

# CREUS Engineering

Civil Engineers & Project Managers  
#610 EAST TOWER - 221 ESPLANADE WEST, NORTH VANCOUVER BC, V7M3J3  
PH: 604-987-9070 WEBSITE: www.creus.ca

DRAWING LIST	
DWG No	
KEY	KEY PLAN
SERV	SERVICING PLAN
D-1	STORM MAIN EXTENSION
BG	BUILDING GRADES
SMP-1	STORMWATER MANAGEMENT
SMP-2	STORMWATER MANAGEMENT

PROJECT:

**229-231 W 15th ST.  
NORTH VANCOUVER, BC**

CLIENT:

**SYMPHONY GROUP OF  
COMPANIES**



SITE MAP  
SCALE 1:2000

**2022-07-18**

**RE-ISSUED FOR DEVELOPMENT PERMIT**

SEE DRAWING KEY FOR GENERAL NOTES  
 SEE DRAWING R-1 FOR ROADWORKS NOTES  
 SEE DRAWING SERV FOR WATERWORKS NOTES  
 SEE DRAWING SERV FOR STORM & SANITARY NOTES

**LEGAL DESCRIPTION**

LOT F; EAST PART OF BLOCK 48; DL 548;  
 GROUP 1; PLAN 16457; NWD

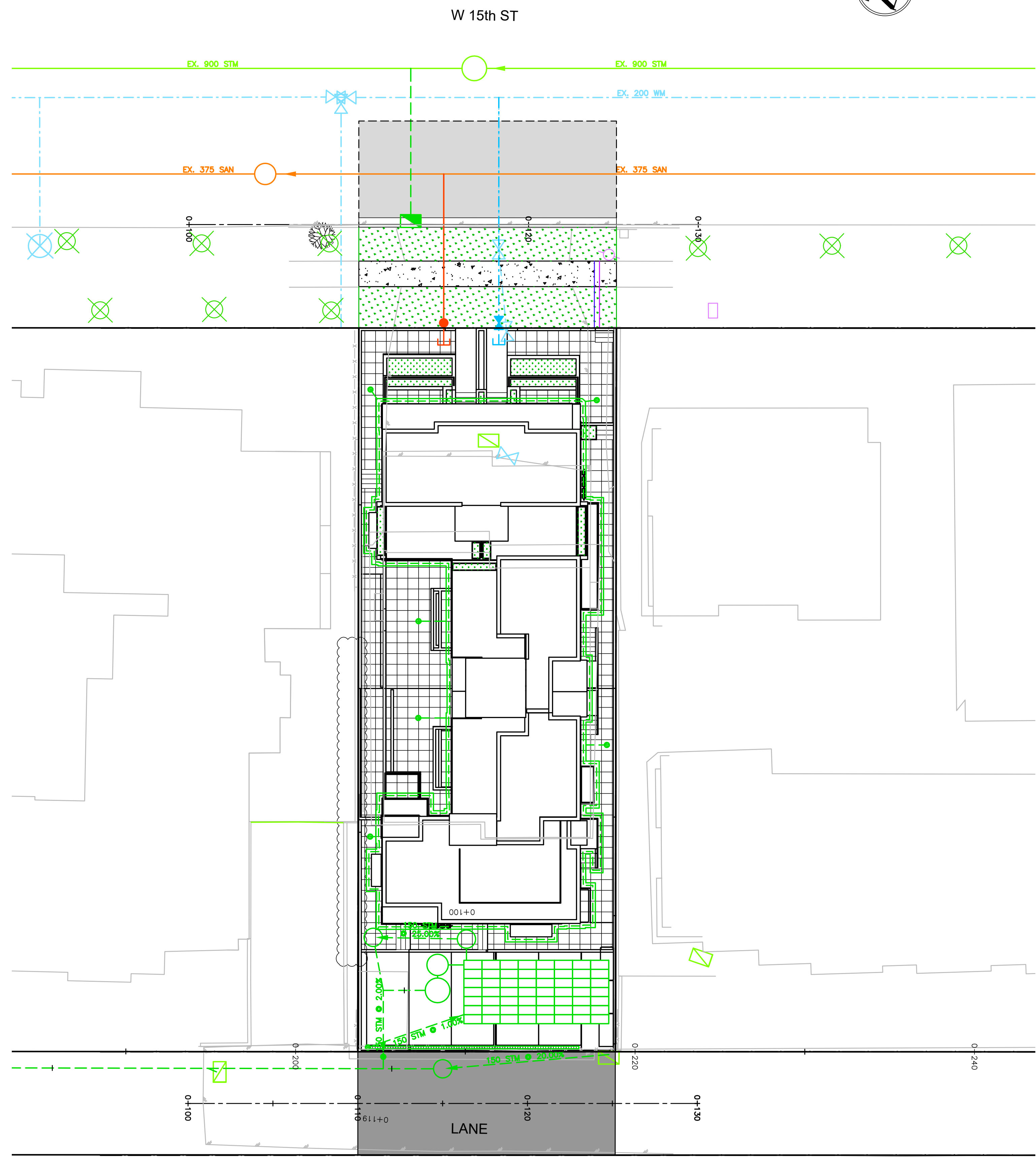
**BENCHMARK INFORMATION**

ELEVATIONS ARE METRIC, GEODETIC DATUM, AND DERIVED FROM CONTROL MONUMENT 73H1020  
 EL: 87.13m (285.86')

