

GENERAL NOTES:

1. ALL WORKMANSHIP, COMPONENT DESIGN & MATERIAL SHALL BE TO THE ALBERTA BUILDING CODE 2006 OR BETTER.
2. CHECK ALL DIMENSIONS, ELEVATIONS & DETAILS PRIOR TO CONSTRUCTION OR FABRICATION. REPORT ANY DISCREPANCIES OR DESIRED MODIFICATIONS TO THE ENGINEER.
3. ALL MECHANICAL, ELECTRICAL & INSTRUMENTATION OPENINGS THROUGH WALLS & FLOORS ARE NOT SHOWN ON THESE DRAWINGS. COORDINATE LOCATIONS & DETAILS. VERIFY FLOOR DRAIN & DRAIN PIPE LOCATIONS WITH MECHANICAL.
4. FOUNDATION DESIGN IS BASED UPON THE FOUNDATION INVESTIGATION & GEOTECHNICAL REPORT PREPARED BY LEVELTON CONSULTANTS LTD, TITLED BAR U RANCH WORKSHOP REPLACEMENT, BAR U RANCH NATIONAL HISTORIC SITE, MUNICIPAL DISTRICT OF Foothills, ALBERTA DATED AUGUST 26, 2015.
 1. ENSURE THAT THE REQUIREMENTS OUTLINED IN THIS REPORT ARE READ & UNDERSTOOD PRIOR TO COMMENCING WITH FOUNDATION WORK.
 2. GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF ALBERTA SHALL VERIFY THAT THE DESIGN PARAMETERS GIVEN IN THE SOIL REPORT MATCH THE ACTUAL CONDITIONS PRIOR TO PLACING CONCRETE.
 3. UNDER NO CIRCUMSTANCES IS THE SOIL UNDER THE STRUCTURE TO BE ALLOWED TO FREEZE, DRY OUT OR BECOME SATURATED PRIOR TO, DURING OR SUBSEQUENT TO CONSTRUCTION.
 4. STRUCTURAL FOUNDATION TO BEAR ON UNDISTURBED NATIVE COMPACT SANDY GRAVEL, WITH FACTORED BEARING RESISTANCE AT ULS OF 200 kPa.
 5. SUBGRADE PREPARATION FOR SLAB ON GRADE TO PROVIDE MINIMUM MODULUS OF SUBGRADE REACTION OF 25 MPa/m. GEOTECHNICAL ENGINEER TO CERTIFY.
 6. REINFORCING STEEL - GRADE 400 DEFORMED BARS. HOOK BARS AT OPPOSITE FACE AT DISCONTINUOUS ENDS. PROVIDE CLASS 'B' LAP SPICES THROUGHOUT EXCEPT WHERE OTHER DIMENSIONS ARE SHOWN. TIE & SECURE IN PLACE PRIOR TO PLACING CONCRETE. WHERE REINFORCING IS SHOWN IN ONE DIRECTION ONLY, PROVIDE 15M @ 250 O.C EACH FACE & PERPENDICULAR TO THAT SHOWN.

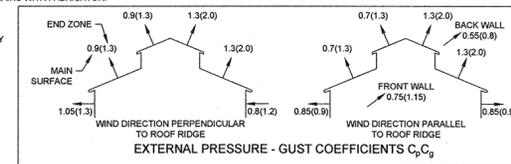
CLASS B REINFORCING LAP SPICES U.N.O.		
TOP BARS	OTHERS	
10M	440	340
15M	685	680
20M	1185	910
25M	1850	1425

A TOP BAR IS DEFINED AS A BAR HAVING A MINIMUM OF 300mm OF CONCRETE BENEATH IT.

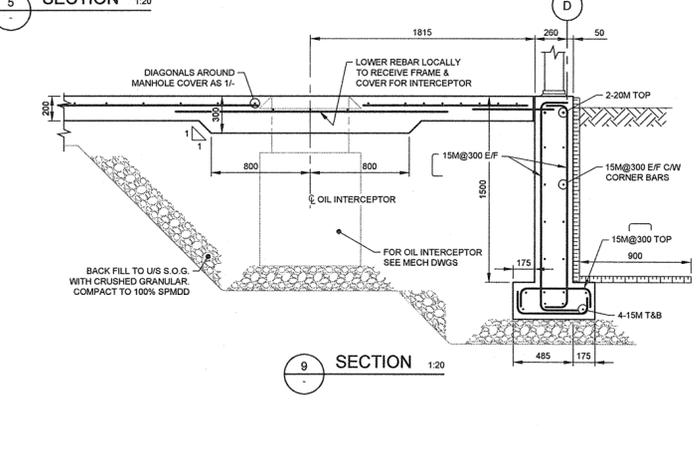
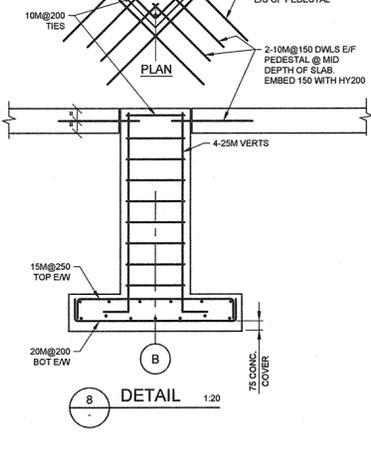
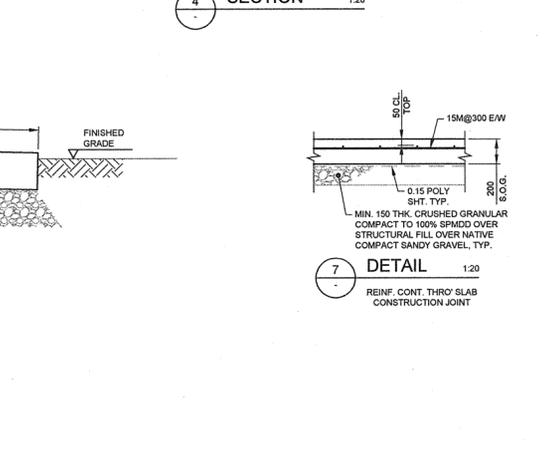
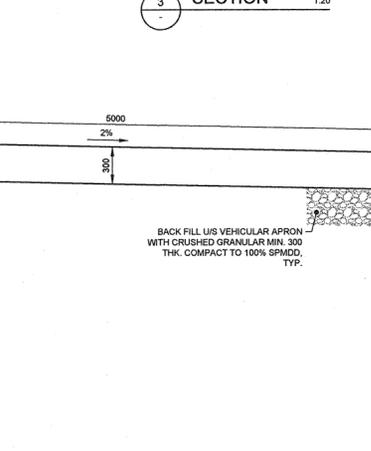
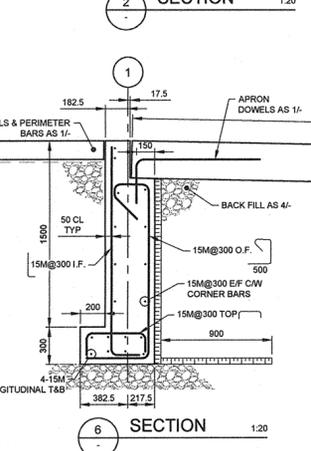
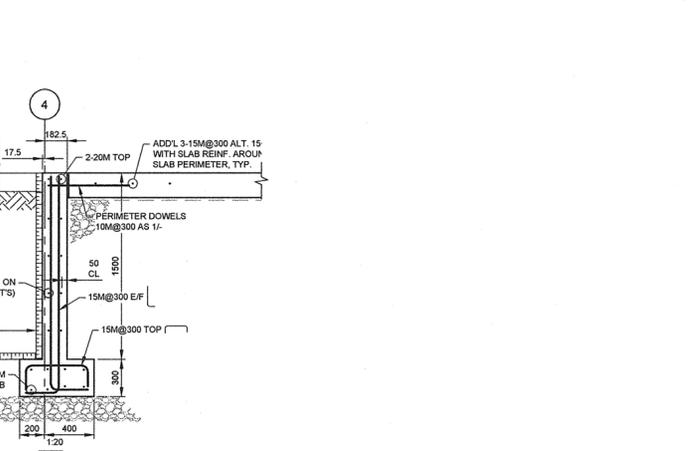
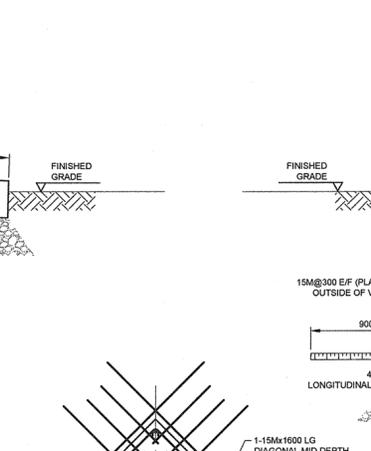
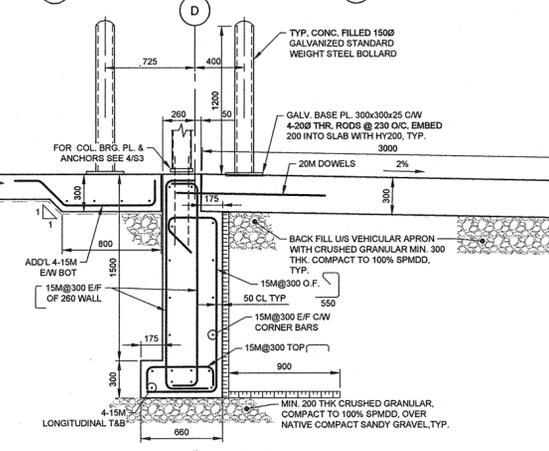
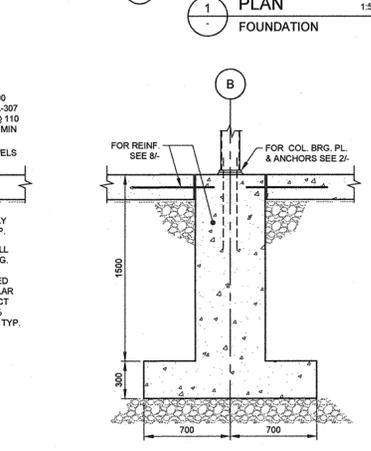
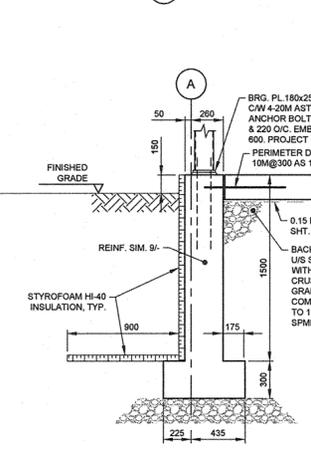
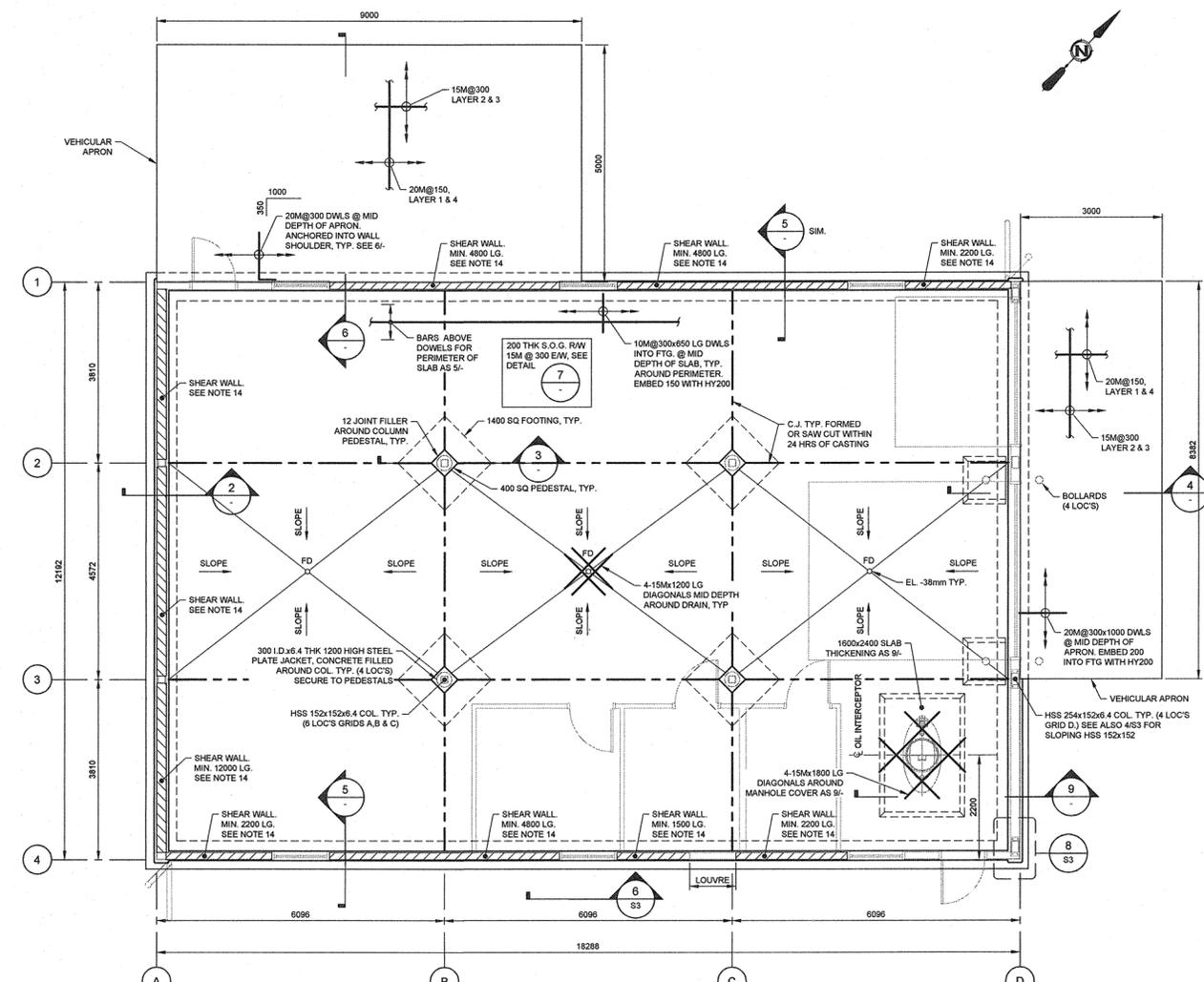
CONCRETE COVER TO REINFORCING STEEL:
 75mm FOR CONCRETE CAST AGAINST SOIL
 50mm FOR CONCRETE CAST AGAINST MUD SLAB & ALL OTHER SURFACES UNLESS SPECIFICALLY NOTED.

5. ENSURE ALL REINFORCING STEEL IS 50mm CLEAR OF ANY EMBEDDED METAL PILING.
6. CONCRETE: ALL STRUCTURAL CONCRETE EXPOSURE CLASS S-2 TO CNS36A A23.1. ALL CONCRETE TO HAVE 35 MPa MINIMUM COMPRESSIVE STRENGTH AT 56 DAYS, MAXIMUM W/C RATIO 0.45, 5-8% ENTRAINED AIR FOR FOOTINGS & EXTERIOR APRONS. NO AIR ENTRAINMENT FOR INTERIOR SLAB.

