

THE FOLLOWING ADDENDUM SUPERCEDES INFORMATION CONTAINED IN DRAWINGS AND SPECIFICATIONS ISSUED FOR THE PROJECT TO THE EXTENT REFERENCED. THIS ADDENDUM FORMS PART OF THE TENDER DOCUMENTS AND IS SUBJECT TO ALL OF THE CONDITIONS SET OUT IN THE CONTRACT CONDITIONS.

This electrical addendum contains three (3) pages, plus thirty (30) pages Electrical Drawings plus eighteen (18) pages June 29 Questions, for a total of fifty-one (51) pages.

Part 1 Bubbles have been drawn around affected areas to indicate revised details

- Revised scale sizes on drawings - 8420,8421,8427
- ATS to MTS on 8/8430 and 9/8430
- Added panel 6A breaker size on 9/8430
- Revised 8425 Keynotes
- Revised 8412 control tripping for XPR-1
- Revised panel 6A sizes 8430
- Revised transformer. Generator grounding details and notes on 8421
- Revised generator transformer from Y-Y to Delta-Y and generator power feeders from 4c to 3c on sheet 8410
- Revised drawing 8433 conductor sizes
- Revised drawing 8426 generator panel note.
- Revised drawings 8420, 8421, 8432 to clearly indicate future equipment not in scope of SES or generator project.

Part 2 Addendum Q/A

- .1 Question: Please confirm we are to provide all protection and metering as well as SCADA system programming to allow for the future 4th generator?

 Refer to sheet 8412 for all included protection for 4th generator. Equipment shown on the control panel and associated wiring and terminal blocks are to be included. The expected installation is to be such that all new field devices in the generator can be brought back to the control panel in SES and connected and with minimal programming the system brought online. The new SCADA system should be scalable such that an additional generator can be brought online with minimal re-coding
- .2 Question: Confirm the panel size, number of breakers and sizing that should be allowed for on panel 2SES-SP-2.

 Panel information have been added to sheet 8425.
- .3 Question: Specification section 26 36 01 references the inclusion of a voltage regulator in the generator control panel. Specification section 26 32 10 requests it as part of the diesel generator supply package. Please confirm that AVR supplied and installed on diesel generator is acceptable.

 AVR on generator is acceptable as long as it can be remotely controlled by the control system.
- .4 Question: Please confirm Automatic Transfer Switches shown on drawing 8430 are Manual Transfer Switches.

 Correct, drawing 8430 revised to indicate this.
- .5 Question: Please confirm on drawing 8430 Panel 6C and 6A are existing and not to be replaced under this scope

 No, these panels are to be replaced. Carry only costs for breakers shown on revised SLD. Panel 6a breaker size has been added to 8430.
- .6 Question 6. Key notes on drawing 8425 indicate that panel board is to come with integrated transfer switch - Please confirm this is not necessary.

Question: Drawing 8423 - keynotes indicate that 3MVA transformer to come with internal oil heater and oil pump. Is it possible to remove this equipment required based on the location and size of this transformer?

Refer to sheet 8423 for revised keynote removing oil pump, and visual inspection window transformer requirements.

- .7 Question Drawing 8423 - keynotes indicate that 3MVA transformer to come visual confirmation window – Please confirm this visual window is not necessary.
Not required, see above.
- .8 Question 9. Drawing 8411 – does not indicate a main breaker for panel 6SES-SP-2 but keynotes on drawing 8425 imply a 400A main breaker for the board is required. Please confirm if a main breaker is required on this board.
6SES-sp-2 does not require an internal main breaker. Panel protection is provided by the 400AF/300AT breaker located in the exterior panel 6SES-SP-0. Refer to sheet 8423 keynote 24
- .9 Question 3. Section 26 32 10 clause 1.5.4.3 – our digital generator set controllers are button operated for run-off-auto and are not available with a key operated switch. It's expected that since the generator sets are housed in key-locked enclosures that this would suffice to allow restricted access to the operation. Also for lock-out protection we recommend removing the battery cable from the batteries. Is this an acceptable deviation?
The generator key switch is not to be located in the generator enclosure but on the control board inside SES, since this is not a lockable enclosure a key switch is required. Shown on sheet 8425 keynote 17.
- .10 Question Please confirm the design intention is to have the Diesel Generator (DG) controllers and load sharing units for the generators provided external to the DG units and not to be mounted on the DG's themselves. Please confirm the intention is also to have the generator main breaker and Automatic Voltage regulators for the generators along with the governors mounted directly on the generators themselves.
DG controller and load shed are to be remotely mounted in control panel in SES. Generator main breaker, regulators to be internal to the generator as long as they accept external control inputs/outputs.
- .11 Question Section 26 32 10 clause 2.3.1.1 – modern diesel engines operate at much higher BMEP's while maintaining transient performance through more precise injection timing and turbocharging. Our proposed engines operate in the BMEP range of about 300-350psi. Is this an acceptable clarification?
This is an acceptable variance. Ensure alternator output power is not to exceed 80% of the generator breaker rating
- .12 Question Section 26 32 10 clause 2.10.6 – pre and post operation turbocharger lubrication is not recommended on MTU S2000 engines. Is this an acceptable clarification?
This is an acceptable variance.
- .13 Question Section 26 32 10 clause 2.11.6.1 - please clarify "15 shock"
Should say 15G shock.
- .14 Question Section 26 32 10 clause 2.11.6.7.1 – diesel prime mover generators are not capable of 10% voltage dip when rated to ISO 8528 standards as earlier referenced. Please see attached sizing report which details the capability of our suggested generator set model to handle a 725kW prime power load. Is the attached performance report acceptable for this project?
. 0-75% Vdip of 13.7% is acceptable.
- .15 Question Section 26 32 10 clause 2.16.1 – fuel tanks cannot be constructed with aluminized or galvanized steel as the coating will flake off and damage the fuel system.
Tank should be exterior corrosion resistant, suitable for installation where sea spray is a regular occurrence, exterior finishes as noted. Suitable for diesel fuel contact
- .16 Question Questions regarding New PSS, Scope for New TCS. See attached marked up documents.

Answers written chronologically from June 29 Questions PDF attached to addendum

- Typo – we are not replacing the PSS in South Side Substation. We are connecting into the existing SES SCADA system.
- Screens are indicated on generator control panel in SES.
- Assume TCS is only going to display information related to the standby system and the remote trip/close load statuses.
- Existing workstations will be located in the SES control room.
- DC Power to be 2C#10. Assume 15A 1P breaker. It is to run the Generator control panel systems if/when both generator and normal power are offline.
- Monitoring Transformer coil temperature and transformer oil level. Will trigger warning/shutdowns when pre-set safety limits are exceeded based on transformer supplier recommended values.
- The High Resistance Grounding System should not be in this specification as there is not such system in the scope of this work.

.17 Question There is a 2" conduit specified, with no wire size or quantity for the DC power supply to the TCS. What is this for? Wire size?

For the service panel connection feeder inside each generator. Size at 4c#6 Cu.

.18 Question Are the breakers to the Load Bank and 6SES-SP-2 equipped with motorized reclosers?

Yes, these breakers are equipped with motorized remote trip/close motors

.19 Question Neutral ground resistors are in the specification, however not shown on the oneline drawing. Are NGR's required?

NGR's are not required.

.20 Question The 12kv Transformer has no protection on the secondary side (12/25kv) until it reaches the 12/25kv switchboard, 28m away. This appears to be contrary to Section 14-100 of the electrical code.

The transformer protection relay XPR-1 should have the ability to open trip the generator breakers, shutting down the system and removing the need for a primary HV circuit breaker, this was not clearly indicated. Refer to sheet 8412 for revised control.

.21 Question Section 26 32 10 2.23.10

Is the panel mentioned the switchboard for paralleling the gensets? I want to confirm if the switchboard need to come to our shop, and have all three gensets wired and tested with the switchgear in place.

The panel is the control panel for the generator system. The control system can be tested without generators running by impressing current, voltage, other input types by simulating desired inputs on the sensors and confirming the system operates as expected.

Part 3 Addendum General Comments

1. Generators to be Tier 2 not Tier 4 as originally indicated
2. Generators to be **725kW** as indicated on Sheet 8410.
3. Added transformer T25/12SES-2 as tag for generator transformer.
4. Added stress cones for T25/12SES-2 HV connection.

END OF ELECTRICAL ADDENDUM NO. 01

Addendum Questions Answered

Chronologically

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 29 23.01 – Digital Metering
- .2 Section 26 29 03 - Control Devices

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International).
 - .1 CSA C22.2 No.14-10, Industrial Control Systems
 - .2 CAN3-C17- latest edition, Alternating - Current Electricity Metering.
- .2 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA ICS 1-2000(R2008), Industrial Control and Systems: General Requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 System riser/block diagram including all hardware, communications links, gateways, converters and computers/PC/PLCs.
 - .2 Software packages, including license certificates/quantities. List all applications to be installed on all computers.
 - .3 Computer/Display Hardware including specifications, monitors, storage devices.
 - .4 Samples of all HMI screens to be developed as well as those that are to be modified.
 - .5 Proposed points list for software level integration to existing and proposed devices included in this contract.
 - .6 Proposed points list for alarming, trending and alerts.
 - .7 Transition procedures for implementing the proposed modifications including procedures for:
 - .1 Transfer, storage and reintegration of existing data.
 - .2 Reconnection/integration of existing metering devices on site to remain.
 - .3 Commissioning and testing of new equipment, programming and logic on a live and operational system on an operating facility.

1.4 QUALITY ASSURANCE

- .1 Conduct tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Submittal Procedures.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 GENERAL SYSTEM DESCRIPTION

What are we replacing as part of the scope of this contract?

The replacement Power System SCADA (PSS) will be a complete replacement of the existing hardware and software of the system currently installed at the South Side Substation. These devices will connect to the existing server(s).

All new metering, protection and control devices shall be implemented with real-time and recorded values automated input/output operations, trend logs, calculations, alarming, monitoring of ancillary inputs, automation, waveform capture and data display.

- .3 The new PSS devices installed in this contract specifically for use with transfer, generator and load control shall be referred to as the Transfer Control System (TCS), but is a fully integrated part of the PSS.
- .4 All existing graphical interface screens currently in use with the existing System shall be modified to correctly show physically and electrically the new electrical distribution equipment. It is the responsibility of the contractor to ensure that all existing functionality is brought forward and replicated in the new PSS interface screens.
 - Provide new graphical interface screens to summarize power system status, generator operation, loadbank system, breaker status, load priorities and position in re-energization sequence.
 - Provide new graphical interface screens for each new protective relay, digital meter or motor control device, including a mimic of the front panel display, readout of all alarms, faults and real-time power data from the device. Operators will be able to remotely reset and control device from this screen.
- .7 Provide fully operation touch screen interface at SES Generator Switchboard. This panel will allow for full access and control of devices in the PSS for remote operation of breakers and devices, and specifically the generator, transfer control and loadbank equipment. This device will be a flush mounted, industrial touch screen computer and function as a full node on the PSS SCADA Ethernet network.

Where is a New PSS screen required? Not on Drawings.

- .8 The existing system has extensive custom programming currently in use for alarming, energy monitoring, revenue billing and trending; integration similar to this shall be provided for all equipment on the PSS SCADA system. Refer also to drawings for layout of relevant existing system, including devices that are to remain in operation. It is the responsibility of the contractor to ensure that all existing functionality is maintained or upgraded to be compatibility in the new Generator Switchboard devices.
- .9 Existing PSS System Arrangement
 - .1 The system consists of dual servers, complete with fully redundant RAID storage arrays. One of these servers is located at the PHS control room, the other at the SES control room. These servers will be configured such that in the event of a server failure, complete control will be brought up on the second server. The database for all historical logging and operational logic will be synchronized at both locations.
 - .2 The digital power meters located in the field will not only monitor standard energy, power quality and breaker status functions, but will also have remote and automated control authority for opening and closing circuit breakers to which they are connected.
 - .3 Monitoring of electrically related parameters, including transformer winding temperature and electrical room temperatures will be input into digital meters for trending and alarming.
 - .4 The PSS will provide automated functionality for control of circuit breakers for load control, power factor, priority loading, etc under certain conditions. These automated functions may not be enabled at the conclusion of this project but must be programmed and fully demonstrated in operation.
 - .5 The PSS will be largely Ethernet based, using direct copper Cat 6 STP (shielded twisted pair) cabling to new devices. New and existing optical fiber cabling will be used to tie into existing equipment on the site, as well as linking in between SES and SSSR.
 - .6 The PSS will include direct connection to protection relays, motor protection and control devices, and other systems from which information will be read using Ethernet based protocols. This data will include real-time power measurements, as well as alarm data, and general data that will be used for trending. All devices will integrate tightly using native protocols and programming languages.
 - .7 The PSS and proposed or installed distribution equipment will provide for real-time visualization of actual power consumption at all key locations of the facility. The Transfer Control System (TCS) will be fully aware of the loads in order to provide predictive engagement of an appropriate level of standby power. The system, via interface with the Pumphouse SCADA and control system, will be aware of site priorities to ensure a reserve power capacity for starting/running particular critical loads (pumps, compressors, cranes, etc.) This data will be gleaned through the digital metering devices, PLC equipment, status and recent historical power demands of the site.
 - .8 When the site is to be power by standby power, a priority sequence of energizing the loads shall be followed, along with a time delay between each load step.

- .9 Upon loss of utility power, all 25kV breakers will open by control of the protective devices on site. An automatic 'repowering' sequence can be triggered manually, or automatically once utility power is restored, bringing loads back on in a priority, controlled basis to ensure that stable power is maintained.
- .10 Existing devices on site include, but are not limited to:
 - .1 Powerlogic 7650
 - .2 Powerlogic 7330
 - .3 Powerlogic 8300
 - .4 PML 3710, 3720
 - .5 PML 7700
 - .6 Allen Bradley PowerLogix PLC
 - .7 Schweitzer Engineering Laboratories Protective Relays, various models.
 - .8 Schneider/Square D moulded case circuit breakers with metering and power factor controllers.
 - .9 Schneider Medium voltage distribution and motor control equipment.

2.2 PSS – SOFTWARE – EXISTING FUNCTIONAL DESCRIPTION

- .1 Existing PSS software is an implementation of Power logic eSCADA and ION EEM. All TCS devices must be implemented into this system.
- .2 General
 - .1 The Power Management Software shall be a web-enabled monitoring system intended to monitor an entire electrical distribution infrastructure, from incoming utility feeds down to low voltage distribution points as well as interfacing with additional automation and control functions.
 - .2 The system shall be designed to monitor and manage energy consumption throughout an enterprise across a network of facilities to improve energy availability and reliability, manage and measure energy consumption and provide trending/alarm for fault identification and resolution.
 - .3 The software shall be a standard product based on a successful, proven software platform.

Key features shall include:

 - .1 Data acquisition for metering devices, sensors, and other intelligent electronic devices.
 - .2 Power Quality analysis (including harmonics, and voltage and current sinusoids).
 - .3 Graphical displays of information.
 - .4 Reporting tools with standard reports.
 - .5 Automated (and manually activated) revenue metering reports for electrical energy and water.
 - .6 Interactive historical data analysis.
 - .7 Power Factor monitoring and control.
 - .8 Load monitoring and control.

- .9 Third Party Device Integration through Modbus RTU and Modbus TCP protocols.
- .10 Support real-time data display and control actions for multiple users for applications such as sub-metering, load monitoring / shedding, real-time pricing and generator control.
- .11 Expansion of system through distributed IO servers.
- .3 Redundancy
 - .1 The PSS will have a layer of redundancy as defined in this section. The redundancy will provide a means to run the PSS software from one of two servers. The redundancy software will determine which server is deemed the most fit to host the PSS software at any given time and run the software from that server.
 - .1 Handled Faults
 - .2 The system shall be capable of smoothly handling faults of the following nature: Network, Disk, Fan, Power supply, Temperature, Internal voltage, Memory, Motherboard, BMC, Processor and issues with Host software.
 - .1 Fault notification
 - .3 In the event of a fault listed above the PSS shall be capable of immediately notifying a pre-registered recipient of the problem.
 - .1 System Uptime
 - .4 The PSS shall have an annual uptime of 99.99%.
- .4 Performance
 - .1 The PSS shall provide communications, view screen and event performance according to the specifications in this section.
 - .2 Real-Time
 - .1 Communications
 - Response Time**
The response time of devices in the PSS will be less than or equal to the values below:
Ethernet Device: 0.5 seconds
Serial Device: 1 second
 - .2 Screens
 - Update Rate**
The update rate of any screen in the system shall be less than or equal to the values below:
Update Rate: 5 seconds
 - Initial Load Time**
The update rate of any screen in the system shall be less than or equal to the values below:
Load Time: 5 seconds
 - Alarming
 - Alarm Processing Time**
The Alarm Processing Time system shall be less than or equal to the values below:
Load Time: 5 seconds

Alarm Notification Time

The Alarm Notification Time system shall be less than or equal to the values below:

Load Time: 10 seconds

- .3 Effect of Off-Line Devices
 - .1 If any device on a serial loop goes off-line for any reason it shall not have any effect on the communications performance of any of the other devices on the same loop.
- .4 Events
 - .1 Data Logs
 - .1 The Data Log Retrieval Time from any device shall be less than one minute.
- .5 Software Components
 - .1 General
 - .1 Software shall expand on existing Powerlogic SCADA and datalogging software, including all required licensing and drivers required.

2.3 PSS SYSTEM – HARDWARE

- .1 TCS SES HMI
 - .1 19" (478 mm) Active matrix LCD TFT LED backlit touchscreen industrial flat screen industrial PC/display) complete with integral LED indicator and piezo alert.
 - .2 Ethernet interface complete with copper to single mode fiber media convertor
 - .3 Power supply for connection to local 120VAC system and UPS.
 - .4 1280x1024 pixels SXGA; 16 million colours.
 - .5 Processor: Core 2 Duo P8400 2.26 GHz 6MB cache.
 - .6 Video Controller: Intel GMA 4500MHD, 384 MB RAM
 - .7 Memory: 4 GB DDR3 RAM; 512kB SRAM.
 - .8 Fan cooled.
 - .9 Solid State, SSD Flash disk with >60GB storage.
 - .10 Touch panel: Analog Resistive.
 - .11 Ports: USB 2.0 on back and front panel; RS232C serial; DVI-I video; Ethernet.
 - .12 Windows 7 64 bit operating system.
 - .13 Flush Mount with NEMA 4X front panel rating.
 - .14 HMI will be configured to display all TCS and PSS screens and all full access and control to PSS operations Password control will be implemented as required.
- .2 Industrial Ethernet Switch
 - .1 Where Ethernet based communications is inside switchgear, control panels or unitized electrical equipment, network cabling shall shielded twisted pair (STP), including all patch cords and terminations.

- .2 Ethernet switches shall be industrial quality, suitable for mounting inside an enclosure.
- .3 Suitable for temperatures from -40 to 85 degree C.
- .4 Fiber uplink ports where noted.
- .5 Rack and surface mount.

2.4

PSS SYSTEM – TCS PROGRAM AND OPERATIONS

.1 General Description

- .1 The PSS is a tightly integrated SCADA and automation system that collects information, provides alarming, trending and data analysis while also provide specific automatic and remote control of power system equipment. Much of the information required for use and decision making by the TCS will come from this existing system. The contractor is expected to provide adequate time to completely familiarize themselves with this system prior to initiating their software and hardware design. A Departmental Representative will arrange for suitable access to required information.
- .2 The TCS will integrate at a software level using ModBUS or similar protocols over Ethernet into new and existing control/protection relays, power system protection relays, generator control systems, air and molded case circuit breakers, power factor controllers, battery chargers, PLC (Programmable Logic Controllers), RID (Remote Input Device) and all existing equipment noted in the drawings.
- .3 The existing system layout drawings are provided, as a key part of this project is the integration of these existing devices into the new TCS including all existing and new control functions, monitoring, trending and recorded data.
- .4 Consistency of GUI between the existing system and the new TCS is important to ensure continuity of operations at the facility as the system is viewed or used by both electrical and non-electrical personnel. Existing screens should be thoroughly reviewed. Contractor shall allow for time to liaise with the Departmental Representative to review requirements, controls and layouts for all screens.
- .5 The existing system has many custom programming elements providing revenue metering, custom alarms, and trending. These must be replicated in the new TCS.
- .6 Operational and programming considerations are following, but the general operating scheme is presented here:
 - .1 The TCS will act as a standby power system transfer, generator and load controller. The system will provide full authority over the open and closed transition operation of the 25kV Generator breaker, DND feeder breaker, BC Hydro breakers 1 and 2, and 25kV bus tie breaker.
 - .2 The system will accommodate the following scenarios:
 - .1 DND feeder – Generator breaker – Open transition
 - .2 DND feeder – Generator breaker – Closed Transition
 - .3 BCH1, 2, Bus tie – Generator breaker – Open transition
 - .4 BCH1, 2, Bus Tie – Generator breaker – Closed Transition

Does the TCS only access and display information as related to the TCS or does the GUI display and control all information on the PSS?

- .3 Where an open transition transfer scheme is required or noted, it shall be facilitate using electrical interlocks. These interlocks will be selectable by using a conceal mechanical switch, that will also enable close transition switching for that particular transfer pair. Note that mechanical key interlocks are in place to prevent simultaneous closing of the DND and BCH 1,2 breakers.
- .4 Transfer Operations – Utility Failure - Open Transition
 - .1 Upon failure of utility power, the existing protection system will automatically open all 25kV circuit breakers. In this situation the generators will be called to start by the transfer controller. The generators will operate as ‘first to the board’ whereby the first generator to attain 60Hz and rated voltage will be the synch source to which all other generators (if required) are to synch to. Once the required number of generators is synronized, the 25kV generator breaker will close. Using a priority and load based sequence (refer to drawings), the loads will be energized along with a prescribed time delay to allow for power to stabilize.
 - .2 Upon return of utility power, and selection of open transition, the transfer controller will monitor for 3 minutes of stable utility power. Once this timer has expired, load breakers still closed will now open simultaneously, followed by the 25kV generator breaker and subsequently the 600V generator breakers.. At this point, the BC Hydro feeder breaker(s) will now be closed, and the open load breakers will be closed as prescribed by the priority sequence noted. Upon completion of cool down time delay, the generators will be shut down
- .5 Transfer Operations – Utility Failure - Closed Transition
 - .1 Upon failure of utility power, the existing protection system will automatically open all 25kV circuit breakers. The generators will be called to start by the transfer controller. The generators will operate as ‘first to the board’ whereby the first generator to attain 60Hz and rated voltage will be the synch source to which all other generators (if required) are to synch to. Once the required number of generators is synchronized, the 25kV generator breaker will close. Using a priority and load based sequence (refer to drawings), the loads will be energized along with a prescribed time delay to allow for power to stabilize.
 - .2 Upon return of utility power the transfer controller will monitor for 3 minutes of stable utility power. Once this timer has expired, load breakers will remain closed and the geneator bus will synchronize with the utility source. Once the synchronizing requirements have been met, the BCH1, 2 breakers will be closed. Load will be shed from the generator(s) to the utility and once below the low power threshold, the 25kV generator breaker will open, and subsequently the 600V generator breakers. Upon completion of cool down time delay, the generators will be shut down.
- .6 The number of generators required to be brought on line at any given time will be based on the following parameters:

- .1 Level of redundancy – a setting on the generator page will allow operators to determine whether an n+1 level of redundancy is required, or a minimal number of generators is acceptable.
- .2 The level of available fuel will be used as a factor for available generators and/or runtime. When an extended runtime is required, the TCS may be configured for minimal loading, no redundancy and therefore maximum runtime on available fuel. The TCS shall provide a constant, real-time predicted available runtime based on the actual available fuel, current (averaged) power levels and empirically derived fuel flows.
- .3 When used in a fully automatic mode, the TCS will determine the optimal number of generators to operate based on an extended runtime or n+1 configuration. The system will utilize pre-failure power levels on all controlled loads to determine the required power level, using prioritized loads for shedding as required. The system will know the current and expected requirements for critical loads including the following:
 - .1 **Main dewatering pumps** – if water level in the dock is between high and low levels, it will be assumed that a dewatering operation is underway. Power capacity will be reserved in the system suitable for starting and running one main dewatering pump (1000HP).
 - .2 **Auxiliary dewatering pumps** – if water level in the dock is at an 'empty' state, it will be assumed that a maintenance dewatering operation may be required, such that the auxiliary dewatering pump may be called to operate. The TCS will reserve suitable capacity for starting and running one auxiliary dewatering pump (250HP).
 - .3 **Travelling cranes** – the digital metering system, using recent loading data, will determine whether any of the three cranes were recently in use pre-failure. The TCS will reserve suitable capacity for starting and running the correct number of cranes based on recent power usage.
 - .4 **Air Compressors** – Usage and demand on the air compressor system will be considered pre-failure and appropriate power reserves will be made in the generator system. The numbers of compressors required can be manually overridden to allow for extended runtime and manual reduction of air demand. The TCS shall reserve suitable capacity based on recent compressor demand information.
 - .5 **Building loads** – Building and infrastructure loads will be provided for based on recent demand data. Time of day will be a consideration and if building loads are low, and it is after normal operational hours, this load may be considered lower priority, but

will be considered high priority during the normal operating hours regardless of load levels. All lifts stations, pump stations and other critical infrastructure loads will be allowed for at all time.

- .6 **Reserve loading** – The TCS will know when any of the ‘reserved’ loads are operating and actively deduct this from the generator capacity in reserve.
- .7 Automatic shedding of loads shall be initiated by the TCS based on available generator capacity, reserve loading and real-time power demands. Shedding of loads will be done on a priority basis such that lowest priority loads are opened first. The TCS shall monitor the real-time demand and make bring on loads as deemed suitable while preserving the required reserve. All load shedding or closing operation will be completed with a suitable damping factor to allow for loads to stabilize so as to allow any further loading decisions to be made.
- .8 Additional generator(s), if available may be brought on line as determined by preset parameters regarding loading, priorities, runtime and redundancy.
- .9 The TCS will be aware of generators that are ‘off’, faulted or out of fuel and adjust available load capacity accordingly. In the event of a fault or fuel depletion condition, additional or alternate generators may be brought line, if available.
- .10 **Load Testing Modes** – The TCS will provide a number of manual, automated and semi-automated modes for testing of the generators and transfer systems.
 - .1 **Manual Single Generator Static Test** – The TCS will provide a mode that will allow for the manual load banking (with the static resistive load bank) of any of the generators. The TCS will always be monitoring for a utility failure and will revert to a full automatic mode in the event of a utility failure. This mode will, by interfacing with the HMI, start one generators, close the generator breaker and engage the load bank. Full monitoring and recording of all operational parameters will be provided for review of data as required.
 - .2 **Multiple Generator Static Test** - The TCS will provide a mode that will allow for the manual load banking (with the static resistive load bank) of any combination of the generators. The TCS will always be monitoring for a utility failure and will revert to a full automatic mode in the event of a utility failure. This mode will, by interfacing with the HMI, start the appropriate generators, allow the generators to synchronize and close to the generator 600V bus and engage the load bank. Full monitoring and recording of all operational parameters will be provided for review of data as required. This mode can be used ensure correct operation of the 600V generator breakers and synchronizer relays.
 - .3 **Multiple Generator Site Test, Closed Transition** - The TCS will provide a mode that will allow for use of the site as a load and for any combination of the generators. The TCS will always be

monitoring for a utility failure and will revert to a full automatic mode in the event of a utility failure. This mode will, by interfacing with the HMI, start the appropriate generators, allow the generators to synchronize and close to the generator 600V bus and synchronize with the utility at the 25kV generator breaker. A closed transition transfer will occur at this time, that will gradually transfer loads to the generator. Once a low load condition is met, the utility circuit breakers will be opened. Note that the transfer of load to generator will be inhibited if the current site loading exceeds the capability of the connected generators. Full monitoring and recording of all operational parameters will be provided for review of data as required. A controlled return to normal state will be initiated upon completion of this test. This mode can be used ensure correct operation of the 600V generator breakers, 25kV generator breaker and synchronizer relays as well as utilizing site loading to suitably load the generator system.

- .4 If the static resistive load bank is in use at the time of a utility failure, the TCS shall immediately shed this load and put the TCS system back into automatic mode.

Part 3 Execution

3.1 INSTALLATION

.1 Existing System

- .1 Review and thoroughly understand all existing programmed logic and installed hardware of the existing digital metering system, including inputs/outputs that are to be read by the TCS system or that shall be read using software protocols.
- .2 New TCS shall be fully operational and commissioned prior to implementing. All transitions or phased cutovers to existing equipment must be approved by the Owner in advance and must be presented as part of the shop drawing submittals. Approaches or methodologies that compromise the safety of operation of the facility, as determined by the Owner, will be rejected.
- .3 All existing functionality will remain in place after the installation of the new TCS. Any modifications to existing equipment, cabling or infrastructure to support the revised system architecture, communications or software requirements is the responsibility of the contractor.
- .4 Upon successful demonstration of the new TCS, all equipment made obsolete and noted for removal in these drawings shall be removed. All digital metering equipment shall be carefully removed and handed over to the Owner in the current operational state that is was in, prior to removal.
- .5 All existing workstations shall be retained, and new client viewing software, complete with all required licenses, shall be installed for correct operation with the new TCS.

.2 New PSS

Where? Not on Drawings

- .1 The new PSS shall be fully tested and commissioned, to that extent possible, prior to arriving on site. This testing will include at a minimum all new switchgear, low voltage distribution and motor controls. The

equipment and networking will be mocked up and all functions demonstrated to the satisfaction of the Departmental Representative. A minimum of 96 hours notice must be provided as to the initiation of this testing.

- .2 Install, test and fully commission all communications cabling to appropriate EIA/TIA Category 6 STP standards prior to connecting to equipment. All communications equipment shall be fully tested and deemed acceptable by manufacturer's representative prior to connecting to PSS.
- .3 All Digital Meters, protection relays, generator/transfer controls, circuit breakers and other devices communicating via Ethernet or serial communications shall be configured to use a protocol or language native to both the field devices and the PSS software. Intermediate protocol or language convertors will not be accepted.
- .4 All PSS communications equipment shall be grouped together and mounted in the Communications closet co-located at each substation. Equipment specific to the TCS and interconnecting within the Generator Switchboard or to generators can reside in the Generator Switchboard. This equipment shall be arranged to be as compact as possible while not reducing access for maintenance, inspections or additions. Connect to a dedicated UPS circuit.
- .5 All existing PSS server equipment is located in the control room co-located at each substation.
- .6 PSS/TCS vendor/integrator/contractor shall provide all required time as need to fully commission, program, and test and demonstrate the complete TCS system to the satisfaction of the Departmental Representative. This work phase shall be undertaken early enough such that unexpected delays do not hinder or delay to completion of the project to the schedule provided. Deployment of additional forces by the aforementioned parties to complete this project in a timely fashion is expected.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at time and check out operation of section.
- .3 Upon completion of sectional test, undertake group testing.
- .4 Check out complete system for operational sequencing.

3.3 CLEANING

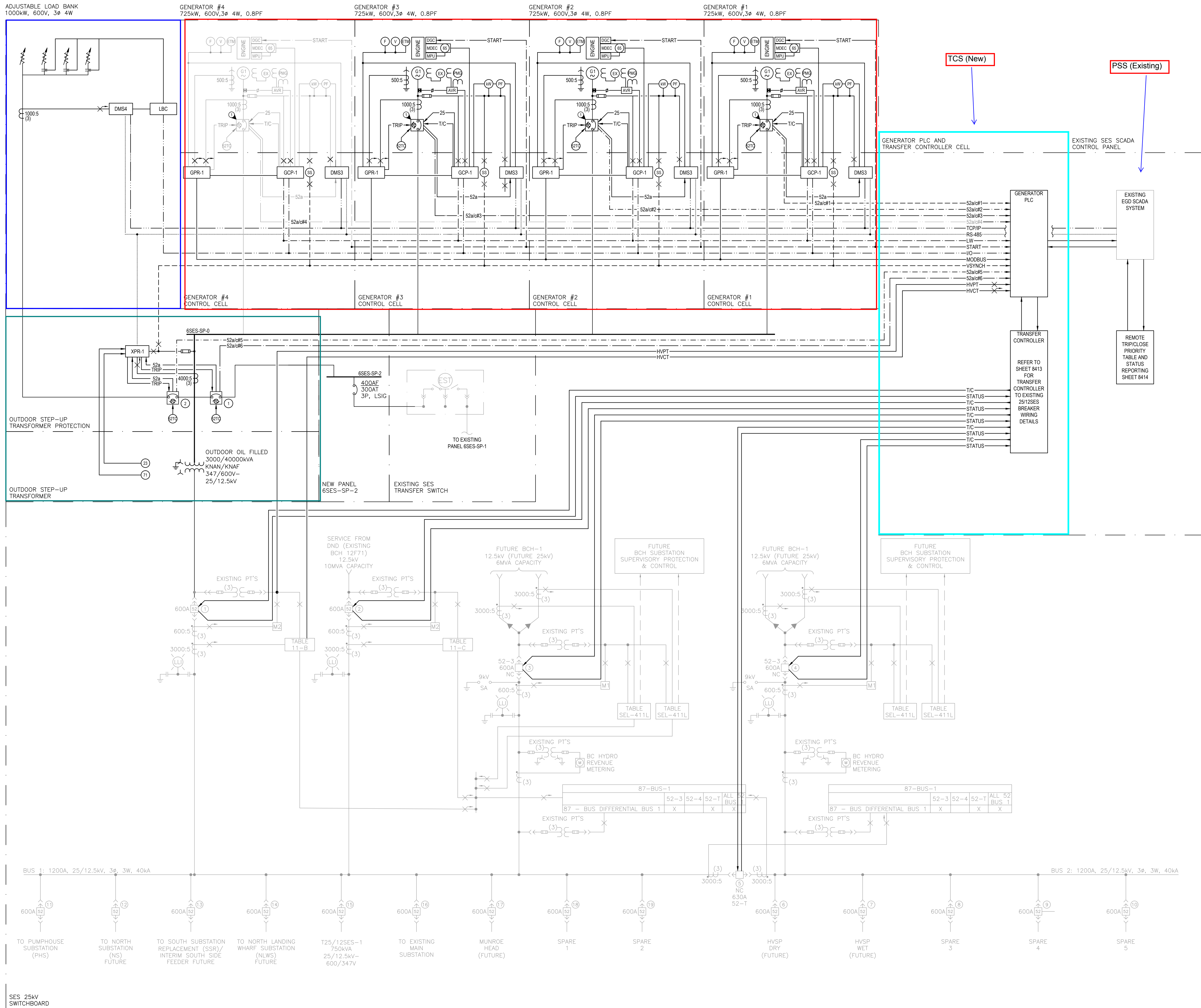
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

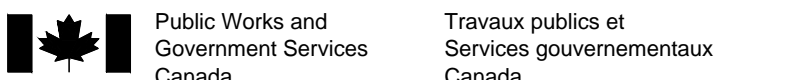
3.4 DEMONSTRATION AND TRAINING

- .1 The vendor of the PSS/TCS software and integrator shall provide a complete and thorough demonstration of all functionality of the PSS/TCS, including full array of operational modes, simulated alarms, trending, viewing of data, fault finding,

- waveform capture, sequence of operations, remote equipment operation and navigation around the TCS software.
- .2 The demonstration will be conducted three times, with approximately six attendees in each session. Documentation and operational guides shall be provided to all attendees.
 - .3 Four training sessions shall be provide for four attendees per group. This training would be performed on site, on the actual equipment being operated on, or in meeting room facilities at the site. These sessions, with a duration of approximately 30 hours, upon completion would provide training to give confidence in the operators with regards to the following tasks:
 - .1 Viewing of data.
 - .2 Viewing and acknowledging alarms.
 - .3 Output data/waveforms/alarms to hardcopy or pdf format for export.
 - .4 Navigation around all standard and custom GUI screens.
 - .5 Viewing data in protection devices, including fault information and waveform captures.
 - .6 Basic data manipulation related to trend data (max, min, plotting graphs, etc.).
 - .7 Use of manual and automatic revenue report generation.
 - .8 Discussion of basic troubleshooting for normal issues or problems.
 - .9 Overview of actual installed hardware, servers and software systems, including specification communications topologies and unique operational arrangements.

END OF SECTION






Public Works and
Government Services
Canada

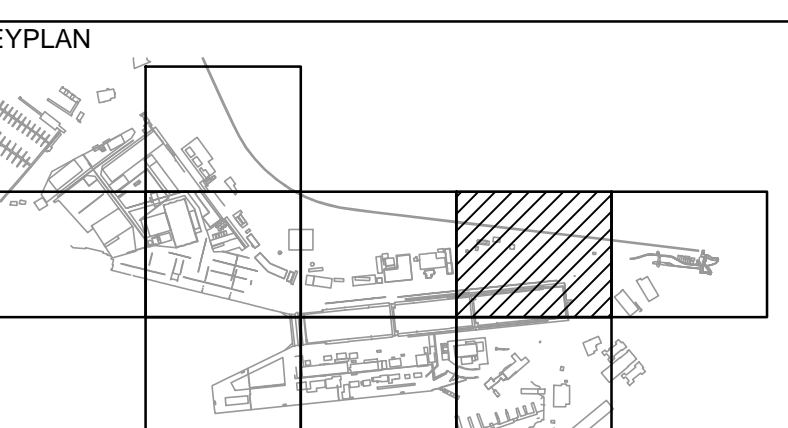
Travaux publics et
Services gouvernementaux
Canada

REAL PROPERTY SERVICES
Pacific Region
SERVICES IMMOBILIERS
Region de Pacifique



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KEYPLAN



5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/	Description/Description	Date/Date

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
I. BARNES

Drawn by/Dessiné par
J. BIELING / S. SEYMOUR

PWSC Project Manager/Administrateur de Projets TPSGC
Jamie LeBlanc

PWSC Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC
Preetipal Paul

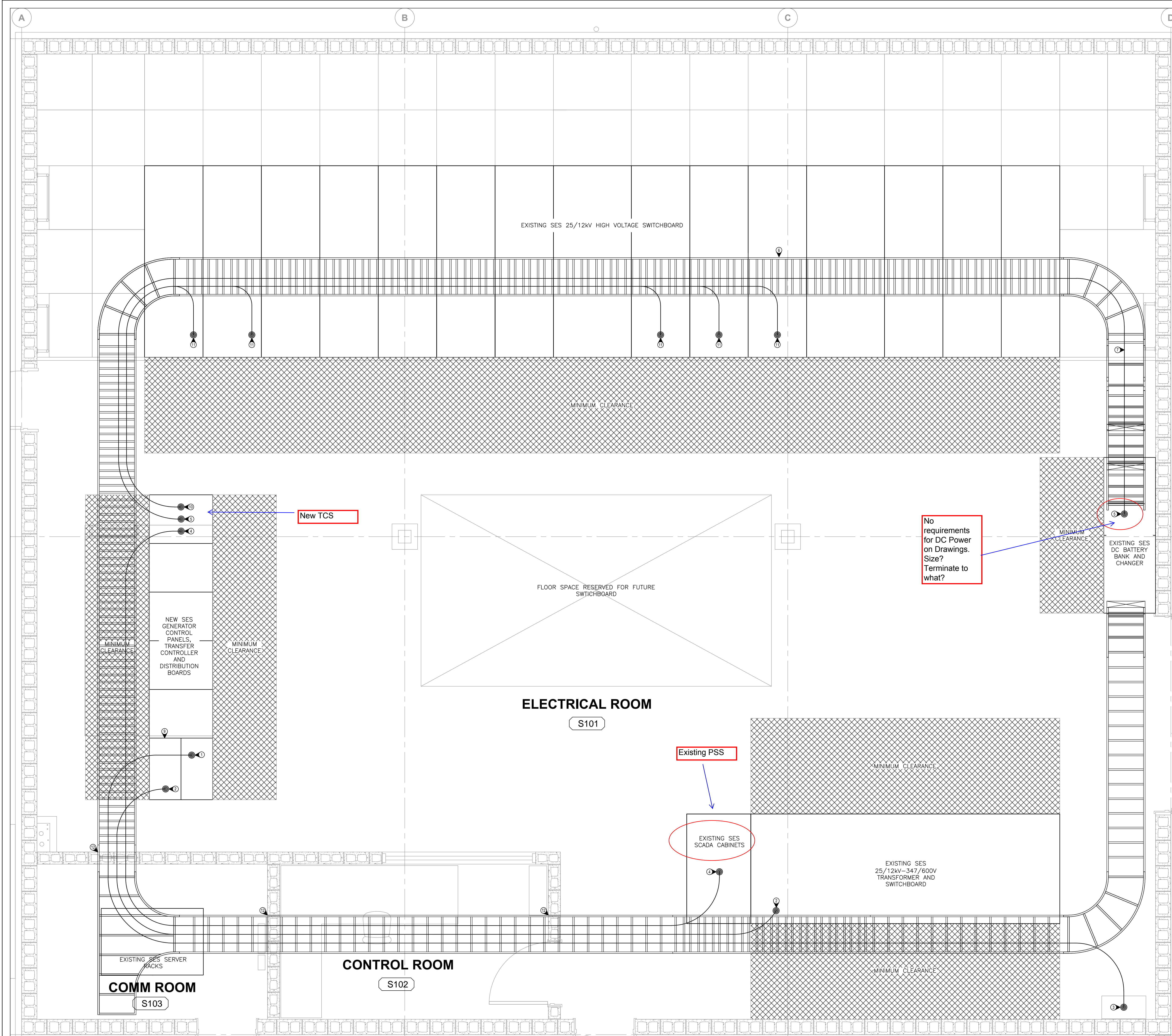
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SERVICE ENTRANCE SUBSTATION
GENERATOR CONTROL AND
PROTECTION

Project No./No. du projet	Sheet/Feuille	Revision no./ La Revision no.
R.057890.003	8412	5

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KEYNOTES

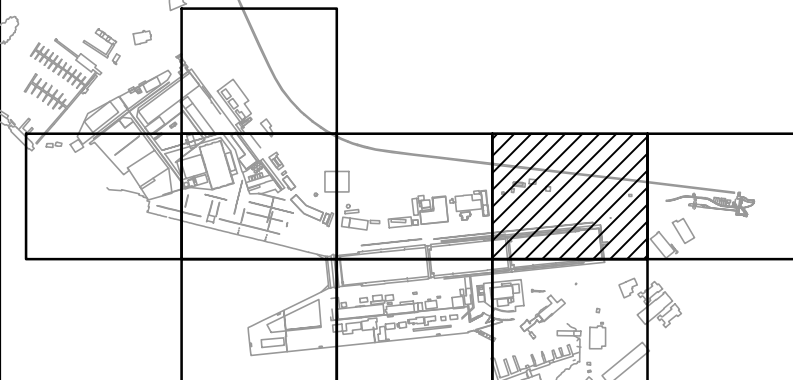
- NEW 1x103mm EMT C. FROM NEW PANEL 6SES-SP-2 TO EXISTING SES 400A TRANSFER SWITCH. REFER TO SINGLE LINE DIAGRAM FOR CONDUCTOR SIZING.
- CONNECT NEW GENERATOR AND EQUIPMENT SERVICE PANEL 2SES-SP-2 VIA NEW 1x53mm EMT C. FROM EXISTING PANEL 2SES-SP-1. PANEL TO BE 200A, 120/208V 3Ø 4W 10kA.
- CONNECT GENERATOR 6SES-SP-2 ATS SERVICE TO EXISTING 600V ATS. DISCONNECT EXISTING MAIN SUBSTATION GENERATOR CABLE AND MAKE SAFE.
- CONNECT GENERATOR CONTROLLER, TRANSFORMER, AND ATS CONTROL AND MONITORING CIRCUITS TO SCADA SYSTEM. REFER TO CONTROL SYSTEM DETAILS FOR ADDITIONAL INFORMATION.
- CONNECT GENERATOR CONTROL BOARD TO EXISTING 125VDC STATION SUPPLY PANEL.
- EXISTING LV AND COMMUNICATION CABLE TRAYS
- 1x53mm TRAY MOUNTED EMT FOR 125VDC SERVICE.
- NOT USED
- CONNECT GENERATOR BATTERY, LIGHTING AND CONTROL POWER TO NEW 2SES-SP-2 POWER PANEL.
- TRANSFER CONTROLLER DIRECT 1x41mm EMT C. CONNECTIONS TO 25kV VIA EXISTING OVERHEAD CABLE TRAYS.
- TRANSFER CONTROLLER DIRECT CONNECTIONS TO 25kV SWITCHBOARD FOR CLOSED AND OPEN TRANSITION SWITCHING SCHEME.
- CORE THROUGH EXISTING CONCRETE BLOCK WALL TO ALLOW TRAY SUSPENDED CONDUIT TO PASS THROUGH WALL. SEAL AND FIRE STOP EDGES OF PENETRATION.

NOTES:

THE SCOPE OF THIS CONTRACT DOES NOT INCLUDE THE CIVIL WORKS FOR IN GROUND CONDUIT OR CONCRETE PAD WORK. DETAILS ONLY SHOWN FOR CO-ORDINATION AND INFORMATION PURPOSES ONLY.



