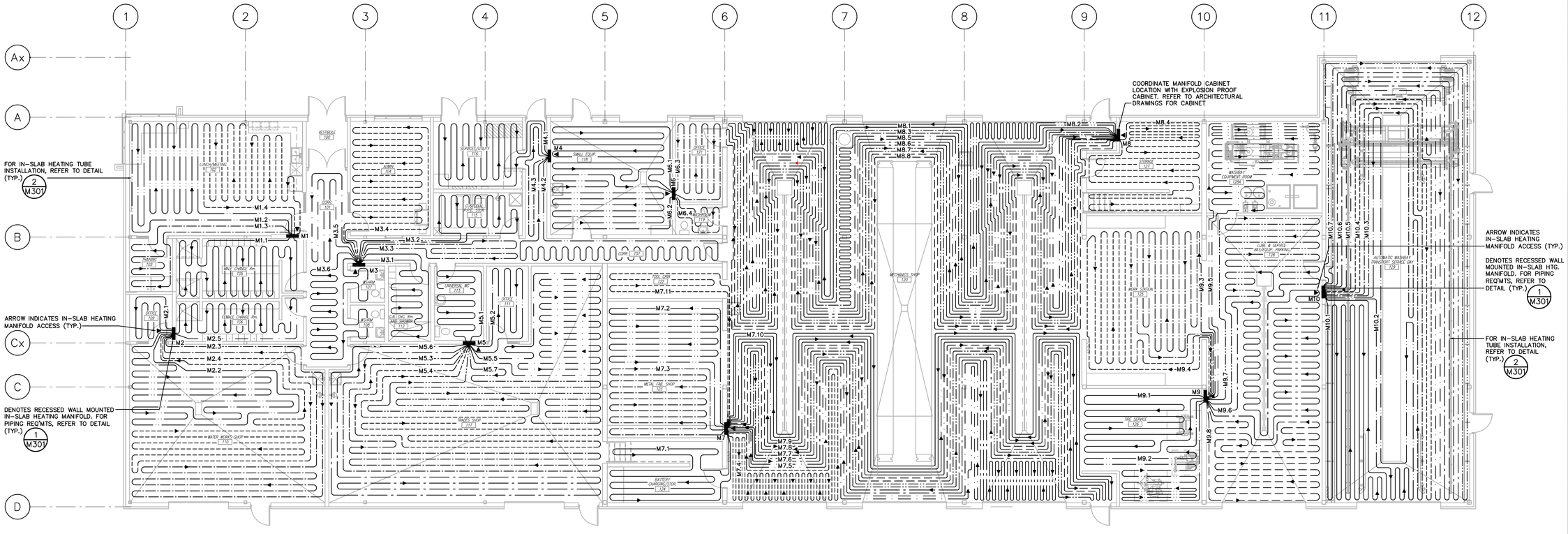
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: MAIN FLOOR AND MEZZANINE HYDRONIC PLANS AND GENERAL HYDRONIC NOTES

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **M300**

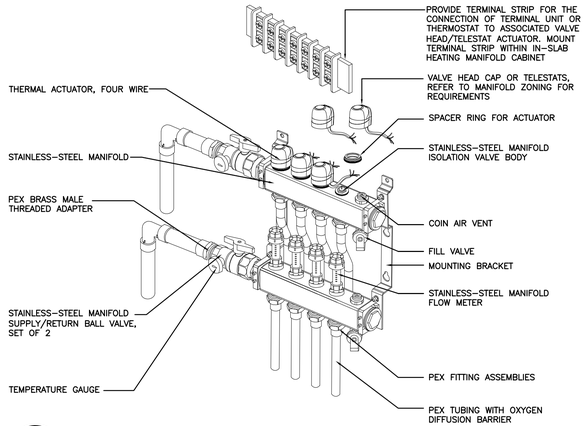


MAIN FLOOR PLAN -IN-SLAB RADIANT HEATING LAYOUT

SCALE: 1:100

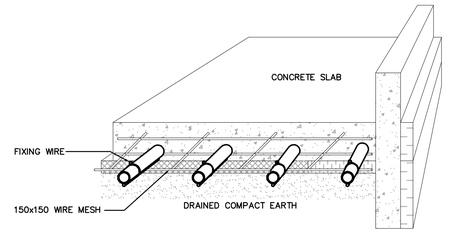
IN-SLAB HEATING MANIFOLD LOOP SCHEDULE

MANIFOLD	CIRCUIT	AREA SERVED	LENGTH (METERS)	TUBE SIZE (mm)	SPACING (mm)	FLOW (L/MIN.)	PRESS. DROP (kPA)	HEAT LOAD (WATTS)
M1	M1.1	105 MALE CHANGE Rm.	58	13ø	305	0.80	2.4	188
	M1.2	102 LUNCH/MEETING	76	13ø	305	2.23	16.4	1580
	M1.3	103 TRAINING	34	13ø	305	0.79	1.2	580
	M1.4	102 LUNCH/MEETING	71	13ø	305	2.01	13.2	1435
M2	M2.1	109 OFFICE	17	13ø	305	0.38	0.3	223
	M2.2	110 WATER WORKS SHOP	89	13ø	305	2.65	26.0	1877
	M2.3	110 WATER WORKS SHOP	90	13ø	305	2.65	26.0	1878
	M2.4	110 WATER WORKS SHOP	89	13ø	305	2.61	25.1	1854
	M2.5	106 FEMALE CHANGE ROOM	41	13ø	305	0.53	0.9	137
M3	M3.1	112 G.N. CHANGE Rm. AND SHOWER	33	13ø	305	1.02	1.8	585
	M3.2	115 CUSTODIAL/P.P.E. STOR.	39	13ø	305	1.06	2.4	695
	M3.3	101 CORRIDOR	28	13ø	305	0.38	0.3	73
	M3.4	104 ADMINISTRATION	75	13ø	305	1.25	6.3	894
	M3.5	101 CORRIDOR	31	13ø	305	0.42	0.3	95
	M3.6	101 CORRIDOR 107/108 WASHROOMS	45	13ø	305	0.64	1.2	230
M4	M4.1	116 SERVICES/UTILITY	58	13ø	305	1.82	9.0	1266
	M4.2	101 CORRIDOR	51	13ø	305	0.64	1.5	233
	M4.3	101 CORRIDOR	15	13ø	305	0.38	0.3	260
M5	M5.1	113 UNIVERSAL WASHROOM	29	13ø	305	0.95	1.5	675
	M5.2	111 OFFICE	28	13ø	305	0.38	0.3	132
	M5.3	117 TRADES SHOP	82	13ø	305	1.60	10.2	1140
	M5.4	117 TRADES SHOP	82	13ø	305	1.60	10.5	1155
	M5.5	117 TRADES SHOP	79	13ø	305	1.60	9.6	1122
	M5.6	117 TRADES SHOP	84	13ø	305	1.60	10.8	1161
	M5.7	117 TRADES SHOP	83	13ø	305	1.60	10.8	1168
M6	M6.1	118 SMALL EQUIPMENT	58	13ø	305	1.06	3.6	751
	M6.2	118 SMALL EQUIPMENT	59	13ø	305	1.02	3.6	735
	M6.3	121 OFFICE	35	13ø	305	0.95	1.8	670
	M6.4	119 WASHROOM	12	13ø	305	0.38	0.0	62
M7	M7.1	124 BATTERY CHRG./STOR.	54	13ø	305	0.80	2.1	554
	M7.2	123 METAL FAB. SHOP	69	13ø	305	0.98	3.9	395
	M7.3	123 METAL FAB. SHOP	68	13ø	305	0.91	3.6	363
	M7.4	120 MECHANICS SHOP	94	13ø	150	2.14	19.4	1548
	M7.5	120 MECHANICS SHOP	82	13ø	150	1.89	13.5	1339
	M7.6	120 MECHANICS SHOP	146	19ø	150	3.44	27.5	2449
	M7.7	120 MECHANICS SHOP	129	19ø	150	2.99	19.1	2140
	M7.8	120 MECHANICS SHOP	131	19ø	150	3.03	20.0	2166
	M7.9	120 MECHANICS SHOP	133	19ø	150	3.07	20.6	2195
	M7.10	120 MECHANICS SHOP	134	19ø	150	3.14	21.5	2225
	M7.11	122 TOOL CRIB	40	13ø	305	0.45	0.6	264
M8	M8.1	120 MECHANICS SHOP	113	19ø	150	2.57	12.9	1825
	M8.2	120 MECHANICS SHOP	68	13ø	150	1.51	6.8	1084
	M8.3	120 MECHANICS SHOP	156	19ø	150	3.63	15.2	2582
	M8.4	127 STORAGE	92	13ø	150/305	2.31	21.5	1151
	M8.5	120 MECHANICS SHOP	174	19ø	150	3.94	19.7	2809
	M8.6	120 MECHANICS SHOP	175	19ø	150	3.97	20.3	2835
	M8.7	120 MECHANICS SHOP	177	19ø	150	4.05	20.9	2876
	M8.8	120 MECHANICS SHOP	179	19ø	150	4.05	21.5	2898
M9	M9.1	126 TIRE SERVICE	56	13ø	305	0.83	2.4	408
	M9.2	126 TIRE SERVICE	56	13ø	150/305	0.68	1.8	295
	M9.3	125 WORK STATION	84	13ø	305	1.06	5.4	236
	M9.4	125 WORK STATION	78	13ø	305	1.02	4.5	225
	M9.5	128A WASHBAY EQUIP. Rm.	111	13ø	150/305	1.48	12.6	1028
	M9.6	128 LUBE & SERVICE BAY	98	13ø	305	3.48	45.0	2484
	M9.7	128 LUBE & SERVICE BAY	84	13ø	305	3.07	32	2190
	M9.8	128 LUBE & SERVICE BAY	81	13ø	305	2.73	24.8	1949
M10	M10.1	129 AUTOMATIC WASHBAY	112	19ø	230	3.22	19.1	2304
	M10.2	129 AUTOMATIC WASHBAY	71	13ø	230	2.01	13.2	1431
	M10.3	129 AUTOMATIC WASHBAY	80	13ø	230	2.27	18.2	1629
	M10.4	129 AUTOMATIC WASHBAY	77	19ø	230	2.20	3.3	1571
	M10.5	129 AUTOMATIC WASHBAY	81	13ø	230	2.31	18.9	1650
	M10.6	129 AUTOMATIC WASHBAY	133	19ø	230	3.86	14.3	2738
	M10.7	129 AUTOMATIC WASHBAY	84	13ø	230	2.38	20.7	1705
TOTALS	63 CIRCUITS	–	–	–	–	116.46	–	78,395



1 M301 DETAIL -TYPICAL IN-SLAB HEATING MANIFOLD

SCALE: NTS



2 M301 DETAIL -IN-SLAB TUBING INSTALLATION

NTS

LOOP DESIGNATION SYMBOL

DENOTES MANIFOLD NUMBER

TO MX–X —— DENOTES LOOP NUMBER

IN-SLAB HEATING DESIGN CRITERIA

DESIGN SUPPLY WATER TEMPERATURE = 110°F
DELTA T = 20.0°F
IN-SLAB HEATING SUPPLIER SHALL ZONE BUILDING AS INDICATED ON DESIGN DRAWINGS AND PROVIDE COMPLETE RADIANT FLOOR DESIGN SUBMITTAL PACKAGE PRIOR TO INSTALLATION.

NOTE:
FOR GENERAL HYDRONIC NOTES, REFER TO DRAWING M300

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22
Revision		Date

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 29/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

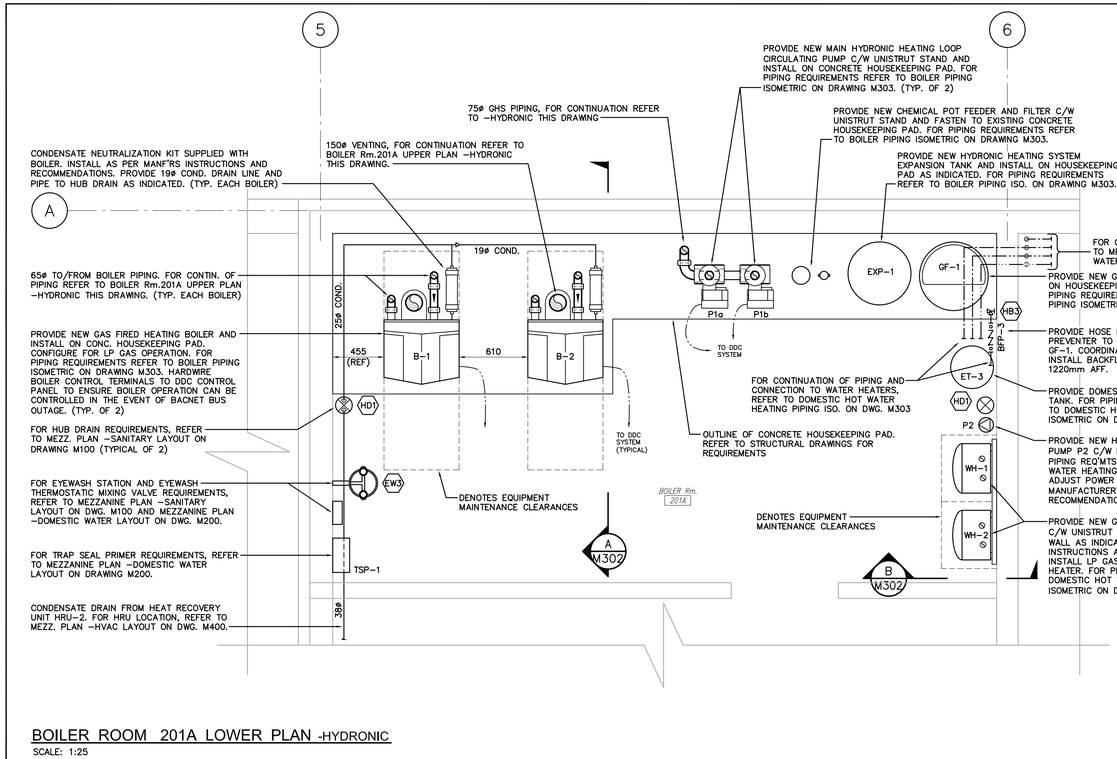
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR IN-SLAB RADIANT HEATING PLAN,
IN-SLAB HEATING MANIFOLD LOOP SCHEDULE AND DETAILS

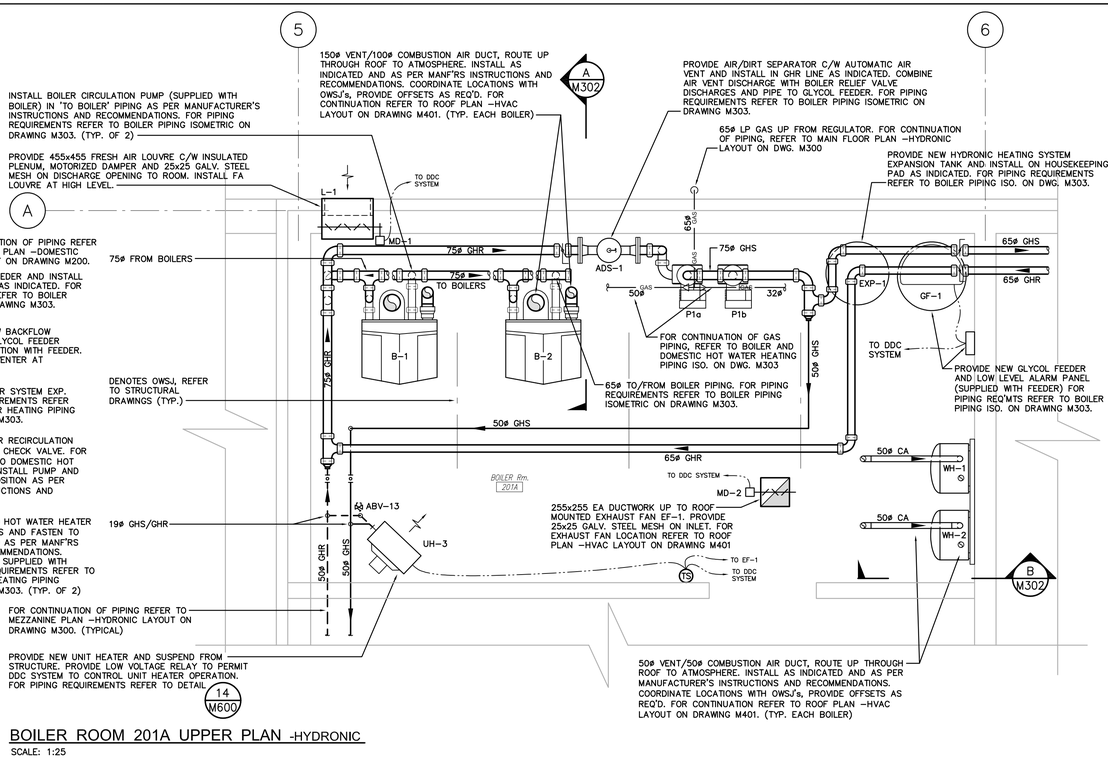
Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M301



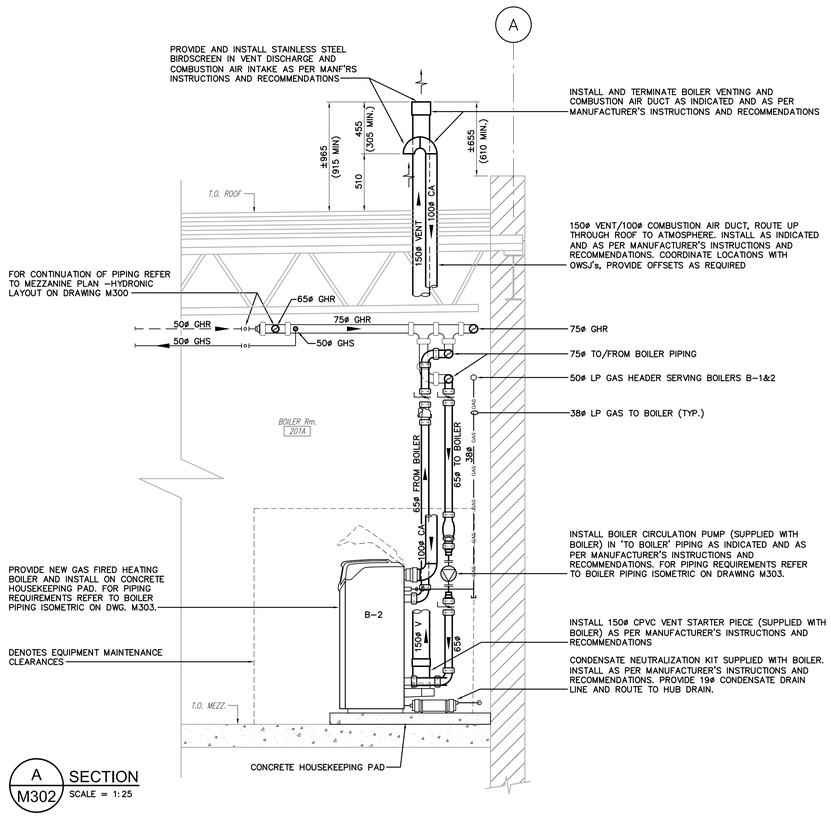
BOILER ROOM 201A LOWER PLAN -HYDRONIC

SCALE: 1:25



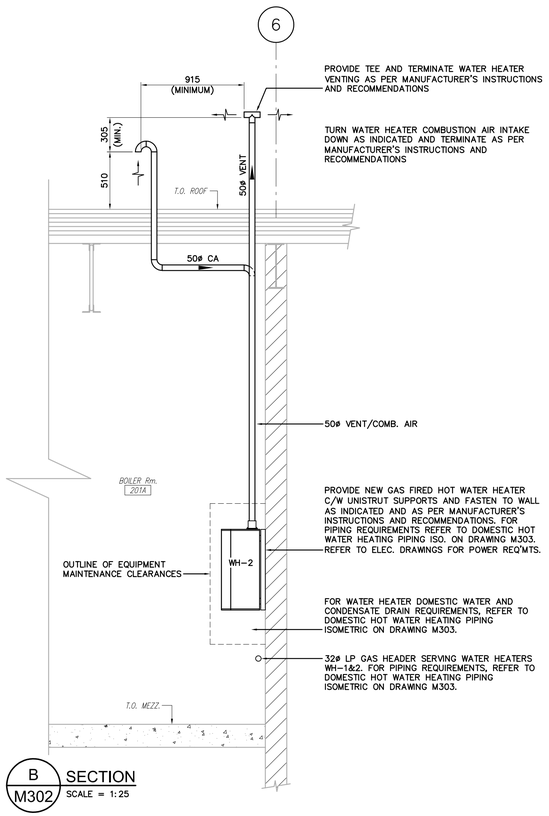
BOILER ROOM 201A UPPER PLAN -HYDRONIC

SCALE: 1:25



A M302 SECTION

SCALE = 1:25



B M302 SECTION

SCALE = 1:25

NOTE:

FOR GENERAL HYDRONIC NOTES, REFER TO DRAWING M300. FOR GENERAL HVAC NOTES, REFER TO DRAWING M400

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22
No.	Revision	Date

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER D. W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: BOILER ROOM PLANS AND SECTIONS

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

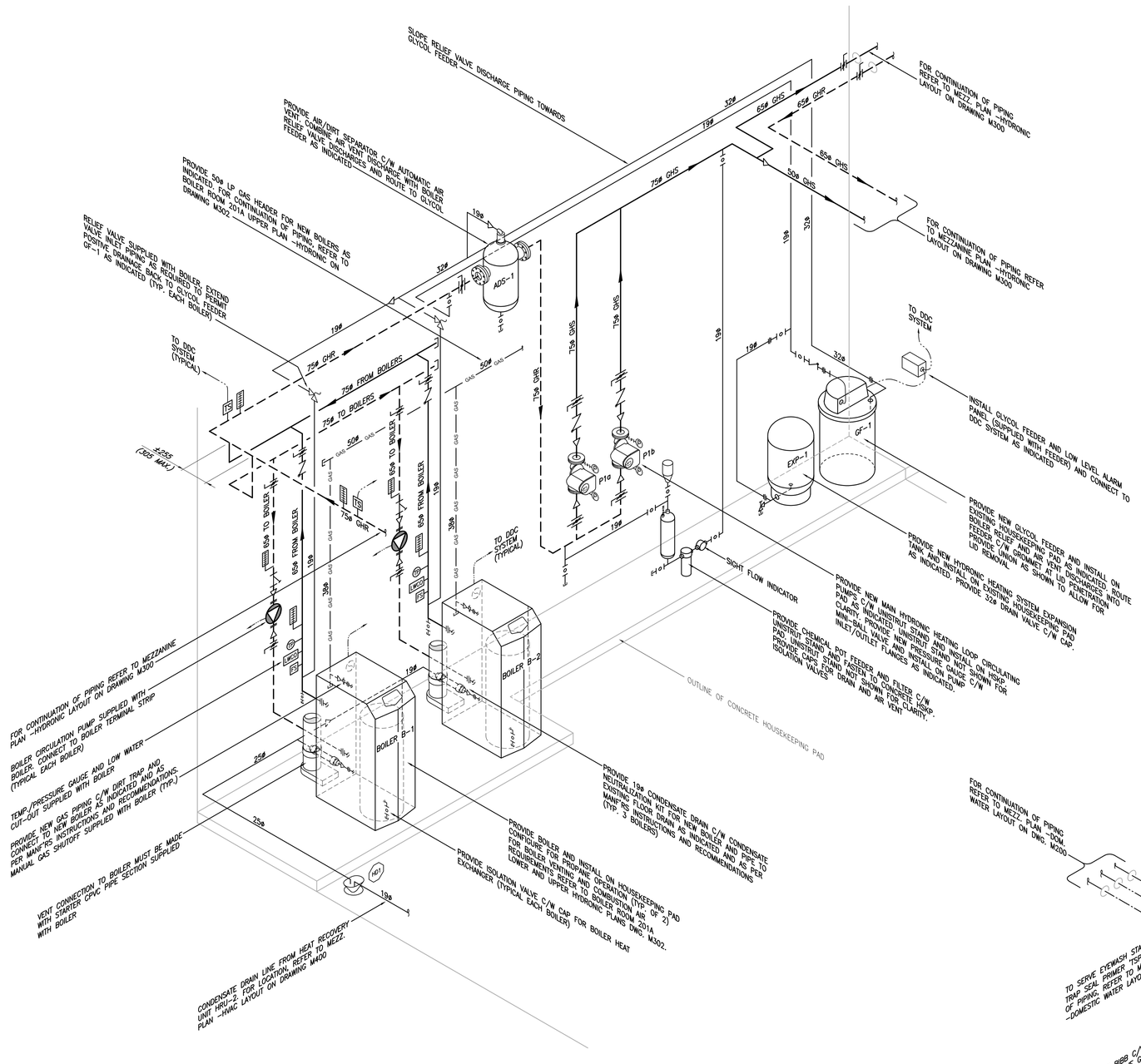
Drawing No: **M302**

NOTES

1. GENERAL CONTRACTOR SHALL WIRE ALL ANCILLARY BOILER CONTROLS AS PER MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS TO PROVIDE A COMPLETE AND WORKING HEATING PLANT. ASSIGN WORK TO APPROPRIATE ELECTRICAL OR CONTROLS CONTRACTOR AS REQUIRED BY COMPONENT VOLTAGES.
2. CHARGE HYDRONIC HEATING SYSTEM AND EXPANSION TANKS TO SYSTEM OPERATING PRESSURE.
3. PROVIDE ADHESIVE SIGN INDICATING '35/65 PROPYLENE GLYCOL/WATER MIXTURE' AND MOUNT TO NEW GLYCOL FEEDER GF-1.

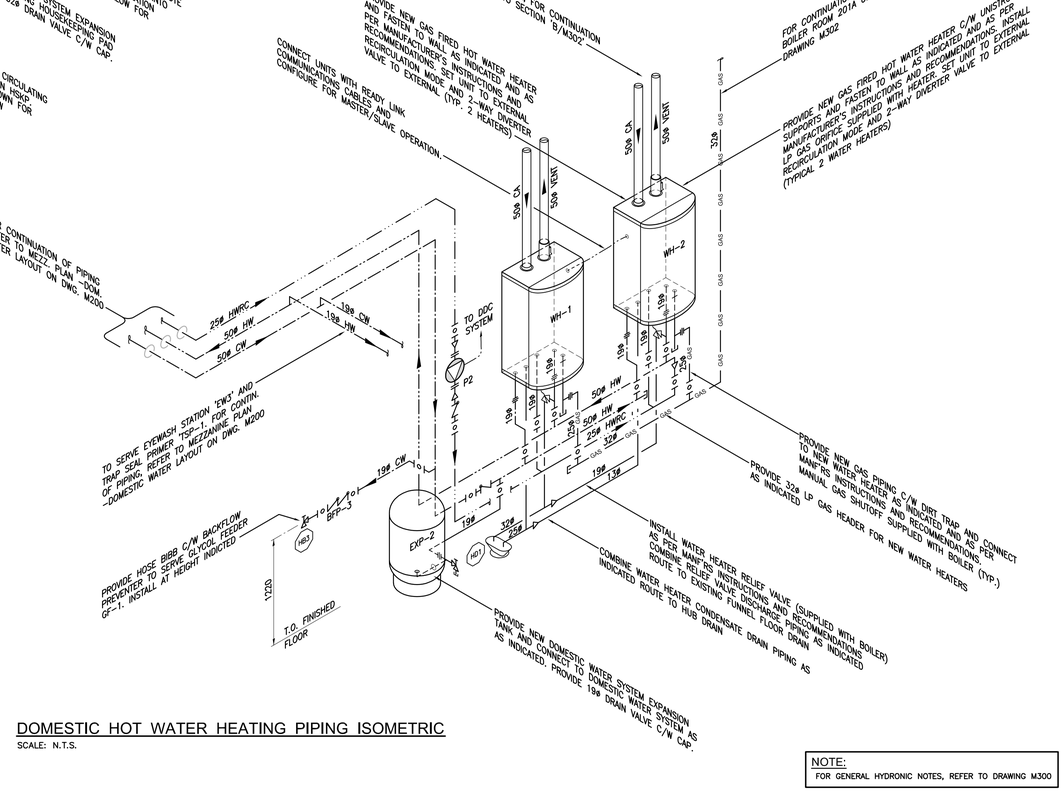
LEGEND

- BALL TYPE SHUT OFF VALVE
- CHECK VALVE
- STRAINER
- BUTTERFLY VALVE
- DRAIN VALVE C/W CAP
- THERMOMETER
- SAFETY RELIEF VALVE
- UNION
- REDUCER
- PRESSURE GAUGE
- TEMPERATURE/PRESSURE GAUGE
- TEMPERATURE SENSOR
- FLOW SWITCH



BOILER PIPING ISOMETRIC

SCALE: N.T.S.



DOMESTIC HOT WATER HEATING PIPING ISOMETRIC

SCALE: N.T.S.

NOTE:
FOR GENERAL HYDRONIC NOTES, REFER TO DRAWING M300

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22
Revision		Date

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

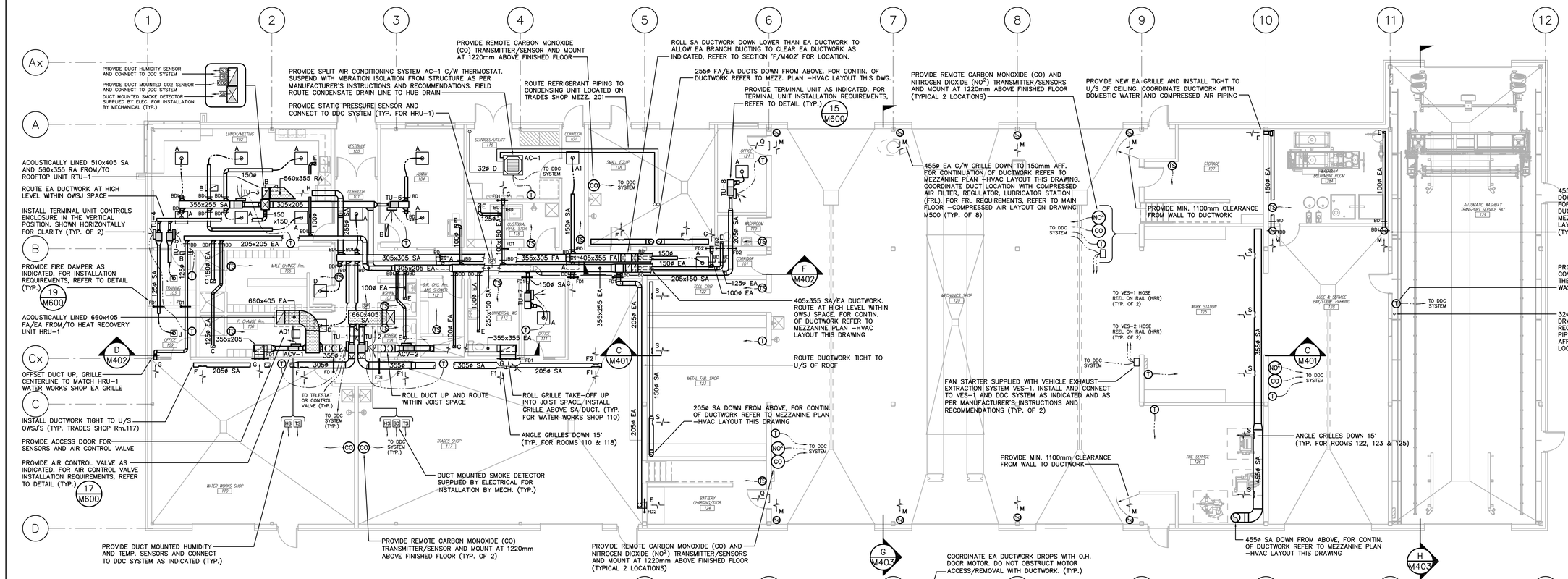
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
BOILER PIPING AND DOMESTIC HOT WATER HEATING PIPING ISOMETRICS

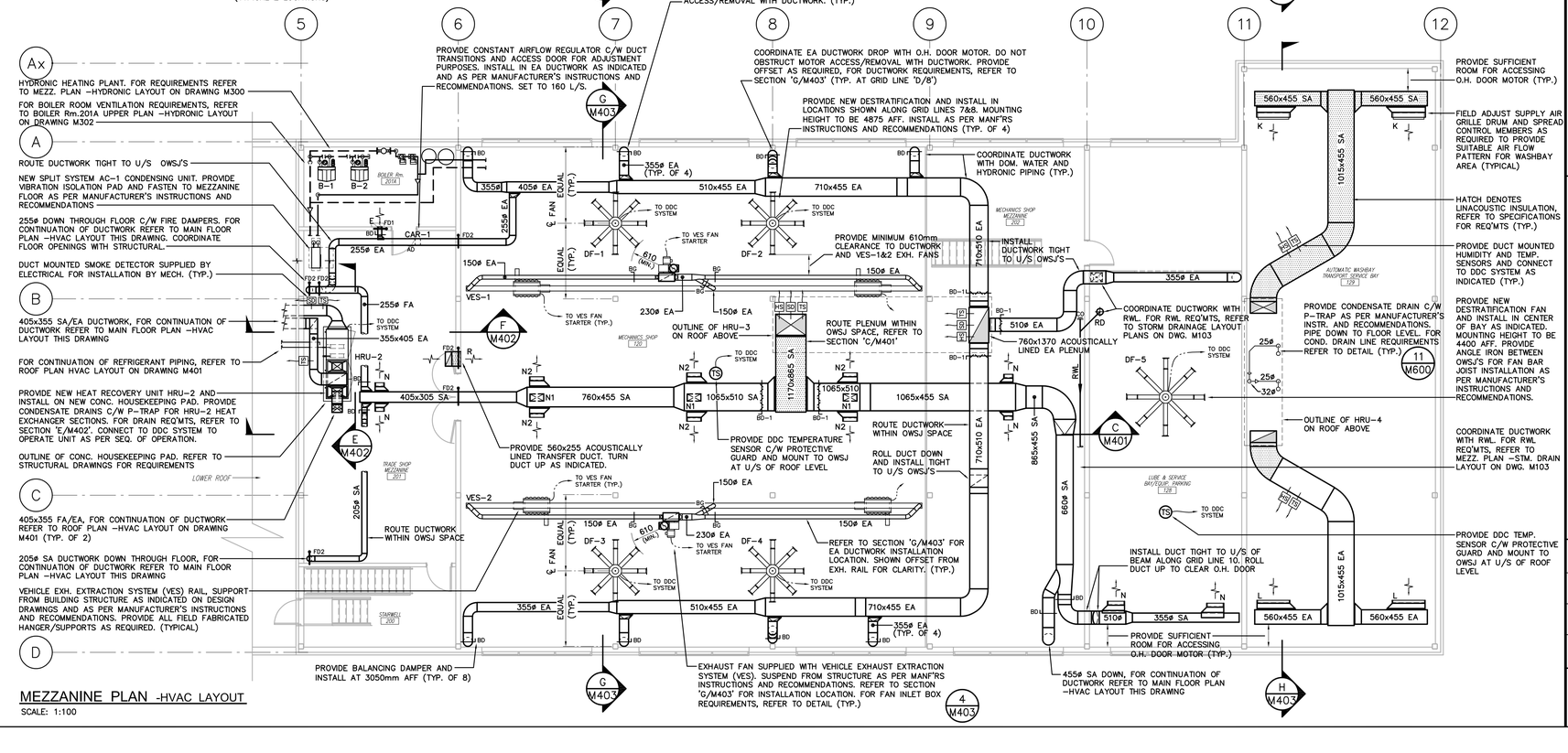
Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M303



MAIN FLOOR PLAN -HVAC LAYOUT

SCALE: 1:100



MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

NOTE:

1. TEST/ADJUST/BALANCING (TAB) CONTRACTOR SHALL ASSIST THE CONTROLS CONTRACTOR IS SETTING AND CALIBRATING HEAT RECOVERY UNIT HRU-3 MODULATING BY-PASS DAMPER. SETTINGS SHALL BE AS FOLLOWS;
   - WITH NO VEHICLE EXHAUST EXTRACTION SYSTEM (VES) OPERATING –DAMPER NORMALLY CLOSED
   - WITH ONE VES OPERATING – 660 L/S
   - WITH TWO VES OPERATING – 1320 L/S
2. UPON COMPLETION OF VEHICLE EXHAUST EXTRACTION SYSTEM (VES-X) AIR BALANCING, TAB CONTRACTOR SHALL PERMANENTLY MARK BLAST GATE DAMPER POSITIONS AND FASTEN BLADES IN PLACE UTILIZING THUMB SET SCREW.

GENERAL HVAC NOTES:

1. FOR MECHANICAL SPECIFICATIONS, EQUIPMENT LIST AND SEQUENCE OF OPERATIONS REFER TO M700 SERIES DRAWINGS.
2. WHERE CEILING IS TO BE USED AS RA PLENUM, ALL MATERIALS USED IN CEILING SPACE TO MEET (OR EXCEED) MINIMUM SMOKE AND FLAME SPREAD RATINGS AS DEFINED IN O.B.C.
3. USE FT6 PLENUM RATED CABLING WHERE INSTALLED IN PLENUM SPACES. WIRING IN ACCESSIBLE CEILING SPACE TO BE SUPPORTED BY TRAY OR P-CLIPS. CABLES TO BE STRAPPED USING VELCRO, TIE STRAPS ARE NOT ACCEPTABLE. INSTALL WIRING PARALLEL TO BUILDING LINES. LABEL WIRING AT EACH END AND EQUIPMENT TO CONFORM TO CONFORM WITH INDUSTRY STANDARDS.
4. CO-ORDINATE DISTRIBUTION DUCTWORK, DIFFUSERS AND GRILLES WITH DOMESTIC WATER PIPING, SANITARY, HYDRONIC PIPING, GAS PIPING, EQUIPMENT, LIGHTING LAYOUT, COMPRESSED AIR, REFRIGERANT PIPING, CONDENSATE PIPING, BUILDING STRUCTURE AND REQUIRED CEILING HEIGHTS. INSTALL IN ACCESSIBLE CEILING SPACE WHERE POSSIBLE.
5. PROVIDE ACCESS DOORS WHERE REQUIRED. REFER TO ARCHITECTURAL FOR REFLECTED CEILING PLANS.
6. ACOUSTICALLY LINE DUCTWORK WHERE INDICATED. NOT ALL EXTERNAL INSULATION SHOWN FOR CLARITY. INSULATE DUCTWORK AS PER MECHANICAL SPECIFICATIONS ON DRAWING M700.
7. PROVIDE ADEQUATE SUPPORT FOR ALL EQUIPMENT, DUCTWORK AND PIPING. PROVIDE SERVICE CLEARANCE FOR ALL EQUIPMENT AS PER MANUFACTURERS RECOMMENDATIONS.
8. INSULATE EXTERIOR AND INTERIOR REFRIGERANT LIQUID AND SUCTION LINES AS PER MECHANICAL SPECIFICATIONS ON DRAWING M700.
9. ALL FIRE DAMPERS TO BE AS NOTED. FOR FIRE DAMPER INSTALLATION REQUIREMENTS REFER TO DETAIL 19/M600
10. PROVIDE NON-RATED OR FIRE RATED ACCESS DOORS TO MAINTAIN ACCESS TO MECHANICAL EQUIPMENT AND PIPING WHERE REQUIRED.
11. ALL NEW FLOOR/WALL/ROOF OPENINGS REQUIRED TO FACILITATE INSTALLATION OF DUCTWORK SHALL BE PROVIDED BY ARCHITECTURAL.
12. REFER TO ARCHITECTURAL PLANS FOR FIRE SEPARATIONS. ALL PENETRATIONS TO BE SEALED TO MAINTAIN INTEGRITY OF FIRE RATING. PROVIDE FIRE DAMPER OR ULC LISTED INTUMESCENT FIRESTOP ASSEMBLY FOR DUCTWORK AND PIPING PENETRATING REQUIRED SEPARATIONS.

MEZZANINE PLAN -HVAC LAYOUT

SCALE: 1:100

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28/22

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LICENSED PROFESSIONAL ENGINEER D.W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: MAIN FLOOR AND MEZZANINE HVAC PLANS AND GENERAL HVAC NOTES

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **M400**

PROVIDE TRANSITIONS AS REQUIRED TO CONNECT 510x405 SA AND 560x355 RA DUCTS TO ROOFTOP UNIT OUTLET/INLET CONNECTIONS. TRANSITION DUCTWORK WITHIN ROOF CURB AREA. REWORK ROOFTOP UNIT FULL HEIGHT ROOF CURB RAILS AS REQUIRED TO ALLOW TRANSITIONING OF SUPPLY AND RETURN AIR DUCTWORK WITHIN ROOF CURB AREA.

PROVIDE ROOFTOP UNIT C/W PRE-FABRICATED INSULATED ROOF CURB. PROVIDE NEW DDC EQUIPMENT CONTROLLER AND TERMINATE TO UNIT TERMINAL STRIP. CONNECT TO DDC SYSTEM AND PROGRAM TO OPERATE UNIT AS PER SEQUENCE OF OPERATION.

19ø GHS/GHR PIPING SERVING HRU HYDRONIC HEATING COIL. FOR CONTINUATION OF PIPING REFER TO MAIN FLOOR PLAN –HYDRONIC LAYOUT ON DRAWING M300. (TYP. FOR RTU–1)

BOILER B–2 VENTING AND COMBUSTION AIR DUCT

BOILER Rm.201A ROOF MOUNTED EXHAUST FAN C/W PREFABRICATED INSULATED ROOF CURB

PROVIDE HEAT RECOVERY UNIT C/W PRE–FABRICATED INSULATED ROOF CURB. ALIGN INSIDE EDGE OF ROOF CURB WITH EDGE OF BEAM FLANGE ALONG GRID LINES 'B' AND '8'. CONNECT TO DDC SYSTEM TO OPERATE UNIT AS PER SEQUENCE OF OPERATION

WATER HEATER WH–1&2 VENTING AND COMBUSTION AIR DUCTING. PROVIDE MINIMUM CLEARANCES AS INDICATED AND AS PER MANF'RS INSTRUCTIONS AND RECOMMENDATIONS

PROVIDE TRANSITIONS AS REQUIRED TO CONNECT 1170x865 SA AND 760x1370 EA DUCTS TO HEAT RECOVERY UNIT OUTLET/INLET CONNECTIONS. TRANSITION DUCTWORK WITHIN ROOF CURB AREA. REWORK FULL HEIGHT ROOF CURB RAILS AS REQUIRED TO ALLOW TRANSITIONING OF DUCTWORK WITHIN ROOF CURB AREA. REFER TO SECTION 'C/M401' FOR REQ'MTS.

PROVIDE COOLING COIL DRAIN LINE C/W P–TRAP FOR ROOFTOP UNIT, FOR PIPING REQUIREMENTS REFER TO DETAIL 11/M600

BOILER B–1 VENTING AND COMB. AIR DUCT

PROVIDE NEW DDC SYSTEM OUTDOOR AIR TEMP. AND HUMIDITY SENSOR C/W SUNSHIELD AND INSTALL ON NORTH SIDE OF BUILDING AS INDICATED

PROVIDE MINIMUM 305mm FROM EDGE OF BOILER B–1 COMBUSTION AIR DUCT TO EDGE OF BOILER B–2 VENT AS PER MANF'RS INSTRUCTIONS AND RECOMMENDATIONS.

PV — DENOTES NEW PLUMBING VENT (TYP.)

MAINTAIN MINIMUM CLEARANCE FROM PLUMBING VENT TO AIR HANDLING EQUIPMENT FRESH AIR INTAKE (TYP.)

PROVIDE FABRICATED HYDRONIC HEATING COIL PIPING VESTIBULE. FOR FABRICATION REQUIREMENTS REFER TO DETAIL 18/M600

305ø EA FROM VEHICLE EXHAUST EXTRACTION SYSTEM VES–2

CONNECT HEAT RECOVERY UNIT BY–PASS DAMPER TO DDC SYSTEM AS INDICATED

PROVIDE NEW CONCRETE PATIO STONE SUPPORT BASE FOR NEW CONDENSING UNIT. PLACE 50 THICK ROOFMATE INSULATION WITH ROOFING FELT COVER BETWEEN PATIO STONE AND ROOF

PROVIDE CONDENSING UNIT AND PLACE ON NEW SUPPORT BASE AS INDICATED

38ø GHS/GHR PIPING SERVING HRU HYDRONIC HEATING COIL. FOR CONTIN. OF PIPING REFER TO MEZZ. PLAN –HYDRONIC LAYOUT ON DWG. M300.

FOR CONDENSATE DRAINS AND P–TRAPS REFER TO MEZZANINE PLAN –HVAC LAYOUT ON DRAWING M400

FOR CONTINUATION OF REFRIGERANT PIPING, REFER TO MEZZ. PLAN –HVAC LAYOUT ON DWG. M400

CAP DX COOLING COIL AND CONDENSATE DRAIN PAN CONNECTIONS FOR FUTURE USE

MAINTAIN MINIMUM CLEARANCE FROM PLUMBING VENT TO AIR HANDLING EQUIPMENT FRESH AIR INTAKE (TYP.)

HEAT RECOVERY UNIT HRU–2 FRESH/EXHAUST AIR GOOSENECK. FOR REQUIREMENTS REFER TO SECTION 'E/M402'. (TYPICAL OF 2)

50ø GHS/GHR PIPING SERVING HRU HYDRONIC HEATING COIL. FOR CONTINUATION OF PIPING REFER TO MEZZANINE PLAN –HYDRONIC LAYOUT ON DRAWING M300. FOR HEATING COIL PIPING REQ'MTS REFER TO DETAIL 13/M600

PROVIDE CONDENSATE DRAIN C/W P–TRAP AND PIPE DOWN TO ROOF LEVEL AS PER MANF'RS INSTRUCTIONS AND RECOMMENDATIONS. FOR CONDENSATE DRAIN LINE REQ'MTS REFER TO DETAIL (TYP.) 11/M600

PROVIDE HEAT RECOVERY UNIT C/W PRE–FABRICATED INSULATED ROOF CURB. CONNECT TO DDC SYSTEM TO OPERATE UNIT AS PER SEQUENCE OF OPERATION

PROVIDE TRANSITIONS AS REQUIRED TO CONNECT 660x405 SA/EA DUCTS TO HEAT RECOVERY UNIT OUTLET/INLET CONNECTIONS. TRANSITION DUCTWORK WITHIN ROOF CURB AREA. REWORK FULL HEIGHT ROOF CURB RAILS AS REQUIRED TO ALLOW TRANSITIONING OF DUCTWORK WITHIN ROOF CURB AREA. REFER TO SECTION 'D/M402' FOR REQUIREMENTS.

PROVIDE REFRIGERANT PIPING SUPPORTS AS REQUIRED. REFER TO EQUIPMENT LIST FOR REQUIREMENTS. (NOT ALL SUPPORTS SHOWN FOR CLARITY)

PROVIDE FABRICATED HYDRONIC HEATING COIL PIPING VESTIBULE. FOR FABRICATION REQUIREMENTS REFER TO DETAIL 18/M600

PROVIDE TRANSITIONS AS REQUIRED TO CONNECT 610x815 SA/EA DUCTS TO HEAT RECOVERY UNIT OUTLET/INLET CONNECTIONS. TRANSITION DUCTWORK WITHIN ROOF CURB AREA. REWORK FULL HEIGHT ROOF CURB RAILS AS REQUIRED TO ALLOW TRANSITIONING OF DUCTWORK WITHIN ROOF CURB AREA. REFER TO SECTION 'H/M403' FOR REQUIREMENTS.

305ø EA FROM VEHICLE EXHAUST EXTRACTION SYSTEM VES–1 C/W BACKDRAFT DAMPER AND VELOCITY CONE. FOR CONE REQUIREMENTS REFER TO DETAIL (TYP. FOR VES–2) 3/M403

DENOTES EQUIPMENT MAINTENANCE CLEARANCES (TYPICAL)

DENOTES EQUIPMENT MAINTENANCE CLEARANCES (TYP.)

DENOTES NEW ROOF DRAIN (TYP.)

PROVIDE CONDENSATE DRAIN C/W P–TRAP AND PIPE DOWN TO ROOF LEVEL AS PER MANF'RS INSTRUCTIONS AND RECOMMENDATIONS. FOR CONDENSATE DRAIN LINE REQ'MTS REFER TO DETAIL (TYP.) 11/M600

NOTE:
1. ROOFTOP UNIT (RTU–1) AND ALL ROOF MOUNTED HEAT RECOVERY UNITS (HRU–X) ARE SUPPLIED WITH PREFABRICATED INSULATED ROOF CURBS. INSTALL NEW ROOF CURBS LEVEL AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. PROVIDE FORMED ANGLE ROOF CURB SUPPORTS AS REQUIRED AND FASTEN TO ROOF CURB TO ALLOW FOR LEVEL CURB INSTALLATION ON SLOPED ROOF DECKING. ANGLE SUPPORT SHALL BE FABRICATED FROM GALVANIZED STEEL SHEET SAME GAUGE AS ROOF CURB. (TYP.)

ROOF PLAN -HVAC LAYOUT
SCALE: 1:100

C/M401 SECTION -HVAC
SCALE: 1:50

HATCH DENOTES LINACOUSTIC INSULATION, REFER TO SPECIFICATIONS FOR REQUIREMENTS (TYP.)

ALIGN INSIDE EDGE OF ROOF CURB WITH EDGE OF BEAM FLANGE AS INDICATED. (TYPICAL ALONG GRID LINE B)

PROVIDE MINIMUM CLEARANCE TO DUCTWORK PERIPHERAL JOINTS AND BRACING

COORDINATE DUCTWORK WITH O.H. CRANE CLEARANCE REQUIREMENTS

205ø SA OFFSET AND ROUTE WITHIN OWSJ SPACE AS INDICATED

KEEP DUCTWORK TIGHT TO U/S OF LOWEST SLOPING ROOF STEEL AS INDICATED

150ø RWL

PROVIDE HEAT RECOVERY UNIT C/W PRE–FABRICATED INSULATED ROOF CURB. CONNECT TO DDC SYSTEM TO OPERATE UNIT AS PER SEQUENCE OF OPERATION

PROVIDE TRANSITIONS AS REQUIRED TO CONNECT SA/EA DUCTWORK TO HEAT RECOVERY UNIT OUTLET/INLET CONNECTIONS. TRANSITION DUCTWORK WITHIN ROOF CURB AREA. REWORK FULL HEIGHT ROOF CURB RAILS AS REQUIRED TO ALLOW TRANSITIONING OF DUCTWORK WITHIN ROOF CURB AREA.

760x1370 EA PLENUM

OUTLINE OF 510ø EA BEHIND

205ø RWL

COORDINATE DUCTWORK WITH RWL. FOR RWL REQUIREMENTS, REFER TO STORM DRAINAGE LAYOUT PLANS ON DWG. M103

710x510 EA ROUTE DUCTWORK WITHIN OWSJ SPACE AS INDICATED

OUTLINE OF 710x510 EA BEHIND

150ø SA

ANGLE SA GRILLE DOWN 15° (TYPICAL)

355ø SA

305x405 SA | 455x760 SA | 510x1065 SA | 1170x865 SA | 510x1065 SA | 455x1065 SA | 455x865 SA

T.O. ROOF | T.O. MEZZANINE | T.O. MAIN FLOOR | O.H. CRANE | CRANE RAIL | BUILDING COLUMN

TRADE SHOP MEZZANINE 201 | METAL FAB. SHOP 123 | MECHANICS SHOP 120 | MECHANICS SHOP MEZZANINE 202 | WORK STATION 125

NOTE:
FOR GENERAL HVAC NOTES, REFER TO DRAWING M400

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28/22

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LICENSED PROFESSIONAL ENGINEER D.W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

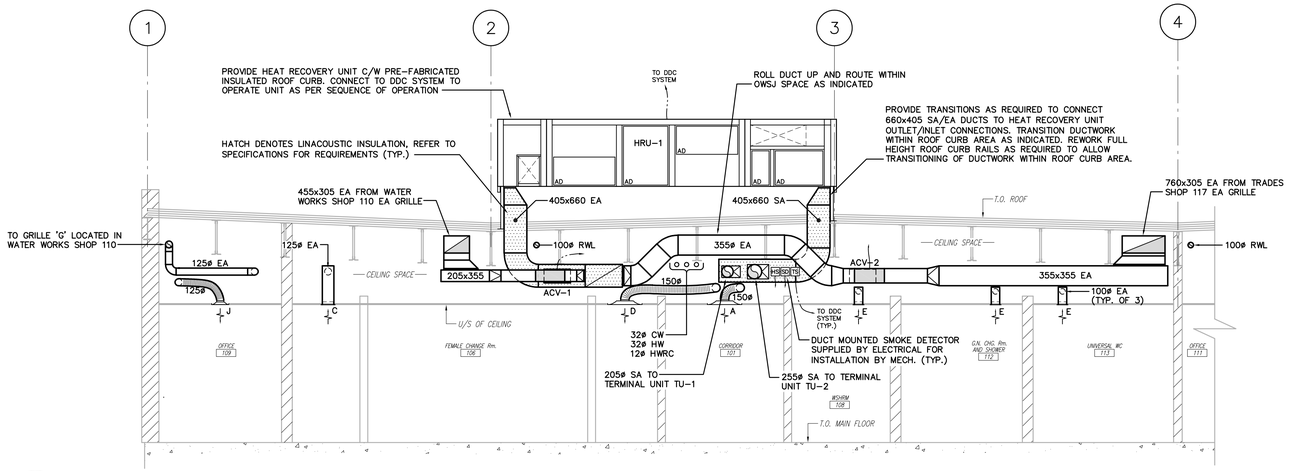
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

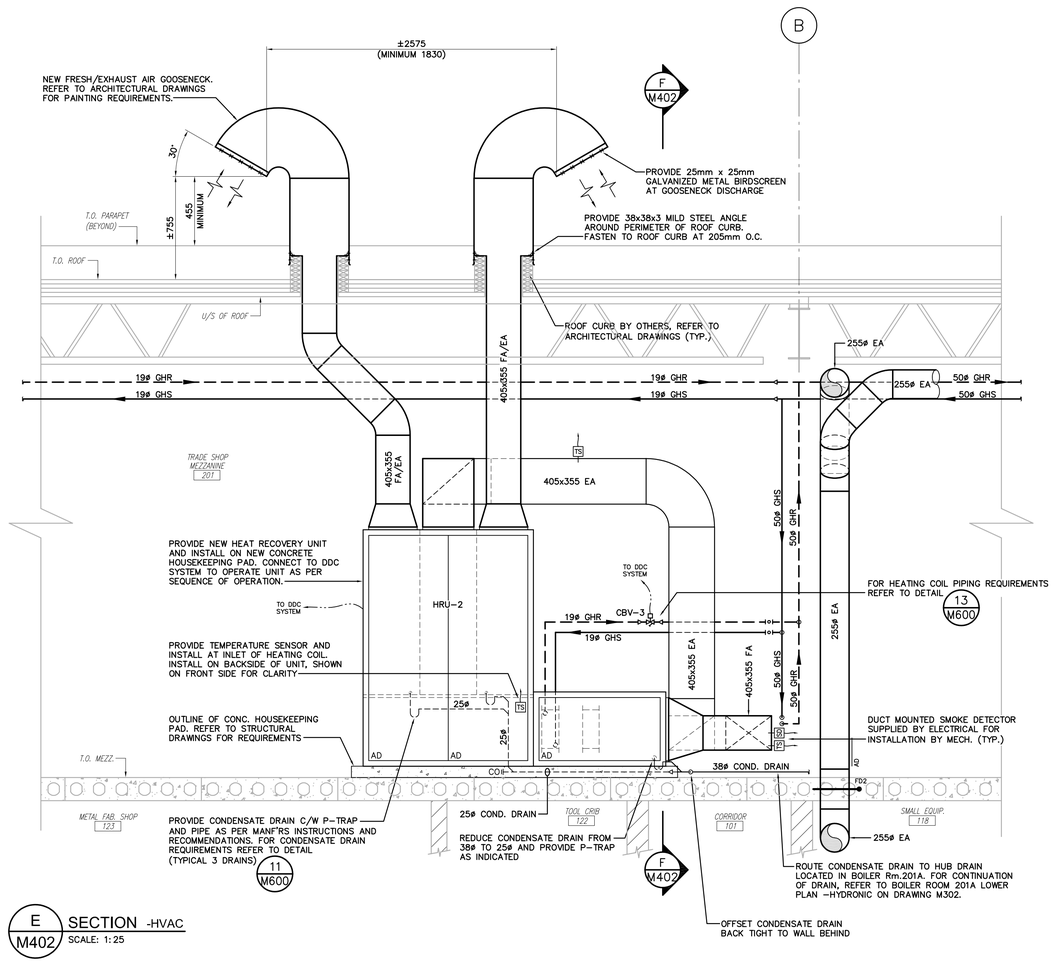
Drawing Title: ROOF HVAC PLAN AND SECTION

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

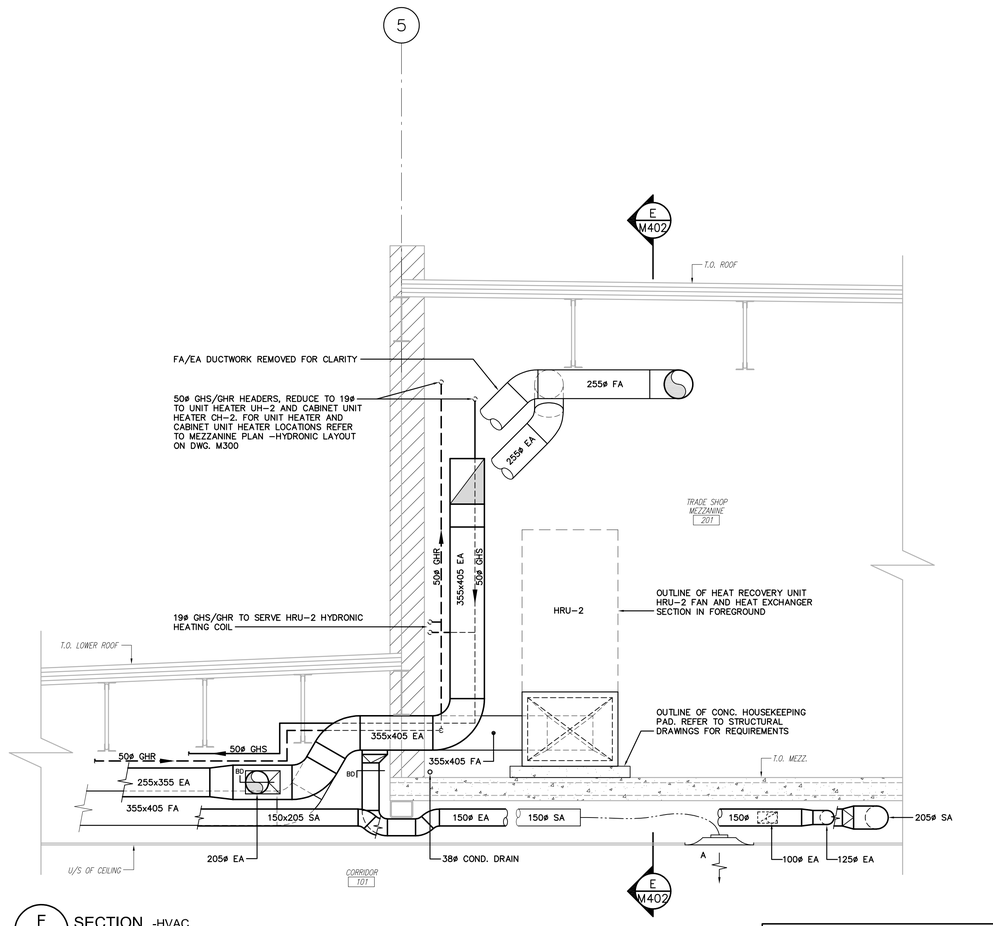
Drawing No: **M401**



D / M402 SECTION -HVAC
SCALE: 1:50



E / M402 SECTION -HVAC
SCALE: 1:25



F / M402 SECTION -HVAC
SCALE: 1:25

NOTE:
FOR GENERAL HVAC NOTES, REFER TO DRAWING M100

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Date	Revision
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER
	0

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

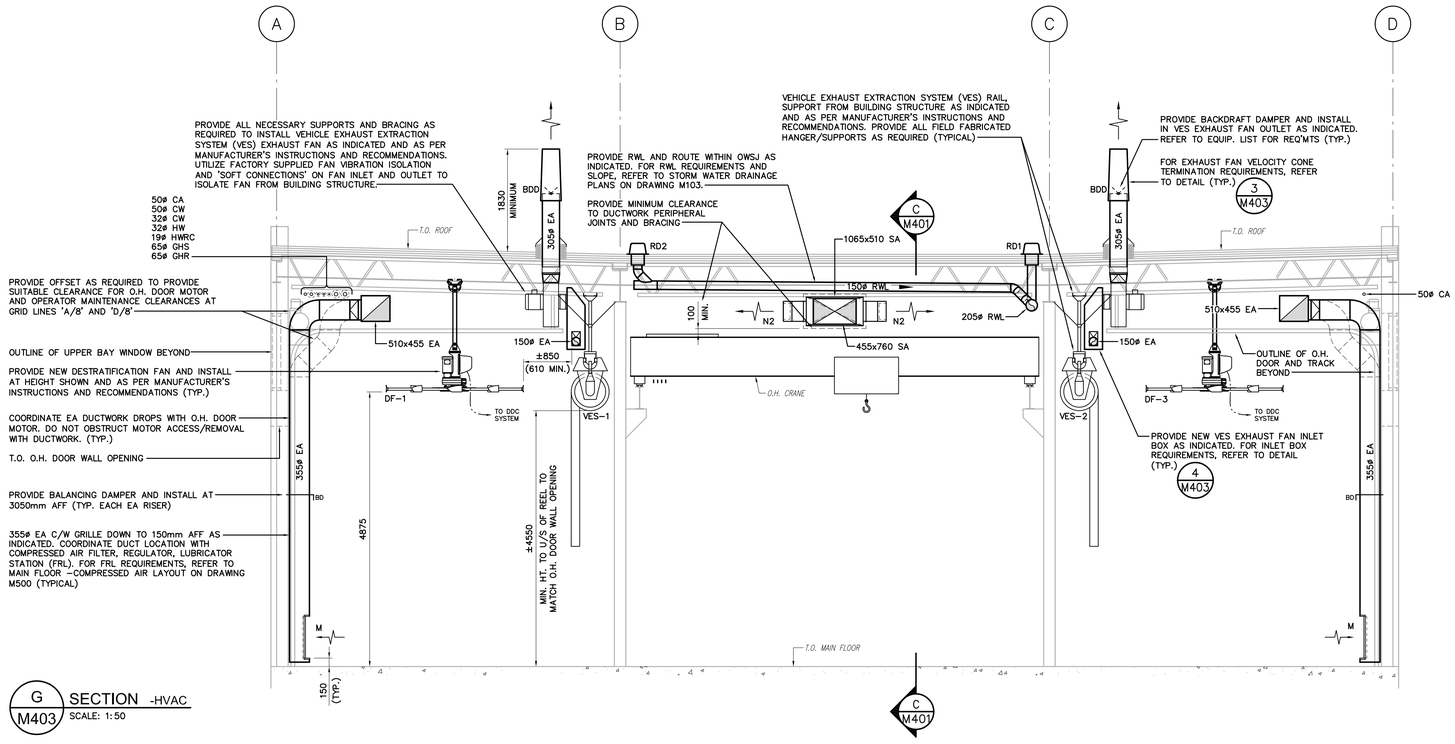
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