- MAXIMUM SUMP:
 WALLS - 60 mm
 BEAMS, STRUCTURAL SLABS - 80 mm
7. FOOTINGS, FOUNDATIONS, SLABS ON GRADE - 60 mm
 8. CONSOLIDATE ALL CONCRETE USING INTERNAL VIBRATORS
 9. SANDBLAST CLEAN & ROUGHEN ALL CONSTRUCTION JOINTS TO A FULL 5mm AMPLITUDE, MAXIMUM 12 METRES BETWEEN CONSTRUCTION JOINTS. PROVIDE 20mm CHAMFER AT ALL EXPOSED CONCRETE EDGES UNLESS NOTED OTHERWISE.
 10. STEELWORK
 1. DESIGN MATERIALS, PROCEDURES & WORKMANSHIP TO CAN/CSA S16.08.
 2. PLATES & STRUCTURAL SHAPES: CSA G40.21 GR. 300W EXCEPT W/ BEAMS GR. 350W.
 3. HSS: CSA G40.21 GR. 350W
 4. PIPE: ASTM A53 (P) = 240MPa
 5. BOLTS: ASTM A325
 6. ANCHOR BOLTS: ASTM A307 OR BETTER
 7. WELDING TO CSA W59 BY A DIVISION 1 OR 2 FIRM ONLY, UNDER CSA W47, 6mm F.W. U.N.O.
 11. WOOD FRAMING
 1. DESIGN FABRICATION, ERECTION, AND OTHER CONSTRUCTION PRACTICES TO CONFORM TO CAN/CSA-O86-09 & CAN/CSA-O122-0.
 2. BOLTS TO CONFORM TO ASTM A307-07a.
 3. DESIGN CONNECTIONS IN ACCORDANCE WITH CAN/CSA-O86-09 FOR THE LOADS INDICATED ON THE DRAWINGS.
 4. PROVIDE A MINIMUM OF 2 BOLTS IN BOLTED CONNECTIONS.
 5. INSTALL ROOF SHEATHING DIAPHRAGM WITH PANEL END-JOINTS LOCATED ON ROOF FRAMING STAGGERED AT LEAST 800mm. USE 12.5 THICK S-P-F PLYWOOD WITH 3.25mm DIAMETER 2.5' LONG COMMON WIRE NAILS WITH MINIMUM NAIL PENETRATION OF 38mm IN FRAMING. NAILS SPACED AT 100mm O/C MAXIMUM AT DIAPHRAGM BOUNDARIES & AT 150mm O/C AT ALL OTHER PANEL EDGES. PROVIDE 38x164 BLOCKING ALONG PANEL EDGES BETWEEN FRAMING MEMBERS. SHEATHING PANELS TO RUN PERPENDICULAR TO FRAMING.
 6. ALL LUMBER SHALL BE TO CSA O141 & NLGA STANDARD GRADING RULES FOR CANADIAN LUMBER
 7. ALL STUDS SHALL BE 1 OR 2 S-P-F OR BETTER.
 8. PLYWOOD TO CSA O121, DOUGLAS FIR SHEATHING GRADE OR GIS AS SPECIFIED.
 12. WOOD TRUSSES
 1. DESIGN PRE-FABRICATED WOOD TRUSSES & CONNECTIONS FOR THE LOADS INDICATED ON THE DRAWINGS. PROVIDE ALL NECESSARY BLOCKING, BRACING, STIFFENERS & CONNECTIONS IN ACCORDANCE WITH CAN/CSA-O86-09.
 2. TRUSSES SHALL BE MANUFACTURED BY A FABRICATOR MEMBER OF TPIC.
 3. TRUSS DESIGN & DETAILS SHALL BE BY THE TRUSS SUPPLIER
 4. ALL TEMPORARY & PERMANENT TRUSS BRIDGING & BRACING TO BE DESIGNED BY THE TRUSS SUPPLIER.
 5. TRUSSES TO BE FABRICATED FROM NLGA GRADED LUMBER TO CSA O86.
 6. TRUSS SPACING TO BE 610mm (TO BE CONFIRMED BY TRUSS SUPPLIER).
 7. SUBMIT SHOP DRAWINGS & ERECTION DRAWINGS OF ALL WOOD TRUSSES & CONNECTIONS SIGNED & SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ALBERTA FOR REVIEW ONLY PRIOR TO FABRICATION. RESPONSIBILITY FOR DETAILED DESIGN OF ALL TRUSS MEMBERS & CONNECTIONS REMAINS WITH FABRICATOR.
 13. DESIGN LOADS & CRITERIA (IMPORTANCE CATEGORY - NORMAL)
 1. ROOF LOADS
 - SNOW LOAD $s_s = 1.0 (0.9) S_n = 1.4 kPa$ $S_n = 0.1 kPa$
 - DEAD LOAD - SELF WEIGHT OF COMPONENTS & MIN. 1 kPa FOR ROOF ASSEMBLY
 - MECH & ELEC LOAD ALLOWANCE = 0.2 kPa
 - MIN. CONCENTRATED LOAD OF 1.3 kN AT ANY LOCATION ON ROOF
 2. WIND LOAD
 - $s_w = 1.0 (0.75) q_1 s_1 = 0.70 kPa$, $q_1 / 10 = 0.53 kPa$. SEE ALSO ADJACENT DIAGRAM.
 3. EARTHQUAKE
 - S_{sd}(2) S_{sd}(5) S_{sd}(10) S_{sd}(20) PGA
 - 0.15 0.09 0.04 0.03 0.09
 - R₁ = 1.5, R₂ = 1.2
 - SITE CLASSIFICATION: TYPE C
 - I_e = 1.0
 4. FLOOR LOADS
 - FLOOR LIVE LOAD = 12 kPa OR CAT 1/28G INTEGRATED TOOL CARRIER, MAXIMUM AXLE LOAD = 74 kN
 14. SHEAR WALLS:
 - 14.1. EACH END OF SHEAR WALLS DETAILD ON 14-1 IS TO HAVE 2-PLY STUDS & H098 HOLD DOWNS BY SIMPSON STRONG-TIE C/W 7/8" (220) HLT1 HAS THR. ROD 450mm MINIMUM EMBEDMENT INTO CONCRETE FOOTING WITH HT HY200. INTERMEDIATE CONNECTIONS BETWEEN EACH END OF SHEAR WALLS TO BE 1/2" (12.70) HLT1 HAS THR. RODS @ 610 O/C MAXIMUM MINIMUM OF 2 INTERMEDIATE ANCHORS PER SHEAR WALL WITH 200mm MINIMUM EMBEDMENT WITH HT HY200.
 - 14.2. SHEAR WALL ON GRID A TO BE 38x184 @ 406 O.C. PROVIDE 2 PLY 38x184 WHEN STUD WALL HEIGHT EXCEEDS 3800mm.
 - 14.3. NAILS TO BE 2.5" LONG, 3.25mm @ COMMON WIRE NAILS. SEE SHEAR WALL SCHEDULE.
 - 14.4. CHORD MEMBERS TO BE NAILED TOGETHER WITH 2 ROWS OF NAILS @ 230 MAX O.C.
 - 14.5. PANEL EDGES TO BE BACKED WITH 38mm WIDE BLOCKING MEMBERS.
 - 14.6. MINIMUM WOOD MEMBER THICKNESS AT HOLD DOWN LOCATIONS TO BE 114mm (4.5").
 - 14.7. PENETRATIONS AT HOLD DOWN LOCATIONS ARE NOT ALLOWED.
 - 14.8. PENETRATIONS LARGER THAN 200mm x 200mm ARE ONLY ALLOWED WITH ENGINEER'S APPROVAL.



LOCATION	SHEATHING	CHORDS	NAIL SPACING	
			PANEL EDGES	INTERMEDIATE
GRIDS 184	12.5 THK PLY ON OUTER FACE	2 PLY 38x140 E/E	@ 150mm O/C	@ 305mm O/C
GRID A	12.5 THK PLY ON BOTH FACES	3 PLY 38x184 E/E	@ 150mm O/C	@ 305mm O/C



No.	Date/Date	Description/Description	Drawn by/Designé par	Approved/Approuvé
0	2015NOV04	ISSUED FOR TENDER & CONSTRUCTION	M.C.	R.P.
A	2015AUG28	ISSUED FOR TENDER & CONSTRUCTION	M.C.	R.P.

Revision / Revision

Consultant's Name: **Associated Engineering**
 Nom de l'expert-consultant: **Association d'Ingénierie**

Eng. Stamp: **Associated Engineering**
 Scelle de l'ingénieur: **Association d'Ingénierie**

APEGA Permit to Practice P 3979

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Client/Client: **Parks Canada Agency** / **L'Agence Parcs Canada**

Western and Northern Region / Ouest et Nord du Canada

Project Title/Titre du projet: **BAR-U RANCH WORKSHOP REPLACEMENT**

WATERTON LAKES NATIONAL PARK

Drawing Title/Titre du dessin: **FOUNDATION PLAN GENERAL NOTES AND DETAILS**

Surveyed by/Arpenté par: **RISTO PROTIC** / Drawn by/Designé par: **VICTOR YIN** / Date/Date: **MAR 27, 2015**

Designed by/Concept par: **RISTO PROTIC** / Revised by/Revisé par: **AS SHOWN** / Scale/Echelle: **AS SHOWN**

