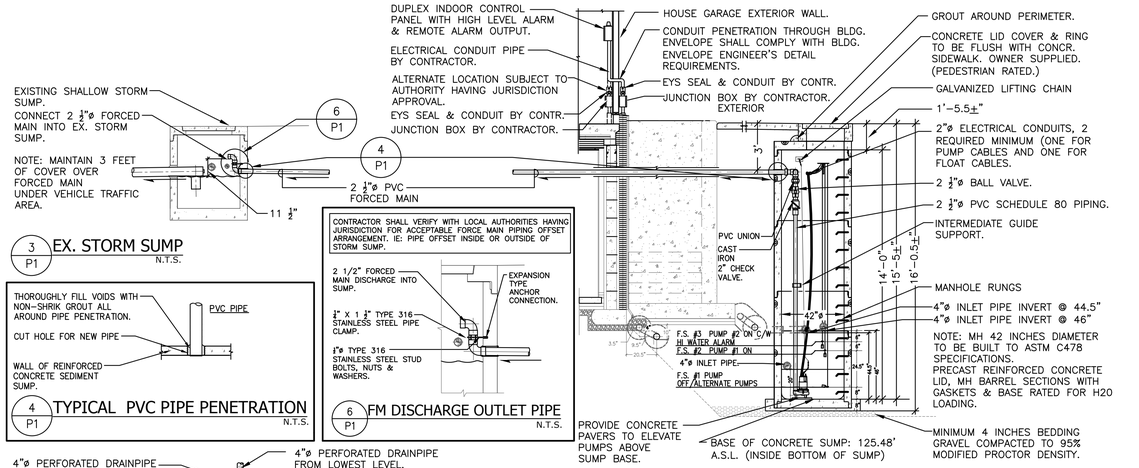
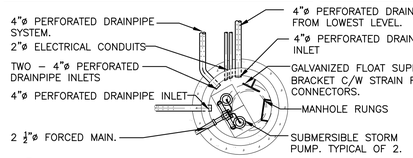
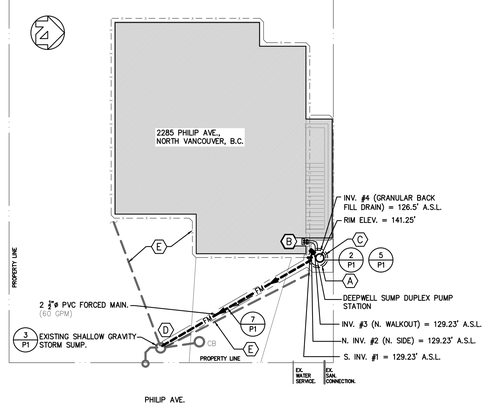




WARNING: STORM DUPLEX PUMP SUMP CONFINED SPACE. BEFORE A WORKER OR SERVICE CONTRACTORS ENTER A CONFINED SPACE, SHALL BE RESPONSIBLE IMPLEMENT & COMPLY WITH WORK SAFE BC REQUIREMENTS FOR CONFINED SPACE ENTRY PROGRAM.

NOTES:
PROVIDE 1/2"ø GALVANIZED STEEL LADDER RUNGS CAST INTO MANHOLE RING WALL AT 12" ON CENTRES FOR FULL DEPTH. GROUT ALL JOINTS AND AROUND INLET & OUTLET PIPES. REFER TO DRAWINGS FOR PIPE SIZES, INLET AND OUTLET INVERTS INTO TRAPPING SUMP. PROVIDE WELL COMPACTED CLEAN RIVER SAND AROUND SIDES AND BOTTOM OF SUMP PIT AND BASE. CONTRACTOR TO VERIFY WITH THE LOCAL PLUMBING INSPECTOR AND INCORPORATE ANY ADDITIONAL REQUIREMENTS.