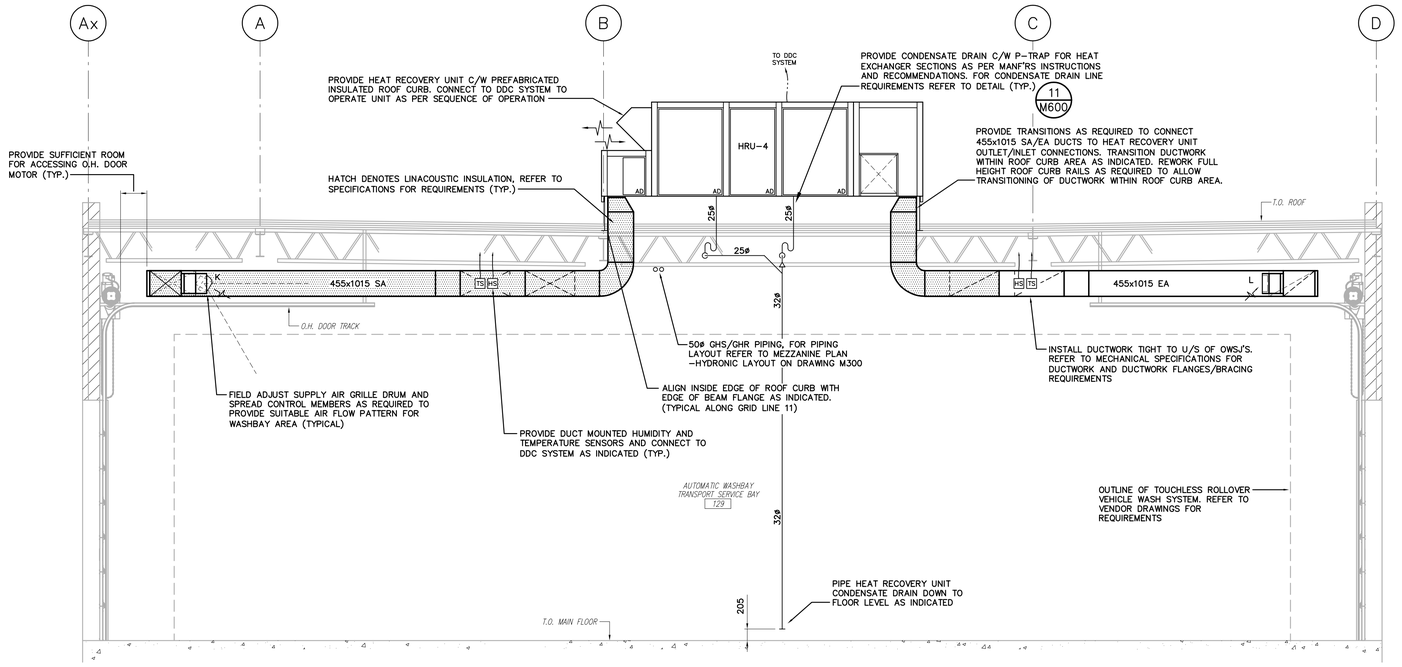
Drawing Title:
HVAC SECTIONS

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

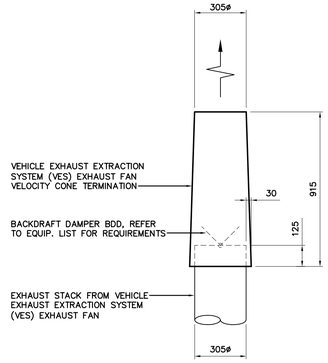
Drawing No:
M402



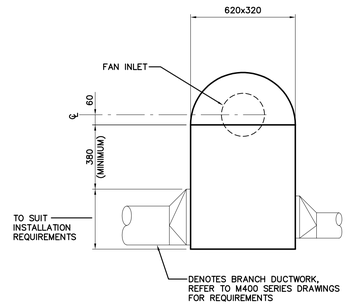
G M403 SECTION -HVAC
SCALE: 1:50



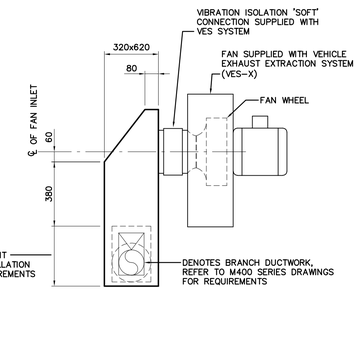
H M403 SECTION -HVAC
SCALE: 1:50



3 M403 DETAIL -VES-X EXH. FAN VELOCITY CONE TERMINATION
SCALE = N.T.S.



FRONT ELEVATION



SIDE ELEVATION

4 M403 DETAIL -VES-X EXHAUST FAN INLET BOX
SCALE = N.T.S.

0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22
Revision		Date

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LICENSED PROFESSIONAL ENGINEER D. W. SHALLEY July 28/22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

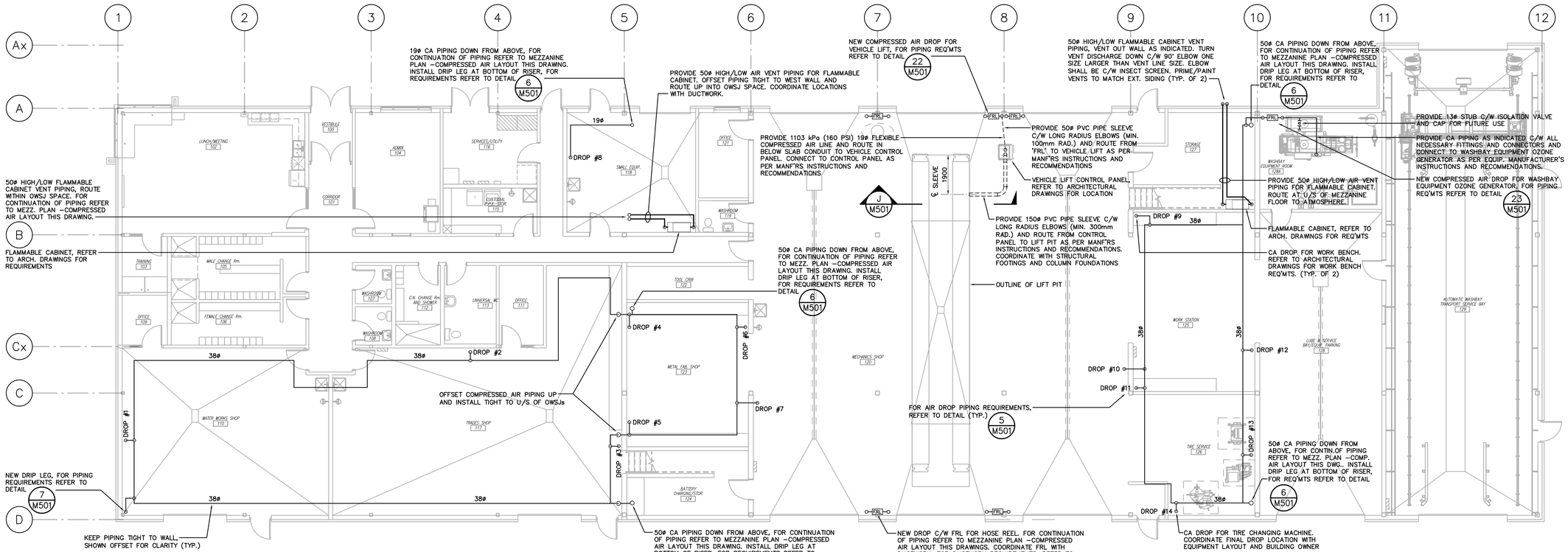
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: HVAC SECTIONS AND DETAILS

Drawn By: ER	Checked By: DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **M403**

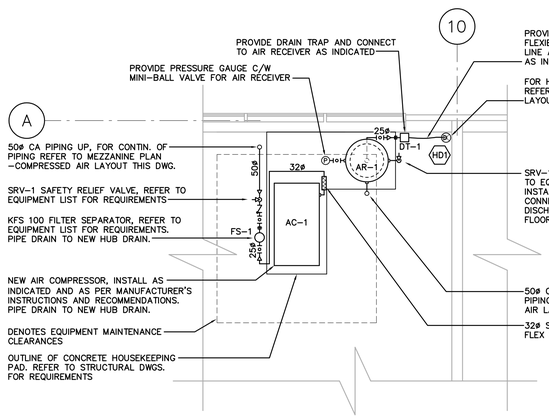


MAIN FLOOR PLAN -COMPRESSED AIR LAYOUT

SCALE: 1:100

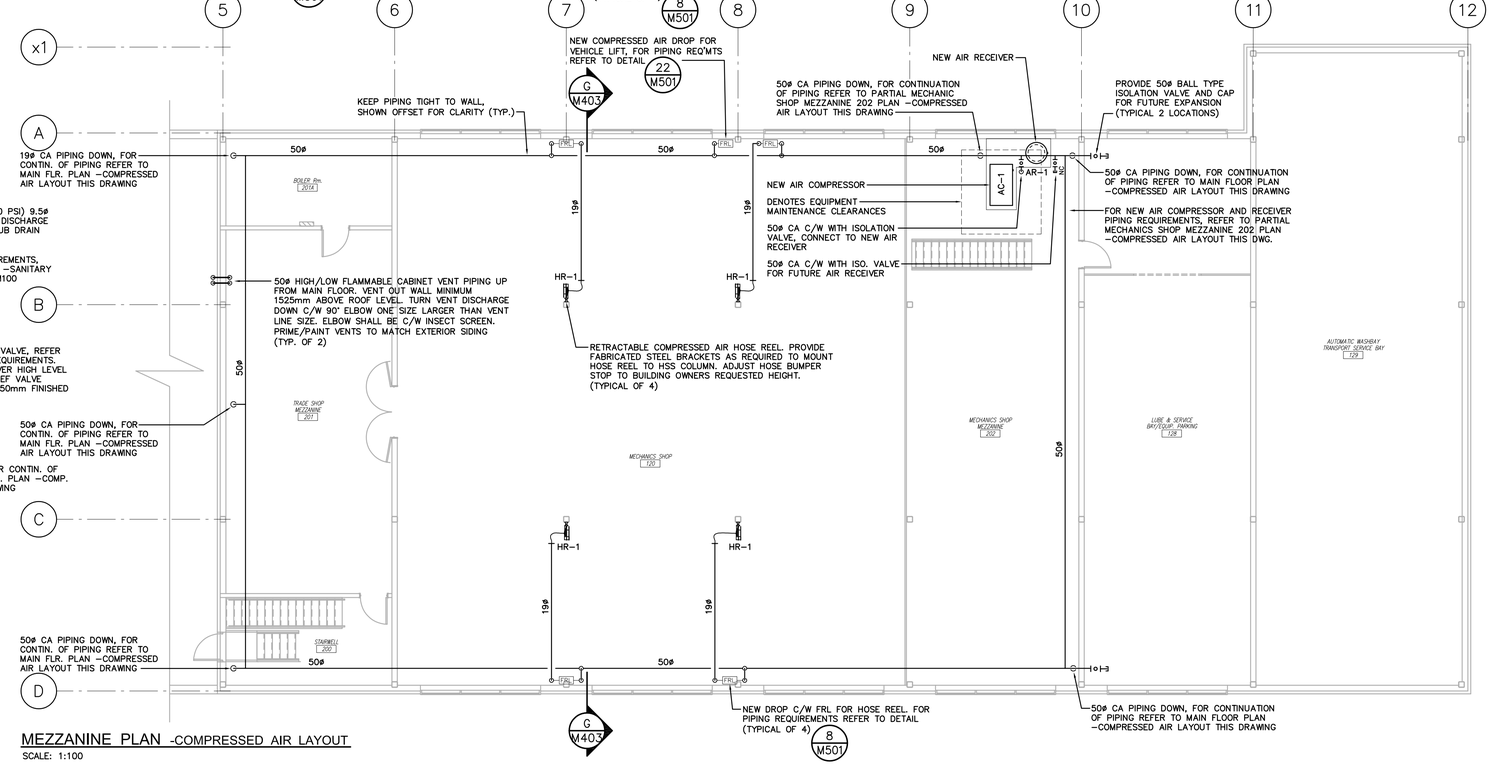
NOTES:

1. SLOPE COMPRESSED AIR PIPING HEADERS TOWARDS DRIP LEGS
2. NEW COMPRESSED AIR PIPING TO BE PNEUMATICALLY TESTED AT 210 PSIG AS PER PARA. 13.5.1 TO 137.5.5 OF ASME B31.1 – LATEST EDITION.
3. NEW COMPRESSED AIR PIPING SYSTEM SHALL BE INSPECTED BY THE TSSA INSPECTOR. CONTRACTOR TO CARRY THE COSTS OF ALL REQUIRED INSPECTIONS BY THE TSSA.



PARTIAL MECH. SHOP MEZZ. 202 PLAN -COMPRESSED AIR LAYOUT

SCALE: 1:50



MEZZANINE PLAN -COMPRESSED AIR LAYOUT

SCALE: 1:100

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

0	ISSUED FOR PERMIT AND TENDER	JULY 28 /22
	Revision	Date

LICENSED PROFESSIONAL ENGINEER
D.W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

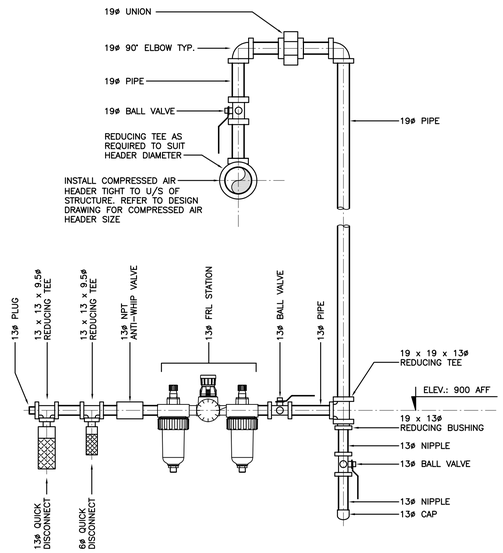
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

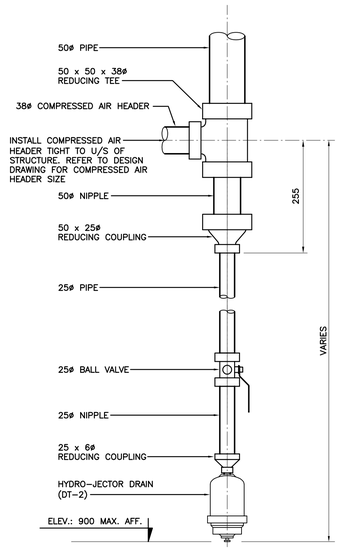
Drawing Title: MAIN FLOOR AND MEZZANINE COMPRESSED AIR PLANS

Drawn By: ER	Checked By: DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

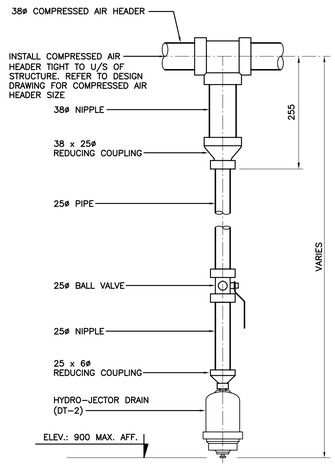
Drawing No: **M500**



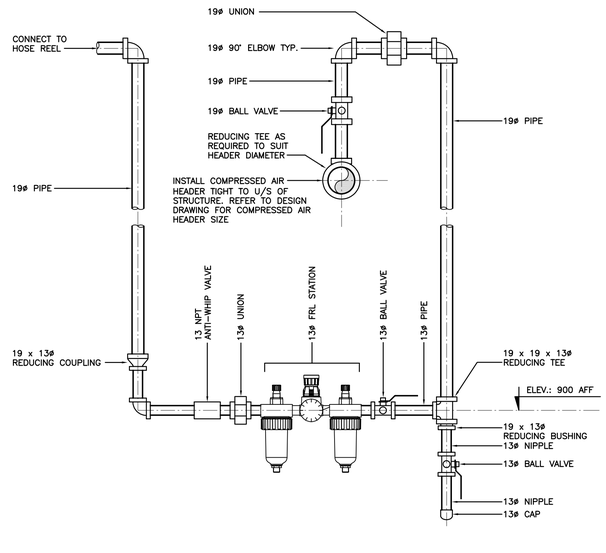
5 M501 DETAIL -TYPICAL AIR DROP
SCALE = N.T.S.



6 M501 DETAIL -TYPICAL DRIP LEG
SCALE = N.T.S.



7 M501 DETAIL -DRIP LEG IN Rm. 110
SCALE = N.T.S.



8 M501 DETAIL -TYPICAL HOSE REEL AIR DROP
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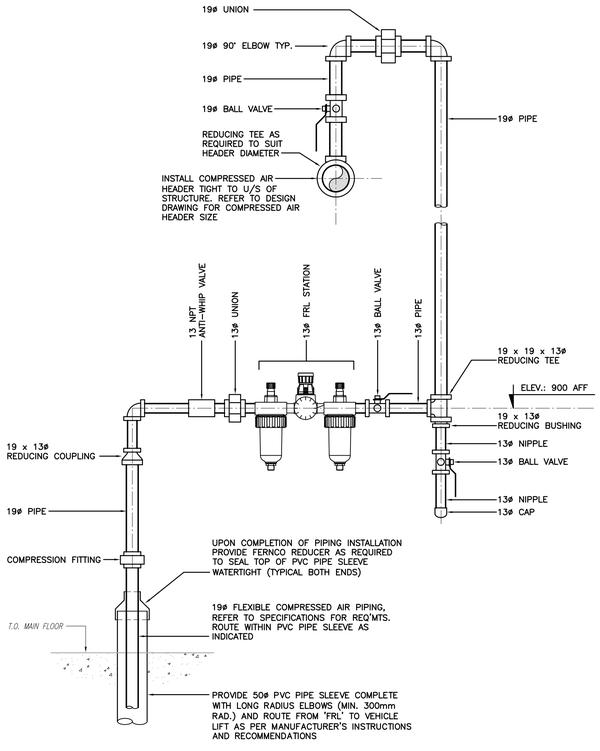

22 M501 DETAIL -VEHICLE LIFT AIR DROP
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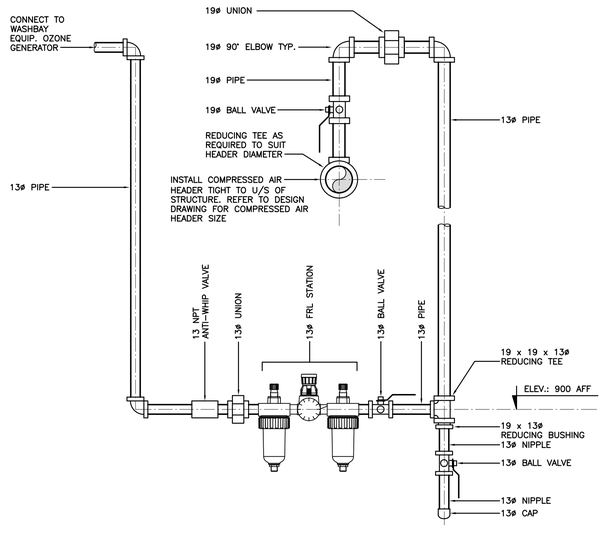
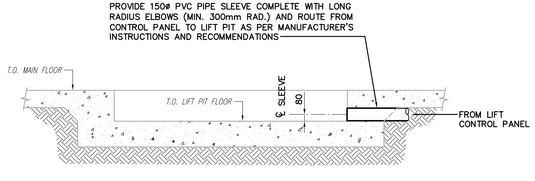


23 M501 DETAIL -WASHBAY EQUIPMENT OZONE GENERATOR AIR DROP
SCALE = N.T.S.



J M501 SECTION
SCALE: NTS

0	JULY 28 / 22	ISSUED FOR PERMIT AND TENDER
Revision	Date	

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

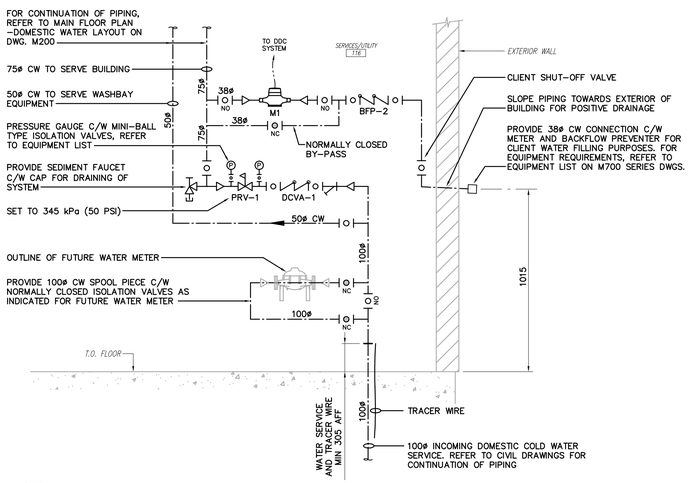
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

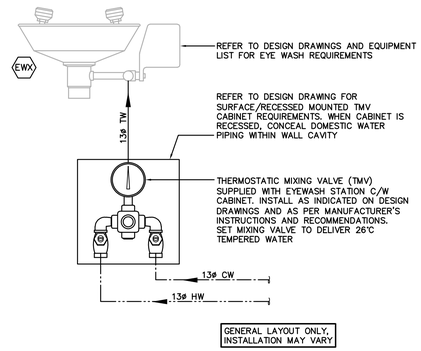
Drawing Title:
COMPRESSED AIR SYSTEM DETAILS

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M501



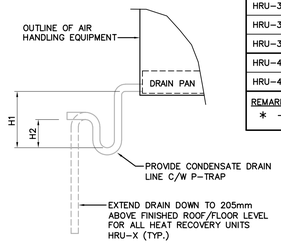
9 M600 DETAIL -DOMESTIC WATER METER DETAIL
SCALE = N.T.S.



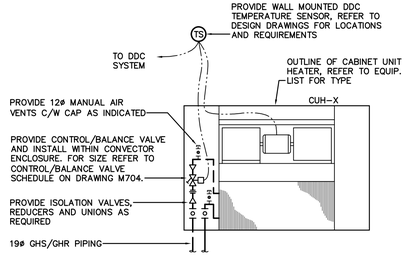
10 M600 DETAIL -EYEWASH THERMOSTATIC MIXING VALVE
SCALE = N.T.S.

CONDENSATE DRAIN SIZING			
EQUIPMENT	DRAIN SIZE	DIMENSIONS H1	DIMENSIONS H2
RTU–1 –CONDENSATE DRAIN	19ø	125	80
HRU–1 –HEAT EXCHANGER SECTION	25ø	130	85
HRU–1 –HEAT EXCHANGER SECTION	25ø	130	85
HRU–1 –COOLING COIL DRAIN PAN	38ø	*	
HRU–2 –HEAT EXCHANGER SECTION	25ø	125	80
HRU–2 –HEAT EXCHANGER SECTION	25ø	125	80
HRU–2 –COOLING COIL DRAIN PAN	25ø	25	50
HRU–3 –HEAT EXCHANGER SECTION	25ø	120	80
HRU–3 –HEAT EXCHANGER SECTION	25ø	120	80
HRU–3 –COOLING COIL DRAIN PAN	38ø	*	
HRU–4 –HEAT EXCHANGER SECTION	25ø	120	80
HRU–4 –HEAT EXCHANGER SECTION	25ø	120	80

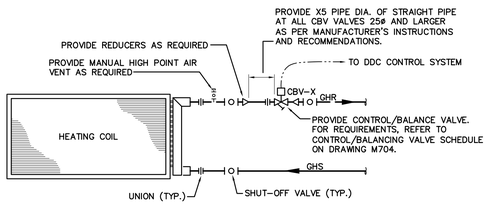
REMARKS:
* –CAP FOR FUTURE USE



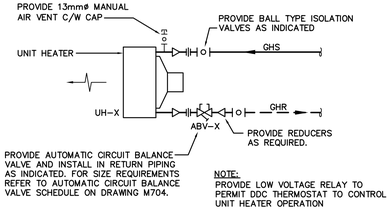
11 M600 DETAIL -CONDENSATE DRAIN TRAP
SCALE = N.T.S.



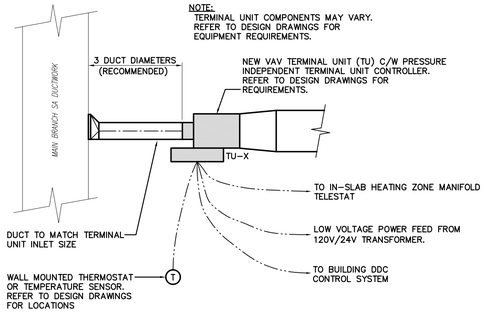
12 M600 DETAIL -TYPICAL CABINET UNIT HEATER PIPING
SCALE = N.T.S.



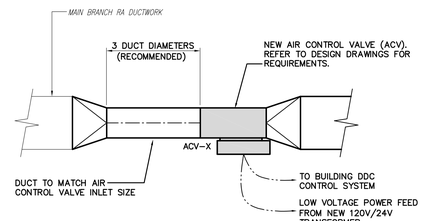
13 M600 DETAIL -TYPICAL HEATING COIL PIPING
SCALE = N.T.S.



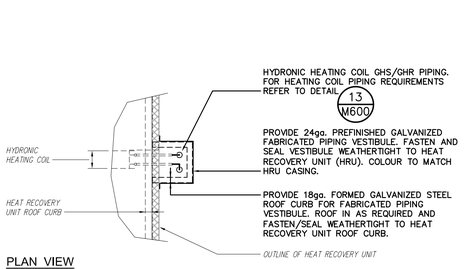
14 M600 DETAIL -TYPICAL UNIT HEATER PIPING
SCALE = N.T.S.



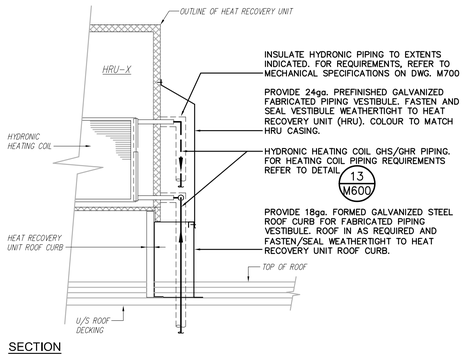
15 M600 DETAIL -VAV TERMINAL UNIT TYPICAL INSTALLATION
SCALE = N.T.S.



17 M600 DETAIL -AIR CONTROL VALVE TYPICAL INSTALLATION
SCALE = N.T.S.

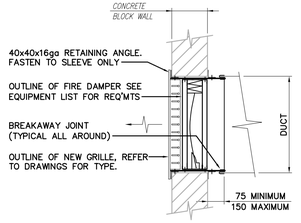


PLAN VIEW



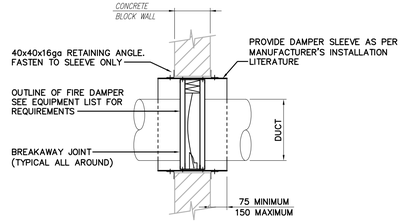
SECTION

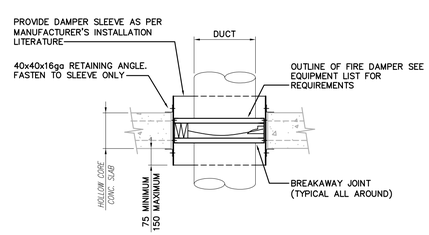
18 M600 DETAIL -HRU-X HYDRONIC HEATING COIL PIPING VESTIBULE
SCALE = N.T.S.



NOTE:

1. FIRE DAMPER SHALL BE MOUNTED AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
2. FASTEN RETAINING ANGLES TO SLEEVE WITH No.8 SHEET METAL SCREWS AT 205 O.C. DO NOT FASTEN ANGLES TO WALL.
3. ONCE FIRE DAMPER INSTALLATION IS COMPLETE, SEAL RETAINING ANGLE TO WALL AND DUCT SLEEVE AS PER THE TOWN OF MARATHON BUILDING SERVICES REQUIREMENTS AND DAMPER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.





19 M600 DETAIL -FIRE DAMPER INSTALLATION
SCALE: NTS

MECHANICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

No.	Date	Revision
0	JULY 28 / 22	ISSUED FOR PERMIT AND TENDER

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D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: DETAILS

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **M600**

MECHANICAL SPECIFICATIONS

GENERAL

1. PROVIDE ALL LABOUR, MATERIAL, EQUIPMENT, FEES, PERMITS AND INSPECTIONS BY OUTSIDE AGENCIES AND CHARGES TO PERFORM ALL OPERATIONS FOR THE COMPLETE INSTALLATION OF THE HVAC AND PLUMBING SYSTEMS AS INDICATED.
2. ALL MATERIALS AND INSTALLATION IS TO COMPLY WITH THE ONTARIO BUILDING CODE, NFPA REGULATIONS, ONTARIO FIRE CODE, GAS UTILIZATION CODE, BUILDING STANDARDS FOR THE HANDICAPPED, ONTARIO ELECTRICAL SAFETY CODE AND THE TOWN OF MARATHON ENGINEERING STANDARDS.
3. MAINTAIN INSURANCE TO FULLY PROTECT OWNER, CONSULTANT AND SELF FROM ANY AND ALL CLAIMS DUE TO ACCIDENTS, MISFORTUNES, ETC., TO LIMITS SET DOWN BY THE OWNER.
4. REMOVE ALL WASTE MATERIALS AND CLEAN UP TO OWNER'S SATISFACTION. AT THE END OF THE JOB, CLEAN THE EQUIPMENT AND TOUCH UP FINISH TO RESTORE TO "AS NEW" CONDITION.
5. ONLY FIRST CLASS WORKMANSHIP AND GOOD INSTALLATION PRACTICES WILL BE ACCEPTED. USE QUALIFIED TRADESMEN FOR ALL TYPES OF WORK.
6. PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR YOUR WORK. TOUCH UP PAINT ALL CUT ENDS OF HANGER RODS AND UNISTRUT SUPPORTS WITH GALVANIZED PAINT.
7. BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED BY YOUR WORK.
8. CONTRACTOR SHALL FULLY PROTECT EXISTING FLOOR SURFACES (IE. PLYWOOD) FROM DAMAGE AS A RESULT OF DEMOLITION/INSTALLATION OF EQUIPMENT OR ANY WORK REQUIRED UNDER THE CONTRACT.
9. PROVIDE SHOP DRAWINGS FOR MAJOR EQUIPMENT COMPONENTS FOR REVIEW BY THE ENGINEER.
10. PATCH AND REPAIR ALL OPENINGS, SURFACES, ETC., TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS AND BUILDING ENVELOPE.
11. MECHANICAL DRAWINGS TO BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

FIRE PROTECTION

FIRE EXTINGUISHERS AND FIRE HOSE CABINETS

1. PROVIDE FIRE EXTINGUISHER WHERE INDICATED ON DRAWINGS.
2. MOUNT EXTINGUISHERS CABINETS AND WALL MOUNTED EXTINGUISHERS AT LOCATIONS INDICATED ON THE DRAWINGS AND AT 1500mm MAXIMUM TO TOP OF EXTINGUISHER/CABINET IN ACCORDANCE WITH NFPA 10.

PLUMBING

1. SANITARY AND VENT PIPING ABOVE GROUND WHERE NOT CONCEALED IN BUILDING CONSTRUCTION TO BE PVC TO CAN/CSA–B181.2–M90. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED CLASSIFICATION NOT TO EXCEED 50. (IPEX SYSTEM "XFR" OR EQUAL).
2. SANITARY PIPING UNDER GROUND AND ABOVE GROUND CONCEALED WITHIN BUILDING CONSTRUCTION TO BE PVC TO CAN/CSA–B181.2–M90.
3. WASHBAY EQUIPMENT RECYCLED WATER, BUFFER TANK OVERFLOW AND SUBMERSIBLE PUMP TO RECYCLE SYSTEM PIPING SHALL BE SCHEDULE 80 PVC TO CAN/CSA–B181.2–M90
4. DOMESTIC WATER PIPING ABOVE GROUND TO BE TYPE 'M' COPPER TO ASTM B88M.
5. WASHBAY EQUIPMENT COLD WATER SUPPLY PIPING FROM OUTLET SIDE OF WASHBAY EQUIPMENT BACKFLOW PREVENTER BFP–4 TO ALL WASHBAY AND WASHBAY ASSOCIATED EQUIPMENT SHALL BE TYPE 'L' COPPER TO ASTM B88M.
6. WASHBAY AND HAND WAND HIGH PRESSURE 300 PSI COLD WATER SUPPLY PIPING FROM ASSOCIATED PUMPS TO MACHINE AND HAND WAND FESTOONS SHALL BE SCHEDULE 40 HOT DIPPED GALVANIZED STEEL PIPE AND FITTINGS SCREWED TO ASTM A53/A53M.
7. INSULATE ABOVE GROUND DOMESTIC WATER AND ALL WASHBAY EQUIPMENT COLD WATER SUPPLY PIPING WITH FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT AS FOLLOWS:

SERVICE	NPS	THICKNESS
HOT WATER (HW)	32mm AND UNDER 38mm AND OVER	25mm 38mm
COLD WATER (CW)	32mm AND UNDER 38mm AND OVER	12mm 25mm
HOT WATER RECIRC (DHWR)	ALL SIZES	25mm
WASHBAY EQUIP. PIPING	32mm AND UNDER 38mm AND OVER	25mm 38mm
WASHBAY HIGH PRESS.	ALL SIZES	38mm

COVER EXPOSED INSULATED PIPING, VALVES AND FITTINGS WITH PVC JACKETING. LABEL LINES TO INDICATE SERVICE AND DIRECTION OF FLOW.

8. WASHBAY EQUIPMENT DETERGENT PIPING AND FITTINGS SHALL BE CLASS 150 SCHEDULE 40 304 STAINLESS STEEL TO ASTM B36.19M, ASTM A312/A312M AND ASTM A182/A182M.
9. TRAP SEAL PRIMER PIPING TO BE PLENUM RATED POTABLE WATER PEX PIPING.
10. BELOW GROUND STORM DRAINAGE TO BE PVC–SDR–35 COMPLETE WITH A CHANNEL FOR HEAT TRACING.
11. STORM DRAINAGE CONCEALED WITHIN BUILDING CONSTRUCTION TO BE PVC TO CAN/CSA–B137.3. INSULATE ROOF DRAIN BODIES AND RAINWATER LEADERS FULL LENGTH WITH 25mm THICK RIGID MINERAL FIBRE COMPLETE WITH VAPOUR BARRIER, JACKET AND FACING MATERIAL.
12. STORM DRAINAGE ABOVE GROUND WHERE NOT CONCEALED IN BUILDING CONSTRUCTION TO BE PVC TO CAN/CSA B181.90. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED CLASSIFICATION NOT TO EXCEED 50 (IPEX SYSTEM "XFR" OR EQUAL). INSULATE ROOF DRAIN BODIES 25mm THICK MINERAL FIBRE COMPLETE WITH VAPOUR BARRIER, JACKET AND FACING MATERIAL. COVER EXPOSED PIPING AND FITTINGS WITH PVC JACKETING.
13. PROVIDE HEAT TRACING FOR STORM DRAINAGE PIPING FROM CATCH BASIN BACK TO 610mm PAST HORIZONTAL BEND IN CEILING SPACE.
14. FLAMMABLE CABINET VENTING TO BE SCHEDULE 40 STEEL PIPE SCREWED. PRIME AND PAINT EXTERIOR PORTION OF VENTING. CONSULT ARCHITECT FOR COLOUR REQUIREMENTS.
15. GAS PIPING TO BE SCHEDULE 40 STEEL PIPE. NPS 12mm TO 50mm SCREWED, NPS 65mm AND OVER, PLAIN END. PAINT ENTIRE GAS SYSTEM YELLOW. VALVES, SUPPORTS AND ATTACHMENTS AS PER CSA INTERNATIONAL NATURAL GAS AND PROPANE INSTALLATION CODE, LATEST EDITION.
16. HYDRONIC HEATING PIPING:

50mm AND UNDER	SCHEDULE 40 CARBON STEEL, SCREWED OR PLAIN ENDS.
65mm AND OVER	SCHEDULE 40 CARBON STEEL, ROLLED GROOVED.

17. PIPE FITTINGS NPS 65mm AND OVER, VICTAULIC. PIPE AND FITTINGS 50mm AND UNDER, BLACK MALLEABLE SCREWED OR VICTAULIC QUICKVIC SD INSTALLATION READY SYSTEM CONFORMING TO ASME B31.1 ASME B31.3 AND ASME B31.9. INSULATE PIPING WITH FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION COMPLETE WITH VAPOUR BARRIER JACKET AND LONGITUDINAL SELF–SEAL LAP JOINT OF THE FOLLOWING THICKNESS:

SERVICE	NPS	THICKNESS
INTERIOR HOT WATER HEATING	32mm AND UNDER 38mm AND OVER	25mm 38mm

COVER EXPOSED INTERIOR INSULATED PIPING, VALVES AND FITTINGS WITH PVC JACKETING.

18. LABEL ALL NEW PIPING WITH FLOW ARROWS AND WITH THE FOLLOWING NOTATIONS:

GLYCOL HEATING SUPPLY	– GHS
GLYCOL HEATING RETURN	– GHR
DOMESTIC HOT WATER	– HW
DOMESTIC COLD WATER	– CW
DOMESTIC HOT WATER RECIRCULATION	– DHWR
WASHBAY EQUIPMENT CW PIPING	– CW SUPPLY
WASHBAY HIGH PRESSURE PIPING	– CW SUPPLY – HP
STORM DRAINAGE	– STORM DRAINAGE

19. HEAT RECOVERY UNIT HRU–2 (LOCATED INSIDE) AND BOILER CONDENSATE DRAIN LINES TO BE CPVC TO CAN/CSA–B181.2–M90.
20. ROOF MOUNTED HEAT RECOVERY UNIT AND ROOFTOP UNIT CONDENSATE DRAIN LINES TO BE DWV COPPER TO ANSI B16.29–1980.
21. AIR VENT RELIEF PIPING TO BE TYPE 'M' COPPER TO ASTM B88M.
22. HYDRONIC HEATING TUBING TO BE 12mmø WIRSBO–HEPEX (CROSS–LINKED POLYETHYLENE). MANUFACTURED TO ASTM F876–STANDARD SPECIFICATION FOR CROSS–LINKED POLYETHYLENE (PEX) TUBING.
23. INSTALL HYDRONIC HEATING TUBING AS PER MANUFACTURERS RECOMMENDATIONS. SECURE TUBING TO CONCRETE WIRE MESH OR REBAR AT MAXIMUM 1220mm INTERVALS. SECURE 180° BENDS AT TOP OF ARC AND 305mm FROM TOP OF ARC ON EACH SIDE. PRESSURE TEST INDIVIDUAL LOOPS PRIOR TO POURING.
24. REFRIGERANT PIPING TO BE TYPE ACR COPPER TUBING, SOFT ANNEALED OR HARD DRAWN IN SIZES UP TO AND INCLUDING NPS 19mm. USE TYPE ACR HARD DRAWN TUBING FOR SIZES NPS 25mm AND LARGER. FITTINGS TO BE HEAVY WROUGHT COPPER, SOLDER JOINT TYPE WITH ADAPTER FITTINGS WHERE SCREWED CONNECTIONS ARE NECESSARY, OR ON SIZES NPS 16mm AND LESS, FLARELESS COMPRESSION TYPE.
25. INSULATE REFRIGERANT LIQUID AND SUCTION LINES, OUTSIDE AND INSIDE THE BUILDING WITH FIRE RETARDANT ELASTOMERIC CLOSED CELL FOAM OR NEOPRENE TUBING APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS USING THE RECOMMENDED ADHESIVE. INSULATION THICKNESS AS FOLLOWS:

SERVICE	NPS	THICKNESS
REFRIGERANT PIPING	32mm AND UNDER 38mm AND OVER	12mm 25mm

26. COMPRESSED AIR PIPING TO BE SCHEDULE 80 TO ASTM A53 GRADE B. PIPE FITTINGS TO ASTM A197 – 150# CLASS MALLEABLE IRON THREADED. BALL VALVES TO BE STANDARD PORT BRASS SCREWED, 500 PSI WOG RATING NEWMAN HATTERSLEY FIG. 1969.

MECHANICAL SPECIFICATIONS -CONTINUED

PLUMBING –CONTINUED

27. FLEXIBLE COMPRESSED AIR PIPING SHALL BE RAPIDAIR MAXLINE TUBING TO ASTM F1282, 1380 kPa (200 PSI) AT 22.8°C (73°F).
28. NEW COMPRESSED AIR PIPING TO BE PNEUMATICALLY TESTED AT 210 PSIG AS PER PARA. 13.5.1 TO 137.5.5 OF ASME B31.1 – LATEST EDITION. ISOLATE FLEXIBLE COMPRESSED AIR DURING TESTING.
29. NEW COMPRESSED AIR PIPING SYSTEM SHALL BE INSPECTED BY THE TSSA INSPECTOR. CONTRACTOR TO CARRY THE COSTS OF ALL REQUIRED INSPECTIONS BY THE TSSA.
30. SLOPE ALL COMPRESSED AIR PIPING IN DIRECTION OF FLOW. PROVIDE DRIPLEGS AT ALL LOW POINTS IN SYSTEM.
31. ALL COMPRESSED AIR SUB–HEADERS AND TAKE–OFFS TO BE FROM TOP OF MAIN.
32. CONTRACTOR TO PROVIDE LINE LABELING FOR COMPRESSED AIR COMPLETE WITH FLOW ARROWS AT 6.0 METER INTERVALS AND AT BOTH SIDES OF WALLS WHERE PIPING PENETRATIONS OCCUR FOR COMPRESSED AIR.
33. CONTRACTOR TO REGISTER THE COMPRESSED AIR SYSTEM WITH THE TSSA, PROVIDE ALL NECESSARY INSPECTIONS, AND COVER ALL ASSOCIATED COSTS FOR REGISTRATION AND INSPECTION SERVICES. PROVIDE COPIES OF ALL DOCUMENTATION TO THE CONSULTANT AND INCLUDE ALL DOCUMENTATION IN THE O&M MANUAL
34. CONTRACTOR TO VERIFY ELEVATIONS OF EXISTING AND NEW SANITARY GRADES PRIOR TO EXCAVATION AND INSTALLATION.
35. LIMITS OF CONTRACT – SANITARY SEWER AND WATERMAIN: TO 1525mm (5'–0") BEYOND EXIT OF BUILDING.
36. SOLDER/BRAZING TO BE LEAD FREE. ACCEPTABLE MATERIAL: CANFIELD WATERSAFE.
37. BALL VALVES: FULL PORT, BRONZE CONSTRUCTION, CHROME PLATED BALL, CONBRACO 70 SERIES OR EQUAL.
38. GRANULAR BEDDING CLASS B: PLACE IN UNIFORM LAYERS, NOT EXCEEDING 150mm COMPACTED THICKNESS. SHAPE BED TO GRADE AND TO PROVIDE A UNIFORM BEARING SURFACE FOR PIPE. COMPACT EACH LAYER TO AT LEAST 95% MAXIMUM DENSITY TO ASTM D698.
39. TEST SANITARY SEWER TO REQUIREMENTS OF OBC. PART 7.
40. ALL PLUMBING FIXTURES TO BE CSA APPROVED.
41. VENT ALL PLUMBING FIXTURES TO OBC, PART 7.
42. ALL HOSE BIBBS TO BE COMPLETE WITH VACUUM BREAKER.
43. INSTALL ALL FLOOR DRAINS WITH TRAP SEAL PRIMER AS INDICATED ON DRAWINGS.
44. INSTALL ALL FIXTURES WITH SHUT–OFF VALVES.
45. FLUSH, RINSE AND TEST WATER SYSTEM WITH POTABLE WATER AS PER REQUIREMENTS OF O.B.C OR AUTHORITY HAVING JURISDICTION.
46. UPON COMPLETION OF CONSTRUCTION, CHANGE OUT ALL FILTERS AND PROVIDE ONE SPARE SET OF FILTERS FOR ALL APPLICABLE EQUIPMENT.
47. TEST BACKFLOW PREVENTERS AS PER CSA REQUIREMENTS OR AUTHORITY HAVING JURISDICTION. PROVIDE WRITTEN REPORT.
48. ALL CONNECTIONS TO EXISTING DOMESTIC WATER SYSTEM AND NEW EQUIPMENT ARE TO BE COMPLETE WITH BALL VALVES.
49. CHARGE HYDRONIC HEATING SYSTEM WITH PROPYLENE GLYCOL/WATER MIXTURE TO INDICATED LEVEL. GLYCOL SHALL BE SUITABLE FOR USE WITH SYSTEM AND APPROVED BY EQUIPMENT MANUFACTURER. BLEED OUT ALL ENTRAINED AIR AS REQUIRED TO PROVIDE A FULLY OPERATIONAL SYSTEM.

VENTILATION

1. ALL DUCTWORK IS TO BE INSTALLED IN ACCORDANCE WITH THE DRAWINGS AND SHALL BE ERECTED IN AN APPROVED, SUBSTANTIAL AND WORKMANLIKE MANNER. DUCTWORK TO BE TO SMACNA STANDARD. REVIEW STRUCTURAL/ARCHITECTURAL PLANS PRIOR TO FABRICATION OF DUCTWORK SYSTEMS.
2. ALL SPIRAL WOUND DUCTWORK SHALL BE MINIMUM 24ga. GALVANIZED SPIRAL WOUND DUCTWORK OF LOCK FORMING QUALITY TO ASTM A525M. PROVIDE DUCTMATE SPIRALMATE COMPANION FLANGES.
3. AUTOMATIC WASHBAY TRANSPORT SERVICE BAY 129 HEAT RECOVERY UNIT HRU–4 SUPPLY AND EXHAUST AIR AIR DUCTWORK SHALL BE FABRICATED FROM 14 GAUGE UTILITY GRADE ALUMINUM COMPLETE WITH 50x50x5 GASKETTED ALUMINUM VANSTONE FLANGED CONNECTIONS. PROVIDE 50x50x5 ALUMINUM ANGLE BRACING AT 1220mm O.C AND 50x5 ALUMINUM SPLIT BAND DUCT HANGERS WITH 13mmø THREADED HANGER RODS.
4. SEAL ALL TRANSVERSE JOINTS WITH WATER BASED HIGH PRESSURE DUCT SEALANT. ON EXPOSED DUCTWORK, APPLY SEALANT INTERNALLY OR USE SILVER EXTERNAL SEALANT.
5. ALL GOOSENECKS SHALL BE PAINTABLE FITTINGS UTILIZING SATIN COAT GALVANIZED SHEET METAL. REFER TO ARCHITECTURAL DRAWINGS FOR COLOUR REQUIREMENTS.
6. ACOUSTICALLY LINE SUPPLY, RETURN AND EXHAUST AIR DUCTWORK TO EXTENTS INDICATED ON DESIGN DRAWINGS WITH 25mm THICK LINACOUSTIC INSULATION. DUCT SIZES SHOWN ACCOMMODATES FOR 25mm THICK LINACOUSTIC INSULATION. DO NOT INCREASE SIZE.
7. EXTERNALLY INSULATE ALL NON–ACOUSTICALLY LINED ROOFTOP UNIT RTU–1 AND HEAT RECOVERY UNIT HRU–2 RECTANGULAR SUPPLY AND FRESH AIR DUCTWORK WITH 38MM THICK RIGID MINERAL FIBRE BOARD INSULATION COMPLETE WITH VAPOUR BARRIER. PROVIDE CORNER BEADS TO FINISH INSULATION EDGES WHERE EXPOSD. SECURE INSULATION TO DUCTWORK WITH FIRE RESISTIVE ADHESIVE AND IMPALING PINS WITH SPEED CLIPS AT 305mm CENTERS. CUT OFF PROTRUDING ENDS OF PINS AND COVER SPEED CLIPS WITH SCRIM FOIL PRESSURE SENSITIVE TAPE.
8. EXTERNALLY INSULATE ALL ROOFTOP UNIT RTU–1 AND HEAT RECOVERY VENTILATOR HRU–2 ROUND SUPPLY AIR DUCTWORK WITH 38mm THICK MINERAL FIBER BLANKET COMPLETE WITH VAPOUR BARRIER. SECURE INSULATION AND COVER EXPOSED EDGES WITH SCRIM FOIL PRESSURE SENSITIVE TAPE.
9. EXTERNALLY INSULATE HEAT RECOVERY UNIT HRU–2 FRESH/EXHAUST AIR DUCTWORK FROM UNIT OUTLET TO UNDERSIDE OF ROOF WITH 38mm THICK RIGID MINERAL FIBRE BOARD INSULATION COMPLETE WITH VAPOUR BARRIER. PROVIDE CORNER BEADS TO FINISH INSULATION EDGES. SECURE INSULATION TO DUCTWORK WITH FIRE RESISTIVE ADHESIVE AND IMPALING PINS WITH SPEED CLIPS AT 305mm CENTERS. CUT OFF PROTRUDING ENDS OF PINS AND COVER SPEED CLIPS WITH SCRIM FOIL PRESSURE SENSITIVE TAPE.
10. EXTERNALLY INSULATE EXHAUST FAN AND FRESH AIR DAMPER WALL SLEEVES WITH 38mm THICK RIGID MINERAL FIBRE BOARD INSULATION COMPLETE WITH VAPOUR BARRIER. PROVIDE CORNER BEADS TO FINISH INSULATION EDGES. SECURE INSULATION TO DUCTWORK AND SLEEVES WITH FIRE RESISTIVE ADHESIVE AND IMPALING PINS WITH SPEED CLIPS AT 305mm CENTERS. CUT OFF PROTRUDING ENDS OF PINS AND COVER SPEED CLIPS WITH SCRIM FOIL PRESSURE SENSITIVE TAPE.
11. BOILER AND DOMESTIC HOT WATER HEATER VENTING SHALL BE SCHEDULE 40 PVC CERTIFIED TO ULC S636 AND CSA B149.1. SOLVENT CEMENT SHALL CONFORM TO CAN/CSA–B181.2. OR TO CERTIFIED SYSTEM. IPEX SYSTEM 636 OR ACCEPTABLE EQUAL.
12. BOILER ABD DOMESTIC HOT WATER HEATER COMBUSTION AIR DUCTING SHALL BE PVC TO CAN/CSA–B181.2–M90.
13. ALL BOILER AND DOMESTIC HOT WATER HEATER VENTING AND COMBUSTION AIR DUCTING SHALL BE INSTALLED AS PER THE DESIGN DRAWING AND MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
14. PROVIDE ALL CONTROLS FOR AIR HANDLING UNITS, INCLUDING THERMOSTATS/TEMPERATURE SENSORS. MOUNT CENTER LINE OF THERMOSTATS/TEMPERATURE SENSORS AT 1200mm ABOVE THE FINISHED FLOOR. WIRE ALL CONTROLS TO MAKE A COMPLETE AND WORKING SYSTEM.
15. ALL AIR SYSTEMS SHALL BE BALANCED BY TAB CONTRACTOR INDEPENDENT OF CONTRACTORS PERFORMING CONSTRUCTION WORK TO ±5% OF DESIGN VALUES SHOWN ON DRAWINGS. TAB CONTRACTOR SHALL SUBMIT AIR BALANCE REPORT IN TWO FORMATS: TWO (2) BOUND HARD COPIES AND ELECTRONIC FORMAT ON CD. SUBMIT AIR BALANCE REPORT FOR REVIEW BY THE DESIGN ENGINEER. THE REPORT SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
    - –FAN AND MOTOR SPEEDS
    - –FAN MOTOR OPERATING AMPERAGE
    - –AIR FLOWS IN MAIN BRANCH DUCTS
    - –TERMINAL UNIT AIR FLOWS
    - –AIR OUTLET FLOWS
    - –AIRFLOW TEMPERATURES
    - –PRESSURE DROPS ACROSS ALL EQUIPMENT FANS, COILS, FILTERS, ETC.

    TAB CONTRACTOR SHALL ASSIST CONTROLS CONTRACTOR IN THE SETUP AND CALIBRATION TERMINAL UNITS, AIR CONTROL VALVES AND HEAT RECOVERY UNIT HRU–3 MOTORIZED BY–PASS DAMPER.
16. UPON COMPLETION OF CONSTRUCTION, CHANGE OUT ALL FILTERS AND PROVIDE ONE SPARE SET FOR ALL APPLICABLE EQUIPMENT.
17. PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR EQUIPMENT, DUCTWORK AND PIPING.
18. INSTALL FIRE DAMPERS WHERE INDICATED AND TO CODE TO MAINTAIN INTEGRITY OF FIRE SEPARATION. PROVIDE ACCESS DOOR FOR ALL FIRE DAMPERS.
19. INSULATED FLEXIBLE DUCTWORK TO BE NON–COLLAPSIBLE WITH 2–PLY POLYESTER LAMINATED INNER CORE PERMANENTLY BONDED TO A SPRING STEEL WIRE HELIX, BLANKET FIBERGLASS INSULATION WITH BLACK POLYETHYLENE OUTER JACKET. FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED RATING NOT TO EXCEED 50. ACCEPTABLE MATERIAL: BOFLEX MEI, MINIMUM LENGTH 610mm, MAXIMUM LENGTH 1200mm.
20. DUCTWORK TO BE INSTALLED AS TIGHT TO STRUCTURE AS POSSIBLE.
21. PROVIDE '0.5D' THROAT RADIUS AT ALL ELBOWS UNLESS SHOWN OTHERWISE.
22. PROVIDE TURNING VANES AT ALL 90° DUCTWORK ELBOWS WHERE INDICATED ON DESIGN DRAWINGS.
23. MAINTAIN A MINIMUM DISTANCE OF 1830mm BETWEEN INTAKE AND EXHAUST ON ROOF OR EXTERIOR WALLS.