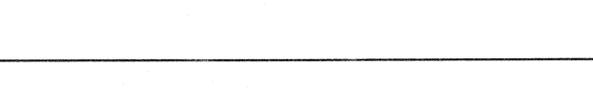
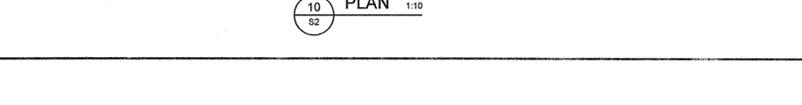
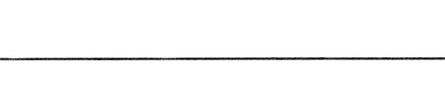
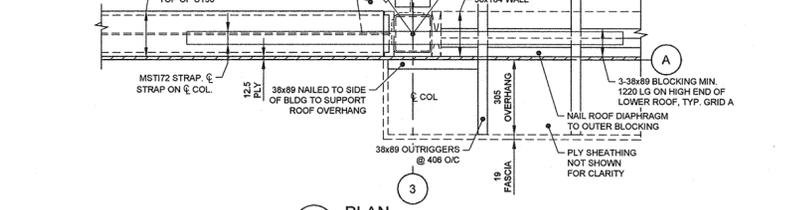
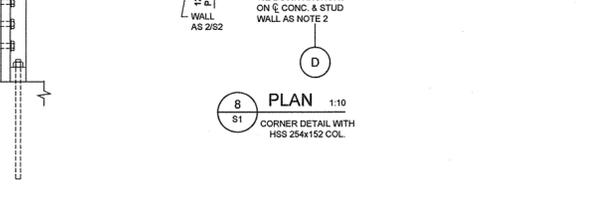
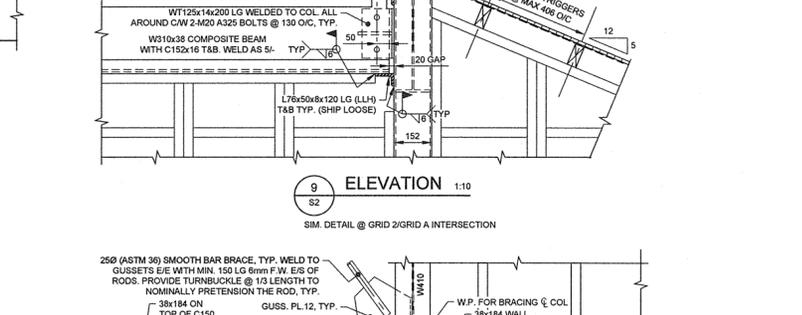
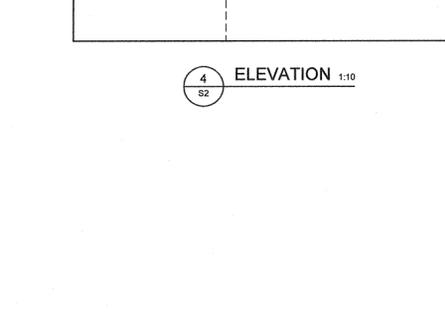
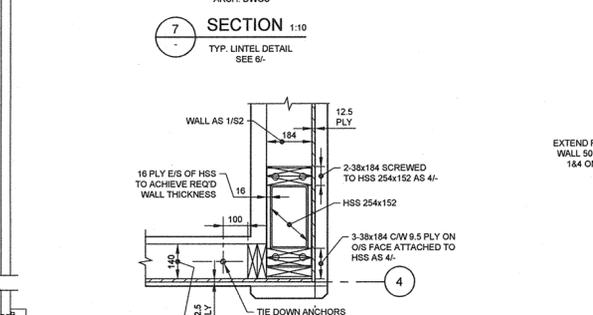
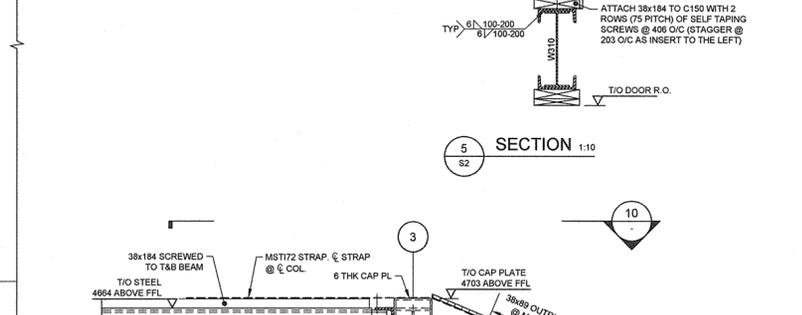
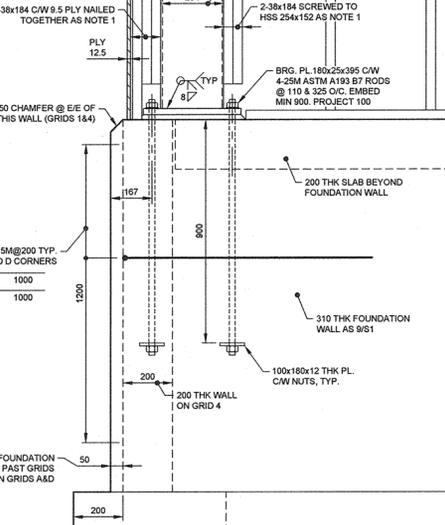
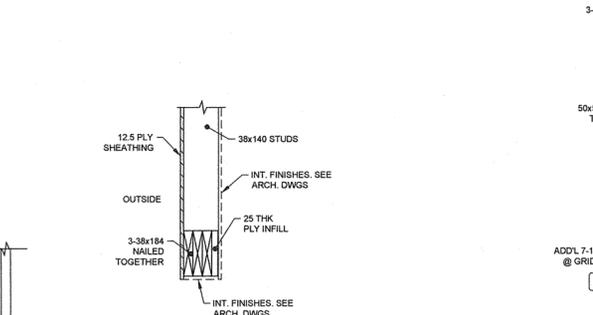
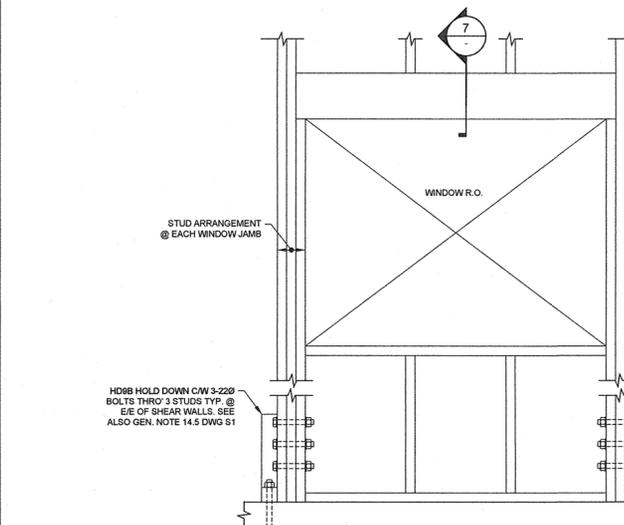
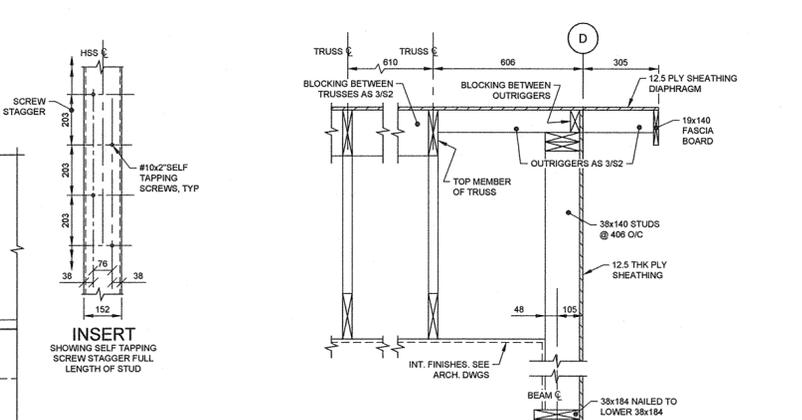
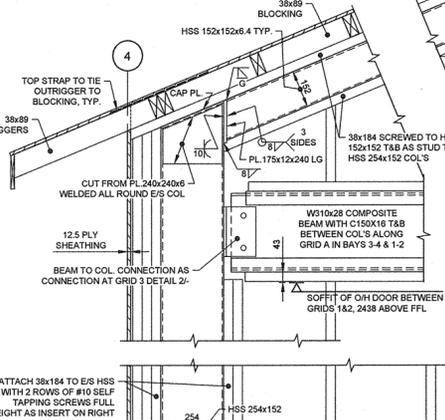
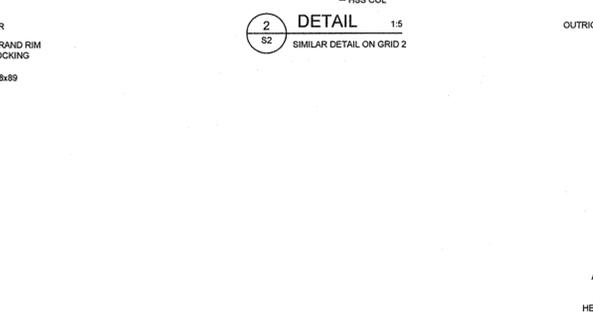
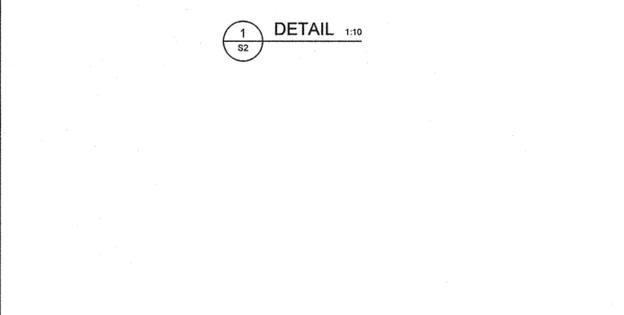
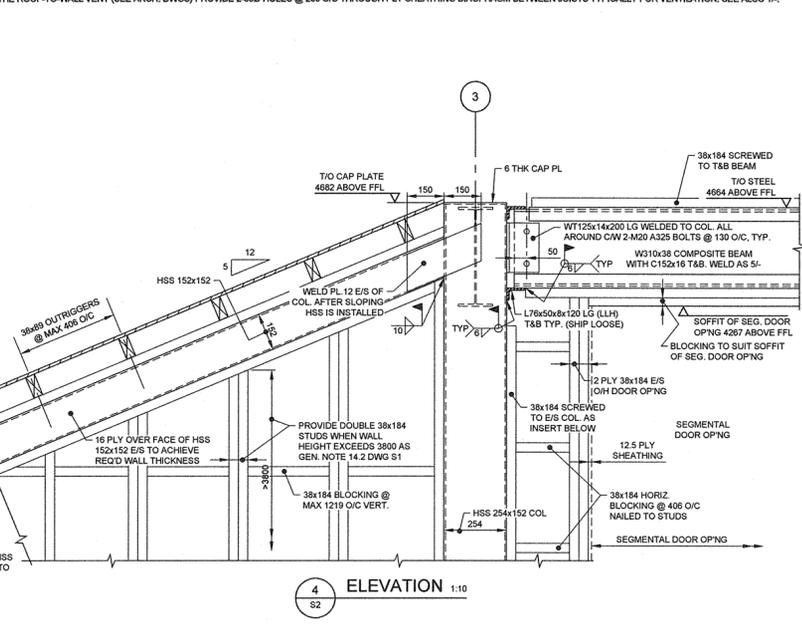
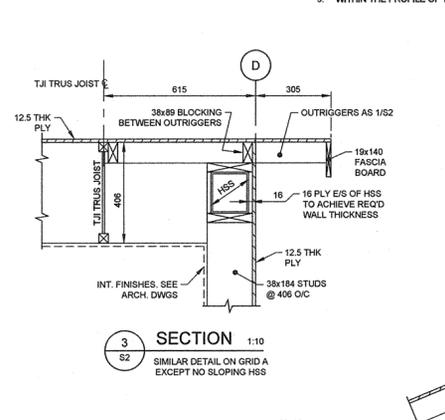
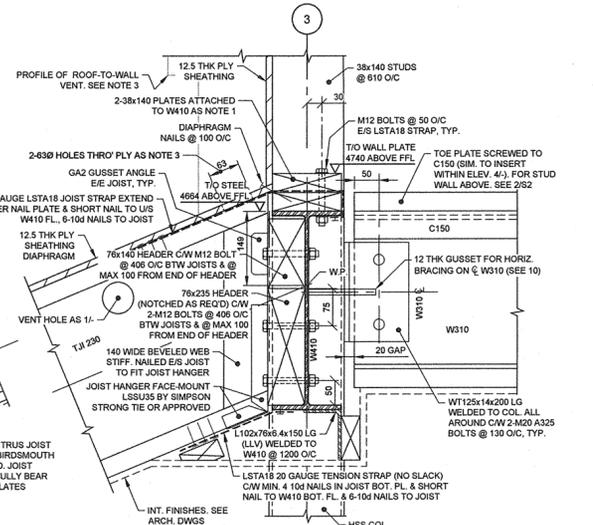
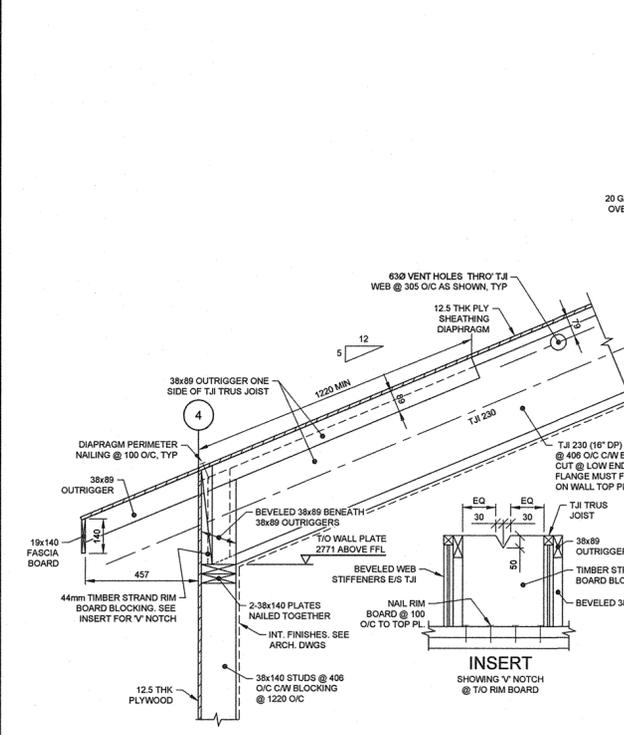
PWOSC Project Manager/Administrateur de Projets: **TP50C**

Client Acceptance/Acceptation du client: **Approved/Approuvé par**

Project No./No. du projet: **20153361** / Asset No./No. de l'actif: **AS SHOWN** / Sheet No./No. de la feuille: **AS SHOWN**

Drawing Reference No./No. de référence du dessin: **S1**

- NOTES
- IF MULTIPLE 38x140 OR 38x184 TIMBER BATTENS ARE TO BE ATTACHED TO STEEL MEMBERS, THE INITIAL BATTEN IS TO BE CONNECTED USING SELF TAPPING SCREWS IN A STAGGERED ARRANGEMENT SIMILAR TO THE INSERT DETAIL WITHIN ELEVATION 4. ALL ADDITIONAL BATTENS ARE TO BE NAILED TO THE FIRST.
 - ALL WALL SECTIONS NOT DESIGNATED AS SHEAR WALLS (AS 181) ARE TO RECEIVE 12.5 THK PLY SHEATHING. THE ROD TIE DOWN ANCHORS @ MAX 610 O/C AS 84.
 - WITHIN THE PROFILE OF THE ROOF-TO-WALL VENT (SEE ARCH. DWGS) PROVIDE 2-630 HOLES @ 200 O/C THROUGH PLY SHEATHING DIAPHRAGM BETWEEN JOISTS TYPICALLY FOR VENTILATION. SEE ALSO 11.



No.	Date	Description/Description	Drawn by	Approved
0	2015NOV04	ISSUED FOR TENDER & CONSTRUCTION	M.C.	R.P.
A	2015AUG28	ISSUED FOR TENDER & CONSTRUCTION	M.C.	R.P.

Revision / Revision	
A	detail number
B	source drawing no. de dessin no.
C	detail on drawing no. detail sur dessin no.

Consultant's Name
Nom de l'expert-consultant

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APEGA Permit to Practice P 3979

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Client/Client

Parks Canada / L'Agence Parcs Canada
Agency / Agence

Western and Northern Region / Ouest et Nord du Canada

Project title/Titre du projet
BAR-U RANCH WORKSHOP REPLACEMENT

Project title/Titre du dessin
WATERTON LAKES NATIONAL PARK

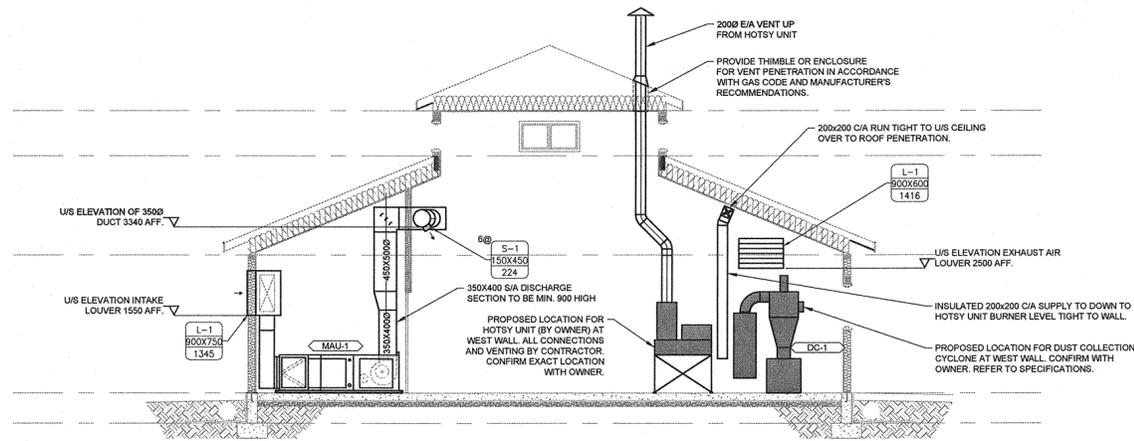
Drawing Reference No./No. de référence du dessin
BUILDING DETAILS

Surveyed by/Arpenté par	Drawn by/Designé par	Date/Date
	VICTOR YIN	MARCH 27, 2015

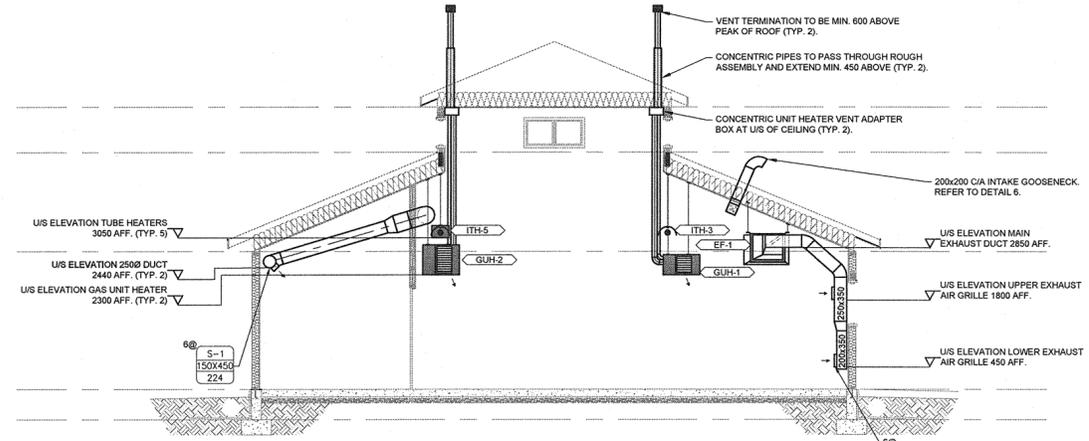
Designed by/Conçue par	Reviewed by/Revisé par	Scale/Echelle
RISTO PROTIC		AS SHOWN

Client Acceptance/Acceptation du client	Approved by/Approuvé par

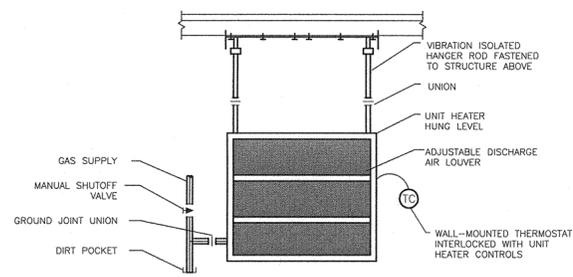
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20153361	S3



1 SECTION 1:50

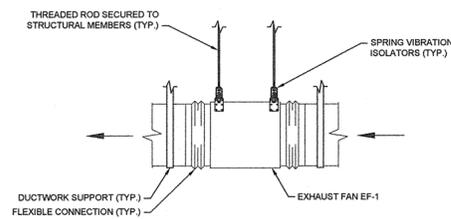


2 SECTION 1:50

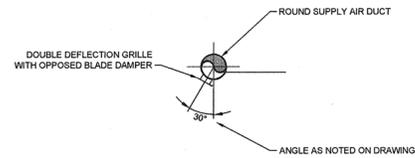


3 DETAIL UNIT HEATER INSTALLATION

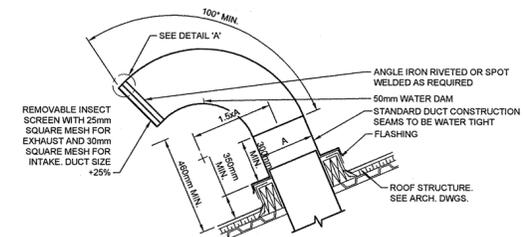
NOTES:
1. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. ADJUST DISCHARGE AIR LOUVERS FOR OPTIMUM HEAT DISTRIBUTION.