CONTRACTOR TO VERIFY & LOCATE EXISTING MAINS & SERVICE CONNECTIONS & NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO BEGINNING CONSTRUCTION

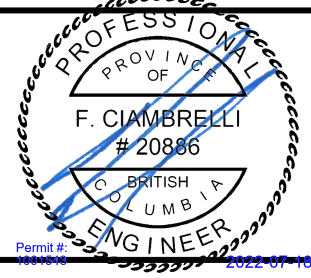
**GENERAL NOTES**

1. THE TERM 'ENGINEER' REFERS TO CREUS ENGINEERING LTD. THEIR CONTACT IS FRED CIAMBRELLI AND CAN BE CONTACTED AT 604-987-9070.
2. ALL CONSTRUCTION WITHIN THE PROPERTY MUST CONFORM TO THE MUNICIPAL STANDARDS, MASTER MUNICIPAL SPECIFICATIONS, CURRENT B.C. BUILDING CODE, & B.C. PLUMBING CODE.
3. THE ENGINEER IS RESPONSIBLE FOR THE IMPLEMENTATION OF THE WORKS. THE CONTRACTOR MUST CONTACT THE ENGINEER FOR ALL DESIGN ENQUIRIES.
4. ALL CONSTRUCTION & TESTING IN CITY OF NORTH VANCOUVER RIGHT OF WAY MUST CONFORM TO THE MASTER MUNICIPAL SPECIFICATIONS AND STANDARD DRAWINGS AS MODIFIED BY THE CITY OF NORTH VANCOUVER CONSTRUCTION SPECIFICATIONS (SCHEDULE C OF BYLAW MMCD 8014) AND STANDARD DRAWINGS AS NECESSARY.
5. NO WARPING OF SIDEWALK ARE ALLOWED IN ROADWAYS, ALL WARPING OF SIDEWALK TO MATCH EXISTING LEVELS SHALL OCCUR WITHIN THE PROPERTY BOUNDARIES.
6. THE CONTRACTOR SHALL ENSURE THAT ALL APPROVALS REQUIRED FOR THE PROPOSED WORK HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION.
7. LOCATIONS OF EXISTING UNDERGROUND SERVICES HAVE BEEN DETERMINED FROM UTILITY AS-CONSTRUCTED DRAWINGS AND THIRD PARTY SURVEY. CONTRACTOR TO CONTACT BC ONE CALL AND PROVIDE COPIES TO ENGINEER AND VERIFY THE LOCATION OF ALL EXISTING SERVICES AND TO NOTIFY ENGINEER OF ANY DISCREPANCIES, CONFLICTS OR OMISSIONS PRIOR TO BEGINNING OF CONSTRUCTION.
8. ONSITE SERVICING WORKS TO COMMENCE ONLY AFTER OFFSITE SERVICE CONNECTION HAS BEEN INSTALLED & VERIFIED. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCY BETWEEN ENGINEERING DRAWINGS AND EXISTING FIELD CONDITIONS PRIOR TO CONSTRUCTION.
9. THE CONTRACTOR SHALL USE EXTREME CARE WHEN WORKING NEAR EXISTING SERVICES AND ANY SERVICES DISTURBED ARE TO BE REPLACED TO THE SATISFACTION OF THE ENGINEER AND THE CITY.
10. THE CONTRACTOR MUST NOTIFY THE ENGINEER 48 HOURS PRIOR TO STARTING OR RESTARTING CONSTRUCTION TO ESTABLISH AN INSPECTION SCHEDULE. THEY MUST ALSO CONTACT THE ENGINEER 48 HOURS BEFORE ANY REQUIRED INSPECTION.
11. THE ENGINEER MUST NOTIFY THE CITY NOT LESS THAN 24 HOURS BEFORE WORK OUTSIDE THE PROPERTY IS STARTED, RESTARTED OR INSPECTIONS ARE REQUIRED.
12. EXISTING ROADWAY NOT INCLUDED IN THESE PROPOSED WORKS SHALL BE KEPT CLEAN AND CLEAR FOR THE DURATION OF CONSTRUCTION, AND LEFT IN THE SAME CONDITION AS PRIOR TO CONSTRUCTION. SURROUNDING STREETS SHALL BE SWEEPED DAILY, IF NECESSARY.
13. EXISTING TREES THAT ARE TO REMAIN SHALL BE PROTECTED BY WAY OF A SOLID FENCE ERECTED OUTSIDE THE DRUPLINE OF THE TREE.
14. TRAFFIC CONTROL PER APPROVED TRAFFIC MANAGEMENT PLAN & THE MINISTRY OF TRANSPORTATION 'TRAFFIC MANUAL FOR WORK ON ROADWAYS' / TRANSPORTATION ASSOCIATION OF CANADA 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES'. CONTRACTOR TO INFORM ENGINEER AND CNV IMMEDIATELY OF ANY FORESEEN OR UNFORESEEN CHANGES TO THE SCHEDULE.