EQUIPMENT LIST

CO1	WATTS MODEL CO–1200–R EPOXY COATED CAST IRON FLOOR CLEANOUT SUPPLIED COMPLETE WITH 125mmø ROUND ADJUSTABLE GASKETTED HEAVY DUTY ROUND STAINLESS STEEL TOP, REMOVABLE GAS TIGHT GASKETTED BRASS CLEANOUT PLUG, NO HUB STANDARD OUTLET. REFER TO DESIGN DRAWINGS FOR SIZE.
DW1	RESIDENTIAL DISHWASHER SUPPLIED BY OWNER. PLUMBING CONTRACTOR TO INSTALL AND PROVIDE SANITARY AND DOMESTIC WATER PIPING AS REQUIRED TO PROVIDE A COMPLETE AND WORKING INSTALLATION.
EW1	BRADLEY MODEL S19224DCPT WALL MOUNT HALO EYEWASH SUPPLIED COMPLETE WITH TYPE 304 STAINLESS STEEL BOWL WITH INTEGRAL STRAINER, TYPE 304 STAINLESS STEEL HINGED BOWL DUST COVER, HEAVY GAUGE SAND CAST ALUMINUM WALL BRACKET WITH SAFETY YELLOW COATING, 32mmø DRAIN FITTING AND TAILPIECE, CHROME PLATED P–TRAP, TYPE 304 STAINLESS STEEL HIGHLY VISIBLE PUSH HANDLE, 13mm STAY–OPEN EYEWASH CHROME PLATED BRASS BALL VALVE, INTEGRAL 19.2 L (5.1 GPM) FLOW CONTROL, 13mmø NPT WATER SUPPLY INLET AND MODEL S19–2000–RS EMERGENCY FIXTURE THERMOSTATIC MIXING VALVE SUPPLIED COMPLETE WITH STAINLESS STEEL RECESSED CABINET, LIQUID FILLED THERMOSTAT, CHECKSTOPS ON INLETS, ADJUSTABLE SETPOINT, TEMPERATURE CONTROL, BUILT–IN COLD WATER BYPASS, HOT WATER SHUTOFF WHEN COLD SUPPLY IS LOST, DIRT AND LIME RESISTANT BODY, DIAL THERMOMETER, 13mmø HOT/COLD INLET CONNECTIONS 13mmø TEMPERED WATER OUTLET CONNECTION. FIELD ADJUST THERMOSTATIC MIXING VALVE TO 29°C, MOUNT EYEWASH AS PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS AND OBC REQUIREMENTS TO MEET BARRIER FREE REQUIREMENTS.
EW2	BRADLEY MODEL S19224DCPT WALL MOUNT HALO EYEWASH SUPPLIED COMPLETE WITH TYPE 304 STAINLESS STEEL BOWL WITH INTEGRAL STRAINER, TYPE 304 STAINLESS STEEL HINGED BOWL DUST COVER, HEAVY GAUGE SAND CAST ALUMINUM WALL BRACKET WITH SAFETY YELLOW COATING, 32mmø DRAIN FITTING AND TAILPIECE, CHROME PLATED P–TRAP, TYPE 304 STAINLESS STEEL HIGHLY VISIBLE PUSH HANDLE, 13mm STAY–OPEN EYEWASH CHROME PLATED BRASS BALL VALVE, INTEGRAL 19.2 L (5.1 GPM) FLOW CONTROL, 13mmø NPT WATER SUPPLY INLET AND MODEL S19–2000–SS EMERGENCY FIXTURE THERMOSTATIC MIXING VALVE SUPPLIED COMPLETE WITH STAINLESS STEEL SURFACE MOUNTED CABINET, LIQUID FILLED THERMOSTAT, CHECKSTOPS ON INLETS, ADJUSTABLE SETPOINT, TEMPERATURE CONTROL, BUILT–IN COLD WATER BYPASS, HOT WATER SHUTOFF WHEN COLD SUPPLY IS LOST, DIRT AND LIME RESISTANT BODY, DIAL THERMOMETER, 13mmø HOT/COLD INLET CONNECTIONS 13mmø TEMPERED WATER OUTLET CONNECTION. FIELD ADJUST THERMOSTATIC MIXING VALVE TO 29°C, MOUNT EYEWASH AS PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS AND OBC REQUIREMENTS TO MEET BARRIER FREE REQUIREMENTS.
EW3	BRADLEY MODEL S19224DC WALL MOUNT HALO EYEWASH SUPPLIED COMPLETE WITH TYPE 304 STAINLESS STEEL BOWL WITH INTEGRAL STRAINER, TYPE 304 STAINLESS STEEL HINGED BOWL DUST COVER, HEAVY GAUGE SAND CAST ALUMINUM WALL BRACKET WITH SAFETY YELLOW COATING, 32mmø DRAIN FITTING AND TAILPIECE, TYPE 304 STAINLESS STEEL HIGHLY VISIBLE PUSH HANDLE, 13mm STAY–OPEN EYEWASH CHROME PLATED BRASS BALL VALVE, INTEGRAL 19.2 L (5.1 GPM) FLOW CONTROL, 13mmø NPT WATER SUPPLY INLET AND MODEL S19–2000–SS EMERGENCY FIXTURE THERMOSTATIC MIXING VALVE SUPPLIED COMPLETE WITH STAINLESS STEEL SURFACE MOUNTED CABINET, LIQUID FILLED THERMOSTAT, CHECKSTOPS ON INLETS, ADJUSTABLE SETPOINT, TEMPERATURE CONTROL, BUILT–IN COLD WATER BYPASS, HOT WATER SHUTOFF WHEN COLD SUPPLY IS LOST, DIRT AND LIME RESISTANT BODY, DIAL THERMOMETER, 13mmø HOT/COLD INLET CONNECTIONS 13mmø TEMPERED WATER OUTLET CONNECTION. FIELD ADJUST THERMOSTATIC MIXING VALVE TO 29°C, MOUNT EYEWASH AS PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS AND OBC REQUIREMENTS TO MEET BARRIER FREE REQUIREMENTS.
FD1	WATTS MODEL FD–100–C–A FLOOR DRAIN SUPPLIED COMPLETE WITH EPOXY COATED CAST IRON BODY WITH ANCHOR FLANGE, REVERSIBLE MEMBRANE CLAMP WITH PRIMARY AND SECONDARY WEEP HOLES, 6mm THICK ADJUSTABLE NICKEL BRONZE ROUND STRAINER AND 13mm NPT TRAP PRIMER CONNECTIONS. REFER TO DESIGN DRAWINGS FOR OUTLET SIZE.
FD2	WATTS MODEL FD–460–7–9 AREA DRAIN SUPPLIED COMPLETE WITH EPOXY COATED CAST IRON BODY WITH ANCHOR FLANGE, BODY COLLAR WITH WEEPHOLES, 324x324 SQUARE ADJUSTABLE TOP WITH HEEL PROOF DUCTILE IRON HINGED TRACTOR GRATE WITH XHD LOAD RATING (3375–4500 kg), TRAP PRIMER TAPPING, NO HUB STANDARD OUTLET. REFER TO DESIGN DRAWINGS FOR OUTLET SIZE.
HB1	WATTS MODEL HY–725 CONCEALED LEAD FREE NON–FREEZE WALL HYDRANT SUPPLIED COMPLETE WITH NICKEL BRONZE BOX AND DOOR, CHROME PLATED HYDRANT FACE, INTEGRAL VACUUM BREAKER, 19mmø HOSE CONNECTION, 19mmø FEMALE x 25mmø MALE PIPE CONNECTION, ALL BRONZE HEAD, SEAT CASTING AND INTEGRAL WORKING PARTS, BRONZE WALL CASING, AND LOOSE KEY. LENGTH TO SUIT WALL THICKNESS
HB2	WOODFORD MODEL V122 MILD CLIMATE HOT AND COLD WALL FAUCET SUPPLIED COMPLETE WITH VERTICAL MOUNT ROUGH BRASS BODY, EPDM PACKING WITH ADJUSTABLE PACKING NUT, STANDARD 'O' SIZE SEAT WASHER, POWDER COATED DIE CAST ALUMINUM OVAL HANDLES, ANTI–SIPHON WITH INTEGRAL CHECK AND ATMOSPHERE VENT, 19mmø MPT HOT AND COLD INLET CONNECTIONS, 19mmø MALE HOSE NOZZLE OUTLET CONNECTION.
HB3	WATTS MODEL LFSC8–6 LEAD FREE CAST BRASS HEX SHOULDERED HOSE BIBB SUPPLIED COMPLETE WITH TEE HANDLE, ADJUSTABLE PACKING NUT, TAMPER PROOF VACUUM BREAKER WITH BREAK AWAY SCREW, 19mmø MNPT INLET CONNECTION, 19mmø I.P. INLET HOSE END.
HD1	WATTS MODEL FD–200–EG–7 FLOOR DRAIN SUPPLIED COMPLETE WITH EPOXY COATED IRON FLOOR DRAIN, ANCHOR FLANGE, WEEPHOLES, ADJUSTABLE ROUND HEEL PROOF NICKEL BRONZE STRAINER, 102x229mm BRONZE OVAL FUNNEL AND TRAP PRIMER TAPPING, 75mmø CONNECTION.
L1	AMERICAN STANDARD MODEL 0355.012 LUCERNE WALL–HUNG LAVATORY SUPPLIED COMPLETE WITH VITREOUS CHINA CONSTRUCTION, FRONT OVERFLOW, SELF–DRAINING DECK AREA WITH CONTOURED BACK AND SIDE SPLASH SHIELDS, FAUCET LEDGE, 102mm CENTERS, WALL HANGER, CONCEALED ARM SUPPORT OPENINGS, GRID STRAINER, ANGLE VALVES, LAV RISER, ESCUTHEON PLATES, P–TRAP WITH CLEANOUT AND WATTS MODEL CA–411–WC FLOOR MOUNTED LAVATORY CARRIER SUPPLIED COMPLETE WITH HEAVY GAUGE STEEL UPRIGHTS WITH INTEGRAL WELDED FEET, ADJUSTABLE EPOXY COATED IRON ARMS WITH LEVELING SCREWS AND BASIN LOCKING DEVICE, UPPER TIE ROD AND PLATED HARDWARE AND DELTA MODEL 591T0258TR HARDWIRED ELECTRONIC FAUCET SUPPLIED COMPLETE WITH CAST 102mm ONE PIECE SPOUT BODY WITH INTEGRAL WATERPROOF SENSOR AND CONNECTOR DMD SELF–ADAPTIVE TECHNOLOGY, CHROME FINISH, VANDAL RESISTANT 1.9 LPM LAMINAR OUTLET, ADJUSTABLE SENSING RANGE AND TIMEOUT, METAL HOLD DOWN PACKAGE, DELTA MODEL 060704A 20VA HARDWIRE TRANSFORMER, DELTA MODEL ELAVT0008ARI 255x255 RECESSED ROUGH–IN BOX WITH 305x305 STAINLESS STEEL COVER, FACTORY ASSEMBLED HOT AND COLD INLETS SUPPLIES, TEMPERED WATER DISCHARGE, POINT OF USE THERMOSTATIC MIXING VALVE WITH INTEGRAL CHECK VALVES AND SCREWDRIVER STOPS, SOLENOID VALVE AND DRIVER BOARD. LAVATORY COLOUR TO BE WHITE NOTE: –ONE (1) TRANSFORMER WILL SERVE UP TO 10 ELECTRONIC FAUCETS –MOUNT LAVATORY AS PER MANUFACTURER'S INSTRUCTIONS
L2	AMERICAN STANDARD MODEL 0954.004EC MURRO UNIVERSAL DESIGN VITREOUS CHINA WALL–HUNG SINK SUPPLIED COMPLETE WITH EVERCLEAN FINISH, REAR OVERFLOW, RECESSED SELF–DRAINING DECK, FAUCET HOLES AT 102mm CENTERS, MODEL 0059.020EC KNEE SHROUD, GRID STRAINER, ANGLE VALVES, LAV RISER, ESCUTCHEON PLATES, P–TRAP WITH CLEANOUT, WATTS MODEL CA–411–WC FLOOR MOUNTED LAVATORY CARRIER WITH CONCEALED ARMS, HEAVY GAUGE STEEL UPRIGHTS WITH INTEGRAL WELDED FEET, ADJUSTABLE EPOXY COATED IRON ARMS WITH LEVELING SCREWS AND BASIN LOCKING DEVICE, UPPER TIE ROD AND PLATED HARDWARE, AND DELTA MODEL 591T0258TR HARDWIRED ELECTRONIC FAUCET SUPPLIED COMPLETE WITH CAST 102mm ONE PIECE SPOUT BODY WITH INTEGRAL WATERPROOF SENSOR AND CONNECTOR DMD SELF–ADAPTIVE TECHNOLOGY, CHROME FINISH, VANDAL RESISTANT 1.9 LPM LAMINAR OUTLET, ADJUSTABLE SENSING RANGE AND TIMEOUT, METAL HOLD DOWN PACKAGE, DELTA MODEL 060704A 20VA HARDWIRE TRANSFORMER, DELTA MODEL ELAVT0008ARI 255x255 RECESSED ROUGH–IN BOX WITH 305x305 STAINLESS STEEL COVER, FACTORY ASSEMBLED HOT AND COLD INLETS SUPPLIES, TEMPERED WATER DISCHARGE, POINT OF USE THERMOSTATIC MIXING VALVE WITH INTEGRAL CHECK VALVES AND SCREWDRIVER STOPS, SOLENOID VALVE AND DRIVER BOARD. LAVATORY AND KNEE SHROUD COLOUR TO BE WHITE NOTE: –ONE (1) TRANSFORMER WILL SERVE UP TO 10 ELECTRONIC FAUCETS –MOUNT LAVATORY AS PER MANUFACTURER'S INSTRUCTIONS AND OBC REQUIREMENTS TO MEET BARRIER FREE CLEARANCES.
MS1	PROFLO MODEL PFMB2424S MOP SERVICE BASIN SUPPLIED COMPLETE WITH MOLDED HIGH DENSITY COMPOSITE BASIN, STAINLESS STEEL DRAIN BODY, REMOVABLE STAINLESS STEEL DOME STRAINER/LINT BASKET, MODEL PFMBSSDRN 75mmø STRAINER AND GASKET AND MODEL PFWG24S STAINLESS STEEL WALL GUARD SET AND DELTA MODEL 28T9 CAST BRASS WALL MOUNT SERVICE SINK FAUCET SUPPLIED WITH TWO COLOUR INDEXED METAL CROSS HANDLES, INTEGRAL STOPS, GARDEN HOSE END THREAD, PAIL HOOK, INLINE VACUUM BREAKER, WALL BRACE, AND ROUGH CHROME PLATED FINISH, DELTA MODEL 28T910 STAINLESS STEEL MOP HANGER SUPPLIED WITH THREE (3) SPRING LOADED RUBBER GRIP HOLDERS, DELTA MODEL 28T911 STAINLESS STEEL HOSE HOLDER SUPPLIED WITH SPRING LOADED RUBBER GRIP HOLDER AND 1220mm LONG REINFORCED HOSE WITH BRASS COUPLING.
OS1	ZURN PROCEPTOR OMC 100 CSA FIBERGLASS HYDROMECHANICAL BELOW GROUND OIL AND SEDIMENT INTERCEPTOR SUPPLIED COMPLETE WITH FIBERGLASS REINFORCED PLASTIC CONSTRUCTION, WASTEWATER/CLEAN WATER CHAMBERS WITH BAFFLE AND INTERNAL FLOW DISTRIBUTOR, 100mmø SCHEDULE 40 PVC WASTEWATER/CLEAN WATER CHAMBER INSPECTION PORTS, COALESER FILTERS, SUCTION PIPE ACCESSORY WITH 100mmø SCHEDULE 40 PVC TOP SUCTION PORT, TWO (2) 75mmø SCHEDULE 40 PVC VENT CONNECTIONS, 100mmø SCHEDULE 40 PVC INLET/OUTLET CONNECTIONS AND EXTENSION COLLAR TO SUIT INSTALLATION DEPTH. PROVIDE CAMLOCK CONNECTION COMPLETE WITH DUSTPLUG TO SUIT SUCTION PORT TERMINATION. NON–EMULSIFIED OIL CAPACITY: 0.631 L/S (10 USGPM) TOTAL WET VOLUME: 378.5 L (100 USGAL) MAXIMUM OIL CAPACITY: 159.0 L (42 USGAL) MAXIMUM SOLIDS CAPACITY: 87.1 L (23 USGAL)
OS2	MIFAB MODEL MI–OS–1–3–FL OIL/SEDIMENT INTERCEPTOR SUPPLIED COMPLETE WITH 10ga. STEEL CONSTRUCTION WITH EPOXY COATING ON INSIDE AND OUTSIDE, OPTION STAINLESS STEEL GRATE WITH 10,000 lbs RATING, REMOVABLE SEDIMENT BUCKET AND MUD PAN, DEEP SEAL TRAP WITH INTEGRAL SEWER GAS STOPPER, INTERNAL VENT SYSTEM, CLEANOUT PLUG, OPTIONAL ANCHOR FLANGE, 75mmø NO HUB OUTLET CONNECTION. TOTAL WET VOLUME: 45.2 L (12 USGAL) MAXIMUM SOLIDS CAPACITY: 5.4 kg (12 lbs)
S1	FRANKE MODEL LBD4408P–1/3 TOP MOUNT DROP IN SELF RIMMING DOUBLE BOWL SINK SUPPLIED COMPLETE WITH 18 GAUGE 18–10 STAINLESS STEEL CONSTRUCTION WITH #4 SATIN FINISH, FULLY UNDERCOATED BOWLS, SPILLWAY PARTITION, FAUCET LEDGE, 3 HOLE FAUCET PUNCHING WITH 102mm CENTERS, 203mm CENTERSET, INSTALLATION KIT, WASTE FITTINGS, ANGLE VALVES, FACTORY APPLIED RIM SEAL, CUTOUT TEMPLATE, FACTORY INSTALLED EZ TORQUE FASTENERS, CENTER BACK WASTE LOCATIONS, 89mm CRUMB CUP STRAINERS, 38mm BRASS TAIL PIECES, ESCUTHEON PLATES AND DELTA MODEL 100LF–HDF SINGLE HANDLE DECK MOUNTED FAUCET SUPPLIED WITH CAST BRASS BODY WITH CHROME PLATED FINISH, 221mm LONG SPOUT WITH 180° SWING RANGE, SELF POSITIONING VANDAL RESISTANT LEVER HANDLE, DIAMOND COATED CERAMIC CONTROL CARTRIDGE, 9.5ø STRAIGHT STAGGERED COPPER SUPPLY TUBES, STANDARD 9.5ø FITTINGS, AND 5.7 LPM VANDAL RESISTANT AERATOR.

EQUIPMENT LIST -CONTINUED

S2	FRANKE MODEL SSL2424–1/2 SINGLE COMPARTMENT SERVICE SERIES FREE STANDING SINK SUPPLIED COMPLETE WITH 14 GAUGE TYPE 304 18/10 STAINLESS STEEL CONSTRUCTION WITH #4 SATIN FINISH, FULLY WELDED 610x610x355 DEEP SQUARE CORNER BOWL WITH ROLLED RIM EDGES, 229mm HIGH INTEGRAL STAINLESS STEEL SPLASH BACK, STAINLESS STEEL TUBULAR LEGS WITH ADJUSTABLE FEET, CENTER WASTE LOCATION, CRUMB CUP STRAINER, 38mmø BRASS TAILPIECE, 2–32mmø FAUCET HOLES, 205mm CENTERSET AND DELTA MODEL 28P4402LF CAST BRASS TWO HANDLE WALL MOUNT SINK FAUCET SUPPLIED WITH 205mm TUBULAR SWING SPOUT, ADA COMPLIANT 102mm COLOUR INDEXED HOODED BLADE HANDLES, 1/4 TURN CYLINDER TYPE CONTROL MECHANISM WITH BRASS STEM, STAINLESS STEEL PLATE AND REPLACEABLE NON–METALLIC SEATS.
SH1	DELTA MODEL T17TH155–20 MULTICHOICE UNIVERSAL THERMOSTATIC SHOWER VALVE SUPPLIED COMPLETE WITH TEMPASSURE 17T THERMOSTATIC CARTRIDGE, THERMOSTATIC WAX ELEMENT, POLISHED CHROME PLATED FINISH, RED/BLUE TEMPERATURE MARKINGS, LEVER VOLUME CONTROL WITH FIELD ADJUSTABLE LIMIT ROTATION INTO HOT WATER ZONE, METAL LEVER VOLUME CONTROL HANDLER WITH TEMPERATURE ADJUSTMENT, OPTIONAL 1753mm LONG CP STAINLESS STEEL HOSE (STRETCHES TO 2337mm) HANDSHOWER WITH PUSH BUTTON PAUSE AND STANDARD 610mm STAINLESS STEEL SLIDE BAR AND DELTA MODEL R10000–UNWS MULTICHOICE VALVE BODY WITH SCREWDRIVER STOPS WITH 13mm UNIVERSAL INLETS/OUTLETS, FORGED BRASS BODY.
TD1 TRENCH DRAIN (2 REQUIRED)	NORSTAR INDUSTRIES U–DRAIN SYSTEM SUPPLIED COMPLETE WITH FOUR (4) 3048mm (10–0") LONG GALVANIZED STEEL U–DRAIN SECTIONS, GALVANIZED STEEL U–DRAIN END CAP, GALVANIZED STEEL ADAPTER PLATE, GALVANIZED STEEL 610x610x610mm COMMERCIAL SUMP WITH SINGLE U–DRAIN INLET CONNECTION AND THREE (3) 114mmø OUTLET CONNECTIONS (TWO (2) FACTORY SUPPLIED CAPS FOR USED OUTLET CONNECTIONS), GALVANIZED STEEL REMOVABLE SILT STRAINER, 6mm THICK REINFORCED GASKETTED CHECKER PLATE LID, GALVANIZED STEEL E–Z MOUNT BRACKETS, GALVANIZED STEEL BOLT PACKS AND GALVANIZED U–DRAIN PADDLE AND PADDLE HANDLER.
TD2	NORSTAR INDUSTRIES U–DRAIN SYSTEM SUPPLIED COMPLETE WITH ONE (1) 1524mm (5'–0") LONG GALVANIZED STEEL U–DRAIN END SECTION, TWO (2) 3048mm (10–0") LONG GALVANIZED STEEL U–DRAIN SECTIONS, GALVANIZED STEEL U–DRAIN END CAP, GALVANIZED STEEL ADAPTER PLATE, GALVANIZED STEEL 610x610x610mm COMMERCIAL SUMP WITH SINGLE U–DRAIN INLET CONNECTION AND THREE (3) 114mmø OUTLET CONNECTIONS (TWO (2) FACTORY SUPPLIED CAPS FOR USED OUTLET CONNECTIONS), GALVANIZED STEEL REMOVABLE SILT STRAINER, 6mm THICK REINFORCED GASKETTED CHECKER PLATE LID, GALVANIZED STEEL E–Z MOUNT BRACKETS AND GALVANIZED STEEL BOLT PACKS.
W1	RESIDENTIAL WASHING MACHINE SUPPLIED BY OWNER. PLUMBING CONTRACTOR SHALL SUPPLY WATTS MODEL 175C SURFACE MOUNTED BALL–TYPE WASHING MACHINE SHUTOFF VALVE COMPLETE WITH SINGLE LEVER HOT/COLD SHUT OFF VALVE, BRONZE BODY, 13mmø SWEAT COPPER ELL ADAPTERS FOR COPPER TUBING, 19mm HOT/COLD HOSE OUTLET CONNECTIONS. NOTE: PLUMBING CONTRACTOR TO INSTALL AND PROVIDE SANITARY AND DOMESTIC WATER PIPING AS REQUIRED TO PROVIDE A COMPLETE AND WORKING INSTALLATION.
WC1	AMERICAN STANDARD MODEL 2467.100 CADET FLOWISE RIGHT HEIGHT ELONGATED PRESSURE ASSISTED HIGH EFFICIENCY ULTRA LOW CONSUMPTION VITREOUS CHINA TOILET SUPPLIED COMPLETE WITH EVERCLEAN FINISH, 419mm BOWL RIM HEIGHT, ELONGATED BOWL, PRESSURE–ASSISTED SIPHON JET FLUSH ACTION, FULLY GLASSED 54mm TRAPWAY, 255x305 WATER SURFACE AREA, CLOSE–COUPLED FLUSHOMETER TANK, METAL CHROME TRIP LEVER, SPEED CONNECT TANK/BOWL COUPLING SYSTEM, SANITARY DAM ON BOWL, TWO (2) BOLT CAPS, 305mm ROUGH IN, MODEL 5901.110T HEAVY DUTY OPEN FRONT SEAT COMPLETE WITH EVERCLEAN FINISH AND MODEL 4142.801 TANK AND TANK COVER WITH RIGHT HAND TRIP LEVER. WATER CLOSET COLOUR TO BE WHITE.
WC2	AMERICAN STANDARD MODEL 2467.100 CADET FLOWISE RIGHT HEIGHT ELONGATED PRESSURE ASSISTED HIGH EFFICIENCY ULTRA LOW CONSUMPTION VITREOUS CHINA TOILET SUPPLIED COMPLETE WITH EVERCLEAN FINISH, 419mm BOWL RIM HEIGHT, ELONGATED BOWL, PRESSURE–ASSISTED SIPHON JET FLUSH ACTION, FULLY GLASSED 54mm TRAPWAY, 255x305 WATER SURFACE AREA, CLOSE–COUPLED FLUSHOMETER TANK, METAL CHROME TRIP LEVER, SPEED CONNECT TANK/BOWL COUPLING SYSTEM, SANITARY DAM ON BOWL, TWO (2) BOLT CAPS, 305mm ROUGH IN, MODEL 5901.110T HEAVY DUTY OPEN FRONT SEAT COMPLETE WITH EVERCLEAN FINISH AND MODEL 4142.801 TANK AND TANK COVER WITH RIGHT HAND TRIP LEVER. WATER CLOSET COLOUR TO BE WHITE. NOTE: TOILET SEAT THICKNESS TO ENSURE BARRIER FREE HEIGHT IS MAINTAINED WHERE APPLICABLE (460mm MAX. TO TOP OF SEAT)
⊗ FE–1	NATIONAL FIRE EQUIPMENT MODEL ABC–050WWD, 3A10BC ULC RATED FIRE EXTINGUISHER SUPPLIED COMPLETE WITH WALL BRACKET.
⊗ FE–2	NATIONAL FIRE EQUIPMENT LTD. MODEL ABC–050WWD 5lb DRY CHEMICAL FIRE EXTINGUISHER SUPPLIED COMPLETE WITH STEEL CYLINDER WITH CYLINDER SKIRT AND POLYESTER POWDER PAINT FINISH, DISCHARGE VALVE WITH STAINLESS STEEL FERRULES, HAND RIVETS AND GAUGE, STAINLESS STEEL PULL PIN, 3A10BC ULC RATING AND MODEL 102F RECESSED FIRE EXTINGUISHER CABINET SUPPLIED COMPLETE WITH 22ga. STEEL TUB, 16ga. STEEL DOOR AND TRIM, FULL LENGTH SEMI–CONCEALED PIANO HINGE, FLUSH STAINLESS STEEL DOOR LATCH, BAKED ENAMEL PAINT AND GLAZE, 4.75mm CLEAR GLASS.
RD1 ROOF DRAIN	MIFAB MODEL R1200–F1 LARGE SUMP FLOW CONTROLLED ROOF DRAIN SUPPLIED COMPLETE WITH LACQUERED CAST IRON DEEP SUMP, SERRATED ANCHOR FLANGE, INTEGRAL GRAVEL STOP, GALVANIZED ADJUSTABLE EXTENSION, OPTIONAL UNDERDECK CLAMP, HARDWARE SET, SELF–LOCKING CAST IRON DOME, ACCUFLOW PARABOLIC WEIR WITH ONE (1) SLOT, PVC SOCKET CONNECTION BODY, AND FIELD SUPPLIED ANCHOR RODS TO SUIT ROOF INSULATION THICKNESS. REFER TO DESIGN DRAWING FOR OUTLET SIZE REQUIREMENTS. NOTE: FIELD ADJUST WEIR FOR DESIRED FLOW RATE, CONSULT CIVIL ENGINEER FOR FLOW SETTING
RD2 ROOF DRAIN	MIFAB MODEL R1200–F2 LARGE SUMP FLOW CONTROLLED ROOF DRAIN SUPPLIED COMPLETE WITH LACQUERED CAST IRON DEEP SUMP, SERRATED ANCHOR FLANGE, INTEGRAL GRAVEL STOP, GALVANIZED ADJUSTABLE EXTENSION, OPTIONAL UNDERDECK CLAMP, HARDWARE SET, SELF–LOCKING CAST IRON DOME, ACCUFLOW PARABOLIC WEIR WITH TWO (2) SLOTS, PVC SOCKET CONNECTION BODY, AND FIELD SUPPLIED ANCHOR RODS TO SUIT ROOF INSULATION THICKNESS. REFER TO DESIGN DRAWING FOR OUTLET SIZE REQUIREMENTS. NOTE: FIELD ADJUST WEIR FOR DESIRED FLOW RATE, CONSULT CIVIL ENGINEER FOR FLOW SETTING
DOWNSPOUT NOZZLE	WATTS MODEL RD–940 DOWNSPOUT NOZZLE SUPPLIED COMPLETE WITH CAST NICKEL BRONZE NOZZLE WITH ANCHOR FLANGE, COUNTERSUNK MOUNTING HOLES, NO HUB CONNECTION. REFER TO DESIGN DRAWINGS FOR NOZZLE SIZE.
DCVA–1 (WATER METER)	APOLLO VALVES MODEL 4ALF 101 03 LEAD FREE DOUBLE CHECK VALVE ASSEMBLY SUPPLIED COMPLETE WITH STAINLESS STEEL BODY, GLASS FILLED PPO/STAINLESS STEEL COVERS, BRONZE/GLASS FILLED PPO/STAINLESS STEEL CHECK VALVES, STAINLESS STEEL SPRINGS, CENTER STEM GUIDED TRIFORCE CHECK VALVES WITH CLORAMINE RESISTANT SILICONE SEAT DISCS, SNAP–IN CHECK RETAINERS, LEAD FREE BALL TYPE TEST COCKS WITH STAINLESS STEEL HANDLES, STAINLESS STEEL SHUT–OFF VALVES, OS&Y FLANGED 75ø INLET/OUTLET CONNECTIONS AND STAINLESS STEEL Y–STRAINER SHIPPED LOOSE.
PRV–1 PRESSURE REDUCING VALVE	WATTS MODEL LFN223B LEAD FREE SUPER CAPACITY WATER PRESSURE REDUCING VALVE SUPPLIED COMPLETE WITH LEAD FREE CAST COPPER SILICON ALLOY BODY, REPLACEABLE STAINLESS STEEL ALLOY SEAT, REINFORCED BUNA–N ENLARGED DIAPHRAGM, REINFORCED BUNA–N SEAT, SPRING CAGE AND SEAT ORIFICE FOR SUPER CAPACITY PERFORMANCE, STANDARD BY–PASS FEATURE, 172–517 kPa (25–75 PSI) ADJUSTMENT RANGE, 75mm FNPT CONNECTIONS.
PRV–2 PRESSURE REDUCING VALVE	WATTS MODEL LF223 LEAD FREE HIGH CAPACITY WATER PRESSURE REDUCING VALVE SUPPLIED COMPLETE WITH LEAD FREE CAST BRONZE BODY AND BOTTOM PLUG, STAINLESS STEEL SEAT WITH BUNA–N GASKET, BRASS LOCKING NUT, ZINC PLATED WIRE SPRING, BUNA–N O–RING, REINFORCED BUNA–N DIAPHRAGM WITH CAST IRON PLATE, LEAD FREE COPPER SILICONE ALLOY DISC HOLDER, 172–517 kPa (25–75 PSI) ADJUSTMENT RANGE, 50mm FNPT CONNECTIONS.
Ⓟ PRV PRESSURE GAUGE	WINTERS P9S 90 SERIES MODEL P9S90223 PRESSURE GAUGE SUPPLIED COMPLETE WITH 90mm WHITE ALUM. DIAL WITH BLACK AND RED MARKINGS, BLACK STEEL CASE, REMOVABLE THREADED ACRYLIC LENS, BRASS SOCKET, PHOSPHOR BRONZE BOURBON TUBE, BRASS FLUTTERLESS MOVEMENT WITH ZERO ADJUSTMENT, ALUMINUM BLACK POINTER, BRASS 6mm NPT BOTTOM CONNECTION, MINI–BALL TYPE ISO. VALVE, DUAL SCALE 0/690 kPa (0/100 PSI) PRESS. RANGE.
TMV–1 THERMOSTATIC MIXING VALVE	CASH ACME MODEL HG145 LEAD FREE THERMOSTATIC MIXING VALVE SUPPLIED COMPLETE WITH LEAD FREE DZR BRASS BODY AND INTERNAL CAP, STAINLESS STEEL SPRINGS, ENGINEERED POLYMER PISTON, STAINLESS STEEL INLET STRAINER SCREENS, MOUNTING CLAMP, INTEGRAL CHECKS, 35°C – 48°C ADJUSTABLE OUTLET TEMPERATURE RANGE (FACTORY SET TEMPERATURE RANGE 40°C – 43.3°C), 9.5mmø COMPRESSION TYPE HOT/COLD INLET CONNECTIONS AND 9.5mmø COMPRESSION TYPE TEMPERED WATER OUTLET CONNECTION.
TMV–2 THERMOSTATIC MIXING VALVE	CASH ACME MODEL HG110–D LEAD FREE THERMOSTATIC MIXING VALVE SUPPLIED COMPLETE WITH LEAD FREE DZR BRASS BODY, BRASS INTERNAL CAP, STAINLESS STEEL SPRINGS, ENGINEERED POLYMER PISTON, STAINLESS STEEL INLET STRAINER SCREENS, INTEGRAL CHECKS, 29°C – 80°C ADJUSTABLE OUTLET TEMPERATURE RANGE (FACTORY SET TEMPERATURE RANGE 46°C – 49°C), 19mmø FNPT HOT/COLD INLET CONNECTIONS, 19mmø FNPT TEMPERED WATER OUTLET CONNECTION AND OPTIONAL MODEL 25376 TEMPERATURE GAUGE WITH LEAD FREE DZR BRASS BODY AND CAPTIVE NUT, STAINLESS STEEL GAUGE SHELL, EPDM FACE SEAL AND 19mmø NPSM UNION x MNPT CONNECTIONS.
TBV–1 HOT WATER RECIRC. THERMO SETTER	CALEFFI MODEL 116141AC THERMOSETTER ADJUSTABLE RECIRCULATION THERMAL BALANCING VALVE SUPPLIED COMPLETE WITH DZR LOW LEAD BRASS BODY, STAINLESS STEEL AND COPPER ADJUSTABLE CARTRIDGE, STAINLESS STEEL SPRINGS, PEROXIDE CURED EPDM HYDRAULIC SEALS, ABS ADJUSTMENT KNOB, TAMPERPROOF ADJUSTMENT LOCKING SCREW, PROBE TYPE TEMPERATURE GAUGE WITH DRY–WELL, CHECK VALVE, 13mmø FNPT INLET/OUTLET CONNECTIONS, AND MODEL CBN116140 INSULATION SHELL. FIELD ADJUST SET TO 43.3°C,
BFP–1 BACKFLOW PREVENTER	APOLLO VALVES MODEL DUCLF4N PRODUCT NUMBER 4NLF–3A3–3A LEAD FREE DUAL CHECK VALVE BACKFLOW PREVENTER SUPPLIED COMPLETE WITH LEAD FREE BRONZE BODY, LEAD FREE BRASS TAILPIECE, BRASS UNION NUT, GLASS FILLED NORYL REPLACEABLE CHECK MODULES, STAINLESS STEEL SPRINGS, EPDM SEAT DISCS, 13mmø FNPT INLET/OUTLET CONNECTIONS.
BFP–2 BACKFLOW PREVENTER	APOLLO VALVE MODEL 4ALF–905–A2F LEAD FREE SPILL RESISTANT VACUUM BREAKER TYPE BACKFLOW PREVENTER SUPPLIED COMPLETE WITH BRONZE BODY, BALL VALVES AND TEST COCKS, UV–RESISTANT ABS CANOPY, GLASS FILLED PPO BONNET, CHECK VALVE CARTRIDGE AND FLOAT, STAINLESS STEEL SPRINGS, CHLORAMINE RESISTANT SILICONE SEAT DISCS, CHLORAMINE RESISTANT EPDM O–RINGS AND 25ø FPT CONNECTIONS.
BFP–3 BACKFLOW PREVENTER	APOLLO VALVE MODEL 4ALF–904–A2F LEAD FREE SPILL RESISTANT VACUUM BREAKER TYPE BACKFLOW PREVENTER SUPPLIED COMPLETE WITH BRONZE BODY, BALL VALVES AND TEST COCKS, UV–RESISTANT ABS CANOPY, GLASS FILLED PPO BONNET, CHECK VALVE CARTRIDGE AND FLOAT, STAINLESS STEEL SPRINGS, CHLORAMINE RESISTANT SILICONE SEAT DISCS, CHLORAMINE RESISTANT EPDM O–RINGS AND 19ø FPT CONNECTIONS.

Date	Revision	
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER	0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MECHANICAL SPECIFICATIONS AND EQUIPMENT LIST

Drawn By: ER	Checked By: DS
Scale: N/A	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	
Drawing No: **M700**	

EQUIPMENT LIST -CONTINUED

BFP-4 BACKFLOW PREVENTER	APOLLO VALVE MODEL 4ALF-217-A2F LEAD FREE REDUCED PRESSURE PRINCIPAL TYPE BACKFLOW PREVENTER SUPPLIED COMPLETE WITH BRONZE BODY, BALL VALVES AND TEST COCKS, 300 SERIES STAINLESS STEEL SPRINGS, CHLORAMINE RESISTANT SILICONE SEAT DISCS, NITRITE AND NYLON DIAPHRAGM, GLASS FILLED PPO BONNET, CHLORAMINE RESISTANT EPDM O-RINGS, STAINLESS STEEL BALL VALVE HANDLES, Y-STRAINER (SHIPPED LOOSE), 13mm SAE THREADED TEST COCKS, MODEL AGD4A112 AIR GAP DRAIN, 38mmø FPT CONNECTIONS.
TSP-1 TRAP SEAL PRIMER	PRECISION PLUMBING MODEL MPB-500-115V MINI-PRIME ELECTRONIC TRAP SEAL PRIMER SUPPLIED COMPLETE WITH 16 GAUGE 305x305x100mm DEEP SURFACE MOUNTED CABINET, MODEL D-814PC ACCESS DOOR WITH PRIME COAT, 13mmø MNPT INLET CONNECTION, SHUT-OFF VALVE, SOLENOID VALVE, AIR GAP DISCHARGE FITTING, 13mmø FNPT DISCHARGE CONNECTION, CONTROL PANEL, PRESET 24 HR. TIME CLOCK, CONTROL MODULE WITH MANUAL OVERRIDE SWITCH AND 120/1/60 POWER.
TSPM-1 TRAP SEAL PRIMER MANIFOLD	PRECISION PLUMBING MODEL PT-10 LEAD FREE AUTOMATIC TRAP SEAL PRIMER ASSEMBLY SUPPLIED COMPLETE WITH 16 GAUGE 355x405x152mm DEEP FLUSH MOUNTED FIRE RATED CABINET, MODEL D1416SS STAINLESS STEEL ACCESS DOOR WITH SCREW DRIVER LATCH, 19mmø FNPT INLET CONNECTION, SHUT-OFF VALVE, WATER HAMMER ARRESTOR, SOLENOID VALVE, ANTI-SIPHON ATMOSPHERIC VACUUM BREAKER, TYPE 'L' COPPER CALIBRATED MANIFOLD WITH 10-13mmø COMPRESSION TYPE COPPER TUBE DISCHARGE CONNECTIONS, CONTROL PANEL, PRESET 24 HR. TIME CLOCK, CONTROL MODULE WITH MANUAL OVERRIDE SWITCH AND 120/1/60 POWER. CAP ALL UNUSED MANIFOLD CONNECTIONS.
TSPM-2 TRAP SEAL PRIMER MANIFOLD	PRECISION PLUMBING MODEL PT-8 LEAD FREE AUTOMATIC TRAP SEAL PRIMER ASSEMBLY SUPPLIED COMPLETE WITH 16 GAUGE 355x405x86mm DEEP FLUSH MOUNTED CABINET, MODEL D1416SS STAINLESS STEEL ACCESS DOOR WITH SCREW DRIVER LATCH, 19mmø FNPT INLET CONNECTION, SHUT-OFF VALVE, WATER HAMMER ARRESTOR, SOLENOID VALVE, ANTI-SIPHON ATMOSPHERIC VACUUM BREAKER, TYPE 'L' COPPER CALIBRATED MANIFOLD WITH 8-13mmø COMPRESSION TYPE COPPER TUBE DISCHARGE CONNECTIONS, CONTROL PANEL, PRESET 24 HR. TIME CLOCK, CONTROL MODULE WITH MANUAL OVERRIDE SWITCH AND 120/1/60 POWER. CAP ALL UNUSED MANIFOLD CONNECTIONS.
CLIENT DOMESTIC CW FILL CONNECTION	• DIXON MODEL 150-F-AL CAM AND GROOVE ADAPTER SUPPLIED COMPLETE WITH 356T6 ALUMINUM CONSTRUCTION, 38mmø NPT INLET CONNECTION, 38mmø CAM & GROOVE OUTLET CONNECTION. • DIXON MODEL 150-C-AL COUPLE x HOSE SHANK SUPPLIED COMPLETE WITH 356T6 ALUMINUM CONSTRUCTION, NITRILE RUBBER GASKET, 38mmø CAM & GROOVE INLET CONNECTION, 38mmø HOSE SHANK OUTLET CONNECTION AND DUSTPLUG.
M1 CLIENT WATER FILL METER	NEPTUNE MODEL T-10 COLD WATER METER SUPPLIED COMPLETE WITH LEAD FREE HIGH COPPER ALLOY MAIN CASE, NUTATING DISC MEASURING CHAMBER, ELECTRICAL GROUNDING CONTINUITY, NEPTRONIC TRICON-S REGISTER WITH THERMOPLASTIC HOUSING AND REED SWITCH TECHNOLOGY, 25mm THREADED CONNECTIONS. OPERATING RANGE: 0.23 M^3/H TO 11.36 M^3/H (1 TO 50 USGPM)
WH-1&2 GAS FIRED WATER HEATER	NAVIEN MODEL NPE-240A2-LP WALL MOUNTED GAS FIRED TANKLESS CONDENSING WATER HEATER SUPPLIED COMPLETE WITH COOLED ROLLED CARBON STEEL CASE, STAINLESS STEEL HEAT EXCHANGERS, ECO PREMIXED BURNER, NEGATIVE PRESSURE GAS VALVE, CONDENSATE COLLECTOR, TEMPERATURE LOCKOUT, INTERNAL CIRCULATION PUMP AND 1.9 LITER BUFFER TANK, PART No.300009323A LEAD FREE PLUMB EASY VALVE SET WITH PRESSURE RELIEF VALVE, PART No.GXXX000546 READY-LINK COMMUNICATION CABLE, INTERNAL CIRCUIT BOARD, FLAME SENSOR SYSTEM, AIR PROVING SWITCH, IGNITION OPERATION DETECTOR, WATER TEMPERATURE HIGH LIMIT SWITCH, EXHAUST TEMPERATURE HIGH LIMIT SENSOR, POWER SURGE FUSE, OVERHEAT PREVENTION DEVICE, FREEZE PROTECTION MODE, FAN MOTOR ROTATION DETECTOR, 13ø CONDENSATE DRAIN CONNECTION, 19ø NPT COLD/HOT/HOT WATER RECIRCULATION AND GAS CONNECTION, 50ø PVC INTAKE AND EXHAUST CONNECTIONS, 3.8 L WATER HOLDING CAPACITY, OPTIONAL LP GAS CONVERSION KIT, 20/1/60 POWER. NOTE: PREPARE/CONVERT WATER HEATER FOR LOW PRESSURE PROPANE GAS USE AS PER WATER HEATER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
EXP-2 DOMESTIC WATER SYSTEM	AMTROL MODEL ST-25V THERM-X-TROL THERMAL EXPANSION TANK SUPPLIED COMPLETE WITH STEEL SHELL WITH URETHANE FINISH, HEAVY DUTY BUTYL DIAPHRAGM, ANTIMICROBIAL POLYPROPYLENE LINER, PROJECTION WELDED AIR VALVE WITH INSIGHT INDICATOR CAP, 40 PSIG FACTORY PRECHARGE, 19mm NPTF STAINLESS STEEL SYSTEM CONNECTION. TANK VOLUME: 39 LITERS / MAXIMUM ACCEPTANCE VOLUME: 39 LITERS
P2 HOT WATER RECIRC. PUMP	GRUNDFOS MODEL ALPHA1 15-55 SF/LC PRODUCT NUMBER 99287250 HIGH EFFICIENCY VARIABLE SPEED CIRCULATOR SUPPLIED COMPLETE WITH STAINLESS STEEL PUMP HOUSING, STAINLESS STEEL ROTOR CAN AND CLADDING, MAGNETITE RESISTANT DESIGN WITH STAINLESS STEEL BEARING PLATE, CARBON TRUST BEARING, CERAMIC SHAFT, CERAMIC BEARING RINGS, PES COMPOSITE 30% GLASS FILLED IMPELLER, EPDM GASKETS, INTEGRATED CHECK VALVE, THREE CONSTANT PRESSURE CONTROL MODES, LED DISPLAY, PUSH BUTTON CONTROLS, FLANGED CONNECTIONS, FOAM INSULATING JACKET, 0.06hp ECM MOTOR, LINE CORD, 120/1/60 POWER. CAPACITY: 0-1.07 L/S AT 0-5.8 METERS (0-17 GPM AT 0-19 FT.)
B-1&2 BOILERS	LOCHINVAR MODEL FTXL850L FIRE TUBE CONDENSING/MODULATING HIGH EFFICIENCY LP GAS FIRED BOILER SUPPLIED COMPLETE WITH HEAVY GAUGE PRIMED AND PAINTED STEEL JACKET ASSEMBLY, ADJUSTABLE LEVELING LEGS, BURNER FLAME OBSERVATION PORT, SEALED COMBUSTION, DIRECT SPARK IGNITION, MODULATING BURNER WITH 7:1 TURNDOWN, STAINLESS STEEL FIRE-TUBE HEAT EXCHANGER, 24 VAC CONTROL CIRCUIT AND COMPONENTS, SMART SYSTEM DIGITAL OPERATING CONTROL WITH MULTI-COLOUR GRAPHIC LCD DISPLAY AND NAVIGATION DIAL, ON/OFF SWITCH, HIGH LIMIT TEMPERATURE CONTROL WITH MANUAL RESET, AUTOMATIC RESET HIGH LIMIT, OUTLET WATER TEMPERATURE SENSOR, SUPPLY WATER TEMPERATURE SENSOR, LOW WATER CUTOUT, FLUE TEMPERATURE SENSOR, LOW AIR PRESSURE SWITCH, TEMPERATURE GAUGE, PRESSURE GAUGE, 65mmø WATER CONNECTIONS, 150mmø VENT AND 100mmø AIR INTAKE, CONDENSATE TRAP, LOCH-N-LINK PROGRAMMING USB DRIVE PORT, THREE (3) RESET TEMPERATURE INPUTS WITH INDEPENDENT OUTDOOR RESET CURVES FOR EACH, PUMP CONTROL, CASCADING SEQUENCER WITH BUILT-IN REDUNDANCY, BUILDING MANAGEMENT SYSTEM INTEGRATION, PROGRAMMABLE SYSTEM EFFICIENCY OPTIMIZERS, LOW AND HIGH VOLTAGE TERMINAL STRIPS FOR ELECTRICAL CONNECTIONS, TIME CLOCK, DATA LOGGING, OPTIONAL MODEL CN4-850 CONDENSATE NEUTRALIZER KIT, OPTIONAL ROOM AIR KIT No.100157616, OPTIONAL VARIABLE SPEED BOILER CIRCULATOR, OPTIONAL 30 PSI RELIEF VALVE, CPVC VENT STARTER PIECE, 120/1/60 POWER. CAPACITY: 850 MBTUH INPUT / 825 MBTUH OUTPUT NOTE: PREPARE BOILER FOR LOW PRESSURE PROPANE GAS USE AS PER BOILER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
P1a/P1b HEATING LOOP CIRC. PUMPS	GRUNDFOS MAGNA3 MODEL 65-150 F (N) VARIABLE SPEED CANNED ROTOR TYPE CIRCULATING PUMP SUPPLIED COMPLETE WITH CAST IRON/STAINLESS STEEL PUMP HOUSING, ALUMINUM STATOR HOUSING, EPDM STATOR HOUSING O-RINGS, POLYCARBONATE CONTROL BOX, PPS ROTOR CAN, PES IMPELLER, STAINLESS STEEL SHAFT, STAINLESS STEEL NECK RING, STAINLESS STEEL BEARING PLATE, ALUMINUM OXIDE/CARBON THRUST BEARING, INTEGRAL CONTROLLER, BUILT-IN DIFFERENTIAL PRESSURE AND TEMPERATURE SENSOR, BACNET INTERFACE MODULE, 65ø FLANGED CONNECTIONS, 4-POLE SYNCHRONOUS PERMANENT MAGNET MOTOR, 208/1/60 POWER. CAPACITY: 6.33 L/S AT 13.7 METERS
EXP-1 HEATING LOOP EXPANSION TANK	AMTROL EXTROL MODEL SX-90V DIAPHRAGM TYPE EXPANSION TANK SUPPLIED COMPLETE WITH STEEL SHELL WITH URETHANE TOPCOAT, HEAVY DUTY BUTYL/EPDM DIAPHRAGM, AIR VALVE, 83 kPa FACTORY PRECHARGE, 32mmø FNPT SYSTEM CONNECTION, 165.0 LITER TANK VOLUME, 128.7 LITER ACCEPTANCE VOLUME
GF-1 GLYCOL FEEDER	AXIOM INDUSTRIES LTD. MODEL SF-100 PACKAGE HYDRONIC SYSTEM FEEDER SUPPLIED COMPLETE WITH 208 LITER GALLON STORAGE/MIXING TANK WITH LID, PUMP SUCTION HOSE WITH INLET STRAINER, PRESSURE PUMP WITH THERMAL CUTOUT, INTEGRAL PRESSURE SWITCH, INTEGRAL CHECK VALVE, CORD AND PLUG, PRE-CHARGED ACCUMULATOR TANK WITH EPDM DIAPHRAGM, MANUAL DIVERTER VALVE FOR AIR PURGING AND AGITATING, 35-380 KPA ADJUSTABLE PRESSURE REGULATOR WITH GAUGE, BUILT-IN CHECK VALVE, UNION CONNECTION, 12ø x 915 LONG FLEXIBLE CONNECTION HOSE WITH CHECK VALVE, LOW LEVEL PUMP CUT-OUT, MODEL RIA10-1-SAA ALARM PANEL WITH PUMP/ALARM RELAY, POWER ON AND ALARM INDICATING LIGHTS, ALARM BUZZER, TEST SWITCH, SILENCE/OFF SWITCH, FLOAT SWITCH, RECEPTACLE FOR SF-100, DRY CONTACTS FOR REMOTE MONITORING, 120/1/60 POWER.
ADS-1 AIR ELIMINATOR/DIRT SEPARATOR	SPIROTHERM MODEL VDT300FA SPIROVENT AIR ELIMINATOR/DIRT SEPARATOR SUPPLIED COMPLETE WITH STEEL SHELL, BRASS VENT HEAD, NON-FERROUS FLOAT, VITON SEAL AND O-RING, BRASS SKIM VALVE, COPPER COALESCING MEDIUM, 25mmø BRASS BALL TYPE DRAIN VALVE, AND 75mmø ASME FLANGED CONNECTIONS. PROVIDE NIPPLE AND CAP FOR DRAIN VALVE. MAXIMUM FLOW RATE: 8.83 L/S (240 GPM)
CHEMICAL POT FEEDER	AXIOM INDUSTRIES LTD. MODEL CBF-2 CHEMICAL BY-PASS FEEDER SUPPLIED COMPLETE WITH CARBON STEEL SHELL WITH GREEN EPOXY FINISH, TWO (2) 19mm NPT CARBON STEEL TEES, FOUR (4) 19mm CARBOND STEEL NIPPLES, TWO (2) BRASS BALL VALVES, 600 mL POLYETHYLENE GRADUATED FUNNEL WITH INTEGRAL 20 MESH STRAINER AND 19mm FNPT CONNECTIONS, WALL BRACKET CLAMPS, 7.6 LITER (2 GAL) CAPACITY.
FILTER	GENERAL FILTRATION MODEL GF010 FILTER CARTRIDGE HOUSING SUPPLIED COMPLETE WITH 304 STAINLESS STEEL BODY, CAST IRON HEAD, CARBON STEEL CENTER POST AND NUT, BUNA-N HEAD GASKET, PTFE CAP NUT GASKET, 19mm FNPT INLET/OUTLET CONNECTIONS, 6mm FNPT DRAIN CONNECTION. SUPPLY TWELVE (12) 20 MICRON FILTER CARTRIDGES TO SUIT HOUSING.
SIGHT FLOW INDICATOR	AXIOM INDUSTRIES LTD. MODEL ASFI-075 SIGHT FLOW INDICATOR SUPPLIED COMPLETE WITH BRASS BODY, EPDM O-RING, TEMPERED BOROSILICATE GLASS WINDOW, STAINLESS STEEL CAGE, TPX BALL, 19mm FNPT CONNECTIONS, COMPATIBLE WITH PROPYLENE AND ETHYLENE GLYCOL.
BUTTERFLY VALVE	VICTAULIC SERIES 300 OR 700 SUPPLIED COMPLETE WITH CAST IRON BODY, DUCTILE IRON DISC WITH ELECTROLESS NICKEL COATING, EPDM SEAT, 416 STAINLESS STEEL STEM, EPDM STEM SEAL, 316 STAINLESS STEEL BEARINGS WITH TFE LINING, LOCKING LEVER HANDLE, ROLLED GROOVED END CONNECTIONS.
STRAINER BOILERS	VICTAULIC SERIES 732 WYE TYPE STRAINER SUPPLIED COMPLETE WITH DUCTILE IRON BODY, COUPLING AND END CAP, TYPE 304 STAINLESS STEEL BASKET, MESH UNDERLAY WITH 63% FREE AREA, EPDM COUPLING GASKET, FACTORY INSTALLED BLOW DOWN DRAIN VALVE WITH CAP.
STRAINER DOMESTIC WATER SYSTEM	APOLLO 59LF SERIES LEAD FREE BRONZE WYE STRAINER SUPPLIED COMPLETE WITH CAST LEAD FREE BRONZE BODY AND CAP, 304 STAINLESS STEEL SCREEN, PTFE SEALS, AND NPT FEMALE THREADED CONNECTIONS. FOR SIZE REQUIREMENTS REFER TO DESIGN DRAWINGS.
CHECK VALVE PUMPS/BOILERS	VICTAULIC SERIES 716 SUPPLIED COMPLETE WITH DUCTILE IRON BODY, STAINLESS STEEL DISC, EPDM DISC SEAL AND COATING, 316 STAINLESS STEEL SHAFT, 416 STAINLESS STEEL SHAFT PLUG, 302/304 STAINLESS STEEL SPRING, ROLLED GROOVED END CONNECTIONS.

EQUIPMENT LIST -CONTINUED

CHECK VALVES DOMESTIC WATER SYSTEM	APOLLO 161T-LF SERIES LEAD FREE BRONZE SWING CHECK VALVE SUPPLIED COMPLETE WITH LEAD FREE BRONZE BODY, CAP AND HANGER, STAINLESS STEEL PIN, LEAD FREE BRASS SEAT, BRASS PLUG, AND NPT FEMALE THREADED CONNECTIONS. FOR SIZE REQUIREMENTS REFER TO DESIGN DRAWINGS.
THERMOMETER	WINTERS TIM-LF SERIES LEAD FREE INDUSTRIAL THERMOMETER SUPPLIED COMPLETE WITH 230mm VALOX IMPACT RESISTANT CASE, ORGANIC LIQUID FILLED TUBE, GLASS LENS, 90mm STEM, 19mm NPT CONNECTION, AND 19mm LEAD FREE BRASS SEPARABLE THERMOWELL. DUAL SCALE - RANGE TO SUIT SERVICE.
PRESSURE GAUGE	FNW MECHANICAL CONTRACTOR'S PRESSURE GAUGE SUPPLIED COMPLETE WITH 114mmø WHITE ALUMINUM DIAL, BLACK AND RED DUAL PRESSURE SCALES, 304 STAINLESS STEEL CASE AND RING, ACRYLIC LENS, 6mm BRASS MNPT CONNECTION, MINI-BALL TYPE ISOLATION VALVE, PHOSPHOR BRONZE BOURDON TUBE AND BRASS MOVEMENT. RANGE TO SUIT SERVICE. PROVIDE MINI-BALL VALVES FOR INSTALLATION.
ABV-X AUTOMATIC CIRC. BALANCE VALVE	GRISWOLD ISOLATOR 'R' MODEL IR_2S0__ AUTOMATIC FLOW CONTROL VALVE SUPPLIED COMPLETE WITH FORGED BRASS BODY, STAINLESS STEEL CARTRIDGE, STAINLESS STEEL BALL AND STEM PACKAGE, TEFLON BALL VALVE SEATS DUAL TEFLON AND EPDM STEM SEAL, FEMALE NPT CONNECTIONS. FOR VALVE SIZE AND FLOW REQUIREMENTS REFER TO AUTOMATIC CIRCUIT BALANCING VALVE SCHEDULE. VALVE PSID RANGE = 2-32
CBV-X 2-WAY CONTROL BALANCE VALVE 12ø SIZE	BELIMO MODEL Z2050QPT-D+CQKB24-SR-RL ZONETIGHT PRESSURE INDEPENDENT 2-WAY CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24VAC ELECTRONIC FAIL-SAFE ACTUATOR, 0-10VDC CONTROL INPUT, BRASS BODY, CHROME PLATED BRASS BALL AND STEM, 13ø NPT CONNECTIONS. FOR VALVE FLOW REQUIREMENTS, REFER TO CONTROL/BALANCING VALVE SCHEDULE.
CBV-X 2-WAY CONTROL BALANCE VALVE 19ø SIZE	BELIMO MODEL Z2075QPT-G+CQKB24-SR-RL ZONETIGHT PRESSURE INDEPENDENT 2-WAY CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24 VAC ELECTRONIC FAIL-SAFE ACTUATOR, 0-10 VDC CONTROL INPUT, BRASS BODY, CHROME PLATED BRASS BALL AND STEM, 19ø NPT CONNECTIONS. FOR VALVE FLOW REQUIREMENTS, REFER TO CONTROL/BALANCING VALVE SCHEDULE.
CBV-X 2-WAY CONTROL BALANCE VALVE 25ø AND UP	BELIMO MODEL P2___SU-___+AKRX24-EP2-MOD ELECTRONIC PRESSURE INDEPENDENT 2-WAY CHARACTERIZED CONTROL VALVE, NORMALLY CLOSED, FAIL OPEN, 24 VAC ELECTRONIC FAIL-SAFE ACTUATOR, MODBUS AND BACNET COMMUNICATION, FORGED BRASS NICKEL PLATED BODY AND SENSOR HOUSING, STAINLESS STEEL BALL AND STEM, TEFLON PTFE SEAT, TEFZEL CHARACTERIZING DISC, EPDM O-RING AND PACKING, NPT CONNECTIONS AND FOR NON-TOXIC ANTIFREEZE/WATER SOLUTION MEASUREMENT. FOR VALVE SIZE AND FLOW REQUIREMENTS, REFER TO CONTROL/CIRCUIT BALANCE VALVE SCHEDULE.
CUH-1 CABINET HEATER	ZEHNDER RITTLING MODEL RFRC-420 SIZE 10 FULLY RECESSED CEILING MOUNTED HYDRONIC CABINET UNIT HEATER SUPPLIED COMPLETE WITH 16ga. INSULATED INTERNAL CABINET, 16ga. INTERNALLY INSULATED IVORY EPOXY POWDER COATED REMOVABLE HINGED FRONT PANEL WITH TAMPER RESISTANT QUARTER TURN FASTENERS AND SAFETY CHAINS, LEFT SIDE VALVE/PIPING ACCESS AND CONNECTIONS, RIGHT SIDE ELECTRICAL ACCESS AND CONNECTION, INTERNAL MOUNTING FRAME FOR CEILING MOUNTING, FOUR (4) FORWARD CURVED CENTRIFUGAL DOUBLE WIDTH FAN WHEEL, 2 ROW HIGH CAPACITY HEATING COIL WITH 13mm O.D. SEAMLESS COPPER TUBE WITH MECHANICALLY BONDED ALUMINUM FINS, MANUAL AIR VENT, 25mm CLEANABLE ALUMINUM MESH FILTER, 24F3 CONTROL PACKAGE WITH 120/24V TRANSFORMER, 24V FAN RELAY AND 3 SPEED FAN SWITCH, TWO (2) PSC PERMANENTLY LUBRICATED TOTALLY ENCLOSED 3 SPEED 1/15hp MOTORS WITH INTEGRAL THERMAL OVERLOAD PROTECTION, 120/1/60 POWER.
CUH-2 CABINET HEATER	ZEHNDER RITTLING MODEL RW-280 SIZE 02 WALL MOUNTED HYDRONIC CABINET UNIT HEATER SUPPLIED COMPLETE WITH 16ga. INSULATED INTERNAL CABINET, 16ga. INTERNALLY INSULATED IVORY EPOXY POWDER COATED REMOVABLE FRONT PANEL WITH TAMPER RESISTANT QUARTER TURN FASTENERS, RIGHT SIDE VALVE/PIPING ACCESS AND CONNECTIONS, LEFT SIDE ELECTRICAL ACCESS AND CONNECTION, INTERNAL MOUNTING FRAME FOR WALL MOUNTING, ONE (1) FORWARD CURVED CENTRIFUGAL DOUBLE WIDTH FAN WHEEL, 2 ROW HIGH CAPACITY HEATING COIL WITH 13mm O.D. SEAMLESS COPPER TUBE WITH MECHANICALLY BONDED ALUMINUM FINS, MANUAL AIR VENT, 25mm CLEANABLE ALUMINUM MESH FILTER, 24F3 CONTROL PACKAGE WITH 120/24V TRANSFORMER, 24V FAN RELAY AND 3 SPEED FAN SWITCH, ONE (1) PSC PERMANENTLY LUBRICATED TOTALLY ENCLOSED 3 SPEED 1/40hp MOTOR WITH INTEGRAL THERMAL OVERLOAD PROTECTION, 120/1/60 POWER.
UH-1&2 UNIT HEATER	MODINE MODEL HC-86SB01FA HOT WATER UNIT HEATER SUPPLIED COMPLETE WITH HORIZONTAL DELIVERY, 20ga. CASING WITH BAKED POLYESTER POWDERCOAT GRAY/GREEN FINISH, THREADED HANGER CONNECTIONS IN CASING TOP, FINGERPROOF FAN GUARD/MOTOR MOUNTING BRACKET, 19mm FNPT CAST BRONZE SIDE CONNECTIONS, STANDARD SERPENTINE COIL DESIGN WITH 25mm O.D.x0.762mm THICK COPPER HORIZONTAL TUBES WITH MECHANICALLY BONDED VERTICAL FINS, REDUCED MOTOR SPEED, SOLID STATE MOTOR SPEED CONTROLLER, 1/8hp TOTALLY ENCLOSED MOTOR WITH THERMAL OVERLOAD, 1000 RPM, 115/1/60 POWER. CAPACITY: 6215 WATTS (21,225 BTUH) USING 0.095 L/S (1.5 GPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 26.7°C (80.0°F)
UH-3 UNIT HEATER	MODINE MODEL HC-33SB01FA HOT WATER UNIT HEATER SUPPLIED COMPLETE WITH HORIZONTAL DELIVERY, 20ga. CASING WITH BAKED POLYESTER POWDERCOAT GRAY/GREEN FINISH, THREADED HANGER CONNECTIONS IN CASING TOP, FINGERPROOF FAN GUARD/MOTOR MOUNTING BRACKET, 19mm FNPT CAST BRONZE SIDE CONNECTIONS, STANDARD SERPENTINE COIL DESIGN WITH 25mm O.D.x0.762mm THICK COPPER HORIZONTAL TUBES WITH MECHANICALLY BONDED VERTICAL FINS, REDUCED MOTOR SPEED, SOLID STATE MOTOR SPEED CONTROLLER, 1/25hp TOTALLY ENCLOSED MOTOR WITH THERMAL OVERLOAD, 1000 RPM, 115/1/60 POWER. CAPACITY: 2070 WATTS (7075 BTUH) USING 0.032 L/S (0.5 GPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 26.7°C (80.0°F)
RTU-1 ROOFTOP AIR HANDLING UNIT	DAIKIN REBEL MODEL DPS004A COMMERCIAL PACKAGED ROOFTOP UNIT, NOMINAL 4 TONS CAPACITY SUPPLIED COMPLETE WITH WEATHERPROOF GALVANIZED STEEL DOUBLE WALL FOAM INJECTED INSULATED PANEL CABINET WITH POLYESTER RESIN BEIGE COLOURED EXTERIOR FINISH, HINGED ACCESS DOORS, BOTTOM DISCHARGE, BOTTOM INLET, 0-100% ECONOMIZER WITH COMPARATIVE ENTHALPY CONTROL, OUTDOOR/RETURN AIR PARALLEL BLADE DAMPERS WITH FACTORY MOUNTED AND WIRED SPRING RETURN DAMPER ACTUATORS, BAROMETRIC EXHAUST AIR DAMPER, OUTDOOR AIR HOOD WITH MOISTURE ELIMINATOR FILTERS, DRAW THROUGH FILTER SECTION WITH MERV 8 50mm THICK PREFILTERS AND MERV 8 100mm THICK FINAL FILTERS, DRAW THROUGH MULTI-ROW INTERLACED DX COOLING COIL, STAINLESS STEEL DOUBLE SLOPED DRAIN PAN WITH 19mm MNPT CONNECTION, 4 ROWS OF SEAMLESS COPPER TUBING WITH MECHANICALLY EXPANDED ALUMINUM PLATE FINS, 16 FINS/IN, ELECTRONIC CONTROLLED EXPANSION VALVE, R-410A REFRIGERANT CHARGE, HOT WATER HEATING COIL WITH 2 ROWS OF COPPER TUBING WITH MECHANICALLY EXPANDED RIPPLED AND CORRUGATED ALUMINUM PLATE FINS, 8 FINS/IN, 32mmø (1 1/8"ø) SWEAT TYPE HOT WATER COIL CONNECTIONS, CAST ALUMINUM MICRO CHANNEL CONDENSING COIL WITH PLATE FINS, SUB-COOLING COIL, CONDENSING UNIT FAN WITH LOW NOISE BLADES AND ECM MOTOR, FACTORY MOUNTED AND WIRED CONDENSER FAN MOTOR SPEED CONTROLLER, 1 INVERTER SCROLL TYPE COMPRESSOR, SUCTION AND HEAD PRESSURE TRANSDUCERS, COMPRESSOR REFRIGERANT SUCTION AND DISCHARGE TEMPERATURE SENSORS, FACTORY WIRED WEATHERPROOF CONTROL PANEL, SINGLE POINT POWER TERMINAL BLOCK FOR MAIN POWER CONNECTION, LOW VOLTAGE TERMINAL BOARD, 115V CONTROL CIRCUIT TRANSFORMER, SYSTEM SWITCH, HIGH TEMPERATURE SENSORS, THIRD PARTY CONTROL TERMINAL STRIP, MICROTECH III CONTROLLER FOR INVERTER COMPRESSOR, 610mm HIGH PREFABRICATED INSULATED ROOF CURB WITH NAILING STRIP AND GASKET, FACTORY MOUNTED AND WIRED SUPPLY AND EXHAUST FAN SPEED CONTROLLERS, DIRECT DRIVE SWSI AIRFOIL SUPPLY AND EXHAUST FANS, 4.0hp ECM PREMIUM EFFICIENCY DIRECT DRIVE SUPPLY FAN AND EXHAUST FAN MOTORS, 208/3/60 POWER. AIR FLOW CAPACITY: 670 L/S @ 250 Pa ESP HEATING: 670 L/S FROM 16.7°C (62.0°F) TO 22.8°C (72.9°F) USING 0.196 L/S (3.1 GPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 36.9°C (98.4°F)
HRU-1 HEAT RECOVERY UNIT	TEMPEFF NORTH AMERICA MODEL RG 1500 DUAL CORE OUTDOOR ENERGY RECOVERY UNIT SUPPLIED COMPLETE WITH DOUBLE DECK (PARALLEL) CONFIGURATION, RIGHT HAND ACCESS, 50mm THICK FOAM INJECTED PANELS WITH 24ga G90 GALVANIZED STEEL EXTERIOR CASING AND INNER LINER, SUPPLY/EXHAUST AIR HOODS WITH GALVANIZED BIRD SCREENS, 18ga ROOF AND GUTTERS, 100mm 10ga. BASEFRAME, RIGHT HAND HINGED ACCESS DOORS WITH LOCKING LATCHES, FULL SIZE HANDLES AND BULB GASKET, REMOVABLE ALUMINUM DUAL CORE ENERGY CORES COMPRISED OF HIGH GRADE CORRUGATED ALUMINUM, ENERGY CORE STAINLESS STEEL DRAIN PANS WITH LEFT HAND 25mmø NPT CONNECTIONS, FAST ACTING ELECTRIC LOW LEAKAGE MULTI-DAMPER SWITCHOVER SECTION WITH ACTUATORS, GREASABLE PILLOW BLOCK BEARINGS AND EPDM BULB SEALS, SUPPLY AIR 50mm THICK MERV 10 FILTERS, DIRTY FILTER SWITCH, DIRECT DRIVE AIRFOIL PLENUM SUPPLY AND EXHAUST AIR FANS, FAN AND MOTOR ASSEMBLY VIBRATION ISOLATION, 1.5hp SUPPLY AIR FAN/1.0hp EXHAUST AIR FAN TEFC PREMIUM EFFICIENCY INVERTER DUTY MOTORS WITH FACTORY SUPPLIED AND WIRED VARIABLE FREQUENCY DRIVES, SINGLE POINT POWER CONNECTION, 610mm HIGH INSULATED ROOF CURB, 575/3/60 POWER. CAPACITY: 805 L/S SUPPLY AIR @ 250 Pa ESP 855 L/S EXHAUST AIR @ 250 Pa ESP DX COOLING COIL MODEL 3DX-05-22.0-09-23.2-9 DUAL CIRCUIT INTERTWINED DX COOLING COIL, R410A REFRIGERANT, 559x591mm (22"x23.25") NOMINAL FIN HEIGHT/LENGTH, DIST-1/DIST-2 (FEEDS) 5/4, GALVANIZED STEEL 16ga. CASING, 5 ROWS, RIFLED COPPER TUBES WITH 0.254mm (0.010") THICK CORRUGATED ALUMINUM FINS, 9 FINS/IN. SPACING, LEFT HAND COIL HANDING, TWO (2) 12.7mm (1/2") COPPER SWEAT TYPE LIQUID CONNECTIONS, TWO (2) 22.23mm (7/8") COPPER SWEAT TYPE SUCTION CONNECTIONS, 7.22°C (45.0°F) SUCTION TEMPERATURE, STAINLESS STEEL DRAIN PAN WITH LEFT HAND 38mmø (1 1/2"ø) CONDENSATE CONNECTION. CAPACITY: 22206 WATTS (75.77 MBH) TOTAL CAPACITY / 12508 (42.68 MBH) SENSIBLE CAPACITY COOLING 805 L/S FROM 25.3°C/19.7°C (77.5°F/67.4°F) Db/Wb TO 12.8°C/11.9 (55.0°F/53.4°F) Db/Wb HEATING COIL MODEL 3W-04-22.05-07-23.3-4 GLYCOL HEATING COIL, 559x591mm (22"x23.25") NOMINAL FIN HEIGHT/LENGTH, 0.18 CIRCUIT RATIO, GALVANIZED STEEL 16ga. CASING, 4 ROW, PLAIN COPPER TUBES WITH 0.2032mm (0.008") THICK CORRUGATED ALUMINUM FINS, 7 FINS/IN., LEFT HAND COIL HANDING, TYPE 'L' COPPER HEADERS, 13mmø (1/2"ø) MPT CONNECTIONS. CAPACITY: 11192 WATTS (38.19 MBH) TOTAL CAPACITY, HEATING 805 L/S FROM 12.8°C (55.0°F) TO 23.9°C (75.0°F) USING 0.170 L/S (2.70 USGPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 26.7°C (80.0°F)