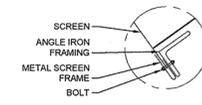
4 DETAIL CEILING SUSPENDED INLINE EXHAUST FAN INSTALLATION



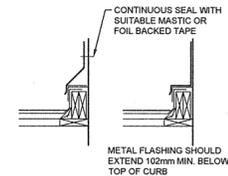
5 DETAIL AIR OUTLET INSTALLATION



6 DETAIL GOOSENECK ROOF PENETRATION



DETAIL-A



ALTERNATE FLASHING DETAILS

No.	Date/Date	Description/Description	Drawn by/Dessiné par	Approved/Approuvé
0	2015NOV04	ISSUED FOR TENDER & CONSTRUCTION	M.H.	S.D.
A	2015/O8/28	ISSUED FOR TENDER AND CONSTRUCTION	C.W.	M.H.

Revision / Revision	
A	detail number / numéro de détail
B	source drawing no. / no. de dessin
C	detail on drawing no. / détail sur dessin no.

Consultant's Name / Nom de l'expert-conseil: **Associated Engineering**
 Eng. Sloane / Scieur de l'ingénieur: **Sloane**
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Client/client: Parks Canada / Agence Canada / L'Agence Parcs Canada
Western and Northern Region / Ouest et Nord du Canada

Project title/Titre du projet: **BAR-U RANCH WORKSHOP REPLACEMENT**
WATERTON LAKES NATIONAL PARK

Drawing title/Titre du dessin: **BUILDING MECHANICAL SECTIONS & DETAILS**

Surveyed by/Arpenté par: COLIN WATTS	Drawn by/Dessiné par: COLIN WATTS	Date/Date: AUGUST 28, 2015
Designed by/Concept par: MIKHAEIL HORVATH	Reviewed by/Revisé par: Scott/Scottie	AS SHOWN

Client Acceptance/Acceptation du client: Approved by/Approuvé par: **ME**

Project No./No. du projet: 20153361	Sheet No./No. de la feuille: M2
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ELECTRIC DOMESTIC WATER HEATER SCHEDULE								
TAG	LOCATION	MANUFACTURER	MODEL	VOLUME (L)	ELECTRICAL DATA		TANK DIMENSIONS (mm)	NOTES
					ELEMENT (kW)	VOLTAGE (V / Ph / Hz)		
DWH-1	MECH. ROOM	RHEEM	PROE6	23	2	120 / 1 / 60	400g x 388	

Notes:

ELECTRIC DUCT HEATER SCHEDULE													
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	HEATING OUTPUT (kW)	AIR DATA				ELECTRICAL DATA		DIMENSIONS L x W x H (mm)	NOTES
						FLOW (L/s)	E.S.P. (Pa)	E.A.T. (°C)	L.A.T. (°C)	ELEMENT (kW)	VOLTAGE (V / Ph / Hz)		
EDH-1	VENTILATION AIR HEATING	MECH. ROOM	THERMOLEC	TER-8-4-240	4	60	50	-40.0	15.0	4	240 / 1 / 60 16.7 A	295 x 295 x 200	1

Notes:
1. CW BUILT-IN ADJUSTABLE ELECTRONIC DUCT TEMPERATURE SENSOR, SET TO 15°C.

ELECTRIC RADIANT PANEL SCHEDULE								
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	ELECTRICAL DATA		DIMENSIONS L x W x H (mm)	NOTES
					HEATING (W)	VOLTAGE (V / Ph / Hz)		
RCP-1	SPACE HEATING	OFFICE	QMARK	CP621	625	115 / 1 / 60	1220 x 610 x 25	1, 2
RCP-2	SPACE HEATING	WASHROOM	QMARK	CP751	750	115 / 1 / 60	1220 x 610 x 25	2, 3

Notes:
1. PROVIDE COMPLETE WITH LINE VOLTAGE NON-PROGRAMMABLE DIGITAL THERMOSTAT TO CONTROL BOTH PANELS.
2. COORDINATE EXACT LOCATION OF PANEL(S) WITH ACOUSTIC CEILING TILE GRID.
3. PROVIDE COMPLETE WITH LINE VOLTAGE NON-PROGRAMMABLE DIGITAL THERMOSTAT TO CONTROL PANEL.

DIRECT-FIRED MAKE-UP AIR UNIT														
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	GAS INPUT (kW)	HEATING OUTPUT (kW)	AIR DATA				ELECTRICAL DATA		DIMENSIONS L x W x H (mm)	NOTES
							FLOW (L/s)	E.S.P. (Pa)	E.A.T. (°C)	L.A.T. (°C)	MOTOR (HP)	VOLTAGE (V / Ph / Hz)		
MAU-1	MAKE-UP AIR	MECH. ROOM	ENGINEERED AIR	HE40	102	102	1344	188	-40	15	3	230 / 1 / 60 MCA 21.1 A FLA 16 A	2692 x 1143 x 812	1, 2

Notes:
1. PROVIDE CW MOTORIZED DAMPER AT INTAKE, MOTOR STARTER, DISCONNECT SWITCH, REMOTE MOUNTED HOA PANEL
2. INTERLOCK WITH GAS DETECTION SYSTEM AND EXHAUST FAN EF-1

FAN SCHEDULE										
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	AIR DATA			ELECTRICAL DATA		NOTES
					FLOW (L/s)	E.S.P. (Pa)	RPM	MOTOR (HP)	VOLTAGE (V / Ph / Hz)	
SF-1	VENTILATION	MECH. ROOM	SOLER & PALAU	TD-150S	60	125	2200	FRAC	120 / 1 / 60	1, 2
EF-1	VEHICULAR GAS DETECTION SYSTEM EXHAUST	WORKSHOP	GREENHECK	BDF-120	1416	188	600	1.5	120 / 1 / 60	2, 3
EF-2	WASH-ROOM EXHAUST	WASHROOM	GREENHECK	SP-A-110	42	63	950	FRAC	120 / 1 / 60	2, 4
DC-1	DUST COLLECTION	WORKSHOP	ONEIDA	PRO 1500	750 (MAX)	TBD	TBD	3	230 / 1 / 60	5

Notes:
1. CW REMOTE MOUNTED SWITCH, SPEED CONTROLLER FOR BALANCING, DUCT REDUCERS, FILTER BOX WITH REPLACEABLE FILTER MEDIA, AND MOUNTING BRACKET
2. PROVIDE CW VIBRATION ISOLATION HANGERS/MOUNTS FOR INSTALLATION AS PER MANUFACTURER'S RECOMMENDATIONS
3. INTERLOCK WITH GAS DETECTION SYSTEM AND MAKE-UP AIR UNIT MAU-1
4. CW WITH TIMER SWITCH
5. EQUIPMENT DATA SUBJECT TO CONFIRMATION BY SYSTEM VENDOR. REFER TO SPECIFICATIONS ON DRAWINGS.

GAS FIRED UNIT HEATER SCHEDULE									
TAG	LOCATION	MANUFACTURER	MODEL	AIR FLOW (L/s)	GAS INPUT (kW)	GROSS OUTPUT (kW)	ELECTRICAL DATA		NOTES
							MOTOR (HP)	VOLTAGE (V / Ph / Hz)	
GUH-1	WORKSHOP	REZTOR	UDAS 60	363	15.8	13.1	FRAC	115 / 1 / 60 FLA 2.4 A	1
GUH-2	WORKSHOP	REZTOR	UDAS 100	635	27.7	23.3	FRAC	115 / 1 / 60 FLA 3.9 A	2

Notes:
1. CW CONCENTRIC ROOF VENT KIT, THERMOSTAT, ADJUSTABLE LOUVER DIFFUSER, FAN GUARD
2. CW CONCENTRIC ROOF VENT KIT, TWO-STAGE THERMOSTAT, ADJUSTABLE LOUVER DIFFUSER, FAN GUARD, TWO-STAGE GAS VALVE

GAS-FIRED INFRARED TUBE HEATERS							
TAG	LOCATION	MANUFACTURER	MODEL	GAS INPUT (kW)	ELECTRICAL DATA		NOTES
					MOTOR (HP)	VOLTAGE (V / Ph / Hz)	
ITH-1 THRU ITH-5	WORKSHOP	ROBERTS GORDON	VANTAGE II CTH-40	11.7	FRAC	120 / 1 / 60 1A (RLN) 5A (START)	

Notes:

GRILLE, DIFFUSER AND LOUVER SCHEDULE						
TAG	SERVICE	MANUFACTURER	MODEL	DESCRIPTION	SIZE (mm)	NOTES
L-1	INTAKE EXHAUST	RUSKIN	ELF6375DX	150 DEEP EXTRUDED ALUMINUM DRAINABLE LOUVER	SEE DWGS.	1
S-1	OFFICE AND WORKSHOP VENTILATION	E.H. PRICE	PURAFLO	IN-WALL DISPLACEMENT DIFFUSER, WHITE FINISH	SEE DWGS.	
S-2	MAKE-UP AIR SUPPLY	E.H. PRICE	HCD2 CW VCSS	HIGH CAPACITY STEEL DRUM DIFFUSER, CW SPREAD CONTROL AND HEAVY DUTY BALANCING DAMPER	SEE DWGS.	
E-1 T-1	RETURN TRANSFER	E.H. PRICE	80F/A	STEEL FRAME ALUMINUM 13 X 13 X 13 EGG CRATE CORE CW BALANCING DAMPER	SEE DWGS.	

Notes:
1. LOUVER COLOUR(S) TO BE APPROVED BY ARCHITECT.

OIL INTERCEPTOR SCHEDULE									
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	TYPE	VOLUME (L)	DESIGN PRESS.	DIMENSIONS (mm)	NOTES
INT-1	OIL INTERCEPTOR	WORKSHOP	GREEN TURTLE	PROCEPTOR GMC-150	FRP	578	ATMOSPHERIC	812 X 1575 X 1020	1, 2

Notes:
1. PROVIDE COMPLETE WITH EXTENSION COLLAR
2. REFER TO MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND STRUCTURAL DRAWINGS FOR LOCAL SLAB REINFORCEMENT DETAILS

No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé
0	2015/04/04	ISSUED FOR TENDER & CONSTRUCTION	M.H.	S.D.
A	2015/09/28	ISSUED FOR TENDER AND CONSTRUCTION	M.H.	S.D.

Revision / Révision

A detail number / numéro de détail
B source drawing no. / no. dessin
C detail on drawing no. / détail sur dessin no.

Consultant's Name / Nom de l'expert-consultant: **Associated Engineering**

Eng. Sheng / Ingénieur: **Sheng**

APEGA Permit to Practice P 3979

Ma

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Client/Client: **Parks Canada Agency / L'Agence Parcs Canada**

Western and Northern Region / Ouest et Nord du Canada

Project Title/Titre du projet: **BAR-U RANCH WORKSHOP REPLACEMENT**

WATERTON LAKES NATIONAL PARK

Drawing Title/Titre du dessin: **BUILDING MECHANICAL EQUIPMENT SCHEDULES**

Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date
	MIKHAEL HORVATH	AUGUST 21, 2015
Designed by/Concept par	Reviewed by/Revisé par	Scale/Echelle
MIKHAEL HORVATH		N/A
PWSC Project Manager/Administrateur de Projets TPSCC		
Client Acceptance/Acceptation du client / Approved by/Approuvé par		
Per Responsible Officer/Responsable / PWSC Project Manager/Administrateur de Projets TPSCC		
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
20153361		M3

1. GENERAL

- 1.1 Intent
1. The intent of this specification and the drawings is to provide a complete and fully operating mechanical system in complete accord with applicable codes. The Mechanical Contractor shall make provisions for labour, material, and equipment necessary to complete the mechanical work.
2. Drawings and specifications are complementary to each other and what is called for in one is binding as if called for by both. Should any discrepancy appear between drawings and specifications which leaves doubt as to the true intent and meaning, obtain a ruling from the Consultant ten (10) days before submitting tender. Failing this, allow for most expensive alternative.
3. Contract documents are diagrammatic only. They are to establish scope, material and quality. They are not detailed installation drawings. Minor details usually not shown or specified and any incidental accessories required for proper installation of the system are to be included in the work.
4. Contractor is to ensure that all installed equipment will fit within given spaces. Make reference to the electrical, mechanical, architectural and structural drawings, when setting out work and before ordering equipment.
5. Consultant is defined as the Associated Engineering Representative administering the project.

- 1.2 Code Compliance
1. All work shall conform to current edition of National, Provincial and Municipal Codes, Standards and Acts; and will meet the requirements of Authorities having jurisdiction.

- 1.3 Liability
1. Assume responsibility for layout of work; and for any damage caused to the Owner or other Tenants by improper execution of work.
2. Protect finished and unfinished work from damage.
3. Take responsibility for condition of materials and equipment supplied and protect until work is completed and accepted. Co-ordinate deliveries with the general contractor.

- 1.4 Qualifications
1. Work performed under Division 15 must be carried out by licensed tradesmen regularly employed and experienced with the type of work being installed under the Contract.

- 1.5 Certificates
1. Give notices, obtain permits and approvals, and pay fees so work specified may be carried out. Furnish certificates if requested, as evidence that work conforms with laws and regulations of the authorities having jurisdiction.

- 1.6 Cutting and Patching
1. All work shall be co-ordinated with other trades especially that related to cutting and patching of required openings; and locations and installation of sleeves, inserts, support, curbs, frames and access doors.

- 1.7 Alternative Materials and Equipment
1. Contract price shall be based on materials and equipment specified. Approval by Consultant of equipment submitted by the mechanical trades is equal to that specified does not relieve the mechanical trades of any responsibility.
2. Revisions required to adapt accepted alternatives shall be included in the contract price. No increase in the contract price will be considered to accommodate the use of equipment other than that specified.

- 1.8 Shop Drawings
1. Email shop drawings to Consultant for all equipment specified in the specification or drawings for review. Do not order equipment or materials until Consultant has reviewed shop drawings.

- 1.9 Guarantee
1. Provide the Owner with a written guarantee that the equipment installed and work performed shall remain in serviceable condition for a period of one (1) year from the date of final acceptance by the Owner. The warranty shall cover material as well as labour.