KEYPLAN



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4	ISSUED FOR 100% REVIEW	16/05/05
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0		
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Revision		

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ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

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Jamie LeBlanc

PWSSC Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC

Preetipal Paul

Drawing title/Titre du dessin

SES FLOOR PLAN EXISTING AND NEW EQUIPMENT FOOTPRINTS

Project No./No. du projet

R.057890.003

Sheet/Feuille

8432

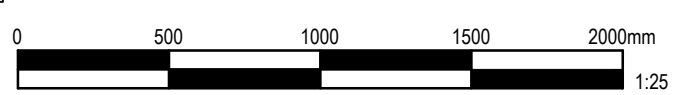
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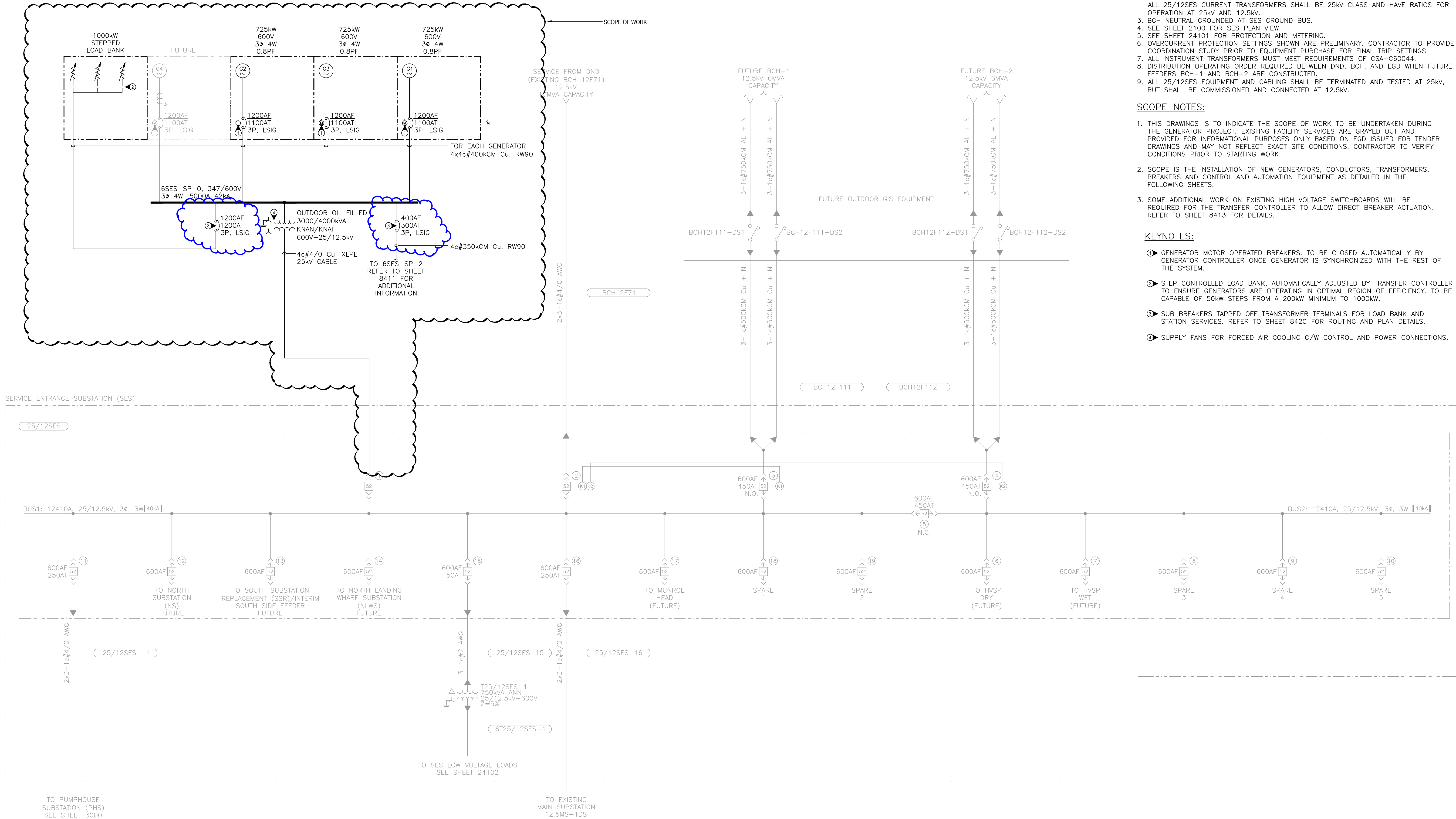
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SES FLOOR PLAN EXISTING AND NEW EQUIPMENT FOOTPRINTS

1/25





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SERVICE ENTRANCE SUBSTATION (SES)
SINGLE LINE DIAGRAM
N.T.S.

GENERAL NOTES:

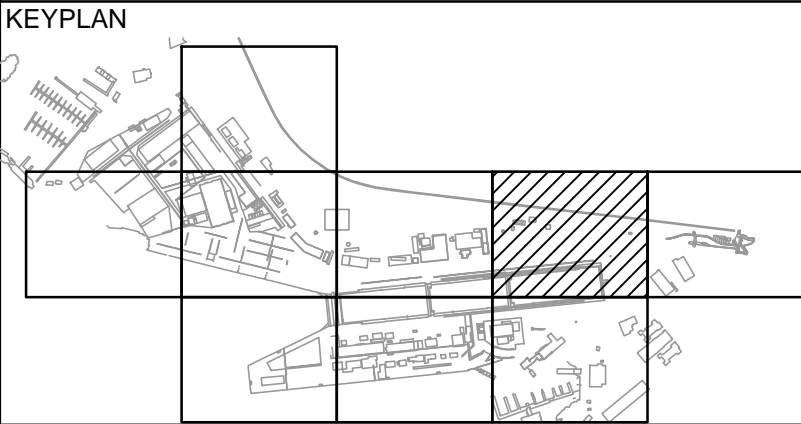
1. ALL HIGH VOLTAGE TRANSFORMERS SHALL BE DUAL PRIMARY WINDING 25/12.5kV.
2. ALL 25/12SES POTENTIAL TRANSFORMERS SHALL BE RATED FOR 25kV (14.4kV L-N).
3. ALL 25/12SES CURRENT TRANSFORMERS SHALL BE 25kV CLASS AND HAVE RATIOS FOR OPERATION AT 25kV AND 12.5kV.
4. BCH NEUTRAL GROUNDED AT SES GROUND BUS.
5. SEE SHEET 24101 FOR PROTECTION AND METERING.
6. OVERCURRENT PROTECTION SETTINGS SHOWN ARE PRELIMINARY. CONTRACTOR TO PROVIDE COORDINATION STUDY PRIOR TO EQUIPMENT PURCHASE FOR FINAL TRIP SETTINGS.
7. ALL INSTRUMENT TRANSFORMERS MUST MEET REQUIREMENTS OF CSA-C60044.
8. DISTRIBUTION OPERATING ORDER REQUIRED BETWEEN DND, BCH, AND EGD WHEN FUTURE FEEDERS BCH-1 AND BCH-2 ARE CONSTRUCTED.
9. ALL 25/12SES EQUIPMENT AND CABLING SHALL BE TERMINATED AND TESTED AT 25kV, BUT SHALL BE COMMISSIONED AND CONNECTED AT 12.5kV.

SCOPE NOTES:

1. THIS DRAWINGS IS TO INDICATE THE SCOPE OF WORK TO BE UNDERTAKEN DURING THE GENERATOR PROJECT. EXISTING FACILITY SERVICES ARE GRAYED OUT AND PROVIDED FOR INFORMATIONAL PURPOSES ONLY BASED ON EGD ISSUED FOR TENDER DRAWINGS AND MAY NOT REFLECT EXACT SITE CONDITIONS. CONTRACTOR TO VERIFY CONDITIONS PRIOR TO STARTING WORK.
2. SCOPE IS THE INSTALLATION OF NEW GENERATORS, CONDUCTORS, TRANSFORMERS, BREAKERS AND CONTROL AND AUTOMATION EQUIPMENT AS DETAILED IN THE FOLLOWING SHEETS.
3. SOME ADDITIONAL WORK ON EXISTING HIGH VOLTAGE SWITCHBOARDS WILL BE REQUIRED FOR THE TRANSFER CONTROLLER TO ALLOW DIRECT BREAKER ACTUATION. REFER TO SHEET 8413 FOR DETAILS.

KEYNOTES:

- 1. GENERATOR MOTOR OPERATED BREAKERS, TO BE CLOSED AUTOMATICALLY BY GENERATOR CONTROLLER ONCE GENERATOR IS SYNCHRONIZED WITH THE REST OF THE SYSTEM.
- 2. STEP CONTROLLED LOAD BANK, AUTOMATICALLY ADJUSTED BY TRANSFER CONTROLLER TO ENSURE GENERATORS ARE OPERATING IN OPTIMAL REGION OF EFFICIENCY. TO BE CAPABLE OF 50kW STEPS FROM A 200kW MINIMUM TO 1000kW.
- 3. SUB BREAKERS TAPPED OFF TRANSFORMER TERMINALS FOR LOAD BANK AND STATION SERVICES. REFER TO SHEET 8420 FOR ROUTING AND PLAN DETAILS.
- 4. SUPPLY FANS FOR FORCED AIR COOLING C/W CONTROL AND POWER CONNECTIONS.



5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
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1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
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Revision/ Revision	Description/Description	Date/Date
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Client/client

**ESQUIMALT
GRAVING DOCK**

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

Project title/Titre du projet

**825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK**

**EGD-SSES
STANDBY POWER
GENERATION SYSTEM**

Consultant Signature Box Only

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Drawn by/Dessine par
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Preetipal Paul

Drawing title/Titre du dessin

**SERVICE ENTRANCE SUBSTATION
HIGH VOLTAGE
SINGLE LINE DIAGRAM**

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.057890.003	8410	5

Part 1 General**1.1 SECTION INCLUDES**

- .1 Equipment, fabrication and installation for ground fault protection.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 26 05 00 - Common Work Results – Electrical
- .3 Section 26 12 16 - Dry Type, Medium Voltage Transformers
- .4 Section 26 23 00 - Low Voltage Switchgear.

1.3 REFERENCES

- .1 CAN/CSA-C22.2 No. 144, Ground Fault Circuit Interrupters.

1.4 SUBMITTALS

- .1 Refer to Section 01 33 00 - Submittal Procedures.
- .2 Submit product data and shop drawings.
- .3 Submit test report for field testing of ground fault equipment to Departmental Representative and a certificate that system as installed meets criteria specified.

Part 2 Products**2.1 EQUIPMENT**

- .1 Ground fault monitoring and protection equipment as indicated: components of one manufacturer.

2.2 480 V HIGH-RESISTANCE GROUNDED SYSTEM (GFM)

- .1 Provide a ground fault monitoring alarm and protection system on 480 V, 3-phase, 3-wire high-resistance grounded system.
 - .1 Unit shall be self-contained, mounted inside the low voltage switchgear section, in a fully enclosed metal compartment. Coordinate space requirements for GFM directly with the manufacturer of switchgear. GFM shall be factory integrated with switchgear assembly prior to arrival on site.
 - .2 A neutral grounding resistor (NGR) rated for continuous duty with 375°C temperature rise over 40°C ambient, at maximum 5 A, a pulsing system for fault tracing, and zero sequence CT for ground fault monitoring.
 - .3 The NGR elements shall be of nickel chromium wire, wound onto high quality porcelain cores. Resistance shall vary less than 10% throughout the temperature range.
 - .4 An alarm resistor unit for connection to the main 480 V system.
 - .5 Toroidal zero sequence current sensors as indicated, with a window opening sized for actual conductors used in transformer.
 - .6 Rack mounted monitoring system with a control module, test module and minimum of six feeder module spaces. Provide the required number of feeder modules as shown, plus one spare feeder module in each rack.

No, NGR on oneline.
Are they required?

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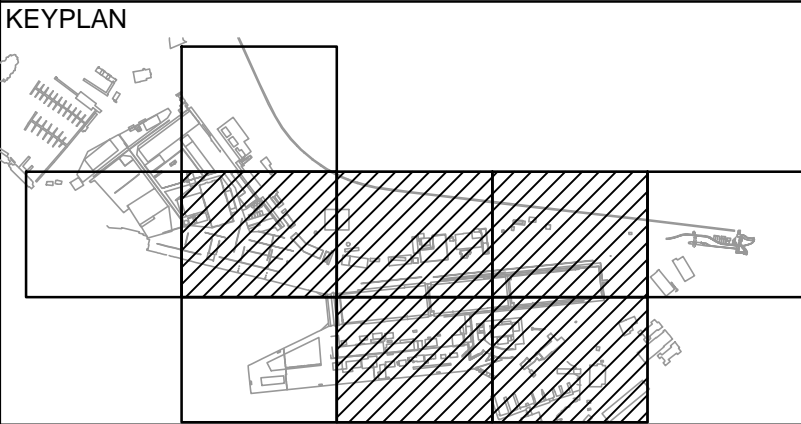
EGD-SSES

STANDBY POWER GENERATION SYSTEM

DRAWING NO. DRAWING TITLE
8000 SERIES – ESQUIMALT GRAVING DOCK EGD–SSES STANDBY POWER GENERATION SYSTEM

ELECTRICAL

8408	COVER
8409	ELECTRICAL SYMBOL LEGEND
8410	SERVICE ENTRANCE SUBSTATION HIGH VOLTAGE SINGLE LINE DIAGRAM
8411	SERVICE ENTRANCE SUBSTATION LOW VOLTAGE SINGLE LINE DIAGRAM
8412	SERVICE ENTRANCE SUBSTATION GENERATOR CONTROL AND PROTECTION
8413	SERVICE ENTRANCE SUBSTATION TRANSFER CONTROLLER CONNECTION DETAILS
8414	ESQUIMALT GRAVING DOCK LOAD CONTROL PRIORITY TABLE
8420	SERVICE ENTRANCE SUBSTATION STANDBY POWER SYSTEM SITE PLAN
8421	GENERATOR TRANSFORMER GROUNDING LAYOUT (EXISTING)
8422	SERVICE ENTRANCE SUBSTATION DUCT ENTRY CROSS–SECTIONS (EXISTING)
8423	SERVICE ENTRANCE SUBSTATION GENERATOR TRANSFORMER PLAN AND ELEVATION DETAILS
8424	SERVICE ENTRANCE SUBSTATION LOAD BANK ELEVATION AND DETAILS
8425	SERVICE ENTRANCE SUBSTATION GENERATOR POWER AND CONTROL BOARD DETAILS
8426	SERVICE ENTRANCE SUBSTATION GENERATOR ENCLOSURE ELEVATIONS AND DETAILS
8427	EGD TOWABLE GENERATOR ELEVATIONS AND DETAILS
8430	EGD TOWABLE GENERATOR CONNECTION LOCATIONS AND DETAILS
8431	EGD TOWABLE GENERATOR CONNECTION BOX LOCATION PHOTOS
8432	SES FLOOR PLAN EXISTING AND NEW EQUIPMENT FOOTPRINTS
8433	DUCT BANK CROSS–SECTION DETAILS (EXISTING)
8450	SERVICE ENTRANCE SUBSTATION HIGH VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8451	SERVICE ENTRANCE SUBSTATION LOW VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8452	PUMPHOUSE SUBSTATION HIGH VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8453	PUMPHOUSE SUBSTATION LOW VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8454	SOUTH SIDE SUBSTATION REPLACEMENT HIGH VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8455	SOUTH SIDE SUBSTATION REPLACEMENT LOW VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8456	MAIN SUBSTATION SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8457	OLD PUMPHOUSE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8458	NORTH LANDING WHARF SUBSTATION SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8459	OLD SOUTH SIDE SUBSTATION HIGH VOLTAGE SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)
8460	EXISTING STANDBY POWER SYSTEM SINGLE LINE DIAGRAM (FOR INFORMATION ONLY)



6	ISSUED FOR ADDENDUM	16/06/30
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**ESQUIMALT
GRAVING DOCK**

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

Project title/Titre du projet

**825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK**

**EGD-SSES
STANDBY POWER
GENERATION SYSTEM**

Consultant Signature Box Only

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Drawn by/Dessiné par
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PWGSC Project Manager/Administrateur de Projets TPSGC
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Preetipal Paul

Drawing title/Titre du dessin

COVER


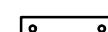










































































Project No./No. du projet	Sheet/Feuille	Revision no./ La Revision no.
R.057890.003	8408	5

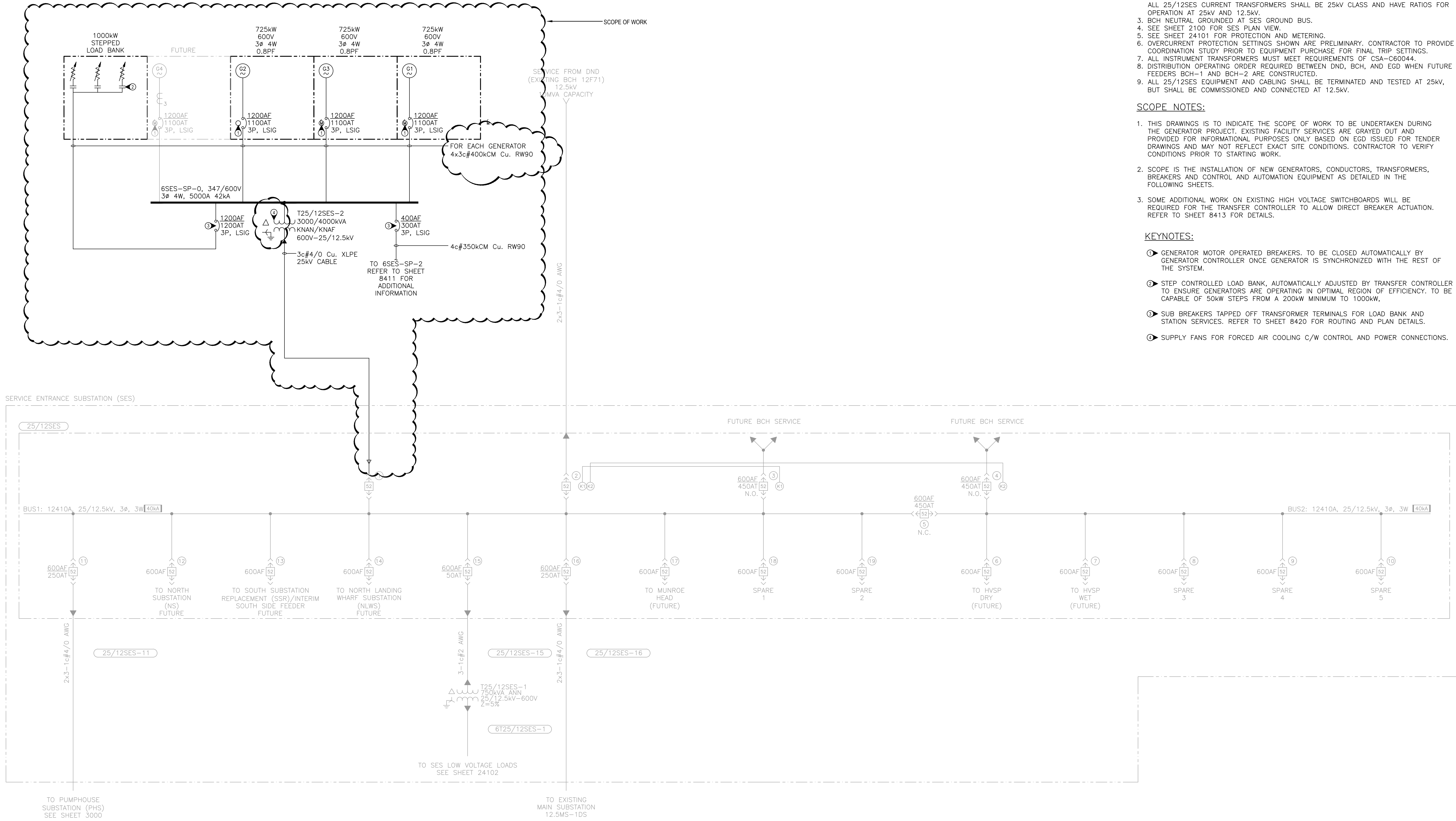


LEGEND - SINGLE LINE & SCHEMATIC DIAGRAMS					
NOT ALL SYMBOLS MAY APPEAR ON DRAWINGS					
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	H.V. CABLE STRESS CONE TERMINATION		HAND-OFF-AUTO 3 POSITION, 2 POLE, SHOWN IN 'HAND' POSITION		PANEL A
	CABLE SIDE		TWO POSITION SELECTOR SWITCH SHOWN IN 'LOCAL' POSITION		FLOAT SWITCH
	INCOMING UTILITY CONNECTION		KEYSWITCH		ULTRASONIC HEAD
	ULTIMATE AVAILABLE FAULT LEVEL (RMS SYM)		SPEED SWITCH		RADIO ANTENNA
	PRESENT AVAILABLE FAULT LEVEL (RMS SYM)		EMERGENCY STOP		METAL OXIDE VARISTOR
	SHORT CIRCUIT RATING OF EQUIPMENT		PUSHBUTTON - NORMALLY CLOSED MOMENTARY		RECTIFIER
	LV CIRCUIT BREAKER (MOLDED CASE)		PUSHBUTTON - NORMALLY OPEN MOMENTARY		THYRISTOR GENERAL
	LV CIRCUIT BREAKER (DRAWOUT)		N.O. DELAYED CLOSING AFTER ENERGIZATION OF ACTUATING COIL		BATTERY
	INSULATED CASE CIRCUIT BREAKER		N.C. DELAYED CLOSING AFTER ENERGIZATION OF ACTUATING COIL		GROUND
	ELECTRICALLY OPERATED FOR REMOTE OR LOCAL (MANUAL) TRIP AND CLOSE		N.O. DELAYED CLOSING AFTER DE-ENERGIZATION OF ACTUATING COIL		1 CONDUCTOR
	BREAKER AUX CONTACTS BREAKER KEY INTERLOCK (# INDICATES KEY MATCH)		N.C. DELAYED CLOSING AFTER DE-ENERGIZATION OF ACTUATING COIL		1 CONDUCTOR + NEUTRAL
	BREAKER DESIGNATION e.g. 52-71 TRIP 500A PROTECTION (OPERATIVE CIRCUIT) BREAKER TRIP UNIT RATING (NOTE 2)		LEVEL SWITCH - CLOSSES ON FALLING LEVEL		1 NEUTRAL
	DRAWOUT CELL		LEVEL SWITCH - CLOSSES ON RISING LEVEL		2 CONDUCTORS
	HV CIRCUIT BREAKER (DRAWOUT) LETTER DESIGNATIONS IF USED: OCB: OIL CIRCUIT BREAKER SF6: SF6 VAC: VACUUM R: RECLOSER		LEVEL SWITCH - OPENS ON RISING LEVEL		2 CONDUCTORS + NEUTRAL
	LIGHTNING ARRESTER/SURGE ARRESTER		TEMPERATURE SWITCH - CLOSSES ON RISING TEMPERATURE		3 CONDUCTORS
	POWER DISCONNECT SWITCH		TEMPERATURE SWITCH - OPENS ON RISING TEMPERATURE		3 CONDUCTORS + NEUTRAL
	LOAD BREAK SWITCH		PRESSURE SWITCH - CLOSSES ON RISING PRESSURE		PORTABLE CABLE WITH SEPARABLE CONNECTORS
	FUSED CUTOUT (POLE MOUNTED)		PRESSURE SWITCH - OPENS ON RISING PRESSURE		EYS SEAL
	FUSED SWITCH		FLOW SWITCH - CLOSSES ON INCREASING MATERIAL FLOW		STUB-OUT FOR CONDUIT, OR INSULATED END FOR SPARE CABLE OR CONTROL WIRING
	EARTHING/SAFETY GROUNDING SWITCH		FLOW SWITCH - OPENS ON INCREASING MATERIAL FLOW		TRANSFORMER
	LIVE LINE INDICATOR		LIMIT SWITCH - NORMALLY OPEN		AUTO TRANSFORMER
	AUTOMATIC TRANSFER SWITCH		LIMIT SWITCH - NORMALLY CLOSED		REACTOR
	MANUAL TRANSFER SWITCH		LIMIT SWITCH - NORMALLY CLOSED HELD OPEN		REACTOR (ALTERNATE SYMBOL)
	CONTROL FUSE		LIMIT SWITCH NORMALLY OPEN HELD CLOSED		FIELD WINDING
	INDICATING INSTRUMENT: V = VOLTMETER A = AMMETER Hz = FREQUENCY METER kW = KILOWATT METER SS = SYNCHROSCOPE		LIMIT SWITCH MAINTAINED NORMALLY OPEN		POTENTIAL TRANSFORMER
	VS = VOLT METER SWITCH AS = AMMETER SWITCH		LIMIT SWITCH MAINTAINED NORMALLY CLOSED		CURRENT TRANSFORMER
	TRANSDUCER		FOOT SWITCH - DEPRESS TO CLOSE		ZERO SEQUENCE CURRENT TRANSFORMER
	CONVERTER		FOOT SWITCH - DEPRESS TO OPEN		TEST LINK/SWITCH/BLOCK (1-LINE DIAGRAM)
	INVERTER		RELAY COIL WITH INHIBIT		TEST LINK (WIRING DIAGRAM)
	REDUCED VOLTAGE STARTER		RELAY COIL OR CONTACTOR COIL		600V BUSDUCT
	VARIABLE FREQUENCY DRIVE		N.O. CONTACT - OPEN WHEN RELAY DE-ENERGIZED		MECHANICAL INTERLOCK
	INTEGRATING/RECORDING/MAX. DEMAND INSTRUMENT: kWd = KILOWATT DEMAND METRE kVAR = KILOVOLT AMPERE RECTIVE METRE ET = ELAPSED TIME (OR HOUR METRE) Ad = AMMETER DEMAND METRE		N.C. CONTACT - CLOSED WHEN RELAY DE-ENERGIZED		ELECTRICAL AND/OR MECHANICAL INTERLOCK
	DIGITAL METERING SYSTEM POWER METER TYPE 1		DEVICE/AUXILIARY CONTACT (N.O. or a)		CABLE LABELS
	DIGITAL METERING SYSTEM POWER METER TYPE 2		DEVICE/AUXILIARY CONTACT (N.C. or b)		MAGNETIC PICKUP UNIT
	DIGITAL METERING SYSTEM REVENUE CERTIFIED METER		FORM-C CONTROL CONTACT		GENERATOR PERMANENT MAGNET EXCITER FIELD
	UTILITY POWER METER		N.O. CONTACT (ALTERNATE) OR DISCONNECT SWITCH		GENERATOR EXCITER FIELD
	SLIP RING		N.C. CONTACT (ALTERNATE)		GENERATOR DIGITAL METERING SYSTEM
	CAPACITOR		RESISTANCE TEMPERATURE DETECTOR		LOAD BANK CONTROLLER
	AC MOTOR (20 DESIGNATES HP)		RESISTOR (GENERAL)		LOAD BANK DIGITAL METERING SYSTEM
	AC MOTOR (GENERAL)		NEUTRAL GROUNDING RESISTOR		ELECTRICALLY INTERLOCKED TO PREVENT BOTH BREAKERS BEING CLOSED SIMULTANEOUSLY
	DC MOTOR (GENERAL)		SHUNT		TRANSFORMER PROTECTIVE RELAY TYPE 1
	AC GENERATOR SET		RESISTOR (ALTERNATE SYMBOL)		OPTO-ISOLATED FREQUENCY SENSOR
	DC GENERATOR (OR EXCITER)		HEATER		
	CONTACTOR MAIN CONTACTS		COIL/SERIES MAGNETIC OVERLOAD DEVICE/SOLENOID		
	VACUUM CONTACTOR		INDICATOR LIGHT		
			PLUG CONNECTOR (CONTROL CCTS); STAB CONNECTOR OR DRAWOUT CONTACTS (PWR CCTS)		
			MULTI FUNCTION PROTECTION RELAY		
			THERMAL OVERLOAD DEVICE		
			VT TEST SWITCH		
			CT SHORTING TYPE TEST SWITCH		
			GENERATOR CONTROL PANEL TYPE 1		
			GENERATOR PROTECTIVE RELAY TYPE 1		
			DIGITAL GENERATOR CONTROLLER		
			MASTER DIGITAL ENGINE CONTROLLER		

LEGEND - LAYOUT DRAWINGS

NOT ALL SYMBOLS MAY APPEAR ON DRAWINGS. SOME SYMBOLS MAY ALSO APPEAR ON SINGLE LINE AND SCHEMATIC DRAWINGS

SYMBOL	DESCRIPTION
LIGHTING:	
	LUMINAIRE
	SUSPENDED LUMINAIRE
	CEILING MOUNTED LUMINAIRE
	WALL MOUNTED LUMINAIRE
	LUMINAIRE ON EMERGENCY 24hr CIRCUIT
	BOLLARD/POST TOP LUMINAIRE
	POLE MOUNTED LUMINAIRES
	DIRECTIONAL LUMINAIRE
	SINGLE POLE TOGGLE SWITCH, GANGED AS SHOWN. LETTERS, WHERE SHOWN, DENOTE SWITCHING
	SINGLE POLE TOGGLE SWITCH MODIFIERS AS FOLLOWS: 2 - TWO POLE 3 - THREE WAY 4 - FOUR WAY WP - WEATHER PROOF XP - EXPLOSION PROOF P - C/W PILOT LIGHT K - KEY OPERATED D - DOOR OPERATED M - MOTOR STARTER MC - MOMENTARY CONTACT, 3-POSITION
	LOW VOLTAGE SWITCH
	DIMMER SWITCH
	3 WAY DIMMER SWITCH
	PHOTO ELECTRIC CELL
EMERGENCY LIGHTING:	
	EXIT SIGN C/W ARROWS AS SHOWN
	EMERGENCY LIGHT BATTERY UNIT, WATTAGE AS SHOWN
	REMOTE EMERGENCY HEADS
GROUNDING:	
	GROUND ROD
	GROUND ROD IN ACCESSIBLE BOX
	END-TO-END GROUND CONNECTION POINT
	X-CONNECTION (GROUNDING)
	T-CONNECTION (GROUNDING)
	GROUNDING PLATE (CAST FLUSH IN CONCRETE)
	WELDED OR EXOTHERMIC END CONNECTION (GROUNDING)
	GROUNDING END CONNECTION WITH CABLE LUG, CLAMP CONNECTOR OR OTHER MECHANICAL CONNECTOR BOLTED TO EQUIPMENT
POWER:	
	MOTOR STARTER
	MAGNETIC MOTOR STARTER
	NON-FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	COMBINATION MAGNETIC STARTER/DISCONNECT SWITCH
	INDOOR SERVICE POLE
	MOTOR CONNECTION
	SURFACE MOUNTED POWER PANEL
	RECESSED/FLUSH MOUNTED POWER PANEL
	PANEL DESIGNATION
	DISTRIBUTION PANEL DESIGNATION
SECURITY:	
	MOTION SENSOR
	CLOSE CIRCUIT TELEVISION CAMERA
	DOOR CONTACT
	ELECTRIC STRIKE
	CARD READER
	REQUEST-TO-EXIT SENSOR
COMMUNICATIONS:	
	TELEPHONE OUTLET
	DATA OUTLET
	COMBINATION DATA/TEL OUTLET C/W 2 DATA & 1 TEL UNLESS OTHERWISE INDICATED
	INTERCOM
	MICROPHONE OUTLET
	CEILING MOUNTED HORN
	WALL MOUNTED HORN
	DUAL COMPARTMENT RACEWAY C/W OUTLETS AS INDICATED
	CEILING MOUNTED FIRE ALARM/PAGING SPEAKER
	WALL MOUNTED FIRE ALARM/PAGING SPEAKER
	CLOCK C/W MASTER CLOCK WIRING AND 120V RECEPTACLE
	SURFACE MOUNTED COMMUNICATIONS PANEL
	RECESSED/FLUSH MOUNTED COMMUNICATIONS PANEL
RECEPTACLES AND OUTLETS:	
	DUPLEX RECEPTACLE
	5-20R (15/20A) DUPLEX RECEPTACLE
	4-PLEX RECEPTACLE
	SINGLE RECEPTACLE
	GROUND FAULT INTERRUPTER RECEPTACLE
	CEILING MOUNTED JUNCTION BOX
	WALL MOUNTED JUNCTION BOX
	MECHANICAL EQUIPMENT CONNECTION
	SPECIAL PURPOSE RECEPTACLE
	SPECIAL PURPOSE OUTLET
	MOTORIZED DAMPER
FIRE ALARM:	
	FIRE ALARM PULL STATION
	FIRE ALARM BELL
	FIRE ALARM STROBE
	COMBINATION HEAT/SMOKE DETECTOR
	FIRE ALARM ZONE ISOLATION MODULE
SITE PLAN:	
	EQUIPMENT CONNECTION AS NOTED ON DRAWING
	HIGH VOLTAGE UNDERGROUND CHAMBER OR BOX
	LOW VOLTAGE UNDERGROUND CHAMBER OR BOX
	COMMUNICATIONS UNDERGROUND CHAMBER OR BOX
	RSC RIGID STEEL CONDUIT



1
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SERVICE ENTRANCE SUBSTATION (SES)
SINGLE LINE DIAGRAM
N.T.S.

GENERAL NOTES:

1. ALL HIGH VOLTAGE TRANSFORMERS SHALL BE DUAL PRIMARY WINDING 25/12.5kV.
2. ALL 25/12SES POTENTIAL TRANSFORMERS SHALL BE RATED FOR 25kV (14.4kV L-N).
3. ALL 25/12SES CURRENT TRANSFORMERS SHALL BE 25kV CLASS AND HAVE RATIOS FOR OPERATION AT 25kV AND 12.5kV.
4. BCH NEUTRAL GROUNDED AT SES GROUND BUS.
5. SEE SHEET 2100 FOR SES PLAN VIEW.
6. SEE SHEET 24101 FOR PROTECTION AND METERING.
7. OVERCURRENT PROTECTION SETTINGS SHOWN ARE PRELIMINARY. CONTRACTOR TO PROVIDE COORDINATION STUDY PRIOR TO EQUIPMENT PURCHASE FOR FINAL TRIP SETTINGS.
8. ALL INSTRUMENT TRANSFORMERS MUST MEET REQUIREMENTS OF CSA-C60044.
9. DISTRIBUTION OPERATING ORDER REQUIRED BETWEEN DND, BCH, AND EGD WHEN FUTURE FEEDERS BCH-1 AND BCH-2 ARE CONSTRUCTED.
10. ALL 25/12SES EQUIPMENT AND CABLING SHALL BE TERMINATED AND TESTED AT 25kV, BUT SHALL BE COMMISSIONED AND CONNECTED AT 12.5kV.

SCOPE NOTES:

1. THIS DRAWING IS TO INDICATE THE SCOPE OF WORK TO BE UNDERTAKEN DURING THE GENERATOR PROJECT. EXISTING FACILITY SERVICES ARE GRAYED OUT AND PROVIDED FOR INFORMATIONAL PURPOSES ONLY BASED ON EGD ISSUED FOR TENDER DRAWINGS AND MAY NOT REFLECT EXACT SITE CONDITIONS. CONTRACTOR TO VERIFY CONDITIONS PRIOR TO STARTING WORK.
2. SCOPE IS THE INSTALLATION OF NEW GENERATORS, CONDUCTORS, TRANSFORMERS, BREAKERS AND CONTROL AND AUTOMATION EQUIPMENT AS DETAILED IN THE FOLLOWING SHEETS.
3. SOME ADDITIONAL WORK ON EXISTING HIGH VOLTAGE SWITCHBOARDS WILL BE REQUIRED FOR THE TRANSFER CONTROLLER TO ALLOW DIRECT BREAKER ACTUATION. REFER TO SHEET 8413 FOR DETAILS.

KEYNOTES:

- 1. GENERATOR MOTOR OPERATED BREAKERS, TO BE CLOSED AUTOMATICALLY BY GENERATOR CONTROLLER ONCE GENERATOR IS SYNCHRONIZED WITH THE REST OF THE SYSTEM.
- 2. STEP CONTROLLED LOAD BANK, AUTOMATICALLY ADJUSTED BY TRANSFER CONTROLLER TO ENSURE GENERATORS ARE OPERATING IN OPTIMAL REGION OF EFFICIENCY. TO BE CAPABLE OF 50kW STEPS FROM A 200kW MINIMUM TO 1000kW.
- 3. SUB BREAKERS TAPPED OFF TRANSFORMER TERMINALS FOR LOAD BANK AND STATION SERVICES. REFER TO SHEET 8420 FOR ROUTING AND PLAN DETAILS.
- 4. SUPPLY FANS FOR FORCED AIR COOLING C/W CONTROL AND POWER CONNECTIONS.

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KEYPLAN

6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/ Revision	Description/Description	Date/Date

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD - VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
I. BARNES

Drawn by/Dessiné par
J. BIELING / S. SEYMOUR

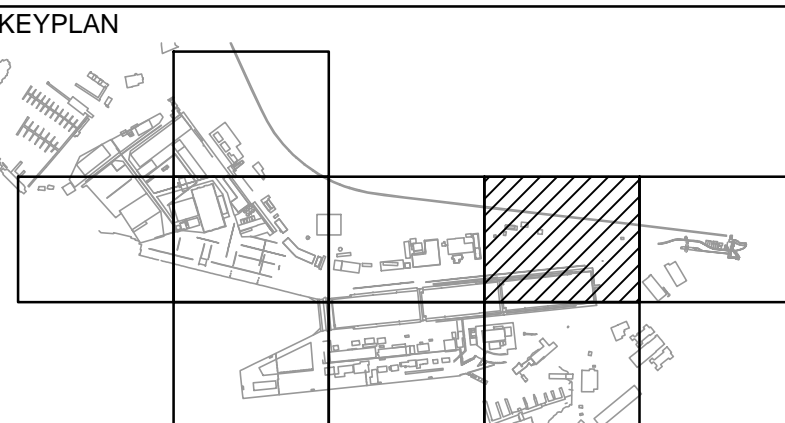
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Preetipal Paul

Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION
HIGH VOLTAGE
SINGLE LINE DIAGRAM

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.057890.003	8410	5



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
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1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/ Revised	Description/Description	Date/Date

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

Project title/Titre du projet

**825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK**

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

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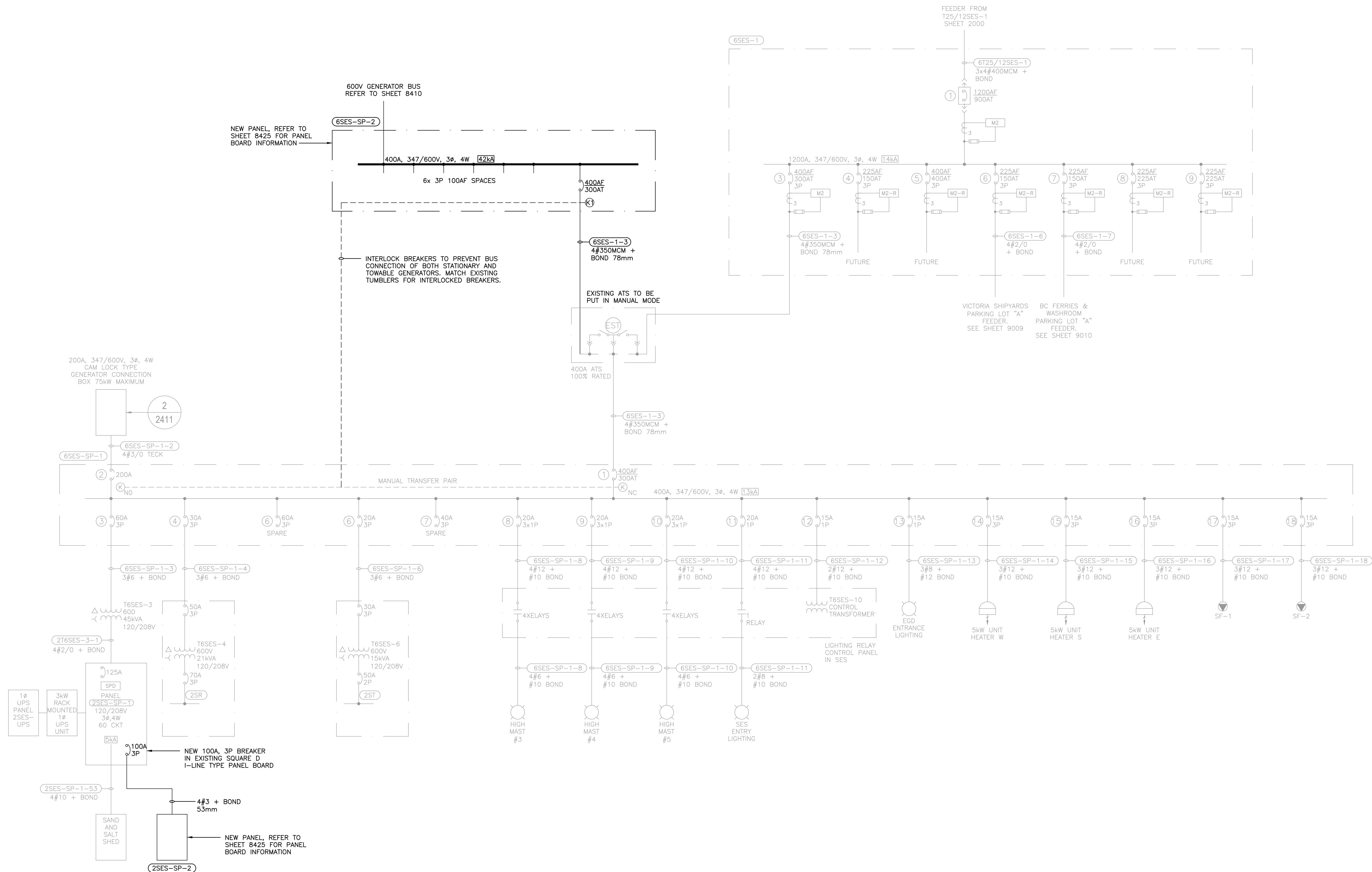
PWGSC Project Manager/Administrateur de Projets TPSGC

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Gestionnaire régionale, Services d'architectural et de génie, TPSG
Preetipal Paul

Drawing title/Titre du dessin

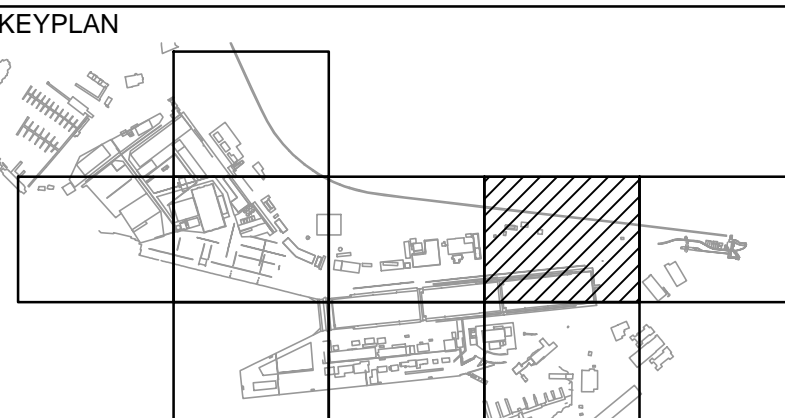
SERVICE ENTRANCE SUBSTATION LOW VOLTAGE SINGLE LINE DIAGRAM

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1 SERVICE ENTRANCE SUBSTATION
LOW VOLTAGE SINGLE LINE DIAGRAM
N.T.S.