EQUIPMENT LIST -CONTINUED

HRU-2 HEAT RECOVERY UNIT	TEMPEFF NORTH AMERICA MODEL RGSP 1800 TYPE 1 CONFIGURATION DUAL CORE INDOOR ENERGY RECOVERY UNIT SUPPLIED COMPLETE WITH RIGHT HAND ACCESS, EXTRUDED ALUMINUM CHANNEL POST CONSTRUCTION, 50mm THICK CABINET INJECTED POLYURETHANE FOAM PANELS WITH 24gsa. G90 GALVANIZED STEEL EXTERIOR CASING AND INNER LINER, HINGED FLUSH MOUNTED ACCESS DOORS WITH LOCKING LATCH, FULL SIZE HANDLES AND BULB GASKET, REMOVABLE ALUMINUM DUAL ENERGY CORES, STAINLESS STEEL ENERGY CORE DRAIN PANS WITH LEFT HAND 25mmø CONNECTIONS, FAST ACTING ELECTRIC LOW LEAKAGE MULTI-DAMPER SWITCHOVER SECTIONS WITH ACTUATORS, GREASABLE PILLOW BLOCK BEARINGS AND EPDM BULB SEALS, SIDE LOADING 50mm THICK MERV 10 FILTERS, DIRTY FILTER SWITCH, DIRECT DRIVE BACKWARD CURVED SUPPLY AND EXHAUST AIR PLENUM FANS WITH ECM MOTORS, SINGLE POINT POWER CONNECTION, 208/3/60 POWER. CAPACITY: 585 L/S FRESH AIR @ 190 Pa ESP / 535 L/S EXHAUST AIR @ 190 Pa ESP DX COOLING COIL MODEL 3DX-04-18.0-11-20.0-6 SINGLE CIRCUIT DX COOLING COIL, R410A REFRIGERANT, 457x508mm (18"x20") NOMINAL FIN HEIGHT/LENGTH, DIST-1 (FEEDS) 6, GALVANIZED STEEL 16ga. CASING, 4 ROWS, RIFLED COPPER TUBES WITH 0.2032mm (0.008") THICK CORRUGATED ALUMINUM FINS, 11 FINS/IN. SPACING, LEFT HAND COIL HANDING, ONE (1) 15.9mm (5/8") COPPER SWEAT TYPE LIQUID CONNECTION, ONE (1) 28.6mm (1 1/8") COPPER SWEAT TYPE SUCTION CONNECTION, 7.22°C (45.0°F) SUCTION TEMPERATURE, STAINLESS STEEL DRAIN PAN WITH LEFT HAND 38mmø (1 1/2"ø) CONNECTION. CAPACITY: 15677 WATTS (53.54 MBH) TOTAL CAPACITY / 8930 WATTS (30.50 MBH) SENSIBLE CAPACITY, COOLING 585 L/S FROM 25.4°C/19.7°C (77.7°F/67.4°F) Db/Wb TO 12.8°C/11.9 (55.0°F/53.4°F) Db/Wb HEATING COIL MODEL 5W-04-16.5-07-20.0-1 GLYCOL HEATING COIL, 419x508mm (16.5"x20") NOMINAL FIN HEIGHT/LENGTH, 0.09 CIRCUIT RATIO, GALVANIZED STEEL 16ga. CASING, 4 ROW, PLAIN COPPER TUBES WITH 0.2032mm (0.008") THICK CORRUGATED ALUMINUM FINS, 7 FINS/IN., LEFT HAND COIL HANDING, TYPE 'L' COPPER HEADERS, 13mmø (1/2"ø) MPT CONNECTIONS. CAPACITY: 9105 WATTS (31.09 MBH) TOTAL CAPACITY, HEATING 585 L/S FROM 11.1°C (52.0°F) TO 23.9°C (75.0°F) USING 0.139 L/S (2.20 USGPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 26.7°C (80.0°F)
HRU-3 HEAT RECOVERY UNIT	TEMPEFF NORTH AMERICA MODEL RG 9500 DUAL CORE OUTDOOR ENERGY RECOVERY UNIT SUPPLIED COMPLETE WITH DOUBLE DECK (PARALLEL) CONFIGURATION, RIGHT HAND ACCESS, 50mm THICK FOAM INJECTED PANELS WITH 24ga G90 GALVANIZED STEEL EXTERIOR CASING AND INNER LINER, SUPPLY/EXHAUST AIR HOODS WITH GALVANIZED BIRD SCREENS, 18ga ROOF AND GUTTERS, 150mm 10ga. BASEFRAME, RIGHT HAND HINGED ACCESS DOORS WITH LOCKING LATCHES, FULL SIZE HANDLES AND BULB GASKET, REMOVABLE ALUMINUM DUAL CORE ENERGY CORES COMPRISED OF HIGH GRADE CORRUGATED ALUMINUM, ENERGY CORE STAINLESS STEEL DRAIN PANS WITH LEFT HAND 25mmø NPT CONNECTIONS, FAST ACTING ELECTRIC LOW LEAKAGE MULTI-DAMPER SWITCHOVER SECTION WITH ACTUATORS, GREASABLE PILLOW BLOCK BEARINGS AND EPDM BULB SEALS, SUPPLY AIR 50mm THICK MERV 10 FILTERS, DIRTY FILTER SWITCH, FRESH AIR INSULATED BY-PASS DAMPER WITH MODULATING 24V BELIMO ACTUATOR, LOW SPEED CONTACT DIRECT DRIVE AIRFOIL PLENUM SUPPLY AND EXHAUST AIR FANS, FAN AND MOTOR ASSEMBLY VIBRATION ISOLATION, 10hp SUPPLY AIR FAN/7.5hp EXHAUST AIR FAN TEFC PREMIUM EFFICIENCY INVERTER DUTY MOTORS WITH FACTORY SUPPLIED AND WIRED VARIABLE FREQUENCY DRIVES, SINGLE POINT POWER CONNECTION, 610mm HIGH INSULATED ROOF CURB, 575/3/60 POWER. CAPACITY: 4800 L/S SUPPLY AIR @ 315 Pa ESP / 4800 L/S EXHAUST AIR @ 315 Pa ESP DX COOLING COIL MODEL 5DX-04-42.0-10-71.4-14 DUAL CIRCUIT INTERTWINED DX COOLING COIL, R410A REFRIGERANT, 1067x1813mm (42"x71.375") NOMINAL FIN HEIGHT/LENGTH, DIST-1/DIST-2 (FEEDS) 7/7, GALVANIZED STEEL 16ga. CASING, 4 ROWS, PLAIN COPPER TUBES WITH 0.2032mm (0.008") THICK CORRUGATED ALUMINUM FINS, 10 FINS/IN. SPACING, LEFT HAND COIL HANDING, TWO (2) 15.9mm (5/8") COPPER SWEAT TYPE LIQUID CONNECTIONS, TWO (2) 41.3mm (1 5/8") COPPER SWEAT TYPE SUCTION CONNECTIONS, 7.22°C (45.0°F) SUCTION TEMPERATURE, STAINLESS STEEL DRAIN PAN WITH LEFT HAND 38mmø (1 1/2"ø) CONDENSATE CONNECTION. CAPACITY: 130080 WATTS (443.86 MBH) TOTAL CAPACITY / 75,700 WATTS (258.30 MBH) SENSIBLE CAPACITY, COOLING 4800 L/S FROM 25.3°C/19.7°C (77.5°F/67.4°F) Db/Wb TO 12.5°C/11.9 (54.5°F/53.5°F) Db/Wb HEATING COIL MODEL 5W-03-42.0-11-71.4-8 GLYCOL HEATING COIL, 1067x1813mm (42"x71.375") NOMINAL FIN HEIGHT/LENGTH, 0.29 CIRCUIT RATIO, GALVANIZED STEEL 16ga. CASING, 3 ROW, PLAIN COPPER TUBES WITH 0.2032mm (0.008") THICK CORRUGATED ALUMINUM FINS, 11 FINS/IN., LEFT HAND COIL HANDING, TYPE 'L' COPPER HEADERS, 50mmø (2"ø) MPT CONNECTIONS. CAPACITY: 112525 WATTS (383.95 MBH) TOTAL CAPACITY, HEATING 4800 L/S FROM 10.0°C (50.0°F) TO 29.0°C (84.21°F) USING 2.25 L/S (35.61 USGPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 30.6°C (87.1°F)
HRU-4 HEAT RECOVERY UNIT	TEMPEFF NORTH AMERICA MODEL RG 4000 DUAL CORE OUTDOOR ENERGY RECOVERY UNIT SUPPLIED COMPLETE WITH DOUBLE DECK (PARALLEL) CONFIGURATION, LEFT HAND ACCESS, 50mm THICK FOAM INJECTED PANELS WITH 24ga G90 GALVANIZED STEEL EXTERIOR CASING AND INNER LINER, SUPPLY/EXHAUST AIR HOODS WITH GALVANIZED BIRD SCREENS, 18ga ROOF AND GUTTERS, 100mm 10ga. BASEFRAME, LEFT HAND HINGED ACCESS DOORS WITH LOCKING LATCHES, FULL SIZE HANDLES AND BULB GASKET, REMOVABLE ALUMINUM DUAL CORE ENERGY CORES COMPRISED OF HIGH GRADE CORRUGATED ALUMINUM, ENERGY CORE STAINLESS STEEL DRAIN PANS WITH INTERNAL BOTTOM 25mmø NPT CONNECTIONS, FAST ACTING ELECTRIC LOW LEAKAGE MULTI-DAMPER SWITCHOVER SECTION WITH ACTUATORS, GREASABLE PILLOW BLOCK BEARINGS AND EPDM BULB SEALS, SUPPLY AIR 50mm THICK MERV 10 FILTERS, DIRTY FILTER SWITCH, DIRECT DRIVE AIRFOIL PLENUM SUPPLY AND EXHAUST AIR FANS, FAN AND MOTOR ASSEMBLY VIBRATION ISOLATION, 5hp SUPPLY AIR FAN/3hp EXHAUST AIR FAN TEFC PREMIUM EFFICIENCY INVERTER DUTY MOTORS WITH FACTORY SUPPLIED AND WIRED VARIABLE FREQUENCY DRIVES, SINGLE POINT POWER CONNECTION, 610mm HIGH INSULATED ROOF CURB, 575/3/60 POWER. CAPACITY: 2000 L/S SUPPLY AIR @ 190 Pa ESP / 2000 L/S EXHAUST AIR @ 190 Pa ESP HEATING COIL MODEL 5W-03-21.0-11-43.0-5 GLYCOL HEATING COIL, 533x1092mm (21"x43") NOMINAL FIN HEIGHT/LENGTH, 0.36 CIRCUIT RATIO, GALVANIZED STEEL 16ga. CASING, 3 ROW, PLAIN COPPER TUBES WITH TURBULATORS AND 0.254mm (0.010") THICK CORRUGATED ALUMINUM FINS, 11 FINS/IN., RIGHT HAND COIL HANDING, TYPE 'L' COPPER HEADERS, 32mmø (1 1/4"ø) MPT CONNECTIONS. CAPACITY: 61,473 WATTS (209.94 MBH) TOTAL CAPACITY, HEATING 2000 L/S FROM -3.9°C (25.0°F) TO 21.1°C (70.0°F) USING 0.938 L/S (14.86 USGPM) OF 35/65 PROPYLENE GLYCOL/WATER SOLUTION ENTERING AT 43.3°C (110.0°F), LEAVING AT 26.7°C (80.0°F)
AC-1 SPLIT A/C SYSTEM	A/C UNIT MITSUBISHI ELECTRIC P-SERIES MODEL PLA-A12EA7 4-WAY CEILING CASSETTE AIR CONDITIONING UNIT SUPPLIED WITH R410A REFRIGERANT, BUILT-IN CONDENSATE LIFT MECHANISM, FILTER INDICATOR SIGNAL, WASHABLE FILTER, ADJUSTABLE AIR FLOW SETTINGS, SIMPLE WIRED CONTROLLER, MODEL PAC-UKPRC001-CN-1 BACNET AND MODBUS INTERFACE, 6.35mmø LIQUID/12.7mmø GAS CONNECTIONS, 32mmø DRAIN CONNECTION, 208-230V/1/60 POWER. CAPACITY: 12,000 BTUH CONDENSING UNIT MITSUBISHI ELECTRIC P-SERIES MODEL PUY-A12NKA7 OUTDOOR CONDENSING UNIT COMPLETE SUPPLIED WITH VARIABLE SPEED INVERTER DRIVEN COMPRESSOR, HIGH PRESSURE PROTECTION, R410A REFRIGERANT, 6mmø LIQUID/13mmø GAS CONNECTIONS, 208-230/1/60 POWER.
VES-1&2 VEHICLE EXHAUST EXTRACTION SYSTEM	PLYMOVENT HOSE REEL ON RAIL VEHICLE EXHAUST EXTRACTION SYSTEM CONSISTING OF THE FOLLOWING COMPONENTS: 17.7 METER (58'-0") LONG VSR PROFILE EXTRUDED ALUMINUM EXTRACTION RAIL SUPPLIED COMPLETE TYPE AA-6063 AIRCRAFT ALUMINUM ALLOY CONSTRUCTION, EXTRACTION RAIL SPLICES, LOW FRICTION RUBBER SEAL, END SOCKETS, 150mmø (6"ø) COLLARS FOR TOP OF RAIL EXHAUST DUCTWORK CONNECTIONS, CRAB STOPPERS AND ALL NECESSARY RUBBER SEAL MOUNTING TOOLS. NOTE: MOUNT AND SUPPORT EXTRACTION RAIL FROM BUILDING STRUCTURE AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. TWO (2) MODEL HRR-850 HOSE REEL ON RAIL SYSTEM SUPPLIED COMPLETE WITH EXTRACTION RAIL CRAB/TROLLEY SYSTEM, PRODUCT NUMBER SER-850-DUAL SPRING HOSE REEL WITH ZINC PLATED DRUM, ZINC COATED AND POWDER COATED STEEL FRAME AND A-FRAME CONSTRUCTED OF PRIMED AND POWDER COATED STEEL, 150mmø x 10.0 METER LONG (6"ø x 32.8') MODEL HT-750 HIGH TEMPERATURE EXHAUST HOSE WITH TWO-PLY CONSTRUCTION UTILIZING HEAT RESISTANT IMPREGNATED GLASS FABRIC MECHANICALLY JOINED TOGETHER WITH AN EXTERNAL STEEL HELIX AND INNER LAYER WITH STAINLESS STEEL WIRE MESH, DESIGNED FOR EXHAUST GAS TEMPERATURES OF 400°C (750°F) CONTINUOUS/450°C (840°F) SPIKE, HOSE CLAMPS FOR HOSE CONNECTION TO REEL AND NOZZLE, MODEL MAS-150 HOSE MOUNTING KIT, AND MODEL MSR-24/2 HOSE REEL TRIGGERED AUTOMATIC FAN START/STOP. TWO (2) STACKER TAILPIPE ADAPTERS FOR 150mmø (6"ø) EXHAUST HOSE, SUPPLIED COMPLETE WITH HEAVY DUTY GALVANIZED STEEL CONSTRUCTION, PIVOTING TELESCOPIC POLE RECEIVER WITH FRICTION JOINT AND LOCKING KNOB, INTERNAL FINGERS TO OPEN FLAPPER/STACK CAPS AND CENTER STACKER OVER EXHAUST PIPE, RUBBER PROTECTION GASKET ON INLET, OPTIONAL FIBERGLASS TELESCOPIC POLE HANDLE WITH MALE PRONG. NOTE: EACH VEHICLE EXHAUST EXTRACTION SYSTEM (VES) HAS TWO (2) HOSE REELS PER EXTRACTION RAIL. PROVIDE ALL NECESSARY EQUIPMENT, COMPONENTS, NOZZLES, ETC. AS REQUIRED TO PROVIDE A COMPLETE AND WORKING SYSTEM AS PER THE INTENT OF THE DESIGN DRAWINGS. MODEL ES-90 FAN STARTER SUPPLIED COMPLETE WITH NEMA 12 ENCLOSURE WITH KEY LOCK, MULTI-VOLTAGE TRANSFORMER, MOTOR STARTER CONTACTOR WITH 24V MAGNETIC COIL, ADJUSTABLE MOTOR OVERLOAD WITH RESET, FUSES FOR PRIMARY AND SECONDARY ELECTRICAL CIRCUITS, SOFT TOUCH CONTROL, AUTO START/STOP/MANUAL RUN MODES AND SYSTEM INDICATOR LED's. NOTE: CONTACTOR AND OVERLOAD TO MATCH HORSEPOWER, VOLTAGE AND PHASING OF EXHAUST FAN MOTOR. MODEL TEV-585-60 DIRECT DRIVE HIGH PRESSURE SINGLE WIDTH UPBLAST CENTRIFUGAL EXHAUST FAN SUPPLIED COMPLETE WITH INTERNAL/EXTERNAL POWDER COATED MILD STEEL FIELD CONFIGURABLE FAN HOUSING, CLASS B SPARK RESISTANT RATING, BACKWARD INCLINED ALUMINUM WHEEL, DYNAMICALLY AND STATICALLY BALANCED NON-OVERLOADING IMPELLER, POWDER COATED STEEL FAN MOTOR MOUNTING BASE, VIBRATION ISOLATION, MODEL TOL-315 OUTLET TRANSITION, INLET/OUTLET SOFT CONNECTIONS, 7.5hp TEFC NEMA PREMIUM EFFICIENCY INVERTER DUTY MOTOR, 575/3/60 POWER. CAPACITY: 660 L/S @ 1850 Pa NOTE: MOUNT UNDERSIDE OF HOSE REEL AT HEIGHT NOTED ON DESIGN DRAWINGS. FIELD VERIFY FACTORY SUPPLIED SUPPORT BRACKET EXTRUDED ALUMINUM SQUARE TUBE LENGTH REQUIREMENTS AND SUPPORT BRACING REQUIREMENTS PRIOR TO ORDERING. CONTRACTOR SHALL PROVIDE ALL NECESSARY FIELD FABRICATED SUPPORTS AND/BRACKETS AS REQUIRED TO FIELD MOUNT AND BRACE FACTORY SUPPLIED VEHICLE EXHAUST EXTRACTION SYSTEM MOUNTING BRACKETS AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

EQUIPMENT LIST -CONTINUED

EF-1 BOILER Rm.201A EXHAUST FAN	GREENHECK MODEL CUE-90-VG DIRECT DRIVE UPBLAST CENTRIFUGAL ROOF EXHAUST FAN SUPPLIED COMPLETE WITH ALUMINUM MOTOR COVER WITH STAINLESS STEEL FASTENERS, ONE PIECE HEAVY GAUGE ALUMINUM WINDBAND, ALUMINUM CURB CAP WITH SPUN VENTURI, ALUMINUM BACKWARD INCLINED WHEEL, FAN VIBRATION ISOLATION, MOTOR COOLING TUBE, DRAIN TROUGH, MODEL GPF 610mm HIGH PREFABRICATED INSULATED ROOF CURB, INTERNAL CONDUIT CHASE, NEMA-1 FACTORY MOUNTED AND WIRED DISCONNECT SWITCH, 0-10VDC CONTROL WIRE INPUTS, 1725 RPM 1/10hp VARI-GREEN EC MOTOR, 115/1/60 POWER. CAPACITY: 235 L/S @ 65 Pa
CU-1 CONDENSING UNIT	DAIKEN MODEL DX16SA0601 OUTDOOR 5 TONS NOMINAL CAPACITY CONDENSING UNIT SUPPLIED COMPLETE WITH HEAVY GAUGE GALVANIZED STEEL CABINET WITH GRILLE STYLE SOUND CONTROL TOP DESIGN, CUSTOM NICKEL GRAY POWDER PAINT FINISH, WIRE FAN DISCHARGE GRILLE, STEEL LOUVRE COIL GUARD, RUST RESISTANT COATED SCREWS, SINGLE STAGE HIGH EFFICIENCY SCROLL COMPRESSOR, HIGH DENSITY FOAM COMPRESSOR SOUND BLANKET, ADVANCED COPELAND CORESENSE TECHNOLOGY, FACTORY INSTALLED FILTER DRIER, COPPER TUBE/ENHANCED ALUMINUM FIN COIL, SWEAT CONNECTION SERVICE VALVES WITH EASY ACCESS GAUGE PORTS, R-410A REFRIGERANT, 16 SEER EFFICIENCY, 208-230/1/60 POWER.
DF-1,2,3&4 DESTRATIFICATION FANS	BIG ASS FANS POWERFOIL D DESTRATIFICATION FAN 2440mm (8'-0") DIAMETER SUPPLIED COMPLETE WITH SIX EXTRUDED ALUMINUM AIRFOILS WITH MILL FINISH, BAF YELLOW COLOURED POLYPROPYLENE BLEND POWERFOIL WINGLETS, BUILT-IN ACCELEROMETER, DOUBLE SAFETY CABLE SYSTEM, AIRFOIL RETAINERS, HUB SAFETY CLIPS, GRADE 8 HARDWARE, GUY WIRES, AIRFOIL RESTRAINT SYSTEM, MOUNTING POST, PERMANENT MAGNET MOTOR, PRE-WIRED VFD, MOTOR AND VFD IP66 RATED ENCLOSURE FOR PROTECTION AGAINST DUST, WATER AND VAPOUR, BACNET BUILDING AUTOMATIC INTEGRATION WITH 0-10 VDC CONTROL, FIRE CONTROL PANEL INTEGRATION, I-BEAM MOUNTING, 200-277/3/60 POWER, COLOUR TO BE SILVER. NOTE: MOUNT UNDERSIDE OF FAN 4875mm (16'-0") ABOVE FINISHED FLOOR. FIELD VERIFY EXTENSION TUBE LENGTH REQUIRED TO SUIT, MOUNTING BRACKET TYPE AND GUY WIRES (IF REQUIRED). CONFIRM WITH MANUFACTURER PRIOR TO ORDERING.
DF-5 DESTRATIFICATION FAN	BIG ASS FANS POWERFOIL D DESTRATIFICATION FAN 3050mm (10'-0") DIAMETER SUPPLIED COMPLETE WITH SIX EXTRUDED ALUMINUM AIRFOILS WITH MILL FINISH, BAF YELLOW COLOURED POLYPROPYLENE BLEND POWERFOIL WINGLETS, BUILT-IN ACCELEROMETER, DOUBLE SAFETY CABLE SYSTEM, AIRFOIL RETAINERS, HUB SAFETY CLIPS, GRADE 8 HARDWARE, GUY WIRES, AIRFOIL RESTRAINT SYSTEM, MOUNTING POST, PERMANENT MAGNET MOTOR, PRE-WIRED VFD, MOTOR AND VFD IP66 RATED ENCLOSURE FOR PROTECTION AGAINST DUST, WATER AND VAPOUR, BACNET BUILDING AUTOMATIC INTEGRATION WITH 0-10 VDC CONTROL, FIRE CONTROL PANEL INTEGRATION, BAR JOIST MOUNTING, 200-277/3/60 POWER, COLOUR TO BE SILVER. NOTE: MOUNT UNDERSIDE OF FAN 4400mm ABOVE FINISHED FLOOR. FIELD VERIFY EXTENSION TUBE LENGTH REQUIRED TO SUIT, MOUNTING BRACKET TYPE AND GUY WIRES (IF REQUIRED). CONFIRM WITH MANUFACTURER PRIOR TO ORDERING.
TU-X.X TERMINAL UNIT	E.H. PRICE MODEL SDV-5000 SINGLE DUCT PRESSURE INDEPENDENT TERMINAL UNIT SUPPLIED COMPLETE WITH 12mm THICK 1.5lb DENSITY INTERNAL INSULATION, CONTROL SHROUD AND MULTI-POINT FLOW SENSOR WITH GAUGE TAPS. REFER TO TERMINAL UNIT/AIR CONTROL VALVE SCHEDULE FOR SIZE REQUIREMENTS.
ACV-X.X AIR CONTROL VALVE	E.H. PRICE MODEL RDV-5000 PRESSURE INDEPENDENT RETROFIT TERMINAL UNIT SUPPLIED COMPLETE WITH 22 GAUGE ZINC COATED STEEL CONSTRUCTION, CONTROL SHROUD AND MULTI-POINT FLOW SENSOR WITH GAUGE TAPS. REFER TO TERMINAL UNIT/AIR CONTROL VALVE SCHEDULE FOR SIZE REQUIREMENTS.
L-1 LOUVRE	PRICE MODEL DE635 FIXED BLADE LOUVRE SUPPLIED COMPLETE WITH 150mm DEEP EXTRUDED ALUMINUM FRAME, CONTINUOUS EXTRUDED ALUMINUM 35° DRAINABLE BLADES, CONCEALED MULLIONS, GALVANIZED STEEL BIRDSCREEN, 'A' INTERIOR FRAME MOUNTING STYLE. CONSULT ARCHITECT FOR COLOUR AND FINISH REQUIREMENTS. L-1 455 x 455 -MECHANICAL ROOM FA INTAKE
MD-X MOTORIZED DAMPER	TAMCO SERIES 9000BF THERMALLY INSULATED MOTORIZED DAMPER SUPPLIED WITH EXTRUDED ALUMINUM THERMALLY BROKEN FRAME, EXTRUDED ALUMINUM OPPOSED ACTION BLADES, SILICONE BLADE AND JAMB SEALS, INSTALLED IN DUCT TYPE MOUNTING ARRANGEMENT WITH DIRECT COUPLED SPRING RETURN DAMPER ACTUATOR, 24V POWER. PROVIDE JACK-SHAFTS WHERE REQUIRED. DAMPER ACTUATOR BY CONTROLS CONTRACTOR. MD-1 455 x 455 -MECHANICAL ROOM FA INTAKE MD-2 255 x 255 -MECHANICAL ROOM EXHAUST AIR
CAR-1 CONSTANT AIR FLOW REG.	ALDES MODEL CAR3-L10-R10 CONSTANT AIRFLOW LOW PRESSURE REGULATOR CONSTRUCTED WITH AMORPHOUS THERMOPLASTIC RESIN ENHANCED WITH ANTIMICROBIAL, ANTI-STATIC AND FLAME RETARDANT ADDITIVES, SUPPLIED COMPLETE WITH AIRFLOW RANGE OF TEN (10), DUAL SIDE AIR FLOW ADJUSTMENT DIAL, AIR FLOW VOLUME INDICATOR, MODULATING ROTARY DAMPER, DOUBLE LIP GASKET, 255mmø DUCT SIZE. PROVIDE DUCT ACCESS DOOR FOR REGULATOR AIRFLOW ADJUSTMENT PURPOSES. SET TO 160 L/S.
FD1 1.5hr RATED FIRE DAMPER	NCA MODEL FDD TYPE A DYNAMIC CLOSURE FIRE DAMPER SUPPLIED COMPLETE WITH ROLL FORMED GALVANIZED STEEL FRAME WITH SAFETY EDGE, ROLL FORMED GALVANIZED STEEL CURTAIN TYPE BLADES, 73.9°C (165°F) FUSIBLE LINK, STAINLESS STEEL SPRING AND ACCESS DOOR (WHERE REQUIRED). REFER TO DESIGN DRAWINGS FOR SIZE REQUIREMENTS.
FD2 3hr RATED FIRE DAMPER	NCA MODEL FDD TYPE A DYNAMIC CLOSURE FIRE DAMPER SUPPLIED COMPLETE WITH ROLL FORMED GALVANIZED STEEL FRAME WITH SAFETY EDGE, ROLL FORMED GALVANIZED STEEL CURTAIN TYPE BLADES, 100°C (212°F) FUSIBLE LINK, STAINLESS STEEL SPRING AND ACCESS DOOR (WHERE REQUIRED). REFER TO DESIGN DRAWINGS FOR SIZE REQUIREMENTS.
BD BALANCING DAMPER	BLADE DAMPER SUPPLIED COMPLETE WITH LOCKING QUADRANT (ECCO KS-145 OR EQUAL)
BD-1 BALANCING DAMPER	TAMCO SERIES 1500 ENHANCED AIR-FOIL CONTROL DAMPER SUPPLIED C/W EXTRUDED ALUMINUM DAMPER FRAME AND BLADES, OPPOSED ACTION BLADES, EXTRUDED SILICONE BLADE AND JAMB SEALS, FLANGED TO DUCT TYPE MOUNTING ARRANGEMENT AND LOCKING QUADRANT TO SUIT DAMPER SHAFT SIZE.
BDD BACKDRAFT DAMPER	GREENHECK MODEL WDR-53 ROUND BACKDRAFT DAMPER SUPPLIED COMPLETE WITH 20ga. GALVANIZED STEEL FRAME, 0.5mm THICK SPRING LOADED ALUMINUM BLADES, CLOSED CELL NEOPRENE/EPDM/SBR BLEND BLADE SEALS, VERTICAL AIRFLOW DIRECTION. REFER TO DESIGN DRAWINGS FOR SIZE REQUIREMENTS.
BG BLAST GATE DAMPER	FULL COLLAR BLAST GATE DAMPER SUPPLIED COMPLETE WITH TWO PIECE CAST ALUMINUM BODY WITH DUCT COLLAR, SLIDING 20ga. GALVANIZED STEEL CUT-OFF BLADE AND THUMB TYPE SET SCREW.
REFRIGERANT PIPING SUPPORTS	CLEARLINE TECHNOLOGIES C-PORT C10 SERIES UV RESISTANT SUPPORT SYSTEM SUPPLIED COMPLETE WITH 100% RECYCLED RUBBER CONSTRUCTION AND GALVANIZED STEEL FASTENING STRUT.
(T)	DDC WALL MOUNTED THERMOSTAT/CO_2 SENSOR COMPLETE WITH LCD DISPLAY, SETPOINT ADJUSTER AND OCCUPIED OVERRIDE BUTTON
(TS)	DDC WALL MOUNTED TEMPERATURE SENSOR
(CO)	QEL MODEL CTS-M5-160X-Q0R (CARBON MONOXIDE) TRANSMITTER/SENSOR SUPPLIED COMPLETE WITH NEMA 1 ENCLOSURE, 2 RELAYS SPDT AND BUZZER.
(CO)(NO^2)	QEL MODEL CTS-M5-160X-Q0R (CARBON MONOXIDE) AND MODEL CTS-M5-150-Q0R (NITROGEN DIOXIDE) TRANSMITTER/SENSORS EACH SUPPLIED COMPLETE WITH NEMA 1 ENCLOSURES, 2 RELAYS SPDT AND BUZZER.
AC-1 AIR COMPRESSOR	KAESER MODEL AS 20T PACKAGED FULLY AUTOMATIC BELT DRIVEN ROTARY SCREW AIR COMPRESSOR SUPPLIED COMPLETE WITH POWDER COATED PANELS, INTEGRATED REFRIGERANT DRYER, SUPER SOUNDPROOFING, VIBRATION DAMPENING, SINGLE STAGE WITH COOLING FLUID INJECTION, DUAL FLOW FAN AND SEPARATE AIR FLOW CHANNELS, DRY AIR FILTER, PNEUMATIC INLET AN VENTING VALVES, COOLING FLUID RESERVOIR WITH THREE STAGE SEPARATOR SYSTEM, SAFETY RELIEF VALVE, MINIMUM PRESSURE/CHECK VALVE, THERMOSTATIC VALVE AND MICRO-FILTER IN COOLANT CIRCUIT, FLUID/COMPRESSED AIR COMBINATION COOLER, TEFC PREMIUM EFFICIENCY 20hp MOTOR, OVERLOAD RELAYS, 32mmø NPT AIR OUTLET AND 575/3/60 POWER CAPACITY: 77 CFM @ 160 PSIG
AR-1 AIR RECEIVER	STEEL FAB 908.5 LITERS (240 GAL) VERTICAL AIR RECEIVER PART NO. A10053 M.A.W.P.: 200 PSIG @ 400°F
FS-1 FILTER	KAESER MODEL KFS-100 FILTERED SEPARATOR, INTERNAL AUTOMATIC DRAIN, DELTA P GAUGE, LIQUID LEVEL INDICATOR, 25mmø NPTF AIR INLET AND OUTLET. CAPACITY: 100 CFM @ 100 PSIG / M.A.W.P.: 250 PSIG
DT-1 DRAIN TRAP	KAESER MODEL ECO-DRAIN 32 ON DEMAND CONDENSATE DRAIN TRAP SUPPLIED COMPLETE WITH 13mmø NPTF INLET AND 13mmø BARBED OUTLET AND 115/1/60 POWER CAPACITY: 100 SCFM / M.A.W.P.: 230 PSIG
DT-2 DRAIN TRAP	MASTER PNEUMATIC HYDRO-JECTOR # BE100-2 AUTOMATIC DRAIN TRAP SUPPLIED COMPLETE WITH 6mmø NPT CONNECTION AND METAL BOWL. M.A.W.P.: 200 PSIG
SRV-1 SAFETY RELIEF VALVE	KUNKLE MODEL 6010DCM01-KM0160 SAFETY RELIEF VALVE SUPPLIED COMPLETE WITH BRONZE CAST BODY, O-RING SEATS, DUAL CONTROL RINGS, GROOVED PISTON TYPE DISC, HEAVY DUTY LIFT LEVER, 13mmø MNPT BOTTOM INLET, 19mmø FNPT SIDE OUTLET CAPACITY: 371 CFM @ 160 PSIG
FLEX CONNECTOR	HOSE MASTER 'ANNUFLEX' SINGLE BRAIDED 316L STAINLESS STEEL THREADED FLEX HOSE ASSEMBLY. ONE (1) - 32mmø FLEX HOSE x 305mm LONG, M.A.W.P.: 645 PSIG
ANTI-WHIP VALVE	TOP RING MODEL # 58.962 ANTI HOSE WHIP VALVE M.A.W.P.: 250 PSIG
FRL -FILTER, REGULATOR, LUBRICATOR	MASTER-PNEUMATIC 13mm SERIES 380 FRL, MODEL ABM1A5B1B14 SUPPLIED COMPLETE WITH METAL BOWLS AND PRESSURE GAUGE. M.A.W.P.: 200 PSIG

	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
EQUIPMENT LIST

Drawn By: ER
Checked By: DS
Scale: N/A
Project No: 22-098
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M701

EQUIPMENT LIST -CONTINUED

HR–1 HOSE REEL (4 REQ'D)	REELCRAFT MODEL 7850 OLP PREMIUM DUTY SPRING RETRACTABLE HOSE REEL SUPPLIED COMPLETE WITH FORMED HIGH GRADE STEEL REEL BASE AND GUIDE ARM POWDER COAT FINISH, FULL FLOW STRESS FREE SWIVEL DESIGN, ADJUSTABLE GUIDE ARM, SWIVEL ASSEMBLY, WALL MOUNTED UNIVERSAL SWING BRACKET, 13mm NPT(F) REEL OUTLET, 13mmø I.D. x 15.24 METER LONG HOSE WITH 13mmø NPT(F) INLET AND 9.5mmø NPT(M) OUTLET, 65.5°C HOSE TEMPERATURE RATING, ADJUSTABLE BUMPER STOP, 340° PIVOT BASE, 13mmø x 610mm LONG INLET HOSE AND M.A.W.P.: 2070 kPa (300 PSI).
AD–1 ACCESS DOOR	ACUDOR MODEL UF–5000 UNIVERSAL FLUSH MOUNT ACCESS DOOR SUPPLIED COMPLETE WITH FLUSH TO FRAME STEEL DOOR WITH ROUNDED SAFETY CORNERS, STEEL ONE PIECE TRIM FLANGE, CONTINUOUS CONCEALED HINGE, STAINLESS STEEL SLOTTED SCREWDRIVER CAM LATCH, WHITE ALKYD BAKED ENAMEL PRIME COAT. SIZE 405mm X 405 mm AND UNDER –16 GAUGE DOOR, 18 GAUGE MOUNTING FRAME. ABOVE 405mm X 405mm –14 GAUGE DOOR, 16 GAUGE MOUNTING FRAME. PRIME AND PAINT TO MATCH NEW GYPSUM BOARD CEILING.

COMMISSIONING

1. COMMISSION SYSTEM OPERATION TO ENSURE THE PROPER OPERATION OF ALL COMPONENTS. BALANCE AIR FLOWS TO THE QUANTITIES SHOWN ON DRAWINGS. BALANCING CONTRACTOR SHALL ASSIST THE CONTROLS CONTRACTOR IN THE SETUP AND CALIBRATION OF THE AIR TERMINAL UNITS AND AIR CONTROL VALVES.
2. COMMISSION SYSTEM OPERATION TO VERIFY THE PROPER OPERATION OF ALL NEW EQUIPMENT. COMMISSIONING WORK TO BE PREFORMED IN CONJUNCTION WITH THE DESIGN CONSULTANT TO VERIFY THE PROPER FUNCTIONING OF THE MECHANICAL SYSTEMS IN ACCORDANCE WITH THE SEQUENCE OF OPERATIONS.
3. PROVIDE END USER TRAINING SESSION INCLUDING SYSTEM DEMONSTRATION, MAINTENANCE REQUIREMENTS AND CONTROL SYSTEM REVIEW.
4. DURING CONSTRUCTION KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT WHICH IS INSTALLED. PROVIDE AS–BUILT DRAWINGS TO REFLECT THE ACTUAL INSTALLED CONFIGURATION AND SUBMIT TO THE DESIGN ENGINEER.
5. PROVIDE OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. O&M MANUALS SHALL BE SUBMITTED IN TWO FORMATS; ONE (1) BOUND HARD COPY AND ONE (1) ELECTRONIC FORMAT ON CD. ELECTRONIC FORMAT SHALL BE COLLATED COMPLETE WITH INDEX AND SECTION DIVIDERS IN THE SAME MANNER AS BOUND HARD COPY. SUBMIT O&M MANUALS TO THE DESIGN ENGINEER.

BUILDING CONTROLS

PROVIDE NEW WEB ENABLED DDC SYSTEM COMPLETE WITH SUPERVISORY CONTROLLER, SUB CONTROLLERS, FIELD DEVICES, COLOUR GRAPHICAL OPERATING SOFTWARE AND UPS. PROVIDE INTEGRAL DISPLAY WITH PUSHBUTTON INTERFACE FOR ALL DDC FIELD CONTROLLERS TO AIDE WITH TROUBLE SHOOTING OF EQUIPMENT. PROGRAM THE DDC SYSTEM GRAPHICAL OPERATING SOFTWARE TO INCORPORATE ALL HVAC AND BUILDING SYSTEMS EQUIPMENT. DDC GRAPHICS SHALL INCLUDE FLOOR PLANS OF THE BUILDING INDICATING ZONE TEMPERATURES AND HVAC SYSTEM EQUIPMENT. GRAPHICAL SYMBOLS SHALL LINK THE OPERATOR TO THE GRAPHICAL DATA DISPLAY FOR THE SPECIFIC COMPONENT. PROGRAM SOFTWARE TO PERMIT MONITORING AND EDITING OF ALL SYSTEM VARIABLES, SCHEDULING AND ALARMS IN REAL TIME VALUES. ALL EQUIPMENT ON/OFF FUNCTIONS AND SETPOINTS SHALL BE ADJUSTABLE VIA THE GRAPHICAL OPERATING SOFTWARE DISPLAY FOR THE SPECIFIC COMPONENT. LABEL ALL NEW CONTROL SYSTEM COMPONENTS.

SEQUENCES OF OPERATION

BOILERS B-1, B-2 & B-3 AND MAIN CIRCULATING PUMPS P1a & P1b

WHEN THE OUTDOOR AIR TEMPERATURE DROPS BELOW THE WARM WEATHER SHUTDOWN SETPOINT (18°C) OR ON A CALL FOR HEAT FROM ANY ZONE, THE DDC SYSTEM SHALL ENABLE THE HYDRONIC HEATING LOOP MAIN CIRCULATING PUMPS P1a/P1b AND THE HEATING BOILERS.

ON A CALL FOR HEAT AS SENSED IN THE SYSTEM SUPPLY LINE, THE LEAD HEATING BOILER AND SECONDARY CIRCULATING PUMP SHALL BE ENERGIZED.

THE LEAD PUMP SHALL BE STARTED AND MODULATED TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT 13.7 METERS (45 FT.). DDC SYSTEM SHALL OPERATE PUMPS P1a AND P1b IN A STANDBY CONFIGURATION PROVIDING AUTOMATIC CHANGEOVER BETWEEN LEAD AND LAG PUMP WHEN A FAILURE IS DETECTED. FAILURE OF A CIRCULATING PUMP SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER. DDC SYSTEM SHALL PROVIDE EQUAL RUN TIME ROTATION AND EXERCISING OF PUMPS DURING A PERIOD OF EXTENDED SHUTDOWN.

THE DDC SYSTEM SHALL OPERATE THE HEATING BOILERS B1 AND B2 IN A LEAD/LAG CONFIGURATION AND MODULATE THE BOILER OUTPUTS TO MAINTAIN THE GLYCOL HEATING LOOP SUPPLY TEMPERATURE AT SETPOINT. ON A REQUIREMENT FOR HEAT AS SENSED IN THE HOT WATER HEATING SYSTEM SUPPLY LINE, LEAD BOILER AND IT'S CIRCULATOR SHALL BE ENERGIZED. IF THE LEAD HEATING BOILER IS UNABLE TO MAINTAIN THE HEATING SYSTEM SUPPLY TEMPERATURE AT SETPOINT AT 80% STAGE–UP SETPOINT, THE LEAD BOILER OUTPUT SHALL BE REDUCED TO 50% AND BOILER B2 SHALL BE STARTED. BOILERS SHALL THEN BE MODULATED IN UNISON AS REQUIRED TO SATISFY THE SUPPLY WATER SETPOINT TEMPERATURE. WHEN THE HEATING PLANT OUTPUT REQUIRED TO SATISFY THE SUPPLY WATER TEMPERATURE SETPOINT DROPS TO 25%, THE LAG BOILER SHALL BE DE–ENERGIZED. BOILER PRIMARY CIRCULATING PUMP SHALL BE ENERGIZED BY THE INTERNAL BOILER CONTROL SYSTEM ON A CALL FOR HEAT. DDC SYSTEM SHALL RESET THE GLYCOL SUPPLY SETPOINT TEMPERATURE BASED ON AN OUTDOOR AIR RESET SCHEDULE (38.0°C AT 0.0°C TO 43.0°C AT –10.0°C). DDC SYSTEM SHALL MONITOR BOILER ALARM CONTACTS AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF A LOCKOUT CONDITION IS DETECTED.

WHEN THE OUTDOOR TEMPERATURE RISES ABOVE THE WARM WEATHER SHUTDOWN SETPOINT WITH NO CALL FOR HEAT, THE HEATING BOILERS AND CIRCULATING PUMPS ARE DE–ENERGIZED.

GLYCOL FEEDER GF-1

DDC SYSTEM SHALL MONITOR THE GLYCOL FEEDER LOW LEVEL ALARM AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF A LOW LEVEL CONDITION IS DETECTED.

DOMESTIC HOT WATER RECIRCULATION PUMP P2

THE DDC SYSTEM SHALL PROVIDE A WEEKLY SCHEDULE FOR THE OPERATION OF THE DOMESTIC HOT WATER CIRCULATING PUMP. THE CIRCULATOR SHALL RUN CONTINUALLY DURING BUILDING OCCUPIED HOURS.

CLIENT WATER FILLING METER M1

THE DDC SYSTEM SHALL MONITOR THE CLIENT WATER FILL METER PULSE OUTPUTS AND TOTALIZE DAILY AND MONTHLY WATER VOLUME USAGE. DDC SYSTEM SHALL RETAIN CONSUMPTION DATA HISTORY FOR A MINIMUM OF 24 MONTHS.

ROOFTOP AIR HANDLING UNIT RTU-1

THE DDC SYSTEM SHALL PROVIDE A WEEKLY SCHEDULE INCORPORATING OPTIMIZED START/STOP SCHEDULING FOR THE OPERATION OF THE ROOFTOP UNIT. ROOFTOP UNIT OPERATION SHALL BE INTERLOCKED WITH HEAT RECOVERY UNIT HRU–2.

OCCUPIED MODE
THE DDC CONTROLLER SHALL ENERGIZE THE ROOFTOP UNIT. UPON PROOF OF ROOFTOP UNIT OPERATION THE TEMPERATURE, PRESSURE CONTROL AND CO_2 LOOPS ARE ENABLED. FAILURE OF THE ROOFTOP UNIT TO RESPOND TO COMMANDS FROM THE DDC SYSTEM SHALL SHUT THE ROOFTOP UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A STATIC PRESSURE SENSOR LOCATED 2/3 OF THE DISTANCE DOWNSTREAM IN THE LONGEST SUPPLY DUCT SHALL MONITOR THE SYSTEM PRESSURE AND MODULATE THE SUPPLY FAN SPEED TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE AT SETPOINT. THE DDC SYSTEM SHALL MONITOR THE POSITIONS OF THE TERMINAL UNITS AND RESET THE STATIC PRESSURE SETPOINT BETWEEN PROGRAMMED LIMITS (0 TO 250 Pa) TO DRIVE THE MOST OPEN TERMINAL UNIT DAMPER TOWARD THE FULLY OPEN POSITION WHILE MAINTAINING THE TERMINAL UNIT FLOW SETPOINT.

DUCT MOUNTED AND ZONE THERMOSTAT MOUNTED CARBON DIOXIDE (CO_2) DETECTORS SHALL MONITOR THE BUILDING CO_2 LEVEL AND INITIATE A MIXED AIR SEQUENCE IF A SPACE CO_2 LEVEL RISES ABOVE THE SETPOINT LEVEL (800 PPM). DDC SYSTEM SHALL MODULATE THE OUTSIDE AND RETURN AIR DAMPERS TO MAINTAIN THE CO_2 LEVEL SETPOINT. MIXED AIR DAMPERS TO BE NORMALLY AT THE MINIMUM OUTDOOR AIR POSITION (CLOSED) AND ARE INITIATED ONLY BY A CALL FOR COOLING OR CO_2 DETECTION.

MANUAL RESET HIGH AND AUTOMATIC RESET LOW LIMIT CUT–OUTS UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE TEMPERATURE RESPECTIVELY SHALL SHUT THE ROOFTOP UNIT DOWN AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A SMOKE IONIZATION DETECTOR LOCATED IN THE SUPPLY AND RETURN DUCTS SHALL SHUT DOWN THE AIR HANDLER AND INDICATE AN ALARM SIGNAL AT THE SUPERVISORY CONTROLLER AND FIRE ALARM SYSTEM PANEL UPON SENSING THE PRESENCE OF SMOKE. DDC SYSTEM SHALL MONITOR FILTER CONTACTS AND INDICATE SERVICE IS REQUIRED IF A DIRTY FILTER CONDITION IS DETECTED.

VENTILATION MODE
OUTDOOR AND RETURN AIR DAMPERS SHALL BE MODULATED TO MAINTAIN THE AIR HANDLING UNIT CALCULATED SUPPLY AIR DISCHARGE TEMPERATURE SETPOINT. DISCHARGE AIR TEMPERATURE SHALL BE RESET BETWEEN PROGRAMMED LIMITS (13.7°C TO 21.1°C) BASED ON CRITICAL ZONE TEMPERATURE OFFSET. IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW THE SETPOINT TEMPERATURE DUE TO CO_2 SYSTEM OUTDOOR AIR REQUIREMENTS, THE DDC SYSTEM SHALL MODULATE THE GLYCOL HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT.

COOLING MODE
ON A CALL FOR COOLING, OUTDOOR AND RETURN AIR DAMPERS ARE TO BE MODULATED TO MAINTAIN THE CALCULATED DISCHARGE AIR TEMPERATURE SETPOINT. IF THE ECONOMIZER IS UNABLE TO MAINTAIN DISCHARGE AIR TEMPERATURE AT SETPOINT, THE DDC EQUIPMENT CONTROLLER SHALL ENERGIZE MECHANICAL COOLING AND MODULATE THE COOLING STAGES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. WHEN THE ENTHALPY OF THE OUTDOOR AIR EXCEEDS THE ENTHALPY OF THE RETURN AIR, THE MIXED AIR DAMPERS SHALL MOVE TO THE MINIMUM OUTDOOR AIR POSITION.

DDC SYSTEM SHALL MONITOR THE SUM OF ALL TERMINAL UNIT FLOWS. IF THE AIR FLOW DROPS BELOW THE DX COOLING COIL MINIMUM AIRFLOW (400 L/S) WHEN OPERATING MECHANICAL COOLING. THE DDC SYSTEM SHALL PROPORTIONATELY ADJUST TERMINAL UNIT MINIMUM POSITIONS AS REQUIRED TO MEET THE COOLING COIL MINIMUM AIRFLOW VALUE.

UNOCCUPIED MODE
DURING UNOCCUPIED HOURS, THE ROOFTOP UNIT SHALL BE DE–ENERGIZED. THE OUTDOOR AIR AND RETURN AIR DAMPERS SHALL MOVE TO THE FULLY CLOSED POSITION. THE RETURN AIR DAMPER SHALL MOVE TO THE FULLY OPEN POSITION. TEMPERATURE, PRESSURE AND CO_2 CONTROL LOOPS ARE TO BE DISABLED.

SEQUENCES OF OPERATION -CONTINUED

HEAT RECOVERY UNIT HRU-1, WATER WORKS & TRADES SHOPS CARBON MONOXIDE (CO) SYSTEMS, TERMINAL UNITS TU-1&2 AND AIR CONTROL VALVES ACV-1&2

OCCUPIED MODE:
UPON SENSING OCCUPANCY THROUGH THE SPACE MOUNTED OCCUPANCY SENSOR, THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY UNIT VIA THE UNIT START/STOP CONTACT. THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL ENERGIZE THE DAMPER SECTION. UPON DETECTION OF DAMPER OPERATION THE PLC BLOWER INTERLOCK IS ENERGIZED AND THE FRESH AIR AND EXHAUST AIR FANS ARE ENERGIZED. UPON PROOF OF HEAT RECOVERY UNIT OPERATION THE TEMPERATURE AND PRESSURE CONTROL LOOPS ARE ENABLED AND TERMINAL UNITS TU–1&2 AND AIR CONTROL VALVES ACV–1&2 SHALL MOVE TO THE MINIMUM AIR FLOW POSITION. IF THE MOTORIZED DAMPERS AND/OR FRESH AND EXHAUST AIR FANS FAIL TO START, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL SIGNAL THE DDC SYSTEM. DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

A STATIC PRESSURE SENSOR LOCATED IN THE SUPPLY AIR DUCT SHALL MONITOR THE SYSTEM PRESSURE AND GENERATE AND ALARM AT THE SUPERVISORY CONTROLLER IF A HIGH OR LOW PRESSURE CONDITION IS DETECTED.

IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW SETPOINT (20.5°C), THE DDC SYSTEM SHALL MODULATE THE HEAT RECOVERY UNIT HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. AS THE DISCHARGE AIR TEMPERATURE RISES TOWARD SETPOINT THE DDC SYSTEM SHALL MODULATE THE HEATING COIL CONTROL VALVE TOWARD THE CLOSED POSITION.

A SMOKE IONIZATION DETECTOR LOCATED IN THE FRESH AIR SECTION OF THE UNIT SHALL SHUT DOWN THE HEAT RECOVERY UNIT UPON SENSING AN ALARM CONDITION. THE DDC SYSTEM SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF AN ALARM CONDITION IS DETECTED.

THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL SIGNAL THE DDC SYSTEM UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE AIR TEMPERATURE RESPECTIVELY AND THE DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

DDC SYSTEM SHALL MONITOR THE UNIT DIRTY FILTER CONTACTS AND INDICATE SERVICE IS REQUIRED IF A DIRTY FILTER CONDITION IS DETECTED.

GAS DETECTION MODE:
UPON DETECTION OF A HIGH CARBON MONOXIDE (CO) (25 PPM) GAS CONCENTRATION IN THE WATER WORKS SHOP Rm.110 AND/OR THE TRADES SHOP Rm.117 THE DDC SYSTEM SHALL MODULATE THE ASSOCIATED SPACE TERMINAL UNIT AND AIR CONTROL VALVE TO THE MAXIMUM AIR FLOW POSITION AND INCREASE THE HEAT RECOVERY VENTILATOR SUPPLY AND EXHAUST FAN SPEEDS AS REQUIRED. WHEN THE SPACE GAS CONCENTRATION DROPS BELOW SETPOINT, THE DDC SYSTEM SHALL MODULATE THE ASSOCIATED SPACE TERMINAL UNIT AND AIR CONTROL VALVE TO THE MINIMUM AIR FLOW POSITION AND REDUCE THE SPEED OF THE HEAT RECOVERY VENTILATOR SUPPLY AND EXHAUST FAN SPEEDS TO SUIT.

HEAT RECOVERY UNIT HRU-2 –OFFICE AREA

THE DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE FOR THE OPERATION OF THE HEAT RECOVERY UNIT. HEAT RECOVERY UNIT OPERATION SHALL BE INTERLOCKED WITH ROOFTOP UNIT RTU–1.

OCCUPIED MODE
HEAT RECOVERY UNIT SHALL RUN CONTINUALLY DURING BUILDING OCCUPIED HOURS. THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY VENTILATOR VIA THE UNIT START/STOP CONTACT. UPON AN OCCUPIED SIGNAL FROM THE DDC SYSTEM, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL ENERGIZE THE DAMPER SECTION. UPON DETECTION OF DAMPER OPERATION THE PLC BLOWER INTERLOCK IS ENERGIZED AND THE FRESH AIR AND EXHAUST AIR FANS ARE ENERGIZED. IF THE MOTORIZED DAMPERS AND/OR FRESH AND EXHAUST AIR FANS FAIL TO START, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL A SIGNAL THE DDC SYSTEM. DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW SETPOINT (20.5°C), THE DDC SYSTEM SHALL MODULATE THE HEAT RECOVERY UNIT HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. AS THE DISCHARGE AIR TEMPERATURE RISES TOWARD SETPOINT THE DDC SYSTEM SHALL MODULATE THE HEATING COIL CONTROL VALVE TOWARD THE CLOSED POSITION.

A SMOKE IONIZATION DETECTOR LOCATED IN THE FRESH AIR SECTION OF THE UNIT SHALL SHUT DOWN THE HEAT RECOVERY UNIT UPON SENSING AN ALARM CONDITION. THE DDC SYSTEM SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF AN ALARM CONDITION IS DETECTED.

THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL SIGNAL THE DDC SYSTEM UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE AIR TEMPERATURE RESPECTIVELY. THE DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

DDC SYSTEM SHALL MONITOR THE UNIT DIRTY FILTER CONTACTS AND INDICATE SERVICE IS REQUIRED IF A DIRTY FILTER CONDITION IS DETECTED.

UNOCCUPIED MODE:
DURING UNOCCUPIED HOURS, THE DDC SYSTEM SHALL DE–ENERGIZE THE HEAT RECOVERY UNIT. THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL MOVE THE INTERNAL DAMPERS TO THE CLOSED POSITION AND ISOLATE THE BUILDING FROM THE ATMOSPHERE. PRESSING ANY ZONE THERMOSTAT OCCUPIED OVERRIDE BUTTON SHALL ENERGIZE THE HEAT RECOVERY UNIT. HEAT RECOVERY UNIT SHALL RUN AS PER OCCUPIED MODE FOR 2 HOURS OR UNTIL THE OCCUPIED OVERRIDE BUTTON IS PRESSED AGAIN.

HEAT RECOVERY UNIT HRU-3 –MECHANICS SHOP

THE DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE FOR THE OPERATION OF THE HEAT RECOVERY UNIT.

OCCUPIED MODE
HEAT RECOVERY UNIT SHALL RUN CONTINUALLY DURING BUILDING OCCUPIED HOURS. THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY VENTILATOR VIA THE UNIT START/STOP CONTACT. UPON AN OCCUPIED SIGNAL FROM THE DDC SYSTEM, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL ENERGIZE THE DAMPER SECTION. UPON DETECTION OF DAMPER OPERATION, THE PLC BLOWER INTERLOCK IS ENERGIZED AND THE FRESH AND EXHAUST AIR FANS ARE ENERGIZED. IF THE MOTORIZED DAMPERS AND/OR FRESH AIR AND EXHAUST AIR FANS FAIL TO START, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL A SIGNAL THE DDC SYSTEM. DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW SETPOINT (20.5°C), THE DDC SYSTEM SHALL MODULATE THE AIR HANDLER HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. AS THE DISCHARGE AIR TEMPERATURE RISES TOWARD SETPOINT THE DDC SYSTEM SHALL MODULATE THE HEATING COIL CONTROL VALVE TOWARD THE CLOSED POSITION.

A SMOKE IONIZATION DETECTOR LOCATED IN THE FRESH AIR SECTION OF THE UNIT SHALL SHUT DOWN THE HEAT RECOVERY UNIT UPON SENSING AN ALARM CONDITION. THE DDC SYSTEM SHALL GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER IF AN ALARM CONDITION IS DETECTED.

THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL SIGNAL THE DDC SYSTEM UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE AIR TEMPERATURE RESPECTIVELY AND THE DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

DDC SYSTEM SHALL MONITOR THE UNIT DIRTY FILTER CONTACTS AND INDICATE SERVICE IS REQUIRED IF A DIRTY FILTER CONDITION IS DETECTED.

VEHICLE EXHAUST EXTRACTION (VES) MODE:
WHEN ONE (1) VES SYSTEM IS ACTIVATED AS SENSED BY THE DDC SYSTEM VIA THE VES FAN STARTER CURRENT SENSOR, THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY UNIT MOTORIZED BY–PASS DAMPER. THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE MOTORIZE DAMPER TO POSITION No.1 (660 L/S) AND REDUCE THE SPEED OF THE HEAT RECOVERY UNIT EXHAUST FAN TO 4140 L/S. IF THE SECOND VES SYSTEM IS ACTIVATED AS SENSED BY THE DDC SYSTEM VIA THE VES FAN STARTER CURRENT SENSOR, THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE HEAT RECOVERY UNIT MOTORIZED BY–PASS DAMPER TO POSITION No.2 (1320 L/S) AND FURTHER REDUCE THE SPEED OF THE HEAT RECOVERY UNIT EXHAUST FAN TO 3480 L/S. WHEN ONE (1) VES SYSTEM IS DEACTIVATED, THE DDC SYSTEM SHALL INCREASE THE SPEED OF THE HEAT RECOVERY UNIT TO 4140 L/S AND THE MOTORIZE BY–PASS DAMPER SHALL RETURN TO POSITION No.1 (660 L/S). WHEN THE SECOND VES SYSTEM IS DEACTIVATED, THE DDC SYSTEM SHALL INCREASE THE SPEED OF THE HEAT RECOVERY UNIT TO FULL SPEED 4800 L/S AND DEENERGIZED THE MOTORIZED BY–PASS DAMPER. DAMPER SHALL RETURN TO THE NORMALLY CLOSED POSITION.

GAS DETECTION SYSTEM MODE:
UPON DETECTION OF A HIGH CO (25 PPM) OR NO_2 (3 PPM) GAS CONCENTRATION WITH THE UNIT NOT OPERATING, THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY UNIT TO FULL SPEED. HEAT RECOVERY UNIT SHALL OPERATE AS PER OCCUPIED MODE. WHEN THE GAS CONCENTRATION DROPS BELOW SETPOINT, THE HEAT RECOVERY UNIT SHALL BE DE–ENERGIZED.

UNOCCUPIED MODE:
DURING UNOCCUPIED HOURS, THE DDC SYSTEM SHALL DE–ENERGIZE THE HEAT RECOVERY UNIT. THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL MOVE THE INTERNAL DAMPERS TO THE CLOSED POSITION AND ISOLATE THE BUILDING FROM THE ATMOSPHERE. PRESSING ANY ZONE THERMOSTAT OCCUPIED OVERRIDE BUTTON SHALL ENERGIZE THE HEAT RECOVERY UNIT. HEAT RECOVERY UNIT SHALL RUN AS PER OCCUPIED MODE FOR 2 HOURS OR UNTIL THE OCCUPIED OVERRIDE BUTTON IS PRESSED AGAIN.