2 P1 STORM DUPLEX PUMP LIFT STATION — SCALE ¼"=1'-0"



1 P1 SITE PLAN — SCALE: 1/16" = 1'-0"

CIVIL ADDRESS:	LEGAL DESCRIPTION
2285 PHILIP AVE., NORTH VANCOUVER, B.C.	LOT A (EXPLANATORY PLAN 4302) OF LOT 1, BLOCK 12, DISTRICT LOT ABC, PLAN 1234

SYMBOL SCHEDULE

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
FM	BURIED FORCED STORM MAIN.		DRAWING NOTE
	EX. PERIMETER PERFORATED PIPE SYSTEM.		DRAWING REVISION
	EX. STORM SEWER		DETAIL NUMBER DRAWING NUMBER
	PIPE CLEAN-OUT		SECTION NUMBER DRAWING NUMBER
	PIPE CLEAN-OUT TO GRADE	NIC	NOT IN CONTRACT
	DIRECTION OF FLOW	NTS	NOT TO SCALE
	SLOPE PIPE OR DUCT		
	PIPE DROP		
	PIPE RISE		
	PIPE TEE DOWN		
	PIPE TEE UP		

PLUMBING NOTES:

TAG.	DESCRIPTION
A	DEEPWELL DUPLEX PUMP LIFT STATION SUMP.
B	DUPLEX PUMP CONTROL ALARM PANEL LOCATED IN GARAGE.
C	FROM PUMP CONTROL ALARM PANEL CONTROL & POWER WIRING CONDUITS THROUGH GARAGE WALL ABOVE GRADE AND CONDUITS TO OFFSET DOWN TO BELOW GRADE TO SUMP TO SERVICE PUMP CONTROL FLOATS WIRING AND POWER WIRING TO DUPLEX PUMPS.
D	2 ½"ø PVC FORCED MAIN FROM DUPLEX PUMPS TO DISCHARGE INTO EXISTING GRAVITY STORM SUMP.
E	N.I.C. BURIED PERIMETER PERFORATED PIPE SYSTEM & STORM PIPING BY OTHER TRADES.

Mechanical Specification - Division 15

1.0 General

1.1 Scope

.1 This mechanical specification forms part of the contract documents and shall be read in conjunction with all other parts.
.2 Contractor is required to provide complete, tested and fully operational system(s) in accordance with all codes, ordinances, base-building standards and contract documents. The Contractor shall provide all equipment, colour & materials to this end.
.3 Layout drawings are approximate to scale and in some instances diagrammatic. Unless stated otherwise they are not detailed installation instructions.
.4 In the event of any conflicts between the drawings, specification or code requirements, the Contractor shall advise the Engineer in writing to allow resolution of the matter. This to be done during tender stage. Should this not happen the better quality or greater extent of work shall be estimated upon and undertaken. All work to be to the satisfaction of the Engineer and Client.
.5 Prior to submitting their tender and when appointed, the Contractor shall visit the site to become thoroughly familiar with all aspects and issues relating to the work. Changes in contract due to failure in this regard on issues that could have been identified will not be considered.
.6 Contractors undertaking the work must be skilled and experienced in the field of work, and shall within reason allow for all or any additional fittings, equipment or material to execute the work.
.7 Tenders are to be based on equipment as specified. Alternate equipment offered to be identified separately with confirmation of equipment being similar and equal in all aspects. Tenders to state any difference in cost, delivery, benefit options relating to alternate equipment offered, including any revisions necessary to accommodate alternate equipment.
.8 Unless stated otherwise, where separate prices are required, the value of the work stipulated shall be included in the tender price, but the value shall be identified separately together with any implication to the tender price should the item of work not be proceeded with.
.9 The following terms shall be understood to mean:
'Engineer' - the representative of FWD Engineering Ltd.
'Contractor' - the company awarded the contract to undertake the mechanical scope of work pertaining to the project.
'A.H.J.' - authority having jurisdiction.
'Client' - the company or person representing the end user.
'LOA' - Letter of Assurance
'SRP' - Supporting Registered Professional
'RPR' - Registered Professional of Record

1.2 Regulations, Permits & Fees

.1 All work to be in accordance with all applicable & latest codes, regulations of all Authorities Having Jurisdiction including but not limited to
Applicable City or District Building By-Laws
B.C. Building Code
B.C. Plumbing Code
Worker's Compensation Board (WCB)
Fire Marshall
CSA
Electrical Code
B.C. Gas Code & Canadian Gas Code
National Fire Protection Association (NFPA)
Underwriters Laboratories of Canada
.2 Contractor to pay and obtain all necessary permits. Costs to be included in tender value. Provide proof of all certificates as evidence the work is in full compliance.