Client/client

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

25 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

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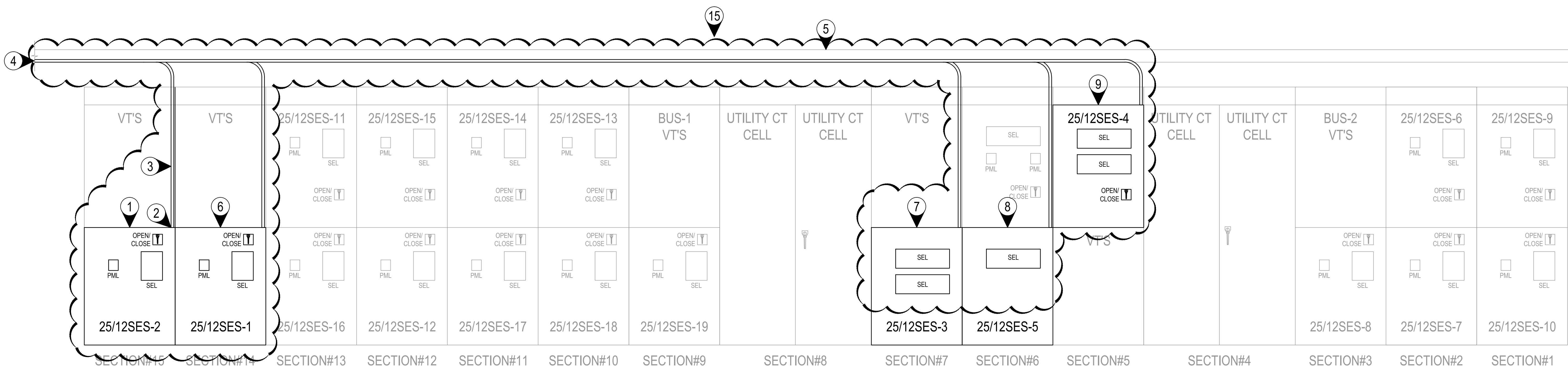
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Jamie LeBlanc

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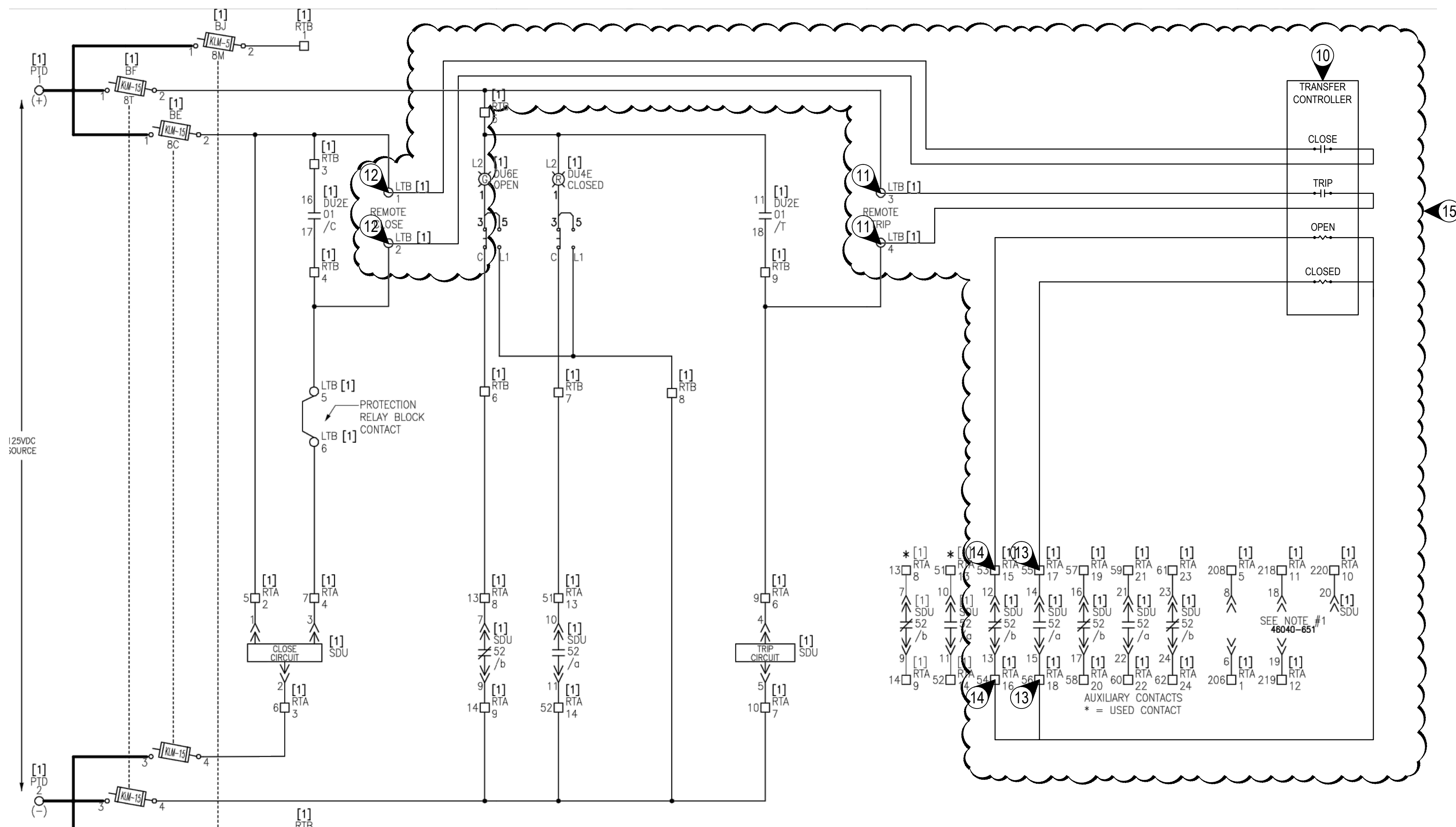
Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION TRANSFER CONTROLLER CONNECTION DETAILS

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
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 SERVICE ENTRANCE SUBSTATION
 25/12SES HIGH VOLTAGE SWITCHBOARD WIRING
 N.T.S.



2
8413

SERVICE ENTRANCE SUBSTATION
25kV BREAKER TYPICAL WIRING DIAGRAM
N.T.S.

KEYNOTES

- ① 25/12SES-1 GENERATOR BREAKER LOCATION IN EXISTING SES 25KV SWITCHBOARD. TO BE WIRED DIRECTLY INTO TRANSFER CONTROLLER AS PART OF CLOSED TRANSITION SWITCHING SCHEME. REFER TO TYPICAL WIRING DIAGRAM FOR WIRING ONTO BREAKER TRIP/CLOSE AND OPEN/CLOSED STATUS CONTACTS.
- ② EXTEND NEW 1X27MM EMT CONTROLS CONDUIT INTO EXISTING HV BREAKER CONTROL COMPARTMENT.
- ③ EXTEND NEW 1X27MM EMT CONTROLS CONDUIT INSIDE EXISTING HV BREAKER COMPARTMENT FROM OVERHEAD EXISTING CABLE TRAY.
- ④ NEW CONDUITS FROM NEW GENERATOR CONTROLLER BOARD VIA MOUNTED BELOW EXISTING OVERHEAD CABLE TRAYS.
- ⑤ EXISTING OVERHEAD CABLE TRAY FOR CONDUIT ROUTING. ENSURE NEW CONDUITS ARE SUITABLY GROUNDED AND BONDED AND THAT BENDING RADII ARE MAINTAINED WHEN ENTERING/EXITING TRAY.
- ⑥ 25/12SES-2 EGD-ND INCOMING FEED TO SES. TO BE CONNECTED INTO TRANSFER CONTROLLER. WHILE THIS SERVICE IS ACTIVE SYSTEM CAN OPERATE AS PART OF AN OPEN OR CLOSED TRANSITION SWITCHING SCHEME. REFER TO TYPICAL WIRING DIAGRAM FOR WIRING ONTO BREAKER TRIP/CLOSE AND OPEN/CLOSED STATUS CONTACTS.
- ⑦ 25/12SES-3 EGD-BCH-1 INCOMING FEED TO SES BUS-1. TO BE WIRED DIRECTLY INTO TRANSFER CONTROLLER AS PART OF AN OPEN OR CLOSED TRANSITION SWITCHING SCHEME. REFER TO TYPICAL WIRING DIAGRAM FOR WIRING ONTO BREAKER TRIP/CLOSE AND OPEN/CLOSED STATUS CONTACTS.
- ⑧ 25/12SES-5 BUS-1 TO BUS-2 THE BREAKER. TO BE WIRED DIRECTLY INTO TRANSFER CONTROLLER AS PART OF AN OPEN OR CLOSED TRANSITION SWITCHING SCHEME. REFER TO TYPICAL WIRING DIAGRAM FOR WIRING ONTO BREAKER TRIP/CLOSE AND OPEN/CLOSED STATUS CONTACTS.
- ⑨ 25/12SES-4 EGD-BCH-2 INCOMING FEED TO SES BUS-2. TO BE WIRED DIRECTLY INTO TRANSFER CONTROLLER AS PART OF AN OPEN OR CLOSED TRANSITION SWITCHING SCHEME. REFER TO TYPICAL WIRING DIAGRAM FOR WIRING ONTO BREAKER TRIP/CLOSE AND OPEN/CLOSED STATUS CONTACTS.
- ⑩ NEW GENERATOR TRANSFER CONTROLLER FOR OPEN AND CLOSED TRANSITION TRANSFER SCHEMES. TO DIRECTLY CONTROL BREAKERS 25/12SES-1 TO 25/12SES-5 VIA DIRECT CONNECTION TO BREAKER CONTROL AND STATUS CONTACTS. REMAINING BREAKERS AROUND SITE TO BE CONTROLLED VIA EXISTING SCADA SYSTEM FOR AUTOMATIC LOAD CONTROL BASED ON SITE PRIORITIES. TYPICAL CONNECTION FOR A SINGLE HV BREAKER SHOWN.
- ⑪ DIRECTLY WIRE TRANSFER CONTROLLER TRIP OUTPUT TO REMOTE TRIP CONTACTS ON HV BREAKER. TYPICAL CONNECTION FOR A SINGLE HV BREAKER SHOWN.
- ⑫ DIRECTLY WIRE TRANSFER CONTROLLER CLOSE OUTPUT TO REMOTE CLOSE CONTACTS ON HV BREAKER. TYPICAL CONNECTION FOR A SINGLE HV BREAKER SHOWN.
- ⑬ DIRECTLY WIRE TRANSFER CONTROLLER BREAKER OPEN STATUS INPUT TO AUXILIARY BREAKER CONTACTS. TYPICAL CONNECTION FOR A SINGLE HV BREAKER SHOWN.
- ⑭ DIRECTLY WIRE TRANSFER CONTROLLER BREAKER CLOSED STATUS INPUT TO AUXILIARY BREAKER CONTACTS. TYPICAL CONNECTION FOR A SINGLE HV BREAKER SHOWN.
- ⑮ EXTENT OF NEW WORK IN EXISTING EQUIPMENT



GENERAL NOTES:

THIS TABLE ASSUMES THE FOLLOWING CONDITIONS:

- THAT ALL MAIN BREAKERS AUTOMATICALLY OPEN DURING A LOSS OF SES UTILITY POWER EVENT.
- NO OTHER GENERATORS ARE CONNECTED TO THE SYSTEM.
- BREAKERS ARE OPERATED VIA THEIR DEDICATED SCADA METERS VIA ETHERNET/FIBRE COMMUNICATIONS.

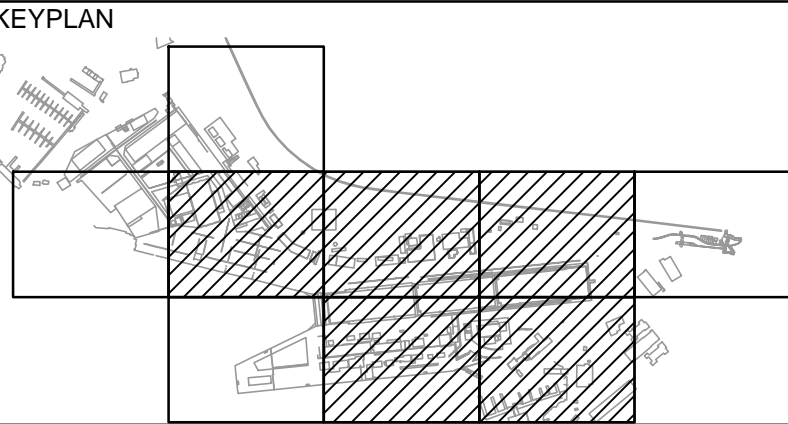
TABLE NOTES:

- LETTERS INDICATE ELECTRICAL INTERLOCK BETWEEN BREAKERS TO PREVENT SIMULTANEOUS OPERATION. A BREAKER WITH "A,B,C" UNDER THE ELECTRICALLY INTERLOCKED COLUMN WOULD BE PREVENTED FROM CLOSING IF A BREAKER MARKED UNDER THE ELECTRICALLY INTERLOCKED COLUMN 'A', 'B' OR 'C' WAS CLOSED. THIS IS TO PREVENT CIRCULAR FEEDS OR ACCIDENTAL ENERGIZATION BY TWO SOURCES.
- NUMBERS INDICATE LOAD SERVICE PRIORITY, WITH LOAD '1' BEING CRITICAL SYSTEMS AND DESCENDING IN IMPORTANCE. '0' LEVEL SYSTEM ARE THOSE WHICH ARE NOT TO BE ENERGIZED BY THE AUTOMATIC SYSTEM.
- ALL LOAD PRIORITIES TO BE CONFIRMED BY DEPARTMENTAL REPRESENTATIVE DURING SHOP DRAWING AND COMMISSIONING STAGES.
- ALL BREAKERS INDICATED ON THIS TABLE HAVE AN EXISTING DEDICATED SCADA METER. ALL METERS WILL REQUIRE RECONFIGURATION OF EXISTING PROGRAMMING TO ALLOW THEM TO BE USED FOR REMOTE OPEN/CLOSE OF BREAKERS VIA LOAD CONTROL SYSTEM. THE ONLY METERS THAT WILL NOT BE USE ARE THOSE WHO ARE DIRECTLY CONNECTED TO THE TRANSFER CONTROLLER. (25/12SES-1 TO 25/12SES-5)

BUILDING NAME	DISTRIBUTION	BREAKER ID	BREAKER DESCRIPTION	ELECTRICALLY INTERLOCKED	LOAD CONTROL PRIORITY	COMMENTS	
SERVICE ENTRANCE SUBSTATION	25/12SES	25/12SES-1	EMERGENCY GENERATORS	A,B,C	DIRECT CONNECTION	GENERATORS ARE TO BE PROGRAMMED FOR BREAK BEFORE MAKE STYLE OPERATIONS WHILE EXISTING SERVICE FROM DND IS IN USE (INTERLOCK 'A'). GENERATORS ARE INTENDED TO ONLY PROVIDE POWER TO DOCK SERVICES AND NOT TO HV SHIP/SHORE CONNECTIONS AND WILL ONLY OPERATE ONCE THE TIE BREAKER IS OPEN (INTERLOCK 'B'). ONCE THE NEW HYDRO SERVICE IS IN OPERATION THE SYSTEM WILL BE AN CLOSED TRANSITION STYLE, BUT IN THE EVENT OF A LOSS OF MAINS POWER EVENT WILL ONLY OPERATE ONCE THE NEW HYDRO CONNECTIONS ARE OPEN CIRCUITED (INTERLOCK 'C'). THEY ARE TO BE OPERATED DIRECTLY VIA TRANSFER CONTROLLER INTERFACING WITH THE BREAKERS NOT VIA SCADA.	
		25/12SES-2	DND SERVICE	A	DIRECT CONNECTION		
		25/12SES-3	HYDRO SERVICE #1	C	DIRECT CONNECTION		
		25/12SES-4	HYDRO SERVICE #2	C	DIRECT CONNECTION		
		25/12SES-5	TIE BREAKER	B	DIRECT CONNECTION		
		25/12SES-6	HVSP (DRY)		1		CRITICAL LOAD - FOR OPERATION OF A SINGLE 1000 HP PUMP OR AIR COMPRESSOR.
		25/12SES-7	HVSP (WET)		3		
		25/12SES-8	SPARE #3		1		CRITICAL LOAD - FOR OPERATION OF AIR COMPRESSOR.
		25/12SES-9	SPARE #4		3		
		25/12SES-10	SPARE #5		1		CRITICAL LOAD - SES BUILDING SERVICES
		25/12SES-11	PUMPHOUSE SUBSTATION		1		CRITICAL LOAD - FOR OPERATION OF A SINGLE CRANE.
		25/12SES-12	NORTH SUBSTATION		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-13	SOUTH SUBSTATION REPLACEMENT		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-14	NORTH LANDING WHARF SUBSTATION		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-15	T25/12SES-1 SERVICE (600V STEP DOWN)		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-16	MAIN SUBSTATION		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-17	MUNROE HEAD		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-18	SPARE #1		0		FUTURE - NO CURRENT CONNECTION
		25/12SES-19	SPARE #2		0		FUTURE - NO CURRENT CONNECTION
	6SES-1	6SES-1-1	MAIN BREAKER		1	CRITICAL LOAD - SES BUILDING SERVICES	
		6SES-1-3	6SES-SP-1 XFER SWITCH		1	CRITICAL LOAD - SES BUILDING SERVICES	
		6SES-1-4	FUTURE		0	FUTURE - NO CURRENT CONNECTION	
		6SES-1-5	FUTURE		0	FUTURE - NO CURRENT CONNECTION	
		6SES-1-6	PARKING LOT 'A' KIOSK		0		
		6SES-1-7	PARKING LOT 'A' WASHROOM		0		
		6SES-1-8	FUTURE		0	FUTURE - NO CURRENT CONNECTION	
		6SES-1-9	FUTURE		0	FUTURE - NO CURRENT CONNECTION	
		6SES-SP-1	6SES-SP-1-1	MAIN BREAKER	D,K	1	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH TEMPORARY GENERATOR AND STANDBY POWER SYSTEM (INTERLOCK 'D'). INTERLOCKED TO PREVENT DUAL PATH ELECTRICAL CONNECTION TO 6SES-SP-1 CRITICAL LOAD - SES BUILDING SERVICES. (INTERLOCK 'L')
	6SES-SP-2	6SES-SP-2-2	TEMPORARY GENERATOR BREAKER	D,L	1		
		6SES-SP-2		K,L	0	OPTIONAL FEED ALLOWING BYPASS OF T6SES-1	
	PUMPHOUSE SUBSTATION	25/12PHS	25/12PHS-1	PHS MAIN BREAKER		1	CRITICAL LOAD - FOR OPERATION OF A SINGLE 1000 HP PUMP OR AIR COMPRESSOR.
			25/12PHS-2	PHS T25/12PHS-2 SERVICE (600V STEP DOWN)		1	CRITICAL LOAD - PHS BUILDING SERVICES
			25/12PHS-3	PHS T25/12PHS-1 SERVICE (240V STEP DOWN)		1	CRITICAL LOAD - FOR OPERATION OF A SINGLE 1000 HP PUMP OR AIR COMPRESSOR.
			25/12PHS-4	SPARE #1		0	FUTURE - NO CURRENT CONNECTION
			25/12PHS-5	SPARE #2		0	FUTURE - NO CURRENT CONNECTION
		2.4PHS	2.4PHS-1	MAIN BREAKER	J	1	CRITICAL LOAD - FOR OPERATION OF A SINGLE 1000 HP PUMP OR AIR COMPRESSOR.
			2.4PHS-2	T6PHS-1 BACKFEED SERVICE (600V STEP UP)	J,N	0	INTERLOCKED TO PREVENT BACKFEED ONTO 25/12PHS BUS FROM TEMPORARY GENERATOR CONNECTION (INTERLOCK 'J'). INTERLOCKED TO PREVENT DUAL PATH ELECTRICAL CONNECTION TO 6PHS-SP-1 (INTERLOCK 'N').
			2.4PHS-3	MCC#1	H	0	INTERLOCKED TO PREVENT OPERATION OF BOTH MCC'S AS LOAD WOULD EXCEED GENERATOR SIZES.
			2.4PHS-4	MCC#2	H	1	CRITICAL LOAD - FOR OPERATION OF A SINGLE 1000 HP PUMP OR AIR COMPRESSOR.
		6PHS-1	6PHS-1-1	MAIN BREAKER		2	
			6PHS-1-2	6PHS-2 FEED		1	CRITICAL LOAD - PHS BUILDING SERVICES
			6PHS-1-3	SPARE		0	FUTURE - NO CURRENT CONNECTION
			6PHS-1-4	SPARE		0	FUTURE - NO CURRENT CONNECTION
			6PHS-1-5	6PHS-1-5 PHS ATS BREAKER		1	CRITICAL LOAD - PHS BUILDING SERVICES
			6PHS-1-6	SPARE		1	INTERLOCKED TO PREVENT ATS BEING FED FROM TWO GENERATOR SOURCES
6PHS-SP-1		6PHS-SP-1-1	MAIN BREAKER	E	1	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH TEMPORARY GENERATOR AND STANDBY POWER SYSTEM CRITICAL LOAD - PHS BUILDING SERVICES	
		6PHS-SP-1-2	TEMPORARY GENERATOR BREAKER	E	0	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH TEMPORARY GENERATOR AND STANDBY POWER SYSTEM. MANUAL CONNECTION FOR TOWABLE GENERATOR	
		6PHS-SP-1-3	6PHS-SP-A FEED		1	CRITICAL LOAD - PHS BUILDING SERVICES	
		6PHS-SP-1-4	SPARE		0	FUTURE - NO CURRENT CONNECTION	
		6PHS-SP-1-5	SPARE		0	FUTURE - NO CURRENT CONNECTION	
		6PHS-SP-1-6	SPARE		0	FUTURE - NO CURRENT CONNECTION	
		6PHS-SP-1-7	T26PHS-5 FEED		1	CRITICAL LOAD - PHS BUILDING SERVICES	
		6PHS-SP-1-8	T6PHS-1 FEED	N	0	INTERLOCKED TO PREVENT ELECTRICAL BACKFEED ONTO 2400V SYSTEM WHILE STANDBY POWER SYSTEM IS RUNNING. MANUAL CONNECTION FOR BACKFEED ONTO 2400V DISTRIBUTION.	
		12.5MS	12.5MS-1	MAIN BREAKER		1	CRITICAL LOAD - FOR OPERATION OF A SINGLE CRANE.
			12.5MS-2	T12.5MS-2 (SHIP POWER)		0	
12.5MS-3	T12.5MS-4 (2400V STEP DOWN)			1	CRITICAL LOAD - FOR OPERATION OF A SINGLE CRANE.		
12.5MS-4	SOUTH SIDE SUBSTATION FEED			0			
12.5MS-5	NORTH LANDING WHARF SUBSTATION FEED			0			
12.5MS-6	T12.5MS-6 (208V STEP DOWN)			2			
12.5MS-7	T12.5MS-7 (600V STEP DOWN)		F	2	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH NEW GENERATORS AND EXISTING MS GENERATOR. CRITICAL LOAD - SES BUILDING SERVICES.		
12.5MS-8	T12.5MS-8 (480V STEP DOWN)			3			
2.4MS-19	MAIN DISCONNECT		Z	2			
2.4MS-20	PUMPHOUSE SERVICE FEED			0			
2.4MS	2.4MS-21		150T CRANE FEED		0	CRANES BACKFEED ONTO POWER SYSTEM AS PART OF AN EXISTING REGENERATIVE BREAKING SCHEME. ENSURE SCADA AND POWER CONTROL SYSTEMS ARE PROGRAMMED SUCH THAT CRANES BREAKING DO NOT CAUSE NUISANCE TRIPS.	
	2.4MS-22		30T CRANE FEED		2		
	2.4MS-23		SOUTH SIDE SUBSTATION 2.4KV FEED		0		
	2.4MS-24		2.4KV STANDBY FEED	Z	0	EXISTING INTERLOCK TO REMAIN, PREVENT SIMULTANEOUS FEEDS FROM 2.4KV NORMAL POWER AND 600V STEP UP TRANSFORMER.	
	12.5NL	12.5NL-1	MAIN	P	3	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH TEMPORARY GENERATOR AND NORMAL POWER SYSTEM	
NORTH LANDING WHARF SUBSTATION	4NL	4NL-0	HFB BUS CONNECTION	N/A	N/A	DIRECT BUS CONNECTION	
		4NL-1	1000 A SPLITTER FEED		4		
		4NL-2	408V REC #1 FEED		4		
		4NL-3	480V REC #2 FEED		4		
		4NL-4	LV KIOSK #1 FEED		4		
		4NL-5	LV KIOSK #2 FEED		4		
		4NL-6	SPARE		0	SPARE	
		4NL-7	T4NL-7 FEED		3		
		4NL-8	T4NL-8 FEED		3		
		4NL-9	T4NL-9 FEED		3		
	4NL-HFB	4NL-10	NEW MANUAL XFER SWITCH	P,Q	0	INTERLOCKED TO PREVENT ELECTRICAL CONNECTION TO BOTH TEMPORARY GENERATOR AND NORMAL POWER SYSTEM (INTERLOCK 'P'). INTERLOCKED TO PREVENT OPERATION OF HFB DURING TEMPORARY GENERATOR OPERATION (INTERLOCK 'Q')	
		4NL-HFB-1	HFB BREAKER	Q	0		

BUILDING NAME	DISTRIBUTION	BREAKER ID	BREAKER DESCRIPTION	ELECTRICALLY INTERLOCKED	LOAD CONTROL PRIORITY	COMMENTS
SERVICE ENTRANCE SUBSTATION	25/12SSSR	25/12SSSR-1	480V STEP DOWN XFMR		3	
		25/12SSSR-2	2400V STEP DOWN XFMR		1	CRITICAL LOAD - CRANE
		25/12SSSR-3	SPACE		0	EMPTY HV CELL
		25/12SSSR-4	SPARE		0	SPARE
		25/12SSSR-5	SPARE		0	SPARE
		25/12SSSR-6	LVSP#6		0	FUTURE - NO CURRENT CONNECTION
		25/12SSSR-7	600V STEP DOWN XFMR		1	CRITICAL LOAD - SSSR BUILDING SERVICES
		25/12SSSR-8	208V STEP DOWN XFMR		1	CRITICAL LOAD - SSSR BUILDING SERVICES
		25/12SSSR-9	LVSP#3		0	FUTURE - NO CURRENT CONNECTION
		25/12SSSR-10	25KV VOLTAGE REGULATOR FEED		3	
		25/12SSSR-11	LVSP#5		0	FUTURE - NO CURRENT CONNECTION
		25/12SSSR-12	SPARE		0	SPARE
		25/12SSSR-13	PT CELL	N/A	N/A	POTENTIAL TRANSFORMER CONNECTION CELL, NO BREAKER.
		25/12SSSR-14	MAIN BREAKER		1	CRITICAL LOAD - SSSR BUILDING SERVICES
	2.4SSSR	2.4SSSR-1	MAIN BREAKER		1	CRITICAL LOAD - CRANE
		2.4SSSR-2	30T CRANE FEED		1	CRITICAL LOAD - CRANE, SEE MAIN SUBSTATION 2.4MS-21 NOTE
		2.4SSSR-3	SPARE		0	FUTURE - NO CURRENT CONNECTION
		2.4SSSR-4	PT CELL	N/A	N/A	POTENTIAL TRANSFORMER CONNECTION CELL, NO BREAKER.
		6SSSR-1-1	AIR COMPRESSOR #4 FEED		1	CRITICAL LOAD - AIR COMPRESSOR
		6SSSR-1-2	AIR COMPRESSOR #4 PUMP FEED		1	CRITICAL LOAD - AIR COMPRESSOR
		6SSSR-1-3	EXISTING 600V ATS		1	CRITICAL LOAD - SSSR BUILDING SERVICES
		6SSSR-1-4	KIOSK #6		3	
		6SSSR-1-5	KIOSK #7		3	
	6SSSR-1	6SSSR-1-6	DS2-W 600V		3	
		6SSSR-1-7	DS2-E 600V		3	
		6SSSR-1-8 TO 11	4X400A SPARES		0	FUTURE - NO CURRENT CONNECTION
		6SSSR-1-12 TO 15	4X200A SPARES		0	FUTURE - NO CURRENT CONNECTION
	6SSSR-SP-1	6SSSR-SP-1-1	MAIN BREAKER		1	CRITICAL LOAD - SSSR BUILDING SERVICES
	4SSSR-1	4SSSR-1-1	HFB BREAKER		3	
		4SSSR-1-2	4SSSR-2 BREAKER		3	
	SOUTH SIDE SUBSTATION REPLACEMENT	4SSSR-2-1	SECTION #1 WEST 400A		4	
		4SSSR-2-2	SECTION #1 CENTRE 400A		4	
		4SSSR-2-3	SECTION #1 EAST 400A		4	
		4SSSR-2-4	SECTION #3 WEST 400A		4	
		4SSSR-2-5	SECTION #3 CENTRE 400A		4	
		4SSSR-2-6	SECTION #3 EAST 400A		4	
		4SSSR-2-7	480V RECEPTACLE 200A		4	
		4SSSR-2-8	VIC SHIP MACHINE SHOP		3	
		4SSSR-2-9	VIC SHIP FAB SHOP		3	
		4SSSR-2-10	KIOSK #3		4	
		4SSSR-2-11	NORTHEAST WALL REC		4	
		4SSSR-2-12	JETTY #1		4	
		4SSSR-2-13	JETTY #2		4	
		4SSSR-2-14	JETTY #3		4	
		4SSSR-2-15	JETTY #4		4	
		4SSSR-2-16	JETTY #5		4	
		4SSSR-2-17	CAPSTAN MCC		1	
		4SSSR-2-18	BARKER BUILDING		3	
	2SSSR-1	4SSSR-2-19	DS2-W		4	
		4SSSR-2-20	DS2-C		4	
		4SSSR-2-21	DS2-E		4	
		4SSSR-2-22	SSSR REC #1		4	
		4SSSR-2-23	SSSR REC #2		4	
		4SSSR-2-24 TO 28	200A SPARE X 4		0	FUTURE - NO CURRENT CONNECTION
		2SSSR-1-1	JETTY MOUNT #1		1	
		2SSSR-1-2	JETTY MOUNT #2		1	
		2SSSR-1-3	JETTY MOUNT #3		1	
		2SSSR-1-4	JETTY MOUNT #4		1	
		2SSSR-1-5	JETTY MOUNT #5		1	
		2SSSR-1-6	KIOSK #1		3	
		2SSSR-1-7	KIOSK #2		3	
		2SSSR-1-8	KIOSK #3		3	
		2SSSR-1-9	PANEL 2T		1	
		2SSSR-1-10	SECTION #1 WEST 125A		4	
		2SSSR-1-11	SECTION #1 CENTRE 125A		4	
		2SSSR-1-12	SECTION #1 EAST 125A		4	
		2SSSR-1-13	SECTION #3 CENTRE 125A		4	
		2SSSR-1-14	SECTION #3 EAST 125A		4	
		2SSSR-1-15	DS2-W		1	
		2SSSR-1-16	DS2-C		1	
		2SSSR-1-17	DS2-E		1	
		2SSSR-1-18	SSSR REC #1		4	
		2SSSR-1-19	SSSR REC #2		4	
		2SSSR-1-20	SSSR REC #3		4	
		2SSSR-1-21	SSSR REC #4		4	
		2SSSR-1-22 TO 25	400A SPARE X 4		0	FUTURE - NO CURRENT CONNECTION
		2SSSR-1-26 TO 33	200A SPARE X 8		0	FUTURE - NO CURRENT CONNECTION

REAL PROPERTY SERVICES
Pacific Region
SERVICES IMMOBILIERS
Region de Pacifique



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/ Révision	Description/Description	Date/Date

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

Drawn by/Dessiné par

J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC

Jamie LeBlanc

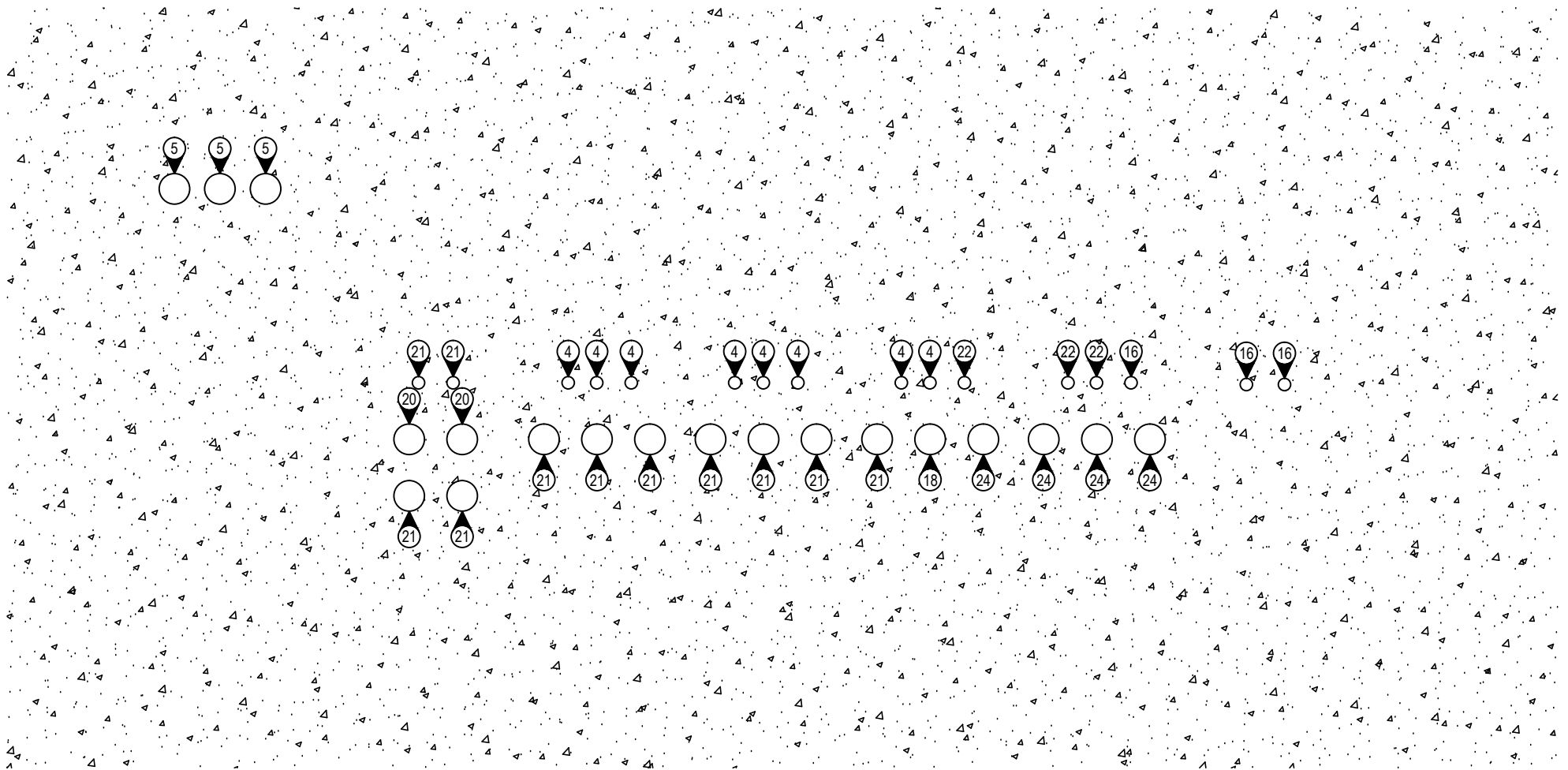
KEYNOTES:

- CONNECT 3x1c#4/0 25kV RATED CABLE TO 25/12SES HIGH VOLTAGE SWITCH BOARD. TERMINATE WITH APPROPRIATE STRESS CONES AND CABLE SUPPORTS
- NEW 25KV CABLE VIA EXISTING CONDUITS TO STEP UP TRANSFORMER DEAD FRONT HIGH VOLTAGE CELL
- NEW 600V DISTRIBUTION 6SES-SP-2. REFER TO CONTROL BOARD DETAILS FOR ADDITIONAL INFORMATION.
- EXISTING 41mm CONDUITS TO GENERATORS FOR POWER AND LIGHTING CIRCUITS.
- EXISTING CONCRETE ENCASED HV CONDUIT FROM WALL PENETRATION INTO TRANSFORMER TO STUB UP IN DEAD FRONT HIGH VOLTAGE CELL.
- TRANSFORMER DEAD FRONT HIGH VOLTAGE AND LOW VOLTAGE CELLS. HV CELL DUAL RATED FOR OPERATION AT BOTH 12.5 AND 25KV.
- NEW 3000/4000kVA 600:12.5/25KV KNAF/KNAF STEP UP TRANSFORMER. REFER TO TRANSFORMER DETAILS FOR ADDITIONAL INFORMATION.
- EXISTING POWER AND DATA CONDUITS FOR NEW GENERATOR DUCT BANK AND OUTDOOR EQUIPMENT. REFER TO SECTION GSES/8431 FOR DUCT BANK LAYOUT DETAILS AND 2/8420 FOR EXISTING CONDUIT ELEVATION.
- EXISTING CONDUITS HAVE BEEN EXTENDED TO BEYOND THE AREA OF WORK TO ALLOW FOR FUTURE CONNECTIONS OF LVSP SERVICE. FOR INFORMATION ONLY.
- NOT USED
- EXISTING CONDUITS STUBS BELOW ALTERNATOR AND GENERATOR CONNECTION POINTS. USE GRS CONDUIT FOR ANY EXPOSED WORK. CO-ORDINATE EXACT LOCATION WITH GENERATOR SUPPLIER FOR CONNECTION OF ALTERNATOR, BATTERIES, LIGHTS AND CONTROL CIRCUITS.
- EXISTING STUBS.
- 725kW GENERATOR FOOTPRINTS. GENERATORS TO BE ORIENTED SUCH THAT RADIATOR FANS FACE TOWARDS TO DOCK, AND NOT TOWARDS THE PROPERTY LINE.
- LOAD BANK BREAKER IN NEW OUTDOOR RATED SWITCHBOARD, REFER TO TRANSFORMER DETAILS FOR ADDITIONAL INFORMATION.
- NEW STEPPED LOAD BANK, REFER TO LOAD BANK DETAILS FOR ADDITIONAL INFORMATION.
- EXISTING 3x41mm CONDUIT FROM SES STUBS TO NEW LOAD BANK FOR POWER AND CONTROL CIRCUITS.

- 6SES-SP-2 BREAKER IN NEW OUTDOOR RATED SWITCHBOARD. REFER TO SINGLE LINE DIAGRAM FOR ADDITIONAL DETAILS
- EXISTING 1x103mm CONDUIT FROM SES STUBS TO NEW ATS PROTECTION BREAKER.
- GENERATOR CONTROL PANEL
- EXTENDED 2x103mm EXISTING CONDUITS TO TRANSFORMER FOR OIL PUMP, HEATER, FANS, AND OIL LEVEL AND TEMPERATURE MONITORING.
- EXISTING CONDUIT STUBS TO REMAIN CAPPED
- INTERCEPT AND EXTEND 3x41mm CONDUIT FROM SES STUBS TO TRANSFORMER COMPARTMENT FOR CONTROL AND POWER CIRCUITS.
- CONNECT GENERATOR INTERNAL DISTRIBUTION PANELS 2SES-G-1, 2SES-G-2 AND 2SES-G-3 TO 2SES-SP-2 POWER PANEL.
- EXISTING CONDUITS TO GENERATOR COMMUNICATIONS AND CONTROLS. VIA EXISTING CABLE PIT INTO APPROPRIATE CONTROL CELL.

NOTES:

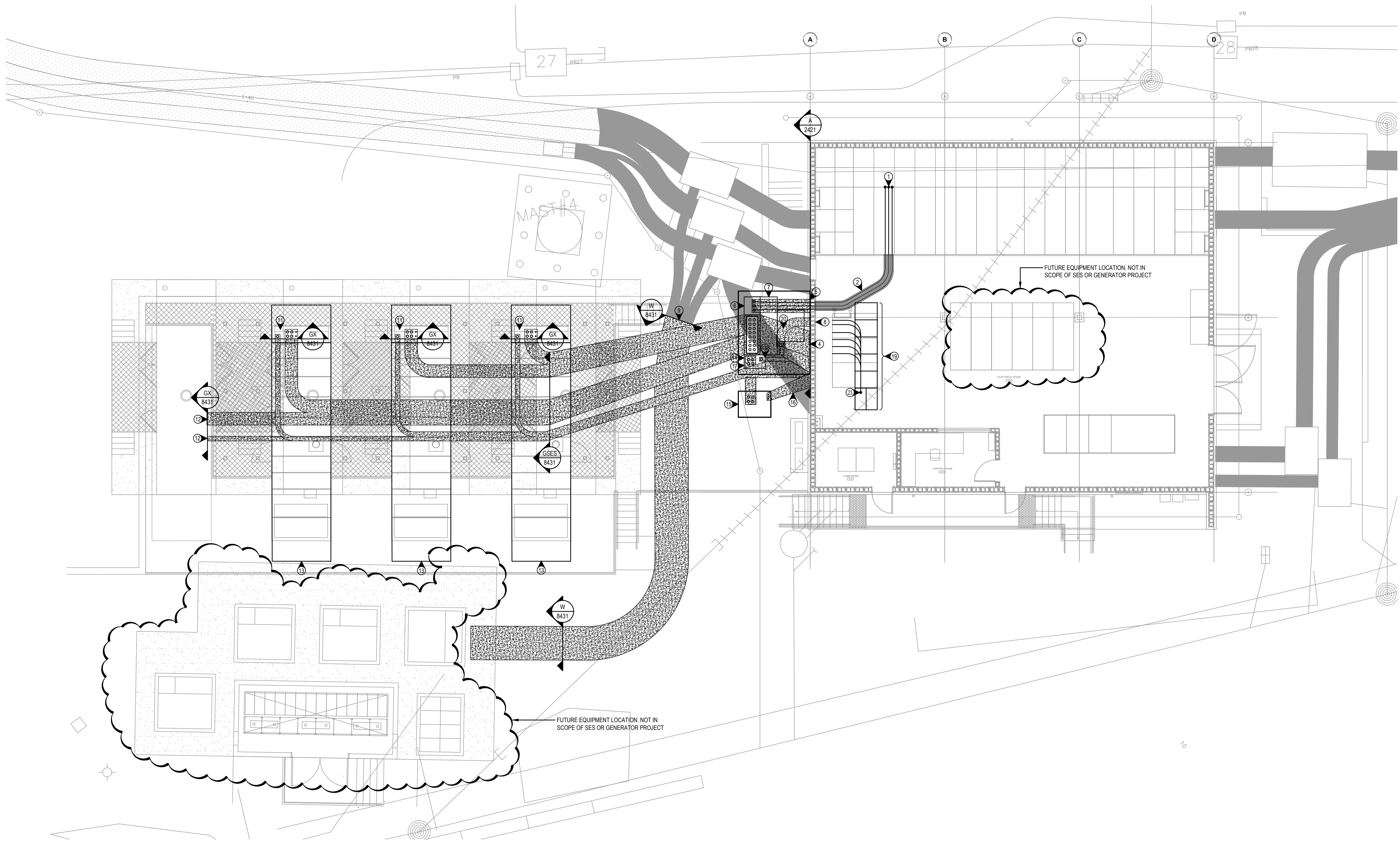
THE SCOPE OF THIS CONTRACT DOES NOT INCLUDE THE CIVIL WORKS FOR IN GROUND CONDUIT OR CONCRETE PAD WORK. DETAILS ONLY SHOWN FOR CO-ORDINATION AND INFORMATION PURPOSES ONLY.



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SERVICE ENTRANCE SUBSTATION
EXISTING WALL ELEVATION

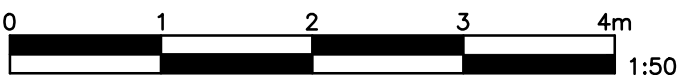
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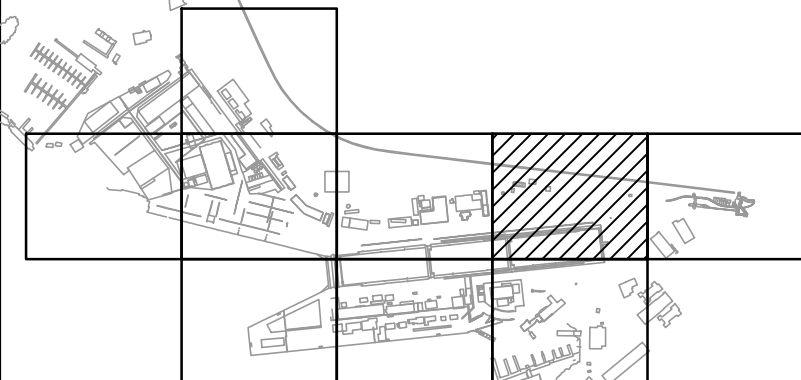
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SERVICE ENTRANCE SUBSTATION
SITE PLAN AND CONDUIT ROUTES

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KEYPLAN



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
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Client/client

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825 ADMIRALS ROAD
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Project title/Titre du projet

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ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

Drawn by/Dessine par

J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC

Jamie LeBlanc

PWGSC Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC

Preetipal Paul

Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION
STANDBY POWER SYSTEM SITE PLAN

Project No./No. du projet

R.057890.003

Sheet/Feuille

8420

Revision no./
La Révision
no.