SEQUENCES OF OPERATION -CONTINUED

HEAT RECOVERY UNIT HRU-4 –AUTOMATIC WASHBAY/TRANSPORTATION SERVICE BAY

THE DDC SYSTEM SHALL PROVIDE AN ADJUSTABLE WEEKLY SCHEDULE FOR THE OPERATION OF THE HEAT RECOVERY UNIT.

OCCUPIED MODE
HEAT RECOVERY UNIT SHALL RUN ON CONTINUALLY ON LOW SPEED (350 L/S) DURING BUILDING OCCUPIED HOURS. THE DDC SYSTEM SHALL ENERGIZE THE HEAT RECOVERY VENTILATOR VIA THE UNIT START/STOP CONTACT. UPON AN OCCUPIED SIGNAL FROM THE DDC SYSTEM, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL ENERGIZE THE DAMPER SECTION. UPON DETECTION OF DAMPER OPERATION THE PLC BLOWER INTERLOCK IS ENERGIZED AND THE FRESH AIR AND EXHAUST AIR FANS ARE ENERGIZED. IF THE MOTORIZED DAMPERS AND/OR FRESH AIR AND EXHAUST AIR FANS FAIL TO START, THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL A SIGNAL THE DDC SYSTEM. DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

UPON A SIGNAL FROM THE TOUCHLESS ROLLOVER VEHICLE WASH SYSTEM PLC INDICATING THE START OF A WASH CYCLE THE DDC SYSTEM SHALL INCREASE THE HEAT RECOVERY UNIT TO HIGH SPEED (2000 L/S). HEAT RECOVERY UNIT SHALL RUN AT HIGH SPEED FOR DURATION OF WASH CYCLE. ONCE WASH CYCLE IS COMPLETE AS SIGNALED BY THE TOUCHLESS ROLLOVER VEHICLE WASH SYSTEM PLC, THE DDC SYSTEM SHALL REDUCE THE SPEED OF THE HEAT RECOVERY UNIT TO MEDIUM (1000 L/S). AFTER A THIRTY MINUTE TIME PERIOD, WITH NO SIGNAL FROM THE PLC INDICATING A NEW WASH CYCLE, THE DDC SYSTEM SHALL REDUCE THE HEAT RECOVERY UNIT SPEED TO LOW SPEED (350 L/S).

IF THE DISCHARGE AIR TEMPERATURE DROPS BELOW SETPOINT (20.5°C), THE DDC SYSTEM SHALL MODULATE THE HEAT RECOVERY UNIT HEATING COIL CONTROL VALVE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AT SETPOINT. AS THE DISCHARGE AIR TEMPERATURE RISES TOWARD SETPOINT THE DDC SYSTEM SHALL MODULATE THE HEATING COIL CONTROL VALVE TOWARD THE CLOSED POSITION.

THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL SIGNAL THE DDC SYSTEM UPON SENSING A HIGH RETURN AIR TEMPERATURE OR LOW DISCHARGE AIR TEMPERATURE RESPECTIVELY. THE DDC SYSTEM SHALL LOCKOUT THE HEAT RECOVERY UNIT OPERATION AND GENERATE AN ALARM AT THE SUPERVISORY CONTROLLER.

DDC SYSTEM SHALL MONITOR THE UNIT DIRTY FILTER CONTACTS AND INDICATE SERVICE IS REQUIRED IF A DIRTY FILTER CONDITION IS DETECTED.

UNOCCUPIED MODE:
DURING UNOCCUPIED HOURS, THE DDC SYSTEM SHALL DE–ENERGIZE THE HEAT RECOVERY UNIT. THE HEAT RECOVERY UNIT INTERNAL CONTROLLER SHALL MOVE THE INTERNAL DAMPERS TO THE CLOSED POSITION AND ISOLATE THE BUILDING FROM THE ATMOSPHERE.

IN-SLAB HEATING

OCCUPIED MODE
ON A DROP IN SPACE TEMPERATURE BELOW THE THERMOSTAT HEATING SETPOINT, THE RADIANT HEATING ZONE tELESTAT(S) SHALL MODULATE OPEN. AS THE SPACE TEMPERATURE RISES TO SETPOINT, THE RADIANT HEATING ZONE TELESTAT(S) SHALL MODULATE CLOSED.

UNOCCUPIED MODE
THE ZONE HEATING TEMPERATURE SHALL BE SET BACK TO UNOCCUPIED SETPOINT. IF THE SPACE TEMPERATURE DROPS BELOW THE UNOCCUPIED HEATING SETPOINT, THE RADIANT HEATING ZONE TELESTAT(S) SHALL MODULATE OPEN. AS THE SPACE TEMPERATURE RISES TOWARD THE UNOCCUPIED SETPOINT, THE RADIANT HEATING ZONE TELESTAT(S) SHALL MODULATE CLOSED.

SERVICES / UTILITY Rm.116 - SPLIT AIR CONDITIONING SYSTEM AC-1

THE DDC SYSTEM SHALL MONITOR THE SPACE TEMPERATURE AND PROVIDE AN ALARM AT THE SUPERVISORY CONTROLLER IF THE SPACE TEMPERATURE RISES ABOVE OR DROPS BELOW THE ALARM TEMPERATURE SETPOINT.

ON A RISE IN TEMPERATURE ABOVE THE THERMOSTAT COOLING SETPOINT (23°C), THE DDC SYSTEM SHALL ENERGIZE MECHANICAL COOLING. WHEN THE SPACE TEMPERATURE IS SATISFIED, MECHANICAL COOLING SHALL BE DE–ENERGIZED.

ON A DROP IN SPACE TEMPERATURE BELOW THE THERMOSTAT HEATING SETPOINT (20°C), MECHANICAL COOLING SHALL BE LOCKED OUT AND THE RADIANT HEATING ZONE TELESTAT(S) SHALL MODULATE OPEN. AS THE SPACE TEMPERATURE RISES TO SETPOINT, THE RADIANT HEATING ZONE TELESTAT(S) SHALL MODULATE CLOSED.

DESTRATIFICATION FANS DF-X

THE DDC SYSTEM SHALL PROVIDE CONTROL OF DESTRATIFICATION FAN OPERATION. FANS SHALL RUN CONTINUALLY DURING OCCUPIED HOURS.

THE DDC SYSTEM SHALL START, STOP AND ADJUST SPEED OF DESTRATIFICATION FANS VIA 0–10 VDC INTERFACE MODULE.

WINTER MODE:
WHEN THE AMBIENT TEMPERATURE IS BELOW THE SPACE SETPOINT TEMPERATURE, THE DDC SYSTEM SHALL MONITOR THE DIFFERENCE IN THE TEMPERATURE BETWEEN THE ROOF MOUNTED TEMPERATURE SENSOR AND THE SPACE TEMPERATURE SENSOR. AS THE SPACE TEMPERATURE SENSED AT THE ROOF LEVEL INCREASES ABOVE THE TEMPERATURE SENSED AT THE FLOOR LEVEL, THE DDC SYSTEM SHALL PROPORTIONATELY INCREASE THE SPEED OF THE DESTRATIFICATION FANS TOWARD THE MAXIMUM SPEED SETTING. AS THE DIFFERENTIAL BETWEEN THE TEMPERATURE SENSORS DECREASES, THE DDC SYSTEM SHALL PROPORTIONATELY DECREASE THE SPEED OF THE DESTRATIFICATION FANS TOWARD THE MINIMUM SPEED SETTING.

SUMMER MODE:
WHEN THE AMBIENT TEMPERATURE IS ABOVE THE SPACE SETPOINT TEMPERATURE, THE DDC SYSTEM SHALL MONITOR THE SPACE TEMPERATURE SENSOR ONLY. DESTRATIFICATION FANS SHALL RUN AT THE MINIMUM SPEED SETTING AT THE SPACE TEMPERATURE SETPOINT. AS THE SPACE TEMPERATURE RISES ABOVE SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY INCREASE THE SPEED OF THE DESTRATIFICATION FANS TOWARD THE MAXIMUM SPEED SETTING AT THE MAXIMUM SPACE TEMPERATURE SETPOINT. AS THE SPACE TEMPERATURE DROPS TOWARD SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY DECREASE THE SPEED OF THE DESTRATIFICATION FANS TOWARD THE MINIMUM SPEED SETTING.

MANUAL MODE:
THE DDC SYSTEM SHALL PERMIT FANS TO BE ENERGIZED AND DEENERGIZED. MANUAL MODE FAN SPEED SHALL BE OPERATOR ADJUSTABLE BETWEEN THE MINIMUM AND MAXIMUM FAN SPEEDS.

UPON A SIGNAL FROM THE BUILDING FIRE ALARM PANEL, THE DDC SYSTEM SHALL SHUT DOWN DESTRATIFICATION FAN OPERATION.

BOILER Rm.201A TEMPERATURE CONTROL UH-1, EF-1, MD-1&2

THE DDC SYSTEM SHALL MONITOR THE BOILER ROOM TEMPERATURE AND CONTROL THE OPERATION OF UNIT HEATER UH–1 AND MECHANICAL ROOM EXHAUST FAN EF–1.

IF THE SPACE TEMPERATURE DROPS BELOW THE SPACE HEATING SETPOINT TEMPERATURE (20°C) AS DETECTED BY THE WALL MOUNTED TEMPERATURE SENSOR, THE DDC SYSTEM SHALL ENERGIZE UNIT HEATER UH–1. BOILER ROOM EXHAUST FAN EF–1 OPERATION SHALL BE LOCKED OUT. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE DDC SYSTEM SHALL DEENERGIZE UNIT HEATER UH–1.

IF THE SPACE TEMPERATURE RISES ABOVE THE SPACE COOLING SETPOINT TEMPERATURE (26.0°C) THE DDC SYSTEM SHALL ENERGIZE MOTORIZED DAMPERS MD–1 AND MD–2. UPON DAMPERS REACHING THE FULLY OPEN POSITION AS SIGNALED BY THE DAMPER END SWITCH, THE DDC SYSTEM SHALL ENERGIZE THE BOILER ROOM EXHAUST FAN EF–1. THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE THE EXHAUST FAN TOWARD THE DESIGN AIR FLOW SETTING AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT SETPOINT. UNIT HEATER UH–1 OPERATION SHALL BE LOCKED OUT.

AS THE SPACE TEMPERATURE FALLS TOWARD THE SETPOINT, THE DDC SYSTEM SHALL PROPORTIONATELY MODULATE EXHAUST FAN EF–1 TOWARD MINIMUM SPEED.

WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE DDC SYSTEM SHALL DEENERGIZE THE EXHAUST FAN EF–1 AND MOTORIZED DAMPERS MD–1 AND MD–2. MOTORIZED DAMPERS SHALL RETURN TO THE NORMALLY CLOSED POSITION.

CABINET UNIT HEATER CUH-X

OCCUPIED MODE
ON A DROP IN SPACE TEMPERATURE BELOW THE THERMOSTAT HEATING SETPOINT (20°C), THE DDC SYSTEM SHALL ENERGIZE THE FORCE FLOW HEATER CIRCULATING FAN AND MODULATE THE GLYCOL HEATING CONTROL VALVE TO THE FULLY OPEN POSITION. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE FORCE FLOW CIRCULATING FAN SHALL BE DE–ENERGIZED AND THE GLYCOL HEATING CONTROL VALVE SHALL RETURN TO THE NORMALLY CLOSED POSITION. FORCE FLOW FAN SPEED SHALL BE ADJUSTABLE (OFF/LOW/MED./HIGH) VIA THE HEATER MOUNTED SPEED CONTROL SWITCH.

UNOCCUPIED MODE
DURING UNOCCUPIED HOURS, THE SPACE HEATING TEMPERATURE IS TO BE SET BACK TO 18°C. IF THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT, THE DDC SYSTEM SHALL ENERGIZE THE FORCE FLOW HEATER CIRCULATING FAN AND MODULATE THE GLYCOL HEATING CONTROL VALVE TO THE FULLY OPEN POSITION. WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE FORCE FLOW CIRCULATING FAN SHALL BE DE–ENERGIZED AND THE GLYCOL HEATING CONTROL VALVE SHALL RETURN TO THE NORMALLY CLOSED POSITION.

UNIT HEATER UH-X

IF THE SPACE TEMPERATURE DROPS BELOW THE HEATING SETPOINT TEMPERATURE (20°C) AS DETECTED BY THE WALL MOUNTED TEMPERATURE SENSOR, THE DDC SYSTEM SHALL ENERGIZE THE UNIT HEATER CIRCULATING FAN VIA THE LOW VOLTAGE RELAY.

WHEN THE SPACE TEMPERATURE SETPOINT IS SATISFIED, THE UNIT HEATER CIRCULATING FAN SHALL BE DEENERGIZED.

SEQUENCES OF OPERATION -CONTINUED

GENERAL

THE DDC CONTROL SYSTEM SHALL MONITOR AND DISPLAY ON THE GRAPHICAL USER INTERFACE (GUI) THE FOLLOWING POINTS AS A MINIMUM AND PROVIDE THE FOLLOWING ALARMS. ALL WRITABLE POINTS SHALL BE ADJUSTABLE VIA THE GUI:

- OUTDOOR DRY BULB TEMPERATURE
- OUTDOOR WET BULB TEMPERATURE
- ROOFTOP UNIT STATUS
- ROOFTOP UNIT SUPPLY FAN FAILURE
- ROOFTOP UNIT RETURN/EXHAUST FAN FAILURE
- ROOFTOP UNIT MOTORIZED RECIRCULATION/FRESH/EXHAUST AIR DAMPER POSITIONS
- ROOFTOP UNIT MOTORIZED RECIRCULATION/FRESH/EXHAUST AIR DAMPER FAILURES
- ROOFTOP UNIT COMPRESSOR INVERTER STATUS
- ROOFTOP UNIT COMPRESSOR INVERTER SPEED
- ROOFTOP UNIT CONDENSING UNIT FAN INVERTER STATUS
- ROOFTOP UNIT CONDENSING UNIT FAN INVERTER SPEED
- ROOFTOP UNIT LOW DISCHARGE AIR TEMPERATURE
- ROOFTOP UNIT HIGH RETURN AIR TEMPERATURE
- ROOFTOP UNIT SUPPLY AIR TEMPERATURE
- ROOFTOP UNIT RETURN AIR TEMPERATURE
- ROOFTOP UNIT EXHAUST AIR TEMPERATURE
- ROOFTOP UNIT MIXED AIR TEMPERATURE
- ROOFTOP UNIT HEATING COIL CONTROL/BALANCE VALVE POSITION
- ROOFTOP UNIT SMOKE DETECTOR STATUS
- ROOFTOP UNIT RETURN AIR CO_2 LEVEL
- ROOFTOP UNIT RETURN AIR HUMIDITY LEVEL
- ROOFTOP UNIT AIR HUMIDITY LEVEL
- SUPPLY AIR STATIC PRESSURE
- HIGH/LOW SUPPLY AIR STATIC PRESSURE
- SPACE TEMPERATURES/CO_2 LEVEL
- TERMINAL UNIT POSITION
- TERMINAL UNIT FLOW RATE
- AIR CONTROL VALVE POSITION
- AIR CONTROL VALVE FLOW RATE
- LOW SPACE TEMPERATURE
- HEAT RECOVERY UNIT STATUS
- HEAT RECOVERY UNIT ALARM SIGNAL
- HEAT RECOVERY UNIT ERROR CODE
- HEAT RECOVERY UNIT STATE/MODE PROHIBITION
- HEAT RECOVERY UNIT LOW AIR FRESH AIR DISCHARGE AIR TEMPERATURE
- HEAT RECOVERY UNIT HIGH EXHAUST AIR INLET TEMPERATURE
- HEAT RECOVERY UNIT FRESH AIR DISCHARGE AIR TEMPERATURE
- HEAT RECOVERY UNIT EXHAUST AIR INLET TEMPERATURE
- HEAT RECOVERY UNIT SMOKE DETECTOR STATUS
- HEAT RECOVERY UNIT FRESH AIR DISCHARGE HUMIDITY LEVEL
- HEAT RECOVERY UNIT EXHAUST AIR INLET HUMIDITY LEVEL
- HEAT RECOVERY UNIT DIRTY FILTER SWITCH
- HEAT RECOVERY UNIT HEATING COIL CONTROL/BALANCE VALVE POSITION
- HEAT RECOVERY UNIT HRU–3 MOTORIZED BY–PASS DAMPER POSITION
- HEAT RECOVERY UNIT HRU–3 MOTORIZED BY–PASS DAMPER FAILURE
- CONDENSING UNIT STATUS/CAPACITY
- CONDENSING UNIT FAILURE
- SPLIT AIR CONDITIONING SYSTEM SPACE TEMPERATURE
- SPLIT AIR CONDITIONING SYSTEM ALARM SIGNAL
- VEHICLE EXTRACTION SYSTEM STATUS
- BOILER STATUS/OPERATING OUTPUT
- BOILER FAILURE ALARM
- HEATING LOOP SUPPLY/RETURN TEMPERATURES
- PRIMARY HEATING CIRCULATING PUMP STATUS
- PRIMARY HEATING CIRCULATING PUMP FAILURE
- PRIMARY HEATING CIRCULATING PUMP SPEEDS
- BOILER PUMP STATUS
- BOILER PUMP FAILURE
- GLYCOL FEEDER LOW LEVEL ALARM
- DOMESTIC HOT WATER RECIRCULATION PUMP STATUS
- DOMESTIC HOT WATER RECIRCULATION PUMP FAILURE
- BOILER ROOM SPACE TEMPERATURE
- BOILER ROOM LOW/HIGH SPACE TEMPERATURE
- BOILER ROOM EXHAUST FAN STATUS
- BOILER ROOM EXHAUST FAN SPEED
- BOILER ROOM EXHAUST FAN AIR FLOW
- BOILER ROOM EXHAUST FAN FAILURE
- BOILER ROOM VENTILATION SYSTEM MOTORIZED DAMPER POSITIONS
- BOILER ROOM VENTILATION SYSTEM MOTORIZED DAMPER FAILURE
- DOMESTIC HOT WATER RECIRCULATION PUMP STATUS
- DOMESTIC HOT WATER RECIRCULATION PUMP FAILURE
- CO/NO_2 GAS DETECTION SYSTEM SENSOR LEVEL
- CO/NO_2 GAS DETECTION STATUS/ALARMS
- DESTRATIFICATION FAN STATUS
- DESTRATIFICATION FAN FAILURE
- DESTRATIFICATION FAN SETTING
- DESTRATIFICATION FAN SPEED
- UNIT HEATER STATUS
- UNIT HEATER FAILURE
- CABINET UNIT HEATER STATUS
- CABINET UNIT HEATER CONTROL/BALANCE VALVE POSITION

THE ALARMS SHALL BE DISPLAYED AT THE SUPERVISORY CONTROLLER AND SHALL APPEAR AS "ACKNOWLEDGED" OR "UNACKNOWLEDGED".

PROGRAM FULL COLOUR GRAPHICS OPERATING SOFTWARE TO PERMIT MONITORING AND EDITING OF SYSTEM VARIABLES, SCHEDULING AND ALARMS VIA WEB ENABLED SUPERVISORY CONTROLLER. GRAPHICAL SYMBOLS SHALL LINK THE OPERATOR TO THE GRAPHICAL DATA DISPLAY FOR THE SPECIFIC COMPONENT. PROVIDE COMPLETE COMMISSIONING SERVICES BY THE DDC SYSTEM AUTHORIZED REPRESENTATIVE TO VERIFY THE PROPER OPERATION OF THE DDC SYSTEM. COMMISSIONING WORK TO BE PERFORMED IN CONJUNCTION WITH THE DESIGN CONSULTANT TO VERIFY THE PROPER FUNCTION OF THE MECHANICAL SYSTEMS IN ACCORDANCE WITH THE SEQUENCE OF OPERATION.

AN ELECTRONIC COPY OF THE SEQUENCE OF OPERATION FOR EACH PIECE OF EQUIPMENT SHALL BE INCORPORATED IN THE DDC PROGRAMMING AND BE EASILY AVAILABLE FOR VIEWING BY THE OPERATOR BY USING A BUTTON ON EACH EQUIPMENT GRAPHIC. LOCATE BUTTON IN SAME RELATIVE LOCATION ON EACH GRAPHIC.

THE SCOPE OF COMMISSIONING SHALL INCLUDE THE FOLLOWING AS A MINIMUM:
- VERIFY ALL CONTROL SYSTEM SETPOINTS AND ALARMS
- CHECK THE OPERATION OF ALL THERMOSTATS
- CHECK THE OPERATION OF ALL TEMPERATURE SENSORS
- REVIEW THE OPERATION OF THE HVAC SYSTEMS INCLUDING THE FOLLOWING:
  - ROOFTOP UNIT (RTU) OPERATION
  - HEAT RECOVERY UNIT (HRU) OPERATION
  - EXHAUST FAN OPERATION
  - CONDENSING UNIT OPERATION
  - CONTROL/BALANCE VALVE OPERATION
  - RADIANT FLOOR TELESTAT OPERATION
  - OUTDOOR AIR TEMPERATURE SENSOR OPERATION AND CALIBRATION
  - WEEKLY SYSTEM START/STOP SCHEDULE
  - OPERATION OF FRESH, EXHAUST AND RETURN AIR DAMPERS
  - NIGHT SETBACK PROGRAMMING
  - COLOUR GRAPHICS OPERATING SOFTWARE PROGRAMMING

PROVIDE OPERATOR TRAINING FOR THE BUILDING CONTROL SYSTEM. (MINIMUM 8 HRS.)

Date	Revision	
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER	0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

D. W. SHALLEY
July 28/22

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
EQUIPMNENT LIST, COMMISSIONING, BUILDING CONTROLS
AND SEQUENCES OF OPERATION

Drawn By: ER
Checked By: DS
Scale: N/A
Project No: 22-098
Date Plotted:
Date Revised: JULY 2022
Drawing No: **M702**

AUTOMATIC CIRCUIT BALANCING VALVE SCHEDULE (ABV-X)

VALVE No.	EQUIPMENT SERVED	SIZE	FLOW RATE (L/S)
ABV-1	IN-SLAB HEATING MANIFOLD M1	13ø	0.126
ABV-2	IN-SLAB HEATING MANIFOLD M2	19ø	0.158
ABV-3	IN-SLAB HEATING MANIFOLD M3	13ø	0.095
ABV-4	IN-SLAB HEATING MANIFOLD M4	13ø	0.063
ABV-5	IN-SLAB HEATING MANIFOLD M5	19ø	0.158
ABV-6	IN-SLAB HEATING MANIFOLD M6	13ø	0.063
ABV-7	IN-SLAB HEATING MANIFOLD M7	19ø	0.442
ABV-8	IN-SLAB HEATING MANIFOLD M8	19ø	0.442
ABV-9	IN-SLAB HEATING MANIFOLD M9	19ø	0.252
ABV-10	IN-SLAB HEATING MANIFOLD M10	19ø	0.315
ABV-11	UNIT HEATER UH-1	13ø	0.095
ABV-12	UNIT HEATER UH-2	13ø	0.095
ABV-13	UNIT HEATER UH-3	13ø	0.032

CONTROL / BALANCING VALVE SCHEDULE (CBV-X)

VALVE No.	EQUIPMENT SERVED	SIZE	FLOW RATE (L/S)
CBV-1	ROOFTOP UNIT RTU-1 HEATING COIL	19ø	0.233
CBV-2	HEAT RECOVERY UNIT HRU-1 HEATING COIL	19ø	0.170
CBV-3	HEAT RECOVERY UNIT HRU-2 HEATING COIL	19ø	0.170
CBV-4	HEAT RECOVERY UNIT HRU-3 HEATING COIL	38ø	2.27
CBV-5	HEAT RECOVERY UNIT HRU-4 HEATING COIL	25ø	0.953
CBV-6	CABINET UNIT HEATER CUH-1 HEATING COIL	19ø	0.170
CBV-7	CABINET UNIT HEATER CUH-2 HEATING COIL	13ø	0.038

DIFFUSER / GRILLE SCHEDULE

	ROOM	EQUIP. No.	SUPPLY AIR				RETURN / EXHAUST AIR			
			TYPE	QTY.	l/s	NECK SIZE	TYPE	QTY.	l/s	NECK SIZE
RTU-1	102 LUNCH/MEETING ROOM	TU-3	A	6	60	150ø	B	2	–	610x305
	103 TRAINING	TU-5	J	1	40	150ø	B	1	–	610x150
	104 ADMINISTRATION	TU-6	A	2	55	150ø	B	1	–	610x150
	109 OFFICE	TU-4	J	1	30	125	Q	1	–	405x355
	111 OFFICE	TU-7	A	1	30	150ø	–	–	–	–
	121 OFFICE	TU-8	A	1	100	150ø	–	–	–	–
HRU-1	110 WATER WORKS SHOP	TU-1 ACV-1	F	2	155	405x150	G	1	335	455x305
	117 TRADES SHOP	TU-2 ACV-2	F1 F2	3 1	160 15	405x150 255x100	G	1	520	760x305
HRU-2	101 CORRIDOR	–	A A1	5 1	60 50	150ø 150ø	–	–	–	–
	102 LUNCH/MEETING ROOM	–	H	1	160	255ø	E	1	25	150x100
	104 ADMINISTRATION	–	–	–	–	–	E	1	25	150x100
	105 MALE CHANGE ROOM	–	D	1	50	150ø	C	1	75	255x150
	106 FEMALE CHANGE ROOM	–	D	1	25	150ø	C	1	50	205x125
	107 WASHROOM	–	–	–	–	–	E	1	25	150x100
	108 WASHROOM	–	–	–	–	–	E	1	25	150x100
	110 WATER WORKS SHOP	–	–	–	–	–	G	1	30	150x150
	112 G.N. CHG. Rm. & SHOWER	–	–	–	–	–	C	1	30	150x100
	113 UNIVERSAL WASHROOM	–	–	–	–	–	E	1	25	150x100
	115 CUSTODIAL/P.P.E. STOR.	–	–	–	–	–	E	1	35	150x150
	116 SERVICE/UTILITY	–	–	–	–	–	G	1	10	150x150
	117 TRADES SHOP	–	–	–	–	–	G	1	30	150x150
	118 SMALL EQUIPMENT	–	–	–	–	–	G	1	25	150x150
	119 WASHROOM	–	–	–	–	–	E	1	25	150x150
	124 BATT. CHARGING/STOR.	–	Q	1	–	405x355	E	1	25	150x100
HRU-3	118 SMALL EQUIPMENT	–	F	1	150	305x205	F	1	150	305x205
	120 MECHANICS SHOP	–	N1 N2	3 6	270 265	510x255 510x255	M	8	465	760x305
	122 TOOL CRIB	–	S	1	25	255x100	–	–	–	–
	123 METAL FAB. SHOP	–	S	2	30	255x100	–	–	–	–
	125 WORK STATION	–	S	3	135	305x205	–	–	–	–
	126 TIRE SHOP	–	S	2	135	305x205	–	–	–	–
	127 STORAGE	–	–	–	–	–	E	1	40	150x150
	128 LUBE & SERVICE BAY	–	N	2	440	610x305	M	2	425	760x305
	128A WASHBAY EQUIP. Rm.	–	–	–	–	–	E	1	30	150x100
	201 TRADE SHOP MEZZANINE	–	N	2	155	305x205	G	1	–	560x255
	201A BOILER ROOM	–	–	–	–	–	E	1	10	150x150
	202 MECHANICS SHOP MEZZ.	–	N	2	150	305x205	–	–	–	–
HRU-4	129 AUTOMATIC WASHBAY TRANSPORT SERVICE BAY	–	K	2	1000	1220x305	L	2	1000	1220x305

REMARKS: TAB CONTRACTOR SHALL FIELD ADJUST ALL SUPPLY AIR GRILLE AIRFOIL BLADES AND DRUM LOUVRE SPREAD CONTROL MEMBERS AS REQUIRED TO PROVIDE SUITABLE AIR FLOW PATTERNS FOR THEIR RESPECTED ZONES

TERMINAL UNIT / AIR CONTROL VALVE SCHEDULE

(BASED ON EH. PRICE 'SDV' SINGLE DUCT TERMINAL UNITS AND 'RDV' AIR VOLUME CONTROL VALVES)

TERMINAL UNIT No.	SIZE	CONTROL ASSEMBLY	AREA SERVED	MIN./MAX. L/S
TU-1	205	RIGHT HAND	110 WATER WORKS SHOP	100/310
TU-2	255	RIGHT HAND	117 TRADES SHOP	165/495
TU-3	230	RIGHT HAND	102 LUNCH/MEETING	75/360
TU-4	100	RIGHT HAND	109 OFFICE	10/30
TU-5	100	RIGHT HAND	103 TRAINING	10/40
TU-6	125	RIGHT HAND	104 ADMINISTRATION	25/110
TU-7	100	LEFT HAND	111 OFFICE	10/30
TU-8	125	RIGHT HAND	121 OFFICE	20/100
ACV-1	205	RIGHT HAND	110 WATER WORKS SHOP	125/335
ACV-2	255	RIGHT HAND	117 TRADES SHOP	190/520

DIFFUSER / GRILLE TYPES

(BASED ON PRICE INDUSTRIES PRODUCTS)

TYPE	DESCRIPTION
A	(SIZE AS NOTED)/610x610/SPD/31/B12
B	(SIZE AS NOTED)/80/NF/B12
C	(SIZED AS NOTED)/620/F/L/A/B12
D	(SIZE AS NOTED)/610x610/SPD/31/SPF/B12
E	(SIZE AS NOTED)/520/F/L/A/B12
F	SDGE/*/(SIZE AS NOTED)/DD/L/VCS3/A/B15
G	(SIZE AS NOTED)/530/F/L/A/B12
H	OPEN END DUCT
J	(SIZE AS NOTED)/305x305/SPD/31/B12
K	(SIZE AS NOTED)/AHCD2/F/A/B15
L	(SIZE AS NOTED)/620DAL/F/L/A/B15
M	SDGER/*/(SIZE AS NOTED)/A/CA
N	(SIZE AS NOTED)/152/F/L/A/VCS5/B15
P	NOT USED
Q	(SIZE AS NOTED)/ATG2/BF/B15
R	NOT USED
S	SDGE/*/(SIZE AS NOTED)/DD/L/VCS3/A/CA

REMARKS:
* REFER TO DESIGN DRAWINGS FOR DUCT SIZE

Date	Revision
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER 0

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

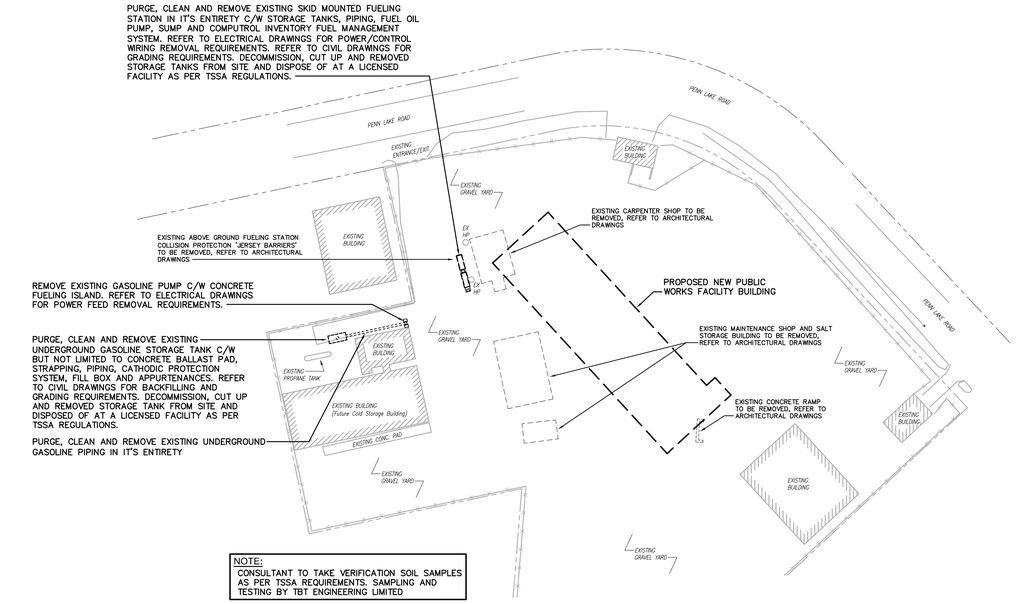
TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
SCHEDULES

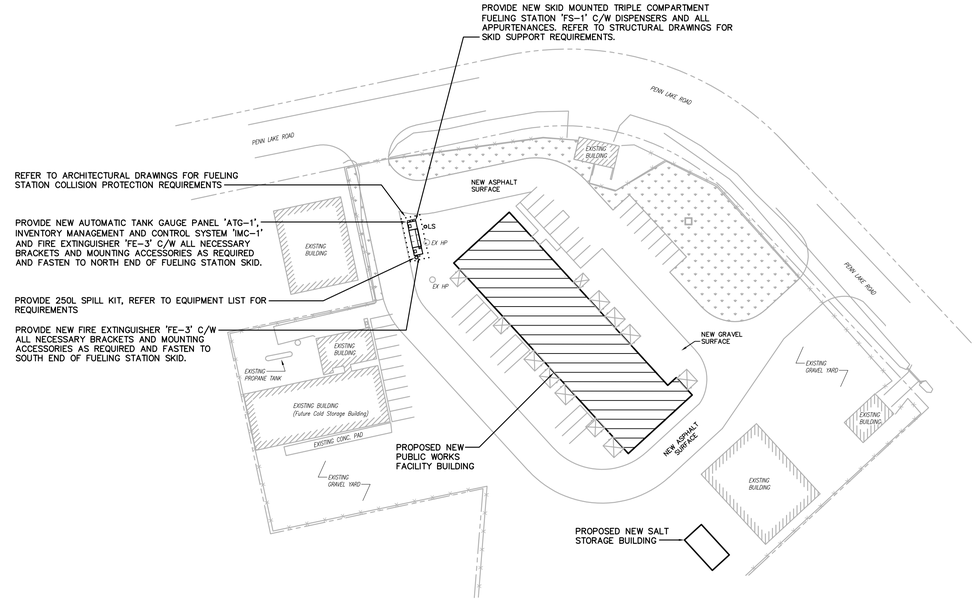
Drawn By:	Checked By:
ER	DS
Scale: N/A	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M703



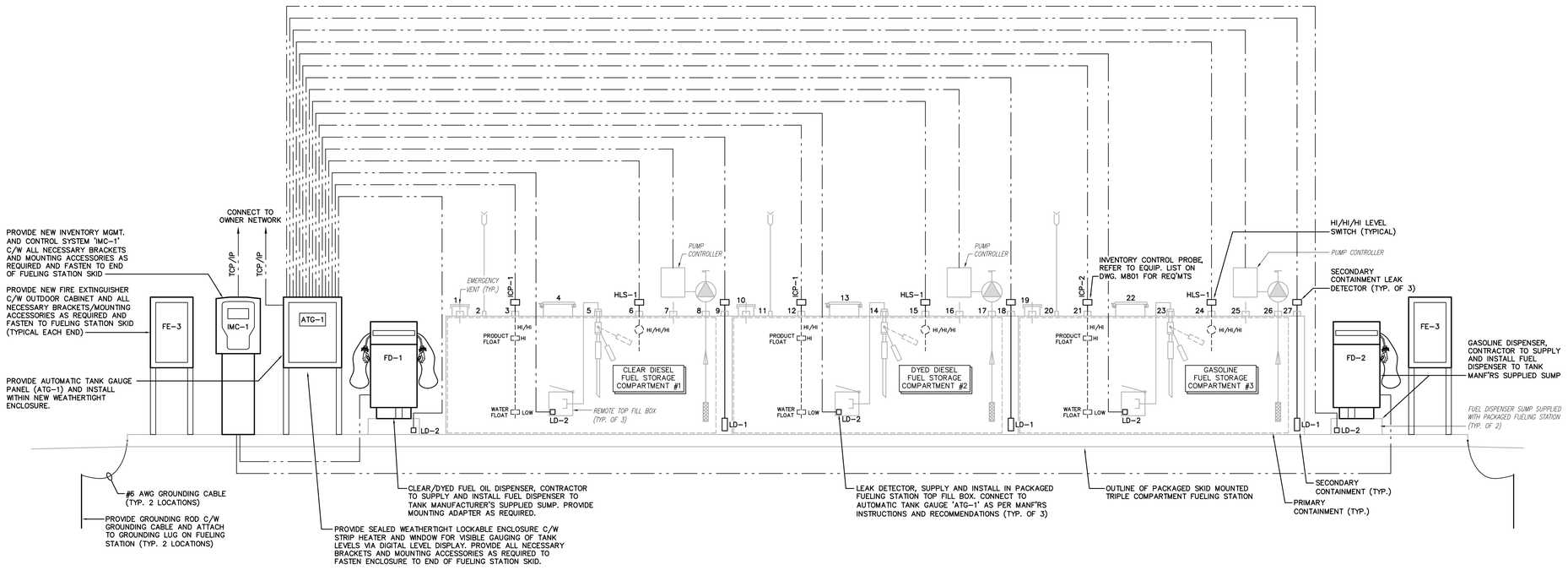
FUEL STORAGE SITE PLAN -DEMOLITION

SCALE: 1:750



FUEL STORAGE SITE PLAN -RENOVATION

SCALE: 1:750



FUEL STORAGE TANK CONTROLLED / MONITORED SCHEMATIC

SCALE: N.T.S

FUELING STATION STORAGE TANK NOZZLES

ITEM	SIZE	DESCRIPTION
1	150ø	PRIMARY CONTAINMENT EMERGENCY VENT
2	75ø	VENT
3	100ø	INVENTORY CONTROL PROBE
4	–	610ø SPILL BOX/TANK ACCESS OPENING COMPLETE WITH 50ø NPT GAUGE STICK PORT WITH CAMLOCK AND DUSTCAP AND 25x19ø NPT FITTING AND PLUG
5	100ø	TANK FILL
6	100ø	HIGH LEVEL ALARM/SENSOR
7	100ø	SPARE
8	100ø	FUEL TRANSFER PUMP
9	50ø	SECONDARY CONTAINMENT LEAK DETECTOR
10	150ø	PRIMARY CONTAINMENT EMERGENCY VENT
11	75ø	VENT
12	100ø	INVENTORY CONTROL PROBE
13	–	610ø SPILL BOX/TANK ACCESS OPENING COMPLETE WITH 50ø NPT GAUGE STICK PORT WITH CAMLOCK AND DUSTCAP AND 25x19ø NPT FITTING AND PLUG
14	100ø	TANK FILL
15	100ø	HIGH LEVEL ALARM/SENSOR
16	100ø	SPARE
17	100ø	FUEL TRANSFER PUMP
18	50ø	SECONDARY CONTAINMENT LEAK DETECTOR
19	150ø	PRIMARY CONTAINMENT EMERGENCY VENT
20	75ø	VENT
21	100ø	INVENTORY CONTROL PROBE
22	–	610ø SPILL BOX/TANK ACCESS OPENING COMPLETE WITH 50ø NPT GAUGE STICK PORT WITH CAMLOCK AND DUSTCAP AND 25x19ø NPT FITTING AND PLUG
23	100ø	TANK FILL
24	100ø	HIGH LEVEL ALARM/SENSOR
25	100ø	SPARE
26	100ø	FUEL TRANSFER PUMP
27	50ø	SECONDARY CONTAINMENT LEAK DETECTOR

REMARKS: CONTRACTOR SHALL PROVIDE ALL REDUCERS, BUSHINGS, ETC. AS REQUIRED TO PROVIDE AND COMPLETE AND WORKING INSTALLATION.

NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 29/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
FUEL STORAGE DEMOLITION AND RENOVATION PLANS
SCHEMATIC AND FUELING STATION STORAGE TANK NOZZLE SCHEDULE

Drawn By:	Checked By:
ER	DS
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
M800

SCOPE OF WORK -ABANDONED GASOLINE FUELING SYSTEM

1. PURGE AND CLEAN ABANDONED UNDERGROUND GASOLINE STORAGE TANK AND ALL PIPING. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ANY REMAINING GASOLINE AND/OR SLUDGE WATER IN STORAGE TANK AND FUELING SYSTEM PRIOR TO REMOVAL.
2. DISCONNECT UNDERGROUND PIPING FROM UNDERGROUND STORAGE TANK AND REMOVE COMPLETE WITH ALL SUPPORTS, APPURTENANCES, GASOLINE PUMP AND CONCRETE FUELING ISLAND.
3. DECOMMISSION, EXCAVATE, CUT UP AND REMOVE ABANDONED UNDERGROUND GASOLINE STORAGE TANK COMPLETE WITH BALLAST PAD, STRAPPING AND APPURTENANCES. DECOMMISSIONED TANK TO BE REMOVED FROM SITE AND DISPOSED OF AT A LICENSED FACILITY AS PER TSSA REGULATIONS.
4. CONSULTANT TO TAKE VERIFICATION SOIL SAMPLES AS PER TSSA REQUIREMENTS. SAMPLING AND TESTING BY TBT ENGINEERING LIMITED.
5. UPON COMPLETION OF REMOVAL, BACKFILL, COMPACT AND GRADE EXCAVATED AREAS, REFER TO CIVIL DRAWINGS FOR REQUIREMENTS.
6. CONTRACTOR IS RESPONSIBLE FOR ALL SITE LOCATES PRIOR TO STARTING UNDERGROUND WORK.

SCOPE OF WORK -FUEL OIL STATION AND INVENTORY MANAGEMENT SYSTEM

1. DEMOLITION AND INSTALLATION OF NEW FUELING STATION AND FUEL INVENTORY MANAGEMENT SYSTEM SHALL BE SCHEDULED/COORDINATED WITH BUILDING OWNER TO MINIMIZE THE DISRUPTION OF THE FUELING SERVICE TO THE CLIENT.
2. CONTRACTOR SHALL TRANSFER THE CLEAR AND COLOURED FUEL OILS FROM THE EXISTING STORAGE TANKS TO THE NEW FUELING STATION. CONTRACTOR SHALL PROVIDE TEMPORARY STORAGE FOR FUEL OILS AS REQUIRED.
3. PURGE AND CLEAN FUEL OIL STORAGE TANKS, SUMPS AND ALL PIPING. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ANY SLUDGE WATER IN STORAGE TANKS, SUMPS AND FUELING SYSTEM PRIOR TO REMOVAL.
4. DECOMMISSION SKID MOUNTED FUELING STATION AND COMPUTROL INVENTORY FUEL MANAGEMENT SYSTEM. CUT UP AND REMOVE ABOVE GROUND FUEL OIL STORAGE TANKS COMPLETE WITH SKID, SUMPS, FUEL OIL PIPING, PUMP AND APPURTENANCES. DECOMMISSIONED TANKS TO BE REMOVED FROM SITE AND DISPOSED OF AT A LICENSED FACILITY AS PER TSSA REGULATIONS. REFER TO ELECTRICAL DRAWINGS FOR FUEL OIL PUMP AND FUEL MANAGEMENT SYSTEM POWER/CONTROLS DEMOLITION REQUIREMENTS. CONTRACTOR TO PROVIDE PROOF OF DISPOSAL LETTER TO CONSULTANT.
5. CONTRACTOR IS RESPONSIBLE FOR ALL SITE LOCATES PRIOR TO STARTING UNDERGROUND WORK.
6. CONSULTANT TO TAKE VERIFICATION SOIL SAMPLES AS PER TSSA REQUIREMENTS. SAMPLING AND TESTING BY TBT ENGINEERING LIMITED.
7. UPON COMPLETION OF REMOVAL, GRADE DEMOLITION AREA, REFER TO CIVIL DRAWINGS FOR REQUIREMENTS.
8. PROVIDE NEW FUELING STATION AREA COMPLETE WITH CONCRETE FUEL STORAGE TANK CONCRETE SUPPORTS (REFER TO STRUCTURAL DRAWINGS) AND COLLISION PROTECTION (REFER TO ARCHITECTURAL DRAWINGS).
9. SUPPLY AND INSTALL ONE (1) NEW 20,000L TRIPLE COMPARTMENT FUEL VAULT COMPLETE WITH ACCESS PLATFORM, FILL LIMITER VALVES, LEVEL GAUGES, LEAK DETECTORS, HI/HI/HI LEVEL/ALARM SENSORS, INVENTORY CONTROL PROBES, TURBINE PUMPS, STARTERS, FILL BOXES, FUEL DISPENSERS AND APPURTENANCES AS INDICATED ON THE CONTRACT DRAWINGS.
10. CONTRACTOR SHALL ASSEMBLE AND INSTALL ALL FUELING STATION 'SHIPPED LOOSE' ITEMS, INCLUDING BUT NOT LIMITED TO, ACCESS LADDER, ACCESS PLATFORM, CATWALK, TANK VENTING, ETC. COMPONENTS SHALL BE ASSEMBLED AND INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS,
11. PROVIDE NEW AUTOMATIC TANK GAUGE PANEL 'ATG–1', INVENTORY MANAGEMENT AND CONTROL SYSTEM 'IMC–1' AND FIRE EXTINGUISHER 'FE–3 C/W ALL NECESSARY BRACKETS AND MOUNTING ACCESSORIES AS REQUIRED AND FASTEN TO END OF FUELING STATION SKID.
12. PROVIDE ALL AUTOMATIC TANK GAUGE PANEL CONTROLS, PROBES, SWITCHES, ETC. AS INDICATED ON DESIGN DRAWINGS. CONNECT/WIRE COMPONENTS TO ASSOCIATED EQUIPMENT AS PER MANUFACTURER'S INSTRUCTION AND RECOMMENDATIONS AND AS REQUIRED TO PROVIDE A COMPLETE AND WORKING SYSTEM.
13. SUPPLY AND INSTALL NEW BULK STORAGE TANK PLATFORM ASSEMBLY AS INDICATED ON DRAWINGS.
14. PROVIDE A SPILL KIT IN THE FUEL OFFLOAD AREA AS SHOWN.
15. PROVIDE LAMINATED TANK LEVEL GAUGE CHARTS AND SEQUENCE OF OPERATIONS FOR ALL FUEL STORAGE TANKS IN THE FUEL OFFLOAD AREA.

FUEL SYSTEM SPECIFICATIONS

GENERAL

1. PROVIDE ALL LABOUR, MATERIAL, EQUIPMENT, FEES, PERMITS AND INSPECTIONS BY OUTSIDE AGENCIES AND CHARGES TO PERFORM ALL OPERATIONS FOR THE COMPLETE INSTALLATION OF THE FUEL STORAGE & DISPENSING SYSTEM AS INDICATED.
2. ALL MATERIALS AND INSTALLATION IS TO COMPLY WITH THE ONTARIO BUILDING CODE, NFPA REGULATIONS, ONTARIO FIRE CODE, NATIONAL FIRE CODE, AND ONTARIO HYDRO ELECTRICAL CODE, AND LIQUID FUELS HANDLING CODE 2017.
3. MAINTAIN INSURANCE TO FULLY PROTECT OWNER, CONSULTANT AND SELF FROM ANY AND ALL CLAIMS DUE TO ACCIDENTS, MISFORTUNES, ETC., TO LIMITS SET DOWN BY THE OWNER.
4. REMOVE ALL WASTE MATERIALS AND CLEAN UP TO OWNER'S SATISFACTION. AT THE END OF THE JOB, CLEAN THE EQUIPMENT AND TOUCH UP FINISH TO RESTORE TO "AS NEW" CONDITION.
5. ONLY FIRST CLASS WORKMANSHIP AND GOOD INSTALLATION PRACTICES WILL BE ACCEPTED. USE QUALIFIED TRADESMEN FOR ALL TYPES OF WORK.
6. PROVIDE ALL NECESSARY HANGERS AND SUPPORT STEEL FOR YOUR WORK.
7. BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED BY YOUR WORK.
8. PROVIDE SHOP DRAWINGS TO CONSULTANT PRIOR TO ORDERING EQUIPMENT.
9. VERIFY THAT ALL EXISTING AND NEW SIGNAGE IS IN ACCORDANCE WITH THE LIQUID FUELS HANDLING CODE 2017.

FIRE PROTECTION

1. PROVIDE TYPE 80–B:C FIRE EXTINGUISHER COMPLETE WITH OUTDOOR FIRE EXTINGUISHER CABINET AS INDICATED ON DRAWINGS. STANDARD OF ACCEPTANCE: NATIONAL FIRE EQUIPMENT LTD.
2. MOUNT EXTINGUISHER CABINETS AT LOCATIONS INDICATED ON THE DRAWINGS AND AT 1.2m (4'–0") TO TOP OF EXTINGUISHERS.
3. UNDER DISPENSER FIRE SUPPRESSION UNITS MUST BE INSPECTED AS PART OF THE YEARLY FIRE EXTINGUISHER INSPECTION REQUIREMENTS AS PER THE ONTARIO FIRE CODE.

GENERAL NOTES

1. FUEL STORAGE TANKS AND PIPING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH LIQUID FUELS HANDLING CODE 2017.
2. MISCELLANEOUS STEEL TO BE PREPPED IN ACCORDANCE WITH STANDARD SSPC–SP2.
3. STRUCTURAL AND MISCELLANEOUS STEEL TO BE SHOP PRIMED WITH 1 COAT OF ZINC RICH PRIMER, 2 COATS ALKYD ENAMEL. COLOURS TO BE SPECIFIED BY THE OWNER.
4. TOUCH UP PAINT ON NEW TANKS AND EQUIPMENT, ONCE INSTALLATION IS COMPLETED.
5. CONTROL SYSTEM WHICH MEETS THE OPERATIONAL REQUIREMENTS AND PERFORMANCE SPECIFICATIONS INCLUDING ALL LEAK DETECTORS AND ALARMS MATCHING THE AUTOMATIC TANK GAUGE 'ATG–1' AND INVENTORY MANAGEMENT SYSTEM 'IMS–1'.
6. CONTRACTOR TO PROVIDE ALL NECESSARY ELECTRICAL/CONTROL COMPONENTS AND WIRING TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.
7. DURING CONSTRUCTION THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK SHOWN ON THE DESIGN DRAWINGS AND THAT OF WHICH IS INSTALLED AND PROVIDE AS–BUILT DRAWINGS.
8. THE CONTRACTOR SHALL REMOVE ALL WASTE MATERIALS AND CLEAN–UP TO THE ENGINEER'S SATISFACTION AT THE END OF THE JOB. CLEAN ALL NEW EQUIPMENT, TOUCH–UP FINISHES, AND RESTORE TO "AS NEW CONDITION".
9. PROVIDE 2 SETS OF O&M MANUALS AND AS–BUILT DRAWINGS. MANUALS TO BE REVIEWED BY THE CONSULTANT.
10. PROVIDE TRAINING TO THE MAINTENANCE PERSONNEL AT THE MARATHON PUBLIC WORKS FACILITY IN THE OPERATION AND MAINTENANCE OF THE NEW FUEL STORAGE/FILLING AND CONTROL SYSTEMS.
11. THE CONTRACTOR SHALL PROVIDE LICENSED AND CERTIFIED TRADESMAN TO PERFORM ALL WORK IN ACCORDANCE WITH ONTARIO REGULATION 216/01 AND 215/01, ESA, AND OTHERS APPLICABLE.
12. CONTAMINATED SOIL SAMPLING, TESTING BY TBT ENGINEERING. CONTRACTOR TO CARRY ALLOWANCES FOR REMEDIATION, REMOVAL, ETC. AS PER CONTRACT DOCUMENTS.
13. IF CONTAMINATED MATERIALS/SOILS ARE ENCOUNTERED DURING THE CONTRACT, AN IMMEDIATE HALT OF WORK SHALL BE ORDERED. THE CONTRACTOR IS TO NOTIFY THE CONSULTANT OF THE CONTAMINATION AND IDENTIFY THE LOCATION AND EXTENT OF CONTAMINATION. REMEDIATION ACTIONS WILL BE PERFORMED BY GUIDELINES. CONTRACT WORK WILL PROCEED WHEN INSTRUCTED BY THE CONSULTANT.
14. TEST AND COMMISSION NEW AND UPGRADED FUEL STORAGE AND CONTROL SYSTEMS.
15. COMMISSION THE NEW FUEL STORAGE SYSTEM IN ITS ENTIRETY AND PROVIDE ALL CERTIFICATION DOCUMENTATION, APPROVAL DOCUMENTATION, TEST REPORTS, AND WARRANTY INFORMATION.
16. SUBMIT SHOP DRAWINGS TO CONSULTANT PRIOR TO ORDERING EQUIPMENT.

PERFORMANCE SPECIFICATIONS

GENERAL

1. CONTROL PANEL TO A HAVE A NEMA 4X ENCLOSURE RATING.
2. AUTOMATIC TANK GAUGE PANEL (ATG–1) IS TO BE EQUIPPED WITH A LOCKABLE ENCLOSURE, SEALED WEATHERTIGHT COMPLETE WITH STRIP HEATER AND WINDOW FOR VISIBLE GAUGING OF TANK LEVEL VIA DIGITAL LEVEL DISPLAY.
3. AUTOMATIC TANK GAUGE PANEL (ATG–1) OPERATING TEMPERATURE RANGE OF 40°C TO –40°C OR BETTER.
4. PROVIDE ALL NECESSARY ELECTRICAL POWER AND CONTROL APPURTENANCES INCLUDING WIRING AND CABLE TRAY TO ENSURE A FULLY OPERATIONAL SYSTEM.
5. PROVIDE THE INSTRUMENTATION AND CONTROL EQUIPMENT AS SPECIFIED HEREIN AND AS INDICATED ON THE CONTRACT DRAWINGS.
6. INSTRUMENTATION AND CONTROLS SUPPLIER IS TO PROVIDE THE FOLLOWING:
   - –SUBMITTALS OF ALL EQUIPMENT SPECIFICATIONS, DRAWINGS, SCHEMATICS, AND COMPLETE INTERCONNECTING WIRING DIAGRAMS PRIOR TO PURCHASE AND INSTALLATION FOR REVIEW BY THE CONSULTANT.
   - –CONTROL SYSTEM O&M MANUALS (2 COPIES).
   - –TRAINING FOR MAINTENANCE AND OPERATIONS STAFF ON CONTROL SYSTEM OPERATION.
   - –CONTROL SYSTEM AS–BUILT DRAWINGS (6 COPIES).
7. PROVIDE ALL NECESSARY ADJUSTING, FIELD CALIBRATION, TESTING, AND COMMISSIONING OF CONTROL SYSTEM. SUBMIT WRITTEN TEST AND COMMISSIONING REPORT TO CONSULTANT FOR FINAL APPROVAL.
8. CONTROLS PERFORMANCE SPECIFICATIONS TO BE READ IN CONJUNCTION WITH SEQUENCE OF OPERATIONS FOR BULK TANK FILLING & DISPENSING.

BULK TANK LEVEL TRANSMITTER -DIESEL / DYED DIESEL / GASOLINE

1. OPERATING SIGNAL RANGE OF 4–20mA
2. LEVEL IS DISPLAYED ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI DISPLAY IN PERCENTAGE AND VOLUME IN LITRES.
3. LEVEL SIGNAL IS USED TO CALCULATE FUEL INVENTORY. TOTAL INVENTORY ON SITE IS DISPLAYED ON HMI.
4. IF ANALOG PROBE IS DISCONNECTED OR SIGNAL IS LOST:
   a. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   b. GENERATES HMI ERROR ALARM ON HMI DISPLAY.
   c. GENERATES HMI ALARM LOG ENTRY.
6. IF LOW LEVEL SET POINT IS REACHED:

   6600 L TANK COMPARTMENT (15% OF TANK VOLUME)

   a. AUTOMATIC TANK GAUGE PANEL (ATG–1) GENERATES A LOW LEVEL ALARM ON THE HMI DISPLAY.
   b. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   c. GENERATES HMI ALARM LOG ENTRY.
7. IF HIGH LEVEL SET POINT IS REACHED:

   6600 L TANK COMPARTMENT (88% OF TANK VOLUME)

   a. AUTOMATIC TANK GAUGE PANEL (ATG–1) GENERATES A HIGH LEVEL ALARM ON THE HMI DISPLAY.
   b. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   c. GENERATES HMI ALARM LOG ENTRY.
8. IF HIGH/HIGH LEVEL SETPOINT IS REACHED:

   6600 L TANK COMPARTMENT (90%) OF TANK VOLUME)

   a. AUTOMATIC TANK GAUGE PANEL (ATG–1) GENERATES A HIGH/HIGH LEVEL ALARM ON THE HMI DISPLAY.
   b. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   c. GENERATES HMI ALARM LOG ENTRY.

NOTE: MANUAL OVERFILL LIMITER VALVE TO BE SET TO 95% OF TANK VOLUME.

BULK TANK HI / HI / HI LEVEL SWITCH

1. IF HIGH/HIGH/HIGH LEVEL SETPOINT IS REACHED:

   6600 L TANK COMPARTMENT (95% OF TANK VOLUME)

   a. AUTOMATIC TANK GAUGE PANEL (ATG–1) GENERATES A HIGH/HIGH LEVEL ALARM ON THE HMI DISPLAY.
   b. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   c. GENERATES HMI ALARM LOG ENTRY.

NOTE: MANUAL OVERFILL LIMITER VALVE TO BE SET TO 95% OF TANK VOLUME.

BULK TANK AND SUMP LEAK DETECTOR

1. IF A LEAK IS DETECTED IN THE BULK TANK INTERSTITIAL SPACE, DISPENSER SUMPS, FILL/SPILL BOXES:
   a. POWER IS CUT OFF TO TURBINE PUMPS IN BULK TANKS.
   b. AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES, GENERATES A LEAK DETECTION ALARM INDICATING WHICH LEAK DETECTOR IS IN ALARM ON THE HMI DISPLAY.
   c. "INDICATOR LED" ON AUTOMATIC TANK GAUGE PANEL (ATG–1) HMI SCREEN FLASHES.
   d. GENERATES HMI ALARM LOG ENTRY.

LABELING OF EQUIPMENT

CONTRACTOR IS TO PROVIDE 3MIL VINYL LABELS AS FOLLOWS:

1. PRODUCT LABELS:
   a. INSTALLED ON ALL SIDES OF EACH TANK
   b. INSTALLED ON ALL PIPING
   c. TANK LABELS TO HAVE A CHARACTER HEIGHT OF 100mm
   d. PIPING LABELS TO HAVE A CHARACTER HEIGHT AND LABEL SPACING AS PER ANSI/ASME A13.1–2007
   e. ALL CHARACTERS ARE TO BE BLACK IN COLOUR
2. ENVIRONMENT CANADA IDENTIFICATION NUMBERS "EC XXXXXXXX":
   a. INSTALLED ON ALL SIDES OF EACH TANK (STORAGE, SUPPLY, DAY AND WASTE OIL TANKS)
   b. INSTALLED ON FUEL TRANSFER PUMP KIOSK & FUEL OFFLOAD KIOSK DOORS
   c. TANK AND KIOSK LABELS TO HAVE A CHARACTER HEIGHT OF 75mm
3. TANK BUNG LABELS:
   a. INSTALLED ADJACENT TO EACH TANK BUNG
   b. ALL BUNGS ARE TO BE LABELED. UNOCCUPIED BUNGS ARE TO BE LABELED 'SPARE'
   c. LABEL TO IDENTIFY MECHANICAL EQUIPMENT OR PIPING OCCUPYING THE TANK BUNG (IE: LEVEL GAUGE, DIP PORT, FUEL OIL SUPPLY, ETC.)
   d. BUNG LABELS TO HAVE A CHARACTER HEIGHT OF 25mm
3. EQUIPMENT LABELS:
   a. LABELS TO HAVE A CHARACTER HEIGHT OF 75mm
   b. FUEL TRANSFER PUMPS
   c. FILL/SPILL BOXES

CONTRACTOR IS TO LABEL ALL VALVES, GAUGES AND STRAINERS IN THE SYSTEM WITH PLASTIC TAGS COMPLETE WITH STAINLESS STEEL BEADED CHAIN. TAGS SHALL HAVE A SHAPE, SIZE, AND COLOUR IN ACCORDANCE WITH CANADIAN FUELS ASSOCIATION COLOUR–SYMBOL SYSTEM TO MARK EQUIPMENT AND VEHICLES FOR PRODUCT IDENTIFICATION.

CONTRACTOR IS TO PROVIDE LAMECOID LABELS FOR EACH SYSTEM CONTROL PANEL.