1.10 Standard of Materials and Workmanship

- 1. Make and quality of materials used are subject to approval by the Consultant. Remove unacceptable materials and install suitable materials in their place.
2. Materials shall be new and of uniform pattern throughout, unless noted otherwise.
3. Employ only tradesmen properly licensed to perform the specific work. The Consultant may perform spot checks for trade tickets and accreditation.

1.11 Owner's Stock

- 1. The Hotly pressure washer referenced on the drawings shall be provided to the Contractor from the Owner's stock. Prior to submitting the tender price, review the equipment to ensure their usability for the project. The tender price shall include the cost of cleaning, servicing, moving in place, and retasking to make these items completely operational.

- 1.12 Record Drawings
1. Keep on site an extra set of white prints and specifications, recording changes and deviations.
2. Upon completion of work, submit final record drawings to the Consultant. These must be submitted within two (2) weeks after acceptance of work. Failure to submit drawings will result in the work being done by the Owner and the cost deducted from the final payment.

1.13 Substantial Completion Inspection

- 1. Advise Consultant five (5) days prior to the date inspection is desired. All systems to be fully operational and any deficiencies should be noted to the Consultant.
2. All deficiencies shall be completed within two (2) weeks after substantial completion and letter submitted to Consultant within that time advising that the work is complete. Failure to complete work will result in work being done by the Owner and the costs deducted from final payment.
3. The following shall be an outline checklist of the minimum requirements to be met by the contractor prior to the Consultant's Substantial Performance by the contractor.
Inspection:
- Complete Balancing Reports
- Complete Commissioning Checklists
- Final Plumbing Inspection Certificate from local plumbing inspector
- Final Gas Inspection Certificate from local gas inspector
- Final Backflow Prevention test reports for all backflow devices
- Controls Commissioning (MAU, Holding Tank Level Monitor)
- Final As-Built Drawings ready for review
- Maintenance and operation manuals, ready for review

1.14 Co-ordination with Electrical Division

- 1. Contractor shall review all equipment requiring electrical hook-up with Electrical Contractor and electrical drawings prior to ordering equipment. Ensure proper electrical characteristics are determined for all affected and related work. This is part of the contractor's shop drawing review and no extras will be considered for power mismatches.

1.15 Co-ordination of Services

- 1. Co-ordinate with proper utilities for services such as water, sewer, natural gas, and assume all charges.
2. Co-ordinate with the owner to shutdown, disconnect, reroute, or make connection to existing services. Provide written 24 hour notice for all service shutdowns.

1.16 Performance Tests

- 1. Operate each mechanical system after mechanical and electrical work has been completed, to demonstrate that each system fulfills the requirements of the contract and operates satisfactorily. These are performance tests and must be completed before work can be finally accepted.

1.17 Operation and Maintenance Manuals

- 1. Provide four (4) copies of manuals prepared by qualified and experienced personnel for use by Owner. Manuals form part of the contract and must be delivered to the Consultant before work will be considered complete. Each manual shall provide the following:
- Layman's description of all mechanical systems including operating maintenance and lubrication instructions.
2. Certification of all equipment where required by local codes and authorities.
3. Shop drawings and maintenance bulletins.
4. List address and telephone numbers of all equipment suppliers and contractors.
5. Performance details for all equipment, including curves for fans with actual operating points noted.

1.18 Balancing

- 1. The approved balancing agencies are: Hydro-Air Services
2. Balance make-up air unit, supply and exhaust fans, and air inlets and outlets to air quantities indicated on the drawings and in this specification.
3. Submit two (2) copies of the report to Engineer within two (2) weeks after substantial completion. Failure to submit the report within the specified time will result in the work being done by the Owner and the costs deducted from final payment.
4. Balancing shall be performed to the following accuracies:
- Air-Terminal Outlets ±10%
- Air-Central Equipment ±5%

1.19 Co-operate with the Balancing Agency as follows:

- 1. Make any corrections as required by Balancing Agency.
2. Allow Balancing Agency free access to site during construction phase. Inform Balancing Agency of any major changes made to systems during construction and provide a complete set of record drawings and specifications for their use.
3. Operate automatic control system and verify set points during balancing.
4. Provide and install balancing dampers, and other materials requested by the Balancing Agency and/or necessary to properly adjust or correct the systems to design flows, without additional cost to Owner.
5. Provide and install pullouts and sheaves for rotating equipment, as required to properly balance the systems to design flows, without additional cost to Owner.

1.20 System Cleaning and Chemical Treatment

- 1. Flush and disinfect all domestic cold and hot water systems.

1.21 Painting and Identification

- 1. Paint all exposed ducts and pipes with colours to match interior finishes or in colours as directed by the Architect.
2. Identify piping with labels and flow arrows. Provide identification at 10 m maximum intervals, before and after pipes passing through walls, at all sides of tees, behind access doors. Use Brady B-500 vinyl cloth labels for non insulated pipes and B-350 for insulated pipes.
3. Identify electric starting switches, thermostats controlling motors and equipment supplied under this division with lamacoid plates having 8 mm minimum letter size.

1.22 Fire-Stoppping

- 1. Fire-stop all pipe and duct penetrations through floors and walls, designated as fire and/or smoke separations.
2. Fire-stopping materials to meet ULC CAN 2515. Acceptable Materials: by "Trimco" or "National Firestopping".
3. Preparation of surfaces and installation of fire-stopping materials shall be carried out as per manufacturer's instructions.

1.23 Flashing and Roof Curbs

- 1. Provide curbs, flash and counter flash where mechanical equipment passes through weather or waterproofed walls, floors and roofs. Install roof mounted equipment on factory supplied roof curbs.

1.24 Metric Conversion

- 1. All units in this division are expressed in SI units. Soft metric conversions are used throughout.
2. Equivalent Nominal Diameters of Pipes - Metric and Imperial.
- Where pipes are specified with metric dimensions and only Imperial sized pipes are available, provide equivalent nominal Imperial sized pipe as indicated in the table, and provide at no extra cost adapters to ensure compatible connections to all metric sized fittings, equipment and piping.

Table with 4 columns: mm inches, mm inches, mm inches, mm inches. Rows include 3/8, 1/2, 3/4, 1, 1 1/8, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30, 40, 50, 60, 75, 100, 150, 200, 250, 300, 375, 450, 500, 600, 750, 1000.

3. Metric Duct Sizes

- 1. The metric duct sizes are expressed as 25 mm = 1 inch.

2. DUCTWORK AND ACCESSORIES

- 2.1 General
1. Fabricate ductwork in accordance with SMACNA Duct Manual and ASHRAE Handbooks. Ductwork shall meet the requirements of NFPA 90A and conform to applicable codes.
2. Prior to fabrication of ductwork, check all ceiling spaces and heights and conflicts with other trades.
3. Duct sizes indicated are inside clear dimensions. For acoustically lined or internally insulated ducts maintains size inside ducts.
4. Provide fire dampers where ducts cross fire separations. Fire dampers shall be ULC listed and constructed in accordance with ULC Standard S112 "Fire Dampers". Fusible links shall be constructed to ULC Standard S505.
5. Provide balancing dampers where indicated on drawings and at points on low pressure supply, return and exhaust ducts where branches are taken from larger ducts.
6. Provide adequately sized access panels for dampers, equipment, fire dampers, valves, radiation valves, and any other equipment requiring servicing.
7. Provide return air openings and/or insulated sound traps where indicated.
8. Modify ceiling system where required to accommodate grilles and diffusers.
9. Size round ducts, installed in place of rectangular ducts, from ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by permission from Engineer.
10. Exposed round ductwork to be spiral lock seam type only.
11. Provide duct hangers and supports in accordance with SMACNA manuals.

2.2 Low Velocity Ductwork

- 1. Ductwork shall be galvanized steel. The minimum sheet metal thickness for ducts including fittings, access doors, and other accessories shall be as per SMACNA duct manual for Low Velocity Ductwork (500 Pa and below).
2. Where low pressure ducts are connected to fan equipment, terminal boxes or any other apparatus, a screwed or bolted flexible gasketed joint shall be provided between the ductwork and the equipment, minimum 50mm wide.

2.3 Duct Sealing

- 1. Round ductwork shall be spiral lock seam type only.
2. Galvanized Steel Ducts: Galvanized steel lock forming quality, having galvanized coating to ASTM A653M, G90 designation for both sides.
3. All supply, return and exhaust duct joints, longitudinal as well as transverse, shall be sealed using:
- 1. Low Pressure Ductwork:
Slip Joints: Apply heavy brush-on high pressure duct sealant. Apply second application after the first application has completely dried out. Where metal clearance exceeds 1.5 mm use heavy mastic type sealant.
Flanged Joints: Soft elastomer butyl or extruded form of sealant between flanges followed by an application of heavy brush-on high pressure duct sealant.
Other Joints: Heavy mastic type sealant.
4. Duct tapes as sealing method are not permitted.
5. Surfaces to receive sealant should be free from oil, dust, dirt, moisture, rust and other substances that inhibit or prevent bonding.
6. Do not insulate any section of the ductwork until it has been inspected and approved of duct sealant application, by the Consultant.

2.4 Dampers & Actuators

- 1. Balancing Dampers
- 1. All manual balancing dampers shall include a manual lock. Allow for standoff kit to accommodate for external duct insulation.
- 2. Fabricate of galvanized steel, minimum 1.6 mm, and provide with lockable quadrants or adjustment rod and lock screw for low pressure systems. Provide lockable quadrants for all duct sizes over 240 x 760 mm and for all medium and high pressure ductwork.
- 3. Single blade dampers are permitted for duct sizes up to 240 x 760 mm.
- 4. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes up to 300 x 1800 mm. Assemble center and edge stamped blades in prime coated or galvanized channel frame with approved type hardware.
- 5. Fabricate multi-blade, parallel action gravity balanced back-draft dampers with blades a maximum of 150 mm width having felt or flexible vinyl sealing edges, with adjustment device to permit setting for varying differential static pressure.
2. Motorized Dampers
- 1. Standard automatic dampers to control supply air or return air shall be extruded aluminum multiple blade type mounted in a 2.0mm extruded aluminum flange frame. Individual blades shall not exceed 150mm in width or 1200mm in length, and shall not extend beyond the frame when in the full open position. Individual blades shall have interlocking edges and compressible seals. Blade seals shall be extruded EPDM and frame seals shall be TPE (antistoprene) thermoplastic. Provide oil impregnated bronze or nylon bearing with additional thrust bearings for vertical blades. Dampers shall be low leakage - max 0.5% leakage at 1000 Pa.
- 1. Design Standard: Tamco Series 1400
2. Thermally insulated dampers shall be used to control outdoor air, exhaust air, mixed air, relief air or where air control is required at thermally insulated ductwork. Extruded aluminum blades shall have a minimum insulation factor of R-2.29 and a temperature index of 55. Dampers shall be low leakage - max 0.5% leakage at 1000 Pa.
3. Design Standard: Tamco Series 9000
4. Damper linkages shall not have "slap" and dampers shall seal tightly.
5. Use parallel blade dampers only where indicated on the drawings or specified elsewhere. Otherwise opposed blade dampers shall be used.
6. Provide permanently lubricated brass bushings in all shafts.
7. Provide heavy duty connections and linkages for damper actuators.
8. Damper blades shall be replaceable without full damper disassembly.
3. Damper Actuators
- 1. Piston or gear driven type damper actuators with spring return to "fail safe" position (i.e. normally closed position as dictated by freeze, fire, or temperature protection).
- 2. Provide pilot positioners on damper actuators sequenced / interlocked with other controls.
- 3. Provide a minimum of one damper actuator per damper section.
- 4. Provide one damper actuator to a maximum 1.5 m2 damper section. Provide supplementary damper actuators as required.
- 5. Damper actuators shall be rigidly attached to the support structure and linkage shall have no "slap".
- 6. Where dampers are used as part of a smoke control system, the maximum response time shall not exceed Code requirements and no longer than 60 seconds.
- 7. Design Standard: Belimo

3. PIPING

3.1 Pipe Material

- 1. Service: Sanitary and Vent (above grade). Material: DWV Copper, Cast Iron, and PVC DWV where permitted by code.
2. Service: Sanitary and Storm Drainage and Vent (below grade inside building). Material: Cast Iron, PVC-DWV.
3. Service: Domestic Cold Water (above grade inside building). Material: Type "L" Hard Copper.
4. Service: Domestic Hot Water (above grade inside building). Material: Type "K" Hard Copper.
5. Service: Domestic Water (buried, inside building). Material: Type "K" Soft Copper.
6. Service: Natural Gas. Material: Steel Schedule 40, A53 Grade B.

3.2 Pipe Connections

- 1. Steel
- 1. Screwed joint steel piping up to and including 40 mm. Weld piping 65 mm and larger including branch connections. Use dielectric type couplings when joining dissimilar metal pipes.
2. Copper
- 1. Use lead free solder for soldering domestic water copper pipe.

3.3 Pipe Hangers And Supports

- 1. All piping shall be firmly supported and securely braced. Provide copper plated hangers and supports for copper piping and galvanized hangers and supports for galvanized piping.
2. Use of perforated straps is not permitted for pipe hangers.
3. Provide ring type hangers for piping up to 40 mm and devise type hangers for piping over 40 mm.

3.4 Pipe Support Spacing

Table with 4 columns: Pipe Size (mm), Rod Diameter (mm), Spacing (m), Spacing (m). Rows include 15, 20-40, 50-65, 9, 1.8, 2.4, 3.0.

3.5 Gas Distribution Piping

- 1. Install gas piping in open or ventilated spaces. Pitch lines and provide drip legs at condensation collection points. Where gas piping is run in concealed space provide ventilation grilles, as required.

4. VALVES

4.1 Domestic Hot And Cold Water System Valves

- 1. Ball valves up to 50 mm; bronze body, chrome plated, bronze ball, threaded or solder ends, TFE seat and packing. 4134 kPa non shock W.O.G. rating, ToyoRed & White 5044A/5048A.

- 2. Gate valves up to 50 mm shall be bronze, solid wedge, rising spindle, 378 kPa W.O.G., threaded ends ToyoRed & White 293. Solder ends Fig. 299.
3. Globe valves up to 50 mm shall be bronze composition disc type fitted with No. 294-S disc for cold water; and No. 110 disc for hot water service. ToyoRed & White 221 for threaded ends; and Fig. 212 for solder ends.
4. Inside hose bibbs shall be bronze body, globe valve, renewable disc, garden hose outlet, 2070 kPa rating.
5. Outside hose bibbs shall be non-freeze type with bronze recessed box and polished bronze cover, hose thread spout vacuum breaker, removable key.