5



Client/client

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

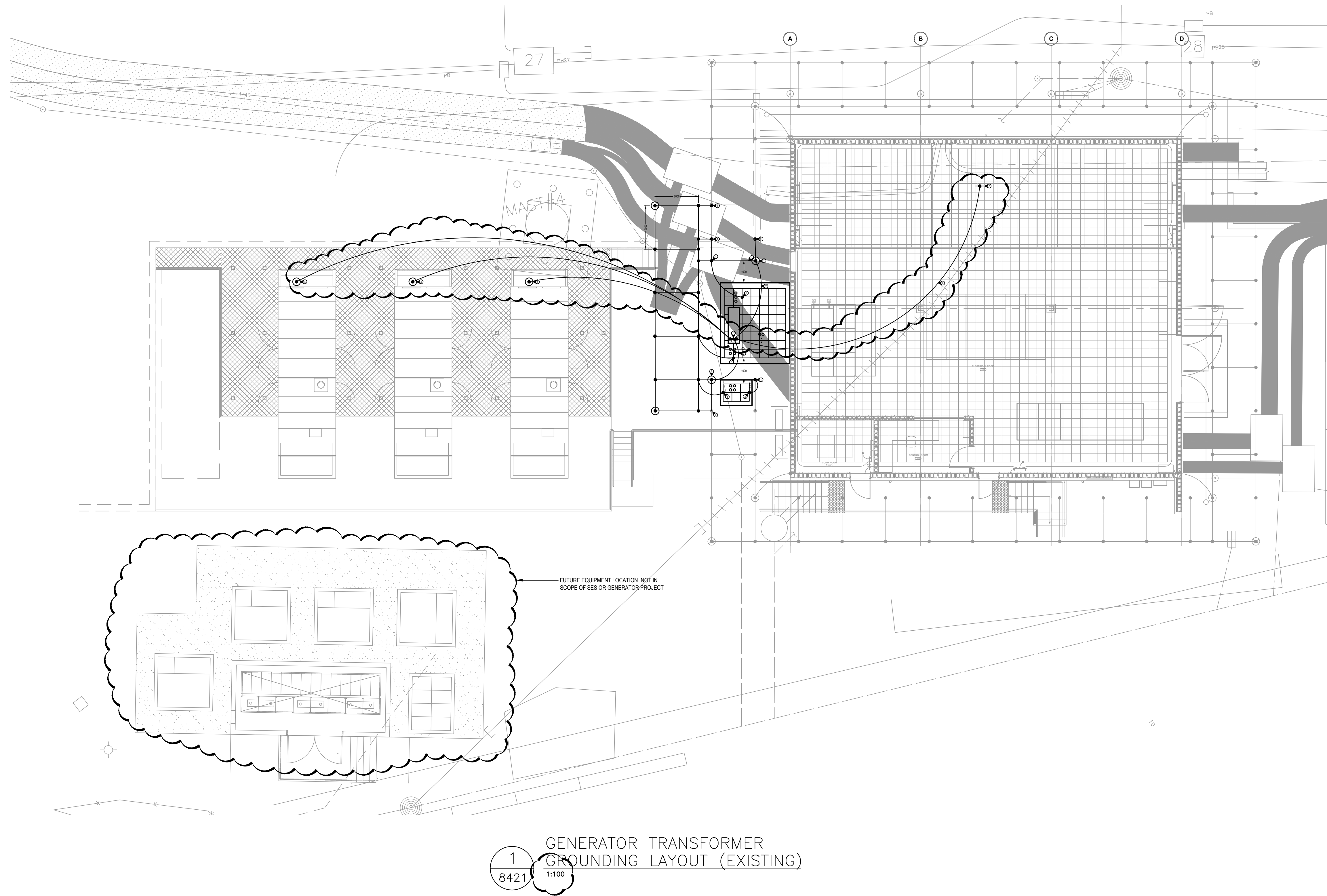
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PWGSC Project Manager/Administrateur de Projets TPSGC

PWGSC, Regional Manager, Architectural and Engineering Services
 Gestionnaire régionale, Services d'architecture et de génie, TPSG
Preetipal Paul

GENERATOR TRANSFORMER GROUNDING LAYOUT (EXISTING)

Project No./No. du projet	Sheet/Feuille	Revision no. La Révision no.
R.057890.003	8421	5



LEGEND	
	GROUND ROD C/W INSPECTION WELL
	GROUND ROD WITHOUT ACCESS
	GROUND ROD CONDUCTOR RISER
	COMPRESSION CONNECTOR
	#4/0 GROUND CONDUCTOR
	ELECTRICALLY CONTINUOUS 15M REBAR @ 300mm O.C.

GENERAL NOTES:

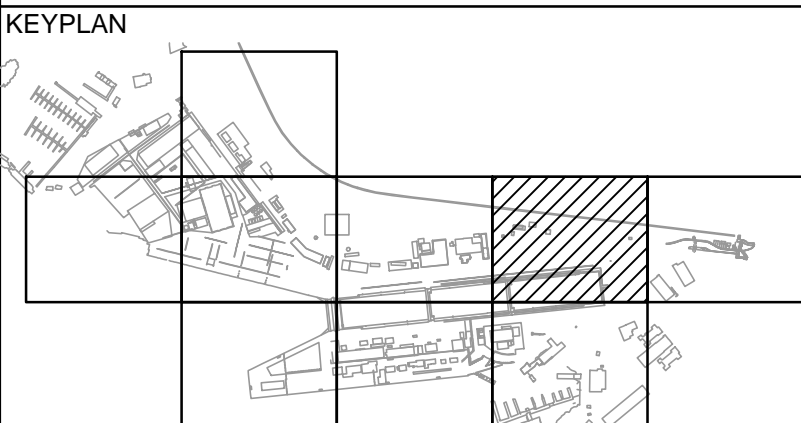
1. GROUNDING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE.
2. SLAB REBAR SHALL BE ELECTRICALLY CONTINUOUS. USE COMPRESSION CONNECTIONS TO ENSURE ALL REBAR IS BONDED TOGETHER.
3. GROUND RODS TO BE SPACED NO LESS THAN ONE ROD LENGTH APART.
4. REBAR SHALL BE BONDED TO COPPER CONDUCTOR AT MAXIMUM 3m SPACING, WHERE REBAR IS NOT ELECTRICALLY CONTINUOUS, A COPPER JUMPER SHALL BE INSTALLED.
5. GROUND CONDUCTOR TO BE BURIED 500mm BELOW FINISH FLOOR.
6. ALL CONNECTIONS TO BE PRE-FILLED WITH OXIDE INHIBITOR PRIOR TO COMPRESSING.
7. ALL GROUNDING CONNECTORS SHALL BE CSA AND IEEE 837 APPROVED.

KEYNOTES:

- ① INTERCEPT EXISTING SES GROUNDING GRID AND EXTEND TO SURROUND NEW GENERATOR TRANSFORMER PAD VIA NEW COMPRESSOR CONNECTORS.
- ② ENSURE TRANSFORMER IS CONNECTED TO GROUND GRID VIA TWO SEPARATE CONNECTIONS.
- ③ ENSURE REBAR IN PADS IS GROUND TO GROUND GRID VIA TWO SEPARATE CONNECTIONS.
- ④ 1c2#/0 CU. INSULATED GENERATOR ALTERNATOR GROUND WIRE FROM GENERATOR ALTERNATOR TO TRANSFORMER GROUND BUS. (TYPICAL)
- ⑤ TRANSFORMER T25/12SES-2 GROUND BUS FOR GROUNDING OF TRANSFORMER, GENERATORS, AND LOAD BANK.
- ⑥ 2x1c2#/0 CU. INSULATED GROUND WIRE FROM TRANSFORMER GROUND BUS TO EXISTING SERVICE ENTRANCE GROUND BUS IN EXISTING 25kV SES MAIN SWITCHBOARD.
- ⑦ EXISTING SERVICE ENTRANCE GROUND BUS TO REMAIN, CONNECT GROUND WIRES USING IRREVERSIBLE CRIMP STYLE CONNECTORS

Plot Date: June 30, 2016 11:45 AM Plotted by: Jacob Biefing
File Name: H:\PROJECTS\2016\1-16-008\DWGS\DWG\B421 SES GROUNDING.DWG



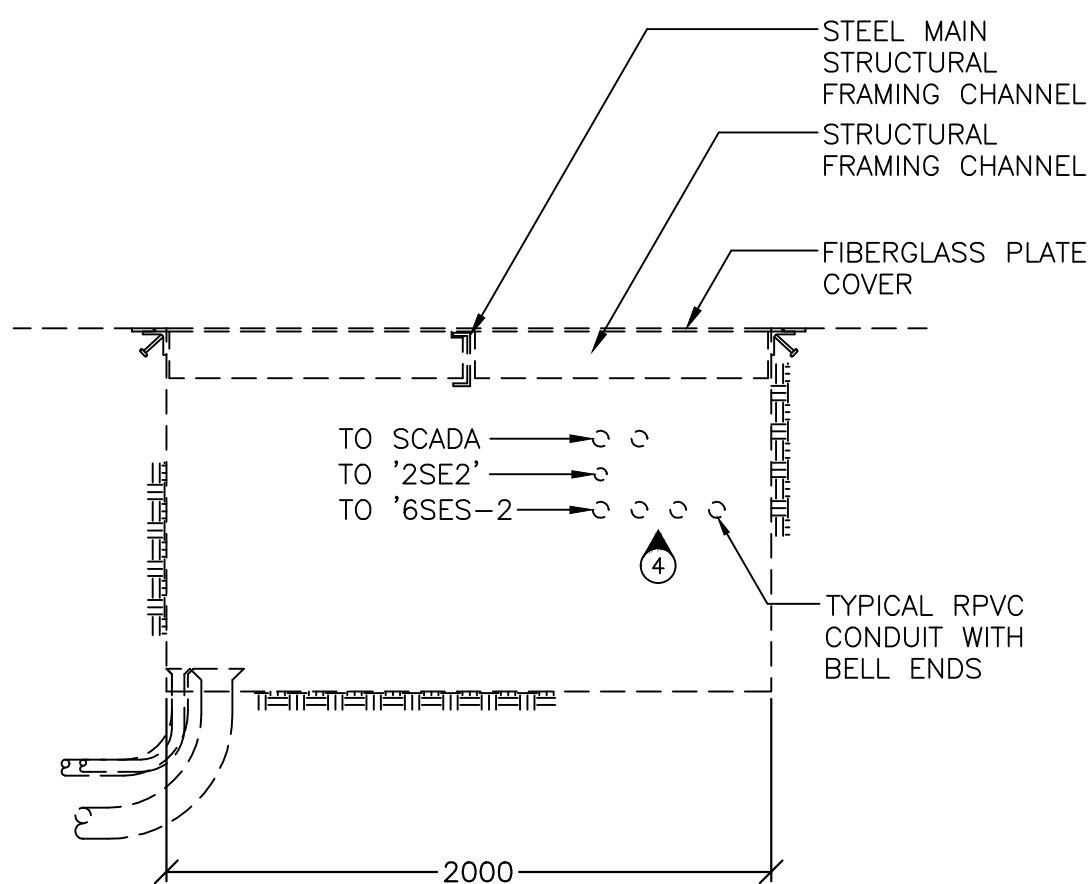
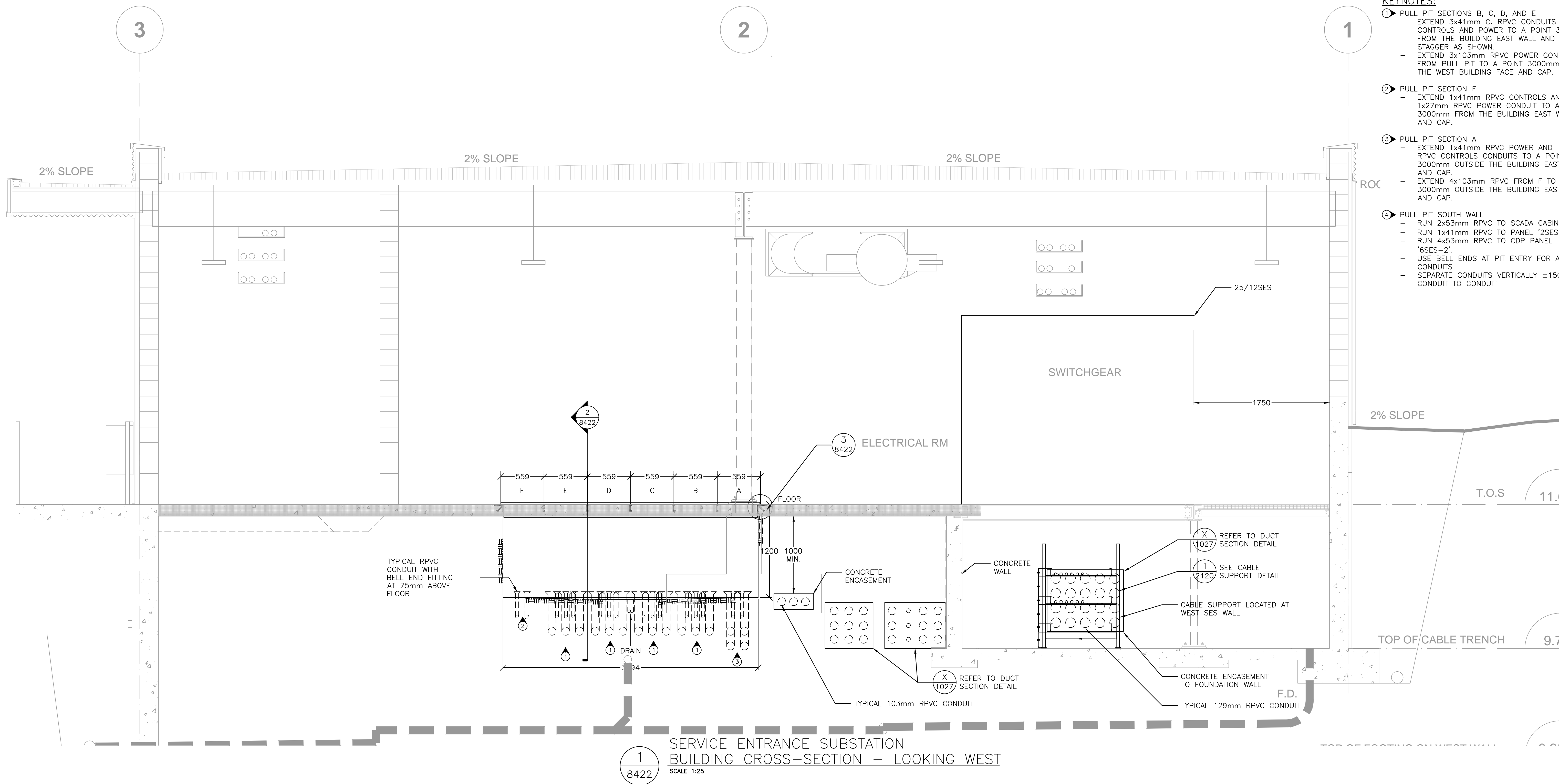


GENERAL NOTES:

1. ALL EQUIPMENT AND CONDUITS SHOWN ARE EXISTING. FOR CLARIFICATION OF AVAILABLE CONDUITS AND SPACE LIMITATIONS.

KEYNOTES:

- PULL PIT SECTIONS B, C, D, AND E
 - EXTEND 3x41mm C. RPVC CONDUITS FOR CONTROLS AND POWER TO A POINT 3000mm FROM THE BUILDING EAST WALL AND CAP. STAGGER AS SHOWN.
 - EXTEND 3x103mm RPVC POWER CONDUITS FROM PULL PIT TO A POINT 3000mm FROM THE WEST BUILDING FACE AND CAP.
- PULL PIT SECTION F
 - EXTEND 1x41mm RPVC CONTROLS AND 1x27mm RPVC POWER CONDUIT TO A POINT 3000mm FROM THE BUILDING EAST WALL AND CAP.
- PULL PIT SECTION A
 - EXTEND 1x41mm RPVC POWER AND 1x41mm RPVC CONTROLS CONDUITS TO A POINT 3000mm OUTSIDE THE BUILDING EAST WALL AND CAP.
 - EXTEND 4x103mm RPVC FROM F TO A POINT 3000mm OUTSIDE THE BUILDING EAST WALL AND CAP.
- PULL PIT SOUTH WALL
 - RUN 2x53mm RPVC TO SCADA CABINET
 - RUN 1x41mm RPVC TO PANEL '2SES'
 - RUN 4x53mm RPVC TO CDP PANEL '6SES-2'.
 - USE BELL ENDS AT PIT ENTRY FOR ALL CONDUITS
 - SEPARATE CONDUITS VERTICALLY ± 150 mm CONDUIT TO CONDUIT



2
8422
SERVICE ENTRANCE SUBSTATION
SOUTH PULL PIT WALL ELEVATION
SCALE NTS

1
8422
SERVICE ENTRANCE SUBSTATION
BUILDING CROSS-SECTION - LOOKING WEST
SCALE 1:25



Revision/	Description/Description	Date/Date
6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		

Client/client

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD - VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

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PWCSC Project Manager/Administrateur de Projets TPSGC

Jamie LeBlanc

PWCSC Regional Manager, Architectural and Engineering Services/
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Preetipal Paul

Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION DUCT ENTRY CROSS-SECTIONS (EXISTING)

Project No./No. du projet

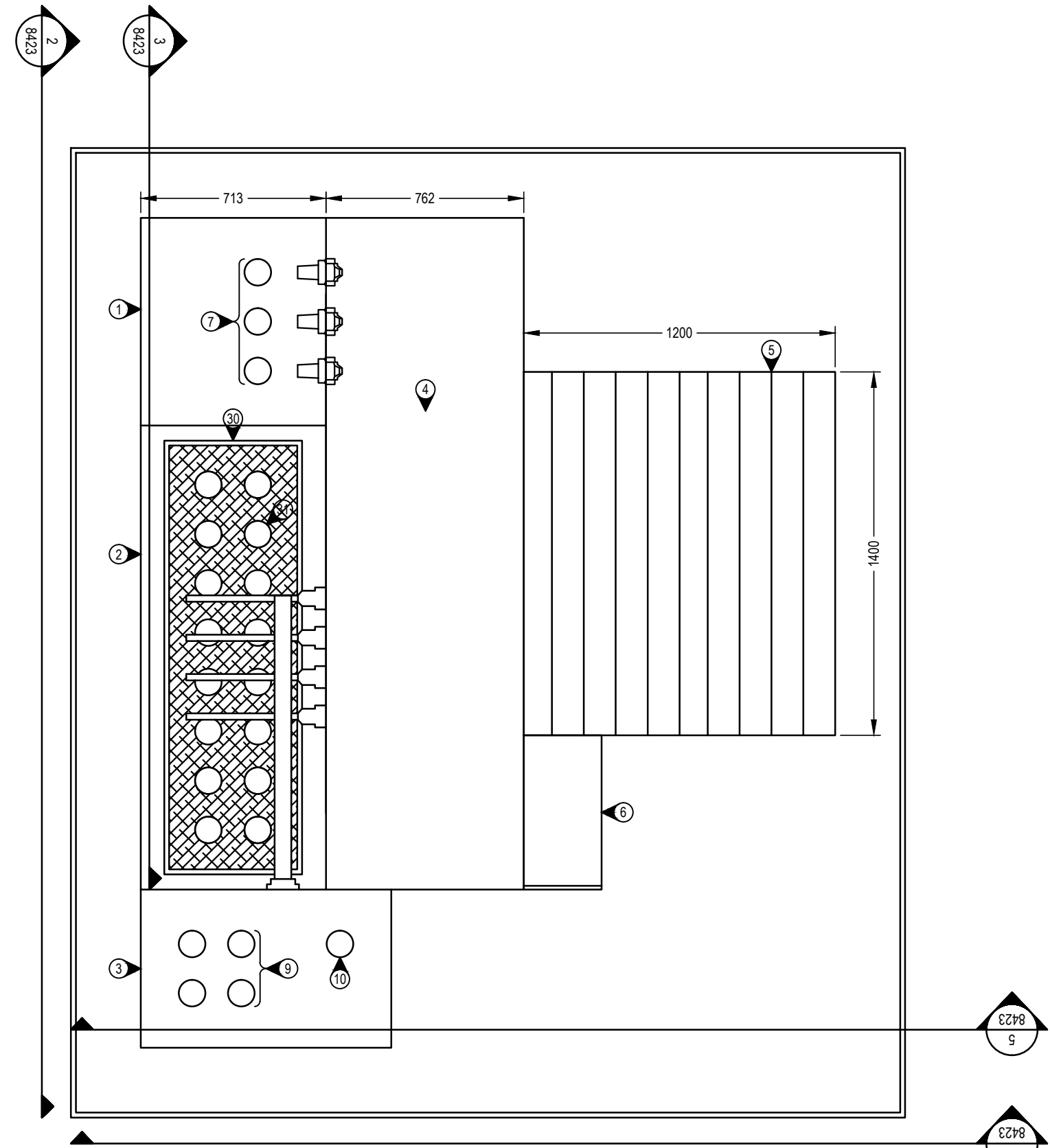
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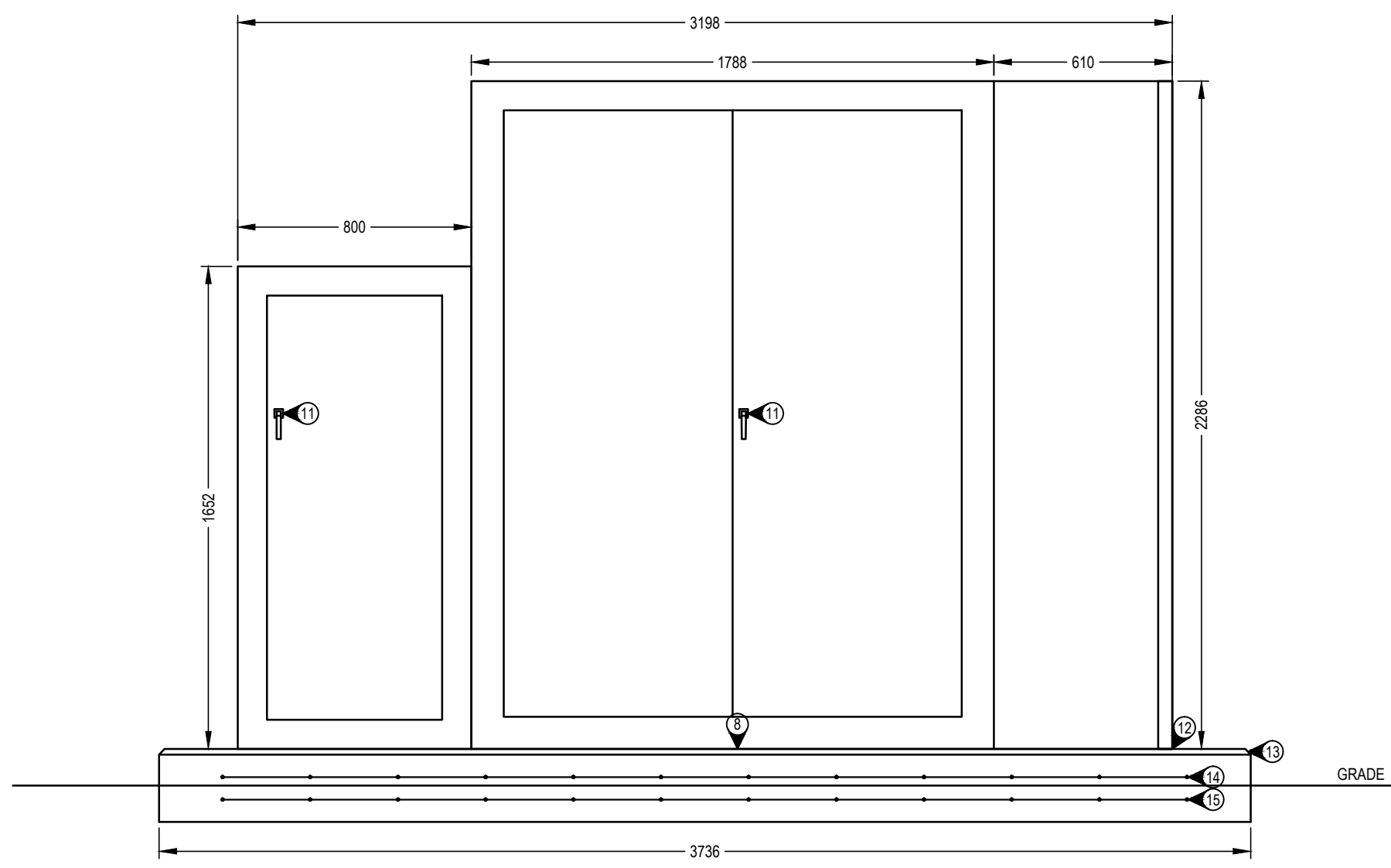
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Revision no./
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no.

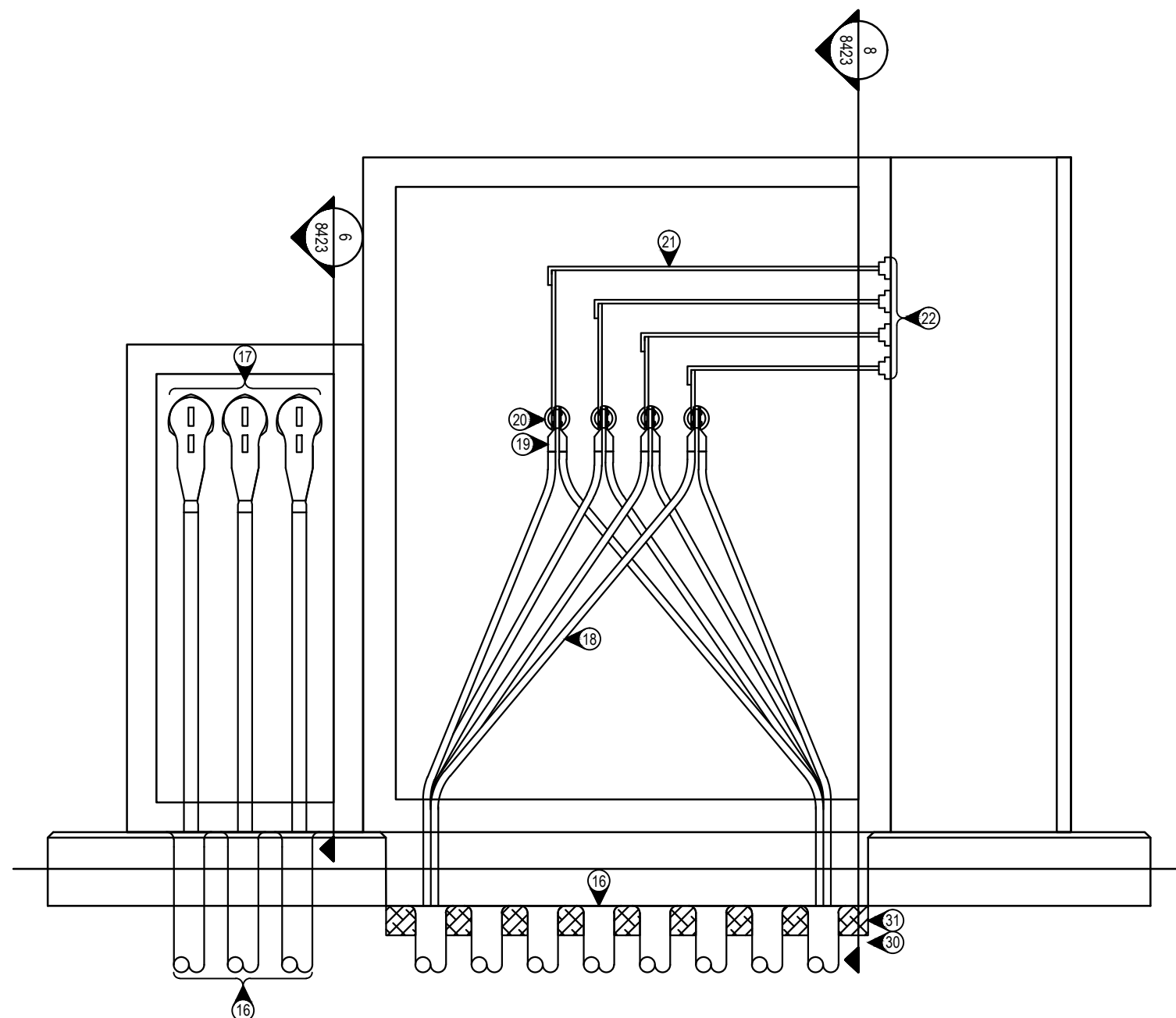
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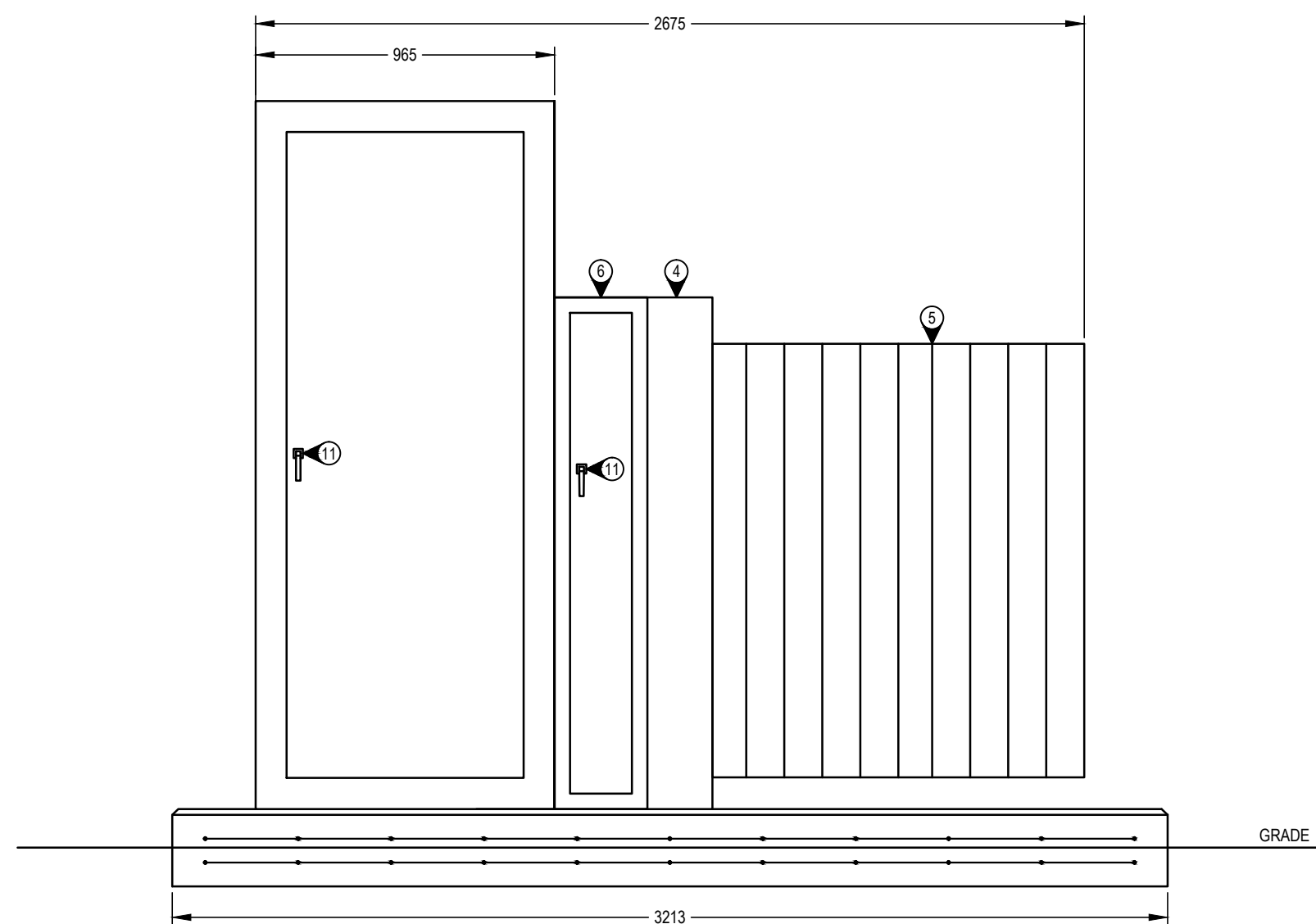
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8423
1:20
GENERATOR TRANSFORMER PLAN VIEW



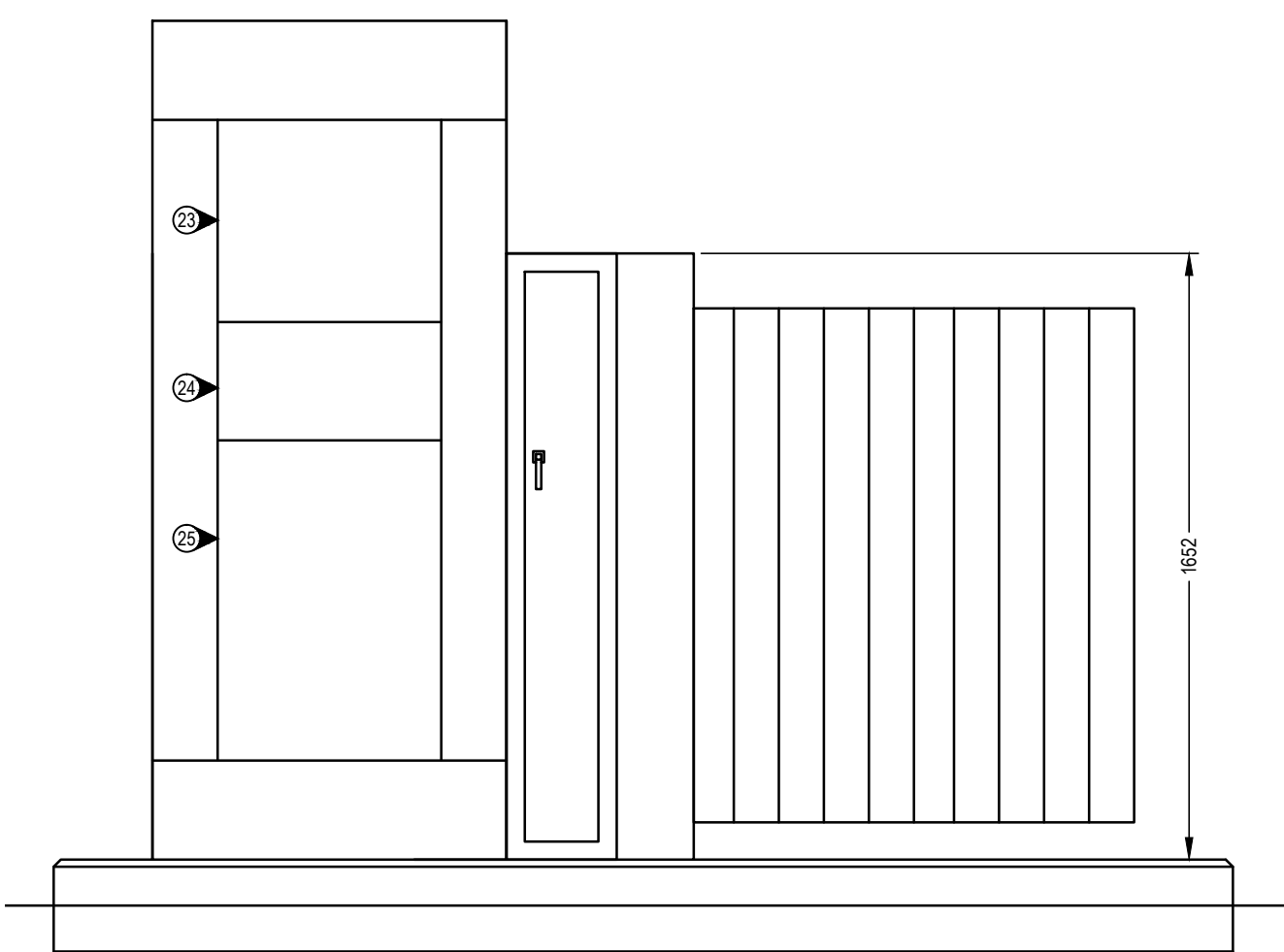
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8423
1:20
GENERATOR TRANSFORMER FRONT EXTERIOR ELEVATION



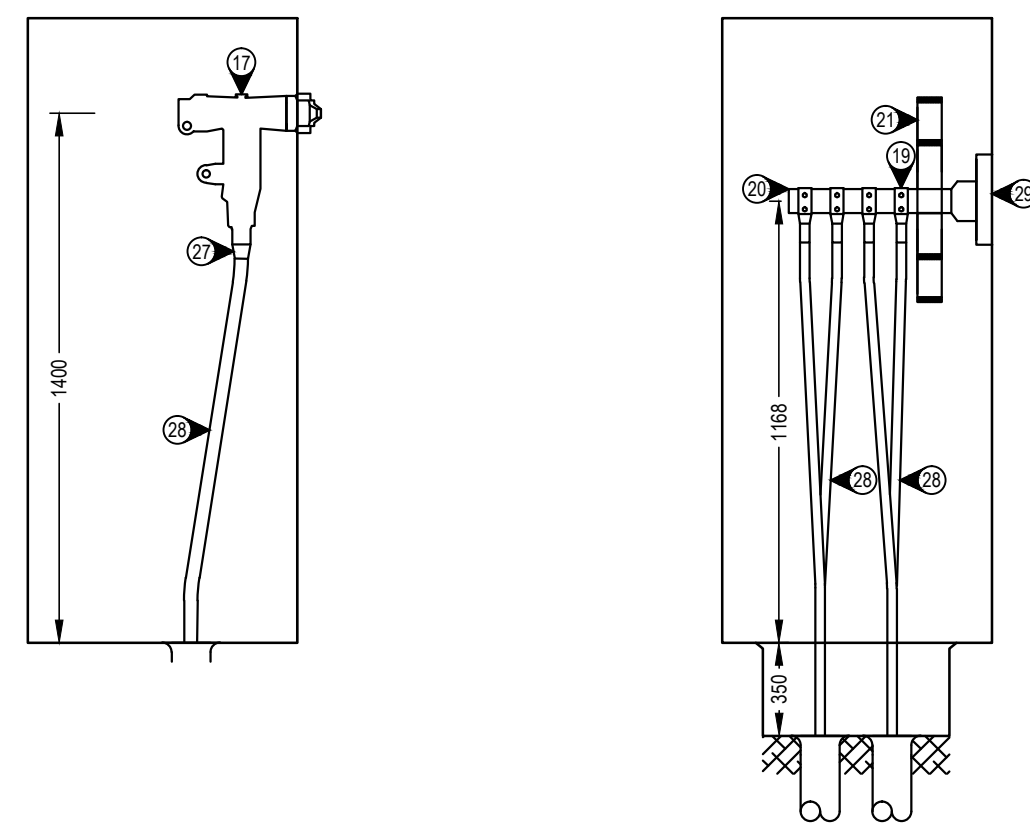
3
8423
1:20
GENERATOR TRANSFORMER FRONT INTERIOR ELEVATION



4
8423
1:20
GENERATOR TRANSFORMER SOUTH EXTERIOR ELEVATION



5
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1:20
GENERATOR TRANSFORMER SOUTH INTERIOR ELEVATION



6
8423
1:20
GENERATOR TRANSFORMER CABLE BOXES INTERIOR SECTION

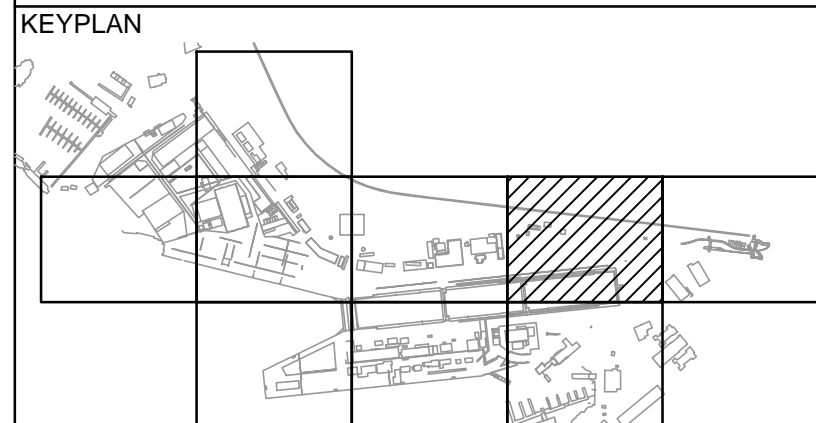
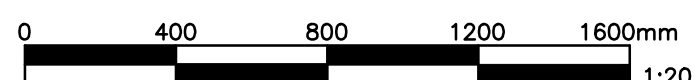
KEYNOTES:

- HIGH VOLTAGE CABLE TERMINATION CELL. COORDINATE CELL DIMENSIONS WITH TRANSFORMER HIGH VOLTAGE TERMINAL LUG LOCATIONS. ENSURE SUFFICIENT SPACE FOR BEND RADIUS OF HIGH VOLTAGE CABLES.
- LOW VOLTAGE CABLE TERMINATION CELL. FOR CONNECTION OF GENERATORS TO TRANSFORMER LOW VOLTAGE TERMINALS. ENSURE THERE IS SUFFICIENT SPACE FOR 16x103MM CONDUITS AND THAT THERE IS SUFFICIENT ROOM FOR CABLE MINIMUM BENDING RADIUS.
- NEW 1600A, 600V 3Ø 4W, CSA 4X MARINE GRADE ALUMINUM ENCLOSED SWITCHBOARD MOUNTED TO OUTDOOR TRANSFORMER LV PULLING SECTION FOR INSTALLATION OF SUB BREAKERS. TO BE RATED FOR 42KA FAULT WITHSTAND WITH SUFFICIENT SPACE FOR A 1200AF/1200AT, 3P LSI&G, AND 2x400AF/300AT, 3P LSI&G BREAKER. REFER TO KEYNOTES 23, 24 AND 25 FOR ADDITIONAL DETAILS.
- 3000/4000KVA KNAN/KN&F 600V/25/12.5KV DUAL RATED STEP UP TRANSFORMER. LOW VOLTAGE PRIMARY WINDING TO BE GROUNDED STAR CONNECTION ARRANGEMENT AND HIGH VOLTAGE SECONDARY WINDING TO BE UNGROUNDED STAR CONNECTION ARRANGEMENT TRANSFORMER TO CONTAIN INTERNAL OIL HEATER, OIL LEVEL SENSOR, WINDING TEMPERATURE SENSOR, AND OIL QUALITY SAMPLING POINT.
- TRANSFORMER COOLING RADIATORS C/W FORCED AIR FANS. ALL RADIATORS SHALL BE MOUNTED ONTO THE MAIN TANK OF THE TRANSFORMER. EACH RADIATOR SHALL BE PROVIDED WITH TOP AND BOTTOM SHUT-OFF VALVES AND SHALL BE DETACHABLE FROM THE MAIN TANK. THE RADIATORS SHALL BE HOT DIPPED GALVANIZED ONLY. RADIATORS SHALL BE EQUIPPED WITH STAINLESS STEEL TYPE DIN 42 55&B BLEEDING AND DRAIN PLUGS. SEALS SHALL BE UV, HEAT AND OIL RESISTANT. RADIATORS SHALL HAVE THE NECESSARY LIFTING EYE CONNECTIONS. FANS TO BE CONTROLLED VIA INTERNAL WINDING TEMPERATURE SENSOR AND POWER VIA 5kVA 600:120V TRANSFORMER LOCATED IN CONTROL COMPARTMENT. FANS TO BE INSTALLED SUCH THAT THEY CAN BE REMOVED AND REPLACED WITHOUT DISASSEMBLY OF TRANSFORMER RADIATORS.
- TRANSFORMER CONTROL CABINET, FOR TRANSFORMER CONTROL/POWER AND MONITORING CONNECTIONS. CO-ORDINATE TRANSFORMER CONTROL CABINET WITH CONDUIT SLAB PENETRATIONS.
- 600A, 25kV DEAD BREAK ELBOW HIGH VOLTAGE BUSHING WELL FOR CONNECTION OF TRANSFORMER HIGH VOLTAGE TERMINALS. ENSURE BUSHING WELLS ARE DESIGNED TO SUPPORT WEIGHT OF THE LOAD BREAK ELBOWS AND CONDUCTORS.
- EXISTING CONCRETE PAD IS SLOPED TOWARDS EDGES TO PREVENT WATER POOLING NEAR EQUIPMENT.
- EXISTING 4x103MM CONDUITS FOR 4x4C400KCM CU. CABLES BETWEEN OUTDOOR ENCLOSURE AND 1000KW LOAD BANK. ENSURE SUFFICIENT SPACE TO ALLOW CONNECTION TO 1200AF BREAKER TERMINAL LUGS WHILE MAINTAINING CABLE BEND RADIUS.
- EXISTING 1x103MM CONDUIT FOR 4C#350KCM CONDUCTOR BETWEEN 400AF BREAKER AND NEW INDOOR PANEL 6SES-SP-2. CO-ORDINATE CONDUIT LOCATION WITH SWITCHBOARD INTERNAL LAYOUT TO ENSURE SUFFICIENT SPACE TO CONNECT TO 400AF BREAKER TERMINALS WHILE MAINTAIN MINIMUM BEND RADIUS AND SEPARATION FROM OTHER BREAKERS.
- DOORS TO BE HINGED, FULLY GASKETED AND PROPERLY GROUNDED AND BONDED. DOOR HANDLES TO BE LOCKABLE.
- PROVIDE POLYURETHANE, WATERPROOF CAULKING SEAL AROUND BASE OF ALL EQUIPMENT TO PREVENT WATER COLLECTING BELOW COVERED AREAS.
- EXISTING 19mm CHAMFER AROUND EDGES OF CONCRETE PAD.
- EXISTING CONCRETE PAD IS 350mm THICK, 100mm EXTENDS ABOVE GRADE AND 250mm BELOW GRADE.
- PAD WAS CONSTRUCTED OF CONCRETE WITH COMPRESSIVE STRENGTH AT MINIMUM 28MPA @28 DAYS. PADS WAS REINFORCED WITH 2 LAYERS OF 15M REBAR INSTALLED AT 300mm O.C. HORIZONTAL SEPARATION DISTANCE. CONFIRM REBAR IS CONNECTED TO TRANSFORMER GROUND GRID AT TWO POINTS ON OPPOSITE SIDES OF PAD.