EQUIPMENT LIST

FS–1 FUELING STATION	WESTEEL PACKAGED SKID MOUNTED TRIPLE COMPARTMENT FUELING STATION CONSISTING OF THE FOLLOWING COMPONENTS: PRODUCT No.HFV20000L TRIPLE COMPARTMENT DD/D/G HORIZONTAL FUEL VAULT KIT SUPPLIED COMPLETE WITH MODEL HFV – 20,000L (4400 IMP. GAL.) 2375ø (93 1/2"ø) TANK, THREE (3) 610mm SPILLBOX/TANK ACCESS OPENING (ONE PER COMPARTMENT) WITH 50ø NPT GAUGE STICK PORT WITH CAMLOCK AND DUSTCAP AND ONE (1) 19mm NPT FITTING AND PLUG, ONE (1) 75mm NPT NORMAL VENT FITTING, INTEGRAL PRIMARY AND SECONDARY EMERGENCY VENTS, TWO (2) 100mm NPT FITTINGS, ONE (1) 50mm SECONDARY INSPECTION FITTING, TWO (2) 610mm WIDE SADDLES, TWO (2) GROUNDING LUGS, WHITE FINISH, ULC S601–14 RATING, GAUGE STICK (SHIPPED LOOSE) AND TANK GAUGE (SHIPPED LOOSE) THREE (3) PRODUCT No.900062 PIPE 3.00x48.00 (1219) ALUM TOE TWO (2) PRODUCT No.900062 VENT 75mm ATMOSPHERIC 354–0300–AV ONE (1) PRODUCT No. 276871 VENT 75mm PRESSURE/VACUUM 749S–1100–AV (8oz. PRESSURE SETTING/0.5oz. VACUUM SETTING) TWO (2) PRODUCT No.TL113 QMT HFV SPLIT – 2375mmø (93 1/2"ø) SPLIT COMPARTMENT OPTION SUPPLIED COMPLETE WITH DOUBLE BULKHEAD WITH 50mm INSPECTION PORT WITH CAMLOCK AND DUSTCAP. ONE (1) PRODUCT No.TL138 QMT HFV SKID – 20,000L STD SUPPLIED COMPLETE WITH W8x18 A36/44W BEAMS, 100mm NPS SCHEDULE 40 TOW PIPE BOTH ENDS, WHITE FINISH ONE (1) PRODUCT No.TL175 QMT HFV SIDE LADDER/PLATFORM – 2375mm (93 1/2") SPLIT SIDE MOUNT LADDER PACKAGE SUPPLIED COMPLETE WITH 610mm WIDE PLATFORM ACCESS LADDER, 610mmW x 1830mmL PLATFORM WITH GALVANIZED GRATING WALKING SURFACE AND GALVANIZED STEEL HANDRAIL ON BOTH SIDES, WHITE FINISH FOR LADDER, CATWALK FRAME AND TOEPLATES. ONE (1) PRODUCT No.TL230 QMT ACC EXTRA CATWALK SECTION SUPPLIED COMPLETE WITH 610mmW x 1830mmL PLATFORM WITH GALVANIZED GRATING WALKING SURFACE AND GALVANIZED STEEL HANDRAIL ON BOTH SIDES, WHITE FINISH FOR CATWALK FRAME AND TOEPLATES. THREE (3) PRODUCT No.TL164 QMT PUMP PKG B 94 FEP 75 STP SINGLE HOSE INSTALLED PUMP PACKAGE SUPPLIED COMPLETE WITH 3/4hp 220 VAC SUBMERSIBLE TURBINE PUMP WITH ANTI–SIPHON KIT, PRE–WIRED INSPECTION READY PUMP CONTROLLER. THREE (3) REMOTE TOP FILL FOR EACH COMPARTMENT. THREE (3) PRODUCT No.TL351 QMT OVERFILL VALVE MRSN 9095x2" INSTALLED MORRISON FIGURE 9095X 50mm OVERFILL PREVENTION VALVE WITH ALUMINUM DROP TUBE. THREE (3) PRODUCT No.TL394ULC QMT HFV VERT. ULC RTF – 93 1/2" TANK BOTTOM FILL SUPPLIED COMPLETE WITH 75mm NPS 150# FLANGED PIPE, 715–TF5–3MB0–0 75mm 38 LITER (10 GAL.) REMOTE FILL BOX, 75mm ALUMINUM DROP PIPE, 75mm NPS ALUMINUM INLET CONNECTION WITH DUSTCAP AND INTEGRAL DRIP TRAY WITH COVER, WHITE FINISH. THREE (3) PRODUCT No.101307 PULSER MODEL 800–F THREE (3) PRODUCT No.900805 E VENT 6 EXTENSION SUPPLIED COMPLETE WITH INSTALLATION HARDWARE. SHIPPED LOOSE FOR FIELD INSTALLATION. TWO (2) FACTORY INSTALLED DISPENSER SUMPS COMPLETE WITH ALL PIPING, FITTINGS AND SHEAR VALVES. SUMPS SHALL BE COMPATIBLE WITH FUEL DISPENSERS FD–1 AND FD–2.
FD–1 FUEL DISPENSER (CLEAR AND DYED DIESEL)	GASBOY ATLAS 9800 SERIES ELECTRONIC DISPENSER, MODEL 9853KXTW2 HI–FLOW TWIN 2 DISPENSER, ELECTRONIC REGISTER, 83 L/MIN (22 GPM) FLOW RATING SUPPLIED COMPLETE WITH 25mm HIGH LCD DISPLAY WITH LED BACKLIGHT, LED LIGHTING TO IDENTIFY FUEL GRADE AND ILLUMINATED FRONT PANEL, FOUR PISTON CFT METER WITH FLOW THROUGH CENTER CHAMBER, 25mm INTERNAL PIPING, OPTIONAL PULSE OUTPUT FOR 3rd PARTY CONTROLLERS, ATLAS STANDARD DISPENSER INLET CENTERING KIT M07676K001, 115/1/60 POWER AND FOLLOWING COMPONENTS: DISPENSER NOZZLE –TWO (2) REQUIRED OPW 11B PRESSURE SENSITIVE AUTOMATIC NOZZLE, MODEL: 11B–0900–B20, COMPLETE WITH YELLOW 2 PIECE HANDWARMER AND FILL GUARD, HOLD OPEN RACK, 19mmø (3/4"ø) NPT INLET, 23mmø (15/16"ø) OD SPOUT, SUITABLE FOR B20 BIODIESEL. DISPENSER HOSE –TWO (2) REQUIRED CONTITECH/GOODYEAR BC COLD FLEX HOSE ASSEMBLY, 19mmø (3/4"ø) HOSE, MAXIMUM W.P. 345 KPA (50 PSI), 7.62M (25'–0") LENGTH, COMPLETE WITH 19mmø (3/4"ø) SOLID X 19mmø (3/4"ø) SWIVEL CRIMPED NPT END FITTINGS. COMPONENTS TO BE APPROVED, ASSEMBLED, MARKED, AND TESTED PER ULC REQUIREMENTS. HOSE BUSHING –QUANTITY AS REQUIRED OPW HOSE BUSHING TO SUIT HOSE INSTALLATION. HOSE RETRIEVER –TWO (2) REQUIRED UNIVERSAL HOSE RETRIEVER, MODEL: 871 MOUNTED ONTO 6.1M (10'–6") HIGH 50mmø (2"ø) GALVANIZED PIPE COMPLETE WITH BASE AND COUNTERWEIGHTS. HOSE BUN –TWO (2) REQUIRED UNIVERSAL HOSE BUN, MODEL: 100HB–100 SUITABLE FOR 19mmø (3/4"ø) ID HOSE. BREAKAWAY –TWO (2) REQUIRED OPW 66REC RECONNECTABLE BREAKAWAY, MODEL: 66REC–1000, 19mmø (3/4"ø) NPT SWIVEL –TWO (2) REQUIRED OPW 45 HOSE SWIVEL, MODEL: 45–5060, 19mm (3/4") MNPT X 19mm (3/4") FNPT WHIP HOSE –TWO (2) REQUIRED CONTITECH/GOODYEAR BC COLD FLEX HOSE ASSEMBLY, 19mmø (3/4"ø) HOSE, MAXIMUM W.P. 345 KPA (50 PSI), 250mm (9") LENGTH, COMPLETE WITH 19mmø (3/4"ø) SOLID X 19mmø (3/4"ø) SWIVEL CRIMPED NPT END FITTINGS. COMPONENTS TO BE APPROVED, ASSEMBLED, MARKED, AND TESTED PER ULC REQUIREMENTS. AUTOMATIC FIRE SUPPRESSION –ONE (1) REQUIRED OPW FLEXWORKS AUTOMATIC FIRE SUPPRESSION SYSTEM. MODEL: FSS–50. FUSIBLE LINK TO ACTIVATE AT 79°C (173°F) PARTICULATE FILTER –TWO (2) REQUIRED DONALDSON PARTICULATE FILTER, MODEL: DBB8777 COMPLETE WITH DONALDSON SINGLE FILTER HEAD, MODEL: P570330, 32mmø (1 1/4"ø) NPT PORTS COMPLETE WITH DIFFERENTIAL GAUGE WATER ABSORBING FILTER –TWO (2) REQUIRED DONALDSON WATER ABSORBING FILTER, MODEL: DBB0248 COMPLETE WITH DONALDSON SINGLE FILTER HEAD, MODEL: P570330, 32mmø (1 1/4"ø) NPT PORTS COMPLETE WITH DIFFERENTIAL GAUGE
FD–2 FUEL DISPENSER (GASOLINE)	GASBOY ATLAS 9800 SERIES ELECTRONIC DISPENSER, MODEL 9853KX HI–FLOW SINGLE DISPENSER, ELECTRONIC REGISTER, 83 L/MIN (22 GPM) FLOW RATING SUPPLIED COMPLETE WITH 25mm HIGH LCD DISPLAY WITH LED BACKLIGHT, LED LIGHTING TO IDENTIFY FUEL GRADE AND ILLUMINATED FRONT PANEL, FOUR PISTON CFT METER WITH FLOW THROUGH CENTER CHAMBER, 25mm INTERNAL PIPING, OPTIONAL PULSE OUTPUT FOR 3rd PARTY CONTROLLERS, ATLAS STANDARD DISPENSER INLET CENTERING KIT M07676K001, 115/1/60 POWER AND FOLLOWING COMPONENTS: DISPENSER NOZZLE –ONE (1) REQUIRED OPW 11B PRESSURE SENSITIVE AUTOMATIC NOZZLE, MODEL: 11B–0900–B20, COMPLETE WITH YELLOW 2 PIECE HANDWARMER AND FILL GUARD, HOLD OPEN RACK, 19mmø (3/4"ø) NPT INLET, 23mmø (15/16"ø) OD SPOUT, SUITABLE FOR B20 BIODIESEL. DISPENSER HOSE –ONE (1) REQUIRED CONTITECH/GOODYEAR BC COLD FLEX HOSE ASSEMBLY, 19mmø (3/4"ø) HOSE, MAXIMUM W.P. 345 KPA (50 PSI), 7.62M (25'–0") LENGTH, COMPLETE WITH 19mmø (3/4"ø) SOLID X 19mmø (3/4"ø) SWIVEL CRIMPED NPT END FITTINGS. COMPONENTS TO BE APPROVED, ASSEMBLED, MARKED, AND TESTED PER ULC REQUIREMENTS. HOSE BUSHING –QUANTITY AS REQUIRED OPW HOSE BUSHING TO SUIT HOSE INSTALLATION. HOSE RETRIEVER –ONE (1) REQUIRED UNIVERSAL HOSE RETRIEVER, MODEL: 871 MOUNTED ONTO 6.1M (10'–6") HIGH 50mmø (2"ø) GALVANIZED PIPE COMPLETE WITH BASE AND COUNTERWEIGHTS. HOSE BUN –ONE (1) REQUIRED UNIVERSAL HOSE BUN, MODEL: 100HB–100 SUITABLE FOR 19mmø (3/4"ø) ID HOSE. BREAKAWAY –ONE (1) REQUIRED OPW 66REC RECONNECTABLE BREAKAWAY, MODEL: 66REC–1000, 19mmø (3/4"ø) NPT SWIVEL –ONE (1) REQUIRED OPW 45 HOSE SWIVEL, MODEL: 45–5060, 19mm (3/4") MNPT X 19mm (3/4") FNPT FLOW REGULATOR –ONE (1) REQUIRED OPW 44 FLOW LIMITER, MODEL: 44–0044, 19mm (3/4") FNPT X 19mm (3/4") FNPT WHIP HOSE –ONE (1) REQUIRED CONTITECH/GOODYEAR BC COLD FLEX HOSE ASSEMBLY, 19mmø (3/4"ø) HOSE, MAXIMUM W.P. 345 KPA (50 PSI), 250mm (9") LENGTH, COMPLETE WITH 19mmø (3/4"ø) SOLID X 19mmø (3/4"ø) SWIVEL CRIMPED NPT END FITTINGS. COMPONENTS TO BE APPROVED, ASSEMBLED, MARKED, AND TESTED PER ULC REQUIREMENTS. AUTOMATIC FIRE SUPPRESSION –ONE (1) REQUIRED OPW FLEXWORKS AUTOMATIC FIRE SUPPRESSION SYSTEM. MODEL: FSS–50. FUSIBLE LINK TO ACTIVATE AT 79°C (173°F) FILTER –ONE (1) REQUIRED CIMTEK 70012 DISPENSER FILTER, MODEL: 300–30, PARTICULATE FILTER COMPLETE WITH 50002 CAST IRON MOUNTING ADAPTER, 25mmø (1"ø) NPT INLET AND OUTLET

EQUIPMENT LIST -CONTINUED

ATG–1 AUTOMATIC TANK GAUGE PANEL ONE (1) REQ'D	VEEDER ROOT MODEL TLS–450PLUS AUTOMATIC TANK GAUGE SYSTEM SUPPLIED COMPLETE WITH PART No.860091–401 TLS–450PLUS CONSOLE WITH 205mm (8") WVGA COLOUR TOUCH SCREEN DISPLAY, NO PRINTER, THREE (3) ETHERNET AND DUAL USB/EXPANSION, DUAL RS–232, UL/cUL, PART No.333545–001 APPLICATION SOFTWARE WITH WEB–ENABLED STORAGE, TLS EXPANSION, STATIC LEAK DETECTION, 3GPH DPLLD, STANDARD HARDWARE INCLUDING 3 PORT ETHERNET MODULE (COMM SLOT 4), 2 PORT USB MODULE (COMM SLOT 5), 3 MODULE COMPARTMENTS, PART No.332812–001 FACTORY INSTALLED MODULE WITH UNIVERSAL SENSOR MODULE (USM) INTERFACE FOR ALL PROBES, SENSORS AND DPLLD, PART No.332813–001 FACTORY INSTALLED MODULE WITH UNIVERSAL INPUT/OUTPUT INTERFACE MODULE (UIOM) FOR RELAY CONTROL AND INPUT SIGNAL MONITORING, SUITABLE INPUTS FOR THREE (3) HIGH LEVEL SWITCHES INDEPENDENT OF MAG LEVEL GAUGES FOR TANK LEVEL MONITORING, MODULES AS REQUIRED TO SUIT INSTALLATION OF EIGHT (8) LEAK DETECTORS (3 LEAK DETECTORS SUITABLE FOR GASOLINE, 5 DETECTORS SUITABLE FOR #2 DIESEL FUEL), 120V POWER
IMC–1 INVENTORY MANAGEMENT CONTROL ONE (1) REQ'D	COMPUTROL SIMCOM FUEL MANAGEMENT SYSTEM SUPPLIED COMPLETE WITH NEMA R3 RATING, THERMOSTATICALLY CONTROLLED HEATER, INSULATED WEATHER COVER, TANK LEVEL MONITORING SYSTEM INTERFACE, CARD/CODE CAPACITY, TRANSACTION MEMORY, 1–32 HOSE CAPACITY, STAINLESS STEEL KEY PAD, ALPHA–NUMERIC KEYPAD ENTRY, FULL COLOUR SCREEN, PROXIMITY CARD/FOB, MAG STRIPE AND COIL CARD READER/CARD TYPES, TRANSACTION/DAILY/POLLING LIMITS, FUEL LIMIT PER CARD CODE CAPABILITIES, PRODUCT REGISTRATION, PRODUCT GRADES, 2–CARD DRIVER/VEHICLE SYSTEM, WEB–BASED MANAGEMENT SOFTWARE AND SQL DATABASE HOSTED IN THE 'CLOUD', REAL–TIME/POLLING INTERVAL DATA SYNC WITH SOFTWARE, ODOMETER/HOURMETER VERIFICATION, CUSTOM MESSAGES, AUDIT PRINTER SUPPORT, AUTOMATIC SWITCHING BETWEEN REAL–TIME AND STANDALONE OPERATION MODES IN THE EVENT OF NETWORK COMMUNICATIONS FAILURE, MULTI–LAYER SECURITY AND ENCRYPTION METHODS AND 110–120/1/60 POWER.
ICP–1 INVENTORY CONTROL PROBE TWO (2) REQ'D	VEEDER ROOT PART No.846397–3XX STAINLESS STEEL MAG PLUS IN–TANK PROBE SUPPLIED COMPLETE WITH HIGH GRADE POLYMER CANISTER WITH WATER DETECTION AND NO LEAK DETECTION/INVENTORY ONLY, PART No.332812–001 PROBE INTERFACE MODULE WITH UNIVERSAL SENSOR MODULE (USM) INTERFACE FOR PROBES, SENSORS AND DPLLD, 4 MODULES PER CONSOLE, 16 PROBE INPUTS PER MODULE, PART No.846400–1X1 MAG PLUS DIESEL FLOAT KIT AND PART No.312020–984 AST INSTALLATION KIT.
ICP–2 INVENTORY CONTROL PROBE ONE (1) REQ'D	VEEDER ROOT PART No.846397–3XX STAINLESS STEEL MAG PLUS IN–TANK PROBE SUPPLIED COMPLETE WITH HIGH GRADE POLYMER CANISTER WITH WATER DETECTION AND NO LEAK DETECTION/INVENTORY ONLY, PART No.332812–001 PROBE INTERFACE MODULE WITH UNIVERSAL SENSOR MODULE (USM) INTERFACE FOR PROBES, SENSORS AND DPLLD, 4 MODULES PER CONSOLE, 16 PROBE INPUTS PER MODULE, PART No.No.846400–1X0 MAG PLUS GASOLINE FLOAT KIT AND PART No.312020–984 AST INSTALLATION KIT.
HLS–1 HI/HI/HI LEVEL/ALARM SENSOR THREE (3) REQ'D	KTECH INDUSTRIES PRODUCTS INC. PART No.FS801E–1 OVERFILL PROTECTION DEVICE SUPPLIED COMPLETE WITH 8mm (5/16") O.D. STAINLESS STEEL STEM, 25mmø (1"ø) 316 STAINLESS STEEL FLOAT, 25mm (1") NPT BUSHING, EXPLOSION PROOF J–BOX, FACTORY SET NORMALLY OPEN (NO) CONTACT ARRANGEMENT, 120V DC/AC MAXIMUM SWITCHING VOLTAGE, 0.4 AMPS DC/AC MAXIMUM SWITCHING CURRENT, 50 VOLT/AMPS DC/AC MAXIMUM SWITCHING POWER. NOTE: CONTRACTOR SHALL CONFIRM LENGTH REQUIREMENTS BASED ON 95% HI/HI TANK LEVEL
LD–1 LEAK DETECTOR THREE (3) REQ'D	VEETER ROOT PART No.794390–420 INTERSTITIAL SENSOR SUPPLIED COMPLETE WITH 4880mm (16'–0") LONG CABLE, SUITABLE FOR ANNULAR SPACES, GAS/DIESEL FUEL COMPATIBILITY, 64x38ø (2 1/2" x 1 1/2"ø) SENSOR AND PART No.312020–928 50mm (2") INTERSTITIAL SENSOR RISER CAP AND ADAPTOR KIT.
LD–2 LEAK DETECTOR FIVE (5) REQ'D	VEETER ROOT PART No.794390–420 INTERSTITIAL SENSOR SUPPLIED COMPLETE WITH 4880mm (16'–0") LONG CABLE, SUITABLE FOR ANNULAR SPACES, GAS/DIESEL FUEL COMPATIBILITY AND 64x38ø (2 1/2" x 1 1/2"ø) SENSOR.
FE–3 FIRE EXTINGUISHER TWO (2) REQ'D	NATIONAL FIRE EQUIPMENT LIMITED MODEL B10P (PART NUMBER 23778) BADGER PURPLE 'K' DRY CHEMICAL FIRE EXTINGUISHER SUPPLIED COMPLETE WITH 10lbs CAPACITY, 80–B:C UL FIRE RATING, PURPLE 'K' AGENT TYPE, 0.45 lb/SEC AGENT FLOW RATE, STEEL CYLINDER, PLATED BRASS VALVE, STAINLESS STEEL HANDLER/LEVER, NITROGEN EXPELLANT, –40°C TO 48.9°C TEMPERATURE RANGE AND NATIONAL FIRE EQUIPMENT LIMITED MODEL CE–1000 HEAVY DUTY OUTDOOR SERIES SURFACE MOUNTED FIRE EXTINGUISHER CABINET SUPPLIED WITH 16ga. GALVANEAL CONSTRUCTION, POLYESTER POWDER COAT RED PAINT FINISH, STYLE 2 STAINLESS STEEL PADDLE LATCH WITH 151 KEYED CYLINDER LOCK, STAINLESS STEEL PIANO HINGE, NEOPRENE GASKET AND UV RESILIENT DECAL.
SPILL KIT	LARGE SPILL KIT SUPPLIED COMPLETE WITH SOCKS, PADS AND ACCESSORIES FOR ABSORPTION OF UP TO 250L (65 GAL) OF FUEL

Date	Revision	
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER	0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
D. W. SHALLEY
July 28/22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
SCOPE OF WORK, SPECIFICATIONS
AND EQUIPMENT LIST

Drawn By: ER	Checked By: DS
Scale: N/A	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	
Drawing No: M801	

DEMAND LOAD CALCULATION

RULES 8-002, 8-210, TABLE 14 - OFFICE LOAD OF 50 W/M						LOAD (WATTS)
OFFICE SPACE (M^2 X 50 W/M^2)						16189
GARAGE (M^2 X 10 W/M^2)						13235
EXISTING EQUIPMENT	QUANTITY	AMPERAGE	VOLTS	PHASE	EFFECTIVE VOLTAGE	
Mig Welder	1	50	208	1	208	10400
Stick Welder	1	50	208	1	208	10400
Plasma Cutter	1	50	208	1	208	10400
Bench Grinder	1	15	120	1	120	1800
Cut Off Saw	1	15	120	1	120	1800
5" Grinder	1	10	120	1	120	1200
5" Grinder	1	10	120	1	120	1200
Drill Press	1	8	120	1	120	960
Tire Changer	1	15	120	1	120	1800
Balancer	1	10	208	1	208	2080
Parts Washer	1	7	120	1	120	840
Chop Saw	1	15	120	1	120	1800
7" Grinder	1	15	120	1	120	1800
Delta Drill Press	1	6	120	1	120	720
Combo Press	1	12	120	1	120	1440
Impact	1	6.5	120	1	120	780
Batter Charger	1	15	120	1	120	1800
Table Saw	1	30	208	1	208	6240
Drill Press	1	15	120	1	120	1800
Miter Saw	1	15	120	1	120	1800
NEW EQUIPMENT						
RTU-1	1	14.8	208	3	360	5326
HRU-1	1	3.5	600	3	1038	3633
HRU-1 Condenser	1	26.9	208	3	360	9680
HRU-2	1	11.2	208	3	360	4030
HRU-2 Condenser	1	17.9	208	1	208	3723
HRU-3	1	21.1	600	3	1038	21902
HRU-3 Condenser	1	38	600	3	1038	39444
Destratification Fans DF-1 & 2	2	15	208	1	208	6240
Vehicle Exhaust VES 1 & 2	2	9	600	3	1038	18684
Boilers B-1 & 2	2	15	120	1	120	3600
Boiler Circ Pumps BCP-1 & 2	2	6.6	120	1	120	1584
Main Circ Pumps P-1 & 2	1	6.6	208	1	208	1373
Glycol Feeder GF-1	1	15	120	1	120	1800
TSPM-1, 2 & 3	1	15	120	1	120	1800
Air Compressor AC-1	1	26	600	3	1038	26988
Wash bay System	1	70	600	3	1038	72660
Wash bay MUA	1	5	600	3	1038	5190
Wash Bay Exhaust Fan	1	5	600	3	1038	5190
Overhead Crane	1	33.3	600	3	1038	34565
Overhead Door Operators	13	10	120	1	120	15600
EV Charging Ports	5	40	208	1	208	41600
DC Fast Chargers (150kW each)	3				0	450000
Oil Filter Crusher	1	30	208	1	208	6240
Vehicle Lift	1	28	208	3	360	10076
TOTAL						881412
BUILDING SERVICE SIZE						
TOTAL BUILDING LOAD						881412
CURRENT DRAW (AMPS) @ 600V, 3 PHASE						849

SERVICE SIZE = 1000 AMPS @ 600V, 3 PHASE, 100% RATED

SHORT CIRCUIT CALCULATION

PRIMARY VOLTAGE OF THE TRANSFORMER (VOLTS)	750000
SECONDARY VOLTAGE OF THE TRANSFORMER (VOLTS)	600
TRANSFORMER IMPEDANCE %	2
TRANSFORMER LET-THROUGH SHORT-CIRCUIT CURRENT (F)	722.54
MULTIPLIER (M)	50
SECONDARY FAULT CURRENT AT THE TRANSFORMER (AMPS)	36127
LENGTH OF SECONDARY CABLING TO MAIN SERVICE ENTRANCE BOARD (FEET)	115
C' VALUE FOR 400 MCM ALUMINUM IN NON-METALLIC CONDUIT	21391
QUANTITY OF CABLES PER PHASE	2
TRANSFORMER LET-THROUGH SHORT-CIRCUIT CURRENT (F)	0.28
MULTIPLIER (M)	0.7812
AVAILABLE FAULT CURRENT AT MAIN SERVICE ENTRANCE BOARD (AMPS)	28224

ELECTRICAL LEGEND

LIGHTING	
	LED LIGHT FIXTURE - AS DESCRIBED
	LED LIGHT FIXTURE - CEILING MOUNTED
	LED LIGHT FIXTURE - POLE MOUNTED
	LED LIGHT FIXTURE - WALL MOUNTED
P	PHOTO CELL
LIGHTING CONTROLS	
	SINGLE POLE SWITCH
	2 GANG SWITCH
3W	THREE WAY SWITCH
4W	FOUR WAY SWITCH
	DIMMER SWITCH
	OCCUPANCY SENSOR - WALL MOUNTED
	CEILING MOUNTED OCCUPANCY SENSOR
EXIT / EMERGENCY LIGHTING	
	LED EXIT LIGHT FIXTURE - CEILING MOUNTED
	LED EXIT LIGHT FIXTURE - WALL MOUNTED
	EMERGENCY LIGHTING BATTERY PACK
	EMERGENCY LIGHTING BATTERY PACK C/W REMOTE HEAD(S)
	EMERGENCY LIGHTING UNIT REMOTE HEAD(S)
RECEPTACLES	
	DUPLEX RECEPTACLE
F	DEDICATED FRIDGE RECEPTACLE
M	DEDICATED MICROWAVE RECEPTACLE
DW	DEDICATED RECEPTACLE - RESIDENTIAL DISHWASHER
	RECEPTACLE - MOUNTED ABOVE COUNTER (RECEPTACLE AS DESCRIBED)
	GFI RECEPTACLE
	GFI RECEPTACLE - MOUNTED ABOVE COUNTER
C.R.L.	CEILING MOUNTED CORD REEL
WP	DENOTES WEATHERPROOF DEVICE
20A	DENOTES 20 AMP DEVICE
IPLC	INTELLIGENT PARKING LOT CONTROLLER
	SINGLE RECEPTACLE
W	DEDICATED WASHER RECEPTACLE
D	DRYER OUTLET

ELECTRICAL LEGEND

COMMUNICATIONS	
	VOICE/ DATA OUTLET
WIFI	DATA DROP FOR WIRELESS ACCESS POINT
SECURITY	
	ELECTRIC STRIKE
CR	CARD READER
C	SECURITY CAMERA
FIRE ALARM	
	MANUAL PULL STATION
	AUTOMATIC FIRE DETECTOR - RATE OF RISE 135°
	AUTOMATIC FIRE DETECTOR - FIXED 135°
	PHOTOELECTRIC SMOKE DETECTOR
m	DUCT TYPE SMOKE DETECTOR
	FIRE ALARM HORN/STROBE
	FIRE ALARM STROBE
FAP	FIRE ALARM PANEL
FAA	FIRE ALARM ANNUNCIATOR
MON	FIRE ALARM MONITORING CABINET
LED	DUCT SMOKE REMOTE LED INDICATOR
ELECTRICAL SYSTEMS	
JB	JUNCTION BOX
HT	HEAT TRACE
	SPECIAL PURPOSE OUTLET - AS DESCRIBED
	MOTOR RATED SWITCH
	DISCONNECT SWITCH
WP	DISCONNECT SWITCH - WEATHER PROOF
	MAGNETIC MOTOR STARTER
M	SINGLE PHASE MOTOR
	THREE PHASE MOTOR
	OVERHEAD DOOR OPERATOR
HP	HYDRO POLE
PL	SWITCH WITH PILOT LIGHT
ACCESSIBILITY	
	PUSH BUTTON - AS DESCRIBED
	BARRIER FREE DOOR OPP.
	CALL FOR ASSISTANCE HORN/STROBE

DRAWING LIST

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

0	ISSUED FOR PERMIT AND TENDER	JULY 29 / 22
Revision		Date

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

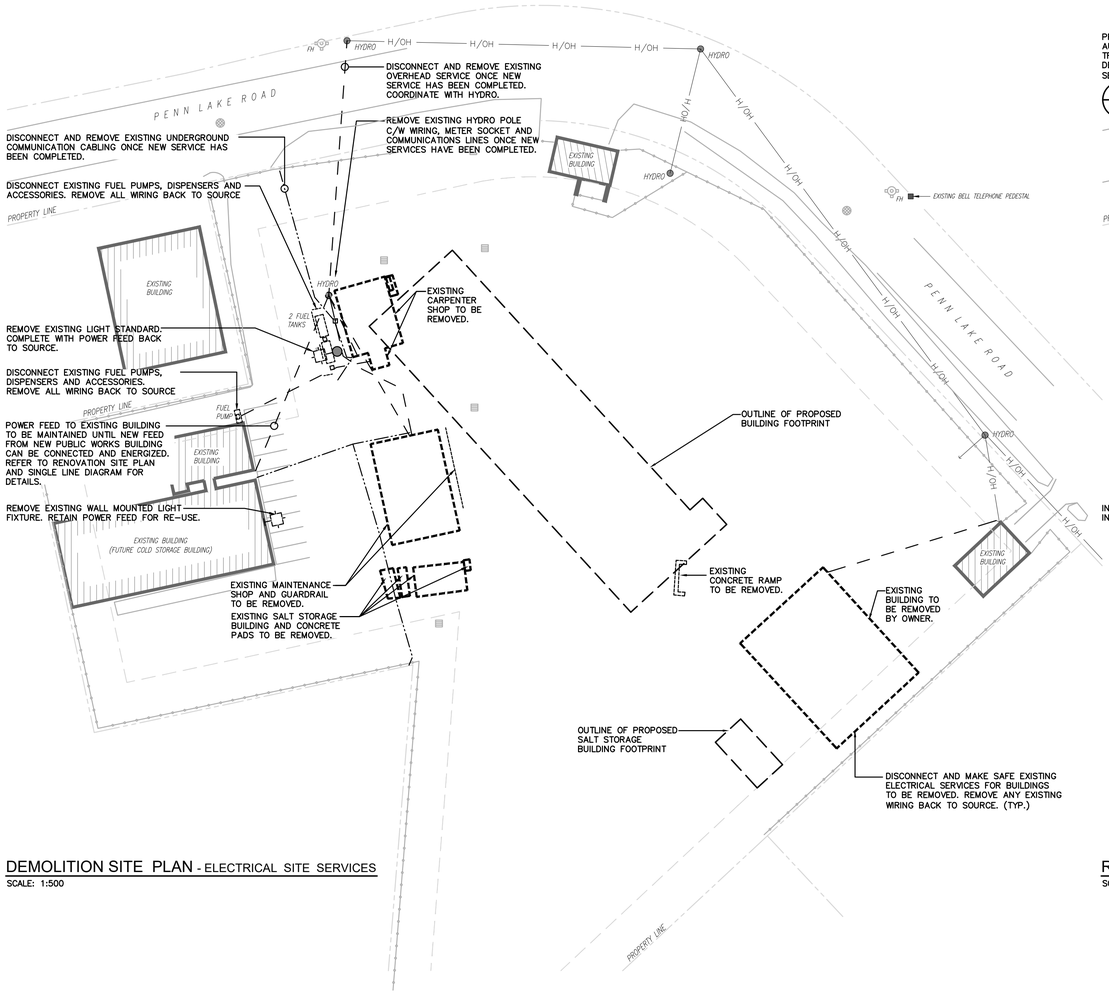
Drawing Title:
ELECTRICAL LEGEND
DEMAND LOAD
SHORT CIRCUIT CALCULATION

Drawn By: NL	Checked By: JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E001

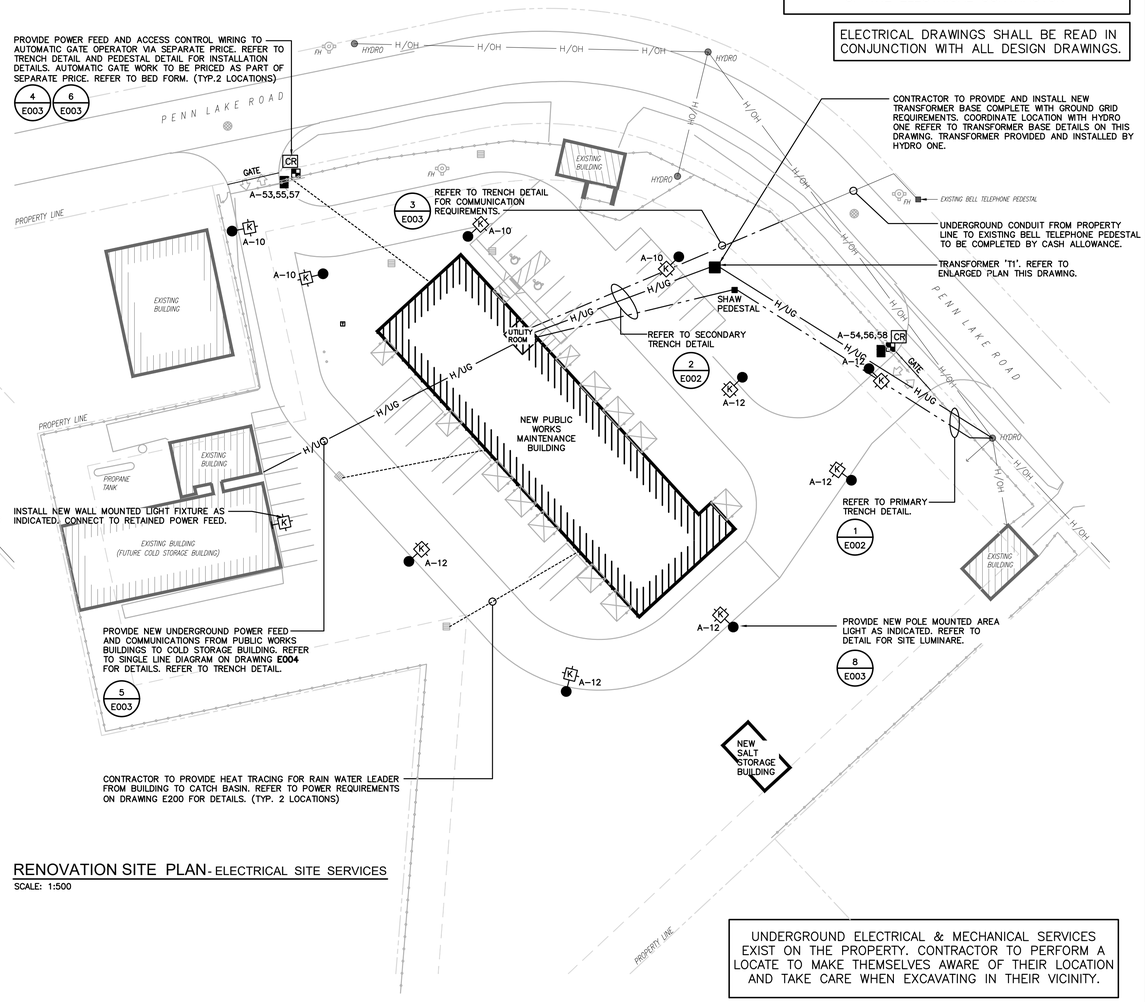
ALL TRENCHING, AND CONCRETE BASES, INDICATED HEREIN, SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.



DEMOLITION SITE PLAN - ELECTRICAL SITE SERVICES

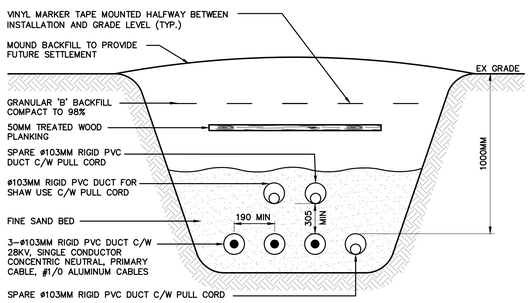
SCALE: 1:500



RENOVATION SITE PLAN - ELECTRICAL SITE SERVICES

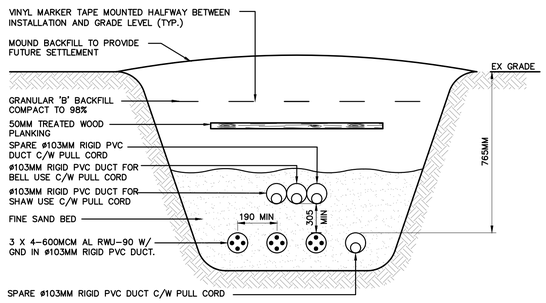
SCALE: 1:500

UNDERGROUND ELECTRICAL & MECHANICAL SERVICES EXIST ON THE PROPERTY. CONTRACTOR TO PERFORM A LOCATE TO MAKE THEMSELVES AWARE OF THEIR LOCATION AND TAKE CARE WHEN EXCAVATING IN THEIR VICINITY.



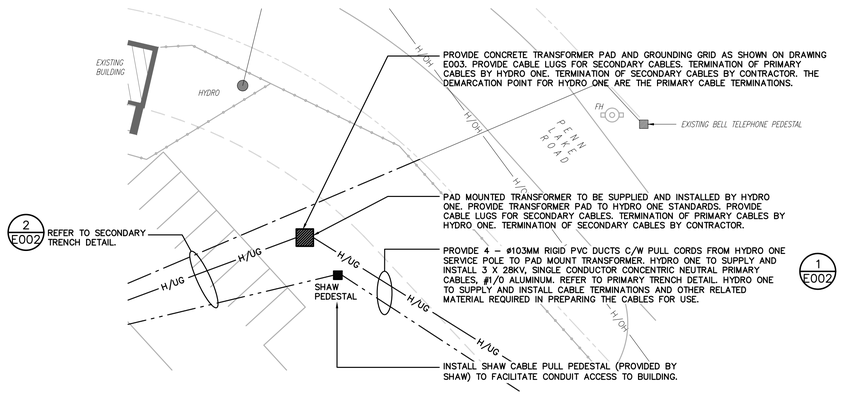
1 E002 TRENCH DETAIL - PRIMARY FEED TO TRANSFORMER

SCALE: N.T.S.



2 E002 TRENCH DETAIL - SECONDARY FEED - TRANSFORMER TO BUILDING

SCALE: N.T.S.



ENLARGED PARTIAL SITE PLAN - ELECTRICAL SITE SERVICES - PAD MOUNTED TRANSFORMER & POWER FEEDS

SCALE: 1:300

0	ISSUED FOR PERMIT AND TENDER	JULY 29 / 22
Revision		Date

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
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Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

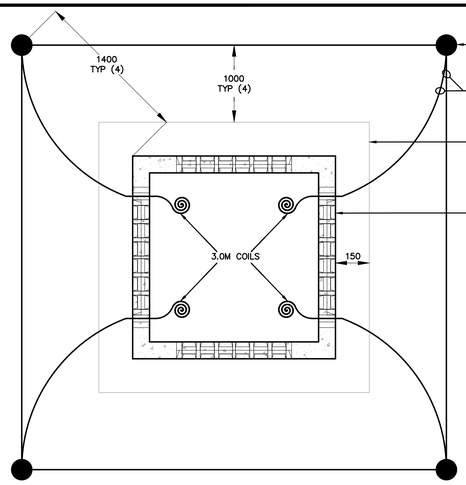
TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
DEMOLITION AND RENOVATION SITE PLANS
ELECTRICAL SITE SERVICES
ELECTRICAL DETAILS

Drawn By: NL	Checked By: JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E002



19 X 3000 GROUND ROD TYP. 4

#2/0 AWG COPPER BARE GROUND GRID TYP. AT 300MM DEPTH AND 1000MM AROUND FOUNDATION.

TAMPERED GRAVEL OUTLINE 20mm TAMPERED CLEAR GRAVEL FOR A DEPTH OF 305MM BELOW PRECAST BASE

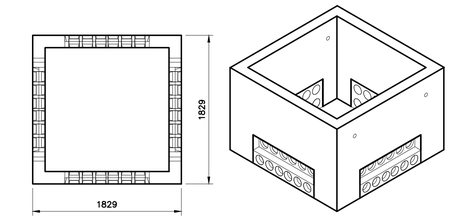
PRE-CAST CONCRETE FOUNDATION

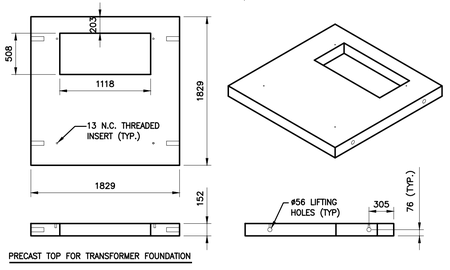
NOTES:

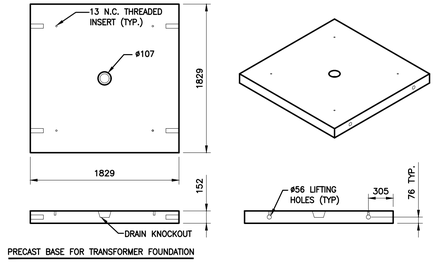
1. ALL CONNECTIONS TO THE TRANSFORMER GROUND RODS THAT ARE TO BE PERMANENTLY BURIED SHALL BE MADE WITH APPROVED THERMITE WELD, COMPRESSION CONNECTORS OR AN APPROVED MECHANICAL CONNECTOR.
2. WHERE REQUIRED TO BE BONDED, THE LOW VOLTAGE NEUTRAL "XO" OF THE TRANSFORMER SHALL BE BONDED TO GROUND WITH A MINIMUM #3/0AWG COPPER CONDUCTOR.

TRANSFORMER GROUND GRID DETAILS

FOR PRECAST PAD MOUNT TRANSFORMER

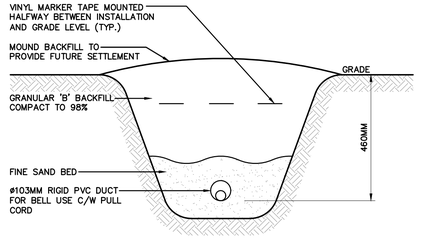






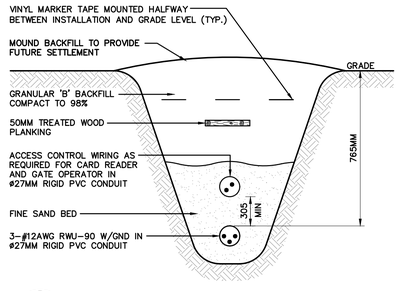
TRANSFORMER PAD ENCLOSURE DETAILS

SCALE: N.T.S.



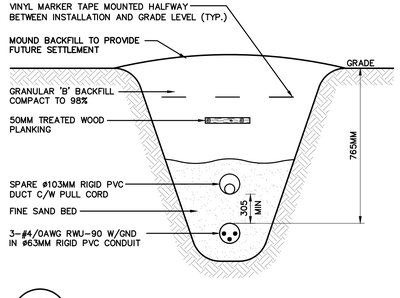
3 / E003 TRENCH DETAIL - BELL TRENCH

SCALE: N.T.S.



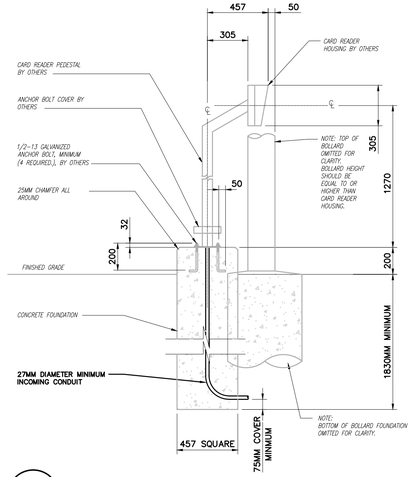
4 / E003 TRENCH DETAIL - GATE OPERATOR (TYP.2)

SCALE: N.T.S.



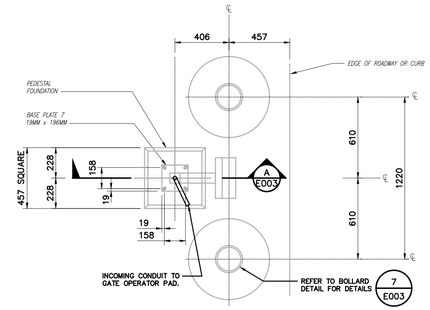
5 / E003 TRENCH DETAIL - COLD STORAGE

SCALE: N.T.S.



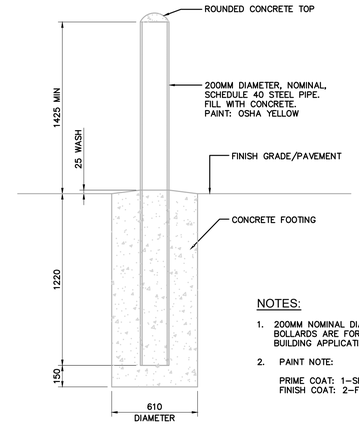
A / E003 SECTION - GATE ENTRY ACCESS SECTION

SCALE: 1:20



6 / E003 DETAIL - GATE ENTRY ACCESS PLAN

SCALE: 1:20



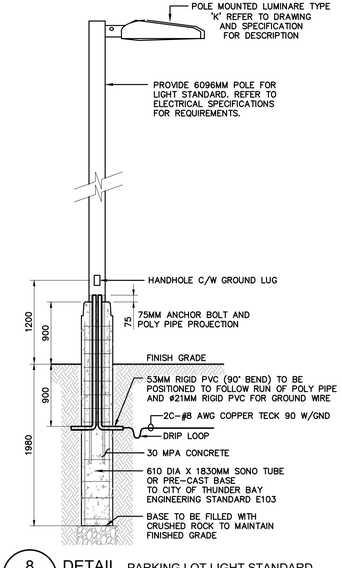
NOTES:

1. 200MM NOMINAL DIAMETER BOLLARDS ARE FOR EXTERIOR BUILDING APPLICATIONS.
2. PAINT NOTE:

   PRIME COAT: 1-SHOP
   FINISH COAT: 2-FIELD

7 / E003 DETAIL - BOLLARD

SCALE: 1:20



8 / E003 DETAIL - PARKING LOT LIGHT STANDARD

SCALE: N.T.S.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

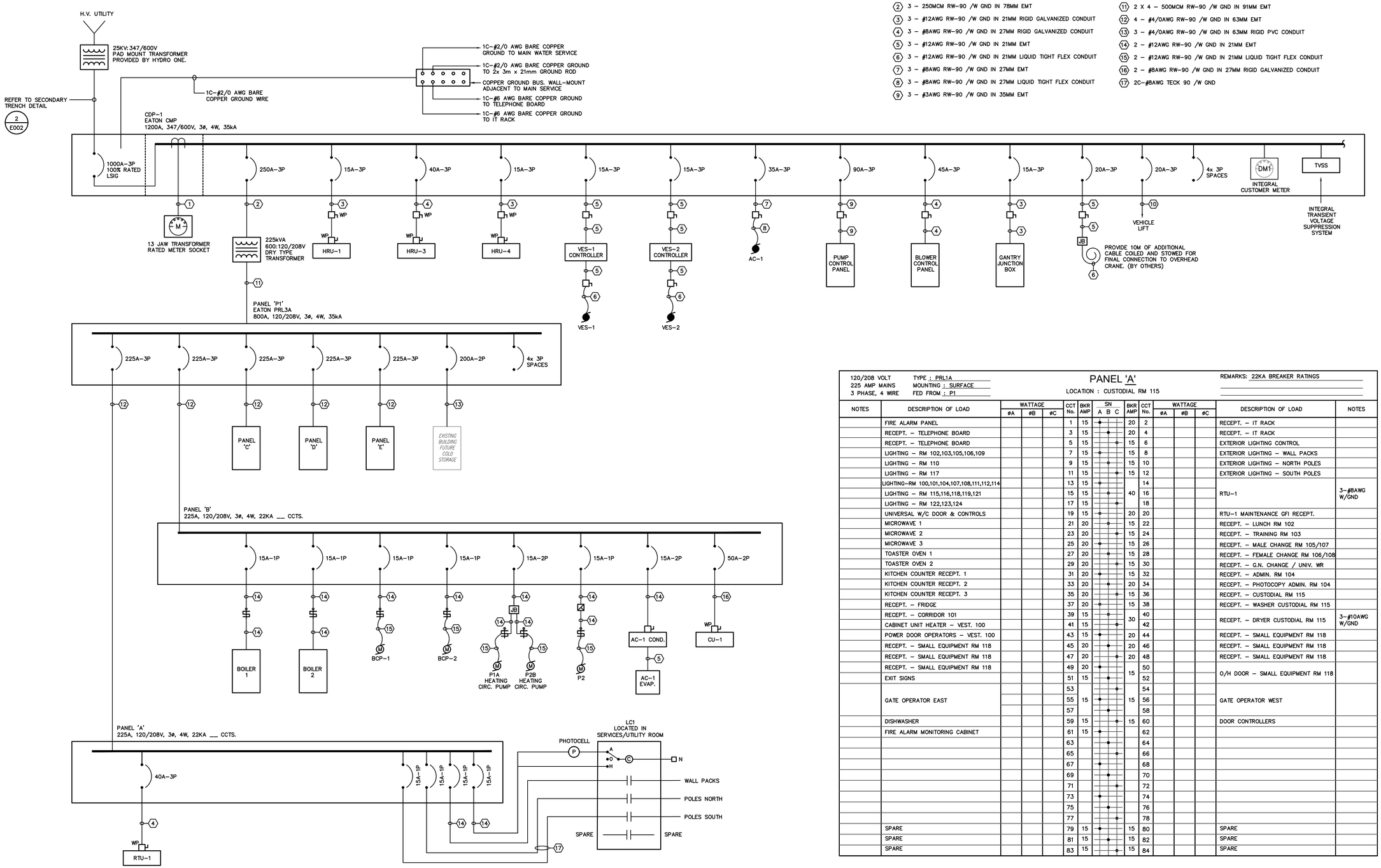
Drawing Title:
ELECTRICAL SITE SERVICES
ELECTRICAL DETAILS
TRENCH DETAILS, POWER AND COMMUNICATIONS

Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E003

CABLE LEGEND

1. EMPTY 35MM EMT
2. 3 – 250MCM RW-90 /W GND IN 78MM EMT
3. 3 – #12AWG RW-90 /W GND IN 21MM RIGID GALVANIZED CONDUIT
4. 3 – #8AWG RW-90 /W GND IN 27MM RIGID GALVANIZED CONDUIT
5. 3 – #12AWG RW-90 /W GND IN 21MM EMT
6. 3 – #12AWG RW-90 /W GND IN 21MM LIQUID TIGHT FLEX CONDUIT
7. 3 – #8AWG RW-90 /W GND IN 27MM EMT
8. 3 – #8AWG RW-90 /W GND IN 27MM LIQUID TIGHT FLEX CONDUIT
9. 3 – #3AWG RW-90 /W GND IN 35MM EMT
10. 3 – #12AWG RW-90 /W GND IN 21MM RIGID PVC (CAST IN SLAB)
11. 2 X 4 – 500MCM RW-90 /W GND IN 91MM EMT
12. 4 – #4/0AWG RW-90 /W GND IN 63MM EMT
13. 3 – #4/0AWG RW-90 /W GND IN 63MM RIGID PVC CONDUIT
14. 2 – #12AWG RW-90 /W GND IN 21MM EMT
15. 2 – #12AWG RW-90 /W GND IN 21MM LIQUID TIGHT FLEX CONDUIT
16. 2 – #8AWG RW-90 /W GND IN 27MM RIGID GALVANIZED CONDUIT
17. 2C–#8AWG TECK 90 /W GND



SINGLE LINE POWER DISTRIBUTION DIAGRAM

SCALE: NTS

PANEL 'A'

LOCATION : CUSTODIAL RM 115

120/208 VOLT
225 AMP MAINS
3 PHASE, 4 WIRE

TYPE : PRL1A
MOUNTING : SURFACE
FED FROM : P1

REMARKS: 22KA BREAKER RATINGS

NOTES	DESCRIPTION OF LOAD	WATTAGE øA	WATTAGE øB	WATTAGE øC	CCT No.	BKR AMP	SN A B C	BKR AMP	CCT No.	WATTAGE øA	WATTAGE øB	WATTAGE øC	DESCRIPTION OF LOAD	NOTES
	FIRE ALARM PANEL				1	15	●	20	2				RECEPT. – IT RACK	
	RECEPT. – TELEPHONE BOARD				3	15	●	20	4				RECEPT. – IT RACK	
	RECEPT. – TELEPHONE BOARD				5	15	●	15	6				EXTERIOR LIGHTING CONTROL	
	LIGHTING – RM 102,103,105,106,109				7	15	●	15	8				EXTERIOR LIGHTING – WALL PACKS	
	LIGHTING – RM 110				9	15	●	15	10				EXTERIOR LIGHTING – NORTH POLES	
	LIGHTING – RM 117				11	15	●	15	12				EXTERIOR LIGHTING – SOUTH POLES	
	LIGHTING–RM 100,101,104,107,108,111,112,114				13	15	●		14				RTU–1	3–#8AWG W/GND
	LIGHTING – RM 115,116,118,119,121				15	15	●	40	16					
	LIGHTING – RM 122,123,124				17	15	●		18					
	UNIVERSAL W/C DOOR & CONTROLS				19	15	●	20	20				RTU–1 MAINTENANCE GFI RECEPT.	
	MICROWAVE 1				21	20	●	15	22				RECEPT. – LUNCH RM 102	
	MICROWAVE 2				23	20	●	15	24				RECEPT. – TRAINING RM 103	
	MICROWAVE 3				25	20	●	15	26				RECEPT. – MALE CHANGE RM 105/107	
	TOASTER OVEN 1				27	20	●	15	28				RECEPT. – FEMALE CHANGE RM 106/108	
	TOASTER OVEN 2				29	20	●	15	30				RECEPT. – G.N. CHANGE / UNIV. WR	
	KITCHEN COUNTER RECEPT. 1				31	20	●	15	32				RECEPT. – ADMIN. RM 104	
	KITCHEN COUNTER RECEPT. 2				33	20	●	20	34				RECEPT. – PHOTOCOPY ADMIN. RM 104	
	KITCHEN COUNTER RECEPT. 3				35	20	●	15	36				RECEPT. – CUSTODIAL RM 115	
	RECEPT. – FRIDGE				37	20	●	15	38				RECEPT. – WASHER CUSTODIAL RM 115	
	RECEPT. – CORRIDOR 101				39	15	●	40					RECEPT. – DRYER CUSTODIAL RM 115	3–#10AWG W/GND
	CABINET UNIT HEATER – VEST. 100				41	15	●	42						
	POWER DOOR OPERATORS – VEST. 100				43	15	●	20	44				RECEPT. – SMALL EQUIPMENT RM 118	
	RECEPT. – SMALL EQUIPMENT RM 118				45	20	●	20	46				RECEPT. – SMALL EQUIPMENT RM 118	
	RECEPT. – SMALL EQUIPMENT RM 118				47	20	●	20	48				RECEPT. – SMALL EQUIPMENT RM 118	
	RECEPT. – SMALL EQUIPMENT RM 118				49	20	●	50					O/H DOOR – SMALL EQUIPMENT RM 118	
	EXIT SIGNS				51	15	●	52						
	GATE OPERATOR EAST				53	15	●	54					GATE OPERATOR WEST	
					55		●	56						
					57		●	58						
	DISHWASHER				59	15	●	60					DOOR CONTROLLERS	
	FIRE ALARM MONITORING CABINET				61	15	●	62						
					63		●	64						
					65		●	66						
					67		●	68						
					69		●	70						
					71		●	72						
					73		●	74						
					75		●	76						
					77		●	78						
	SPARE				79	15	●	15	80				SPARE	
	SPARE				81	15	●	15	82				SPARE	
	SPARE				83	15	●	15	84				SPARE	

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

Revision	Date
0 ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER
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100181072
Jul 28 / 22
PROVINCE OF ONTARIO

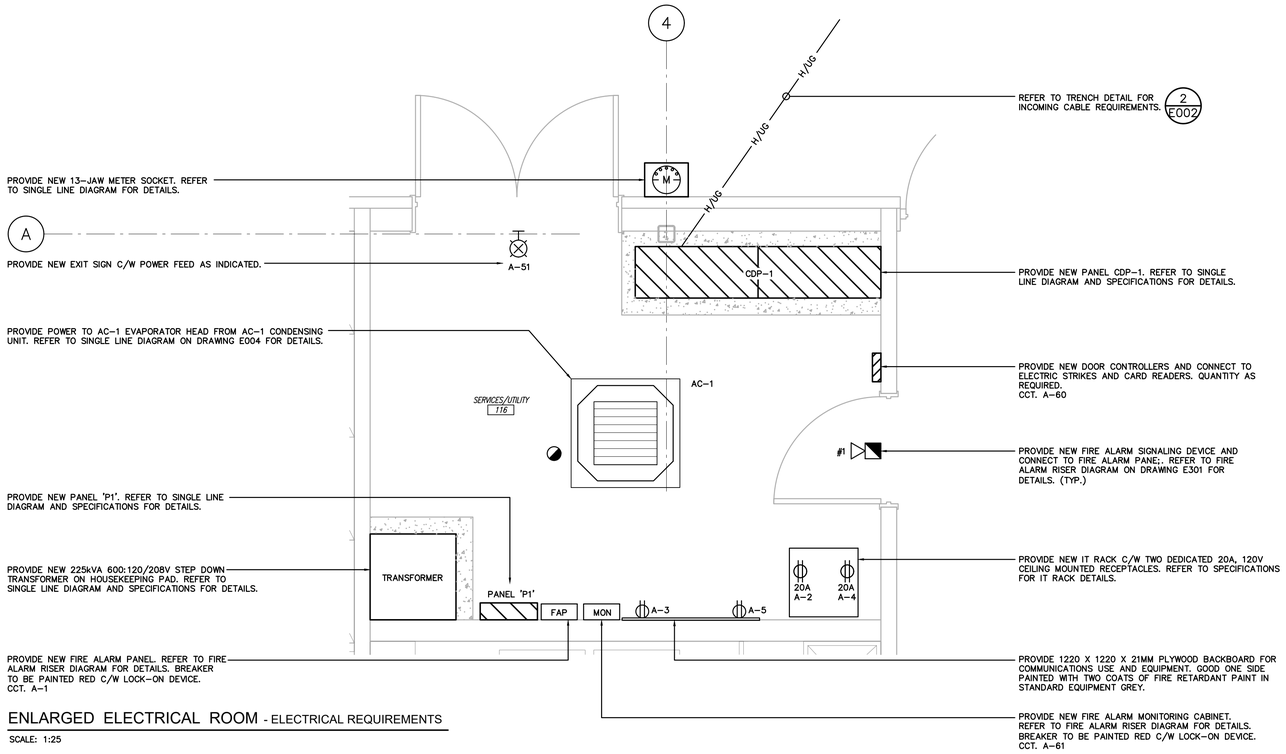
CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

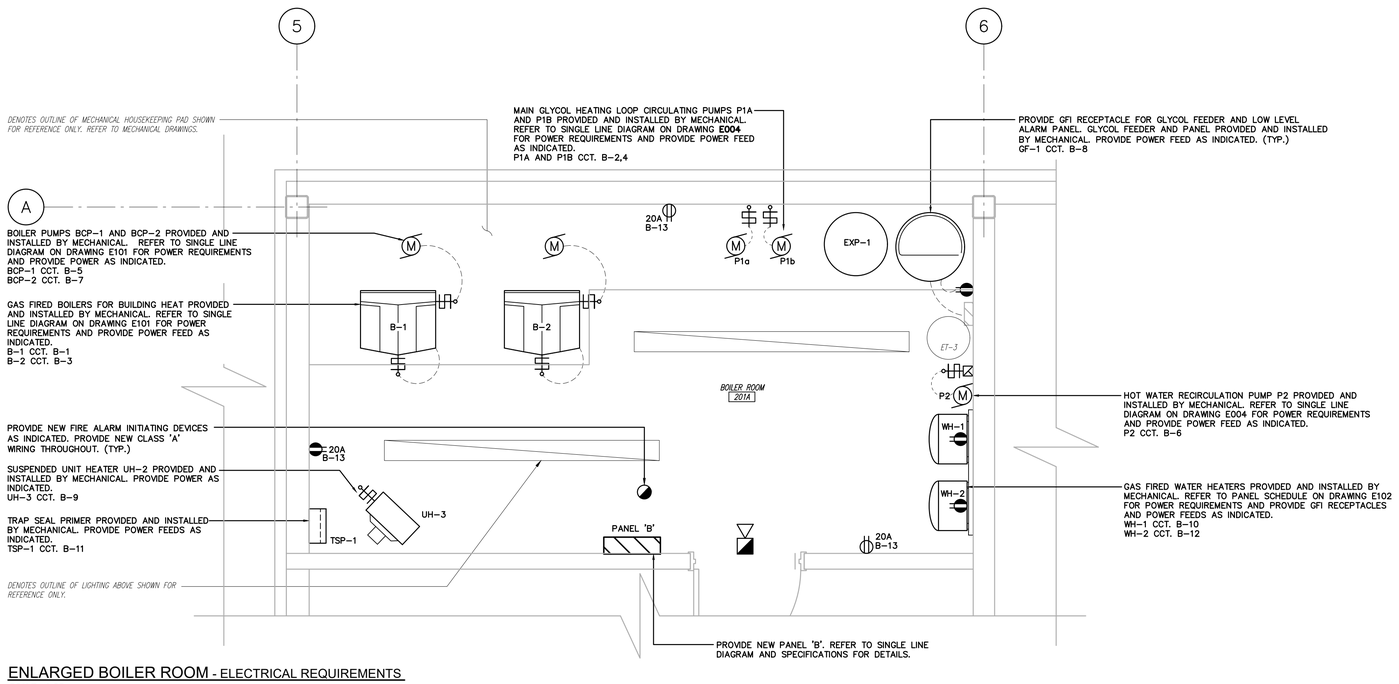
Drawing Title: SINGLE LINE DIAGRAM

Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	
Drawing No: **E004**	



ENLARGED ELECTRICAL ROOM - ELECTRICAL REQUIREMENTS

SCALE: 1:25



ENLARGED BOILER ROOM - ELECTRICAL REQUIREMENTS

SCALE: 1:25

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

Revision	Date
0 ISSUED FOR PERMIT AND TENDER	JULY 29 / 22

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
POWER MAIN FLOOR PLAN
ENLARGED ELECTRICAL ROOM AND BOILER ROOM PLANS
ELECTRICAL REQUIREMENTS

Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E005

120/208 VOLT
225 AMP MAINS
3 PHASE, 4 WIRE

TYPE : PRL1A
MOUNTING : SURFACE
FED FROM : P1

PANEL 'B'

LOCATION : BOILER RM 201A

REMARKS: 22KA BREAKER RATINGS

NOTES	DESCRIPTION OF LOAD	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	CCT No.	BKR AMP	SN A B C	BKR AMP	CCT No.	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	DESCRIPTION OF LOAD	NOTES
	BOILER B1				1	15		15	2				PUMPS P1a & P1b	
	BOILER B2				3	15			4					
	BCP-1				5	15		15	6				DHW RECIRC. PUMP P2	
	BCP-2				7	15		15	8				GYCOL FEEDER GF-1	
	UH-1,2,3 / CUH-2				9	15		15	10				WATER HEATER WH-1	
	TRAP SEAL PRIMER TSP-1				11	15		15	12				WATER HEATER WH-2	
	RECEPT. - BOILER RM 201A				13	20		15	14				LIGHTING - BOILER RM, TRADE MEZZ.	
	HRU-2				15			15	16				ELEC. ROOM AC SYSTEM	
					17	20			18					
					19			50	20				CU-1	
	RECEPT. - MEZZ 201 - NORTH				21	15			22					
	RECEPT. - MEZZ 201/STAIRS				23	15		20	24				CU-1 MAINTENANCE RECEPT.	
					25				26					
					27				28					
					29				30					
					31				32					
					33				34					
					35				36					
					37				38					
					39				40					
					41				42					
					43				44					
					45				46					
					47				48					
					49				50					
					51				52					
					53				54					
					55				56					
					57				58					
					59				60					
					61				62					
					63				64					
					65				66					
					67				68					
					69				70					
					71				72					
					73				74					
					75				76					
					77				78					
	SPARE				79	15		15	80				SPARE	
	SPARE				81	15		15	82				SPARE	
	SPARE				83	15		15	84				SPARE	

120/208 VOLT
225 AMP MAINS
3 PHASE, 4 WIRE

TYPE : PRL1A
MOUNTING : SURFACE
FED FROM : P1

PANEL 'C'

LOCATION : TRADE SHOP RM 117

REMARKS: 22KA BREAKER RATINGS

NOTES	DESCRIPTION OF LOAD	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	CCT No.	BKR AMP	SN A B C	BKR AMP	CCT No.	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	DESCRIPTION OF LOAD	NOTES
	HRU-1 MAINTENANCE RECEPT.				1	20		15	2				TSPM-1	
	O/H DOOR - WATER WORKS				3	15			4					
					5			15	6				O/H DOOR - TRADE SHOP	
	RECEPT. - WATER OFFICE RM 109				7	15		15	8				RECEPT. - TRADES OFFICE	
	EXT. RECEPT. - WATER WORKS				9	20		20	10				EXT. RECEPT. - TRADES SHOP	
	EXT. RECEPT. - TRADES SHOP				11	20		20	12				EXT. RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				13	20		20	14				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				15	20		20	16				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				17	20		20	18				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				19	20		20	20				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				21	20		20	22				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				23	20		20	24				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				25	20		20	26				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				27	20		20	28				RECEPT. - TRADES SHOP	
	RECEPT. - WATER WORKS				29	20		20	30				RECEPT. - TRADES SHOP	
	RECEPT. - TRADES SHOP				31	20		20	32				RECEPT. - TRADES SHOP	
	RECEPT. - TRADES SHOP				33	20		20	34				RECEPT. - TRADES SHOP	
	EXT. RECEPT. - WATER WORKS				35	20		30	36				TABLE SAW - TRADES SHOP	
	EXT. RECEPT. - TRADES SHOP				37	20			38					
	EXT. RECEPT. - TRADES SHOP				39	20			40					
	EXT. RECEPT. - TRADES SHOP				41	20			42					
					43				44					
					45				46					
					47				48					
					49				50					
					51				52					
					53				54					
					55				56					
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					67				68					
					69				70					
					71				72					
					73				74					
					75				76					
					77				78					
	SPARE				79	15		15	80				SPARE	
	SPARE				81	15		15	82				SPARE	
	SPARE				83	15		15	84				SPARE	

120/208 VOLT
225 AMP MAINS
3 PHASE, 4 WIRE

TYPE : PRL1A
MOUNTING : SURFACE
FED FROM : P1

PANEL 'D'

LOCATION : MECH. SHOP RM 120

REMARKS: 22KA BREAKER RATINGS

NOTES	DESCRIPTION OF LOAD	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	CCT No.	BKR AMP	SN A B C	BKR AMP	CCT No.	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	DESCRIPTION OF LOAD	NOTES
	LIGHTING - MECH. SHOP RM 120-EAST				1	20			2					
	LIGHTING - MECH. SHOP RM 120-WEST				3	20		15	4				DESTRATIFICATION FAN DF-1	
	WELDER - FAB SHOP				5	50			6					
					7				8					
	WELDER - FAB SHOP				9	50		15	10				DESTRATIFICATION FAN DF-2	
					11				12					
	RECEPT. - BATTERY CHARGE RM 124				13	20			14					
	RECEPT. - BATTERY CHARGE RM 124				15	20		15	16				DESTRATIFICATION FAN DF-3	
	HEAT TRACE - RM 124				17	15*			18					
	RECEPT. - FAB SHOP RM 123				19	20			20					
	RECEPT. - FAB SHOP RM 123				21	20		15	22				DESTRATIFICATION FAN DF-4	
	RECEPT. - FAB SHOP RM 123				23	20			24					
	RECEPT. - FAB SHOP RM 123				25	20		15	26				RECEPT. - SHOP WASHROOM 119	
	RECEPT. - TOOL CRIB RM 122				27	20		15	28				RECEPT. - SHOP OFFICE RM 121	
	O/H DOOR - SHOP SOUTH WEST				29	15		15	30				O/H DOOR - SHOP NORTH WEST	
					31				32					
	O/H DOOR - SHOP SOUTH MIDDLE				33	15		15	34				O/H DOOR - SHOP NORTH MIDDLE	
					35				36					
	CORD REEL - NORTH WEST				37	20		20	38				CORD REEL - SOUTH WEST	
	EXT. RECEPT. - SHOP NORTH				39	20		20	40				EXT. RECEPT. - SHOP SOUTH	
	EXT. RECEPT. - SHOP NORTH				41	20		20	42				EXT. RECEPT. - SHOP SOUTH	
	RECEPT. - SHOP WEST				43	20		20	44				EXT. RECEPT. - SHOP SOUTH	
	RECEPT. - SHOP WEST				45	20		20	46				EXT. RECEPT. - SHOP SOUTH	
	RECEPT. - SHOP WEST				47	20			48					
	RECEPT. - SHOP WEST				49	20			50					
	RECEPT. - SHOP WEST				51	20			52					
					53				54					
					55				56					
					57				58					
					59				60					
					61				62					
					63				64					
					65				66					
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					69				70					
					71				72					
					73				74					
					75				76					
					77				78					
	SPARE				79	15		15	80				SPARE	
	SPARE				81	15		15	82				SPARE	
	SPARE				83	15		15	84				SPARE	

* DENOTES 30mA EQUIPMENT PROTECTION GFI CIRCUIT BREAKER.