5. INSULATION

5.1 Duct and Breaching Insulation

- 1. Exposed Rectangular Ducts: Rigid fibrous glass insulation, "K" value at 24°C maximum 0.035 w/m°C with factory applied reinforced aluminum foil vapour barrier.
2. Round Ducts and Concealed Rectangular Ducts: Flexible fibrous glass insulation, "K" value 24°C maximum 0.035 w/m°C with factory applied reinforced aluminum foil vapour barrier.
3. Acoustic Lining: Fibrous insulation with "K" value at 24°C maximum 0.035 w/m°C absolute roughness of exposed surface not to exceed 0.58 mm coated to prevent fibre erosion at air velocities up to 254 m/s, 24 kg/m³ minimum density for ductwork and 75 kg/m³ for plenums.
4. Breaching Insulation: Semi-rigid mineral fibre, insulation with glass mat, "K" value 0.035 w/m°C maximum at 24°C. Service temperature 65°C to 450°C.
5. Recovery Jackets: ULC labelled thermocanvas.
6. Ensure surface and insulation is clean and dry prior to and during installation.
7. Ensure insulation is continuous through inside partitions.
8. Finish and seal insulation neatly at hangers, supports, access doors, fire dampers and other protrusions.
9. Recover all insulation except in ceiling spaces, crawl spaces, and mechanical shafts.

Table with 2 columns: Duct & Equipment, Insulation Thickness (mm). Rows include Outside Air Intake, Combustion Air, Exhaust Ducts, Acoustic Lining, Unit Heaters, Tube Heaters, Piping to be Insulated, Domestic Cold Water, Domestic Hot and Recirc, Vents within 3 m of Roof Outlet.

6. PLUMBING

6.1 Plumbing General

- 1. Install vacuum breakers, trap primers and backflow preventers on plumbing lines as required by code.
2. Check invert elevations prior to sanitary and drainage connections.
3. Grade drainage lines 1% per foot, unless noted otherwise.
4. Provide heat trap loop in domestic hot water supply piping at the domestic hot water storage tank.

6.2 Plumbing Fixtures

- 1. Water Closet (WC-1)
- 1. Pressure-Assisted Elongated 381mm High Toilet, white vitreous china, floor mounted, 6L (1.6 US Gal) per flush, two piece. American Standard #2462.016.020 Cadet.
- 2. Heavy duty toilet seat, white solid plastic, open front less cover. Centocore #500STSCC.001
- 3. Provide all metal construction Toilet Supply.
- 4. Provide Floor Flange, (same material as the connecting pipe drain), with all brass bolts and with wax gasket.
2. Lavatory (LAV-1)
- 1. Wall-hung, integral back:
- 1. Bowl: Vitreous china, with splash lip, soap depressions, supply openings on 200 mm centres, overflow. Size: 500 x 450 mm.
- 1. Approved manufacturers: American-Standard AF 0368 (508 x 457).
2. Trim:
- 1. Chrome plated brass single handed mixing faucet, mixing spout, washerless, aerator, handle.
2. Provide accessories to limit maximum flow rate to 8.35 L/minute at 413 kPa.
3. Waste fitting: plug and chain.
3. Floor Drains
- 1. Floor drains shall have lacquered cast iron body with double drainage flange, weep holes, combined two piece body reversible clamping device and adjustable nickel-bronze strainer.
- 2. Floor drains in equipment rooms shall have polished bronze funnel type strainer.

3. FIRE PROTECTION

- 1. Provide fire extinguishers where indicated.
- 1. Cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Provide 4.5 kg size, if not indicated otherwise.
2. Mountable height to be 1500 mm to the top of the bracket.

4. DUST COLLECTION

4.1 Performance & Design

- 1. The contractor shall provide and install a permanent, complete, and fully functioning dust collection system suitable for the demand and tools of the workshop.
2. The contractor shall engage a dust collection equipment vendor to provide a customized dust collection duct design to suit the final locations of all tools in the workshop, to be coordinated with the Owner.
3. The dust collector specified in the equipment schedules (DC-1) constitutes a preliminary selection for the purposes of electrical coordination and establishing performance criteria. The final selection of the dust collection cyclone shall be based on the requirements established through procurement of the dust collection duct design by the dust collection equipment vendor and consultation with the Owner.
4. Design Basis: Onidea Air Systems.

4.2 Dust Collector

- 1. Motor
- 1. Class F TEFC motor with 1.15 Service Factor, 230/1/60, horsepower size as required.
2. Fan Wheel and Housing
- 1. Backward incline fan design.
- 2. Cast aluminum Alloy 356-51, non-sparking, non-ferrous.
- 3. No rivets or welds.
- 3. Cyclone
- 1. 16 gauge cyclone barrel with solid welded construction.
- 2. Powder coated paint finish over heavy gauge steel.
- 3. Outlet shall be rotatable independent of inlet.
- 4. Complete with cyclone stand.
- 4. Filter
- 1. GE Certified (H-12) HEPA Media / MERV 16
- 2. Filter grounding wire
- 3. Flame guard arrester
- 5. Silencer
- 1. Built-in silencer shall maintain sound generated to 80 dBA or less at 3 m.
- 6. Dust Drum
- 1. 35 or 55 US Gallon drum, as directed by Owner.

4.3 Dust Collection Ductwork

- 1. 24 gauge snaplock galvanized steel pipe

5. CONTROLS

5.1 Thermostats, Control Panels, and Gas Detection

- 1. All thermostats, control panels, and sensors to be wall or column mounted at normal mounting height unless specifically noted otherwise.
2. Thermostats to be digital, 7-day programmable type. Honeywell.
3. Vehicular Gas Detection sensors to be Honeywell EF or approved equal.
5.2 Sequences of Operation
- 1. Office and Workshop Ventilation (SF-1, EDH-1)
- 1. Supply Fan SF-1 shall operate on a switch and shall require occupant to energize when space is occupied.
- 2. Electric Duct Heater EDH-1 shall modulate to maintain supply air temperature setpoint of 15°C (adj.).
- 3. Heating Unit Control (TH-1 thru ITH-5, GUH-1 and GUH-2):
- 1. Single or multiple heating appliances are controlled by a single thermostat.
- 2. Thermostats selected shall be intended for application.
- 3. One or two-stage thermostatic control, refer to equipment schedules; provide thermostats accordingly.
- 4. 2-stage thermostats shall modulate unit heater output based on internally programmed logic.
- 5. The thermostats will be set at 15°C (adjustable).
- 3. Exhaust and Make-up Air Ventilation System (EF-1 and MAU-1):
- 1. MAU-1 shall be provided with remote panel capable of operating unit in handoff/aut.
- 2. MAU-1 shall be interlocked with EF-1. Operation of EF-1 shall be verified with air proving switch.
- 3. MAU-1 shall modulate burner as required to maintain a supply air discharge temperature of 15°C.
- 4. Motorized damper at EF-1 discharge shall spring return close.
- 4. Holding Tank Level Monitor
- 1. Holding tank level monitor panel shall produce an audible alarm when a high level is detected.

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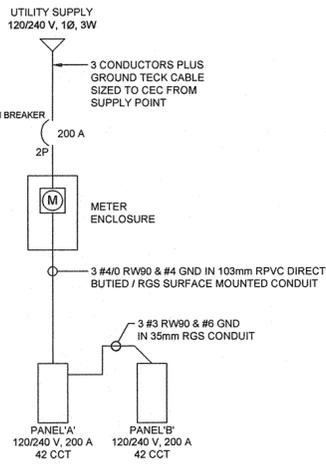
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Drawing Reference No./No. de référence du dessin M4



1 DIAGRAM
SINGLE LINE

PANEL A SCHEDULE												
LOCATION: AS DRAWING MOUNTING: WALL INCOMING LUGS: ISOLATOR MANUFACTURER: EATON, SCHNEIDER			VOLTAGE: 120/240VAC BUS RATING: 22kA MAIN BREAKER: 200A FEEDER: 3 #4/0			PHASE: 1 WIRE: 3						
CCT No.	DESCRIPTION	WATTAGE	BKR AMPS	BUS	BKR AMPS	WATTAGE	DESCRIPTION	CCT No.				
1	LIGHTING AND SURGE PROTECTION		20	A	100		PANEL B	2				
3			20	B	2P			4				
5	WELDER	1000	100	A	30	2532	MAU-1 MAKE UP AIR UNIT	6				
7			2P	B	2P			8				
9	PHASE CONVERTER FOR AIR COMPRESSOR	3300	3300	20	A	20	2000	EDH-1 VENTILATION HEATER	10			
11			2P	B	2P		2000		12			
13	TABLE SAW (NOTE 3)		20	A	15	625	RCP-1 OFFICE HEATER	14				
15			2P	B	15	750	RCP-2 WASHROOM HEATER	16				
17	SHAPER (NOTE 3)		20	A	15	48.7	EF-2 WASHROOM EXHAUST FAN	18				
19			2P	B	50	2400	EF-1 WORKSHOP EXHAUST FAN	20				
21	OVERHEAD DOOR 1 (NOTE 3)		20	A	20	2000	DWH-1 WATER HEATER	22				
23			2P	B	15		SPARE	24				
25	OVERHEAD DOOR 2 (NOTE 3)		20	A	15		SPARE	26				
27			2P	B	15		SPARE	28				
29	DC-1 DUST COLLECTOR	2040	2040	40	A	15	SPARE	30				
31			2P	B	15		SPARE	32				
33	220VAC RECEPTACLES		20	A				34				
35			2P	B				36				
37	220VAC RECEPTACLES		15	A				38				
39			2P	B				40				
41			15	A				42				
SUBTOTALS:		6340	6340			7206	7682					

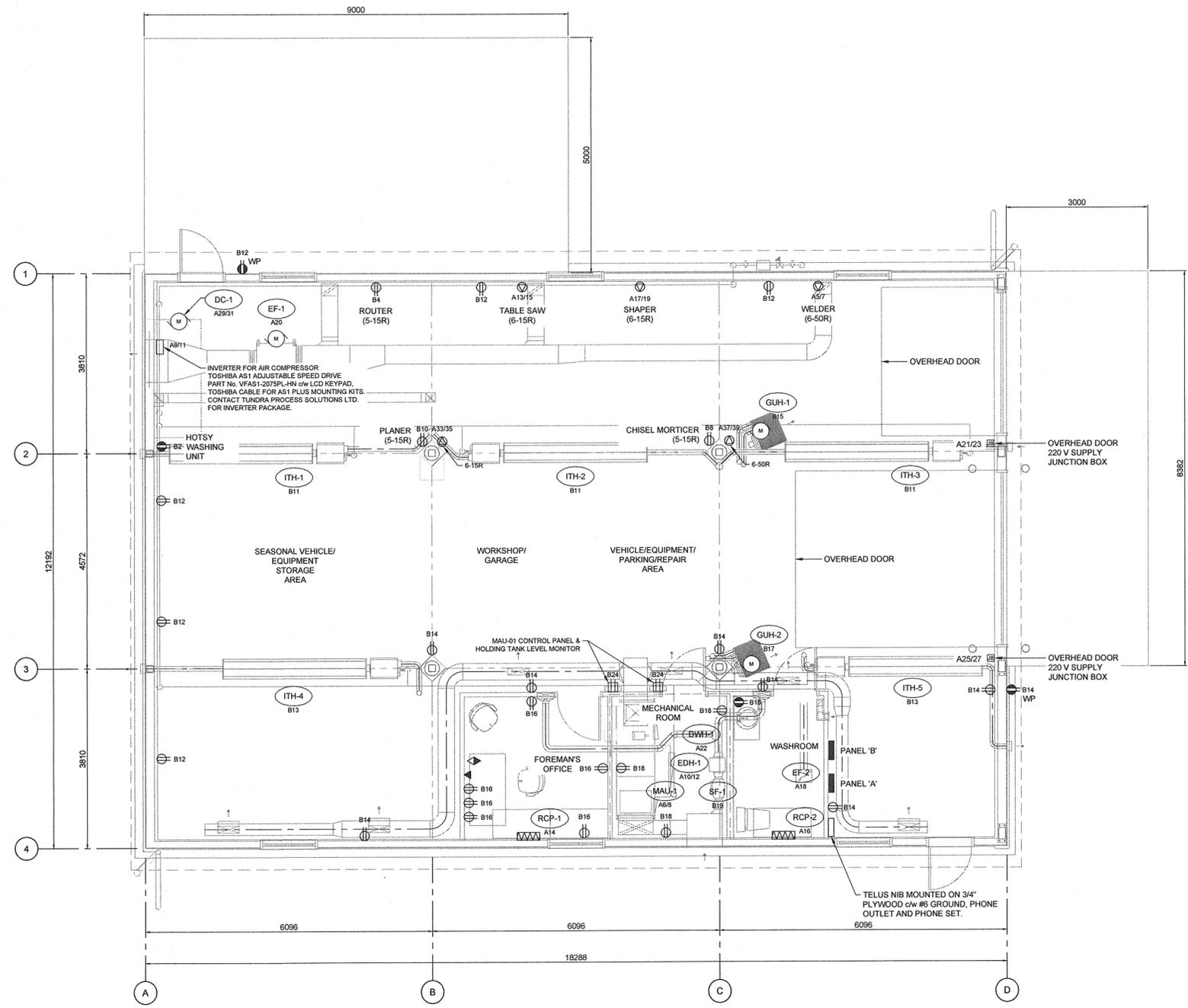
NOTES:
1. SEE BUILDING MECHANICAL DRAWINGS FOR LOCATION OF HEATING AND VENTILATION EQUIPMENT
2. COMBINED LIGHTNING AND SURGE PROTECTION UNIT TO BE LOCATED ADJACENT TO PANELBOARDS.
3. CONTRACTOR TO CONFIRM ELECTRICAL LOAD RATING ON SHOP DRAWINGS PRIOR TO ORDERING PANELBOARD BREAKERS.

PHASE A TOTAL - 13546 W
PHASE B TOTAL - 14022 W
PANEL TOTAL WATTAGE - 12546 W
PANEL TOTAL CURRENT - 56 A

PANEL B SCHEDULE											
LOCATION: AS DRAWING MOUNTING: WALL INCOMING LUGS: ISOLATOR MANUFACTURER: EATON, SCHNEIDER			VOLTAGE: 120/240VAC BUS RATING: 22kA MAIN BREAKER: MAIN LUG ONLY FEEDER: 3 #3 RW90			PHASE: 1 WIRE: 3					
CCT No.	DESCRIPTION	WATTAGE	BKR AMPS	BUS	BKR AMPS	WATTAGE	DESCRIPTION	CCT No.			
1	LIGHTING - MAIN AREA		15	A	15		VEHICLE WASHER (NOTE 3)	2			
3	LIGHTING - MAIN AREA		15	B	15		ROUTER (NOTE 3)	4			
5	LIGHTING - OFFICE, MECH ROOM, WASHROOM		15	A	20	1900	COMPOUND MITRE SAW (NOTE 3)	6			
7	LIGHTING - OUTSIDE		15	B	15		CHISEL MORTICER (NOTE 3)	8			
9	LIGHTING - EMERGENCY		15	A	15		PLANER (NOTE 3)	10			
11	ITH-1, 2, 3 INFRARED TUBE HEATERS	360	15	A	15		120VAC RECEPTACLES - MAIN AREA	12			
13	ITH-4, 5 INFRARED TUBE HEATERS	240	15	A	15		120VAC RECEPTACLES - MAIN AREA	14			
15	GUH-1 UNIT HEATER	288	15	A	15		120VAC RECEPTACLES - OFFICE	16			
17	GUH-2 UNIT HEATER	468	15	A	15		120VAC RECEPTACLES - MECH ROOM, WASHROOM	18			
19	SF-1 VENTILATION FAN		15	B	15		SPARE	20			
21				A	15		SPARE	22			
23				B	15		SPARE	24			
25				A	15		SPARE	26			
27				B	15		SPARE	28			
29				A	15		SPARE	30			
31				B	15		SPARE	32			
33				A				34			
35				B				36			
37				A				38			
39				B				40			
41				A				42			
SUBTOTALS:		708	648			1800	0				

NOTES:
1. SEE BUILDING MECHANICAL DRAWINGS FOR LOCATION OF HEATING AND VENTILATION EQUIPMENT
2. COMBINED LIGHTNING AND SURGE PROTECTION UNIT TO BE LOCATED ADJACENT TO PANELBOARDS.
3. CONTRACTOR TO CONFIRM ELECTRICAL LOAD RATING ON SHOP DRAWINGS PRIOR TO ORDERING PANELBOARD BREAKERS.