- EXISTING CONDUITS ARE CAPPED WITH BELL END FLUSH WITH PAD.
- ENSURE SEPARATION DISTANCE AND ACCESSIBILITY IS PERMITTED FOR SERVICING AND TESTING OF HIGH VOLTAGE DEAD BREAK ELBOWS.
- 400KCM CONDUCTORS CONNECTED TO A, B, C, AND N TRANSFORMER TERMINAL LUGS, PARTIAL CONNECTION DETAIL AS SHOWING ALL CONDUCTORS WOULD BE TOO CLUTTERED. ENSURE ALL BENDING AND SPACING REQUIREMENTS ARE MAINTAINED.
- IRREVERSIBLE CRIMP TERMINAL CONNECTOR LUG, SIZES FOR 400kCM CONDUCTOR. TO BE BOLTED TO TRANSFORMER LV TERMINALS USING HEXAGONAL BOLTS.
- TRANSFORMER LOW VOLTAGE TERMINALS. TO BE SIZED FOR 5000A AT 600V 3PH. TO BE SIZED TO ALLOW CONNECTION OF 8x400KCM TERMINAL LUGS AND 1600A BUS IN NOTE 21. TO BE DESIGNED TO SUPPORT THE LOAD OF ALL CONDUCTORS, TERMINATIONS, CRIMPS AND FITTING WITHOUT BENDING OR DAMAGING TRANSFORMER ENCLOSURE, SEALS OR WINDINGS.
- 1600A BUSSING BETWEEN TRANSFORMER 600V TERMINALS AND OUTDOOR SWITCHBOARD. TO BE OF TIN PLATED COPPER CONSTRUCTION WITH ADEQUATE SUPPORTS AND STANDOFFS.
- 1600A BUSSING PENETRATION BETWEEN TRANSFORMER LV CELL AND OUTDOOR DISTRIBUTION PANEL.
- CONNECTION COMPARTMENT BETWEEN 1600A BUSSING AND 600V, 3ph 4W, 42KA RATED 1600A PANEL BOARD.
- 2x400AF/300AT LSI&G 42KA 600V 3PH BREAKERS
- 1200AF/1200AT LSI&G 42KA 600V 3PH BREAKER
- NOT USED

GENERAL NOTES:

- SUPPLY INSTALL AND WIRE CT SHORTING BLOCKS FOR ALL CT LEADS.
- ALL COVERS HINGED FOR EASE OF ROUTINE MAINTENANCE AND INSPECTION. (eg IR SCAN). PROVIDE BONDING STRAPS FOR ALL DOORS.
- ALL SWITCHBOARD BUS TO BE TIN PLATED COPPER.
- ALL TRANSFORMERS TO BE COPPER WOUND.
- ALL CONDUCTORS TO BE 1000V RATED COPPER
- ALL CONCRETE, UNDERGROUND AND CIVIL WORKS IS EXISTING BY OTHERS.



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/	Description/Description	Date/Date
Client/client		

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
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J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC

Jamie LeBlanc

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Preetipal Paul

Drawing title/Titre du dessin


SERVICE ENTRANCE SUBSTATION
GENERATOR TRANSFORMER PLAN
AND ELEVATION DETAILS

Project No./No. du projet
R.057890.003

Sheet/Feuille
8423

Revision no./
La Révision
no.
5


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Public Works and
Government Services
Canada

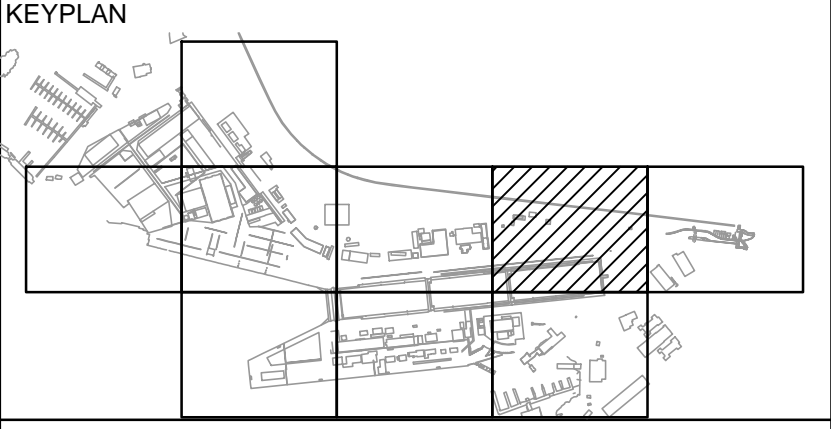
Travaux publics et
Services gouvernementaux
Canada

REAL PROPERTY SERVICES
Pacific Region
SERVICES IMMOBILIERS
Region de Pacifique



AES
CALGARY | VANCOUVER | VICTORIA
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KEYPLAN



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
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3	ISSUED FOR 75% REVIEW	16/04/15
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1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
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Revision/ Révision	Description/Description	Date/Date

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
I. BARNES

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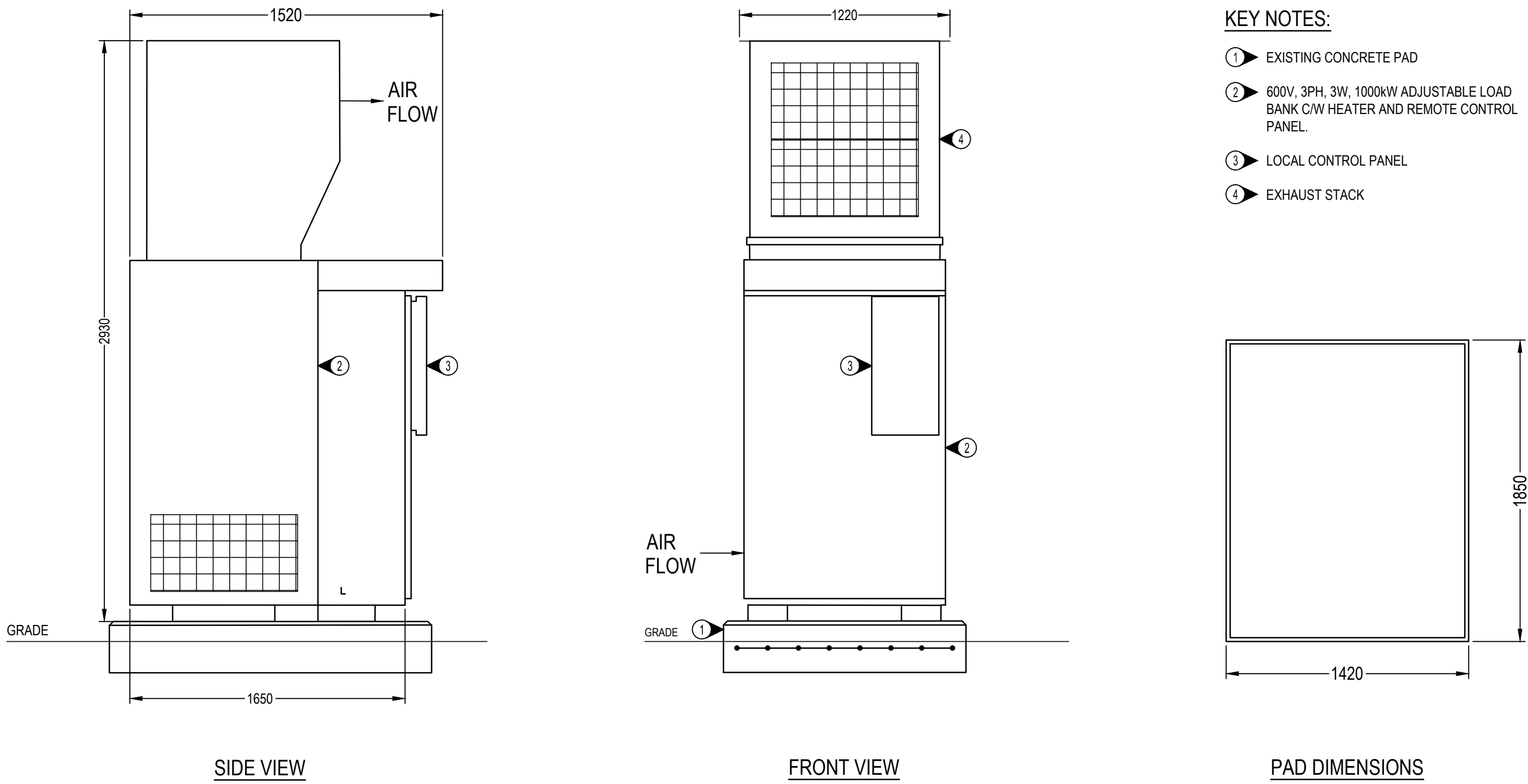
PWGSC Project Manager/Administrateur de Projets TPSGC
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PWGSC Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC
Preetipal Paul

Drawing title/Titre du dessin

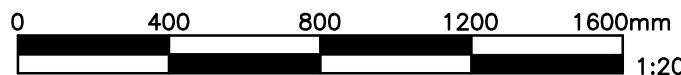
SERVICE ENTRANCE SUBSTATION
LOAD BANK ELEVATION AND DETAILS

Project No./No. du projet R.057890.003	Sheet/Feuille 8424	Revision no./ La Révision no. 5
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1
8424

GENERATOR 1000kW LOAD BANK ELEVATIONS AND DETAILS
1:20





The sketch map shows a city layout with a grid overlay. A rectangular area in the center-right is shaded with diagonal lines. Various buildings and streets are labeled, including 'Mall', 'Museum', 'City Hall', and 'Park'. A compass rose indicates North is towards the top-left.

Technical drawing of a door assembly, showing a cross-section and a top view.

Cross-section (Left): The door is shown with a cross-hatched core. A glass insert is located at the top. The glass insert is labeled with a circled 'G' and a dimension of 22. The door frame is labeled with a circled 'D' and a dimension of 22. The door is shown with a dimension of 22.

Top View (Right): The door is shown with a central glass panel. The glass panel is labeled with a circled 'G' and a dimension of 22. The door frame is labeled with a circled 'D' and a dimension of 22. The door is shown with a dimension of 22.

Dimensions:

- Top view: 990 (Overall width)
- Top view: 8425 (Overall height)
- Top view: 8425 (Overall height)

- ▶ PANEL 6SES–SP–2, 347/600V 3PH 4W, 400A, 42kA WITHSTAND RATED PANEL BOARD. PANEL TO BE BOTTOM ENTRY. PANEL ELEVATION IS ILLUSTRATIVE ONLY, FINAL PANEL LAYOUT TO BE DETERMINED BASED ON SELECTED MANUFACTURER COMPONENT LIMITATIONS. C/W HINGED LOCKABLE DOOR.
- ② MINIMUM 400A/400A LSI 1P/1P 1P/1P 1P/1P BREAKER FOR MOTOR LOADS. TO BE EQUIPPED WITH DIGITAL TRIP UNITS ADJUSTABLE FROM 15–100A. RATED 42kA
- ③ 400AF/300AT LSI G BREAKER FOR FEEDER FROM THIS PANEL TO EXISTING 6SES–SP–1 TRANSFER SWITCH. RATED 42kA
- ④ 400A/400AT LSI G BREAKER FOR FEEDER FROM THIS PANEL TO EXISTING 6SES–SP–1 MAIN BREAKER. RATED 42kA
- ⑤ NOT USED
- ⑥ WIREWAY
- ⑦ 4xGENERATOR CONTROL CELL, FOR GENERATOR CONTROLLER, GENERATOR PROTECTIVE RELAY, GENERATOR METER AND GENERATOR TO BUS CHRONOSCOPE. TO CONTAIN ALL REQUIRED DIN RAILS, MOUNTING DEVICES AND ELECTRONICS TO FORM A COMPLETE AND OPERABLE SYSTEM.
- ⑧ VOLTMETER, KW METER, FREQUENCY METER, KVAR METER, AMMETER, POWER FACTOR METER.
- ⑨ VOLTMETER SELECTOR SWITCH
- ⑩ AMMETER SELECTOR SWITCH
- ⑪ DOOR HANDLE, DOORS TO BE HINGED, WITH 180° SWING
- ⑫ GENERATOR METER, REFER TO SPECIFICATIONS FOR METER REQUIREMENTS
- ⑬ GENERATOR PROTECTION RELAY, REFER TO SPECIFICATIONS FOR RELAY REQUIREMENTS.
- ⑭ GENERATOR CONTROLLER, REFER TO SPECIFICATIONS FOR EQUIPMENT REQUIREMENTS.
- ⑮ EMERGENCY STOP BUTTON

- ④ HORN
- ① MODE SELECTOR SWITCH
- ⑤ GENERATOR BREAKER STATUS LIGHTS: OPEN, CLOSED, TRIPPED
- ③ GENERATOR PLC AND TRANSFER CONTROLLER CELL. TO CONTAIN ALL REQUIRED DIN RAILS, MOUNTING DEVICES AND ELECTRONICS TO FORM A COMPLETE AND OPERABLE SYSTEM.
- ② GENERATOR PLC AND TRANSFER CONTROLLER HMI SCREEN
- ④ NOT USED
- ⑤ MINIMUM 1000MM CLEARANCE AS PER CEC REQUIREMENTS.
- ② CABLE PIT ACCESS LADDER (EXISTING), ENSURE LADDER IS PROPERLY GROUNDED AND BONDED AS PART OF NEW POWER AND CONTROL PANEL INSTALLATION.
- ③ STEEL COVER PLATES OVER PULL PIT (EXISTING), ENSURE PLATES ARE PROPERLY GROUNDED AND BONDED AS PART OF NEW POWER AND CONTROL PANEL INSTALLATION.
- ④ PANEL 2SES-SP-2. 120/208V 3PH 4W, 100A, 10kA WITHSTAND RATED PANEL TO BE BOTTOM ENTRY. PANEL ELEVATION IS ILLUSTRATIVE ONLY, FINAL PANEL LAYOUT TO BE DETERMINED BASED ON SELECTED MANUFACTURER COMPONENT LIMITATIONS. C/W HINGED LOCKABLE DOOR.

JOB NO./NAME	1-16-008 - EGO (SES STANDARD) GENERATION SYSTEM									
PANEL	2-SES-SP2									
SYSTEM	120/200V 3Ø/4W									
TYPE	COP									
LOCATION	SES GENERATOR CONTROL PANEL									
MOUNTING	FLUSH									
NO. CIRCUITS	42									
BUS SIZE	100 A									
SYM. FAULT RATING	10KA									

DESCRIPTION	BRK	POLE	CCT	CCT	POLE	BRK	DESCRIPTION
'2SES-G-1	50	3	01	02	3	50	'2SES-G-2
			03	04			
			05	06			
'2SES-G-3	50	3	07	08	3	50	'2SES-G-4
			09	10			
			11	12			
CONTROL PANEL POWER	15	1	13	14	1	20	SPARE
CONTROL PANEL POWER	15	1	15	16	1	20	SPARE
CONTROL PANEL POWER	15	1	17	18	1	15	T25/12SES-3 SERVICES
CONTROL PANEL POWER	15	1	19	20	2	20	LOAD BANK SERVICES
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			
			31	32			
			33	34			
			35	36			
			37	38			
			39	40			
			41	42			

* CONFIRM BREAKER SIZE WITH GENERATOR SERVICE PANEL AND ADJUST AS REQUIRED AT NO ADDITIONAL COST							
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Revision/ Revision	Description/Description	Date/Date
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Client/client

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

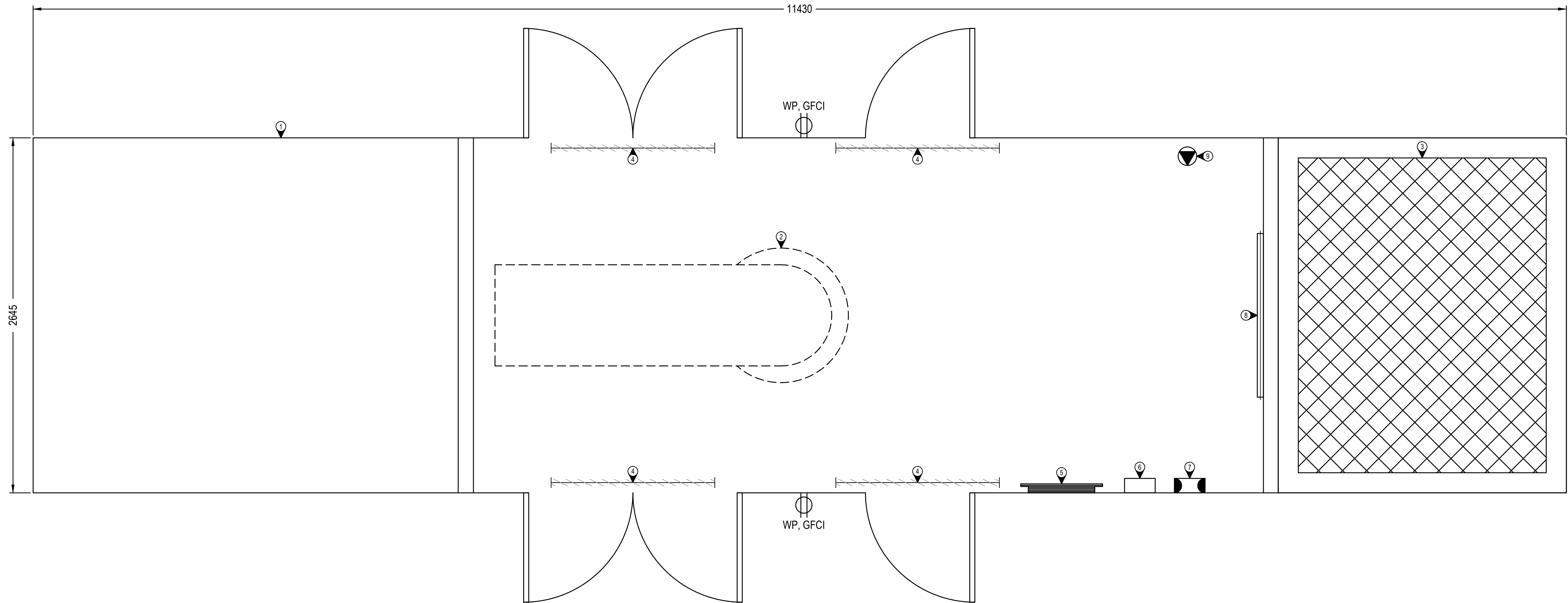
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J. BIELING / S. SEYMOUR

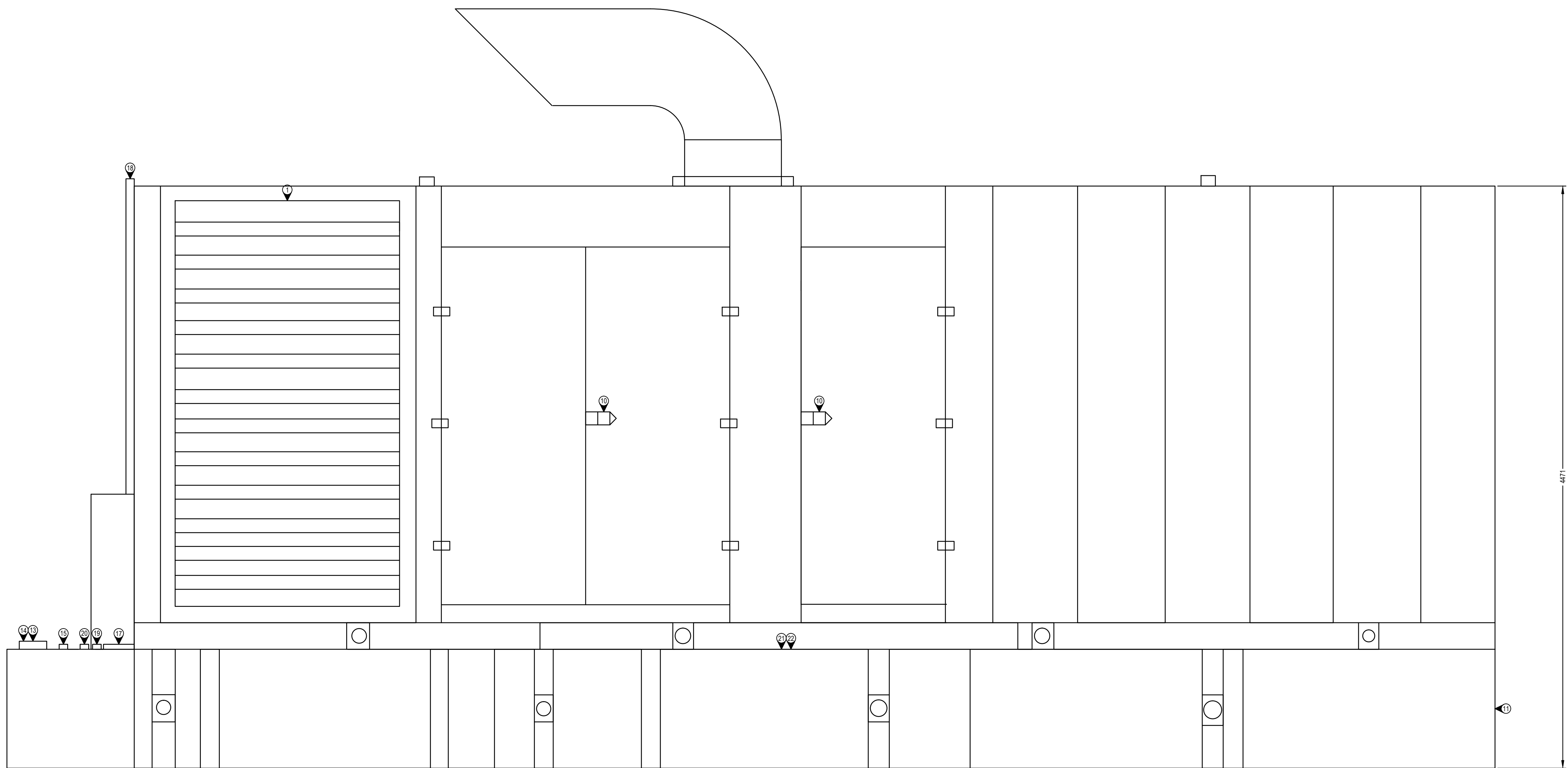
PWGSC, Regional Manager, Architectural and Engineering Services,
 Gestionnaire régionale, Services d'architecture et de génie, TPSGC
Preetipal Paul

SERVICE ENTRANCE SUBSTATION GENERATOR POWER AND CONTROL BOARD DETAILS

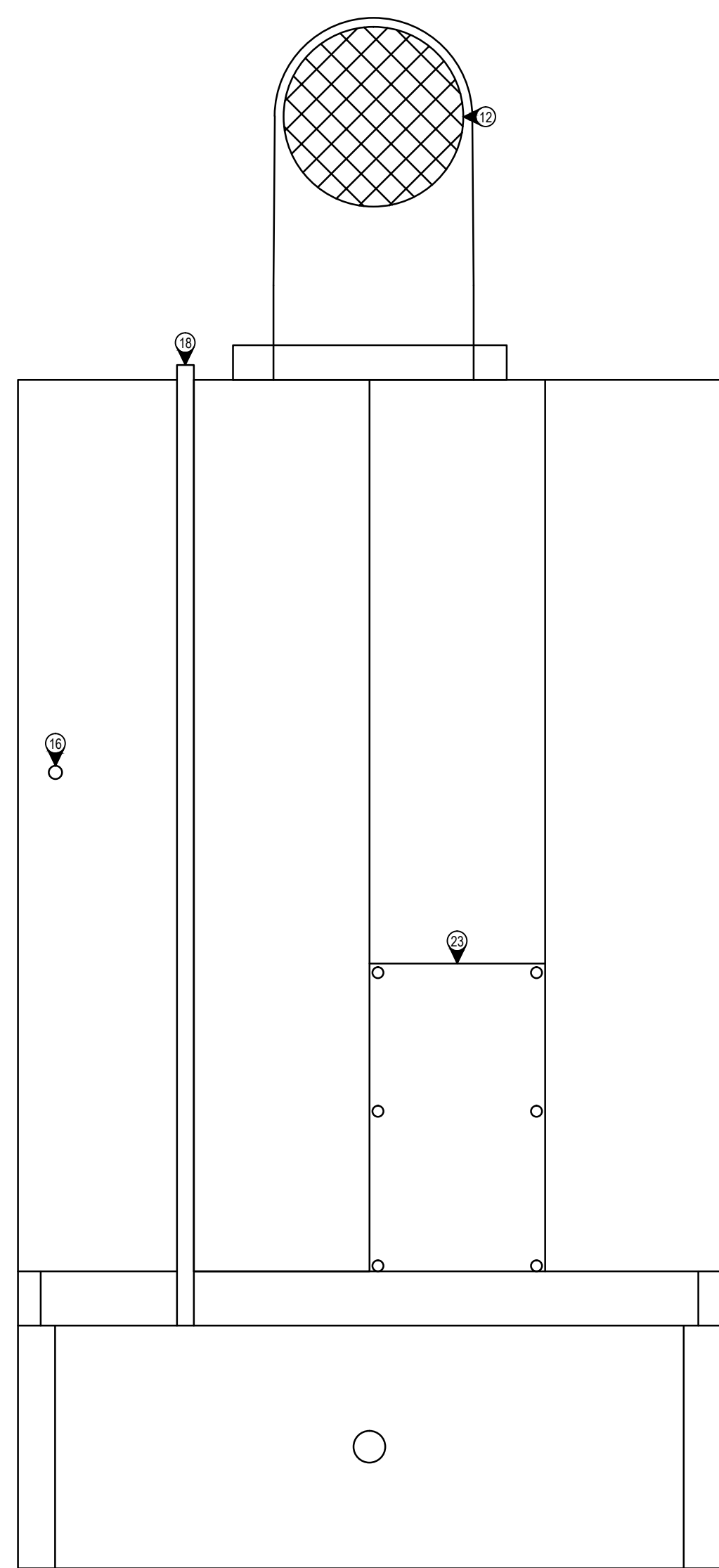
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1
8426
1:20
GENERATOR ENCLOSURE PLAN VIEW



2
8426
1:20
GENERATOR ENCLOSURE AND FUEL TANK SIDE ELEVATION



3
8426
1:20
GENERATOR ENCLOSURE AND FUEL TANK END ELEVATION

GENERAL NOTES:

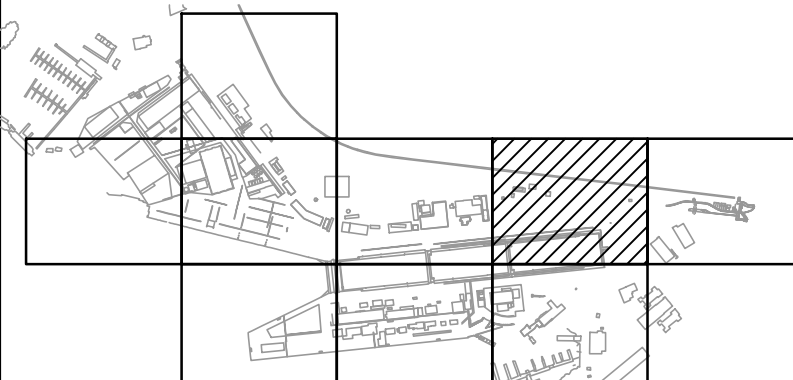
1. REFER TO SPECIFICATIONS FOR GENERATOR CONSTRUCTION AND MATERIAL REQUIREMENTS.
2. DRAWING DIMENSIONS ARE INDICATIVE OF TYPICAL BASIS OF DESIGN UNIT. CONTRACTOR TO DETERMINE FINAL DIMENSIONS AND EQUIPMENT LOCATION AS REQUIRED.

KEYNOTES:

- 1 AIR INTAKE LOUVERS C/W MOTORIZED DAMPERS
- 2 ENCLOSED INSULATED EXHAUST STACK
- 3 AIR EXHAUST GRILL C/W MOTORIZED DAMPERS
- 4 4' 2000 LUMEN LED STRIP LIGHT, 3500K, 10 YEAR WARRANTY FED FROM EMERGENCY LIGHTING BATTERY (KEYNOTE 7). EACH LIGHT INDIVIDUALLY CONTROLLED BY N/O CONTACT ON DOORS.
- 5 NEW 120/240V 100A 12CCT GENERATOR SERVICE PANEL.(2SES-G-X, X IS GENERATOR #)
- 6 GENERATOR BATTERY CHARGER C/W TROUBLE CONTACT FOR CONNECTION TO MONITORING SYSTEM.
- 7 EMERGENCY LIGHTING BATTERY PACK(MINIMUM 2 HOUR BATTERY LIFE)
- 8 1000W GENERATOR ENCLOSURE HEATER
- 9 GENERATOR VENTILATION FAN C/W TIMER AND INTERLOCKED WITH HEATER TO PREVENT SIMULTANEOUS OPERATION.
- 10 GENERATOR DOORS TO BE HINGED, REMOVABLE AND C/W AUTOMATIC DOOR HOLDS. HANDLES TO BE LOCKABLE AND FLUSH MOUNTED.
- 11 GENERATOR BELLY TANK, REFER TO SPECIFICATIONS FOR FUEL VOLUME AND RUNNING TIMES.
- 12 INSTALL BIRD SCREEN IN GENERATOR EXHAUST PIPE TO PREVENT ANIMAL ENTRY.
- 13 TANK FILL PIPE OPENINGS SHALL BE LOCATED OUTSIDE OF THE EQUIPMENT ENCLOSURES AND SHALL BE EQUIPPED WITH TIGHT FILL CONNECTIONS, WITH WEATHERTIGHT COVERS, DESIGNED TO PREVENT TAMPERING.
- 14 TANK FILL CONNECTIONS SHALL BE LOCATED IN SPILL CONTAINMENT DEVICES THAT CONFORM TO ULC/ORD C149.19, CAN/ULC-S663 OR ULC/ORD C58.19.
- 15 VISUAL TANK LEVEL GAUGES SHALL BE PROVIDED AT THE TANK FILL POINTS.
- 16 TANKS SHALL BE PROVIDED WITH AUDIBLE/VISUAL OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 90% OF TANK CAPACITY, LOCATED AT THE FILL POINTS.
- 17 TANK FILL PIPES SHALL BE PROVIDED WITH POSITIVE SHUT OFF OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 95% OF TANK CAPACITY.
- 18 TANK NORMAL AND EMERGENCY VENT PIPES SHALL TERMINATE OUTDOORS AND AT HEIGHTS SPECIFIED IN NFC.
- 19 EACH TANK SHALL BE PROVIDED WITH TWO SPARE 50MM (2") PLUGGED TOP OPENINGS FOR POSSIBLE FUTURE TRANSFER SYSTEM - LOCATION TO BE APPROVED PRIOR TO TANK MANUFACTURE
- 20 EACH TANK SHALL BE PROVIDED WITH SUCTION AND RETURN PIPE CONNECTIONS TO FACILITATE "FUEL POLISHING" - LOCATION AND ARRANGEMENT TO BE APPROVED PRIOR TO TANK MANUFACTURE.
- 21 PROVIDE AS-BUILT DRAWINGS (STAMPED BY A P. ENG) BEFORE THE TANK CAN BE FILLED.
- 22 SUPPLY AND INSTALL THE ENVIRONMENT CANADA IDENTIFICATION LABEL ONCE IT HAS BEEN PROVIDED BY THE DEPARTMENTAL REPRESENTATIVE.
- 23 SUPPLY A MOBILE SPILL RESPONSE KIT WITH A SORBENT CAPACITY OF 350 LITRES FOR EACH GENERATOR



KEYPLAN



Revision/ Revision	Description/Description	Date/Date
6	ISSUED FOR ADDENDUM	16/06/30
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3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		

Client/client

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
I. BARNES

Drawn by/Dessine par
J. BIELING / S. SEYMOUR

PWOSC Project Manager/Administrateur de Projets TPSGC
Jamie LeBlanc

PWOSC Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC
Preetipal Paul

Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION GENERATOR ENCLOSURE ELEVATIONS AND DETAILS

Project No./No. du projet

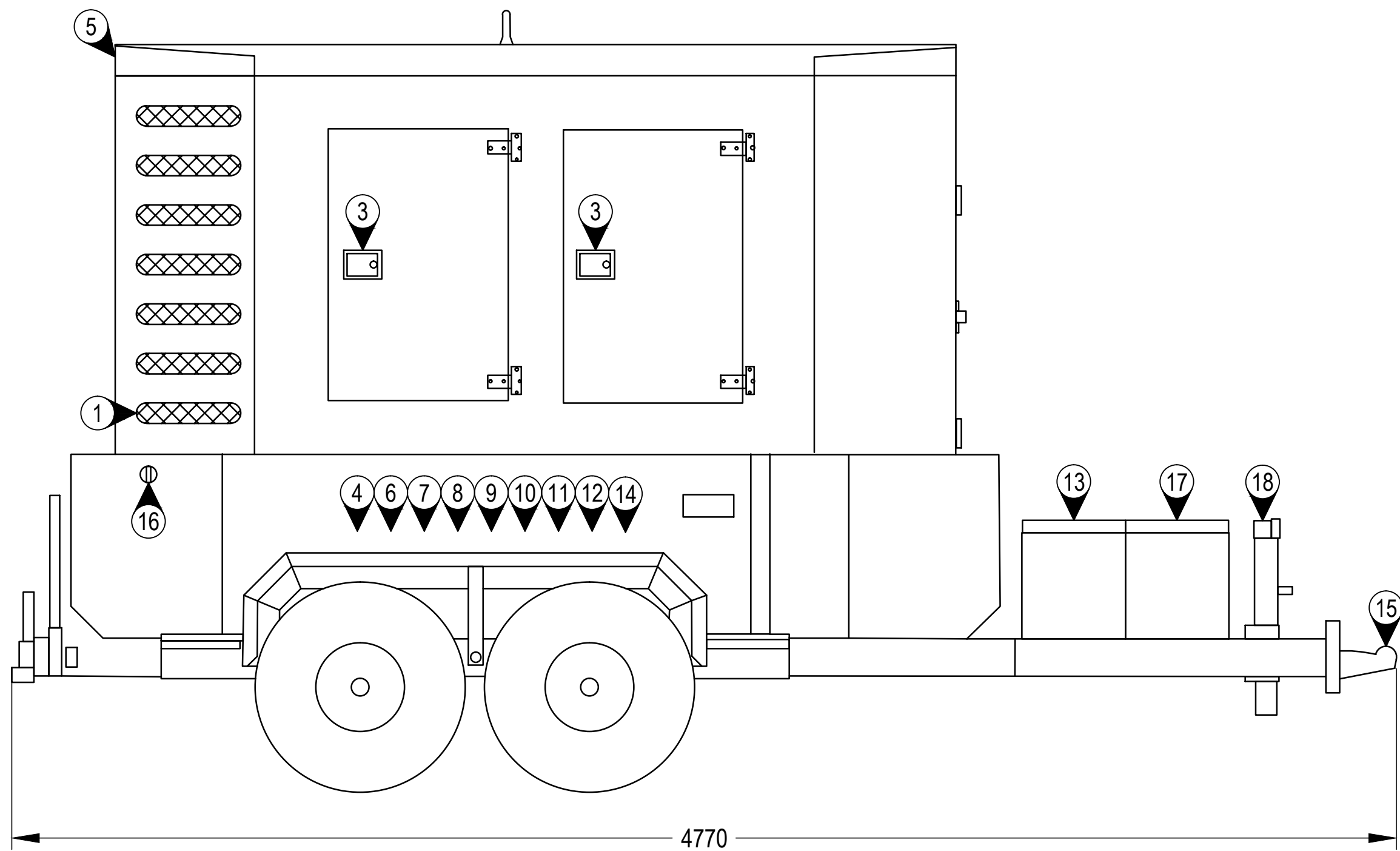
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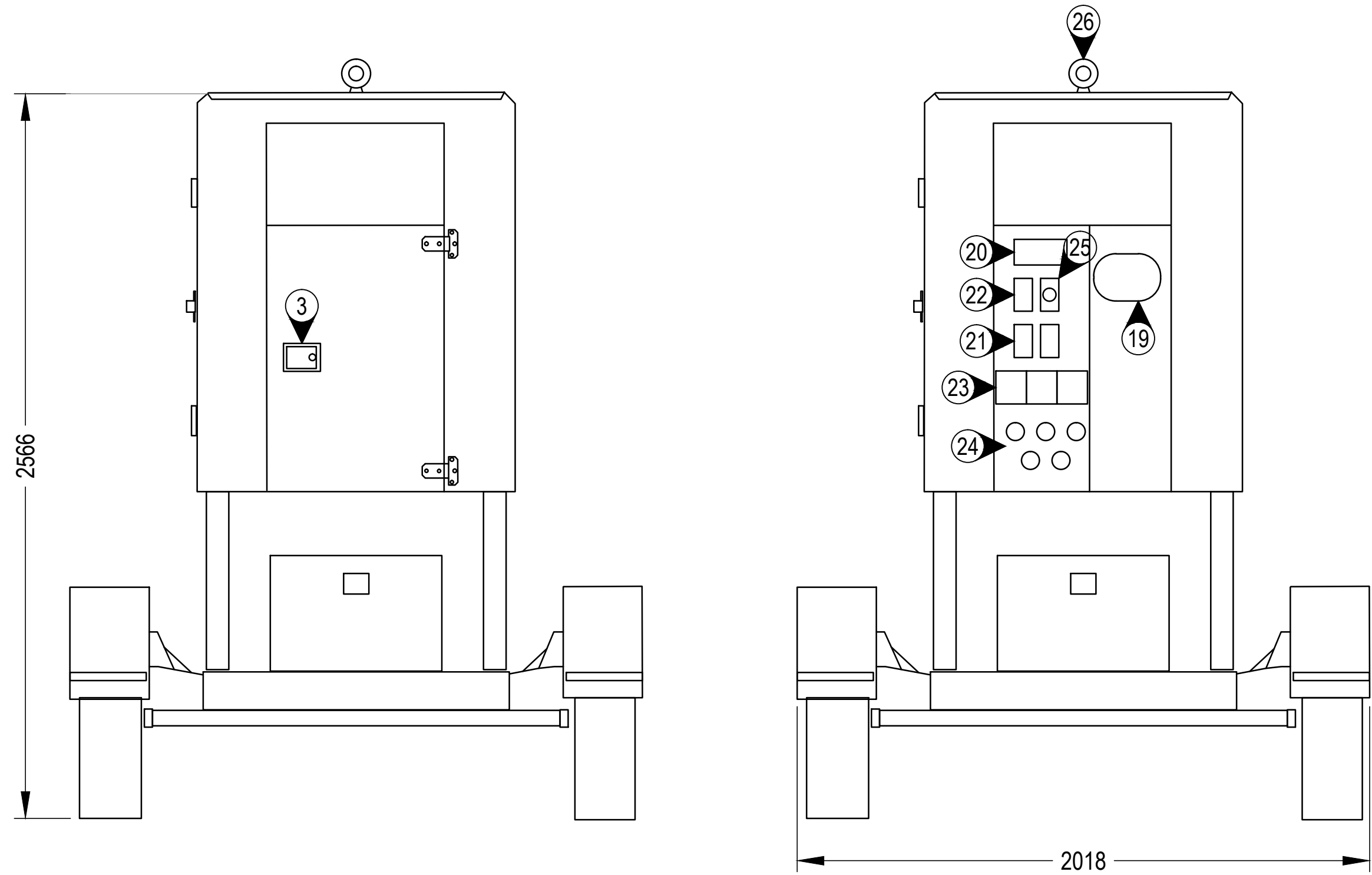
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Revision no./
La Révision
no.

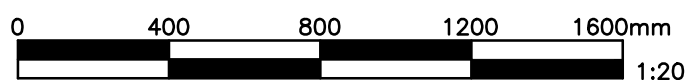
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2
8427
1:10
GENERATOR ENCLOSURE SIDE ELEVATION



3
8427
1:10
GENERATOR ENCLOSURE END ELEVATIONS

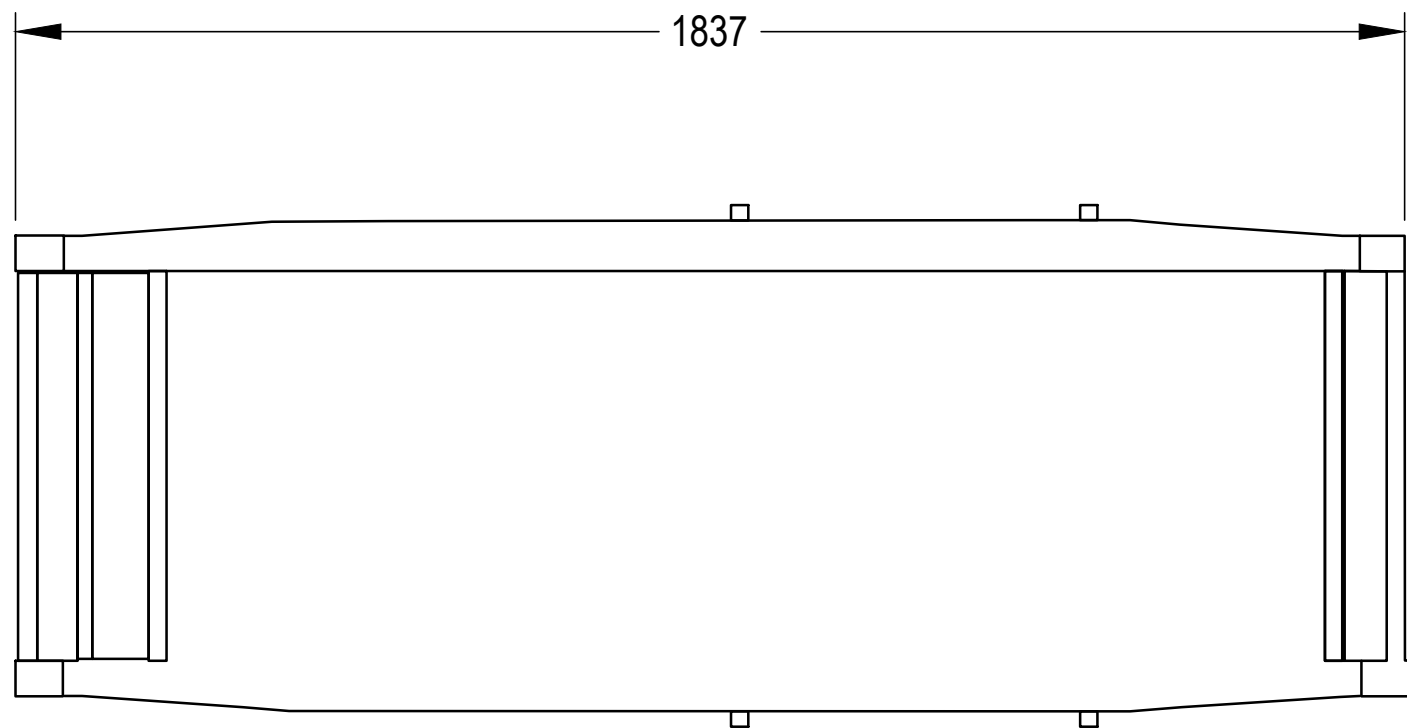


GENERAL NOTES:

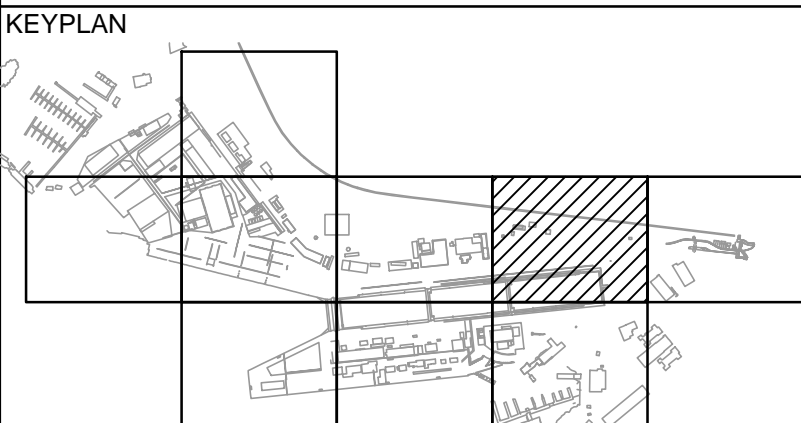
1. REFER TO SPECIFICATIONS FOR GENERATOR CONSTRUCTION AND MATERIAL REQUIREMENTS.
2. DRAWING DIMENSIONS ARE INDICATIVE OF TYPICAL BASIS OF DESIGN UNIT. CONTRACTOR TO DETERMINE FINAL DIMENSIONS AND EQUIPMENT LOCATION AS REQUIRED.