120/208 VOLT
225 AMP MAINS
3 PHASE, 4 WIRE

TYPE : PRL1A
MOUNTING : SURFACE
FED FROM : P1

PANEL 'E'

LOCATION : WORKSTATION RM 125

REMARKS: 22KA BREAKER RATINGS

NOTES	DESCRIPTION OF LOAD	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	CCT No.	BKR AMP	SN A B C	BKR AMP	CCT No.	WATTAGE ØA	WATTAGE ØB	WATTAGE ØC	DESCRIPTION OF LOAD	NOTES
	LIGHTING - RM 125,126,127,128A				1	15		15	2				LIGHTING - SERVICE BAY RM 128	
	LIGHTING - RM 129				3	15		15	4				LIGHTING - MEZZ. 202/202A	
	HRU-3 MAINTENANCE RECEPT.				5	20		20	6				HRU-4 MAINTENANCE RECEPT.	
	TSPM-2				7	15			8					
	O/H DOOR - SHOP NORTH EAST				9	15		15	10				DESTRATIFICATION FAN DF-5	
					11				12					
	O/H DOOR - SHOP SOUTH EAST				13	15		15	14				O/H DOOR - WASH BAY NORTH	
					15				16					
	O/H DOOR - SERVICE BAY				17	15		15	18				O/H DOOR - WASH BAY SOUTH	
					19				20					
	WHEEL BALANCER				21	20		15	22				SUMP PUMP - WASH BAY	
					23			20	24				EXT. RECEPT. - SOUTH	
	EXT. RECEPT. - NORTH				25	20		20	26				EXT. RECEPT. - SOUTH	
	EXT. RECEPT. - NORTH				27	20		20	28				EXT. RECEPT. - SOUTH	
	RECEPT. - STORAGE RM 127				29	20		20	30				RECEPT. - EQUIP. RM 128	
	CORD REEL - SOUTH EAST				31	20		20	32				CORD REEL - NORTH EAST	
	RECEPT. - TIRE SHOP				33	20		15	34				RECEPT. - MEZZ. STORAGE	
	RECEPT. - TIRE SHOP				35	20		20	36				RECEPT. - WORK STATION	
	RECEPT. - TIRE SHOP				37	20		20	38				RECEPT. - WORK STATION	
	RECEPT. - TIRE SHOP				39	20		20	40				RECEPT. - WORK STATION	
	RECEPT. - TIRE SHOP				41	20		20	42				RECEPT. - WORK STATION	
	RECEPT. - TIRE SHOP				43	20		20	44				RECEPT. - WORK STATION	
	OIL FILTER CRUSHER				45	20		20	46				RECEPT. - WORK STATION	
					47			20	48				RECEPT. - WORK STATION	
	WELDER - SHOP				49	50		50	50				WELDER - SHOP	
					51				52					
	RECEPT. - SHOP EAST				53	20		20	54				RECEPT. - SHOP EAST	
	RECEPT. - SERVICE BAY				55	20		15*	56				HEAT TRACE - TIRE SHOP	
	RECEPT. - SERVICE BAY				57	20		20	58				RECEPT. - SERVICE BAY	
	RECEPT. - SERVICE BAY				59	20		20	60				RECEPT. - SERVICE BAY	
	RECEPT. - SERVICE BAY				61	20		20	62				RECEPT. - SERVICE BAY	
	RECEPT. - SHOP SOUTH				63	20		20	64				RECEPT. - SHOP NORTH	
	EXT. RECEPT. - SOUTH				65	20		20	66				EXT. RECEPT. - SOUTH	
	EXT. RECEPT. - SOUTH				67	20			68					
					69				70					
					71				72					
					73				74					
					75				76					
					77				78					
	SPARE				79	15		15	80				SPARE	
	SPARE				81	15		15	82				SPARE	
	SPARE				83	15		15	84				SPARE	

* DENOTES 30mA EQUIPMENT PROTECTION GFI CIRCUIT BREAKER.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

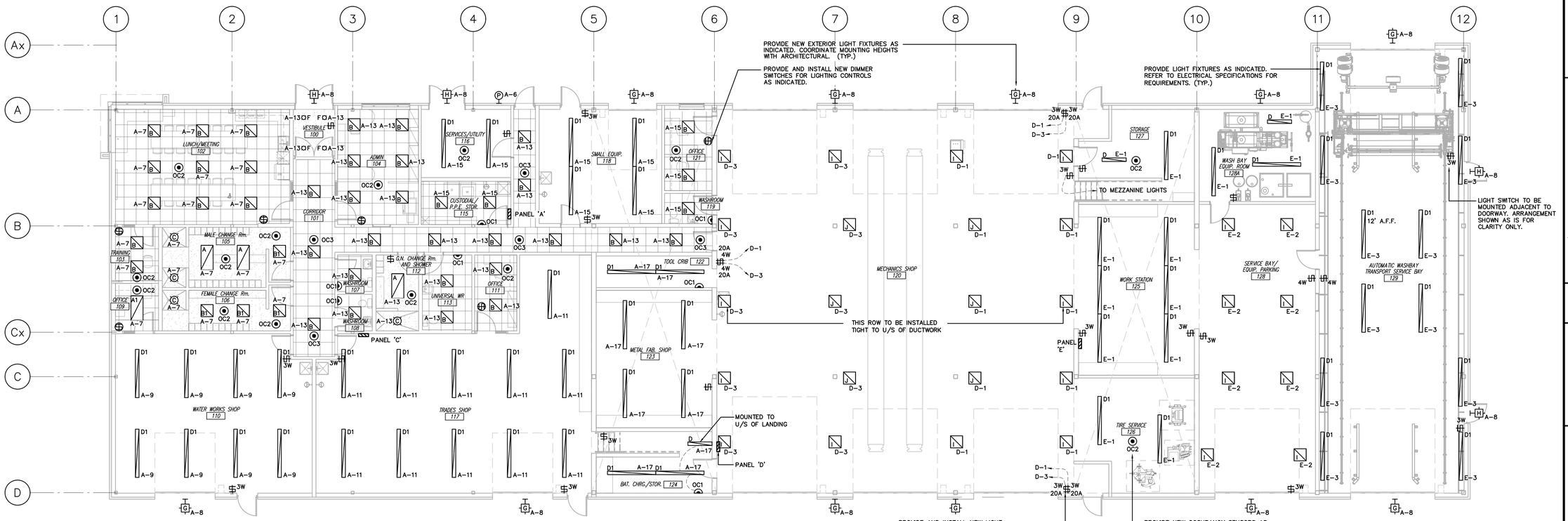
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
PANEL SCHEDULES

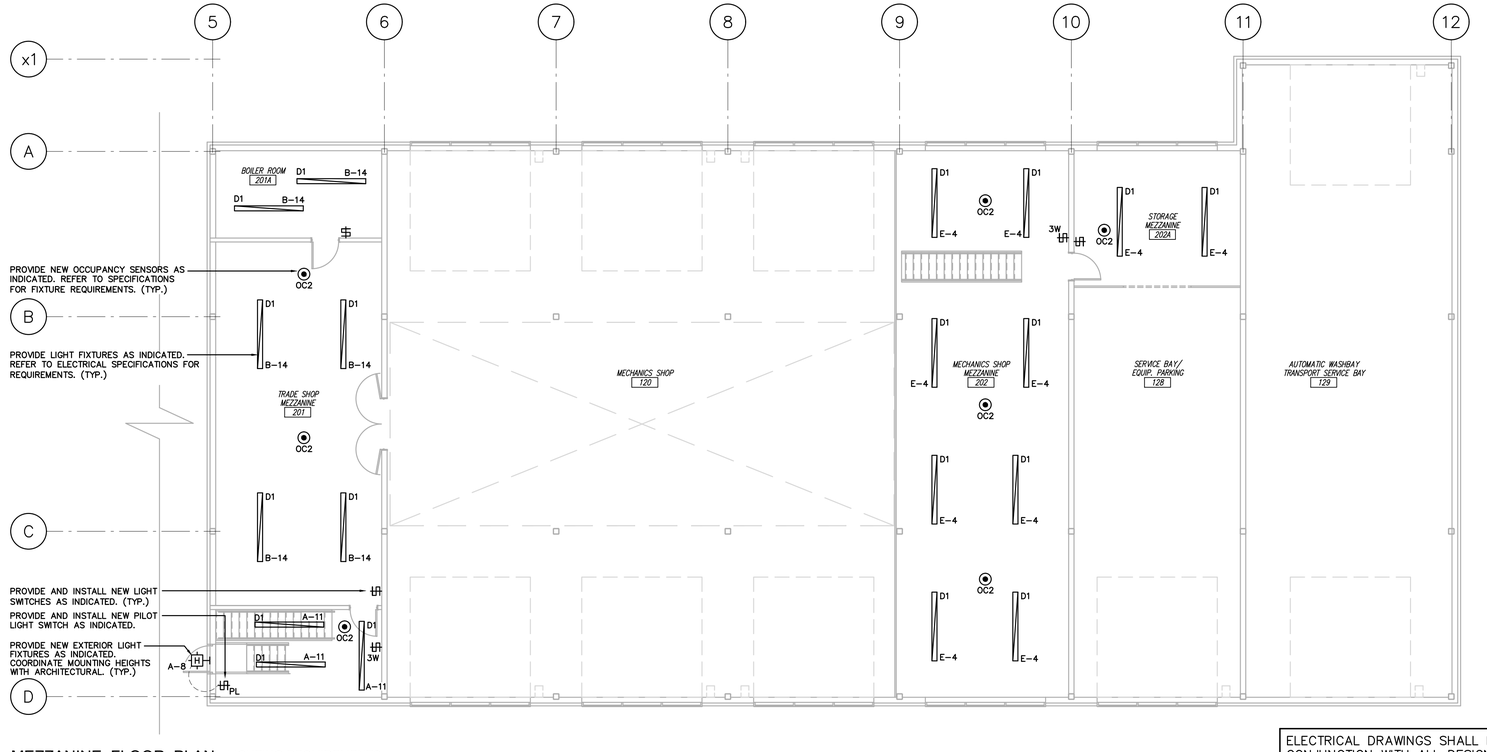
Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E006



MAIN FLOOR PLAN - LIGHTING REQUIREMENTS

SCALE: 1:100



MEZZANINE FLOOR PLAN - LIGHTING REQUIREMENTS

SCALE: 1:100

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
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Jul 28 / 22
PROVINCE OF ONTARIO

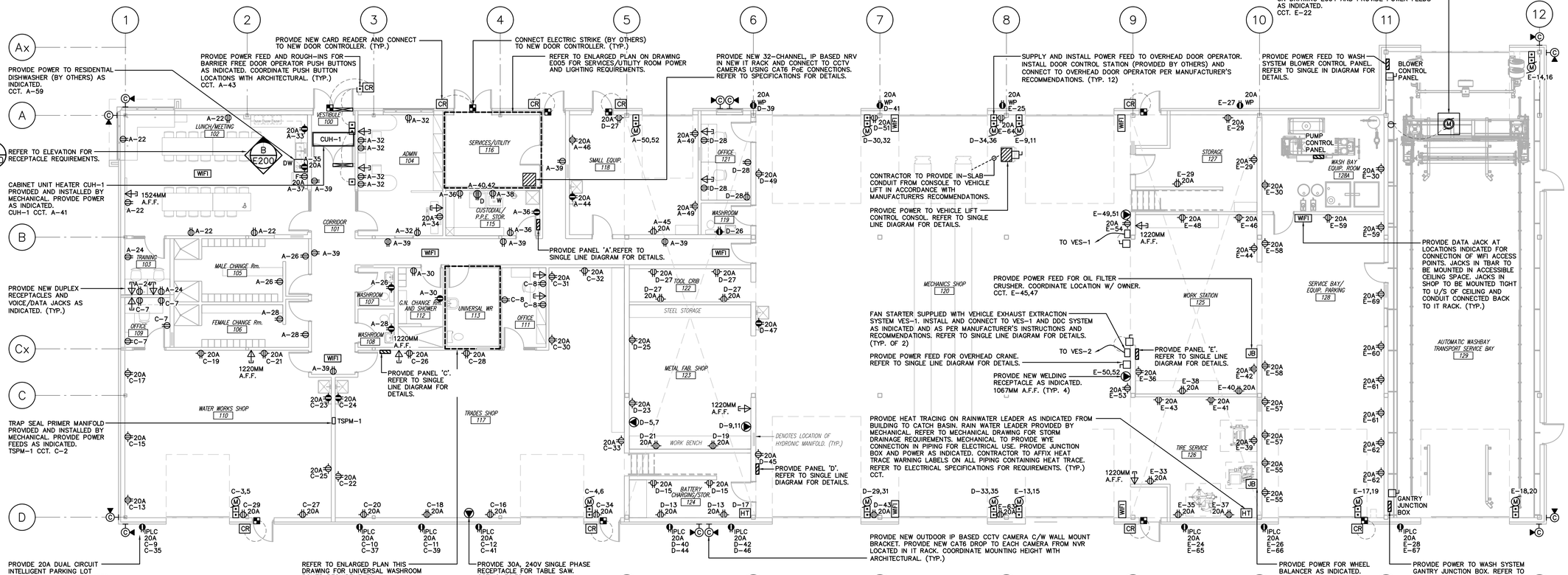
CRITCHLEY HILL
ARCHITECTURE
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR PLAN
MEZZANINE PLAN
LIGHTING REQUIREMENTS

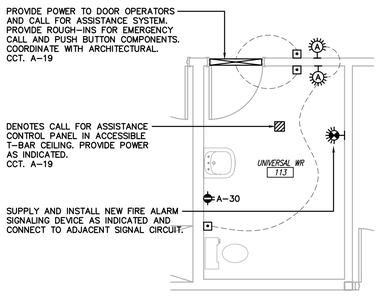
Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E100



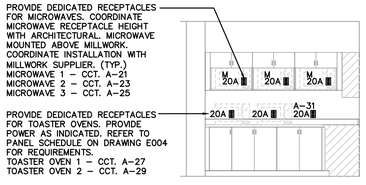
MAIN FLOOR PLAN - POWER REQUIREMENTS

SCALE: 1:100



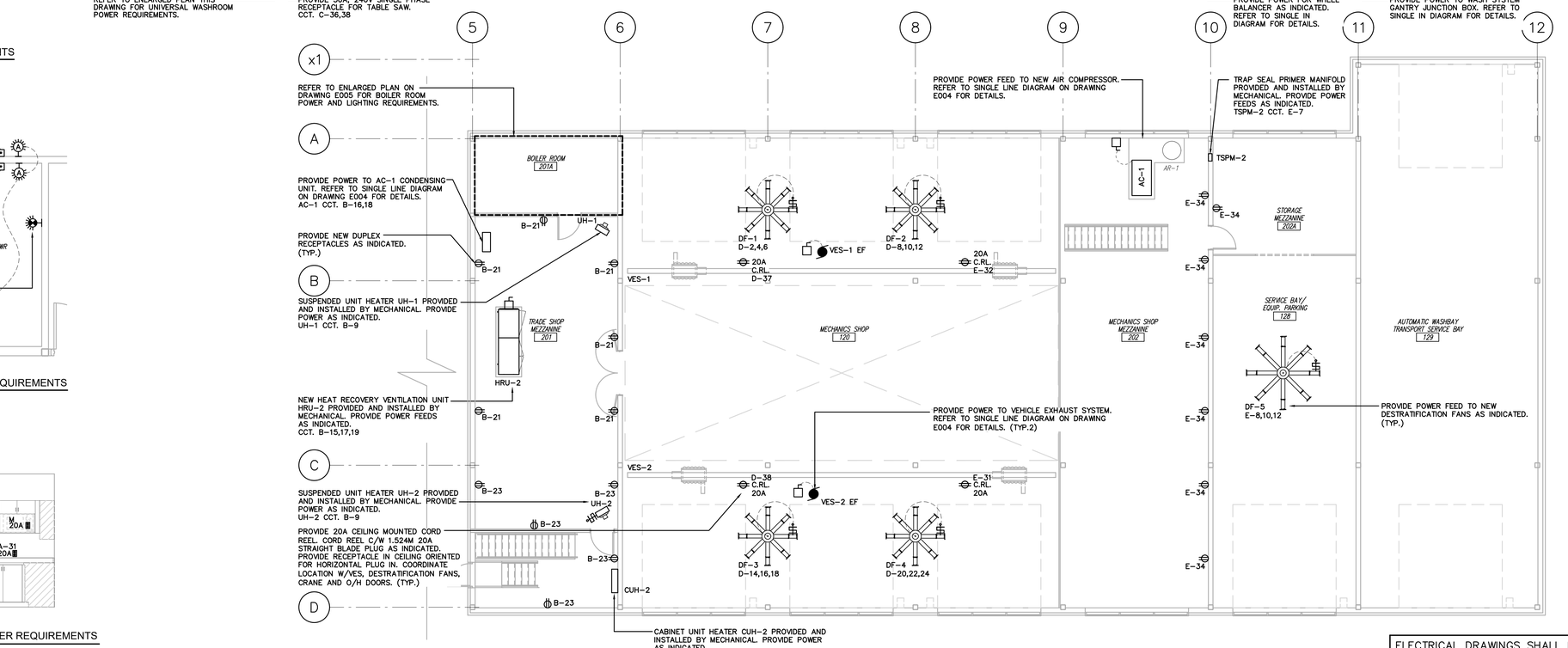
ENLARGED PARTIAL PLAN - POWER REQUIREMENTS

SCALE: 1:50



B / E200 ELEVATION - LUNCH/MEETING POWER REQUIREMENTS

SCALE: 1:50



MEZZANINE FLOOR PLAN - POWER REQUIREMENTS

SCALE: 1:100

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 29 / 22

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LICENSED PROFESSIONAL ENGINEER J. R. KIERSTEAD 100181072 Jul 28 / 22 PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

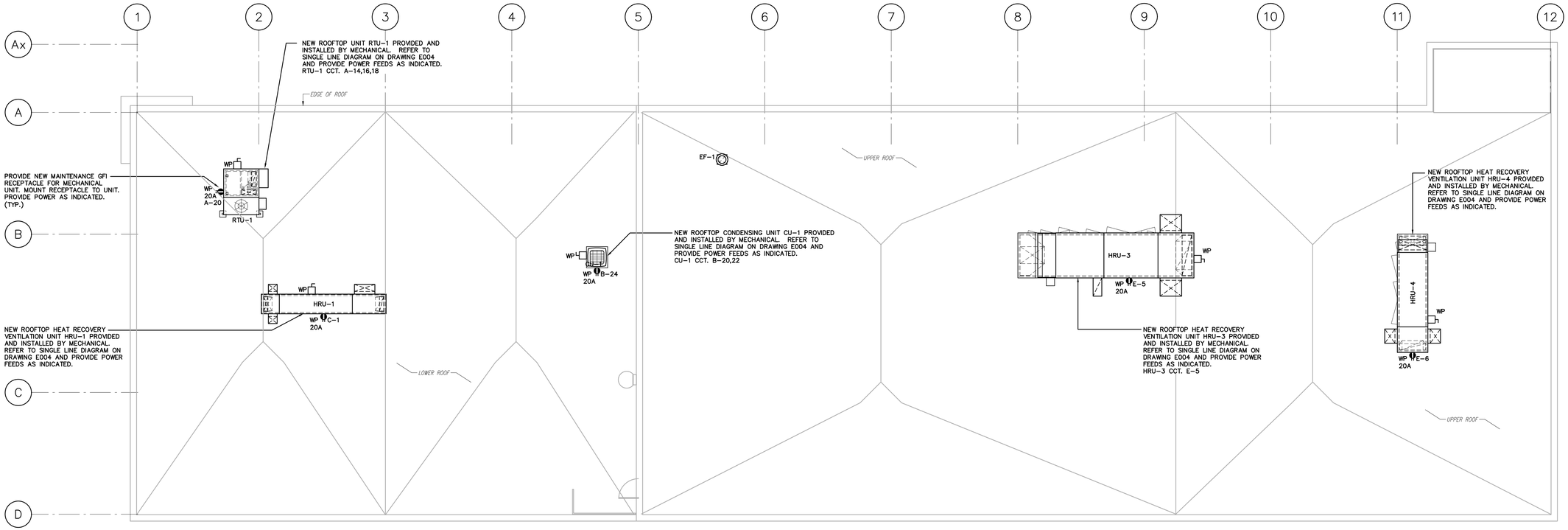
TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY Marathon, Ontario

Drawing Title: MAIN FLOOR PLAN MEZZANINE PLAN POWER REQUIREMENTS

Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **E200**



ROOF PLAN - ELECTRICAL REQUIREMENTS
SCALE: 1:100

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

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LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
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Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

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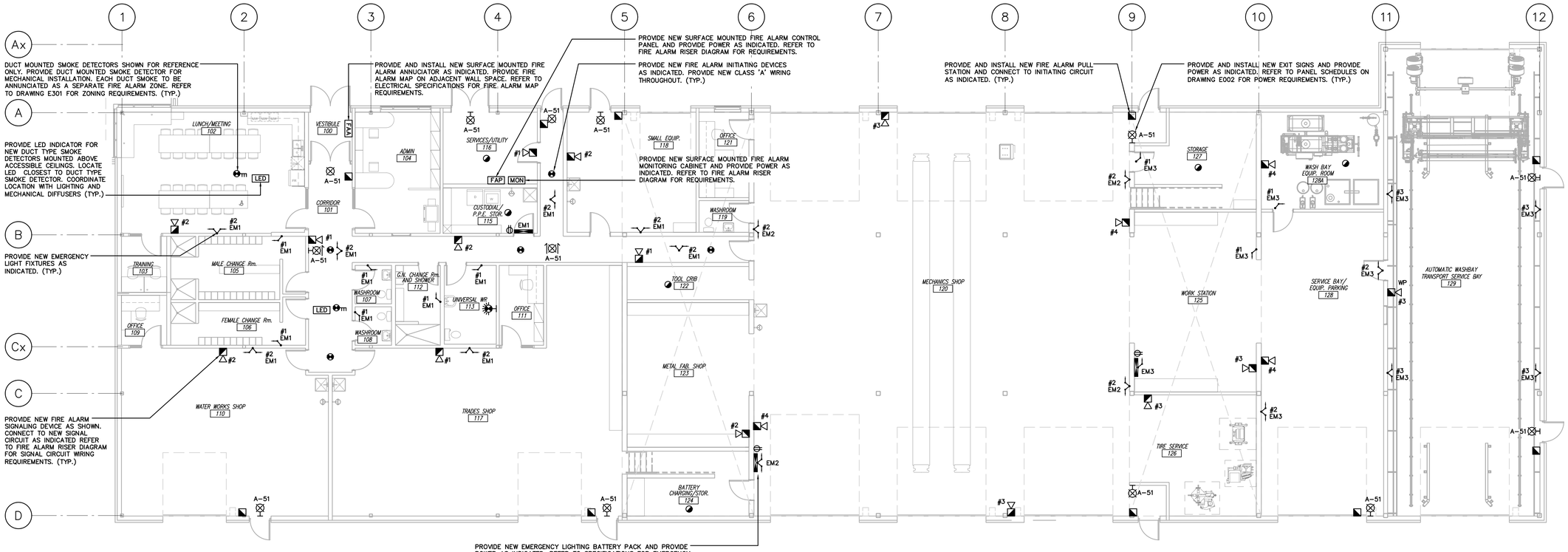
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
ROOF PLAN
ELECTRICAL REQUIREMENTS

Drawn By:	Checked By:
NL	JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E201



MAIN FLOOR PLAN - LIFE SAFETY REQUIREMENTS

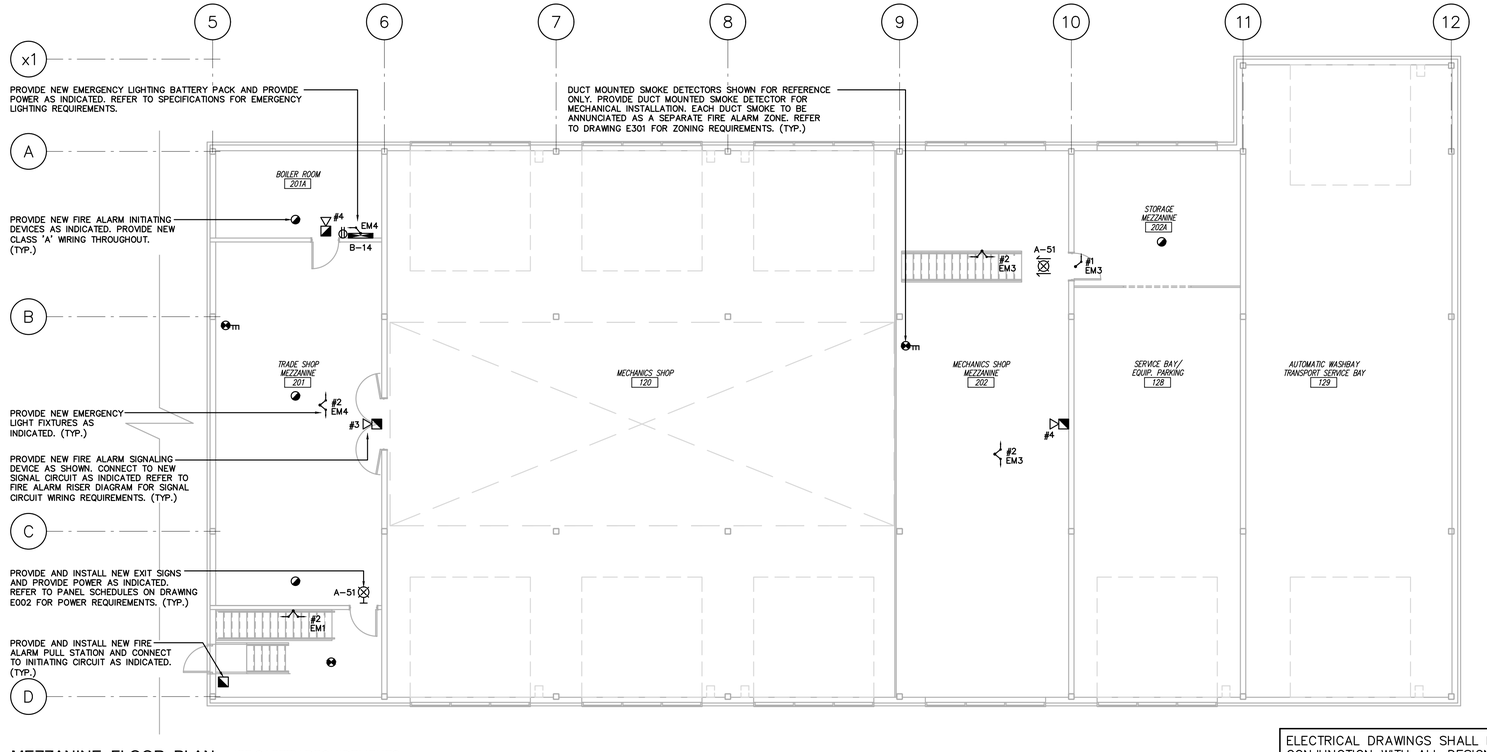
SCALE: 1:100

NOTE:

EMERGENCY LIGHTING BATTERY PACKS SHALL MONITOR THE FOLLOWING LIGHTING CIRCUITS USING ZONE RELAYS:

- EM1: A–7,9,11,13,15,17
- EM2: D–1,3
- EM3: E–1,2,3,4

PROVIDE ZONE CONTROL BOX WITH APPROPRIATE QUANTITY OF ZONES



MEZZANINE FLOOR PLAN - LIFE SAFETY REQUIREMENTS

SCALE: 1:100

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

PROJECT NORTH

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
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Jul 28 / 22
PROVINCE OF ONTARIO

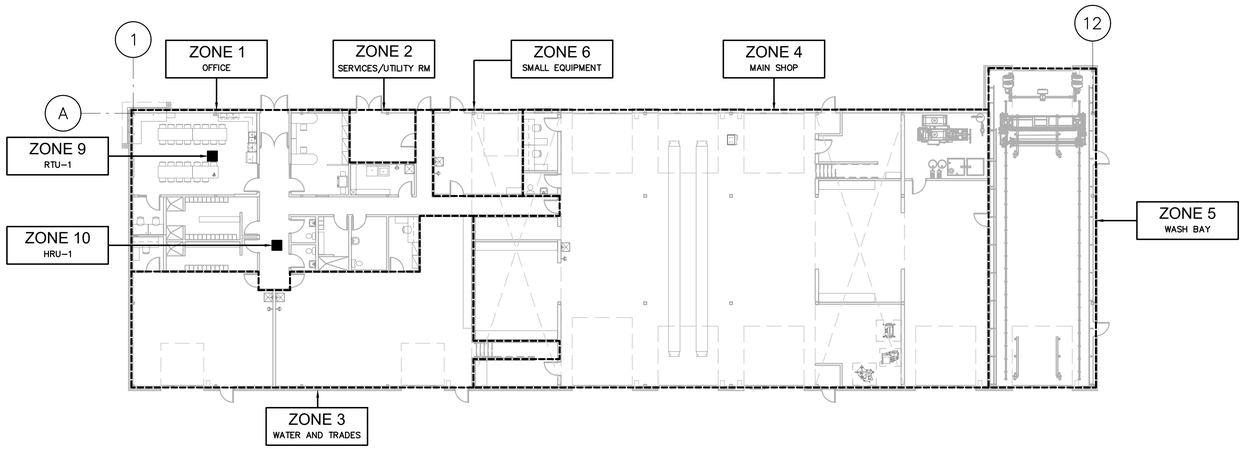
CRITCHLEY HILL
ARCHITECTURE
TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR PLAN
MEZZANINE PLAN
LIFE SAFETY REQUIREMENTS
FIRE ALARM ZONING

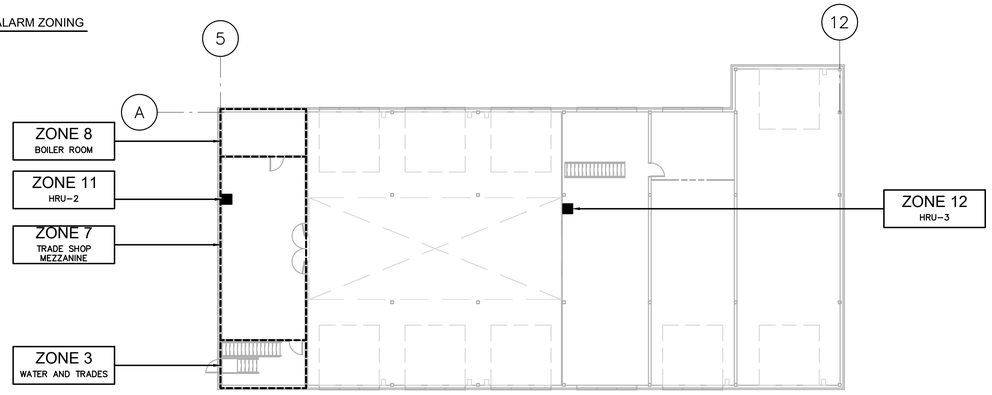
Drawn By: NL	Checked By: JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E300



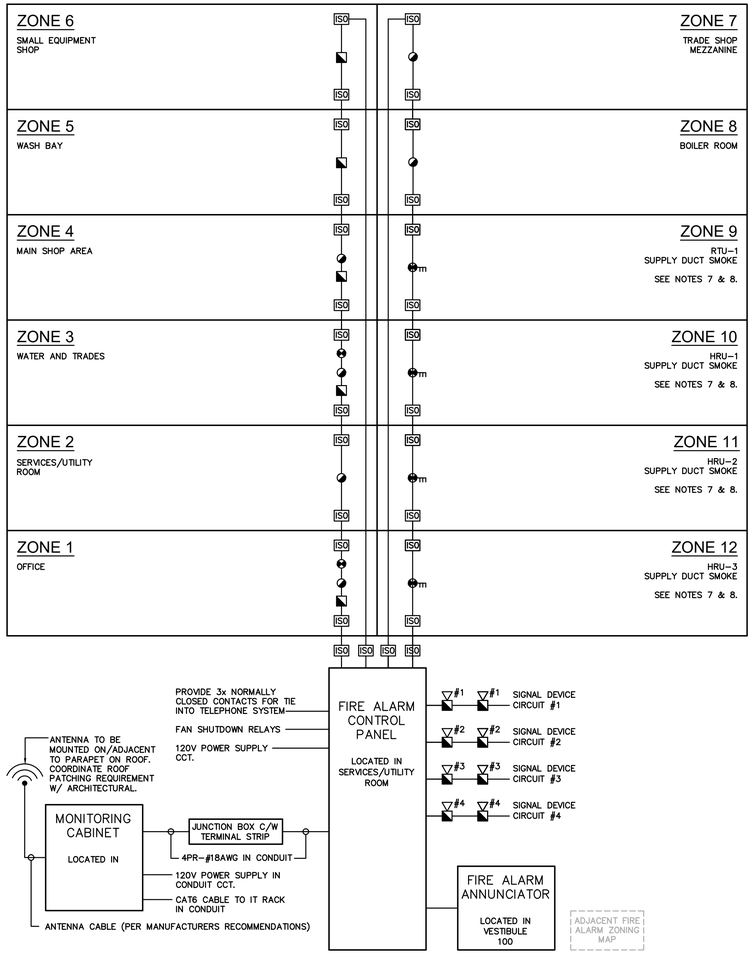
MAIN FLOOR PLAN - FIRE ALARM ZONING

SCALE: 1:200



MEZZANINE FLOOR PLAN - FIRE ALARM ZONING

SCALE: 1:200



FIRE ALARM RISER DIAGRAM - PUBLIC WORKS

SCALE: N.T.S.

NOTES:

1. QUANTITIES SHOWN ARE NOT INDICATIVE OF ACTUAL REQUIREMENTS.
2. REFER TO PLANS FOR QUANTITIES AND LOCATIONS OF DETECTION AND SIGNALING DEVICES.
3. FIRE ALARM DEVICES SHALL BE ADDRESSABLE.
4. CO-ORDINATE WITH MECHANICAL CONTRACTORS FOR DUCT SMOKE LOCATIONS IN SUPPLY DUCTS.
5. EACH DUCT TYPE SMOKE DETECTOR TO BE ADDRESSED AS SEPARATE ZONES.
6. PROVIDE ISOLATION MODULES PER CAN/ULC-S524
12. PROVIDE NEW ZONING MAP ADJACENT TO FIRE ALARM ANNUNCIATOR.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

No.	Revision	Date
0	ISSUED FOR PERMIT AND TENDER	JULY 28 / 22

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
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Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
MAIN FLOOR PLAN
MEZZANINE PLAN
FIRE ALARM ZONING
FIRE ALARM RISER DIAGRAM

Drawn By:	Checked By:
NL	JK
Scale:	Project No:
AS NOTED	22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No:
E301

ELECTRICAL SPECIFICATION

GENERAL INSTRUCTION

1. THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL A COMPLETE ELECTRICAL SYSTEM INCLUDING ALL MATERIALS, EQUIPMENT, SERVICES AND LABOUR NECESSARY AS SHOWN OR IMPLIED FOR A COMPLETE INSTALLATION.
2. ALL WORK SHALL COMPLY WITH THE ONTARIO BUILDING CODE, ONTARIO FIRE CODE AND THE ONTARIO ELECTRICAL SAFETY CODE (OESC) 26TH/ EDITION 2015 AND ALL OTHER APPLICABLE CODES AND REGULATIONS.
3. FURNISH INSPECTION CERTIFICATES, PRIOR TO FINAL PAYMENT, TO SHOW INSTALLED WORK CONFORMS TO SPECIFICATION AND REGULATIONS. PAY ALL FEES AND PERMIT COSTS.
4. ELECTRICAL CONTRACTOR SHALL VERIFY DIMENSIONS OF EQUIPMENT TO BE INSTALLED.
5. EACH ROOM CONTAINING ELECTRICAL EQUIPMENT AND EACH WORKING SPACE AROUND EQUIPMENT SHALL HAVE UNOBSTRUCTED MEANS OF EGRESS PER OESC RULE 2–310.
6. MAINTAIN A MINIMUM WORKING SPACE OF 1 METER WITH SECURE FOOTING ABOUT ELECTRICAL EQUIPMENT SUCH AS SWITCHBOARDS, PANELBOARDS, CONTROL PANELS AND MOTOR CONTROL CENTERS WHICH ARE ENCLOSED IN METAL PER OESC RULE 2–308.
7. ALL WORK AND MATERIAL SUPPLIED BY THE ELECTRICAL SUBCONTRACTOR SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER THE COMPLETION OF THE PROJECT.
8. ALL MATERIALS SHALL BE NEW AND CSA CERTIFIED.
9. PROVIDE SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE ENGINEER.
10. PROVIDE FIRESTOPPING FOR CONDUITS PASSING THROUGH RATED ASSEMBLIES. FIRESTOPPING TO BE ULC LISTED AND TO MATCH WALL/FLOOR ASSEMBLY RATING.
11. ELECTRICAL CONTRACTOR TO REPAIR ALL SURFACES DAMAGED DUE TO WORK PERFORMED TO THE SATISFACTION OF THE OWNER.
12. MOUNTING HEIGHTS FOR DEVICES ARE TO BE PER CODE REQUIREMENTS. ELECTRICAL CONTRACTOR IS TO VERIFY DIMENSIONS SHOWN ON DRAWING.
13. PROTECT EXISTING WORK AND EQUIPMENT DURING CONSTRUCTION.
14. TEST ALL SYSTEM COMPONENTS FOR PROPER OPERATION AND SAFETY.
15. DRAWINGS INDICATE GENERAL LOCATION, QUANTITY AND TYPE OF OUTLETS FOR ELECTRICAL SERVICES ONLY. DO NOT SCALE.
16. CO–ORDINATE ELECTRICAL REQUIREMENTS FOR ALL EQUIPMENT SUPPLIED BY OWNER OR OTHER TRADES. NOTIFY ENGINEER OF ANY CONFLICTS PRIOR TO INSTALLATION.
17. ELECTRICAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE MECHANICAL DRAWINGS TO DETERMINE THE OVERALL EXTENT OF THE WORK.
18. CARRY OUT DEMOLITION AS SHOWN AND AS REQUIRED TO SUIT RENOVATIONS AND ALL NEW CONSTRUCTION REQUIREMENTS. DETERMINE EXTENT OF DEMOLITION ON SITE. REMOVE ALL CONDUIT AND WIRING BACK TO SOURCE. ALL MATERIALS REMOVED AND MADE REDUNDANT BY THIS WORK (UNLESS INDICATED OTHERWISE) SHALL BECOME PROPERTY OF CONTRACTOR.

EXISTING SERVICES

1. OBTAIN LOCATES FOR UNDERGROUND SERVICES (I.E. GAS, TELEPHONE, ETC.). NOTIFY PUBLIC UTILITIES IN ADVANCE OF PLANNED EXCAVATIONS ADJACENT TO THEIR SERVICES. TAKE CARE NOT TO DAMAGE OR DISPLACE ENCOUNTERED SERVICES.
2. AT LOCATIONS WHERE NEW PRIMARY CABLE TRENCH INTERSECTS AN EXISTING UNDERGROUND SERVICE INCREASE DEPTH OF TRENCH AS REQUIRED SUCH THAT THE PRIMARY CABLE DUCT IS ROUTED A MINIMUM OF 305 MM VERTICAL DISTANCE BELOW THE EXISTING UNDERGROUND SERVICE.

TRENCHING

1. EXCAVATE TRENCH WITH SUITABLE MACHINERY TO DEPTHS AND DIMENSIONS AS SHOWN IN TRENCH DETAILS. TRENCH DETAILS ARE PROVIDED AS A GUIDE ONLY. ELECTRICAL CONTRACTOR TO CONFIRM ALL DEPTHS ARE COMPLIANT WITH SECTION 12–012 AND TABLE 53 OF THE ONTARIO ELECTRICAL SAFETY CODE.
2. PLEASE NOTE, THE MINIMUM COVER REQUIREMENTS FOR ELECTRICAL CABLES MAY BE PERMITTED TO BE REDUCED BY 150MM WHERE MECHANICAL PROTECTION IS PLACED IN THE TRENCH OVER THE UNDERGROUND INSTALLATION (OESC SECTION 12–012(2)).
3. PROVIDE VINYL MARKER TAPE MOUNTED HALFWAY BETWEEN CABLE INSTALLATION AND GRADE LEVEL. REFER TO OESC RULE 12–012(11) AND BULLETIN 12–2–15.
4. CUT AND TRIM SIDES OF TRENCHES EVENLY AND AS NEAR VERTICAL AS POSSIBLE AND SHORE AS REQUIRED TO PREVENT CAVE–IN.
5. KEEP BOTTOM OF TRENCH CLEAN AND CLEAR OF LOOSE MATERIAL AND SLOPE OR GRADE AS REQUIRED.
6. SANDFILL SHALL BE UNIFORMLY GRADED CLEAN SAND WITH A MAXIMUM AGGREGATE SIZE OF 2.00 MM AND MAXIMUM OF 8% PASSING THE NUMBER OF 200 SIEVE.
7. NO COVERING UP OR BACKFILLING OF ELECTRICAL EQUIPMENT SHALL BE PERFORMED UNTIL THE ESA INSPECTOR HAS BEEN NOTIFIED AND PERMISSION TO COVER HAS BEEN GRANTED AS PER OESC RULE 2–310.
8. BACKFILL TRENCHES TO THE SATISFACTION OF THE OWNER.
9. REPAIR ALL SURFACES DAMAGED DUE TO WORK PERFORMED TO THE SATISFACTION OF THE OWNER.

PAD MOUNTED SERVICE TRANSFORMER - LOCATION

1. LOCATION OF PAD MOUNTED SERVICE TRANSFORMER TO BE 3 METERS FROM BUILDING STRUCTURES AND 6 METERS FROM BUILDING WINDOW/DOOR OPENINGS AND BUILDING VENTILATION INLETS OR OUTLETS (REFER TO SECTION 26–242 OF THE CE CODE).
2. ADDITIONAL LOCATION RESTRICTIONS ARE AS FOLLOWS;
   - 3 METERS FROM DRIVEWAY
   - 2 METERS FROM ROADWAY CURB
   - 300MM FROM SIDEWALK
   - OUTSIDE THE 15 METER SIGHT LINE AT CORNERS OF STREET INTERSECTIONS (SEE HYDRO ONE DU–03–201 STANDARD)
   - 3 METERS FROM STREET LIGHT POLES, FIRE HYDRANTS AND TREES
   - 150 MM FROM TELEPHONE, INTERNET AND CABLE TV DISTRIBUTION PEDESTALS AND STREET LIGHT DISCONNECT BOXES (THE METALLIC PARTS OF SUCH EQUIPMENT MUST BE BONDED TO THE HYDRO ONE EQUIPMENT GROUND GRID)
3. A 3 METER OPERATING AND MAINTENANCE CLEARANCE SHALL BE PROVIDED AROUND THE PAD MOUNTED TRANSFORMER.

PAD MOUNTED SERVICE TRANSFORMER - FOUNDATION

1. THE FOUNDATION FOR THE PAD MOUNTED TRANSFORMER SHALL BE LEVEL, PLACED ON A MINIMUM 150MM BASE OF COMPACTED GRANULAR "A", AND TOTALLY SUPPORTED BY UNDISTURBED EARTH. SHOULD THE FOUNDATION INSTALLATION REQUIRE PLACEMENT ON SLOPING GROUND, THE LOCAL DISTRIBUTING COMPANY SHALL BE CONTACTED FOR SPECIFIC REMEDIAL MEASURES.
2. CABLE OPENINGS IN FOUNDATIONS SHALL BE SEALED BY POLYEHTYLENE SEALS (POLY SEALS). LIFTING HOLES IN FOUNDATIONS SHALL BE SEALED USING DUCT SEAL COMPOUND.
3. AFTER INSTALLATION OF CABLES AND EQUIPMENT GROUNDING, A MINIMUM OF 3 METERS OF SPACE, IN FRONT OF THE OPERATING SIDE(S) OF THE EQUIPMENT AND 1 METER OF SPACE AROUND THE OTHER SIDES, MUST BE BACKFILLED, COMPACTED AND LEVELED TO THE PROPOSED FINAL GRADE LEVEL.

HYDRO ONE

1. HYDRO ONE'S SCOPE OF WORK FOR THIS PROJECT IS AS FOLLOWS;
   A. UPGRADING OF EXISTING POLE FOR THE SITE
   B. SUPPLY, INSTALLATION AND TERMINATION OF PRIMARY CABLES
   C. SUPPLY AND INSTALLATION OF PAD MOUNTED TRANSFORMER
   D. INSTALLATION OF HYDRO METER
2. CONTRACTORS SCOPE OF WORK IN COORDINATION WITH HYDRO ONE IS AS FOLLOWS;
   A. PROVIDE TRENCH AND 4 X 4"PVC DB2 DUCTS FOR PRIMARY CABLE
   B. PROVIDE THREE PHASE TRANSFORMER BASE INCLUDING GROUND GRID AND GUARD POSTS
   C. PROVIDE SECONDARY CABLES
   D. PROVIDE SECONDARY CABLE LUGS AND TERMINATE SECONDARY CABLES TO PAD MOUNT TRANSFORMER
   E. PROVIDE AND INSTALL METER BASE FOR HYDRO METER
3. ALL HYDRO FEES ASSOCIATED WITH THE AFOREMENTIONED SCOPE OF WORK TO BE PAID FOR VIA CASH ALLOWANCE.

ELECTRICAL SPECIFICATION - CONT'D

COORDINATION

1. CO–ORDINATE ALL WORK WITH HYDRO, ESA, THE ENGINEER AND THE OWNER.
2. CO–ORDINATE ALL WORK WITH UTILITIES.
3. ESA TO INSPECT WORK AS REQUIRED.
4. NECESSARY SERVICE INTERRUPTIONS TO PERFORM WORK SHALL BE CO–ORDINATED WITH OWNER, ENGINEER, ESA AND HYDRO. SERVICE INTERRUPTIONS SHALL BE PLANNED TO BE OF MINIMUM DURATION. ALL PARTIES INVOLVED SHALL BE CONTACTED 72 HOURS IN ADVANCE OF THE SERVICE INTERRUPTION.

SERVICE ENTRANCE SWITCHBOARD

1. SERVICE ENTRANCE BOARD TO BE COMPLETE WITH FOLLOWING SECTIONS IN A SINGLE ENCLOSURE;
   A. MAIN BREAKER SECTION, BOTTOM ENTRY
   B. UTILITY METERING TRANSFORMER COMPARTMENT
   C. DISTRIBUTION SECTION
2. GENERAL INFORMATION;
   A. RATING: 600Y/347V, 3–PHASE 4–WIRE
   B. BUS RATING & TYPE: 1200 AMP TIN PLATED ALUMINUM
   C. GROUND BAR: STANDARD BOLTED ALUMINUM, ALUMINUM OR COPPER CABLE
   D. NEUTRAL RATING: 1200 AMP
   E. MAIN TERMINALS: MUST ACCEPT 3 RUNS OF 650MCM ALUMINUM RWU–90
   F. MINIMUM INTERRUPTING RATING: 35KA
   G. BUS BRACING RATING: 35KA
   H. HORIZONTAL ISOLATING BARRIER
3. ENCLOSURE;
   A. SEAL SCREWS TO ALLOW FOR INSTALLATION OF UTILITY SEALS
   B. NEMA TYPE 1
   C. FREE STANDING, DEAD FRONT, MOUNTED ON CONCRETE PAD, WALL SUPPORTED
   D. BOX AND TRIM FINISH ASA 61
   E. FACTORY ASSEMBLED AND CSA LISTED
4. MAIN SERVICE BREAKER: 1200 AMP FRAME, 100% RATED, TRIP 1000 AMP, LSIG TYPE, SOLID STATE. ENSURE MAIN SERVICE BREAKER WILL ACCOMMODATE INCOMING SERVICE CONDUCTORS.
5. METERING COMPARTMENT FOR SUPPLY AUTHORITY'S CT'S AND/OR PT'S WITH HINGED DOOR COMPLETE WITH SEALING AND PADLOCK PROVISIONS. PROVIDE REMOVABLE MOUNTING PAN WITH COMPARTMENT FOR MOUNTING OF CT'S AND/OR PT'S. THESE PROVISIONS SHALL BE SUBMITTED TO AND APPROVED BY THE SUPPLY AUTHORITY BEFORE MANUFACTURE.
6. DISTRIBUTION SECTION(S) SHALL HAVE FULL CAPACITY NEUTRAL AND CIRCUIT BREAKERS WITH COORDINATED FAULT AND TRIP RATINGS TO SUIT MAIN DISTRIBUTION SWITCHES.
7. THE NEUTRAL CONDUCTOR OF THE WIRING SYSTEM TOGETHER WITH CONDUIT AND SERVICE GROUNDING SYSTEM SHALL BE BONDED TO THE WATER SERVICE AS DETAILED AND IN ACCORDANCE WITH UTILITY REGULATIONS.
8. STRUCTURES SHALL CONSIST OF METAL ENCLOSED STEEL FRAME AND FRONT ENCLOSURES, WHICH SHALL INCLUDE SEPARATE COMPARTMENTS FOR EACH BREAKER AND METERING SECTION. ALL JOINTS OF BUSES SHALL HAVE TIN–PLATED HIGH PRESSURE CONTACTS AND FLAME RETARDANT BUS SUPPORTS.
9. A GROUND BUS SHALL BE PROVIDED BOLTED TO EACH UNIT.
10. PROVIDE SUITABLE WORDED ENGRAVED PLASTIC NAMEPLATES FOR EACH DEVICE AND COMPARTMENT.
11. PROVIDE FINGERS IN SWITCHBOARD FOR ALL CIRCUITS.
12. EATON OR APPROVED EQUAL.

METER SOCKET

1. PROVIDE A 13 JAW, TRANSFORMER RATED, METER SOCKET C/W PROVISIONS FOR TEST SWITCHES OR BLOCKS AND TUNNEL STYLE LINE AND LOAD LUGS WHICH ACCOMMODATE #14–8 COPPER CABLING.

   EATON CAT#: TSU13 OR APPROVED EQUAL

PANELBOARDS

1. PANELBOARDS: TO CSA C22.2 NO. 29.
2. 250 AND 600VOLT PANELBOARDS: BUS AND BREAKERS RATED FOR SYMMETRICAL INTERRUPTING CAPACITY AS INDICATED ON PANEL SCHEDULES (RMS SYMMETRICAL).
3. PANELBOARDS: MAINS, NUMBER OF CIRCUITS, AND NUMBER AND SIZE OF BRANCH CIRCUIT BREAKERS AS INDICATED.
4. COPPER BUS WITH FULL SIZE NEUTRAL.
5. EQUIPMENT GROUND BUS TO MATCH NEUTRAL BUS. BOLTED DIRECTLY TO PANELBOARD ENCLOSURE.
6. ISOLATED GROUND BUS WHERE INDICATED.
7. MAINS SUITABLE FOR BOLT–ON BREAKERS.
8. FINISH TRIM AND DOOR BAKED GREY ENAMEL.
9. CONNECT LOADS TO CIRCUITS AS INDICATED.
10. CONNECT NEUTRAL CONDUCTORS TO COMMON NEUTRAL BUS WITH RESPECTIVE CIRCUIT(S) IDENTIFIED.
11. EATON POW–R–LINE 1A, 2A AND 3A SERIES PANELBOARDS OR APPROVED EQUAL.

SHORT CIRCUIT CURRENT RATINGS

1. THE LISTED POWER DISTRIBUTION EQUIPMENT SHALL CARRY THE ASSOCIATED SHORT CIRCUIT INTERRUPTING RATINGS:
   – PANEL CDP–1: 35KA FULLY RATED
   – PANEL P1: 35KA FULLY RATED
   – PANEL A: 22KA FULLY RATED
   – PANEL B: 22KA FULLY RATED
   – PANEL C: 22KA FULLY RATED
   – PANEL D: 22KA FULLY RATED
   – PANEL E: 22KA FULLY RATED

SHORT CIRCUIT, DEVICE COORDINATION & ARC FLASH STUDY

1. CONTRACTOR SHALL ENGAGE A PROFESSIONAL ENGINEER TO PERFORM A SHORT CIRCUIT, DEVICE COORDINATION AND ARC FLASH STUDY THROUGHOUT THE BUILDING IN ACCORDANCE WITH APPLICABLE IEEE STANDARDS.
2. ADJUST TRIP SETTINGS OF NEW CDP–1 MAIN BREAKER TO ACHIEVE BEST POSSIBLE COORDINATION WITH DEVICES THROUGHOUT THE FACILITY AND MINIMIZE ARC FLASH INCIDENT ENERGY.
3. PROVIDE AND INSTALL ALL ARC FLASH LABELS IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.

TRANSFORMERS

1. ALL TRANSFORMERS TO BE SIZED AS PER DRAWINGS. ALL TRANSFORMER WINDINGS TO BE COPPER.
2. DRY TYPE TRANSFORMERS SHALL BE WALL OR FLOOR MOUNTED INDOOR TYPE, 60 CYCLE TYPE AND NATURAL DRAFT, AIR–COOLED, 600V TO 120/208V, 3 PHASE, 4 WIRE, PRIMARY WINDING SHALL INCLUDE (4) 2 ½"TAPS ARRANGED 2"ABOVE AND 2 "BELOW. NORMAL VOLTAGE INSULATION TO BE RATED CLASS 'H"150 °C.
3. TRANSFORMERS SHALL HAVE FOLLOWING FEATURES;
   A. TYPE: ANN
   B. C.S.A.: C22.2 NO. 47
   C. KVA RATING AS INDICATED
   D. VOLTAGE CLASS: 1.2KV
   E. BIL RATING: 10KV
   F. SOUND LEVEL: 225KVA– 55DB MAXIMUM; 75 KVA AND BELOW 50 DB MAXIMUM
   G. IMPEDANCE: ABOVE 75KVA– 3% TO 4 %
   H. FINISH: ASA 61 GREY AIR DRY
   I. MOUNTS: ANTI–VIBRATION BETWEEN CORE COIL FRAME AND THE ENCLOSURE FRAME
   J. MAKE PRIMARY AND SECONDARY CONNECTIONS SHOWN ON DRAWING WITH FLEXIBLE METAL CONDUITS.
   K. ACCEPTABLE MANUFACTURES: MARCUS, HAMMOND, BEMAG.