PHASE A TOTAL - 2508 W
PHASE B TOTAL - 648 W
PANEL TOTAL WATTAGE - 3156 W
PANEL CURRENT TOTAL - 13 A

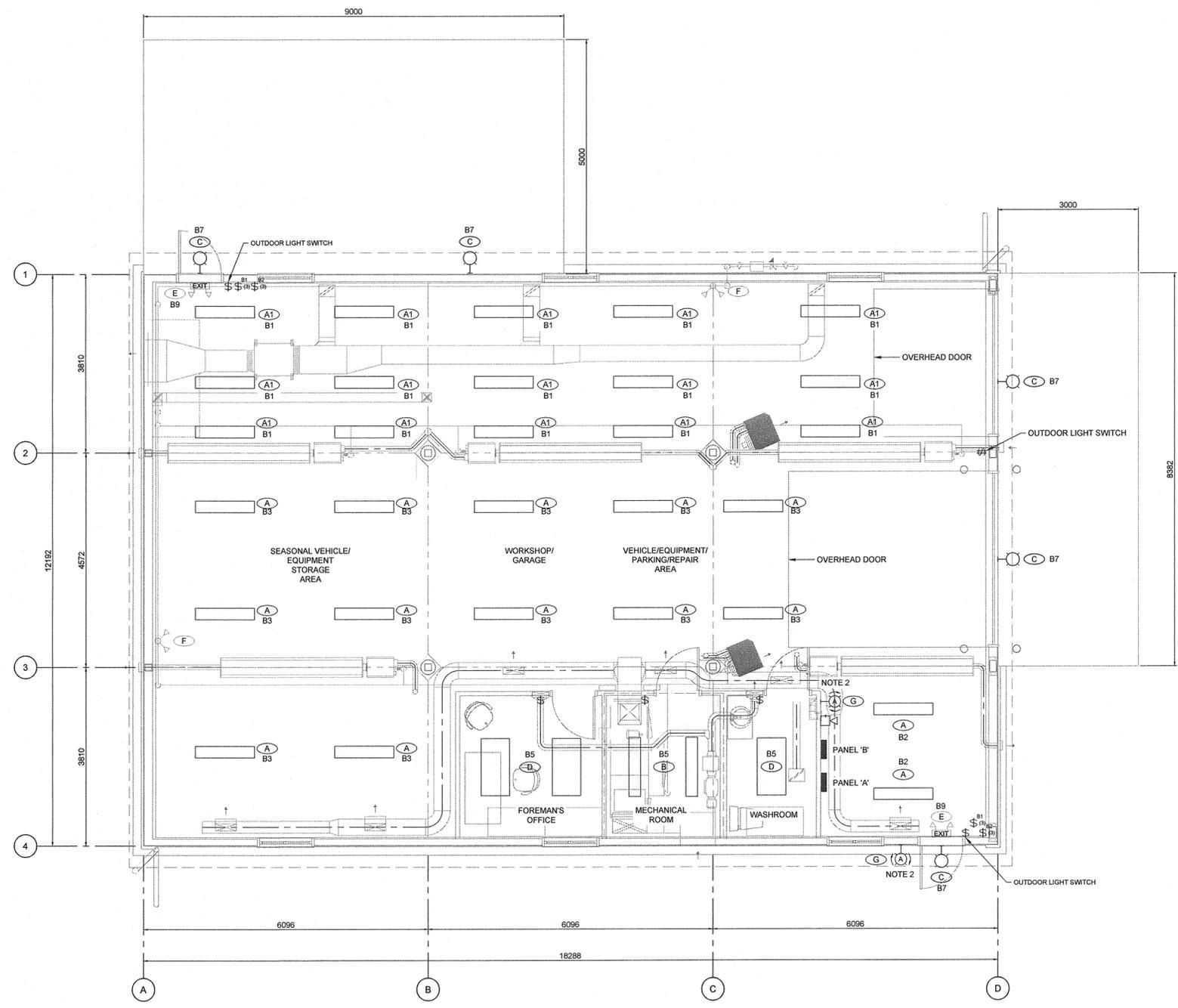


2 PLAN
MAIN FLOOR

- LAYOUT LEGEND:
- ⊖ 220 V SINGLE RECEPTACLE
 - ⊖ 120 V POWER CONNECTION
 - ⊖ 120 V DUPLEX RECEPTACLE
 - ⊖ WP WEATHERPROOF DUPLEX RECEPTACLE - GFCI
 - ⊖ DUPLX RECEPTACLE - GFCI
 - ⊖ JUNCTION BOX
 - ⊖ LIGHTING OR BRANCH PANEL
 - ⊖ TELEPHONE OUTLET
 - ⊖ INTERNET OUTLET
 - A1 PANEL NAME AND CIRCUIT NUMBER

- NOTES:
1. PARKS CANADA TO ADVISE LOCATION OF RECEPTACLES FOR WELDER, AIR COMPRESSOR, TABLE SAW, AND SHAPER PRIOR TO INSTALLATION.
2. PARKS CANADA TO ADVISE LOCATION OF RECEPTACLES FOR ROUTER, COMPOUND MITRE SAW, CHISEL MORTICER, AND PLANER PRIOR TO INSTALLATION

Consultant's Name Nom de l'expert-consultant		Eng. Shomo Secou de l'ingénieur	
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Western and Northern Region		Ouest et Nord du Canada	
Project Title/Titre du projet BAR-U RANCH WORKSHOP REPLACEMENT			
WATERTON LAKES NATIONAL PARK			
Drawing Title/Titre du dessin 240VAC, 120VAC POWER, INTERNET & TELEPHONE			
Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date	
	HOWARD MARIANO	FEB 26, 2015	
Designed by/Concept par	Reviewed by/Revisé par	Scale/Echelle	
RICHARD COLDBECK	AS SHOWN		
PWSC Project Manager/Administrateur de Projets TPSCC			
Client Acceptance/Acceptation du client		Approved by/Approuvé par	
Project No./No. du projet		Asset No./No. de l'actif	Sheet No./No. de la feuille
20153361			E1



- LAYOUT LEGEND:**
- SURFACE MOUNTED OR SUSPENDED FLUORESCENT FIXTURE
 - EMERGENCY / EXIT LIGHT COMBINATION
 - WALL MOUNTED LIGHT
 - FIXTURE TYPE TAG
 - ELECTRIC BASEBOARD HEATER
 - SINGLE POLE SWITCH
 - TWO SWITCHES IN A TWO GANG BOX
 - 3-WAY SWITCH WITH CIRCUIT NUMBER
 - ALARM HORN
 - BEACON
 - B1** PANEL NAME AND CIRCUIT NUMBER

- NOTES:**
- 1220mm x 610mm FITTING MOUNTED IN T-BAR CEILING. SEE ARCHITECTURAL DRAWINGS.
 - WASTE WATER TANK HIGH LEVEL TO GIVE VISUAL AND AUDIBLE ALARM INSIDE THE BUILDING AND VISUAL ALARM OUTSIDE THE BUILDING. AUDIBLE ALARM TO BE MUTED BY PUSH BUTTON OPERATION. VISUAL ALARM TO BE ACKNOWLEDGED AND INDICATION TURNED OFF FOR ONE DAY BY PUSH BUTTON OPERATION.

1 PLAN 1:40
MAIN FLOOR

LIGHTING FIXTURE SCHEDULE

FIXTURE TAG No.	DESCRIPTION	MANUFACTURER	CATALOGUE No.	EQUIPMENT INFORMATION					LAMPS		FINISH	REMARKS
				MOUNTING TYPE	MOUNTING HEIGHT	VOLTS	FIXTURE SIZE	FIXTURE WATTS	No.	TYPE		
A	2-LAMP HIGH BAY	COLUMBIA	LHR4-2-32-M4R-U-E-U	CHAIN	3000mm AFF	120 V	2' x 4'	76 W	2	T8 FLUORESCENT		
A1	2-LAMP HIGH BAY	COLUMBIA	LHR4-2-32-M4R-U-E-U	CHAIN	2400mm AFF	120 V	2' x 4'	76 W	2	T8 FLUORESCENT		
B	2-LAMP HIGH BAY	COLUMBIA	LHR4-2-32-M4R-ST-E-U	CEILING	3000mm AFF	120 V	2' x 4'	76 W	2	T8 FLUORESCENT		
C	OUTDOOR WALLPACK	RUUD	X SE 0 G 04 D U T H	SURFACE WALL MOUNT	SEE ARCHITECTURAL DRAWINGS	120 V	18" x 12"	110 W	2	LED		
D	FLUORESCENT	LITHONIA (WOW LIGHTING)	2AL5 2 28T5MVOLT GEB10PSLP835	T-BAR	SEE ARCHITECTURAL DRAWINGS	120 V	2' x 4'	56 W	2	F28T5 FLUORESCENT		
E	EMERGENCY LIGHT/EXIT SIGN EMERGENCY UNIT	LUMACELL	5LER35002LWW	WALL	2100mm AFF	120 V	-	10 W	2	LED		
F	EMERGENCY LIGHT	LUMACELL	RG12NX722L	WALL	2100mm AFF	120 V	-	10 W	2	LED		
G	WASTE WATER TANK HIGH WATER ALARM	ALLEN BRADLEY	855W-G10Y3L4P1									

D	2015ND04	ISSUED FOR TENDER & CONSTRUCTION	H.M.	R.C.
A	2015/08/28	ISSUED FOR TENDER AND CONSTRUCTION	H.M.	R.C.
No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision

A detail number, numero de detail
B source drawing no., de dessin no.
C detail on drawing no., detail sur dessin no.

Consultant's Name
Nom de l'expert-consultant

Associated Engineering

APEGA Permit to Practice P 3979

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Parks Canada Agency
L'Agence Parcs Canada

Western and Northern Region
Ouest et Nord du Canada

Project title/Titre du projet
BAR-U RANCH WORKSHOP REPLACEMENT

WATERTON LAKES NATIONAL PARK

Drawing title/Titre du dessin
LIGHTING LAYOUT

Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date
	HOWARD MARIANO	FEB 28, 2015
Designed by/Concept par	Reviewed by/Revisé par	Scale/Echelle
RICHARD COLBECK	AS SHOWN	
PWSC Project Manager/Administrateur de Projets TPSC		
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Park Response Officer/Agent Réponse		PWSC Project Manager/Administrateur de Projets TPSC
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
20153361		
Drawing Reference No./No. de référence du dessin		
		E2

ELECTRICAL SPECIFICATION:

- ALL WORKS SHALL BE IN COMPLIANCE WITH THE CANADIAN ELECTRICAL CODE, ALBERTA BUILDING CODE, AND OTHER REGULATIONS IN EFFECT.
- ALL EQUIPMENT SHALL BE INSTALLED TO MANUFACTURER RECOMMENDATIONS.
- CONTRACTOR TO ARRANGE INSTALLATION OF UTILITY SUPPLY AND PROVIDE REQUIRED DOCUMENTATION IN A TIMELY MANNER TO PROVIDE POWER. CONTRACTOR TO WIRE FROM UTILITY SUPPLY POINT TO BUILDING.
- SUPPLY AND INSTALL
 - ONE 103mm RPVC DIRECT BURIED / RGS SURFACE MOUNTED CONDUIT FOR BUILDING POWER SUPPLY FROM THE UTILITY.
 - ONE 53mm RPVC CONDUIT DIRECT BURIED / RGS SURFACE MOUNTED CONDUIT FOR TELUS TELEPHONE CABLES.
 - TWO 53mm RPVC DIRECT BURIED / RGS SURFACE MOUNTED CONDUITS FROM THE WASTE WATER STORAGE TANK TO THE AUDIBLE / VISUAL ALARMS IN THE BUILDING.
- REFER TO CIVIL SITE PLAN FOR CONDUIT LOCATIONS.
- THE CONTRACTOR SHALL READ ALL CONTRACT DOCUMENTS AND COORDINATE WITH TRADES PRIOR TO SUBMISSION OF BID. ENSURE THAT ALL NECESSARY WORKS ARE INCLUDED FOR A COMPLETE FUNCTIONAL INSTALLATION.
- SHOP DRAWINGS SHALL BE SUBMITTED IN FULL DETAIL, AND CLEARLY INDICATING EXACT PRODUCTS, MODELS, FEATURES, CHARACTERISTICS, OPTIONS, ACCESSORIES, AND RATINGS. INCLUDE WIRING DIAGRAMS AND SCHEMATICS. WIRING DIAGRAMS SHOWING INTERCONNECTION OF WORK WITH THE WORK OF OTHER DIVISIONS IS REQUIRED. GENERIC, AMBIGUOUS, OR INCOMPLETE SHOP DRAWINGS ARE SUBJECT TO REJECTION.
- PROVIDE CSA CERTIFIED EQUIPMENT AND MATERIAL.
- WHERE CSA CERTIFIED EQUIPMENT AND MATERIAL IS NOT AVAILABLE, OBTAIN SPECIAL APPROVAL FROM INSPECTION AUTHORITY AND INSTALL SPECIAL APPROVAL LABELS. ENCLOSE SPECIAL APPROVAL DOCUMENTATION IN O&M MANUALS.
- KEEP A SET OF PRINTS ON SITE, UP TO DATE AT ALL TIMES WITH AS-BUILT INFORMATION. RECORD DIMENSIONED LOCATIONS OF UNDERGROUND AND CONCEALED UTILITIES. STAMP SET AND SUBMIT TO OWNER AND CONSULTANT ON COMPLETION.
- PROVIDE OPERATING AND MAINTENANCE DATA INCORPORATED INTO MANUAL.
- INSTRUCT OWNER, CONSULTANT, AND OPERATING PERSONNEL IN OPERATION, CARE AND MAINTENANCE OF SYSTEMS, SYSTEM EQUIPMENT AND COMPONENTS.
- IDENTIFY ELECTRICAL EQUIPMENT WITH LAMACOID NAMEPLATES. COORDINATE NAMES OF EQUIPMENT AND SYSTEMS WITH MECHANICAL