KEYNOTES:

- ➊ AIR INTAKE VENTS
- ➋ NOT USED
- ➌ GENERATOR DOORS TO BE HINGED, REMOVABLE AND C/W AUTOMATIC DOOR HOLDS. HANDLES TO BE LOCKABLE AND FLUSH MOUNTED.
- ➍ GENERATOR BELLY TANK, REFER TO SPECIFICATIONS FOR FUEL VOLUME AND RUNNING TIMES.
- ➎ INSTALL BIRD SCREEN IN GENERATOR EXHAUST PIPE TO PREVENT ANIMAL ENTRY.
- ➏ VISUAL TANK LEVEL GAUGES SHALL BE PROVIDED AT THE TANK FILL POINTS.
- ➐ TANK SHALL BE PROVIDED WITH AUDIBLE/VISUAL OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 90% OF TANK CAPACITY, LOCATED AT THE FILL POINTS.
- ➑ TANK FILL PIPES SHALL BE PROVIDED WITH POSITIVE SHUT OFF OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 95% OF TANK CAPACITY.
- ➒ TANK NORMAL AND EMERGENCY VENT PIPES SHALL TERMINATE OUTDOORS AND AT HEIGHTS SPECIFIED IN NFC.
- ➓ EACH TANK SHALL BE PROVIDED WITH SUCTION AND RETURN PIPE CONNECTIONS TO FACILITATE "FUEL POLISHING" LOCATION AND ARRANGEMENT TO BE APPROVED PRIOR TO TANK MANUFACTURE.
- ➔ PROVIDE AS-BUILT DRAWINGS (STAMPED BY A P. ENG) BEFORE THE TANK CAN BE FILLED.
- ➕ SUPPLY AND INSTALL THE ENVIRONMENT CANADA IDENTIFICATION LABEL ONCE IT HAS BEEN PROVIDED BY THE DEPARTMENTAL REPRESENTATIVE.
- ➖ SUPPLY A MOBILE SPILL RESPONSE KIT WITH A SORBENT CAPACITY OF 100 LITERS
- ➗ FUEL TANK SIZED FOR 24 HOURS OF OPERATION AT 75% LOAD WHEN 50% FULL.
- ➘ BALL HITCH, SIZED TO MATCH EXISTING EGE EQUIPMENT.
- ➙ FUEL TANK FILL POINT C/W LOCK
- ➚ CABLE STOWAGE BOX FOR 16m 5x200A DLO CABLE C/W CAMLOCK CONNECTOR TO MATCH EXISTING EGD GENERATOR CONNECTION POINTS.
- ➛ DROP FOOT JACK
- ➜ DISCONNECT VIEWING WINDOW
- ➝ MOBILE PARALLEL BOX CONNECTOR
- ➞ 2x15A 120V GFCI RECEPTACLES
- ➟ 15A INPUT RECEPTACLE FOR GENERATOR UNIT
- ➠ 3x50A 240V RECEPTACLES
- ➡ 200A CAMLOCKS
- EMERGENCY STOP BUTTON
- ➣ SINGLE POINT LIFTING EYE



1
8427
1:10
GENERATOR ENCLOSURE PLAN VIEW



Revision/ Révision	Description/Description	Date/Date
6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

Drawn by/Dessiné par

J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC

Jamie LeBlanc

PWGSC Regional Manager, Architectural and Engineering Services/
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Preetipal Paul

Drawing title/Titre du dessin

EGD TOWABLE 75kW
GENERATOR ELEVATIONS
AND DETAILS

Project No./No. du projet

R.057890.003

Sheet/Feuille

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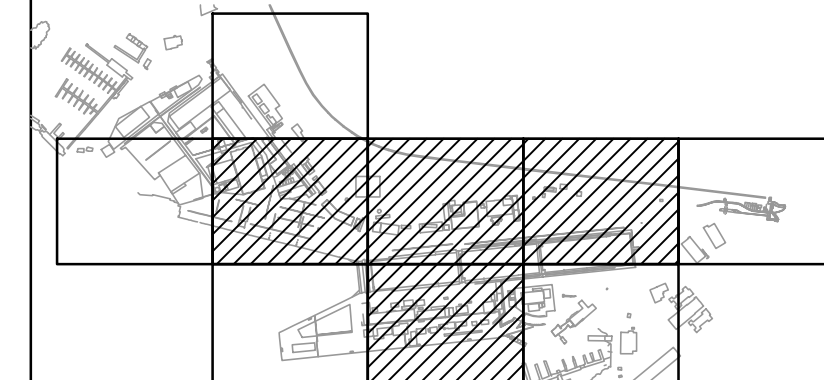
Revision no./
La Révision
no.

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KEYPLAN



Revision		
Client/client		

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet	
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825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept part
I. BARNES

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J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC

Preetipal Paul
PWGSC, Regional Manager, Architectural and Engineering Services/
Gestionnaire régionale, Services d'architecture et de génie, TPSGC

Drawing title/Titre du dessin

EGD TOWABLE GENERATOR CONNECTION LOCATIONS AND DETAILS

Project No./No. du pro

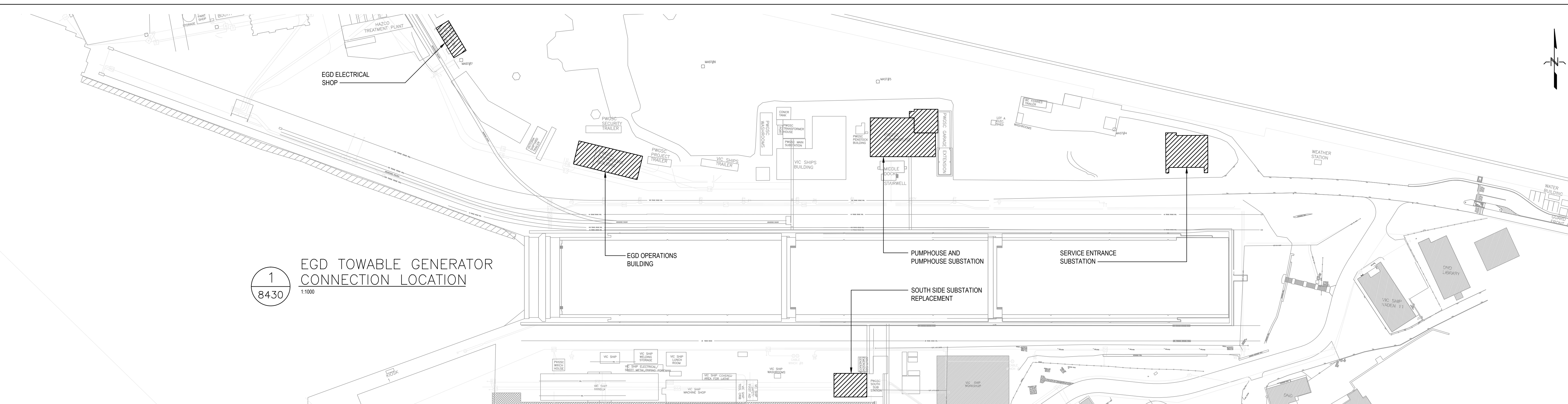
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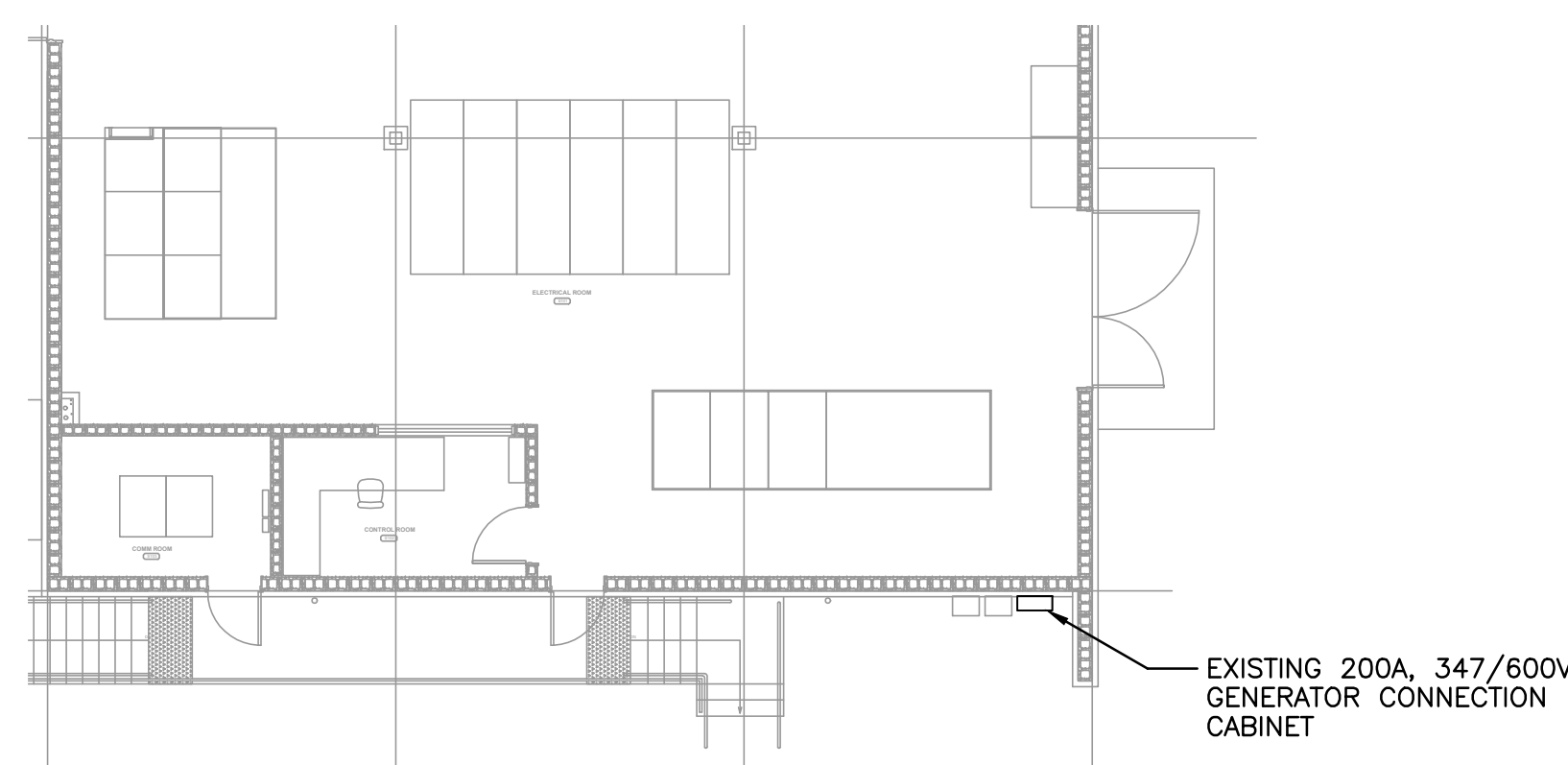
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Revisión no./ La Révision no.

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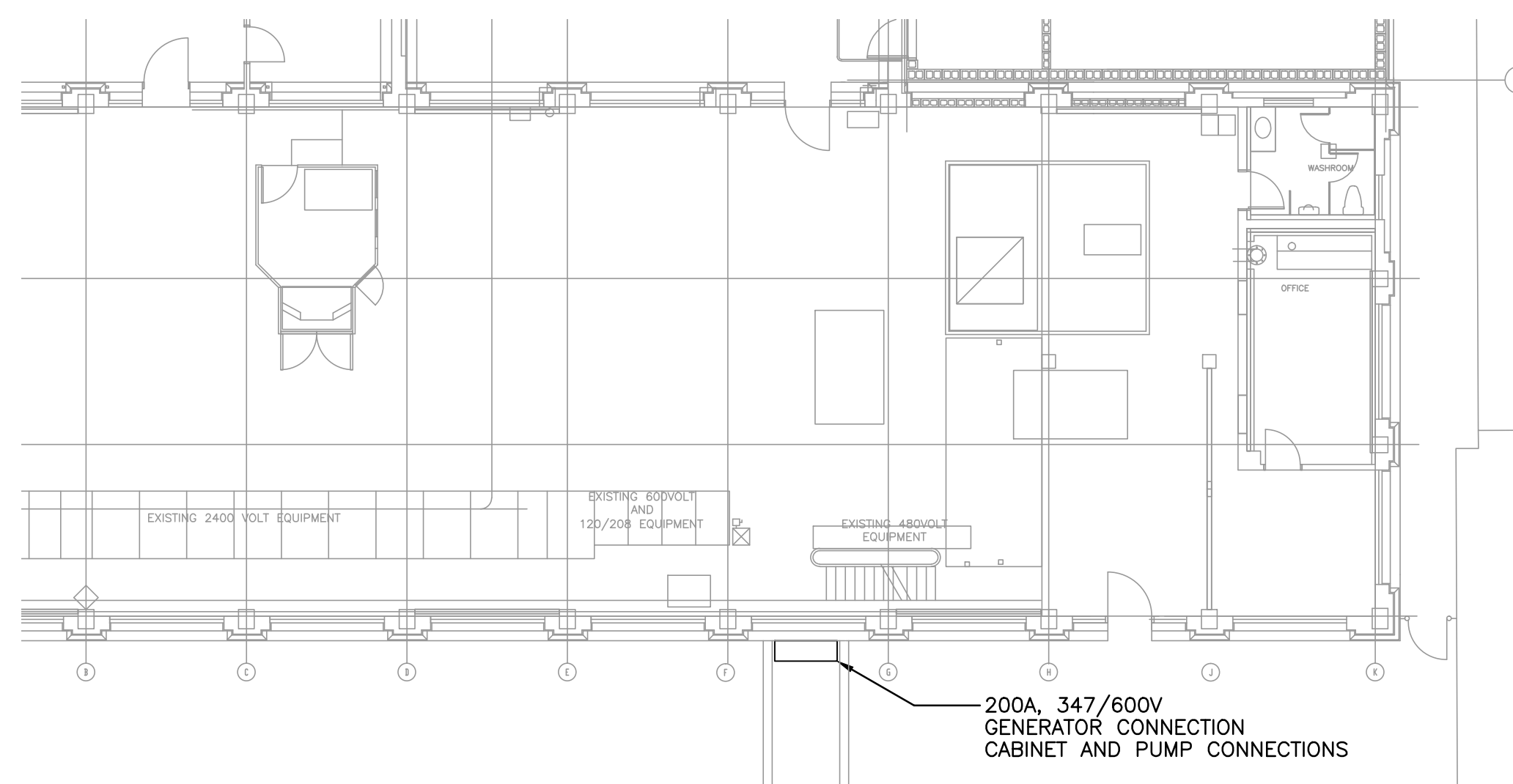
EGD TOWABLE GENERATOR
CONNECTION LOCATION



2
8430

SERVICE ENTRANCE SUBSTATION
CONNECTION LOCATION

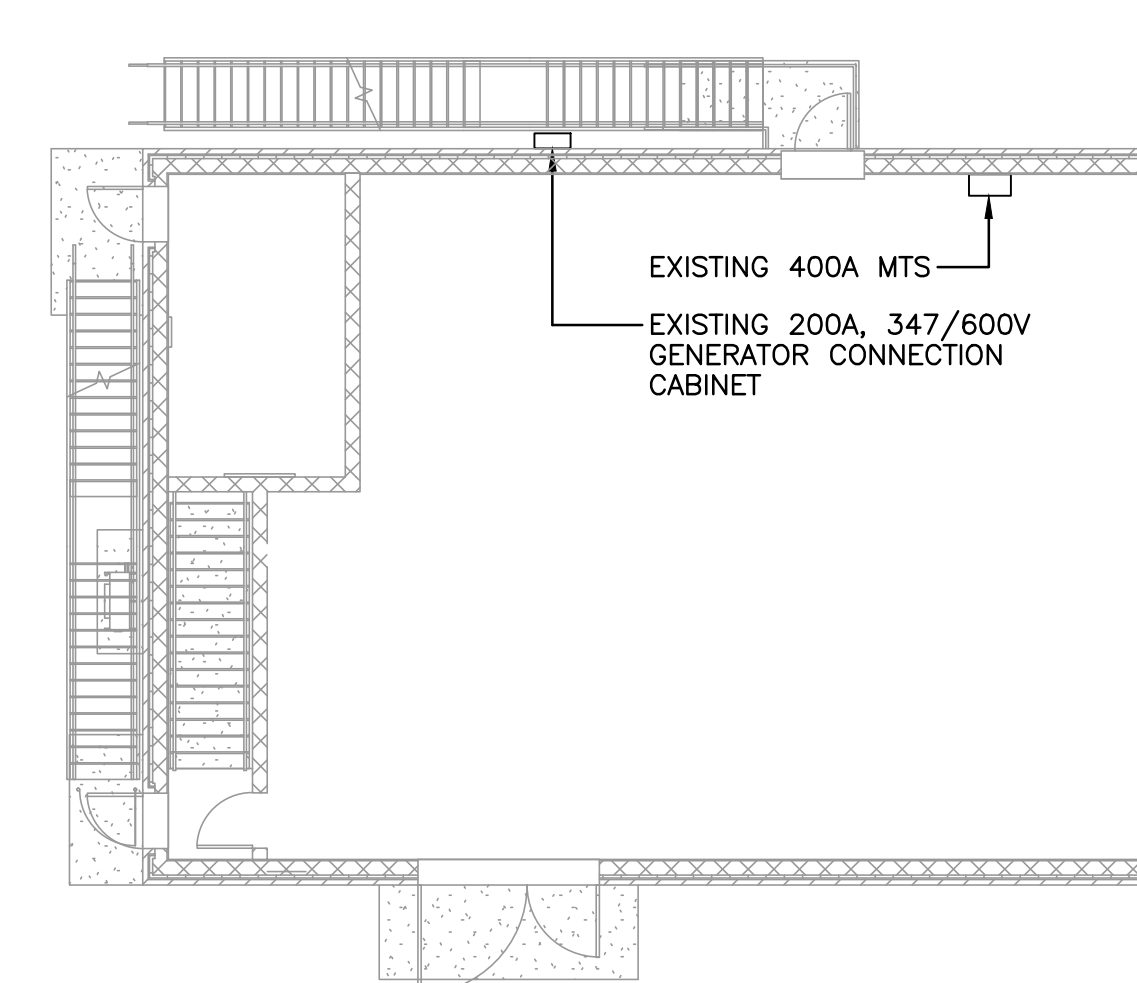
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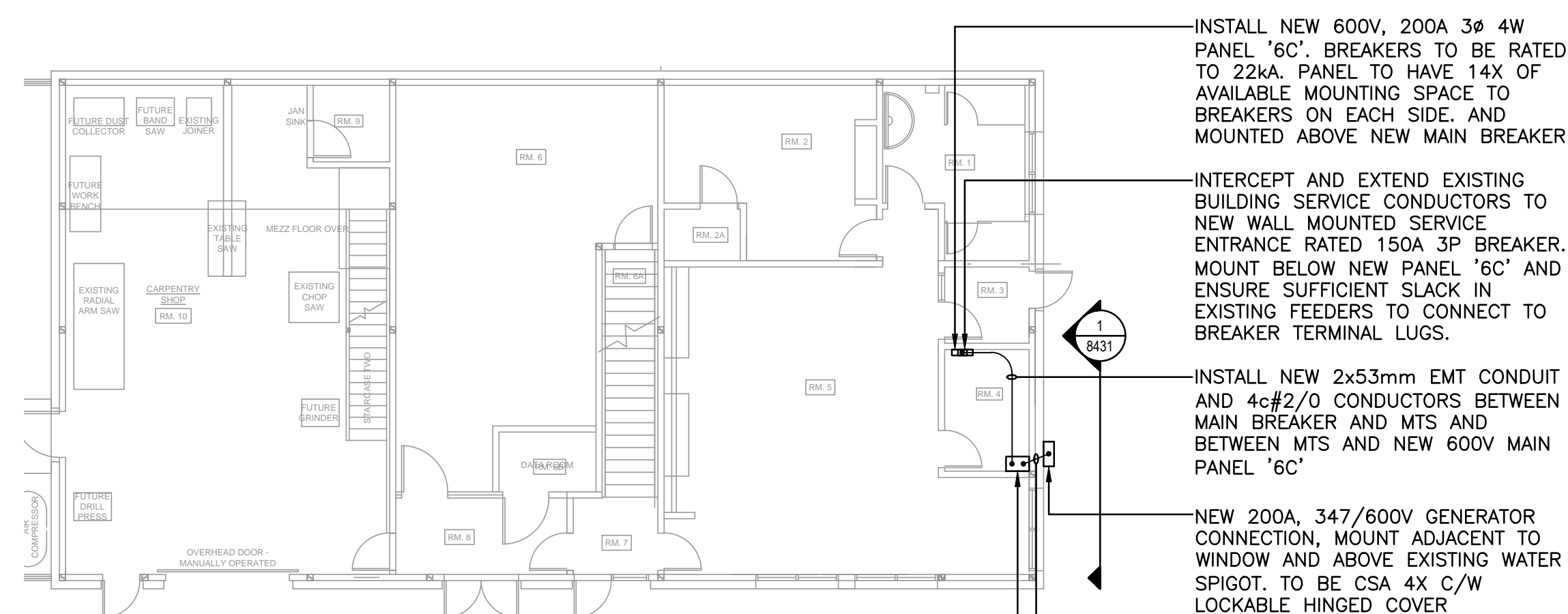


PUMPHOUSE AND PUMPHOUSE SUBSTATION
 EXISTING CONNECTION LOCATION

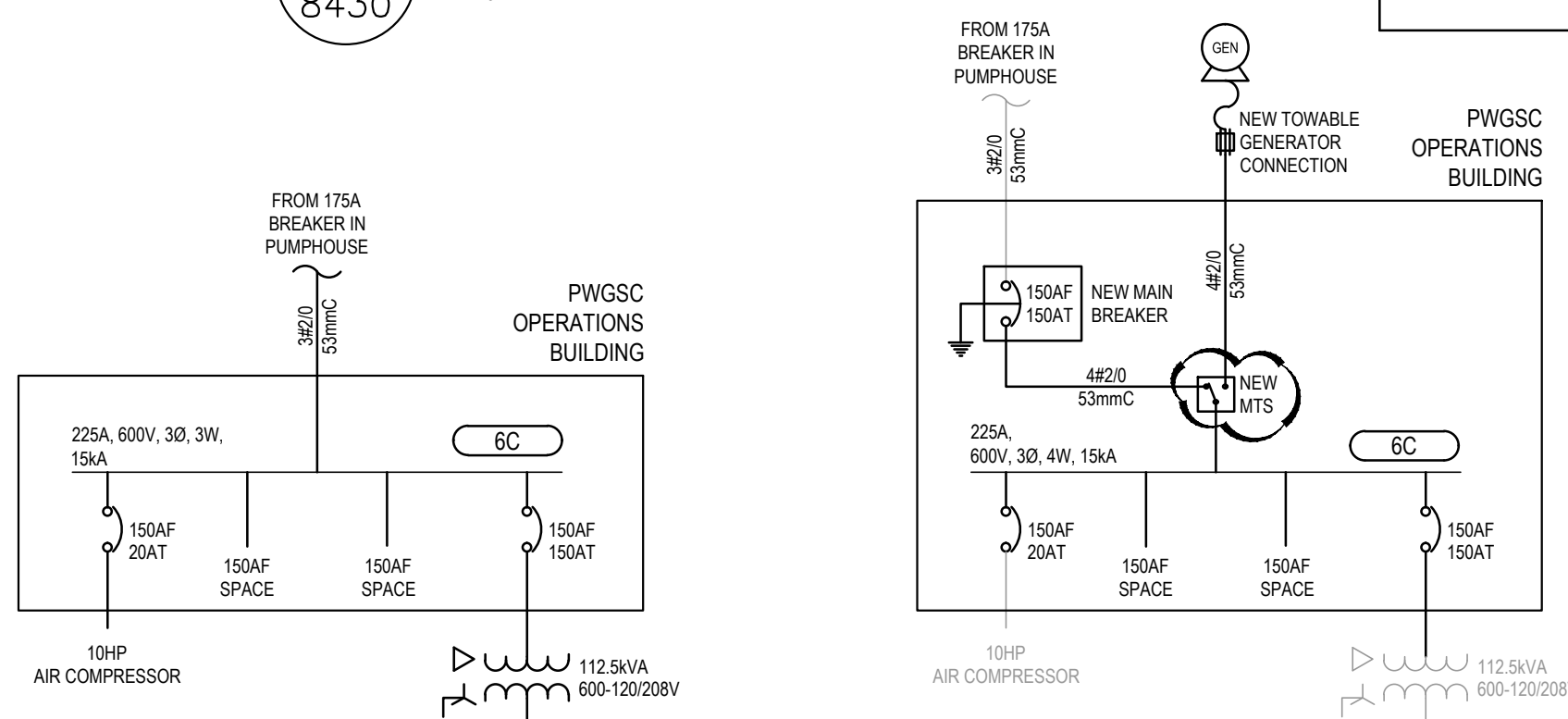
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4 SOUTHSIDE SUBSTATION REPLACEMENT
8430 CONNECTION LOCATION
1:125



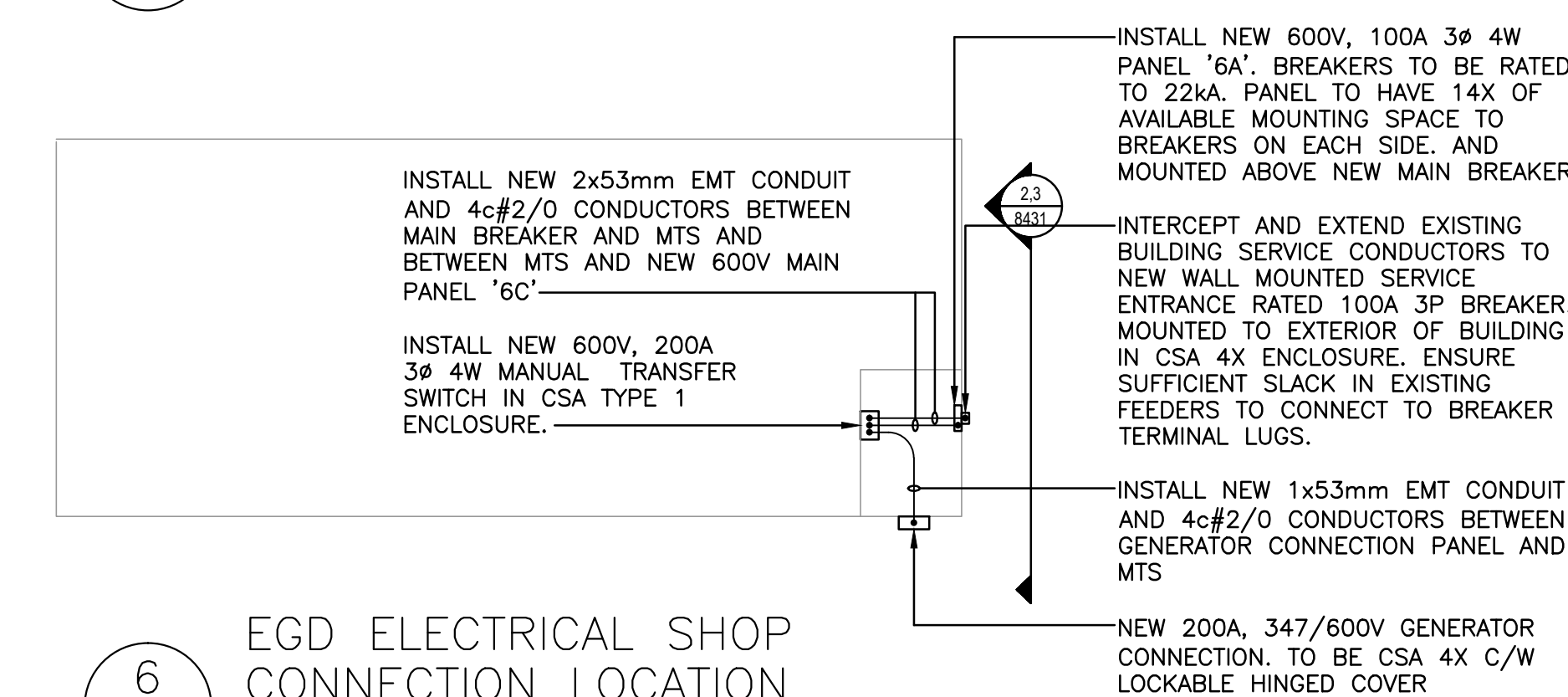
EGD OPERATIONS BUILDING
CONNECTION LOCATION
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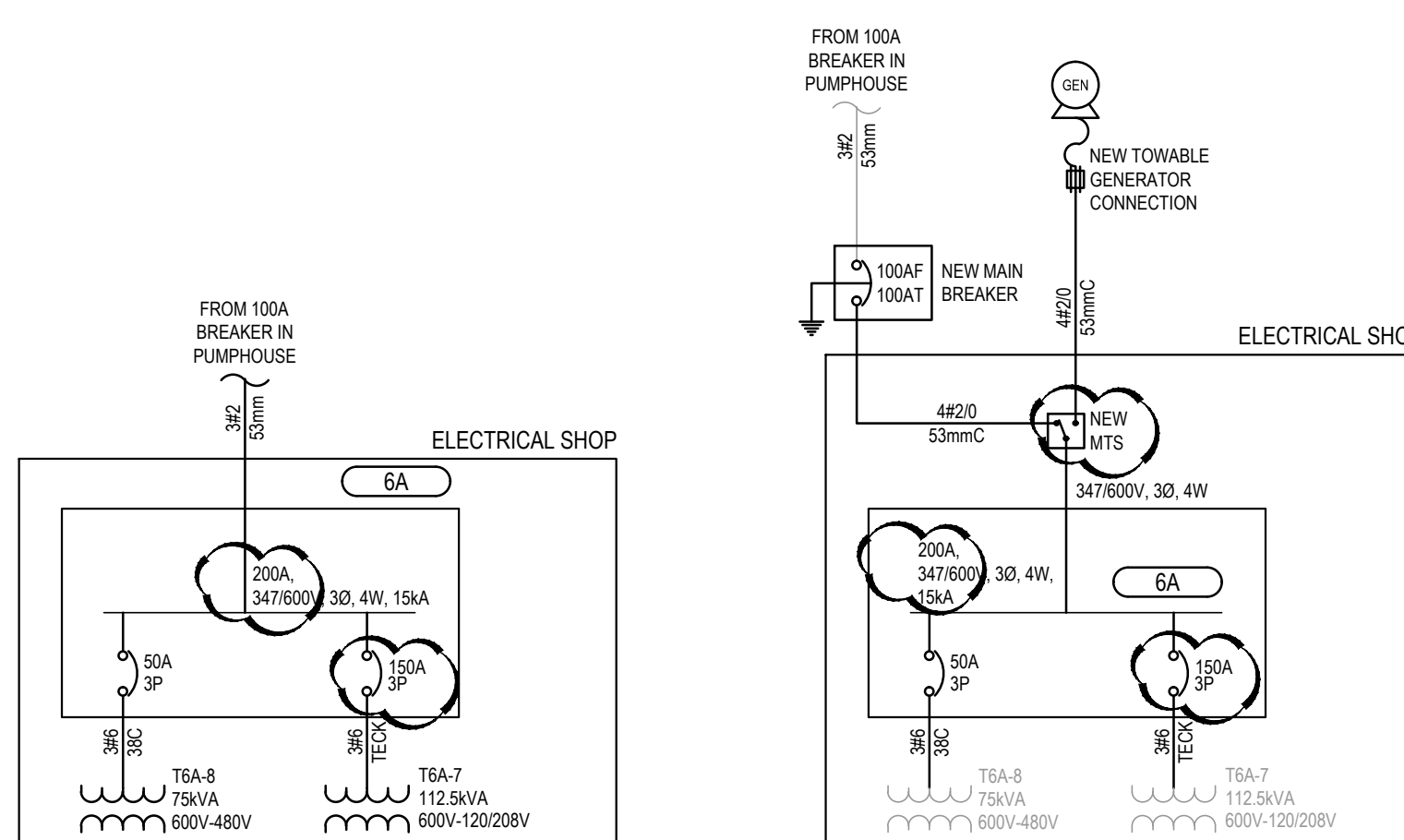
EXISTING SINGLE LINE

REVISÉD SINGLE LINE

EGD OPERATIONS BUILDING
EXISTING AND REVISED SINGLE LINES



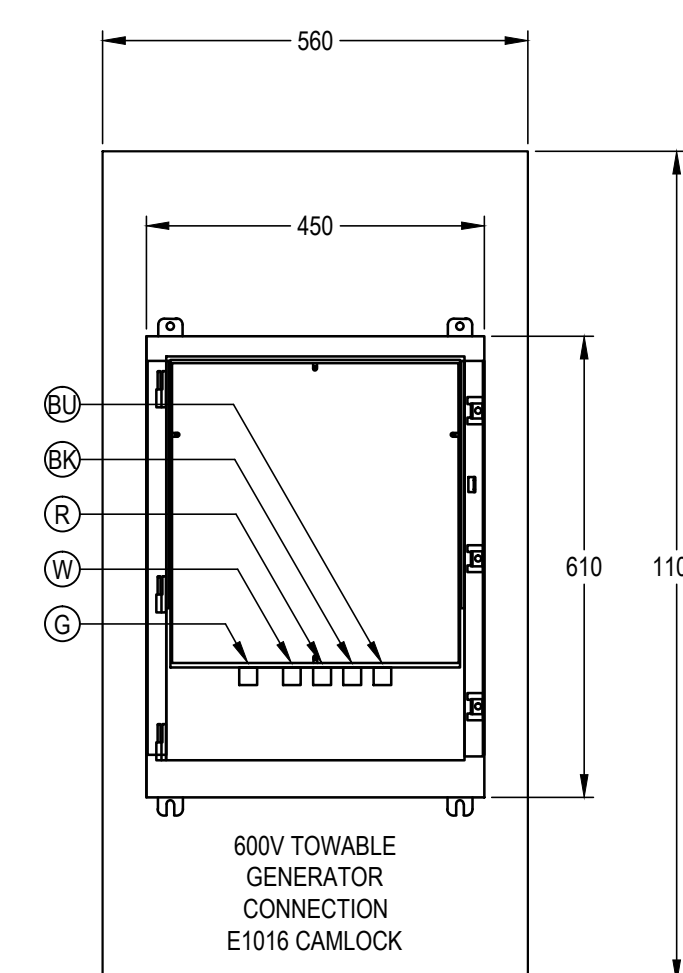
EGD ELECTRICAL SHOP
CONNECTION LOCATION



EXISTING SINGLE LINE

REVISÉD SINGLE LINE

EGD ELECTRICAL SHOP
EXISTING AND REVISED SINGLE LINES




 600V 200A GENERATOR
CONNECTION BOX
 N.T.S.

GENERAL NOTES

1. EXISTING BUILDING SERVICES ARE 600V 3Ø 3W. NEW SERVICE ENTRANCE BREAKERS, WIRING TO NEW PANELS AND WIRING BETWEEN GENERATOR PLUG AND MTS ARE TO BE EQUIPPED WITH NEUTRALS. NEUTRALS TO BE LEFT DISCONNECTED AND PROPERLY COVERED FOR FUTURE WORK ON BUILDING SERVICES.

Plot Date: June 30, 2016 11:46 AM Plotted by: Jacob Biefing
File Name: H:\PROJECTS\2016\1-16-008\DWGS\DWG\B430 GEN TOW CONNECTIONS.DWG





- NEW 1x103mm EMT C. FROM NEW PANEL G6S-SP-2 TO EXISTING SES 400A TRANSFER SWITCH. REFER TO SINGLE LINE DIAGRAM FOR CONDUCTOR SIZING.
- CONNECT NEW GENERATOR AND EQUIPMENT SERVICE PANEL 2SES-SP-2 VIA NEW 1x133mm EMT C. FROM EXISTING PANEL 2SES-SP-1. PANEL TO BE 200A, 120/208V 3Ø 4W 1ØA.
- CONNECT GENERATOR 63SES-SP-2 ATS SERVICE TO EXISTING 800V ATS. DISCONNECT EXISTING MAIN SUBSTATION GENERATOR CABLE AND MAKE SAFE.
- CONNECT GENERATOR CONTROLLER, TRANSFORMER, AND ATS CONTROL AND MONITORING CIRCUITS TO SCADA SYSTEM. REFER TO CONTROL SYSTEM DETAILS FOR ADDITIONAL INFORMATION.
- CONNECT GENERATOR CONTROL BOARD TO EXISTING 125VDC STATION SUPPLY PANEL.
- EXISTING LV AND COMMUNICATION CABLE TRAYS
1x633mm TRAY MOUNTED EMT FOR 125VDC SERVICE.
- NOT USED
- CONNECT GENERATOR BATTERY, LIGHTING AND CONTROL POWER TO NEW 2SES-SP-2 POWER PANEL.
- TRANSFER CONTROLLER DIRECT 1x414mm EMT C. CONNECTIONS TO 25KV VIA EXISTING OVERHEAD CABLE TRAYS.
- TRANSFER CONTROLLER DIRECT CONNECTIONS TO 25KV SWITCHBOARD FOR CLOSED AND OPEN TRANSITION SWITCHING SCHEME.
- CORE THROUGH EXISTING CINDER BLOCK WALL TO ALLOW TRAY SUSPENDED CONDUIT TO PASS THROUGH WALL. SEAL AND FIRE STOP EDGES OF PENETRATION.

THE SCOPE OF THIS CONTRACT DOES NOT INCLUDE THE CIVIL WORKS FOR IN GROUND CONDUIT OR CONCRETE PAD WORK. DETAILS ONLY SHOWN FOR CO-ORDINATION AND INFORMATION PURPOSES ONLY.

6	ISSUED FOR ADDENDUM	16/06/2016
5	ISSUED FOR TENDER	16/05/2016
4	ISSUED FOR 100% REVIEW	16/05/2016
3	ISSUED FOR 75% REVIEW	16/04/2016
2	ISSUED FOR CIVIL COORDINATION	16/03/2016
1	ISSUED FOR SCHEMATIC DESIGN	16/02/2016
0		
Revision/Revision	Description/Description	Date/Date

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

5 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par
J. BARNES

J. BIELING / S. SEYMOUR

PWGSC Project Manager/Administrateur de Projets TPSGC
Jamie LeBlanc

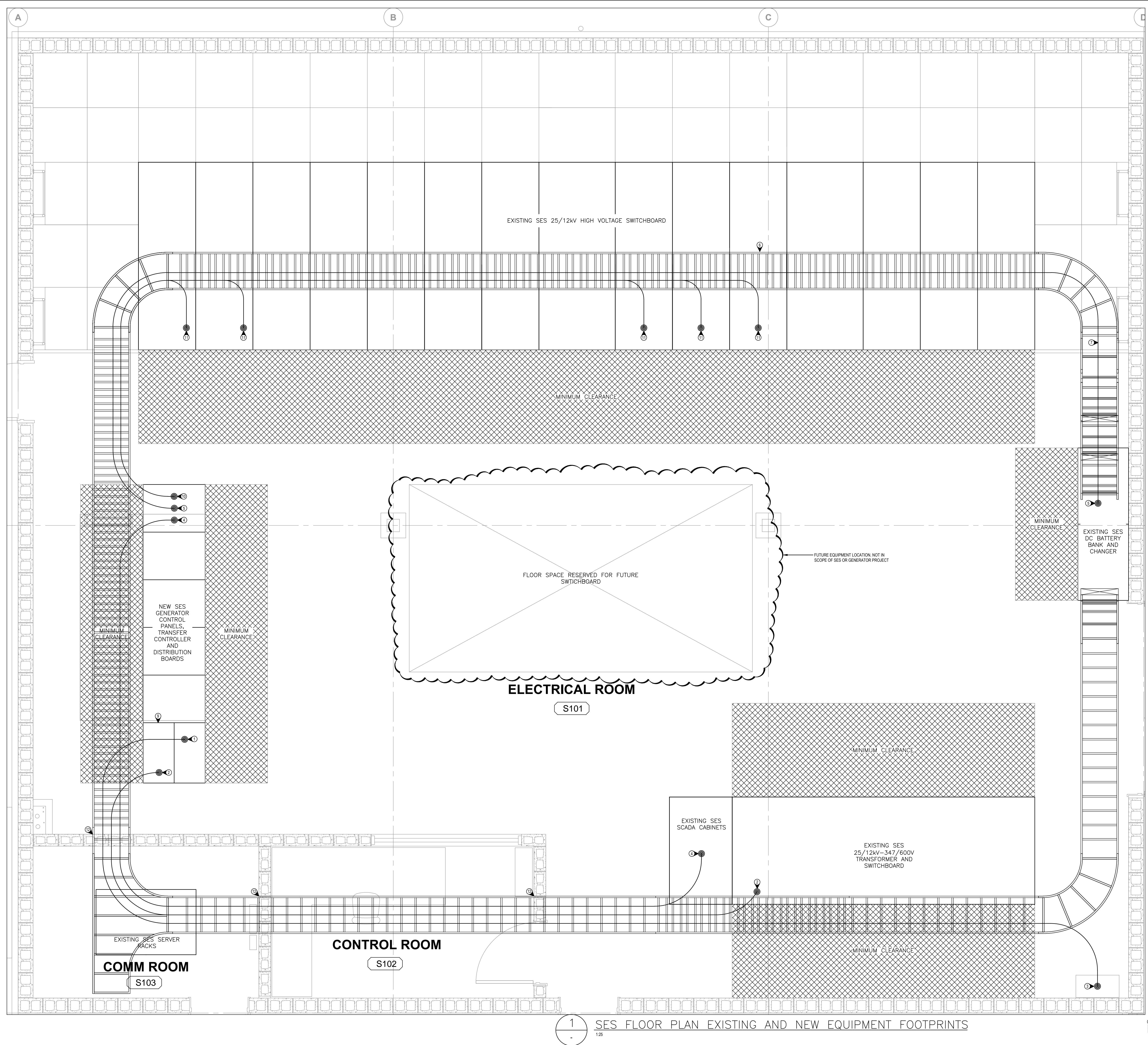
WGSC, Regional Manager, Architectural and Engineering Services/
Région, Services d'architecture et de génie, TPSGC
Preetipal Paul