1.3 Shop Drawings

.1 Prior to ordering any equipment submit 6 sets of shop drawings to the Engineer for review/acceptance. Shop drawings to include names of the manufacturer, model number, performance characteristics, available options, electrical requirements, sizes, weights & required controls. The Contractor shall review and sign shop drawings prior to forwarding to the Engineer as indication they have reviewed & accepted the submittal. The Engineer is not responsible for determining the quantity or handing of equipment.

1.4 Intent and Requirements

.1 Provide a complete and fully operational mechanical system as specified. Equipment and systems shall be installed as indicated close to structure with minimum interference with other services & equipment. Maintain all required service and access spaces.
.2 Co-ordinate with other trades prior to installation to avoid conflicts.
.3 Improperly installed equipment shall be removed and replaced to the satisfaction of the Engineer.
.4 Liaise and co-ordinate with all other trades to avoid conflict. Special close liaison required with the Electrical Contractor to ensure correct power supply connections to equipment are provided.

1.6 Queries

.1 During Tender, any conflicts, ambiguities, omissions or code compliance issues shall be submitted to the Engineer in writing for resolution. Such queries shall be submitted a minimum of 2 working days prior to tender closure.
.2 All queries to be submitted to FWD Engineering Ltd.
.3 Should no such queries be made, tenders will be deemed to be governed by the reasonable interpretation of the Engineer.

1.7 Responsibility & Layout

.1 The Contractor shall be responsible for laying out his work.
.2 Protect equipment and material from damage or weather.
.3 Leave factory covers on equipment until installation and take precautions to avoid ingress of dirt or foreign material into pipes or conduits during construction.
.4 Check and confirm all dimensions on site to ensure adequate space & clearances for equipment prior to ordering of same. Confirm layout of existing 'As Built' systems.
.5 The Contractor shall be responsible to carefully excavate to expose existing below grade drainage piping system. Replace and repair existing storm drainage piping.

1.8 Existing Services

.1 Notify the Engineer in writing should any existing services be observed as being defective, non-operational, dangerous or deemed unacceptable.

1.10 Anticipated Cost Increases

.1 Should the Contractor become aware of any imminent increases in cost of equipment or materials, advice of same shall be given to the Engineer & Client to provide the option to pre-order and avoid the anticipated additional cost.

1.11 Existing Site Services

.1 During execution of the works, services shall be maintained to all existing services unless noted otherwise.
.2 Interruption of any services shall be coordinated with and agreed with the Client as to the duration and time of the event.
.3 The Contractor shall be liable for any damage caused to existing systems by this operation.
.4 Contractor to allow in his price for costs associated with any premium time labour or supervision.

1.12 Cutting and Patching

.1 Unless otherwise noted, the mechanical Contractor shall allow for & be responsible for:
.1 Identifying all openings required for the mechanical services installation. Drawings showing such locations c/w sizes and levels to be submitted together with x-rays to the Engineer for forwarding to the Structural Engineer for approval/comment.
.3 Undertaking all cutting, patching and making good to the Engineers satisfaction all holes and openings required for the mechanical work.
.4 Unless through trade custom or stated differently, the contractor will be responsible for undertaking, the cutting or coring of all holes in floors or walls to accomodate the mechanical plumbing services.
.5 Holes in concrete shall be cut using diamond drill bits and care shall be taken not to create water damage.
.6 Intended hole locations in existing concrete slabs or walls shall be 'x-rayed or scanned' (using GPR, impact-echo, ultrasonic, pachometer, etc) prior to cutting to ensure no conflict with reinforcing, conduit or other impediments. This work to be undertaken by specialists in non-destructive testing as outlined under the alternate equipment suppliers / trades list
.7 Do not cut or core through structural members until approval has been granted by a BC registered Structural Engineer to be engaged by the Contractor.
.8 Drill for expansion bolts, hanger rods, supports and brackets. Check with Structural Engineer, the depth of fixing to ensure no conflict with reinforcing, conduit or other impediments.
.9 Holes incorrectly located shall be closed and correct locations formed.
.10 Repair and patching shall be undertaken by specialists with costs being for the mechanical contractor's account.
.11 All expansion joints and arrangements for the mechanical systems shall be by the contractor.