ELECTRICAL SPECIFICATION - CONT'D

CONDUITS

1. ELECTRICAL METALLIC TUBING (EMT), COUPLINGS AND CONNECTORS: CSA C22.2 NO. 83.
2. RIGID METAL CONDUITS AND FITTINGS: STEEL, GALVANIZED HEAVY WALL, CSA C22.2 NO. 45.
3. FLEXIBLE METAL CONDUITS, LIQUID–TIGHT FLEXIBLE METAL CONDUITS: CSA C22.2 NO. 56.
4. USE EMT CONDUIT AND FITTINGS FOR ALL INTERIOR WIRING UNLESS OTHERWISE SPECIFIED.
5. USE RIGID METAL CONDUITS AND FITTINGS STEEL WHERE EXPOSED INSTALLATION IS SUBJECT TO MECHANICAL INJURY AND FOR EXTERIOR USE.
6. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTION TO MOTORS OR VIBRATING EQUIPMENT IN DAMP, WET OR CORROSIVE LOCATIONS.
7. FOR EXTERIOR MOUNTED CONDUIT PROVIDE EXPANSION FITTINGS AS FOLLOWS;
   A. WEATHERPROOF EXPANSION FITTINGS WITH INTERNAL BONDING ASSEMBLY SUITABLE FOR 100MM LINEAR EXPANSION.
   B. WATERTIGHT EXPANSION FITTINGS WITH INTEGRAL BONDING JUMPER SUITABLE FOR LINEAR EXPANSION AND 10MM DEFLECTION IN ALL DIRECTIONS
   C. WEATHERPROOF EXPANSION FITTINGS FOR LINEAR EXPANSION AT ENTRY TO PANELS.
8. CONDUIT FITTINGS TO BE MANUFACTURED FOR USE WITH CONDUIT SPECIFIED. COATING TO BE THE SAME AS THE CONDUIT. FACTORY 'ELLS' WHERE 90 DEGREE BENDS ARE REQUIRED FOR 25MM AND LARGER CONDUITS. WATERTIGHT CONNECTORS AND COUPLINGS FOR EMT. INSTALL CONDUIT SEALING FITTINGS IN HAZARDOUS AREAS AND FILL WITH COMPOUND. USE EXPLOSION PROOF FLEXIBLE CONNECTIONS TO EXPLOSION PROOF MOTORS.
9. INSTALL CONDUITS TO CONSERVE HEADROOM IN EXPOSED LOCATIONS.
10. CONCEAL CONDUITS EXCEPT IN MECHANICAL AND ELECTRICAL SERVICE ROOMS AND IN UNFINISHED AREAS.
11. INSTALL EXPOSED CONDUITS NEATLY, PARALLEL TO BUILDING LINES WITH CONCENTRIC RIGHT ANGLE BENDS.
12. FOR CONDUITS INSTALLED IN POURED CONCRETE LOCATE THE CONDUITS TO SUIT REINFORCING STEEL, PROTECT CONDUITS FROM DAMAGE WHERE THEY STUB OUT OF THE CONCRETE AND PROVIDE SLEEVES IN ADVANCE OF CONCRETE POUR, WHERE CONDUITS PASS THROUGH SLAB OR WALL.
13. CLEARLY LABEL ALL EXPOSED CONDUIT, PULL BOXES, JUNCTION BOXES, ETC., TO INDICATE THE NATURE OF THE SERVICE.
14. RACEWAY SYSTEMS TO BE COMPLETELY INSTALLED, DRY AND CLEAN BEFORE PULLING CONDUCTORS.
15. PROVIDE POLYPROPYLENE FISH WIRE IN ALL EMPTY CONDUITS.
16. PROVIDE, IN ALL CONDUITS, AN INSULATED GREEN GROUNDING CONDUCTOR (NO.12 AWG). RUN WITH CIRCUIT CONDUCTORS AND TO ALL ENCLOSURES.

WIRING

1. SINGLE OR MULTI–CONDUCTOR TECK 90 CABLES TO CSA STANDARD C22.2 NO. 131. CABLES TO BE 1000 V INSULATION, ALUMINUM SHEATH AND OVERALL PVC JACKET. INSULATION TO BE 1000V CROSS–LINKED POLYETHYLENE SUITABLE FOR INSTALLATION AT A TEMPERATURE DOWN TO MINUS 40 °C COMPLETE WITH ALUMINUM SHEATH AND OVERALL PVC JACKET. TECK 90 CABLES TO BE COPPER UNLESS OTHERWISE INDICATED.
2. 600 VOLT RW90 OR T90 RATING, COPPER CONDUCTORS, MINIMUM #12 AWG, EXCEPT AS OTHERWISE NOTED. 15AMP, 120 VOLT RECEPTACLE BRANCH CIRCUIT HOME RUNS SHALL BE MINIMUM #12 AWG. HOME RUNS OVER 75 FEET SHALL BE MINIMUM #10 AWG. MAXIMUM LENGTH OF BRANCH CIRCUIT FEEDER FROM PANEL TO FURTHEST RECEPTACLE SHALL BE 120 FT.
3. ARMOURED CABLE (TYPE AC90) ONLY IN CONCEALED CEILING SPACE FOR FINAL CONNECTION FROM JUNCTION OR DISTRIBUTION BOXES TO LUMINARIES, RECEPTACLES, AND ALL OTHER ELECTRICAL DEVICES, TO MAXIMUM LENGTH OF 5 METERS. AC90 CABLE SHALL NOT BE USED FROM DISTRIBUTION OR JUNCTION BOXES TO A SECOND JUNCTION BOX.
4. CONDUCTORS REQUIRED FOR THE OPERATION OF LIFE SAFETY SYSTEMS, AS DESCRIBED IN OESC RULE 46–002, SHALL BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER CONDUCTORS AND EQUIPMENT AND SHALL NOT ENTER LUMINAIRE, RACEWAY, BOX, CABINET OR UNIT EQUIPMENT OCCUPIED BY OTHER CONDUCTORS EXCEPT WHERE NECESSARY IN GENERATOR TRANSFER SWITCHES, EXIT SIGNS AND EMERGENCY LIGHTS SUPPLIED BY TWO SOURCES, AS DETAILED IN OESC RULE 46–108(4).
5. ENSURE VOLTAGE DROP DOES NOT EXCEED 2 PERCENT.
6. WIRE CONNECTORS: TWIST–ON PRESSURE TYPE FOR #10 AND SMALLER. SPLIT–BOLT TYPE FOR #8 AND LARGER.

BOXES

1. GALVANIZED SHEET STEEL BOXES WITH CONDUIT K.O.'S TO SUIT INSTALLATION. MASONRY FOR BLOCK WALLS, CONCRETE TIGHT FOR CONCRETE ENCASEMENT, TYPE FS FOR SURFACE MOUNTING. JUNCTION AND PULL BOXES C/W SCREW–ON FLAT COVERS.
2. OPENINGS IN ALL ELECTRICAL METAL BOXES SHALL BE PUNCHED OR CUT. BURRING OF HOLES WILL NOT BE PERMITTED.
3. ALL CONDUITS AND CABLES MUST BE SECURELY FASTENED WITH APPROVED CLIPS AND SCREWS.

IDENTIFICATION

1. IDENTIFY SOURCE, VOLTAGE AND LOAD ON ALL JUNCTION BOXES. USE OF INDELIBLE MARKER FOR THESE LOCATIONS IS ACCEPTABLE.
2. ALL CONDUCTORS TO BE COLOUR CODED IN ACCORDANCE WITH CSA 22.1 SECTION 4.036 AND EXISTING BUILDING WIRE COLOUR CODE SYSTEM.
3. CONTRACTOR TO PROVIDE A "TYPED"PANEL SCHEDULE FOR ALL ELECTRICAL PANELS INSTALLED IN THIS CONTRACT.
4. IDENTIFY PANEL AND CIRCUIT NUMBER ON ALL NEW OR RELOCATED DUPLEX RECEPTACLE FACE PLATES WITH BLACK PRINTED LETTERING ON CLEAR LABELLING TABS (P–TABS).
5. CONDUIT IDENTIFICATION: CODE WITH PLASTIC TAPE OR PAINT AT POINTS WHERE CONDUITS ENTER WALLS, CEILINGS, OR FLOORS AT 3.0M INTERVALS.
6. IDENTIFY ALL ELECTRICAL EQUIPMENT WITH LAMACOID PLATES (BLACK WITH WHITE LETTERING), PANELBOARDS, DISCONNECTS, SPLITTERS, TRANSFORMERS, MOTOR STARTERS ETC.

GROUNDING

1. GROUNDING EQUIPMENT TO CSA C22.2 NO. 41.
2. COPPER GROUNDING CONDUCTORS TO: CSA 22.1 SECTION 10 LATEST EDITION.
3. NON–CORRODING ACCESSORIES NECESSARY FOR GROUNDING SYSTEM.
4. INSTALL COMPLETE PERMANENT, CONTINUOUS, SYSTEM AND CIRCUIT, EQUIPMENT, GROUNDING SYSTEMS, INCLUDING ELECTRODES, CONDUCTORS, CONNECTOR, ACCESSORIES, AS INDICATED, TO CONFORM TO REQUIREMENTS OF ENGINEER AND LOCAL AUTHORITY HAVING JURISDICTION OVER INSTALLATION.
5. MAKE GROUNDING CONNECTIONS IN RADIAL CONFIGURATION ONLY, WITH ALL CONNECTIONS TERMINATING AT SINGLE GROUNDING POINT. AVOID LOOP CONNECTIONS. ENSURE UNIFORMITY OF GROUNDING PRACTICES THROUGHOUT INSTALLATION. INSTALL SYSTEM AND CIRCUIT GROUNDING CONNECTIONS TO THE NEUTRALS OF THE SECONDARY SYSTEMS.
6. FOR STANDARD DUPLEX RECEPTACLES PROVIDE INSULATED GROUND CONDUCTOR, SIZE FOR EQUIPMENT GROUND IN ACCORDANCE WITH ELECTRICAL CODE MINIMUM CONDUCTOR SIZE #12 WITH GREEN INSULATION. GROUND CONDUCTOR TO BE CONNECTED UNDER A BONDING SCREW TO OUTLET BOX(ES) AND PANELBOARD.
7. INSTALL SEPARATE "GREEN" GROUND CONDUCTOR IN SAME CONDUIT WITH CIRCUIT (POWER WIRING) CONDUCTORS. BOND SECURELY TO GROUND SCREW IN EACH OUTLET, JUNCTION, PULL BOX, AND EQUIPMENT ENCLOSURE GROUND CONDUCTOR EQUAL IN AMPACITY TO SIZE OF CIRCUIT AMPACITY OR IN ACCORDANCE WITH CODE FOR EQUIPMENT GROUNDING.
8. INSTALL SEPARATE #6 AWG INSULATED GROUND CONDUCTORS TO EACH TELEPHONE BOARD AND TO EACH IT/LAN RACK FOR CONNECTION TO THE TELEPHONE AND DATA SYSTEMS.
9. BOND SINGLE CONDUCTOR, METALLIC ARMOURED CABLES TO CABINET AT SUPPLY END, AND PROVIDE NON–METALLIC ENTRY PLATE AT LOAD END.
10. INSTALL GROUNDING CONNECTIONS TO TYPICAL EQUIPMENT INCLUDING, BUT NOT NECESSARILY LIMITED TO: PANELBOARDS, TELEPHONE BOARDS IT RACKS, GROUNDING RODS/PLATES AND RECEPTACLES.

ELECTRICAL SPECIFICATION - CONT'D

DISCONNECT SWITCHES

1. ENCLOSED MANUAL AIR BREAK SWITCHES IN NON–HAZARDOUS LOCATIONS: TO CSA C22.2 NO. 4.
2. FUSE HOLDER ASSEMBLIES TO CSA C22.2 NO. 39.
3. FUSIBLE AND NON–FUSIBLE DISCONNECT SWITCH IN CSA ENCLOSURE EEMAC 1 (EEMAC 3R FOR WEATHERPROOF TYPE).
4. PROVISION FOR PADLOCKING IN OFF SWITCH POSITION BY ONE LOCK.
5. MECHANICALLY INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IS IN 'ON' POSITION.
6. QUICK MAKE, QUICK BREAK ACTION.
7. ON–OFF SWITCH POSITION INDICATION ON SWITCH ENCLOSURE COVER.
8. INSTALL DISCONNECT SWITCHES COMPLETE WITH FUSES AS INDICATED.

MANUAL MOTOR STARTERS

1. MANUAL STARTERS, QUICK–MAKE AND BREAK, TOGGLE SWITCH OPERATION, MELTING ALLOY OVERLOADS, TRIP–FREE WITH TRIPPED POSITION INDICATED BY OPERATING HANDLE AND COVER MOUNTED PILOT LIGHT, FLUSH OR SURFACE MOUNTED ENCLOSURE AS REQUIRED.

MAGNETIC MOTOR STARTERS

1. MAGNETIC MOTOR STARTER C/W RED RUN LIGHT, GREEN READY LIGHT, HAND–OFF–AUTO SELECTOR SWITCH, THERMAL OVERLOAD PROTECTION, MAGNETIC SHORT CIRCUIT PROTECTION, 24V COIL, 24V CONTROL TRANSFORMER, 2–NO AUXILIARY CONTACTS AND NEMA 1 ENCLOSURE.
2. MAGNETIC MOTOR STARTERS TO BE SIZED TO ASSOCIATED LOAD.
3. EATON IEC SERIES OR APPROVED EQUAL

SWITCHES

1. MANUALLY OPERATED GENERAL PURPOSE AC SWITCHES TO CSA C22.2 NO. 111.
2. 15 AMP, 120 VOLT SINGLE POLE, DOUBLE POLE, THREE–WAY, FOUR–WAY SPECIFICATION GRADE SWITCHES AS INDICATED. BLACK COLOUR.
3. 20 AMP, 120 VOLT SINGLE POLE, DOUBLE POLE, THREE–WAY, FOUR–WAY SPECIFICATION GRADE SWITCHES AS INDICATED. BLACK COLOUR.
4. 15 AMP, 120 VOLT SINGLE POLE SPECIFICATION GRADE SWITCH COMPLETE WITH RED PILOT LIGHT. BLACK COLOUR.
5. TOGGLE, OPERATED FULLY RATED FOR TUNGSTEN FILAMENT AND FLUORESCENT LAMPS, AND UP TO 80% OF RATED CAPACITY OF MOTOR LOADS.
6. SWITCHES OF ONE MANUFACTURER THROUGHOUT PROJECT. EQUAL TO HUBBELL 1200 SERIES FOR 120VOLT AND 1800 SERIES FOR 347VOLT.
7. INSTALL SWITCHES IN GANG TYPE OUTLET BOX WHEN MORE THAN ONE SWITCH IS REQUIRED IN ONE LOCATION. MOUNTED AT 1200MM A.F.F. UNLESS OTHERWISE NOTED.

DIMMER SWITCHES

1. DIMMER SWITCHES TO BE PROVIDED AS INDICATED. ENSURE THAT DIMMERS ARE COMPATIBLE WITH ASSOCIATED DIMMING BALLASTS. PROVIDE REMOTE DIMMER TO ACHIEVE 3–WAY DIMMING WHERE INDICATED. COORDINATE COLOUR WITH ARCHITECT.

   LUTRON DIVA SERIES OR APPROVED EQUAL

RECEPTACLES

1. RECEPTACLES, PLUGS AND SIMILAR WIRING DEVICES TO CSA C22.2 NO. 42.
2. DUPLEX RECEPTACLES, CSA TYPE 5–15R 125V, 15A, INDUSTRIAL GRADE EQUAL TO LEVITON 5262, BLACK COLOUR.
3. DUPLEX RECEPTACLES, CSA TYPE 5–20R, 125V, 20A, T–SLOT, INDUSTRIAL GRADE EQUAL TO LEVITON 5362, BLACK COLOUR.
4. CSA TYPE 5–15R, 125V, 15A, GROUND FAULT DUPLEX RECEPTACLES, INDUSTRIAL GRADE EQUAL TO LEVITON GFNT1 , BLACK COLOUR.
5. CSA TYPE 5–20R, 125V, 20A, T–SLOT, GROUND FAULT DUPLEX RECEPTACLES, INDUSTRIAL GRADE, FEED–THROUGH, EQUAL TO LEVITON GFNT2, BLACK COLOUR.
6. DUPLEX RECEPTACLES, ISOLATED GROUND TYPE, CSA TYPE 5–15R 125V, 15A, INDUSTRIAL GRADE EQUAL TO LEVITON 5262–IG, RED COLOUR.
7. WHERE EXPOSED TO THE WEATHER, RECEPTACLES OF CONFIGURATIONS 5–15R, 5–20R, 5–20RA, 6–15R, 6–20R AND 6–20A SHALL BE PROVIDED WITH COVER PLATES SUITABLE FOR WET LOCATIONS WHETHER OR NOT A PLUG IS INSERTED INTO THE RECEPTACLE (I.E. IN–USE COVER PLATES). REFERENCE RULE OESC 26–702(2).
8. RECEPTACLES TO BE MOUNTED AT 400MM A.F.F. UNLESS OTHERWISE NOTED.
9. RECEPTACLES TO BE MOUNTED ABOVE COUNTERS AS INDICATED.

COVER PLATES

1. COVER PLATES FOR ALL WIRING DEVICES.
2. BRUSHED STAINLESS STEEL COVER PLATES MOUNTED IN A FLUSH–MOUNTED OUTLET BOX.
3. WP –INDICATES NEW STYLE 'IN–USE' WEATHERPROOF COVER PLATE. COVER PLATES SHALL MAINTAIN A WEATHERPROOF SEAL WHEN THE OUTLET IS IN USE IN ACCORDANCE WITH OESC RULE 26–702.

POWER CORD REEL

1. INDUSTRIAL CORD REEL WITH STEEL CONSTRUCTION, 300 VOLT RATING, CEILING MOUNTED, 13.7 METER CORD, 12/3 SJEO CABLE TYPE, NEMA 5–15R RECEPTACLE.

   HUBBELL CAT#: HBL45123C OR APPROVED EQUAL.

INTELLIGENT PARKING LOT CONTROLLER

1. INTELLIGENT PARKING LOT CONTROLLER TO BE DUAL CIRCUIT, PRE–WIRED INDUSTRIAL OUTLET MOUNTED IN A WEATHERPROOF BOX. COVERPLATE TO BE SUITABLE FOR WET LOCATIONS WHETHER OR NOT A PLUG IS INSERTED INTO THE RECEPTACLE (I.E. IN–USE COVER PLATES). REFERENCE RULE OESC 26–702(2).

   ILPC MODEL M210 OR APPROVED EQUAL

BARRIER FREE DOOR OPERATOR

1. PROVIDE ALL POWER AND CONTROL WIRING FOR BARRIER FREE DOOR SYSTEM.
2. INSTALL CONDUIT AND RECESSED BOXES FOR PUSHBUTTONS AS REQUIRED. COORDINATE LOCATION OF RECESSED BOXES WITH ARCHITECT.
3. COORDINATE WITH DOOR HARDWARE SUPPLIER/INSTALLER.

HEAT TRACE - RAIN WATER LEADERS

1. PROVIDE AND INSTALL HEAT TRACE CABLE WITHIN EACH RAIN WATER LEADER. HEAT TRACE CABLE TO BE ROUTED FROM BUILDING TO CATCH BASIN AS INDICATED. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. FEEDER BREAKERS FOR HEAT TRACE SHALL BE GFCI TYPE CIRCUIT BREAKERS WITH A 30MA EQUIPMENT PROTECTION TRIP THRESHOLD.
3. HEAT TRACE CABLES SHALL BE 120V, 6W/FT, SELF–REGULATING COMPLETE WITH POWER CONNECTION KITS, END SEAL KITS AND ALL OTHER ACCESSORIES FOR A COMPLETE AND FUNCTIONING INSTALLATION.
4. RAYCHEM WINTERGARD WET H612 C/W H900 SERIES ACCESSORIES AS REQUIRED OR APPROVED EQUAL

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

Date	Revision	
JULY 28 / 22	ISSUED FOR PERMIT AND TENDER	0

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
Kierstead
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL
ARCHITECTURE

TBT ENGINEERING
CONSULTING GROUP

Project:
TOWN OF MARATHON
NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title:
ELECTRICAL SPECIFICATIONS

Drawn By: NL
Checked By: JK
Scale: AS NOTED
Project No: 22-098
Date Plotted:
Date Revised: JULY 2022
Drawing No: E400

ELECTRICAL SPECIFICATION - CONT'D

LIGHTING

1. INSTALL LUMINAIRES AFTER MECHANICAL DUCTS, PIPING AND EQUIPMENT IN VICINITY HAVE BEEN INSTALLED. NUMBER OF LUMINAIRES INDICATED ON DRAWINGS SHALL BE CHECKED FOR EXACT LOCATION AS APPROVED BY THE OWNER'S DESIGNEE PRIOR TO INSTALLATION.

2. TYPE 'A'

   610 X 1220MM LED TROFFER C/W 120V INPUT, 40W, 0–10V DIMMING, 5000 LUMEN, 4000K, CENTRE ACRYLIC DIFFUSER AND GYPSUM FRAME KIT.

   LITHONIA STAKPAK 2X4 ALO6 40K (MEDIUM) DGA24 OR APPROVED EQUAL

3. TYPE 'A1'

   SAME AS TYPE 'A' BUT WITHOUT GYPSUM FRAME KIT.

   LITHONIA STAKPAK 2X4 ALO6 40K (MEDIUM) OR APPROVED EQUAL

4. TYPE 'B'

   610 X 610MM LED TROFFER C/W 120V INPUT, 34W, 0–10V DIMMING, 4000 LUMEN, 4000K, CENTRE ACRYLIC.

   LITHONIA STAKPAK 2X2 ALO3 40K (MEDIUM) OR APPROVED EQUAL

5. TYPE 'B1'

   SAME AS TYPE 'B' BUT C/W GYPSUM FRAME KIT

   LITHONIA STAKPAK 2X2 ALO3 40K (MEDIUM) DGA22 OR APPROVED EQUAL

6. TYPE 'C'

   150MM RECESSED DOWNLIGHT, WET LOCATION RATED, 120V INPUT, 13W, TRIAC DIMMING, 970 LUMENS, 4000K, WHITE TRIM RING.

   JUNO WF6 SWW5 90CRI MW OR APPROVED EQUAL

7. TYPE 'D'

   1220MM LONG LED VAPOUR TIGHT FIXTURE, 120V INPUT, 24W, 0–10V DIMMING, 4000 LUMENS, 4000K, LOW PROFILE ACRYLIC LENS, MEDIUM DISTRIBUTION.

   LITHONIA FEM L48 4000LM LPAFL MD MVOLT GZ10 40K 80CRI OR APPROVED EQUAL

8. TYPE 'D1'

   SAME AS TYPE 'D' BUT 2440MM LONG AND 9000 LUMENS, 54W.

   LITHONIA FEM L96 9000LM LPAFL MD MVOLT GZ10 40K 80CRI OR APPROVED EQUAL

9. TYPE 'F'

   100MM RECESSED DOWNLIGHT, WET LOCATION RATED, 120V INPUT, 9W, TRIAC DIMMING, 670 LUMENS, 4000K, WHITE TRIM RING.

   JUNO WF4 SWW5 90CRI MW OR APPROVED EQUAL

10. TYPE 'G'

    WALL MOUNTED LED LIGHT FIXTURE, 120V INPUT, 23W, 3000 LUMENS, 2700K, 80 CRI, COMFORT WIDE DISTRIBUTION. INCLUDE OPTIONAL WIRELESS CONTROL MODULE.

    LITHONIA WDGE2 LED P3SW 27K 80CRI VW MVOLT NLTAIR2 PIRHN DDBXD OR APPROVED EQUAL OR APPROVED EQUAL

11. TYPE 'H'

    SAME AS TYPE 'G' BUT 1200 LUMENS, 10W.

    LITHONIA WDGE1 LED P1SW 27K 80CRI VW MVOLT NLTAIR2 PIRHN DDBXD OR APPROVED EQUAL OR APPROVED EQUAL

12. TYPE 'I'

    292 X 366MM COMPACT LED HIGH BAY, 120V INPUT, 0–10V DIMMING, 128W, 18000 LUMENS, 4000K, WIREGUARD

    LITHONIA CPHB 18000LM HEF GCL MD MVOLT GZ10 40K 80CRI WGX OR APPROVED EQUAL

13. TYPE 'J'

    SAME AS TYPE 'I' BUT 24000 LUMENS, 150W

    LITHONIA CPHB 24000LM HEF GCL MD MVOLT GZ10 40K 80CRI WGX OR APPROVED EQUAL

14. TYPE 'K'

    AREA/SITE LUMINAIRE, 120V INPUT, 115 WATTS, 0–10V DIMMING, TYPE R3 DISTRIBUTION, BRONZE, FINISH. INCLUDE

    LITHONIA CAT#: RSX2 LED PS 30K R3 MVOLT SPA NLTAIR2 PIRHN DDBXD OR APPROVED EQUAL

15. TYPE 'K' LIGHTING POLE

    6096MM HIGH, 125MM SQUARE STEEL POLE, POWDER COAT DARK BRONZE FINISH, GROUNDING PROVISION, REINFORCED HANDHOLE WITH COVER, COORDINATE BOLT CIRCLE WITH CONCRETE BASES.

16. PROVIDE ALL NECESSARY ACCESSORIES AND COMMISSIONING FOR WIRELESS LIGHTING CONTROL SYSTEM FOR EXTERIOR LIGHT FIXTURES TO ACHIEVE DARK SKY RESERVE PARAMETERS PER THE ROYAL ASTRONOMICAL SOCIETY OF CANADA.

LIGHTING CONTACTOR - 'LC1'

1. 60 AMP, 120 VOLT, 6 POLE, ELECTRICALLY HELD CONTACTOR DESIGNED TO HANDLE THE SWITCHING OF LED LIGHTING LOADS. NEMA 1 ENCLOSURE, ON/OFF PUSHBUTTONS, COMPLETE WITH RED RUN AND GREEN OFF PILOT LIGHTS, THREE WIRE CONFIGURATION REQUIRED FOR REMOTE ON/OFF CONTROL, 120 VOLT CONTROL COIL.

   CONTACTOR:
   EATON CAT. NO. ECC SERIES C/W OPTIONS ABOVE OR APPROVED EQUAL

EMERGENCY LIGHTING

1. THE EMERGENCY LIGHTING UNIT SHALL BE INSTALLED IN SUCH A MANNER THAT IT WILL AUTOMATICALLY BE ACTUATED UPON FAILURE OF THE POWER SUPPLY TO THE NORMAL LIGHTING IN THE AREA COVERED BY THAT EMERGENCY LIGHTING UNIT. REFER TO OESC 46–304(4) AND BULLETIN 46–1–5.

2. EMERGENCY LIGHTING UNITS TO BE COMPLETE WITH SEALED LONG–LIFE MAINTENANCE FREE BATTERY, CSA C22.2 NO. 141 CERTIFIED.

3. USE NO. 10 AWG CABLE FOR ALL REMOTE HEADS.

4. PROVIDE MOUNTING BRACKETS WHERE REQUIRED.

5. PROVIDE LOCK–ON DEVICES FOR CIRCUIT BREAKERS FEEDING EXIT LIGHT CIRCUIT AND EMERGENCY LIGHTING RECEPTACLES.

6. INSTALL EMERGENCY LIGHTING UNITS ON WALL MOUNTING PLATFORM AT HIGH LEVEL, WHERE SHOWN AND CONNECT TO 120 VOLT SUPPLY AS INDICATED.

7. INSTALL REMOTE HEADS SOLIDLY TO WALL SUPPORTED OUTLET BOXES.

8. EMERGENCY LIGHTING BATTERY PACKS EM1 THROUGH 4

   EMERGENCY LIGHTING BATTERY UNIT, 120 VOLT INPUT, 12 VOLT OUTPUT, 216 WATT CAPACITY C/W 12V, 6W LED HEADS AS INDICATED, AUTO DIAGNOSTIC, NON–AUDIBLE.

   EMERGI–LITE CAT. NO. 12ESL–216–UN/ 'X' OR APPROVED EQUAL

9. TYPE #1 AND TYPE #2 REMOTE HEADS

   SINGLE AND DOUBLE THERMOPLASTIC INJECTION MOULDED REMOTE HEADS C/W 12 VOLT, 6 WATT LED LAMP(S), WHITE COLOUR.

   EMERGI–LITE CAT. NO. EF9M–LJ OR APPROVED EQUAL (SINGLE)
   EMERGI–LITE CAT. NO. EF9DM–LJ OR APPROVED EQUAL (DOUBLE)

10. TYPE #3 REMOTE HEADS

    NEMA 4X RATED, DOUBLE REMOTE HEADS, FULLY GASKETED POLYCARBONATE HOUSING AND LENS C/W 12 VOLT, 6 WATT LED LAMPS, WHITE COLOUR.

    EMERGI–LITE CAT. NO. EF39P–D–M–LJ–SM OR APPROVED EQUAL

ELECTRICAL SPECIFICATION - CONT'D

EMERGENCY LIGHTING ZONE CONTROL BOX

1. ZONE CONTROL BOX FOR LINE VOLTAGE DETECTION FROM DIFFERENT BUILDING LIGHTING ZONES. IN CASE OF POWER FAILURE OF ONE OR SEVERAL LIGHTING CIRCUITS THE ZONE CONTROL BOX WILL TRANSFER THE BATTERY UNIT TO EMERGENCY LIGHTING MODE FOR A MINIMUM OF 30 MINUTES.

   DETERMINE QUANTITY OF LIGHTING CIRCUITS BEING USED IN THE AREA OF RENOVATION PRIOR TO ORDERING.

   EMERGI–LITE CAT. NO. 1–ZCB–'X'Z –1–U1–B–PB OR APPROVED EQUAL

EXIT SIGNS

1. EXIT SIGNS SHALL COMPLY WITH REQUIREMENTS STATED IN OBC SECTION 3.4.5.

2. EXIT SIGNS SHALL CONSIST OF A GREEN PICTOGRAM AND WHITE GRAPHIC SYMBOL MEETING THE VISIBILITY SPECIFICATION REFERRED TO IN ISO 3864–1. DIMENSIONS OF THE EXIT SIGN SHALL CONFORM TO ISO 7010.

3. INSTALL EXIT SIGNS ON CEILING OR WALL AS INDICATED.

4. IF ILLUMINATION OF AN EXIT SIGN IS PROVIDED FROM AND ELECTRICAL CIRCUIT, THAT CIRCUIT SHALL SERVE NO EQUIPMENT OTHER THAN EMERGENCY LIGHTING IN THE AREA WHERE EXIT SIGNS ARE INSTALLED AND BE CONNECTED TO AN EMERGENCY POWER SUPPLY.

5. TYPE 'EX1'

   DURABLE INJECTION MOULDED THERMOPLASTIC GREEN PICTOGRAM EXIT SIGN C/W LONG LIFE LED LIGHT SOURCE, SELF–POWERED BATTERY BACKUP, AUTO–TEST NON–AUDIBLE, UNIVERSAL FACE, UNIVERSAL MOUNTING AND WHITE HOUSING.

   EMERGI–LITE CAT #: EP3–W–I OR APPROVED EQUAL

PHOTOCELL

1. PROVIDE SURFACE MOUNTED THERMAL PHOTOELECTRIC CONTROL COMPLETE WITH WEATHER–RESISTANT HOUSING, DELAY OF UP TO TWO MINUTES PREVENTING FALSE SWITCHING, 120V, MOUNTED IN RECESSED BACK BOX.

   TORK CAT. NO. 3000 OR APPROVED EQUAL

OCCUPANCY SENSORS

1. ALL SENSOR LOCATIONS ARE APPROXIMATE. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS PRIOR TO INSTALLATION.

2. ULTRASONIC CEILING MOUNT SENSORS SHOULD BE LOCATED A MINIMUM OF 2743MM FROM HVAC SUPPLY/RETURN FANS.

3. SENSOR MOUNTED OVER DOORWAYS SHOULD BE PLACED A MINIMUM OF 305MM INSIDE THRESHOLD.

4. PROVIDE POWER PACKS AND AUXILIARY RELAYS AS PER MANUFACTURER'S INSTRUCTIONS FOR LIGHTING LOAD THEY ARE CONTROLLING.

5. TYPE 'OC1'

   WALL SWITCH MOUNT, DUAL TECHNOLOGY, LINE VOLTAGE OCCUPANCY SENSOR TO BE MOUNTED IN LOCATIONS INDICATED. LOCATIONS ARE APPROXIMATE AND SENSORS SHOULD BE INSTALLED TO SUIT EQUIPMENT IN ROOMS. BLACK COLOUR.

   WATTSTOPPER CAT#: DW–100–B OR APPROVED EQUAL

6. TYPE 'OC2'

   CEILING MOUNT, DUAL TECHNOLOGY, LOW VOLTAGE OCCUPANCY SENSOR TO BE MOUNTED IN LOCATIONS INDICATED. LOCATIONS ARE APPROXIMATE AND SENSORS SHOULD BE INSTALLED TO SUIT EQUIPMENT IN ROOMS.

   WATTSTOPPER CAT#: DT–300 OR APPROVED EQUAL

7. TYPE 'OC3'

   CEILING MOUNT, ULTRASONIC, LOW VOLTAGE OCCUPANCY SENSOR C/W TWO–SIDED LINEAR COVERAGE PATTERN WITH 90' SPACING. SENSOR TO BE MOUNTED IN LOCATIONS INDICATED. SENSOR TO BE SET FOR A 30–MINUTE TIME DELAY.

   WATTSTOPPER CAT#: WT–2255 OR APPROVED EQUAL

8. PROVIDE POWER PACKS AND AUXILIARY RELAYS AS PER MANUFACTURER'S INSTRUCTIONS FOR LIGHTING LOAD THEY ARE CONTROLLING.

   WATT STOPPER MODEL BZ50 OR APPROVED EQUAL.

VOICE/DATA

1. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO RETAIN A QUALIFIED VOICE/DATA CONTRACTOR CERTIFIED FOR THE INSTALLATION OF THE STRUCTURED CABLING SYSTEMS.

2. INSTALL NEW FLOOR MOUNTED, KNOCKDOWN, 4 POST, 44U, ADJUSTABLE DEPTH IT RACK WITH A WEIGHT CAPACITY OF 2,000 LBS. RACK TO BE LOCATED SUCH THAT EXISTING CONDUIT INFRASTRUCTURE CAN BE RE–USED. PROVIDE NEW #6AWG GROUND TO NEAREST ELECTRICAL PANEL.

   HAMMOND CAT#: HWMR1932UBK OR APPROVED EQUAL

3. 20 AMP, HORIZONTAL, RACK MOUNTED, POWER STRIP C/W 1 FRONT RECEPTACLE, 8 REAR RECEPTACLES, REAR MOUNTED CIRCUIT BREAKER AND 9 FOOT LINE CORD (QUANTITY 2)

   MIDDLE ATLANTIC CAT#: PD–920R–NS OR APPROVED EQUAL

4. FOR EACH VOICE/DATA LOCATION PROVIDE SINGLE GANG BOX OR PLASTER RING WITH 21MM CONDUIT CLIP, COMPLETE WITH 21 MM DIAMETER CONDUIT, END BUSHING TO CEILING SPACE AND NYLON PULL ROPE FOR USE BY OTHERS. MOUNTED AT 400 MM A.F.F. UNLESS OTHERWISE INDICATED.

5. CAT 6 CABLE

   CAT 6 CABLE TO BE FT6 RATED (I.E PLENUM RATED). QUANTITY: 2 PER VOICE/DATA OUTLET LOCATION. DESCRIPTION AS FOLLOWS;

   WIREWERKS CAT#: 6040–2PBL–R305 OR APPROVED EQUAL.

6. PATCH PANEL

   CAT6 CERTIFIED, 2U, 48 PORT PATCH PANEL. QUANTITY AS REQUIRED. POPULATED WITH MODULES AS REQUIRED PER ITEM 10.

   WIREWERKS CAT#: WW000041 OR APPROVED EQUAL

7. 4 PORT FACE PLATE

   EACH VOICE/DATA LOCATION TO BE PROVIDED WITH 4 PORT FACE PLATE;

   OR APPROVED EQUAL

8. BLANK INSERTS

   PROVIDE BLANK INSERTS FOR ALL PORTS NOT USED AT EACH VOICE/DATA LOCATION;

   WIREWERKS CAT#: KW–DUSTCAP–BK OR APPROVED EQUAL

9. DATA JACKS

   JACKS TO BE INSTALLED ARE AS FOLLOWS;

   WIREWERKS CAT#: KW–CC645B–BL OR APPROVED EQUAL

ELECTRICAL SPECIFICATION - CONT'D

VOICE/DATA - CONT'D

10. INSTALLATION

    a) LABEL WIRING AT EACH END AND EQUIPMENT TO CONFORM TO CONFORM WITH INDUSTRY STANDARDS AND TELECOMMUNICATIONS REQUIREMENTS (REFER TO CAN/CSA T528)

    b) LABEL CABLES WITH APPROPRIATE CABLE LABELS PRINTED WITH CABLE IDENTIFICATION NUMBER ASSIGNED TO THAT CABLE.

    c) MECHANICALLY PRINT EACH LABEL USING PERMANENT INK CABLE IDENTIFICATION NUMBER IDENTIFYING DATA OUTLETS. IDENTIFY CABLES AT ALL CONNECTIONS AND TERMINATION POINTS.

    d) ATTACH LABELS TO EACH DISTRIBUTION PANEL DESCRIBING PATCH PANEL NUMBER AND CABLE NUMBERS OF ALL CABLES ENTERING PANELS.

    e) GROUND EACH DISTRIBUTION RACK TO GROUND BUS IN ACCORDANCE WITH APPLICABLE CODE REQUIREMENTS.

    f) CONFORM TO TELECOMMUNICATIONS INDUSTRY STANDARDS (REFER TO CSA T529 AND EIA/TIA 568A) FOR ALL CABLE TERMINATION AND PINNING ASSIGNMENTS.

11. INSPECTION AND TESTING

    a) PROVIDE TOOLS, EQUIPMENT, LABOUR AND MATERIALS REQUIRED TO INSPECT AND TEST VOICE/DATA CABLING SYSTEM IN ACCORDANCE WITH INDUSTRY STANDARD AND T529 PROCEDURES.

    b) TEST ALL FOUR PAIRS UTP VOICE AND DATA CABLING RUNS FOR END–TO–END ATTENUATION, NOISE, RESISTANCE AND NEXT MEASUREMENTS FOR CATEGORY 6 LINK COMPLIANCE IN ACCORDANCE WITH CAN/CSA–T529 PROCEDURES.

12. QUALIFICATIONS OF INSTALLER

    a) PROVIDE INSTALLATION AND SUPERVISION WORK SUPERVISED BY TELECOMMUNICATIONS TECHNICIANS QUALIFIED TO INSTALL VOICE AND DATA CABLING SYSTEMS AND TO PERFORM RELATED TESTS AS REQUIRED BY THE MANUFACTURER.

    b) PROVIDE FULLY QUALIFIED TELECOMMUNICATIONS TECHNICIANS, TRAINED AND CERTIFIED IN THE INSTALLATION AND TESTING OF EQUIPMENT SPECIFIED. PROVIDE EVIDENCE UPON REQUESTS IN WRITING PRIOR TO WORK COMMENCEMENT OF MANUFACTURER'S CERTIFICATION OF SUPPLIERS'S ABILITY TO PROPERLY INSTALL STRUCTURED CABLING FOR BUILDINGS.

    c) SUBMIT PROVEN TRACK RECORD IN CABLING PROJECTS OF SIMILAR SIZE. INCLUDE DETAILS OF MINIMUM 3 PROJECTS OF SIMILAR SIZE INVOLVING CATEGORY 6 CABLING AND MULTIMODE FIBRE WHICH HAVE BEEN COMPLETED IN THE LAST 2 YEARS. INCLUDE NAMES, ADDRESSED AND PHONE NUMBERS OF REFERENCES FOR 3 PROJECTS.

13. WARRANTY/CERTIFICATION

    THE VOICE AND DATA SYSTEM SHALL BE A CERTIFIED SYSTEM AND OFFER A 25 YEAR WARRANTY (PARTS AND LABOUR) ON THE ENTIRE STRUCTURED CABLING SYSTEM C/W APPLICATION ASSURANCE (IE: TECHNICAL SUPPORT) FOR THE LIFETIME OF THE INSTALLATION.

    WIREWERKS OR APPROVED EQUAL

14. APPROVED EQUALS: COMMSCOPE, BELDEN

MOUNTING HEIGHTS OF NEW FIRE ALARM EQUIPMENT

1. REMOTE ANNUNCIATOR
   1600MM (MAXIMUM 1800MM TO TOP OF UNIT).
   AUDIBLE DEVICES
   WHERE THE CEILING HEIGHTS ALLOW, AUDIBLE SIGNAL DEVICES SHALL BE INSTALLED SO THAT THE TOP OF THE DEVICE WILL NOT BE LESS THAN 2300 MM ABOVE THE FINISHED FLOOR LEVEL.

2. VISIBLE DEVICES (STROBE LIGHTS)
   WHERE THE CEILING HEIGHTS ALLOW, WALL MOUNTED STROBE LIGHTS SHALL BE INSTALLED SUCH THAT THE ENTIRE LENS IS NOT LESS THAN 2000 MM AND NOT MORE THAN 2400 MM ABOVE THE FINISHED FLOOR.

   WALL MOUNTED AUDIBLE SIGNAL DEVICES SHALL BE INSTALLED AT LEAST 150 MM BELOW THE CEILING MEASURED TO THE TOP EDGE OF THE AUDIBLE DEVICE.

   CEILING MOUNTED STROBE LIGHTS SHALL BE SUSPENDED OR MOUNTED NOT MORE THAN 9000 MM ABOVE THE FINISHED FLOOR.

3. MANUAL PULL STATIONS

   MANUAL PULL STATIONS SHALL BE INSTALLED 1050MM TO 1150MM ABOVE FINISHED FLOOR LEVEL MEASURED FROM THE CENTER OF THE DEVICE.

   MANUAL PULL STATIONS SHALL BE LOCATED SUCH THAT THEY BE VISIBLE AT ALL TIMES.

   WHERE POSSIBLE, INSTALL THE MANUAL PULL STATION ON THE LATCH SIDE OF THE SINGLE DOOR AT A MAXIMUM LATERAL DISTANCE OF 1500MM FROM THE DOOR OPENING.

   MANUAL PULL STATIONS SHALL BE INSTALLED ON BOTH SIDES OF A SERIES OF DOORS EXCEEDING 12 M IN TOTAL WIDTH, AND WITHIN 1500MM OF EACH SIDE OF THE OPENING.

4. DUCT TYPE SMOKE DETECTORS

   DUCT TYPE SMOKE DETECTORS SHALL BE INSTALLED IN THE MAIN SUPPLY DUCT, DOWNSTREAM OF THE MIXING BOX, FILTERS AND FAN. WHERE DUCT TYPE SMOKE DETECTORS CANNOT BE INSTALLED IN THE MAIN SUPPLY DUCT, THEY SHALL BE INSTALLED IN EACH OF THE BRANCH LINES AS CLOSE AS PRACTICAL TO THE SUPPLY FAN DOWNSTREAM OF THE MIXING BOX, FILTERS AND FAN. REFER TO FIGURE 24 OF THE CAN/ULC–S524–14.

   DUCT TYPE SMOKE DETECTORS SHALL ALSO BE INSTALLED IN THE RETURN DUCT AS INDICATED.

5. HEIGHTS ARE SUBJECT TO CHANGE TO SUIT STRUCTURAL REQUIREMENTS, AND OTHER SITE CONDITIONS, AND THEREFORE AS WORK PROGRESSES, AND BEFORE INSTALLING EQUIPMENT, OBTAIN INSTRUCTIONS OR DIRECTIONS FROM OWNER'S DESIGNEE FOR ALTERNATIVE HEIGHTS OR RELOCATION.

FIRE ALARM

1. FIRE ALARM CONTROL PANEL

   NEW HIGH–END, ADDRESSABLE, MICROPROCESSOR BASED, PLATINUM FIRE ALARM CONTROL PANEL. THE CONTROL PANEL SHALL PROVIDE CONTINUOUSLY SUPERVISED OPERATION, GENERAL EVACUATION AND BE ZONED AS INDICATED. THE CONTROL PANEL IS TO BE COMPLETE WITH TWO BATTERIES, SUFFICIENT TO BACKUP THE PANEL FOR 24 HOURS, PANEL MOUNTED LED ZONE INDICATORS AND PANEL MOUNTED ALARM RELAY CARD.

   EDWARDS CAT. NO.: EST3 NO EQUAL

2. ANNUNCIATOR

   REMOTE ANNUNCIATOR COMPRISED OF LCD AND LED DISPLAY FOR ALARM, SUPERVISORY AND TROUBLE. DEDICATED LED'S INDICATING ALARM SILENCE, TROUBLE COMMUNICATION LOSS AND POWER–ON. REMOTE ANNUNCIATOR IS TO BE COMPLETE WITH A LOCAL TONE–ALERT AUDIBLE INDICATOR. PROVIDE AN ENCLOSURE TO HOUSE THE ANNUNCIATORS.

   EDWARDS CAT. NO. RLCD–C AND RLED–C OR APPROVED EQUAL

3. FAULT ISOLATOR MODULE

   FAULT ISOLATOR MODULE PROVIDING PROTECTION FOR THE SYSTEM AGAINST WIRE–TO–WIRE SHORT CIRCUITS ON THE SLC LOOPS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE AN APPROPRIATE NUMBER OF ISOLATION MODULES AND LOCATE THE UNITS AS REQUIRED BY CODE.

   EDWARDS CAT. NO. SIGA–IM

4. THERMAL FIRE DETECTORS

   INTELLIGENT 135°F RATE OF RISE HEAT DETECTOR;
   EDWARDS CAT. NO. SIGA–HRD

   INTELLIGENT 135°F FIXED HEAT DETECTOR;
   EDWARDS CAT. NO. SIGA–HFD

   ALL HEAT DETECTORS TO BE COMPLETE WITH EDWARDS STANDARD DETECTOR BASES SIGA–SB.

5. PHOTO ELECTRIC SMOKE DETECTORS

   INTELLIGENT PHOTO ELECTRIC SMOKE DETECTOR; EDWARDS CAT. NO. SIGA–OSD OR APPROVED EQUAL.

   ALL SMOKE DETECTORS TO BE COMPLETE WITH EDWARDS STANDARD DETECTOR BASES SIGA–SB.

ELECTRICAL SPECIFICATION - CONT'D

FIRE ALARM - CONT'D

6. MANUAL PULL STATION

   ADDRESSABLE, DOUBLE ACTION, PUSH TYPE, ENGLISH MANUAL PULL STATION;

   EDWARDS CAT. NO. SIGA–278

7. HORN/STROBE COMBINATION

   AUDIBLE/VISUAL HORN AND SYNCHRONIZED FLASH, NON–ADDRESSABLE, RED WITH WHITE LETTERING. UNIT TO OPERATE OVER A TWO–WIRE CIRCUIT.

   EDWARDS CAT. NO. G1AVRF

8. STROBE

   STROBE ONLY, NON–ADDRESSABLE, RED WITH WHITE LETTERING. UNIT TO OPERATE OVER A TWO–WIRE CIRCUIT.

   EDWARDS CAT. NO. G1VRF

9. RELAYS

   PROVIDE RELAYS TO SUITE PURPOSE AS REQUIRED. IT SHALL BE THE RESPONSIBILITY OF THE SUPPLIER/CONTRACTOR TO PROVIDE AN APPROPRIATE NUMBER OF RELAYS TO BE USED FOR FAN SHUTDOWNS, RELEASE OF MAGNETIC DOOR HOLD OPEN DEVICES.

   EDWARDS CAT. NO. SIGA–CRH TO BE USED FOR FAN SHUTDOWN
   EDWARDS CAT. NO. SIGA–CR FOR ALL OTHER RELAYS

10. DUCT TYPE SMOKE DETECTORS

    DUCT TYPE SMOKE DETECTORS C/W SAMPLING TUBE. VERIFY LENGTH OF SAMPLING TUBE PRIOR TO ORDERING.

    EDWARDS CAT. NO. SIGA–SD C/W SAMPLING TUBE

11. REMOTE LEDS FOR DUCT TYPE SMOKE DETECTORS

    PROVIDE REMOTE STATUS LED INDICATOR LIGHTS FOR ALL DUCT TYPE SMOKE DETECTORS LOCATED ABOVE CEILINGS AND/OR INACCESSIBLE LOCATIONS.

    EDWARDS CAT. NO. SIGA–LED

12. END OF LINE RESISTORS

    PROVIDE END OF LINE RESISTORS AS REQUIRED.

13. ACCESSORIES

    ENSURE THAT THE FIRE ALARM EQUIPMENT LISTED ABOVE IS SUPPLIED WITH ALL REQUIRED ACCESSORIES FOR A COMPLETE INSTALLATION.

14. CAN/ULC–S561 FIRE ALARM MONITORING SYSTEM
    PROVIDE NEW CAN/ULC–S561–03 COMPLIANT FIRE ALARM SIGNALING SYSTEM C/W CAN/ULC–S559 COMPLIANT SIGNALING EQUIPMENT, PASSIVE COMMUNICATIONS (TELEPHONE AND CELLULAR NETWORK), DEDICATED POWER FEED AND COMMUNICATION CABLING. ALL CABLING SHALL BE RUN IN CONDUIT. PROVIDE ALL NECESSARY EQUIPMENT AND ACCESSORIES FOR A COMPLETE AND FUNCTIONING INSTALLATION. PROVIDE CERTIFICATION NOTICE TO ENGINEER/OWNER FOR RECORDS.

    DSC CAT#: HS32–512TLHC OR APPROVED EQUAL
    PROVIDE DEDICATED 15A, 120V POWER FEED TO THE NEW FIRE ALARM MONITORING UNIT.
    POWER FEED MUST BE MECHANICALLY PROTECTED IN CONDUIT.
    PROVIDE A NEW DEDICATED CAT6 CABLE FROM THE NEAREST IT RACK TO THE NEW FIRE ALARM MONITORING UNIT. COMMUNICATION LINE MUST BE MECHANICALLY PROTECTED IN CONDUIT.
    CONNECT NEW FIRE ALARM MONITORING UNIT TO FIRE ALARM PANEL USING 4PR – #18AWG IN CONDUIT. PROVIDE JUNCTION BOX C/W TERMINAL STRIP BETWEEN FIRE ALARM MONITORING UNIT AND FIRE ALARM PANEL TO SERVE AS DEMARCATION POINT.

15. VERIFICATION

    a) WHEN THE FIRE ALARM SYSTEM IS COMPLETE, MAKE A COMPLETE INSPECTION OF ALL INSTALLED FIRE ALARM EQUIPMENT, INCLUDING EACH AND EVERY COMPONENT WITH A COMPETENT AND QUALIFIED MEMBER OF THE SYSTEM MANUFACTURER'S PERSONNEL TO ENSURE THE FOLLOWING:

       - THAT THE SYSTEM IS COMPLETE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THAT THE SYSTEM IS INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ALL OTHER GOVERNING REQUIREMENTS.
       - THAT THE REGULATION CONCERNING THE SUPERVISION OF COMPONENTS HAS BEEN ADHERED TO AND DEVICES ARE PROPERLY WIRED AND SUPERVISED.

    b) TEST EACH DEVICE AND ALARM CIRCUIT TO ENSURE THAT INITIATING DEVICES TRANSMIT ALARM TO THE CONTROL PANEL AND ACTUATE A GENERAL ALARM.

    c) SIMULATE GROUNDS AND BREAKS ON ALARM AND SIGNALING CIRCUITS TO ENSURE PROPER OPERATION OF TROUBLE SIGNAL.

    d) ON COMPLETION OF THE VERIFICATION INSPECTION AND TESTING, OBTAIN FROM THE MANUFACTURER AND FORWARD TO THE OWNER, A VERIFICATION CERTIFICATE TOGETHER WITH DETAILED INSPECTION REPORTS LISTING EACH AND EVERY SYSTEM COMPONENT, ITS LOCATION IN THE BUILDING AND ITS ACCEPTABILITY.

    e) ENSURE THAT THE COSTS FOR THE ABOVE TESTING, VERIFICATION AND CERTIFICATION ARE INCLUDED IN THE TENDER PRICE.

    f) FIRE ALARM SYSTEM SHALL BE TESTED IN CONFORMANCE WITH CAN/ULC–S537–XX 'STANDARDS FOR THE VERIFICATION OF FIRE ALARM SYSTEM INSTALLATIONS' – LATEST EDITION.

FIRE ALARM SYSTEM - WIRING

1. PROVIDE NEW WIRING AS REQUIRED FOR NEW FIRE ALARM DEVICES. FIRE ALARM WIRING SHALL BE INSTALLED IN CONDUIT.

2. FIRE ALARM CABLE SHALL COMPLY WITH CSA C22.2 NO. 208.

3. THE NUMBER OF CONDUCTORS AND GAUGE OF THE FIRE ALARM CABLE FOR THE WIRING OF THE FIRE ALARM SYSTEM TO BE DETERMINED BY THE MANUFACTURER. THE INSTALLATION OF THE FIRE ALARM CABLES TO BE PERFORMED BY THE CONTRACTOR.

4. WIRING REQUIRED FOR THE OPERATION OF LIFE SAFETY SYSTEMS, AS DESCRIBED IN OESC RULE 46–002, SHALL BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER CONDUCTORS AND EQUIPMENT AND SHALL NOT ENTER LUMINAIRE, RACEWAY, BOX CABINET OR UNIT EQUIPMENT OCCUPIED BY OTHER CONDUCTORS.

5. ENSURE VOLTAGE DROP DOES NOT EXCEED 2 PERCENT.

FIRE ALARM MAP

1. PROVIDE A FIRE ALARM FLOOR MAP ADJACENT TO EACH FIRE ALARM ANNUNCIATOR PANEL. THE FIRE ALARM MAP SHALL BE CAD BASED, MINIMUM 24"X 24" COMPLETE WITH COLOUR GRAPHICS AND ALUMINUM FRAME. FEATURES AS FOLLOWS;

   A) MAP TO BE PLOTTED ON WATER/MOISTURE RESISTANT 2MM VINYL USING UV RESISTANT DYE

   VANDAL RESISTANT SLIM PROFILE THAT MOUNTS DIRECTLY TO THE WALL.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

		JULY 28/22	ISSUED FOR PERMIT AND TENDER
		Date	Revision

Do not scale from this drawing. The Constructor shall verify all actual on site dimensions and report any discrepancies to the Consultant prior to proceeding with the work.

LICENSED PROFESSIONAL ENGINEER
J. R. KIERSTEAD
100181072
Jul 28 / 22
PROVINCE OF ONTARIO

CRITCHLEY HILL ARCHITECTURE

TBT ENGINEERING CONSULTING GROUP

Project: TOWN OF MARATHON NEW PUBLIC WORKS FACILITY
Marathon, Ontario

Drawing Title: ELECTRICAL SPECIFICATIONS

Drawn By: NL	Checked By: JK
Scale: AS NOTED	Project No: 22-098
Date Plotted:	
Date Revised: JULY 2022	

Drawing No: **E401**

ELECTRICAL SPECIFICATION - CONT'D

POWER AND CONTROL

1. PROVIDE 120V POWER FEED TO TRAP SEAL PRIMER TSP-1
2. PROVIDE 120V POWER FEED TO TRAP SEAL PRIMER MANIFOLDS TSPM-1 AND 2.
3. PROVIDE 120V POWER FEED AND GFI RECEPTACLES FOR WATER HEATERS WH-1 AND 2.
4. PROVIDE 120V POWER FEED WIRED THROUGH MAGNETIC STARTER AND LOCAL SERVICE SWITCH FOR HOT WATER RECIRCULATION PUMP P2.
5. PROVIDE 120V POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR BOILERS B1 AND 2.
6. PROVIDE 120V POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR BOILER CIRCULATION PUMPS BCP-1 AND 2.
7. PROVIDE 208V SINGLE PHASE POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR MAIN CIRCULATION PUMPS P1A AND P1B.
8. PROVIDE 120V POWER FEED AND GFI RECEPTACLE FOR GLYCOL FEEDER GF-1 AND ASSOCIATED ALARM PANEL.
9. PROVIDE 120V POWER FEED FOR CABINET UNIT HEATERS CUH-1 AND 2.
10. PROVIDE 120V POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR UNIT HEATERS UH-1, 2 AND 3.
11. PROVIDE 208V THREE PHASE POWER FEED WIRED THROUGH LOCAL WEATHERPROOF DISCONNECT SWITCH FOR ROOF TOP UNIT RTU-1.
12. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL WEATHERPOOF DISCONNECT SWITCH FOR HEAT RECOVERY UNITS HRU-1, 3 AND 4.
13. PROVIDE 208V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH FOR HEAT RECOVERY UNIT HRU-2
14. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH VEHICLE EXHAUST CONTROL PANEL AND TWO DISCONNECT SWITCHES FOR VEHICLE EXHAUST SYSTEMS VES-1 AND 2. REFER TO SINGLE LINE DIAGRAM FOR DETAILS.
15. PROVIDE 120V POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR EXHAUST FAN EF-1.
16. PROVIDE 208V SINGLE PHASE POWER FEED WIRED THROUGH LOCAL WEATHERPROOF DISCONNECT FOR CONDENSING UNIT CU-1.
17. PROVIDE 208V THREE PHASE POWER FEED WIRED THROUGH LOCAL SERVICE SWITCH FOR DESTRATIFICATION FANS DF-1 THROUGH 5.
18. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH FOR AIR COMPRESSOR AC-1.
19. PROVIDE 208V SINGLE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT TO AC-1 CONDENSING UNIT (LOCATED ON MECHANICAL MEZZANINE) CONTINUING ON TO AC-1 EVAPORATOR HEAD (LOCATED IN ELECTRICAL ROOM). REFER TO SINGLE LINE DIAGRAM FOR DETAILS.
20. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH FOR WASH SYSTEM PUMP CONTROL PANEL.
21. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH FOR WASH SYSTEM BLOWER CONTROL PANEL.
22. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH FOR WASH SYSTEM GANTRY JUNCTION BOX.
23. PROVIDE 600V THREE PHASE POWER FEED WIRED THROUGH LOCAL DISCONNECT SWITCH AND JUNCTION BOX FOR THE OVERHEAD CRANE.
24. PROVIDE 600V THREE PHASE POWER FEED ROUTED THROUGH CONCRETE SLAB TO LOCAL DISCONNECT SWITCH FOR VEHICLE LIFT CONTROL CONSOLE. PROVIDE IN SLAB CONDUIT FROM CONTROL CONSOLE TO VEHICLE LIFT IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
25. PROVIDE 208V THREE PHASE POWER FEED TO AUTOMATIC GATE OPERATORS 1 AND 2. *** NOTE****: THIS WORK IS TO BE INCLUDED AS A SEPARATE PRICE. REFER TO BID FORM FOR DETAILS.

POWER AND CONTROL - GENERAL

1. POWER WIRING FOR ALL EQUIPMENT LISTED ABOVE TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. INSTALLATION AND WIRING OF ALL 24 VOLT CONTROL EQUIPMENT ASSOCIATED WITH ABOVE LISTED EQUIPMENT (I.E. THERMOSTATS, ETC.) TO BE PERFORMED BY THE MECHANICAL DIVISION.

ACCESS CONTROL SYSTEM

1. PROVIDE EMPTY SINGLE GANG BOX AND 21MM DIAMETER CONDUIT COMPLETE WITH PULL WIRE BETWEEN SECURITY SYSTEM DEVICES AND CONTROL PANEL. INSTALL CONDUITS AS PER SECURITY SYSTEM PROVIDER INSTRUCTIONS.
2. INSTALL OUTLET BOXES, JUNCTION BOXES AND BACK BOXES AS REQUIRED FOR SECURITY SYSTEM EQUIPMENT.
3. CABLE FOR SECURITY SYSTEM TO BE PROVIDED BY THE SECURITY SYSTEM PROVIDER.
4. THE SECURITY SYSTEM PROVIDER TO DO TERMINATIONS AND HOOK-UPS.
5. CO-ORDINATE INSTALLATION, TERMINATION AND PROGRAMMING OF THE SECURITY SYSTEM WITH CERTIFIED SECURITY AGENT.
6. DOOR CONTROL PANEL

   KANTECH CAT#: KT400; NO EQUAL. QUANTITY AS REQUIRED.
7. SECURITY CARD READER

   SINGLE GANG MOUNT, MULTI-TECHNOLOGY, CAPACITIVE TOUCH KEYPAD CARD READER UNIT.

   KANTECH CAT#: KT-SG-MT-KP; NO EQUAL
8. ACCESS CONTROL SYSTEM WIRING

   ENSURE ALL SECURITY CABLING IS FT6 RATED. PROVIDE AND INSTALL WIRING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
9. INSTALL CABLES FOR SECURITY SYSTEM INTO CONDUIT SYSTEM. WIRING IN CEILING SPACE TO BE SUPPORTED BY EITHER TRAY OR P-CLIPS.
10. ELECTRIC STRIKES ARE TO BE SUPPLIED BY DIVISION 8 BUT CONNECTED AND INTEGRATED INTO THE ACCESS CONTROL SYSTEM BY ELECTRICAL CONTRACTOR
11. PROGRAMMING COSTS ARE TO BE INCLUDED IN CONTRACTORS PRICE.
12. CONTRACTOR TO PROVIDE 100 CARD-STYLE CREDENTIALS COMPLETE WITH NAME AND PHOTOGRAPH PRINTED ON TO CREDENTIAL. COORDINATE WITH OWNER.

ELECTRICAL SPECIFICATION - CONT'D

VIDEO SURVEILLANCE SYSTEM

1. NETWORK VIDEO RECORDER (NVR)

   PROVIDE NEW IP BASED NETWORK VIDEO RECORDERS IN NEW IT RACK, CAPABLE OF RECORDING 32 INDIVIDUAL CHANNELS AT 8 MEGAPIXELS. NVR SHALL EMPLOY H.265/H.264 ENCODING. HDMI, 4K VIDEO OUTPUT. PROVIDE 2 – 10TB SATA HARD DRIVES FOR A TOTAL OF 20TB OF STORAGE. ALSO INCLUDES 16-CHANNEL POE SWITCH.

   CONTRACTOR SHALL PROVIDE PLENUM RATED CAT6 NETWORK CONNECTION TO INTEGRATE NEW NVR INTO THE BOARD'S EXISTING VIDEO MANAGEMENT SOFTWARE.

   LOREX CAT#: N882A38B-W; NO EQUAL
2. SECURITY CAMERAS

   NEW 4K ULTRA HD IP BASED PAN-TILT-ZOOM OUTDOOR CAMERA WITH 25X OPTICAL ZOOM AND COLOUR NIGHT VISION. CAMERAS TO BE SUPPLIED C/W WALL MOUNTING BRACKET AND ALL ACCESSORIES FOR A COMPLETE AND FUNCTIONING INSTALLATION.

   LOREX CAT#: E881AP; NO EQUAL
3. CAT 6 CABLING

   PROVIDE ALL NECESSARY CAT6 COMMUNICATION CABLING FOR THE VIDEO SURVEILLANCE IN ACCORDANCE WITH THE VOICE/DATA SPECIFICATIONS HEREIN.
4. COMMISSIONING, PROGRAMMING & TRAINING

   THE CONTRACTOR SHALL FULLY COMMISSION AND PROGRAM ALL NEW VIDEO SURVEILLANCE COMPONENTS AND PROVIDE TRAINING TO THE END USER GROUP TO THE SATISFACTION OF THE OWNER. ALLOW FOR CAMERA ADJUSTMENTS AT THE DISCRETION OF THE OWNER ONCE THE INSTALLATION HAS BEEN COMPLETED.
5. COORDINATION

   CONTRACTOR SHALL COORDINATE WITH THE CLIENTS' IT MANAGER TO SECURE NECESSARY IP ADDRESSES FOR ALL NEW SECURITY COMPONENTS.

ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL DESIGN DRAWINGS.

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