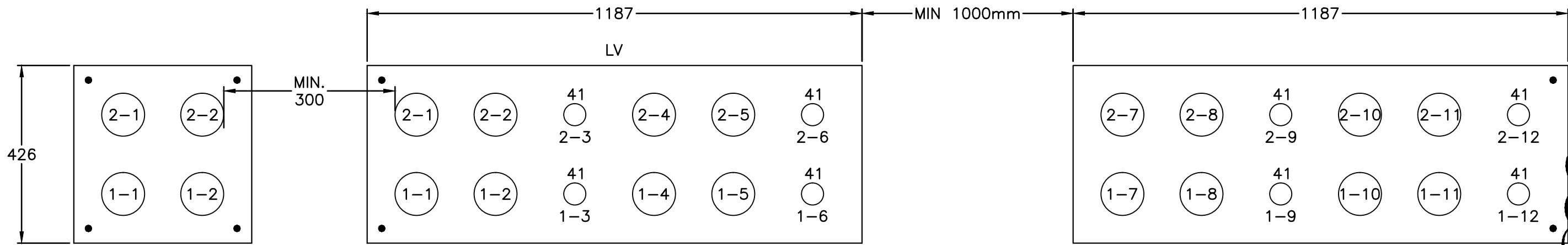
Drawing title/Titre du dessin

SES FLOOR PLAN EXISTING AND NEW EQUIPMENT FOOTPRINTS

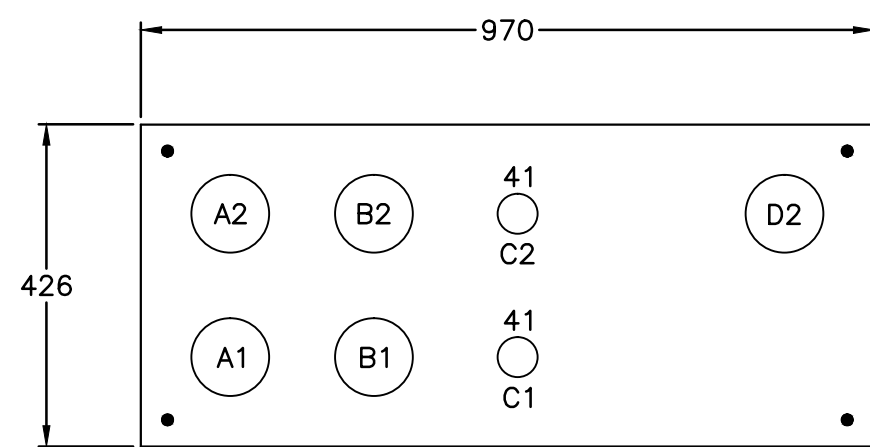
Project No./No. du projet	Sheet/Feuille	Revision no.
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R.057890.003	8432	5
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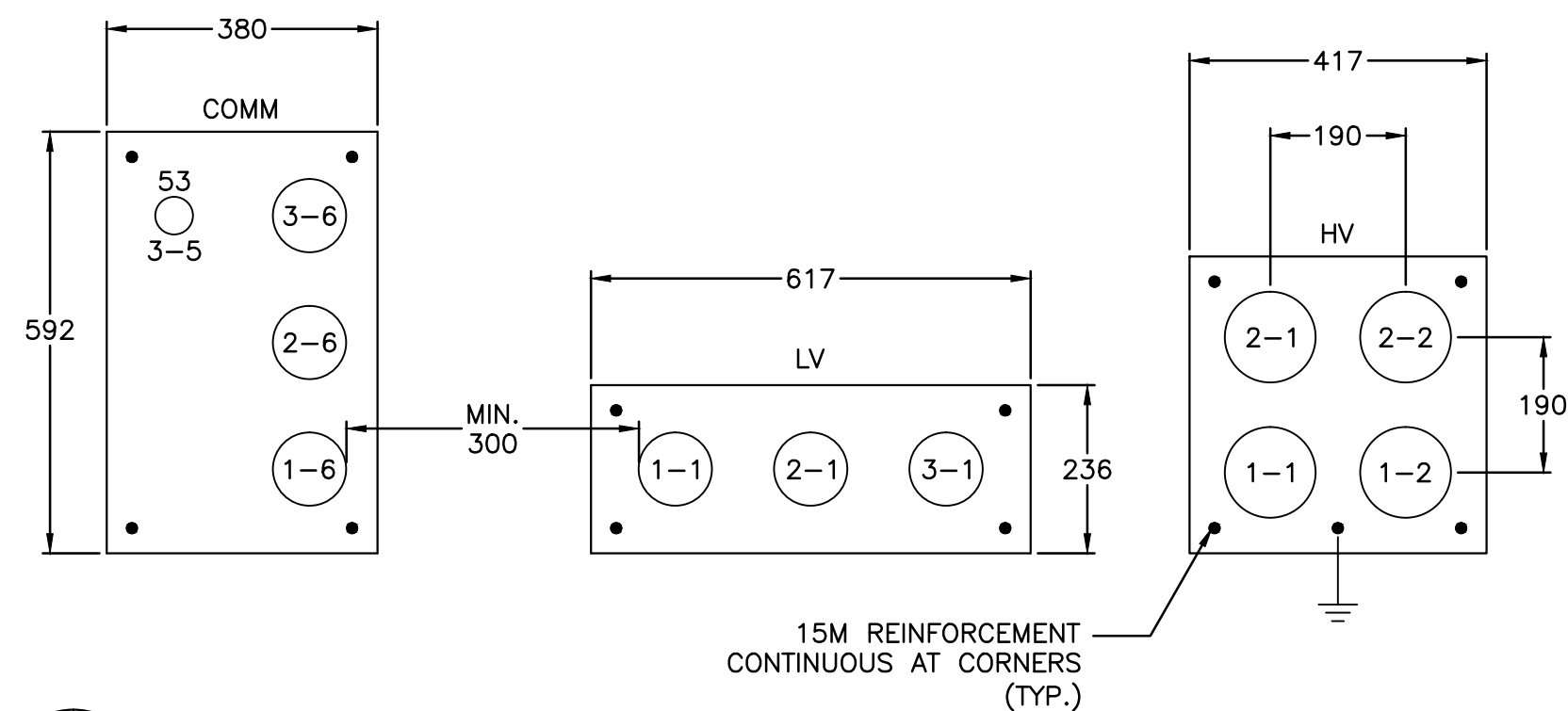
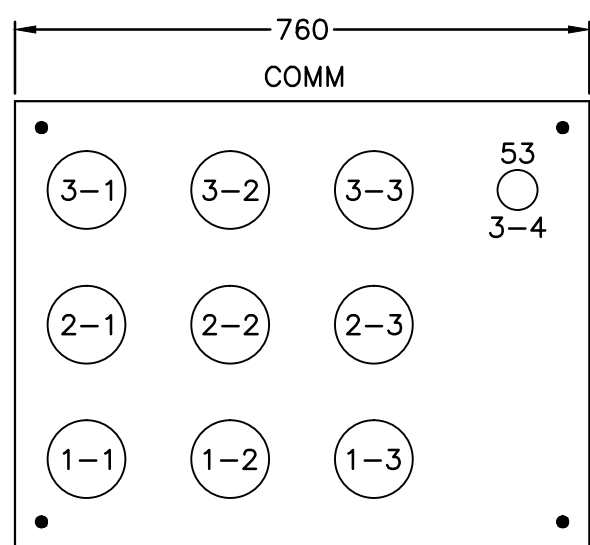




GSES 8433 DUCT SECTION DETAIL
SCALE 1:10



GX 8433 DUCT SECTION DETAIL
SCALE 1:10



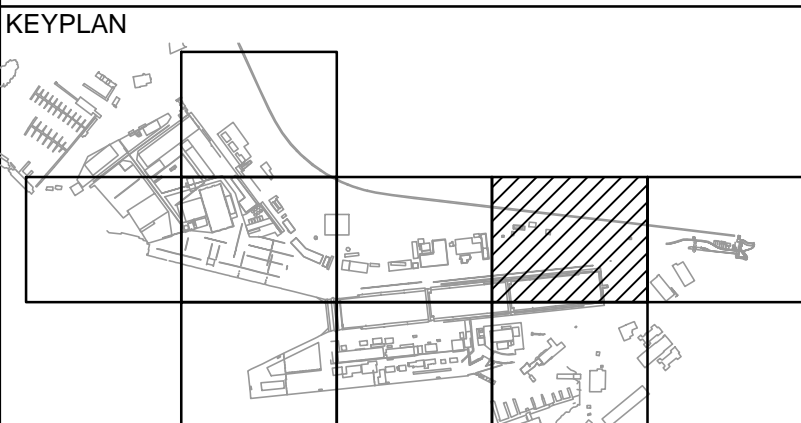
W 8433 DUCT SECTION DETAIL
SCALE 1:10

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
GSES	SES HV STUBS - STEP UP TRANSFORMER	2-2	129	HV	12.5/25kV	3c#4/0	STEP UP TRANSFORMER CIRCUIT
		1-1	103	LV	600V	EMPTY	G4 600V CONDUCTORS 1 OF 4 (FUTURE)
		1-2	103	LV	600V	EMPTY	G4 600V CONDUCTORS 2 OF 4 (FUTURE)
		1-4	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 1 OF 4
		1-5	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 2 OF 4
		1-7	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 1 OF 4
		1-8	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 2 OF 4
		1-10	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 1 OF 4
		1-11	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 2 OF 4
		2-1	103	LV	600V	EMPTY	G4 600V CONDUCTORS 3 OF 4 (FUTURE)
		2-2	103	LV	600V	EMPTY	G4 600V CONDUCTORS 4 OF 4 (FUTURE)
		2-4	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 3 OF 4
	STEP UP TRANSFORMER - GENERATORS	2-5	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 4 OF 4
		2-7	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 3 OF 4
		2-8	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 4 OF 4
		2-10	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 3 OF 4
		2-11	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 4 OF 4
		1-3	41	LV	120/208V	EMPTY	G4 PANEL 2SES-G-4 (FUTURE)
		1-6	41	LV	120/208V	4c#6	G3 PANEL 2SES-G-3
		1-9	41	LV	120/208V	4c#6	G2 PANEL 2SES-G-2
		1-12	41	LV	120/208V	4c#6	G1 PANEL 2SES-G-1
		2-3	41	LV	120/208V	EMPTY	SPARE
		2-6	41	LV	120/208V	EMPTY	SPARE
		2-9	41	LV	120/208V	EMPTY	SPARE
		2-12	41	LV	120/208V	EMPTY	SPARE
	SES - GENERATORS	1-1	103	COMM	N/A	10c#12	G1 CONTROL AND SENSING
		1-2	103	COMM	N/A	10c#12	G2 CONTROL AND SENSING
		2-1	103	COMM	N/A	10c#12	G3 CONTROL AND SENSING
		2-2	103	COMM	N/A	EMPTY	G4 CONTROL AND SENSING (FUTURE)

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
GX	STEP UP TRANSFORMER - GENERATORS	A1	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		B1	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		A2	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		B2	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
	SES - GENERATORS	C1	41	LV	120/208V	4c#6	GX PANEL 2SES-G-X
		C2	41	LV	120/208V	EMPTY	SPARE
	SES - GENERATORS	D2	103	COMM	N/A	10c#12	GENERATOR CONTROL AND SENSING (TYPICAL)

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
W	112HV - STUB	1-1	129	HV	12.5/25kV	EMPTY	FUTURE - LVSP #2
		1-2	129	HV	12.5/25kV	EMPTY	FUTURE
		2-1	129	HV	12.5/25kV	EMPTY	FUTURE - LVSP #2
		2-2	129	HV	12.5/25kV	3c#4/0	GENERATOR STEP UP TRANSFORMER
	113LV - STUB	1-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		2-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		3-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		1-1	103	COMM	N/A	1 COAX	SHAW CABLE
	114C - SES	1-2	103	COMM	N/A	24 SSM, VARIES	FIRE/GENERAL ALARM SYSTEM - 1x24SSM IN SEPERATE INNER DUCTS
		1-3	103	COMM	N/A	144 SSM, 48 SMM, 1 CAT6	1x96 SSM, 1x 48 SSM, 1x48SSM, 1 CAT6 - IN SEPERATE INNER DUCTS
		2-1	103	COMM	N/A	100 PR GEL	TELEPHONE CABLES
		2-2	103	COMM	N/A	EMPTY	FUTURE - FIRE ALARM
		2-3	103	COMM	N/A	EMPTY	FUTURE - LVSP FIBRE
		3-1	53	COMM	N/A	EMPTY	FUTURE
		3-2	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-3	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-4	53	COMM	N/A	EMPTY	FUTURE - FIBRE ONLY
		1-6	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		2-6	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-5	53	COMM	N/A	EMPTY	FUTURE - LVSP FIBRE
	114C - STUB	3-6	103	COMM	N/A	EMPTY	FUTURE - FIRE ALARM

- GENERAL NOTES:
- CONDUIT IN GROUND WORK HAS ALREADY BEEN COMPLETED. SCOPE OF THIS CONTRACT IS RELATED TO INSTALLATION OF ABOVE GROUND CONDUITS AND ALL CONDUCTORS.
 - ALL HV CONDUITS ON THIS DRAWING ARE 129mm. ALL OTHER CONDUITS ON THIS DRAWING ARE 103mm UNLESS NOTED OTHERWISE.
 - ALL CONCRETE ENCASED CONDUITS ARE SCHEDULE 40 RIGID PVC CONDUITS.
 - REINFORCE DUCT BANKS WITH 15M BARS RUN CONTINUOUSLY IN ALL 4 CORNERS OF THE DUCT BANK.
 - INSTALL TWO CONTINUOUS 4/0 AWG INSULATED COPPER GROUND CONDUCTORS IN THE BOTTOM OF EVERY DUCT BANK. TIE IN GROUNDS AT EVERY MANHOLE AND DISTRIBUTION CENTRE TO PROVIDE ELECTRICAL CONTINUITY SITE WIDE. INSULATED GROUND CONDUCTORS ARE IDENTIFIED IN THE CROSS-SECTIONS WITH THE GROUND SYMBOL.
 - PROVIDE ADDITIONAL GROUNDS WHERE DUCT BANKS FAN OUT INTO SEPARATE MANHOLES.
 - BOND ALL METAL RACKING LOCATIONS IN EVERY MANHOLE.
 - USE UNDERGROUND DUCT SPACERS WITH 190mmx190mm DUCT CENTRE TO CENTRE MEASUREMENT.
 - ALL CONDUITS MUST BE ENCASED IN A MINIMUM OF 50mm OF CONCRETE.
 - MAINTAIN MINIMUM 300mm SEPARATION BETWEEN COMMUNICATIONS CONDUITS AND POWER CONDUITS. INSTALL 3 DEDICATED 103mm DEDICATED FIBER OPTIC ONLY DUCT IN THE 300mm SPACE BETWEEN THE LOW VOLTAGE AND THE COMMUNICATIONS CONDUITS.
 - HV-BCH DUCTBANK SHALL BE INSTALLED IN ACCORDANCE WITH BC HYDRO STANDARDS AND CANADIAN ELECTRICAL CODE REQUIREMENTS.
 - ALL DUCTBANKS SHALL BE INSTALLED IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE.
 - REFER TO SITE PLANS FOR SPACING BETWEEN DUCTBANKS.
 - ALL DUCTWORK AND ASSOCIATED EQUIPMENT PROVIDED FOR A COMPLETE, FUNCTIONING AND BC HYDRO APPROVED PRIMARY DELIVERY SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE BC HYDRO PRIMARY GUIDE, THE BC HYDRO PRIMARY METERING GUIDE, AND THE BC HYDRO DISTRIBUTION STANDARD ESS4- SERIES INCLUDING, BUT NOT LIMITED TO, ALL SECTIONS PERTAINING TO DUCT, MANHOLES, DRAINAGE, TRENCHING, ENCASEMENT, MARKING, CONNECTIONS, GROUNDING AND ENGINEERING.



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/Revision	Description/Description	Date/Date

Client/client

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD - VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

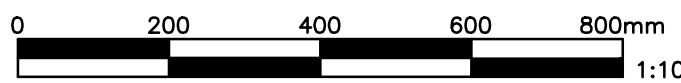
Consultant Signature Box Only

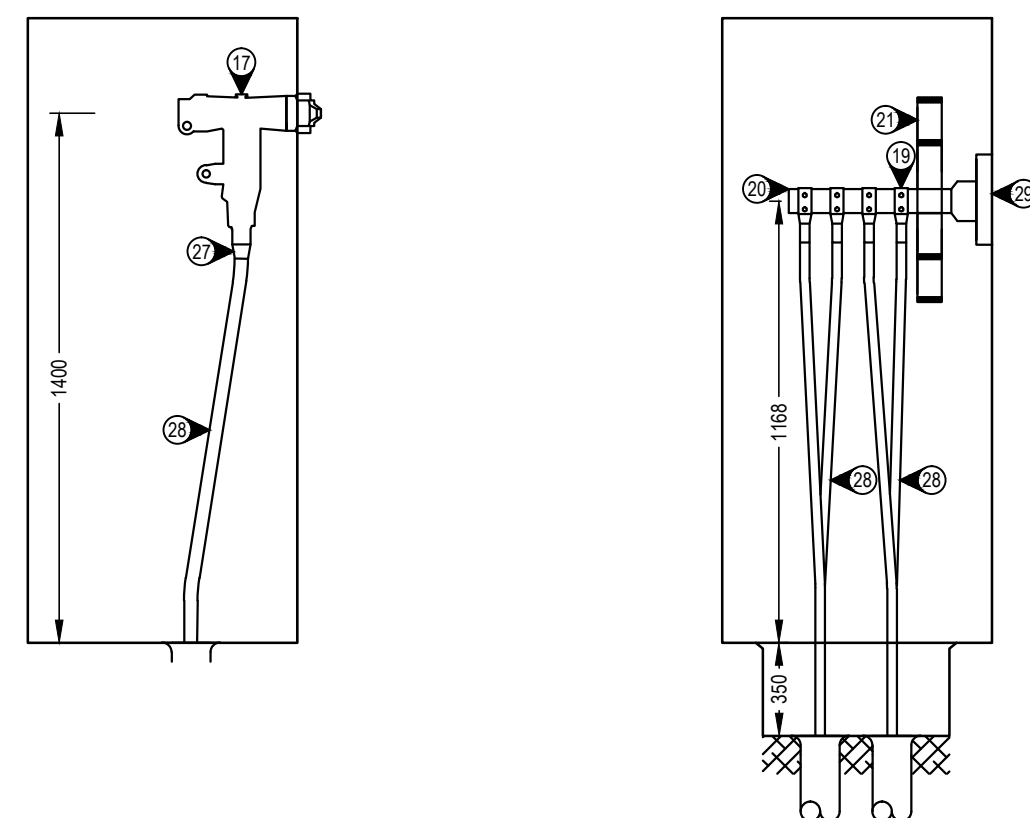
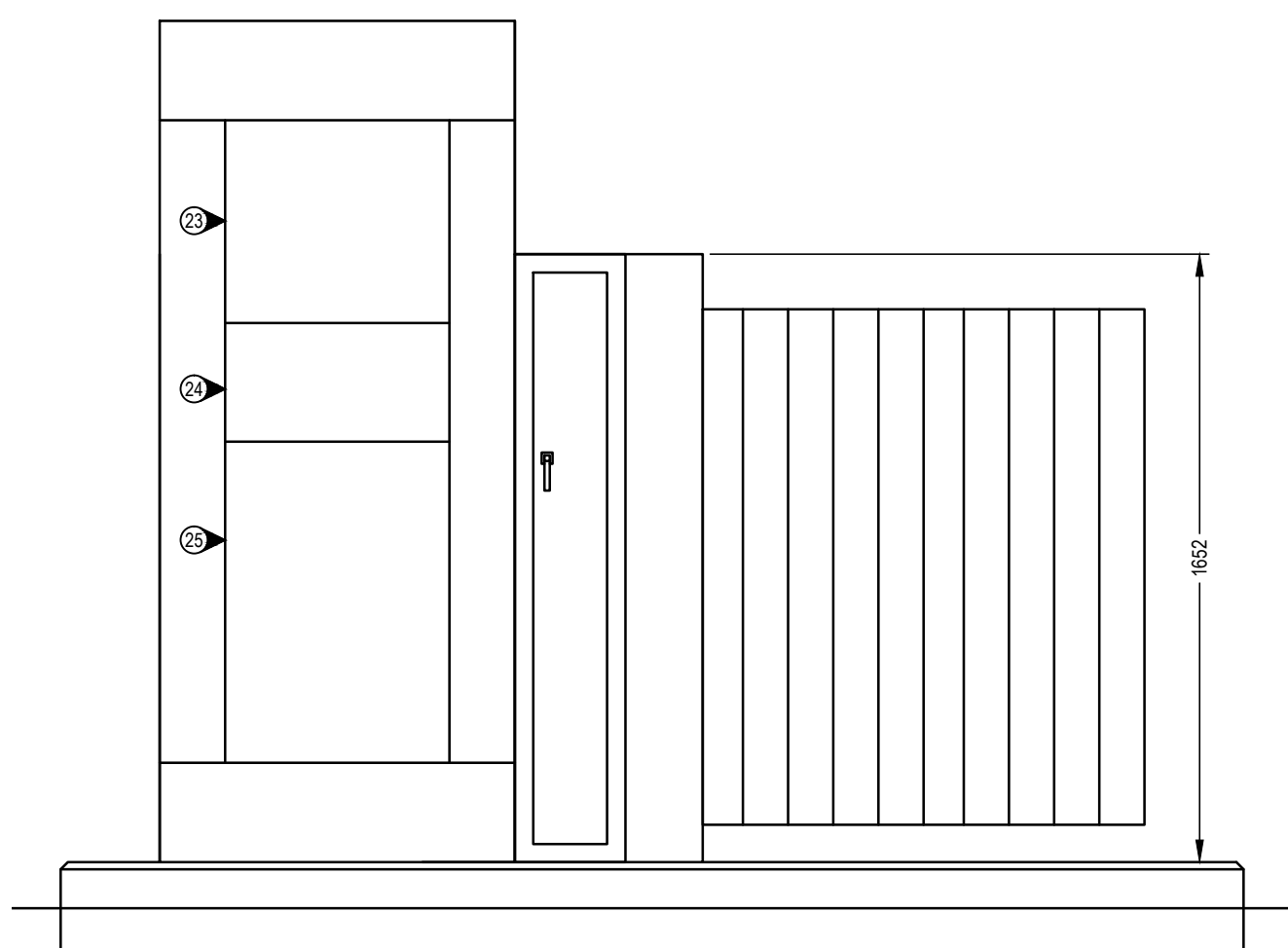
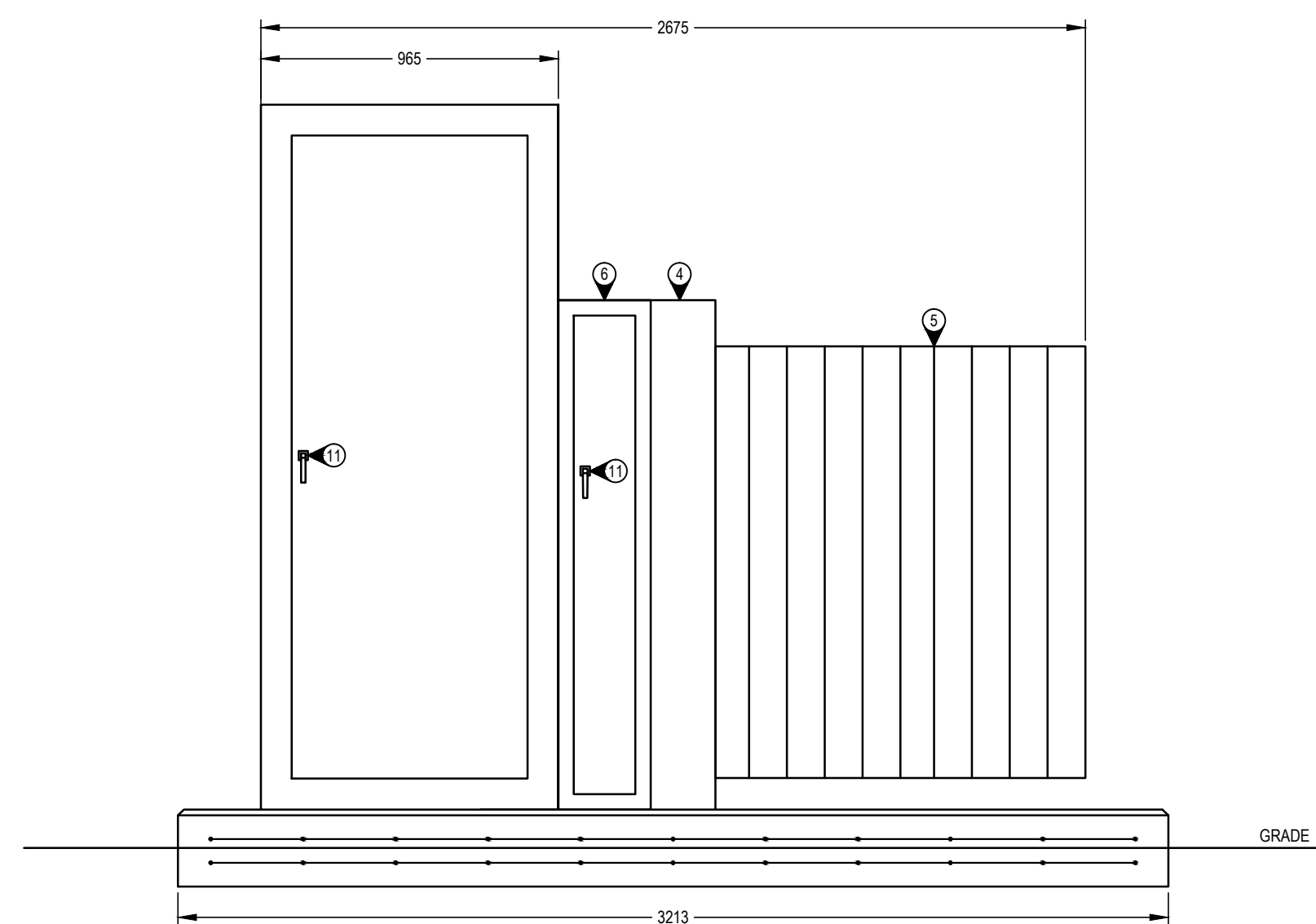
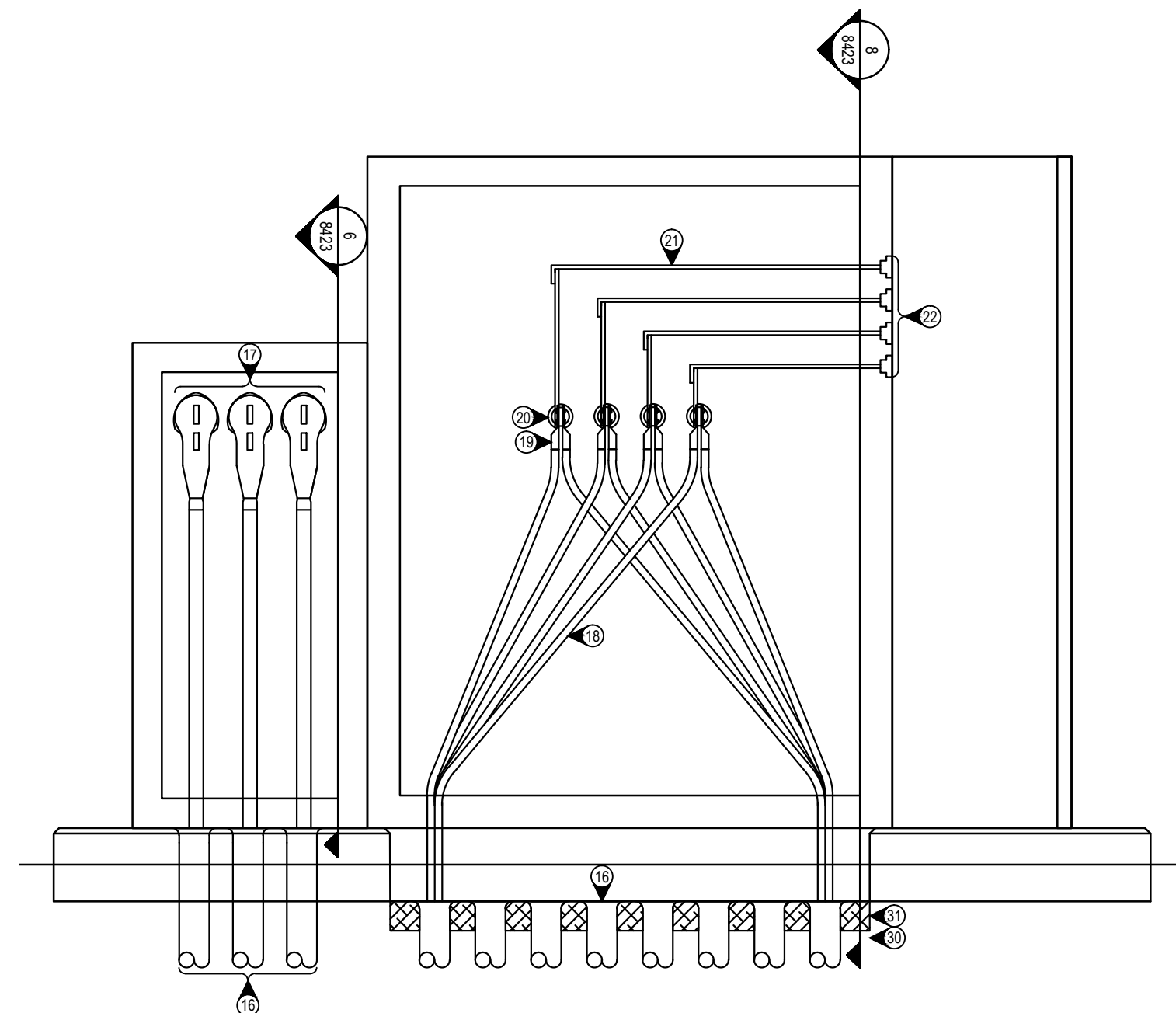
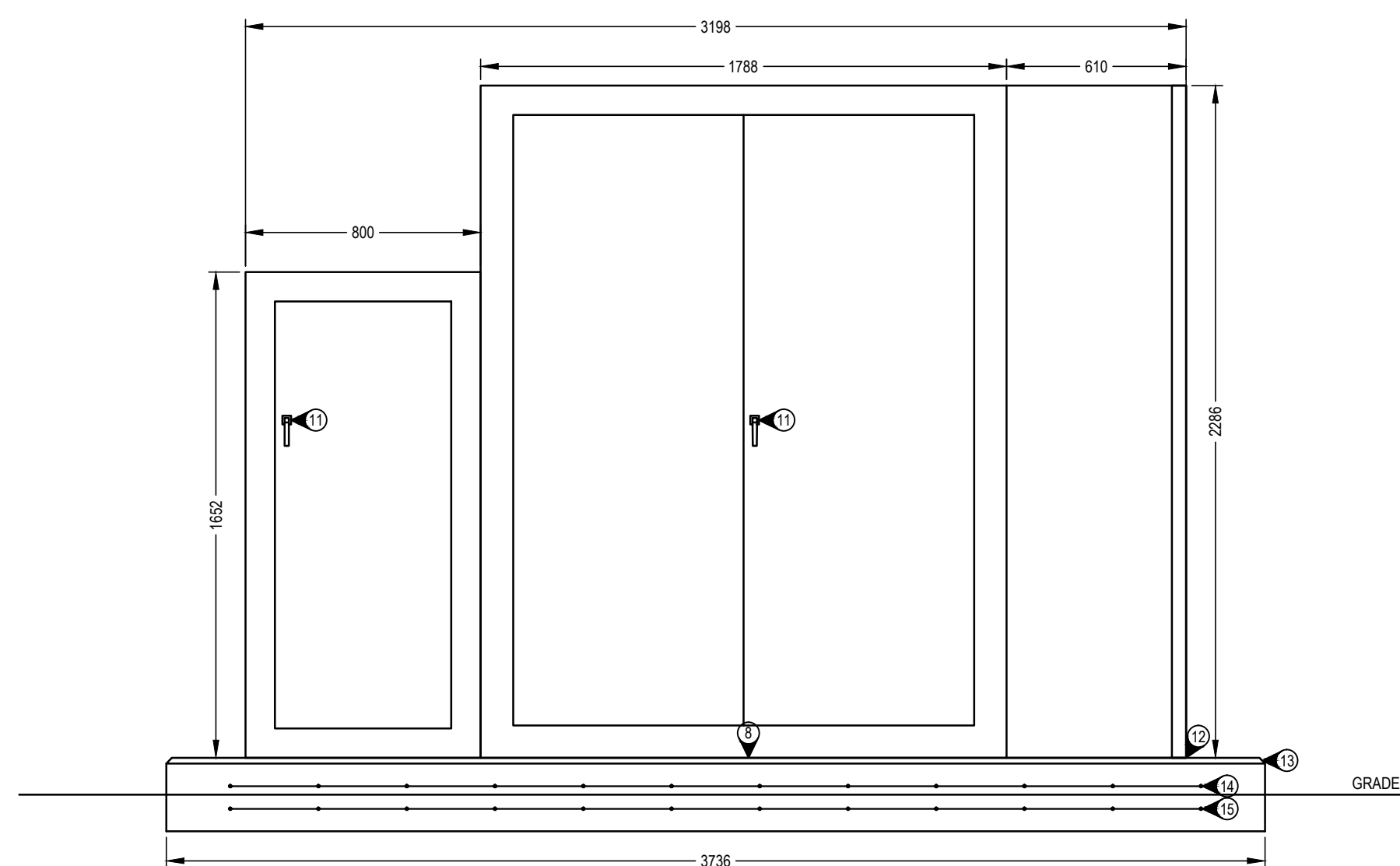
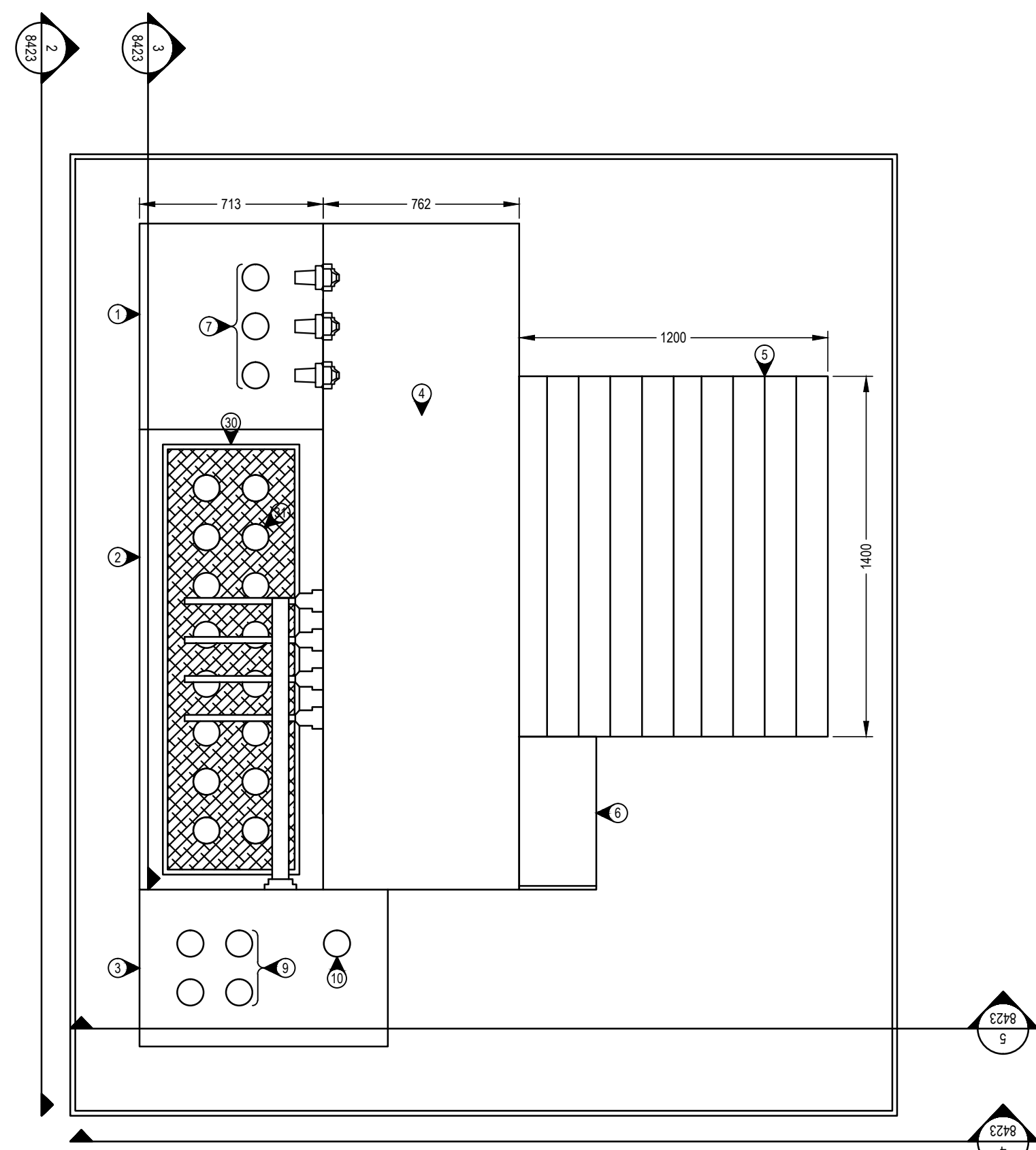
Designed by/Concept par
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Drawing title/Titre du dessin


DUCT BANK CROSS-SECTION DETAILS (EXISTING)

Project No./No. du projet	Sheet/Feuille	Revision no./ La Revision no.
R.057890.003	8433	5






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Public Works and
Government Services
Canada

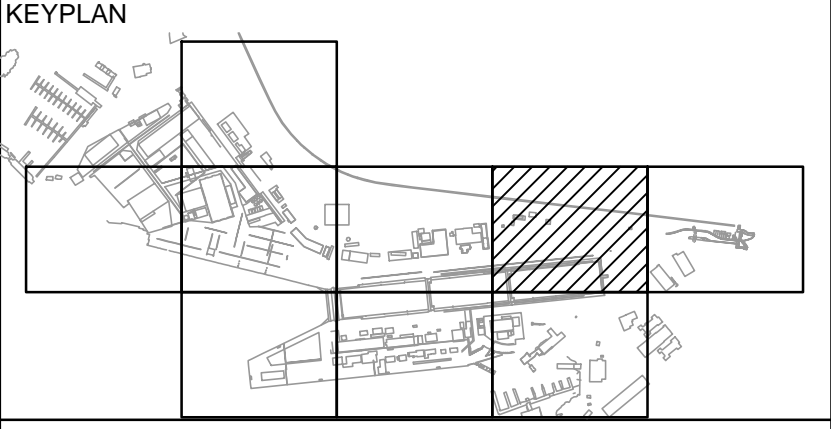
Travaux publics et
Services gouvernementaux
Canada

REAL PROPERTY SERVICES
Pacific Region
SERVICES IMMOBILIERS
Region de Pacifique



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KEYPLAN



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/ Révision	Description/Description	Date/Date

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

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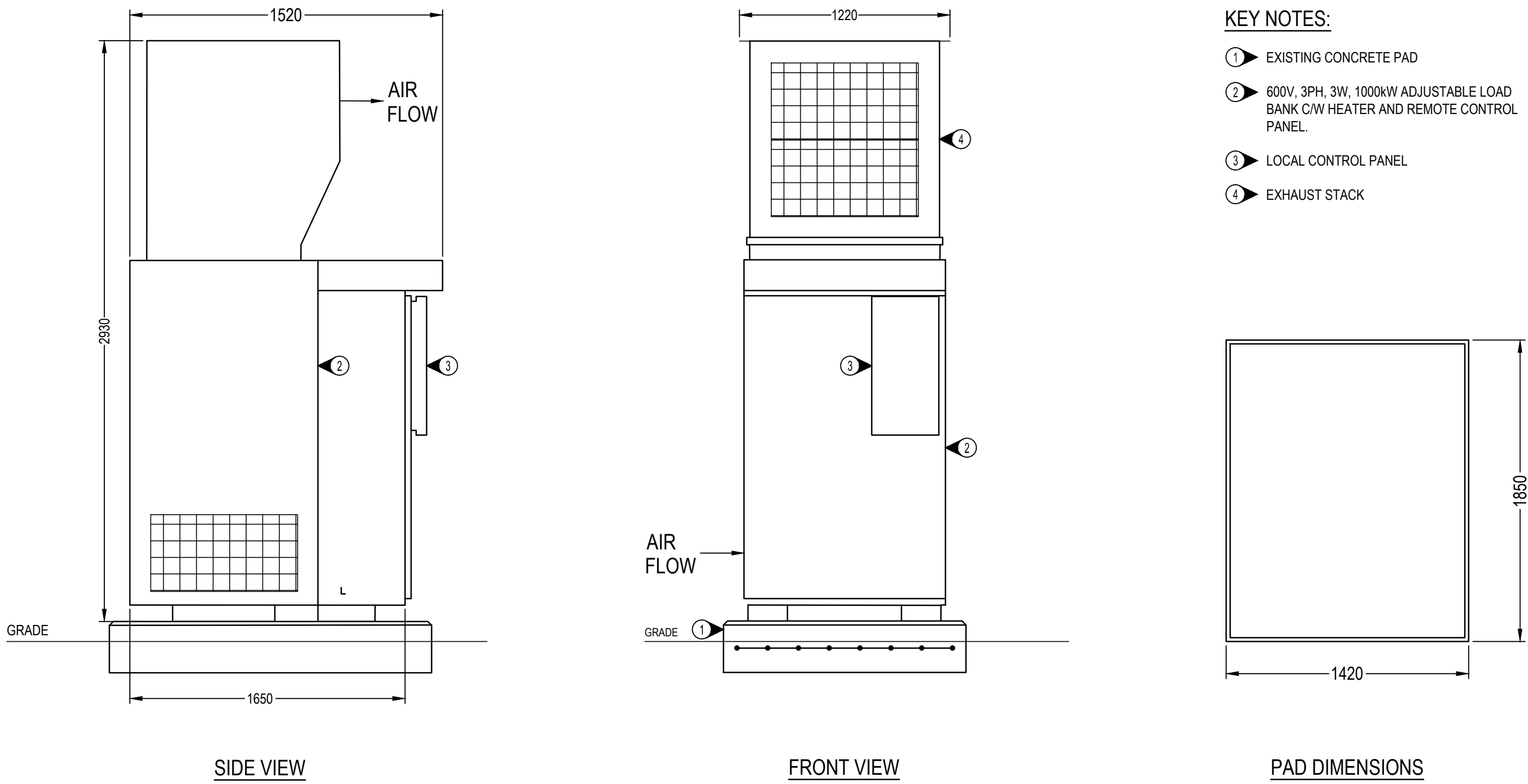
PWGSC Project Manager/Administrateur de Projets TPSGC
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Drawing title/Titre du dessin

SERVICE ENTRANCE SUBSTATION
LOAD BANK ELEVATION AND DETAILS

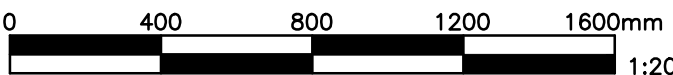
Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.057890.003	8424	5



1
8424

GENERATOR 1000kW LOAD BANK ELEVATIONS AND DETAILS

1:20





- ▶ PANEL 6SES–SP–2, 347/600V 3PH 4W, 400A, 42kA WITHSTAND RATED PANEL BOARD. PANEL TO BE BOTTOM ENTRY. PANEL ELEVATION IS ILLUSTRATIVE ONLY, FINAL PANEL LAYOUT TO BE DETERMINED BASED ON SELECTED MANUFACTURER COMPONENT LIMITATIONS. C/W HINGED LOCKABLE DOOR.
- ② MINIMUM 400A/400A LSI PANEL 6SP-1B 1P 120V BREAKER FOR MOTOR LOADS. TO BE EQUIPPED WITH DIGITAL TRIP UNITS ADJUSTABLE FROM 15–100A. RATED 42KA
- ③ 400AF/300AT LSI BREAKER FOR FEEDER FROM THIS PANEL TO EXISTING 6SES–SP–1 TRANSFER SWITCH. RATED 42KA
- ④ 400A/400AT LSI PANEL 6SES–SP–1 MAIN BREAKER. RATED 42KA
- ⑤ NOT USED
- ⑥ WIREWAY
- ⑦ 4xGENERATOR CONTROL CELL, FOR GENERATOR CONTROLLER, GENERATOR PROTECTIVE RELAY, GENERATOR METER AND GENERATOR TO BUS CHRONOSCOPE. TO CONTAIN ALL REQUIRED DIN RAILS, MOUNTING DEVICES AND ELECTRONICS TO FORM A COMPLETE AND OPERABLE SYSTEM.
- ⑧ VOLTMETER, KW METER, FREQUENCY METER, KVAR METER, AMMETER, POWER FACTOR METER.
- ⑨ VOLTMETER SELECTOR SWITCH
- ⑩ AMMETER SELECTOR SWITCH
- ⑪ DOOR HANDLE, DOORS TO BE HINGED, WITH 180° SWING
- ⑫ GENERATOR METER, REFER TO SPECIFICATIONS FOR METER REQUIREMENTS
- ⑬ GENERATOR PROTECTION RELAY, REFER TO SPECIFICATIONS FOR RELAY REQUIREMENTS.
- ⑭ GENERATOR CONTROLLER, REFER TO SPECIFICATIONS FOR EQUIPMENT REQUIREMENTS.
- ⑮ EMERGENCY STOP BUTTON

- ④ HORN
- ① MODE SELECTOR SWITCH
- ① GENERATOR BREAKER STATUS LIGHTS: OPEN, CLOSED, TRIPPED
- ③ GENERATOR PLC AND TRANSFER CONTROLLER CELL. TO CONTAIN ALL REQUIRED DIN RAILS, MOUNTING DEVICES AND ELECTRONICS TO FORM A COMPLETE AND OPERABLE SYSTEM.
- ② GENERATOR PLC AND TRANSFER CONTROLLER HMI SCREEN
- ② NOT USED
- ② MINIMUM 1000MM CLEARANCE AS PER CEC REQUIREMENTS.
- ② CABLE PIT ACCESS LADDER (EXISTING), ENSURE LADDER IS PROPERLY GROUNDED AND BONDED AS PART OF NEW POWER AND CONTROL PANEL INSTALLATION.
- ② STEEL COVER PLATES OVER PULL PIT (EXISTING), ENSURE PLATES ARE PROPERLY GROUNDED AND BONDED AS PART OF NEW POWER AND CONTROL PANEL INSTALLATION.
- ② PANEL 2SES-SP-2. 120/208V 3PH 4W, 100A, 10kA WITHSTAND RATED PANEL TO BE BOTTOM ENTRY. PANEL ELEVATION IS ILLUSTRATIVE ONLY, FINAL PANEL LAYOUT TO BE DETERMINED BASED ON SELECTED MANUFACTURER COMPONENT LIMITATIONS. C/W HINGED LOCKABLE DOOR.