1.13 Demonstration & Testing

.1 Test and demonstrate all equipment as specified or required by the A.H.J. Provide a minimum of 48 hours notification of intended testing prior to test.
.2 All procedures shall be as per applicable ASHRAE, SMACNA, NFPA, CSA, ASME, and/or ASPE standards.

1.14 Workmanship and Materials

.1 Modifications made to existing systems shall be equal to or an improvement on the existing standard as deemed by the Engineer.
.2 Only new material shall be used unless specified otherwise.
.3 Quality of materials shall be subject to approval by Engineer. Any material rejected shall be removed and replaced at no additional cost to the Client.

1.15 Record and As-Built Drawings

.1 The Contractor shall maintain one set of latest revision drawings on site indicating latest deviations on a daily basis. These drawings shall be readily available and maintained in a legible manner.
.2 If required by client/owner at the completion of works these record drawings shall be handed to FWD Engineering Ltd. to be converted to CAD disks. PDF's of the revised 'Record Drawings' shall be returned to the Contractor and then shall be printed, signed and stamped 'AS-BUILT' by the Contractor. These prints shall be included in the Operating and Maintenance Manuals along with a CD of the PDF's. The Contractor is to allow $300 per drawing (to be paid to FWD) in the tender price for each drawing (not including the specification sheet) all to be paid for by the Contractor.

1.16 Operating and Maintenance Manuals

.1 The Contractor shall submit 1 draft copy of the manual to the Engineer for comment.
.2 Upon modification, the Contractor shall submit 3 manuals in 3-ring hard back binders. There on with separate sections incorporating:
.1 Name of project, Engineers & Contractor.
.2 Description of system operation.
.3 Shop drawings.
.4 List of Manufacturers & Trade names.
.5 Names, addresses & phone numbers of sources of parts & service for maintenance.
.6 Copies of inspection, test & acceptance reports.
.7 Extended Warranties.
.8 Maintenance & Operating Instructions.
.9 Copies of As-Built drawings.
.3 Complete manuals to be handed to the Client and receipt obtained for same. Copy of receipt to be sent to Engineer for record purposes.

1.17 Schedule

.1 Mechanical work shall be in accordance with the General Work Schedule.

1.18 Electrical Liaison

.1 Division 15 Mechanical Contractor shall be responsible and liaise closely with Division 16 Electrical Contractor prior to ordering equipment to ensure compatible electrical connections are provided.

1.19 Site Reviews

.1 The Contractor shall notify the Engineer in writing requesting a 50% review at rough-in installation. The Contractor shall also notify the Engineer for review of below grade work prior to back filling. Notify the Engineer for review prior to concealment of any/all work.
.2 Notification shall be 2 working days prior to required review.
.3 All deficiencies shall be completed within 14 days after substantial completion, and written notification to be provided to the Engineer of this occurrence.

1.20 Project & Substantial Completion

.1 The following requirements must be provided for completion of the project. Items marked with '*' (as applicable) are mandatory requirements for issuance of Schedule Letter C-B.

General

1. * Provision of Operating & Maintenance Manuals.
2. Certification by Contractor all systems are complete and fully operational.
3. Demonstration/instruction to the Client's operational staff on systems operation. A signed statement by the Client's staff that satisfactory training has been provided shall be forwarded to the Engineer. The Contractor shall be responsible for obtaining all necessary documentation and data from his sub-trades and suppliers.
4. * A list of all/any outstanding items. If the list is deemed excessive, Substantial Completion will NOT be considered.
5. As-built layouts (INCLUDING INVERTS FOR ALL BURIED SERVICES).