- AND OTHER TRADES. ENSURE MANUFACTURER'S NAMEPLATES, CSA LABELS, AND IDENTIFICATION NAMEPLATES ARE VISIBLE AND LEGIBLE AFTER EQUIPMENT IS INSTALLED.
- FIRE STOP ALL PENETRATIONS IN ASSEMBLIES THAT ARE FIRE, SMOKE, OR TEMPERATURE RATED.
 - ARRANGE FOR ALL CUTTING, PATCHING, AND SEALING, TO BE CARRIED OUT BY THE TRADE QUALIFIED IN THE PRACTICE.
 - ARRANGE FOR TRENCHING, BACKFILL, SUBGRADE RESTORATION, AND SURFACE RESTORATION. BACKFILL IN LIFTS, WITH MECHANICAL COMPACTION.
 - DO NOT INSTALL OUTLETS BACK-TO-BACK IN WALL. ALL NEW OUTLETS ON OPPOSITE SIDES OF PARTITIONS TO BE SEPARATED BY ONE STUD SPACE TO RETAIN SOUND RATING. PACK AROUND OUTLET WITH BATT INSULATION. CAULK AROUND OUTLET TO PREVENT SOUND FLAKING. ALL POWER, TELEPHONE AND DATA OUTLETS TO BE GANGED ON ONE STUD OR HORIZONTAL BAR WHERE THEY ARE INDICATED IN CLOSE PROXIMITY. USE COMBINATION FACEPLATES WHERE POSSIBLE. CHANGE LOCATION OF OUTLETS AT NO EXTRA COST OR CREDIT. PROVIDING DISTANCE DOES NOT EXCEED 3000 mm, AND INFORMATION IS GIVEN BEFORE INSTALLATION OF FINAL WIRING.
 - ELECTRICAL EQUIPMENT SHALL GENERALLY BE INSTALLED AT FOLLOWING HEIGHTS UNLESS INDICATED OTHERWISE ON THE ARCHITECT'S DRAWINGS. COORDINATE ON SITE. NOTIFY OWNER AND CONSULTANT ON ROUGH IN AND PRIOR TO INSTALLATION OF WIRING. RELOCATE WITHIN 3000 mm (10ft) AS REQUESTED.
 - LOCAL SWITCHES: 1400 mm.
 - WALL RECEPTACLES:
 - GENERAL: 350 mm, 1220 mm WHERE ACCESSIBLE TO CHILDREN. ADJUST TO SUIT FURNITURE AND RACEWAYS. MOUNT GENERAL RECEPTACLES AT COMMON HEIGHTS THROUGHOUT AREAS.
 - BELOW DESKS: 300 AFF AND 430 AFF, COORDINATE WITH OWNER.
 - ABOVE TOP OF CONTINUOUS BASEBOARD HEATER: 200 mm.
 - ABOVE TOP OF COUNTERS OR COUNTER SPLASH BACKS: 175 mm.
 - IN MECHANICAL ROOMS: 1400 mm.
 - PANELBOARDS: AS REQUIRED BY CODE OR AS INDICATED.
 - VOICE DATA OUTLETS:
 - GENERAL: 300 mm. ADJUST TO SUIT FURNITURE AND RACEWAYS. MOUNT GENERAL OUTLETS AT A COMMON HEIGHT THROUGHOUT AREAS.
 - BELOW DESKS: 300 AFF AND 430 AFF, COORDINATE WITH OWNER.
 - WALL MOUNTED TELEPHONE OUTLETS: 800 mm.
 - FIRE ALARM STATIONS: 1500 mm.

- FIRE ALARM NOTIFICATION APPLIANCES: 2100 mm.
- ALL WORKS SHALL BE LAID OUT AND ARRANGED IN AN ORGANIZED FASHION, AND COMPLETED WORKS SHALL HAVE A TIDY FINISHED APPEARANCE.
 - CLEAN AND TOUCH UP SURFACES OF SHOP-PAINTED EQUIPMENT SCRATCHED OR MARRED DURING SHIPMENT OR INSTALLATION, TO MATCH ORIGINAL PAINT.
 - BUILDING WIRES SHALL BE STRANDED FOR 10 AWG AND LARGER. MINIMUM SIZE: 12 AWG. COPPER CONDUCTORS SIZE TO CANADIAN ELECTRICAL CODE, WITH 600 V INSULATION OF CHEMICALLY CROSS LINKED THERMOSETTING POLYETHYLENE MATERIAL. RATED RW90. NMD90 SHALL BE COPPER, MIN 12 AWG, WITH XLPE INSULATION, 600 V, AND JACKET. WIRING FOR FIRE ALARM SYSTEM SHALL BE TO ABC AND CEC SECTION 32 WHERE BUILDING WIRE SIZE IS NOT INDICATED SIZE IN ACCORDANCE WITH C22.1.
 - BUILDING WIRES TO BE INSTALLED IN RIGID GALVANIZED STEEL CONDUIT. USE ELECTRICAL METALLIC TUBING EMT WITH WATER TIGHT FITTING ABOVE 2.4m. FLEXIBLE METAL CONDUIT CAN ONLY BE USED FOR FINAL CONNECTIONS AND CANNOT BE INSTALLED THE ENTIRE LENGTH BETWEEN FIXTURES. ONE HOLE ALUMINUM STRAPS TO SECURE SURFACE CONDUITS AND CABLES 50 mm AND SMALLER. TWO HOLE STEEL STRAPS FOR CONDUITS AND CABLES LARGER THAN 50 mm.
 - INSTALL CONDUIT AND CABLE TO CONSERVE HEADROOM. DO NOT PASS CONDUITS THROUGH STRUCTURAL MEMBERS EXCEPT AS INDICATED.
 - PANELBOARDS TO CSA C22.2 NO.29 AND PRODUCT OF ONE MANUFACTURER. SEQUENCE PHASE BUSSING WITH ODD NUMBERED BREAKERS ON LEFT AND EVEN ON RIGHT. COPPER BUS WITH DOUBLE NEUTRAL. TRIM AND FINISH: BAKED ALMOND ENAMEL. BREAKERS WITH THERMAL AND MAGNETIC TRIPPING. LOCK ON DEVICES FOR 20% OF 15 TO 30 A BREAKERS INCLUDING FIRE ALARM CIRCUIT. NAMEPLATE FOR EACH PANELBOARD. COMPLETE CIRCUIT DIRECTORY WITH LEGEND SHOWING LOCATION AND LOAD OF EACH CIRCUIT. MOUNT PANELS SECURE, PLUMB, TRUE, AND SQUARE. INSTALL SURFACE MOUNTED PANELBOARDS ON PLYWOOD BACKBOARDS IN DRY AREAS OR ON CHANNEL SUPPORTS IN OTHER AREAS. LACE BRANCH CIRCUIT WIRING INTO PANELBOARD WITH APPX 600 mm EXTRA WIRE LENGTH. ROUTE TIDILY FOR EASY VISUAL IDENTIFICATION AND TRACING OF CONDUCTORS.
 - 15 A AND 20 A, 120 V, SINGLE POLE, THREE WAY, AND FOUR WAY SWITCHES TO: CSA C22.2 NO.55 AND CSA C22.2 NO.111. MANUALLY OPERATED GENERAL PURPOSE AC SWITCHES WITH: TERMINAL HOLES APPROVED FOR NO. 10 AWG WIRE; SILVER ALLOY CONTACTS; UREA OR MELAMINE MOULDING FOR PARTS SUBJECT TO CARBON TRACKING; SUITABLE FOR BACK AND SIDE WIRING. IVORY TOGGLE. DECORA STYLE. TOGGLE OPERATED FULLY RATED FOR TUNGSTEN FILAMENT AND FLUORESCENT LAMPS, AND UP TO 80% OF RATED CAPACITY OF MOTOR LOADS. SWITCHES OF ONE MANUFACTURER THROUGHOUT PROJECT.

- DUPEX RECEPTACLES, CSA TYPE 5-15R, 125 V, 15 A, AND CSA TYPE 5-20R, 125 V, 20 A, U GROUND, TO: CSA C22.2 NO.42 WITH FOLLOWING FEATURES: IVORY UREA MOULDED HOUSING. SUITABLE FOR NO. 10 AWG FOR BACK AND SIDE WIRING. BREAK OFF LINKS FOR USE AS SPLIT RECEPTACLES. EIGHT BACK WIRED ENTRANCES, FOUR SIDE WIRING SCREWS. TRIPLE WIPE CONTACTS AND RIVETTED GROUNDING CONTACTS. OTHER RECEPTACLES WITH AMPACITY AND VOLTAGE AS INDICATED. RECEPTACLES OF ONE MANUFACTURER THROUGHOUT PROJECT. COVER PLATES FOR WIRING DEVICES TO: CSA C22.2 NO.42.1. COVER PLATES FROM ONE MANUFACTURER THROUGHOUT PROJECT. SHEET STEEL UTILITY BOX COVER FOR WIRING DEVICES INSTALLED IN SERVICE AREAS. STAINLESS STEEL, BRUSHED, 1 mm THICK COVER PLATES FOR WIRING DEVICES MOUNTED IN FINISHED AREAS AND OCCUPIED AREAS. CAST COVER PLATES FOR WIRING DEVICES MOUNTED IN SURFACE MOUNTED FS OR FD TYPE CONDUIT BOXES. WEATHERPROOF DOUBLE LIFT SPRING LOADED CAST ALUMINUM COVER PLATES. COMPLETE WITH GASKETS FOR DUPEX RECEPTACLES IN OUTDOOR AREAS OR AREAS EXPOSED TO HUMIDITY OR MOISTURE. INSTALL SINGLE THROW SWITCHES WITH HANDLE IN "UP" POSITION WHEN SWITCH CLOSED. INSTALL SWITCHES IN GANG TYPE OUTLET BOX WHEN MORE THAN ONE SWITCH IS REQUIRED IN ONE LOCATION. INSTALL RECEPTACLES IN GANG TYPE OUTLET BOX WHEN MORE THAN ONE RECEPTACLE IS REQUIRED IN ONE LOCATION. PROTECT STAINLESS STEEL COVER PLATE FINISH WITH PAPER OR PLASTIC FILM UNTIL PAINTING AND OTHER WORK IS FINISHED. INSTALL SUITABLE COMMON COVER PLATES WHERE WIRING DEVICES ARE GROUPED. DO NOT USE COVER PLATES MEANT FOR FLUSH OUTLET BOXES ON SURFACE MOUNTED BOXES.
- FIXTURES SHALL HAVE BAKED ENAMEL FINISH. CORROSION RESISTANCE CONVERSION COATING FOR OUTDOOR FIXTURES. METAL SURFACES OF LUMINAIRE HOUSING AND REFLECTORS FINISHED WITH HIGH GLOSS BAKED ENAMEL TO GIVE SMOOTH, UNIFORM APPEARANCE. FREE FROM PINHOLES OR DEFECTS. REFLECTOR AND OTHER INSIDE SURFACES FINISHED AS FOLLOWS: WHITE, MINIMUM REFLECTION FACTOR 90%; COLOUR FAST; FILM THICKNESS NOT LESS THAN 0.03 mm AVERAGE AND IN NO AREAS LESS THAN 0.025 mm; GLOSS NOT LESS THAN 80 UNITS AS MEASURED WITH GLOSS METER; WITHSTAND BENDING OVER 12 mm MANDREL WITHOUT SHOWING SIGNS OF CRACKING OR FLAKING UNDER 10 TIMES MAGNIFICATION; HINGED, GASKETTED, LATCHED DOOR. COORDINATE FINAL INSTALLATION LOCATIONS ON SITE. NOTIFY OWNER AND CONSULTANT WHEN LOCATIONS ARE ROUGHED IN BUT PRIOR TO WIRING. RELOCATE WITHIN 10 FEET AS REQUESTED. ALIGN LUMINAIRES MOUNTED IN CONTINUOUS ROWS TO FORM STRAIGHT UNINTERRUPTED LINE. ALIGN LUMINAIRES MOUNTED INDIVIDUALLY PARALLEL OR PERPENDICULAR TO BUILDING GRID LINES.
- BALLASTS FOR FLUORESCENT LAMPS SHALL BE CBM AND CSA CERTIFIED, ENERGY EFFICIENT TYPE, ELECTRONIC, POWERSMART, WITH THERMAL PROTECTION. RFI/EMI SUPPRESSION CIRCUIT. TOTALLY ENCASED. CAPACITOR: THERMALLY PROTECTED.

- OPERATING FREQUENCY OF ELECTRONIC BALLAST: 21 KHZ MINIMUM. BALLAST FACTOR: GREATER THAN 0.90. SOUND RATED: CLASS A. MOUNTING: INTEGRAL WITH LUMINAIRE.
- UNIT EMERGENCY EQUIPMENT SHALL BE TO CSA C22.2 NO.141. OPERATING TIME 60 MIN. BATTERY: SEALED, MAINTENANCE FREE. CHARGER: SOLID STATE, MULTI RATE, VOLTAGE/CURRENT REGULATED, INVERSE TEMPERATURE COMPENSATED, SHORT CIRCUIT PROTECTED WITH REGULATED OUTPUT OF PLUS OR MINUS 0.01V FOR PLUS OR MINUS 10% INPUT VARIATIONS. SOLID STATE TRANSFER CIRCUIT. LOW VOLTAGE DISCONNECT: SOLID STATE, MODULAR, OPERATES AT 80% BATTERY OUTPUT VOLTAGE. SIGNAL LIGHTS: SOLID STATE, FOR 'AC POWER ON'. LAMP HEADS: DUAL, INTEGRAL IN UNIT, 345 DEGREES HORIZONTAL AND 180 DEGREES VERTICAL ADJUSTMENT. LAMP TYPE: QUARTZ HALOGEN, MINIMUM 12 W. CABINET: SUITABLE FOR DIRECT OR SHELF MOUNTING TO WALL. FINISH: BAKED ENAMEL. AUXILIARY EQUIPMENT: TEST SWITCH; SHELF OR BRACKET; CORD AND PLUG CONNECTION FOR AC; RFI SUPPRESSORS; AUTO DIAGNOSTIC TEST. PROVIDE RECEPTACLE.
 - ALL TESTING TO BE COMPLETED TO CSA Z32-09. TEST GROUNDING WITH GROUND LOOP TESTER FOR 1 RECEPTACLE PER CIRCUIT. RESULT TO BE RECORDED.
 - HVAC STARTERS AND ALL WIRING TO BE BY ELECTRICAL CONTRACTOR IN ACCORDANCE WITH CEC.

0	2015NOV04	ISSUED FOR TENDER & CONSTRUCTION	H.M.	R.C.
A	2015/08/28	ISSUED FOR TENDER AND CONSTRUCTION	H.M.	R.C.

No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé
Revision / Révision				
A		A detail number numero de detail	A	
B		B square drawing no. de dessin no.	B/C	
C		C detail sur dessin no.		

Consultant's Name
Nom de l'ingénieur-consultant



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Client/Client

 Parks Canada Agency	L'Agence Parcs Canada
Western and Northern Region	Ouest et Nord du Canada

Project title/Titre du projet

**BAR-U RANCH
WORKSHOP REPLACEMENT**

WATERTON LAKES NATIONAL PARK

Drawing title/Titre du dessin

**ELECTRICAL
SPECIFICATIONS**

Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date
	HOWARD MARIANO	FEB 26, 2015
Designed by/Concept par	Reviewed by/Révisé par	Scale/Echelle
RICHARD COLBECK		AS SHOWN
PWSC Project Manager/Administrateur de Projets TPSC		
Client Acceptance/Acceptation du client		Approved by/Approuvé par
PWSC Project Manager/Administrateur de Projets TPSC		
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
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