JOB NO./NAME	1-16-008 - EGO (SES STANDARD) GENERATION SYSTEM									
PANEL	2-SES-SP2									
SYSTEM	120/200V 3Ø/4W									
TYPE	COP									
LOCATION	SES GENERATOR CONTROL PANEL									
MOUNTING	FLUSH									
NO. CIRCUITS	42									
BUS SIZE	100 A									
SYM. FAULT RATING	10KA									

DESCRIPTION	BRK	POLE	CCT	CCT	POLE	BRK	DESCRIPTION
'2SES-G-1	50	3	01	02	3	50	'2SES-G-2
			03	04			
			05	06			
'2SES-G-3	50	3	07	08	3	50	'2SES-G-4
			09	10			
			11	12			
CONTROL PANEL POWER	15	1	13	14	1	20	SPARE
CONTROL PANEL POWER	15	1	15	16	1	20	SPARE
CONTROL PANEL POWER	15	1	17	18	1	15	T25/12SES-3 SERVICES
CONTROL PANEL POWER	15	1	19	20	2	20	LOAD BANK SERVICES
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			
			31	32			
			33	34			
			35	36			
			37	38			
			39	40			
			41	42			

* CONFIRM BREAKER SIZE WITH GENERATOR SERVICE PANEL AND ADJUST AS REQUIRED AT NO ADDITIONAL COST							
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Revision/ Revision	Description/Description	Date/Date
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Client/client

**825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1**

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

Consultant Signature Box Only

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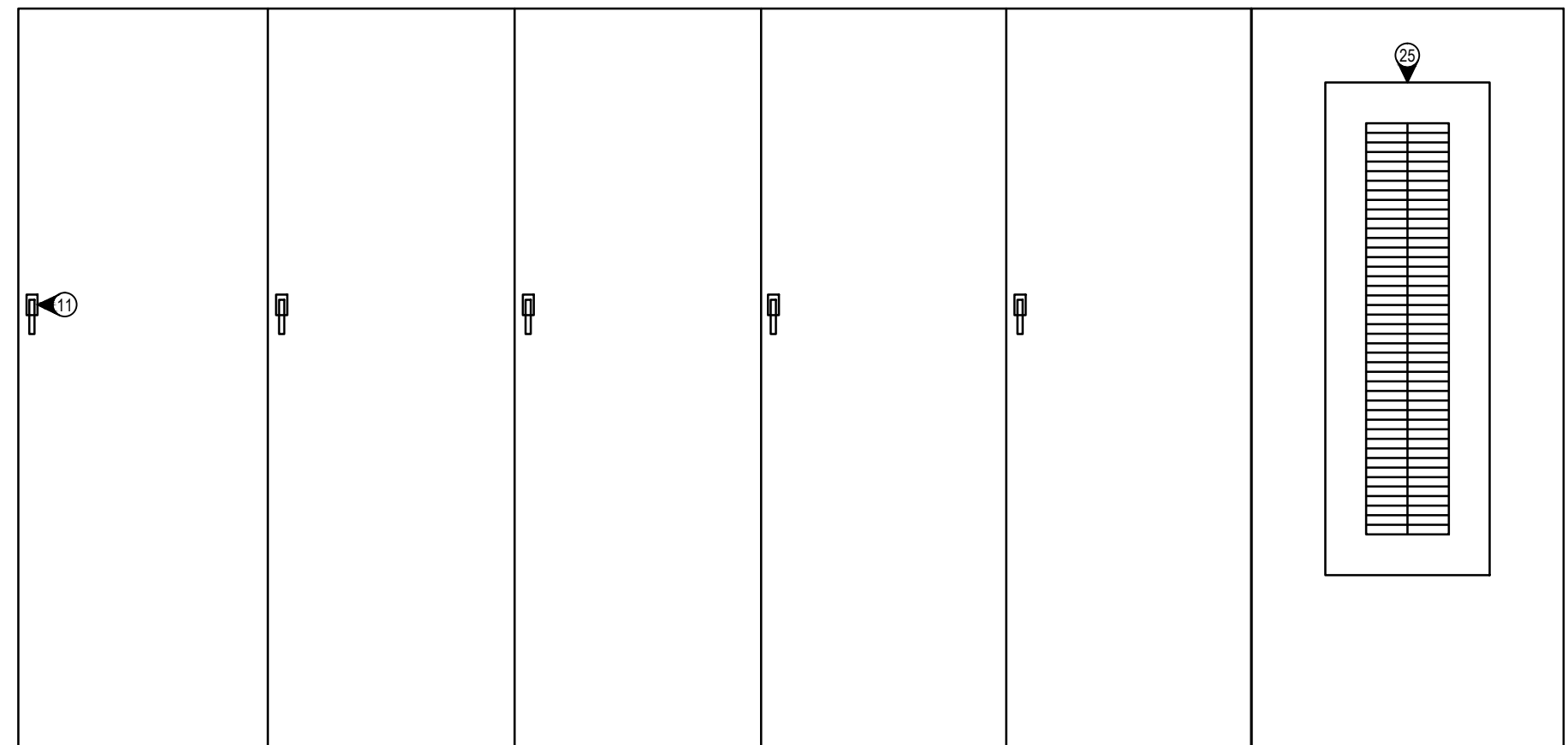
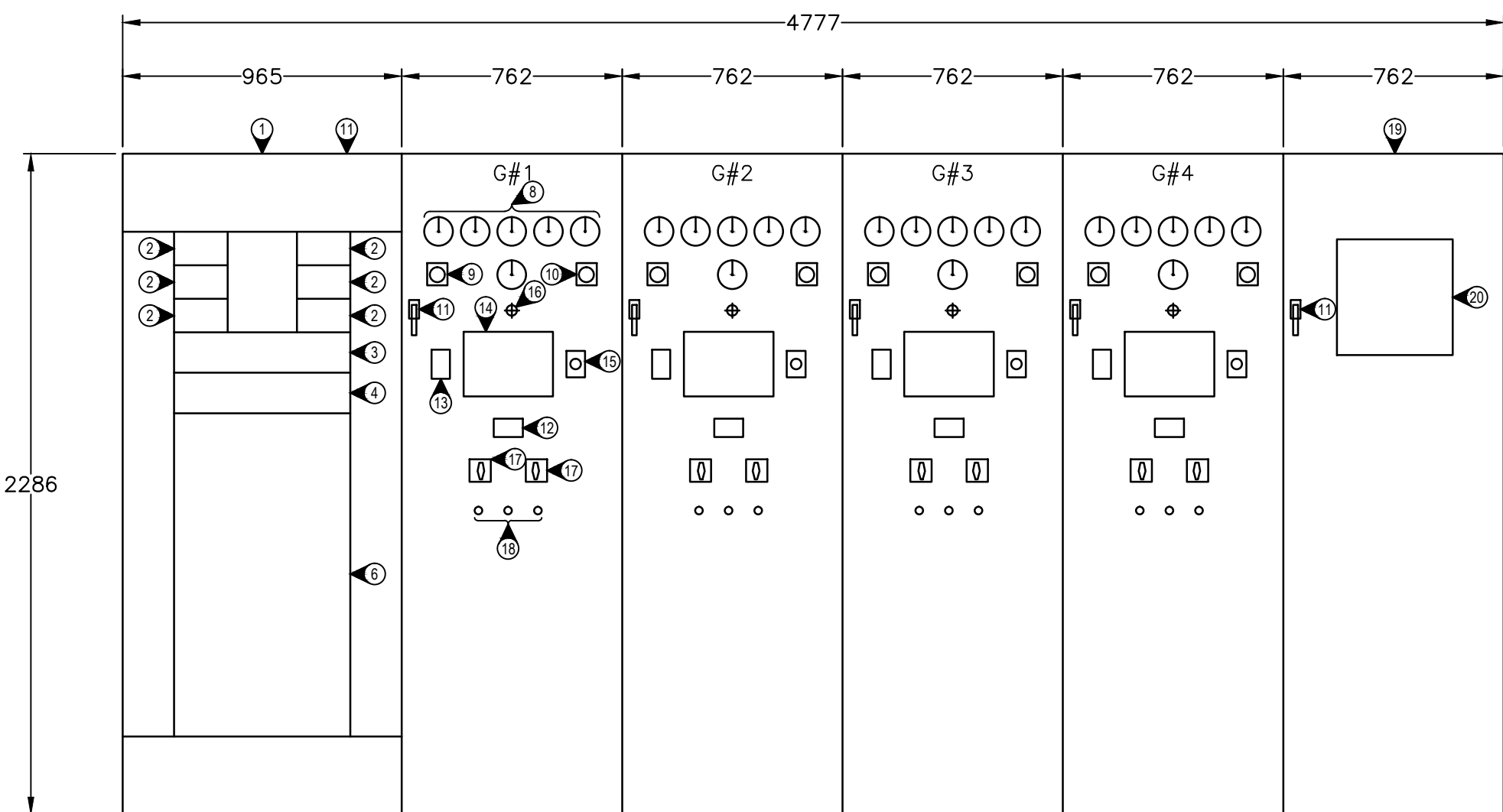
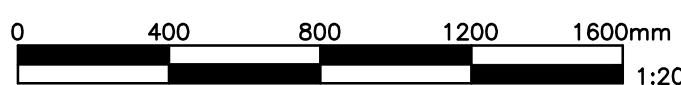
Drawing title/Titre du dessin

R.057890.003

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Revisión n.
La Revisión
no.

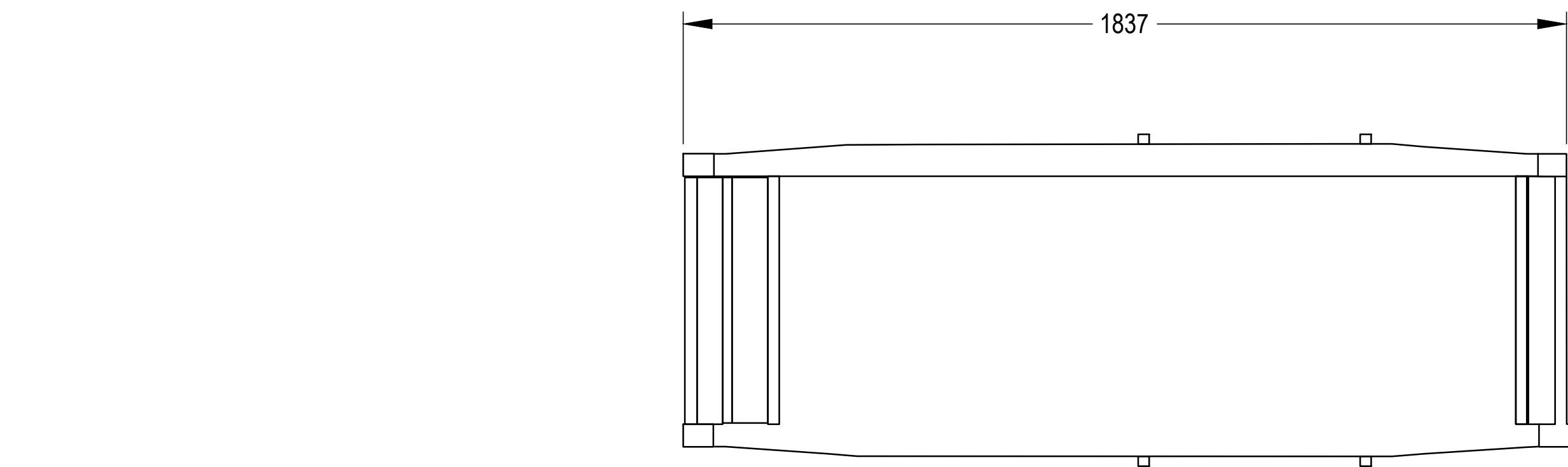
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$$\frac{2}{8425}$$


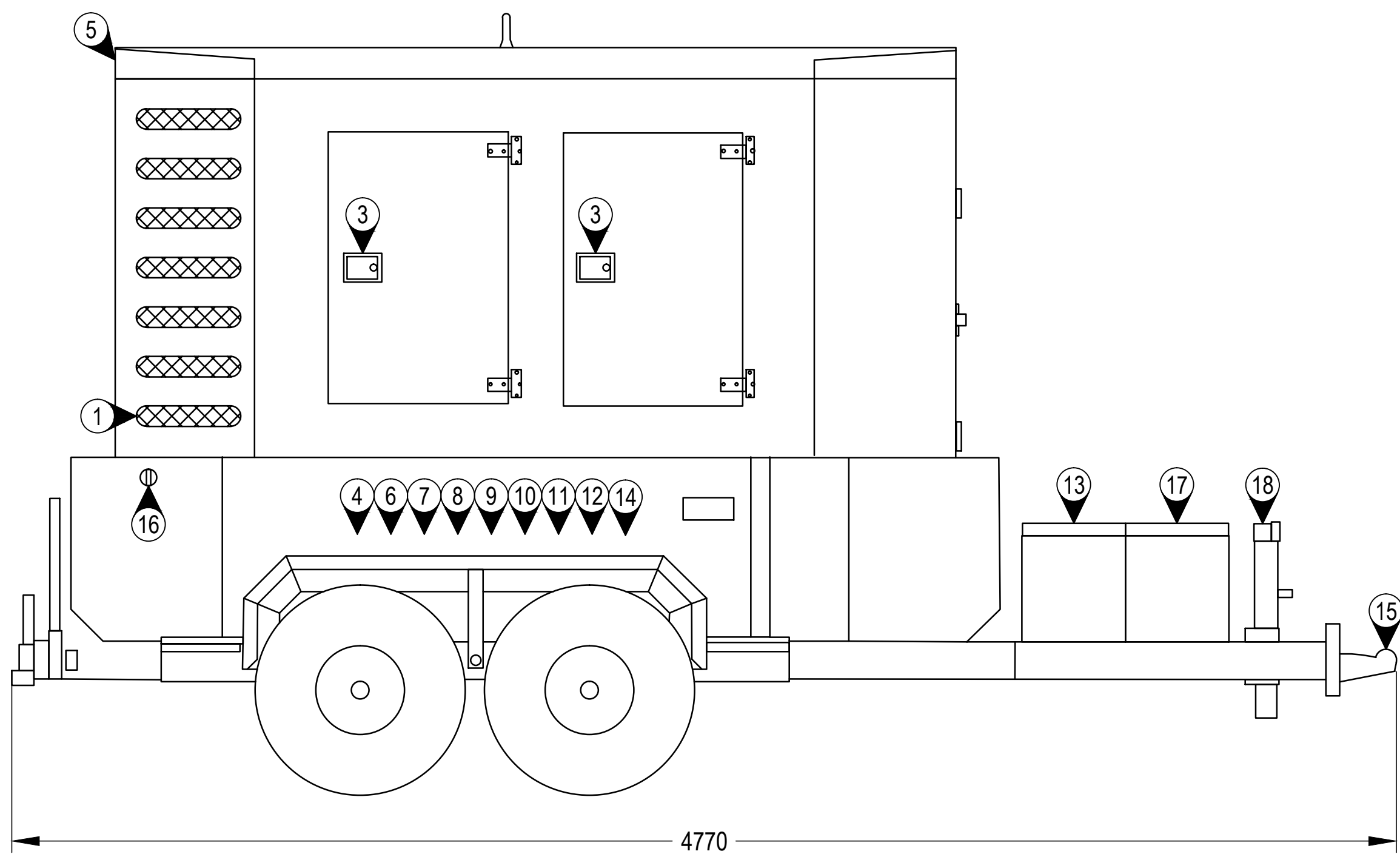


23 SUPPLY A MOBILE SPILL RESPONSE KIT WITH A SORBENT CAPACITY OF 350 LITRES FOR EACH GENERATOR

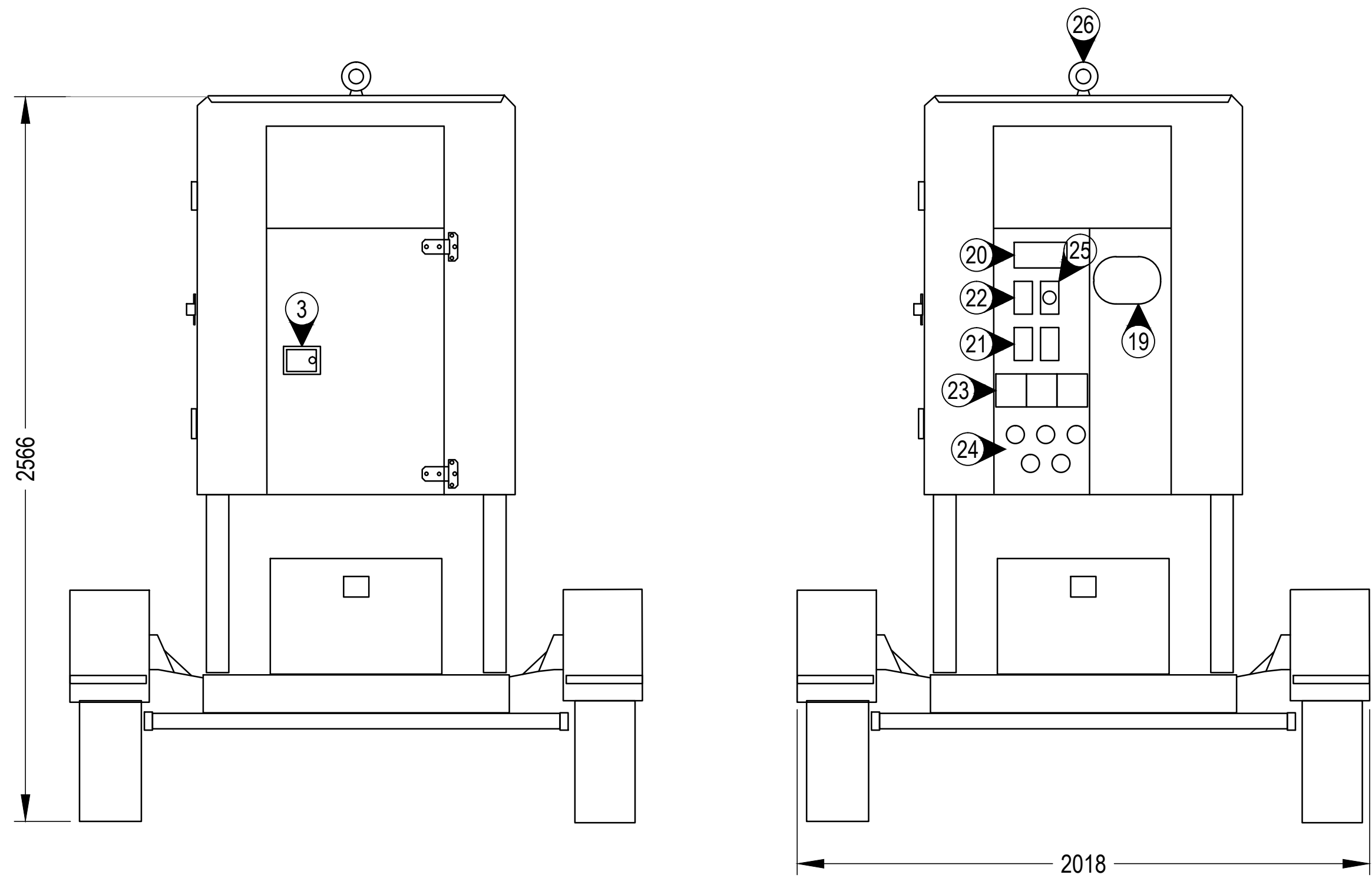
Project No./No. du projet	Sheet/Feuille	Revision no. La Révision no.
R.057890.003	8426	5



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8427
1:10
GENERATOR ENCLOSURE PLAN VIEW



2
8427
1:10
GENERATOR ENCLOSURE SIDE ELEVATION



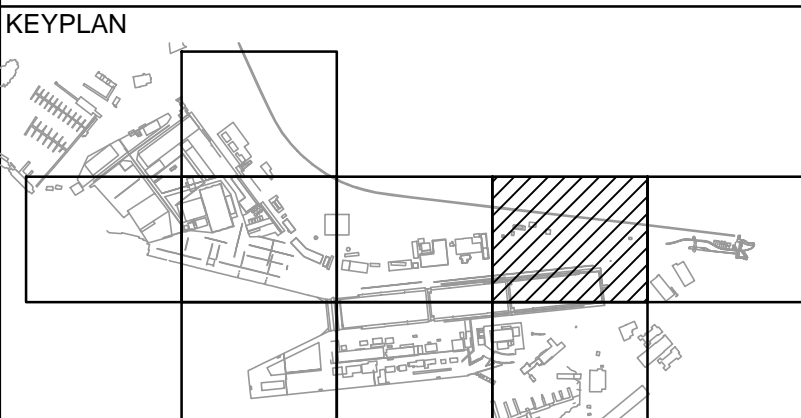
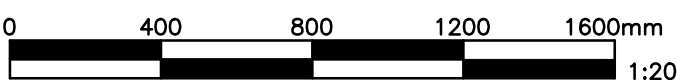
3
8427
1:10
GENERATOR ENCLOSURE END ELEVATIONS

GENERAL NOTES:

1. REFER TO SPECIFICATIONS FOR GENERATOR CONSTRUCTION AND MATERIAL REQUIREMENTS.
2. DRAWING DIMENSIONS ARE INDICATIVE OF TYPICAL BASIS OF DESIGN UNIT. CONTRACTOR TO DETERMINE FINAL DIMENSIONS AND EQUIPMENT LOCATION AS REQUIRED.

KEYNOTES:

- ➊ AIR INTAKE VENTS
- ➋ NOT USED
- ➌ GENERATOR DOORS TO BE HINGED, REMOVABLE AND C/W AUTOMATIC DOOR HOLDS. HANDLES TO BE LOCKABLE AND FLUSH MOUNTED.
- ➍ GENERATOR BELLY TANK, REFER TO SPECIFICATIONS FOR FUEL VOLUME AND RUNNING TIMES.
- ➎ INSTALL BIRD SCREEN IN GENERATOR EXHAUST PIPE TO PREVENT ANIMAL ENTRY.
- ➏ VISUAL TANK LEVEL GAUGES SHALL BE PROVIDED AT THE TANK FILL POINTS.
- ➐ TANK SHALL BE PROVIDED WITH AUDIBLE/VISUAL OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 90% OF TANK CAPACITY, LOCATED AT THE FILL POINTS.
- ➑ TANK FILL PIPES SHALL BE PROVIDED WITH POSITIVE SHUT OFF OVERFILL PROTECTION DEVICES CONFORMING TO CAN/ULC-S661, SET TO OPERATE AT 95% OF TANK CAPACITY.
- ➒ TANK NORMAL AND EMERGENCY VENT PIPES SHALL TERMINATE OUTDOORS AND AT HEIGHTS SPECIFIED IN NFC.
- ➓ EACH TANK SHALL BE PROVIDED WITH SUCTION AND RETURN PIPE CONNECTIONS TO FACILITATE "FUEL POLISHING" LOCATION AND ARRANGEMENT TO BE APPROVED PRIOR TO TANK MANUFACTURE.
- ➔ PROVIDE AS-BUILT DRAWINGS (STAMPED BY A P. ENG) BEFORE THE TANK CAN BE FILLED.
- ➕ SUPPLY AND INSTALL THE ENVIRONMENT CANADA IDENTIFICATION LABEL ONCE IT HAS BEEN PROVIDED BY THE DEPARTMENTAL REPRESENTATIVE.
- ➖ SUPPLY A MOBILE SPILL RESPONSE KIT WITH A SORBENT CAPACITY OF 100 LITERS
- ➗ FUEL TANK SIZED FOR 24 HOURS OF OPERATION AT 75% LOAD WHEN 50% FULL.
- ➘ BALL HITCH, SIZED TO MATCH EXISTING EGE EQUIPMENT.
- ➙ FUEL TANK FILL POINT C/W LOCK
- ➚ CABLE STOWAGE BOX FOR 16m 5x200A DLO CABLE C/W CAMLOCK CONNECTOR TO MATCH EXISTING EGD GENERATOR CONNECTION POINTS.
- ➛ DROP FOOT JACK
- ➜ DISCONNECT VIEWING WINDOW
- ➝ MOBILE PARALLEL BOX CONNECTOR
- ➞ 2x15A 120V GFCI RECEPTACLES
- ➟ 15A INPUT RECEPTACLE FOR GENERATOR UNIT
- ➠ 3x50A 240V RECEPTACLES
- ➡ 200A CAMLOCKS
- EMERGENCY STOP BUTTON
- ➣ SINGLE POINT LIFTING EYE



Revision/ Révision	Description/Description	Date/Date
6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		

Client/client

ESQUIMALT
GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES
STANDBY POWER
GENERATION SYSTEM

Consultant Signature Box Only

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Preetipal Paul

Drawing title/Titre du dessin

EGD TOWABLE 75kW
GENERATOR ELEVATIONS
AND DETAILS

Project No./No. du projet

R.057890.003

Sheet/Feuille

8427

Revision no./
La Révision
no.

5





- NEW 1x103mm EMT C. FROM NEW PANEL G6S-SP-2 TO EXISTING SES 400A TRANSFER SWITCH. REFER TO SINGLE LINE DIAGRAM FOR CONDUCTOR SIZING.
- CONNECT NEW GENERATOR AND EQUIPMENT SERVICE PANEL 2SES-SP-2 VIA NEW 1x133mm EMT C. FROM EXISTING PANEL 2SES-SP-1. PANEL TO BE 200A, 120/208V 3Ø 4W 1ØA.
- CONNECT GENERATOR 6SES-SP-2 ATS SERVICE TO EXISTING 800V ATS. DISCONNECT EXISTING MAIN SUBSTATION GENERATOR CABLE AND MAKE SAFE.
- CONNECT GENERATOR CONTROLLER, TRANSFORMER, AND ATS CONTROL AND MONITORING CIRCUITS TO SCADA SYSTEM. REFER TO CONTROL SYSTEM DETAILS FOR ADDITIONAL INFORMATION.
- CONNECT GENERATOR CONTROL BOARD TO EXISTING 125VDC STATION SUPPLY PANEL.
- EXISTING LV AND COMMUNICATION CABLE TRAYS
1x133mm TRAY MOUNTED EMT FOR 125VDC SERVICE.
- NOT USED
- CONNECT GENERATOR BATTERY, LIGHTING AND CONTROL POWER TO NEW 2SES-SP-2 POWER PANEL.
- TRANSFER CONTROLLER DIRECT 1x41mm EMT C. CONNECTIONS TO 25kV VIA EXISTING OVERHEAD CABLE TRAYS.
- TRANSFER CONTROLLER DIRECT CONNECTIONS TO 25kV SWITCHBOARD FOR CLOSED AND OPEN TRANSITION SWITCHING SCHEME.
- CORE THROUGH EXISTING CINDER BLOCK WALL TO ALLOW TRAY SUSPENDED CONDUIT TO PASS THROUGH WALL. SEAL AND FIRE STOP EDGES OF PENETRATION.

THE SCOPE OF THIS CONTRACT DOES NOT INCLUDE THE CIVIL WORKS FOR IN GROUND CONDUIT OR CONCRETE PAD WORK. DETAILS ONLY SHOWN FOR CO-ORDINATION AND INFORMATION PURPOSES ONLY.

6	ISSUED FOR ADDENDUM	16/06/2016
5	ISSUED FOR TENDER	16/05/2016
4	ISSUED FOR 100% REVIEW	16/05/2016
3	ISSUED FOR 75% REVIEW	16/04/2016
2	ISSUED FOR CIVIL COORDINATION	16/03/2016
1	ISSUED FOR SCHEMATIC DESIGN	16/02/2016
0		
Revision/Revision	Description/Description	Date/Date

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825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

5 ADMIRALS ROAD VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

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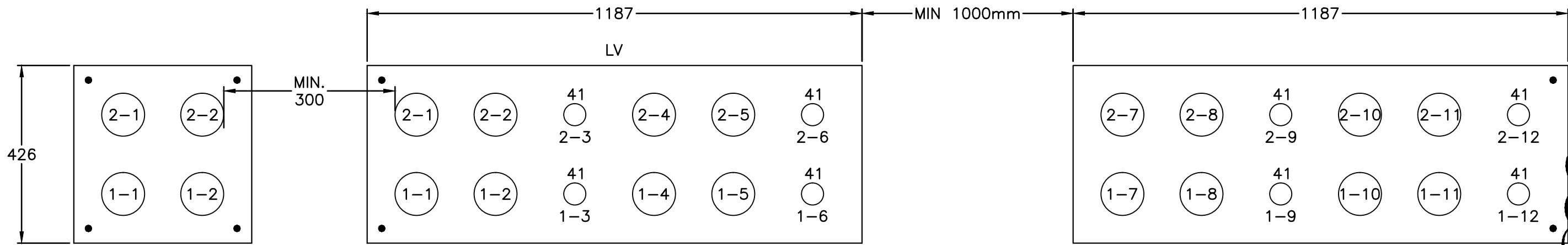
WGSC, Regional Manager, Architectural and Engineering Services/
Questionnaire régionale, Services d'architecture et de génie, TPSGC
Preetipal Paul

Drawing title/Titre du dessin

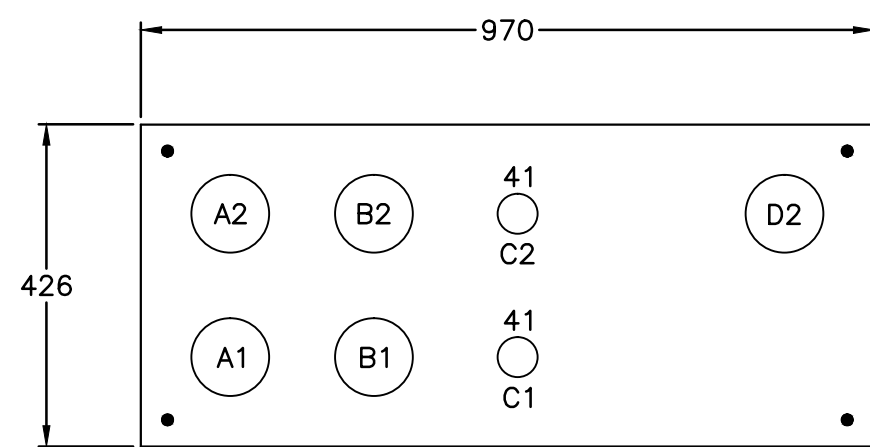
SES FLOOR PLAN EXISTING AND NEW EQUIPMENT FOOTPRINTS

Project No./No. du projet	Sheet/Feuille	Revision no. La Révision no.
R.057890.003	8432	5

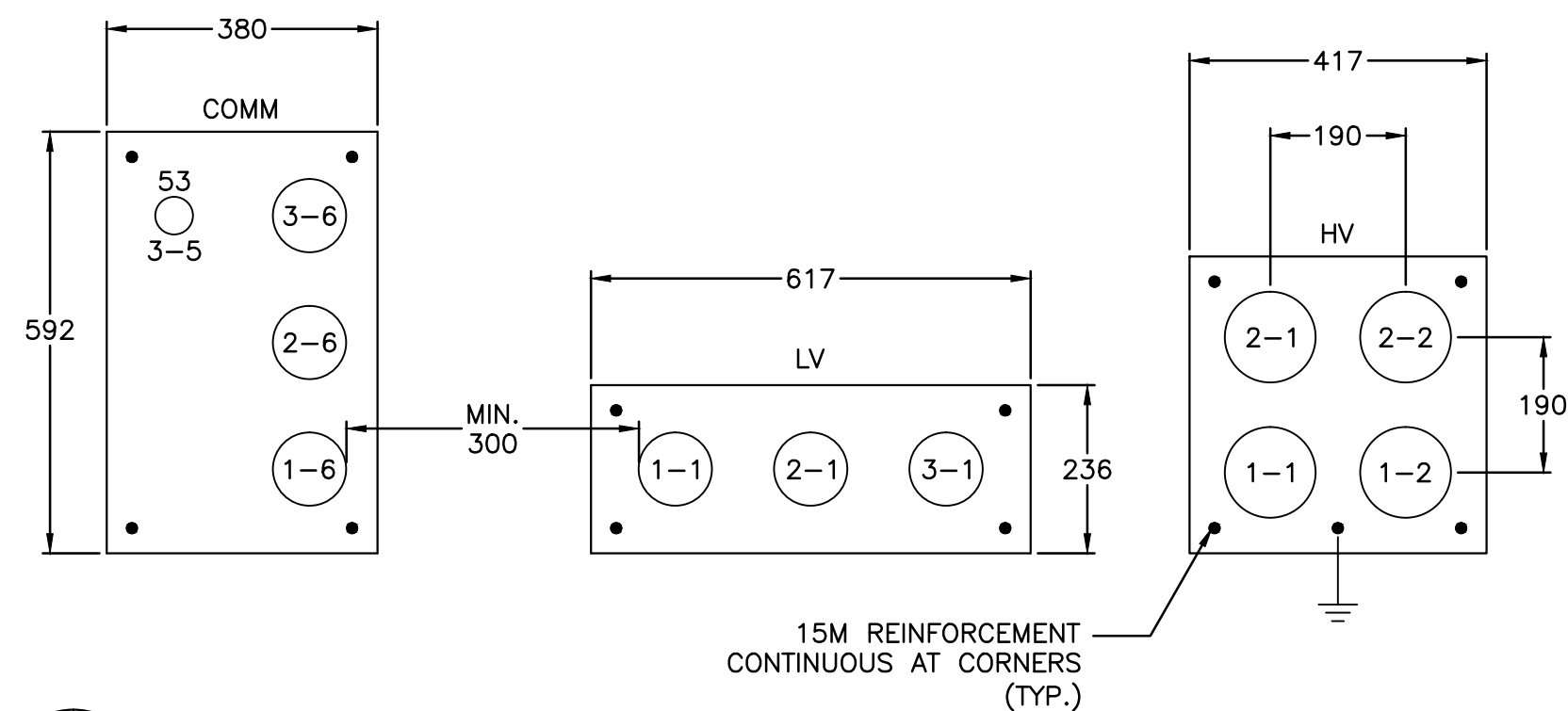
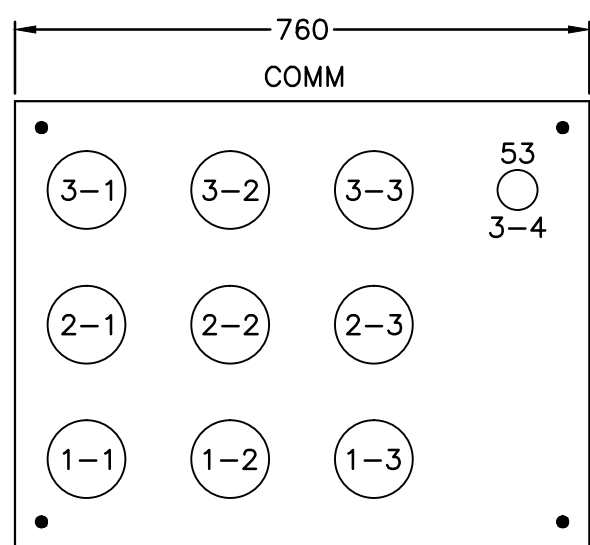




GSES 8433 DUCT SECTION DETAIL
SCALE 1:10



GX 8433 DUCT SECTION DETAIL
SCALE 1:10



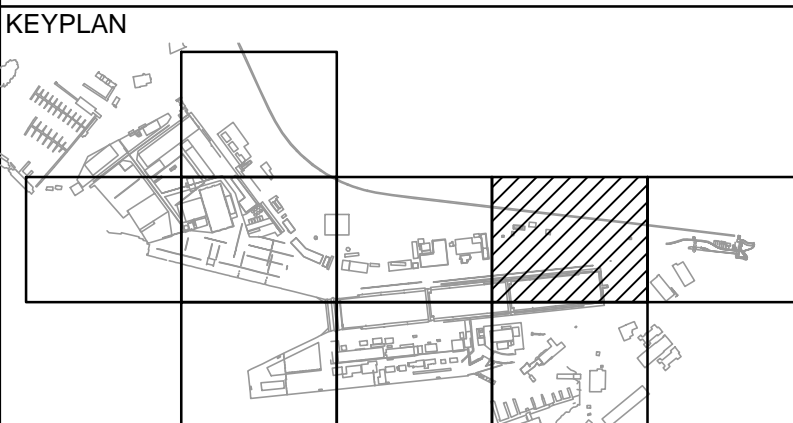
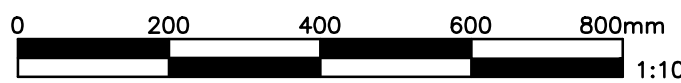
W 8433 DUCT SECTION DETAIL
SCALE 1:10

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
GSES	SES HV STUBS - STEP UP TRANSFORMER	2-2	129	HV	12.5/25kV	3c#4/0	STEP UP TRANSFORMER CIRCUIT
		1-1	103	LV	600V	EMPTY	G4 600V CONDUCTORS 1 OF 4 (FUTURE)
		1-2	103	LV	600V	EMPTY	G4 600V CONDUCTORS 2 OF 4 (FUTURE)
		1-4	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 1 OF 4
		1-5	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 2 OF 4
		1-7	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 1 OF 4
		1-8	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 2 OF 4
		1-10	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 1 OF 4
		1-11	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 2 OF 4
		2-1	103	LV	600V	EMPTY	G4 600V CONDUCTORS 3 OF 4 (FUTURE)
		2-2	103	LV	600V	EMPTY	G4 600V CONDUCTORS 4 OF 4 (FUTURE)
		2-4	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 3 OF 4
	STEP UP TRANSFORMER - GENERATORS	2-5	103	LV	600V	3c#400kCM	G3 600V CONDUCTORS 4 OF 4
		2-7	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 3 OF 4
		2-8	103	LV	600V	3c#400kCM	G2 600V CONDUCTORS 4 OF 4
		2-10	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 3 OF 4
		2-11	103	LV	600V	3c#400kCM	G1 600V CONDUCTORS 4 OF 4
		1-3	41	LV	120/208V	EMPTY	G4 PANEL 2SES-G-4 (FUTURE)
		1-6	41	LV	120/208V	4c#6	G3 PANEL 2SES-G-3
		1-9	41	LV	120/208V	4c#6	G2 PANEL 2SES-G-2
		1-12	41	LV	120/208V	4c#6	G1 PANEL 2SES-G-1
		2-3	41	LV	120/208V	EMPTY	SPARE
		2-6	41	LV	120/208V	EMPTY	SPARE
		2-9	41	LV	120/208V	EMPTY	SPARE
		2-12	41	LV	120/208V	EMPTY	SPARE
	SES - GENERATORS	1-1	103	COMM	N/A	10c#12	G1 CONTROL AND SENSING
		1-2	103	COMM	N/A	10c#12	G2 CONTROL AND SENSING
		2-1	103	COMM	N/A	10c#12	G3 CONTROL AND SENSING
		2-2	103	COMM	N/A	EMPTY	G4 CONTROL AND SENSING (FUTURE)

- GENERAL NOTES:
- CONDUIT IN GROUND WORK HAS ALREADY BEEN COMPLETED. SCOPE OF THIS CONTRACT IS RELATED TO INSTALLATION OF ABOVE GROUND CONDUITS AND ALL CONDUCTORS.
 - ALL HV CONDUITS ON THIS DRAWING ARE 129mm. ALL OTHER CONDUITS ON THIS DRAWING ARE 103mm UNLESS NOTED OTHERWISE.
 - ALL CONCRETE ENCASED CONDUITS ARE SCHEDULE 40 RIGID PVC CONDUITS.
 - REINFORCE DUCT BANKS WITH 15M BARS RUN CONTINUOUSLY IN ALL 4 CORNERS OF THE DUCT BANK.
 - INSTALL TWO CONTINUOUS 4/0 AWG INSULATED COPPER GROUND CONDUCTORS IN THE BOTTOM OF EVERY DUCT BANK. TIE IN GROUNDS AT EVERY MANHOLE AND DISTRIBUTION CENTRE TO PROVIDE ELECTRICAL CONTINUITY SITE WIDE. INSULATED GROUND CONDUCTORS ARE IDENTIFIED IN THE CROSS-SECTIONS WITH THE GROUND SYMBOL.
 - PROVIDE ADDITIONAL GROUNDS WHERE DUCT BANKS FAN OUT INTO SEPARATE MANHOLES.
 - BOND ALL METAL RACKING LOCATIONS IN EVERY MANHOLE.
 - USE UNDERGROUND DUCT SPACERS WITH 190mmx190mm DUCT CENTRE TO CENTRE MEASUREMENT.
 - ALL CONDUITS MUST BE ENCASED IN A MINIMUM OF 50mm OF CONCRETE.
 - MAINTAIN MINIMUM 300mm SEPARATION BETWEEN COMMUNICATIONS CONDUITS AND POWER CONDUITS. INSTALL 3 DEDICATED 103mm DEDICATED FIBER OPTIC ONLY DUCT IN THE 300mm SPACE BETWEEN THE LOW VOLTAGE AND THE COMMUNICATIONS CONDUITS.
 - HV-BCH DUCTBANK SHALL BE INSTALLED IN ACCORDANCE WITH BC HYDRO STANDARDS AND CANADIAN ELECTRICAL CODE REQUIREMENTS.
 - ALL DUCTBANKS SHALL BE INSTALLED IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE.
 - REFER TO SITE PLANS FOR SPACING BETWEEN DUCTBANKS.
 - ALL DUCTWORK AND ASSOCIATED EQUIPMENT PROVIDED FOR A COMPLETE, FUNCTIONING AND BC HYDRO APPROVED PRIMARY DELIVERY SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE BC HYDRO PRIMARY GUIDE, THE BC HYDRO PRIMARY METERING GUIDE, AND THE BC HYDRO DISTRIBUTION STANDARD ESS4- SERIES INCLUDING, BUT NOT LIMITED TO, ALL SECTIONS PERTAINING TO DUCT, MANHOLES, DRAINAGE, TRENCHING, ENCASEMENT, MARKING, CONNECTIONS, GROUNDING AND ENGINEERING.

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
GX	STEP UP TRANSFORMER - GENERATORS	A1	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		B1	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		A2	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
		B2	103	LV	600V	3c#400kCM	GENERATOR 600V CONDUCTORS (TYPICAL)
	SES - GENERATORS	C1	41	LV	120/208V	4c#6	GX PANEL 2SES-G-X
		C2	41	LV	120/208V	EMPTY	SPARE
	SES - GENERATORS	D2	103	COMM	N/A	10c#12	GENERATOR CONTROL AND SENSING (TYPICAL)

CONDUIT AND CABLE SCHEDULE							
CUT SECTION	CONDUIT ROUTE	CONDUIT ID	SIZE (mm)	TYPE	VOLTAGE	CONDUCTORS	COMMENTS
W	112HV - STUB	1-1	129	HV	12.5/25kV	EMPTY	FUTURE - LVSP #2
		1-2	129	HV	12.5/25kV	EMPTY	FUTURE
		2-1	129	HV	12.5/25kV	EMPTY	FUTURE - LVSP #2
		2-2	129	HV	12.5/25kV	3c#4/0	GENERATOR STEP UP TRANSFORMER
	113LV - STUB	1-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		2-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		3-1	103	LV	600V	EMPTY	FUTURE - LOW VOLTAGE SHORE POWER
		1-1	103	COMM	N/A	1 COAX	SHAW CABLE
	114C - SES	1-2	103	COMM	N/A	24 SSM, VARIES	FIRE/GENERAL ALARM SYSTEM - 1x24SSM IN SEPERATE INNER DUCTS
		1-3	103	COMM	N/A	144 SSM, 48 SMM, 1 CAT6	1x96 SSM, 1x 48 SSM, 1x48SSM, 1 CAT6 - IN SEPERATE INNER DUCTS
		2-1	103	COMM	N/A	100 PR GEL	TELEPHONE CABLES
		2-2	103	COMM	N/A	EMPTY	FUTURE - FIRE ALARM
		2-3	103	COMM	N/A	EMPTY	FUTURE - LVSP FIBRE
		3-1	53	COMM	N/A	EMPTY	FUTURE
		3-2	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-3	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-4	53	COMM	N/A	EMPTY	FUTURE - FIBRE ONLY
		1-6	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		2-6	103	COMM	N/A	EMPTY	FUTURE - LVSP COMM
		3-5	53	COMM	N/A	EMPTY	FUTURE - LVSP FIBRE
	114C - STUB	3-6	103	COMM	N/A	EMPTY	FUTURE - FIRE ALARM



6	ISSUED FOR ADDENDUM	16/06/30
5	ISSUED FOR TENDER	16/05/06
4	ISSUED FOR 100% REVIEW	16/05/05
3	ISSUED FOR 75% REVIEW	16/04/15
2	ISSUED FOR CIVIL COORDINATION	16/03/16
1	ISSUED FOR SCHEMATIC DESIGN	16/02/19
0		
Revision/Revision	Description/Description	Date/Date

Client/client

ESQUIMALT GRAVING DOCK

825 ADMIRALS ROAD
VICTORIA, BC, V9A 2P1

Project title/Titre du projet

825 ADMIRALS ROAD - VICTORIA BC
ESQUIMALT GRAVING DOCK

EGD-SSES STANDBY POWER GENERATION SYSTEM

Consultant Signature Box Only

Designed by/Concept par

I. BARNES

Drawn by/Dessine par

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Preetipal Paul

Drawing title/Titre du dessin

DUCT BANK CROSS-SECTION DETAILS (EXISTING)

Project No./No. du projet

R.057890.003

Sheet/Feuille

8433

Revision no./
La Révision
no.

5