Plumbing

1. * Back flow prevention test report.
2. Pressure test report for Sump Pump Suction & Forced Main Piping systems.
3. * Final plumbing acceptance inspection report from the City.

2.5 Plumbing and Piping

.1 All to be in accordance with the BC Plumbing Code, and A.H.J.

.2 Service: Sump Pump Suction & Forced Main Piping:

Schedule 80 PVC Pipe & fittings with CSA Certification with solvent welded for concealed or below ground installations.
Schedule 40 black steel or hot dipped zinc coated galvanized for above grade installation with CSA certification.

.3 General Plumbing and Piping:
.1 All piping to be labelled at max 20' centres as to the service and flow direction.
.2 Provide back flow protection as per code and as indicated on layout & schematic drawings.
.3 Provide dielectric connections between dissimilar materials.
.4 Compression type connections, fittings, valves, etc. are not acceptable.

2.8 Seismic & Vibration Requirements

Seismic:
.1 Seismic restraints shall be provided for all items and equipment forming part of Division 15 work and in accordance with SMACNA 'Guidelines for Seismic Restraints', NFPA, B.C. Building Code and A.H.J.
.2 The Contractor shall retain a B.C. Registered Professional Engineer to act as a SRP and approve seismic restraint measures, who shall provide Schedule S-B and S-C Letters of Assurance to the RPR (FWD Systems Design Ltd) for the mechanical, plumbing and fire protection systems upon installation completion.
.3 The seismic SRP shall show proof and provide a copy of his comprehensive Liability Insurance confirming a minimum coverage of $1,000,000.
.4 The seismic SRP shall undertake a minimum of one construction progress field review. A copy of all field reviews shall be provide to the RPR and at minimum state the date of field review, parties met with, findings, and deficiencies.

2.10 Deroliation
.1 Co-ordinate with other trades to ensure the removal of equipment and systems intended for removal.
.2 Equipment and items intended for reuse to be carefully removed and safely stored in a clean and dry area.
.3 All items and materials removed should as far as possible be recycled.

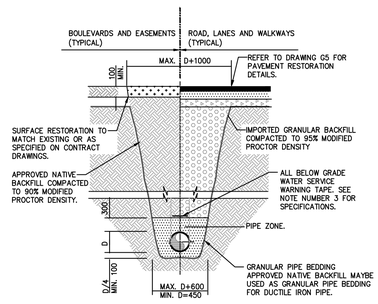
2.11 Supporting Registered Professionals

.1 All SRPs shall show proof and provide a copy of their comprehensive Liability Insurance confirming a minimum coverage of $1,000,000.
.2 All SRPs shall undertake a minimum of one construction progress field review. A copy of all field reviews shall be provide to the RPR and at minimum state the date of field review, parties met with, findings, and deficiencies.

2.12 Description of Work
.1 The following provides a general outline of the scope of work and is intended to assist in the clarification of requirements. It is not fully comprehensive and is to be read in conjunction with the other drawings and documents. It is meant as guideline only!

Duplex Storm Pump Lift Station:

- Provide/install new duplex storm pump lift station with float controls, duplex control/alarm panel and with 42 inch dia. reinforced concrete sump chamber with manhole cover and two 4 inch dia. inlet connections from perimeter perforated foundation dewatering system. sump plumbing services. Refer to plumbing plan for further details.



NOTES:
1. TRENCHING TO COMPLY WITH ALL REQUIREMENTS OF WORKSAFE BC AND LOCAL MUNICIPALITY BYLAW.
2. REFER TO CONTRACT DRAWINGS, PLUMBING SPECIFICATIONS FOR DETAILED SPECIFICATIONS.
3. BELOW GRADE PIPE SERVICE WARNING TAPE.
ALL BURIED FORCED MAIN PIPING TO BE MARKED BELOW GRADE BY USING A METALLIC DETECTABLE REINFORCED UNDERGROUND UTILITY MARKING TAPE. WARNING TAPE SHALL BE A MINIMUM 150MM WIDE. METALLIC GREEN IN COLOR AND CONTINUOUS REPEATING WORDING TEXT LABELLING "CAUTION BURIED PIPE BELOW". BELOW GRADE UTILITY WARNING MARKER TAPE SHALL BE INSTALL ON THE TOP LAYER OF BACKFILL MATERIAL A MINIMUM 300MM DEPTH OVER TOP OF FORCED MAIN SERVICE PIPE. MARKING REINFORCED DETECTABLE UNDERGROUND WARNING TAPE MANUFACTURER: THORTEC OR APPROVAL EQUAL.

7 P1 UTILITY TRENCH — NTS

STORM DUPLEX 2 PUMP SYSTEM SPECIFICATIONS:
FURNISH A DUPLEX 2 PUMP FULLY AUTOMATIC PUMP SYSTEM.
PUMPS SHALL BE MYERS MODEL WHP5-11, ½ HP, 115/1/60 WITH A CAPACITY OF 60 GPM AT 17 FT. TDH.

THE PUMP SHALL BE EQUIPPED WITH A RECESSED TYPE IMPELLER, 50MM (2") DISCHARGE AND 20 FT. OF POWER CABLE.
PUMPS TO BE ALL CAST IRON CONSTRUCTION.
CONTROL PANEL:
PROVIDE A DUPLEX AUTOMATIC PUMP CONTROL PANEL IN AN EEMAC 1 ENCLOSURE FOR INDOOR MOUNTING.
THE CONTROL PANEL SHALL BE CSA APPROVED AND SUPPLIED WITH THE FOLLOWING FEATURES AS STANDARD:
- POWER ON LED DISPLAY INDICATION
- PUMP DISCONNECT CIRCUIT BREAKER
- PUMP RUN LIGHT
- HAND-OFF-AUTOMATIC SELECTOR SWITCHES (H.O.A.)
- ELECTRONIC ALTERNATOR CIRCUIT
- OVERRIDE CIRCUIT
- HIGH LEVEL ALARM LIGHT AND BEEPER WITH RESET
- REMOTE ALARM OUTPUT 12 VOLT
- REMOTE ALARM PANEL WITH LIGHT, BUZZER AND RESET SILENCE SWITCH (OPTIONAL)

FLOAT SWITCHES – THREE (3) REQUIRED (DUPLEX):
PROVIDE THREE (3) FLOAT SWITCHES FOR AUTOMATIC PUMP CONTROL OF THE LIQUID LEVELS. FLOATS TO BE SUPPLIED WITH SUPPORT BRACKET COMPLETE WITH STRAIN RELIEF CONNECTORS.
- F.S. #3 PUMP #2 ON C/W HIGH WATER ALARM
- F.S. #2 PUMP #1 ON
- F.S. #1 OFF-ALTERNATE PUMPS

NORTH

FWD ENGINEERING LTD
#162 –4664 Lougheed Highway
Burnaby, BC
Canada V5C 5T5
Ph: 604.904.2039 Fax: 604.620.1049

Rev.#	Description	Date (D/M/Y)
0	ISSUED BP & PLBG PERMIT	20/08/18

Mechanical drawings to be read in conjunction with and in compliance with the mechanical specifications. Plot size of this drawings is 36"x24".

These drawings are for the purposes specifically identified in the revision and issue columns. These drawings are not for pricing or construction unless indicated as such.

ENGINEER'S SEAL:

DUPLEX PUMP STORM SYSTEM FOR
2285 PHILIP AVE.
NORTH VANCOUVER, BC

PROJECT:

STORM DUPLEX PUMP LIFTSTATION

SHEET TITLE:

Drawn by: HW
Checked by: GF
Scale: AS NOTED
Date: MARCH 9 2015

P1
Dwg.#: of Rev. #

Project #: 0461-001