15. PEDESTRIANS SHALL BE PROTECTED AT ALL TIMES. ANY CLOSURE OF THE SIDEWALK TO BE COORDINATED WITH THE CITY, AND WITH SURROUNDING AFFECTED PROPERTIES AT LEAST 24 HOURS BEFORE ANY REQUIRED CLOSURE.
16. THE CONTRACTOR TO PREPARE AS-BUILT DRAWINGS AND PROVIDE THEM TO THE ENGINEER. AN ENGINEER SHALL PROVIDE CERTIFIED AS-BUILT RECORD INFORMATION TO THE CITY OF NORTH VANCOUVER ENGINEERING, PARKS AND ENVIRONMENT DEPARTMENT.
17. THE CONTRACTOR IS RESPONSIBLE TO OBSERVE ALL GUIDELINES AND TAKE ALL NECESSARY MEASURES TO PROTECT THE NATURAL ENVIRONMENT SUCH AS PREVENTING PARTICULATE MATTER OF ANY ORIGIN FROM ENTERING THE STORM WATER SYSTEM.
18. EXISTING PARKING CONTROL SIGNS TO BE REPLACED AT LOCATIONS AS DIRECTED BY THE CITY.
19. POLE SLEEVES ARE AVAILABLE FOR PICK-UP AT THE CNV, OPERATIONS DIVISION. TO ARRANGE PICK-UP OF SLEEVES, CONTACT CITY SIDEWALKS FOREMAN AT 987-7155.
20. ALL CONSTRUCTION WITHIN THE PROPERTY MUST CONFORM TO THE MASTER MUNICIPAL SPECIFICATIONS, B.C. BUILDING CODE & B.C. PLUMBING CODE.
21. THE CONTRACTOR WILL CONSTRUCT ALL WORKS TO THE SATISFACTION OF THE INSPECTORS FROM THE ENGINEER AND THE REGULATORY AUTHORITY. IF APPLICABLE ADDITIONALLY, THE TELUS WORKS UNDER THE DIRECTION AND TO THE SATISFACTION OF THE TELUS INSPECTOR. HYDRO WORKS TO SATISFACTION OF THE BC HYDRO INSPECTOR, TERASEN WORKS TO SATISFACTION OF THE TERASEN INSPECTOR, SHAW WORKS TO SATISFACTION OF THE SHAW INSPECTOR. THE CONTRACTOR WILL FORWARD TO THE ENGINEER CERTIFICATION OF ACCEPTANCE OR APPROVAL FROM THE ABOVE NOTED INSPECTORS ON COMPLETION OF THE WORK. ELECTRICAL WORKS, IF APPLICABLE TO ALSO BE UNDER PERMIT WITH BC ELECTRICAL SAFETY BRANCH WITH A COPY OF PERMIT AND SIGN OFF TO BE FORWARDED TO THE ENGINEER BY THE CONTRACTOR. CONTRACTOR TO GIVE MINIMUM 48 HOURS NOTICE TO RELEVANT INSPECTOR TO ALLOW FOR INSPECTION ON WORKS AND UPDATE ENGINEER ON SAME.
22. THE CONTRACTOR WILL PERFORM AT HIS OWN COST ALL TESTING REQUIRED BY THE REGULATORY AUTHORITY, MMCD AND THE ENGINEER. TESTING SHALL BE DONE BY AN INDEPENDENT SPECIALTY TESTING FIRM. CONTRACTOR TO GIVE ENGINEER 48 HOURS' NOTICE ON ALL TESTING. COPIES OF TESTS TO BE FORWARDED DIRECTLY BY THE TESTING FIRM TO ENGINEER AND GEOTECHNICAL ENGINEER BY EMAIL.
23. VEHICULAR ACCESS TO EXISTING DWELLINGS AND BUSINESS' TO BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE CONTRACT.
24. RESIDENTS AND BUSINESSES DIRECTLY AFFECTED BY CONSTRUCTION OF THIS PROJECT SHALL BE GIVEN 48 HOURS WRITTEN NOTICE OF THE PROPOSED START OF CONSTRUCTION. IF CONSTRUCTION ENTERS ONTO PRIVATE PROPERTY, THE CONTRACTOR OR DEVELOPER'S AGENT WILL REQUIRED WRITTEN AUTHORIZATION FROM THE PRIVATE PROPERTY OWNER. ENGINEER TO BE FORWARDED COPY OF AUTHORIZATION.
25. RETAINING DESIGNATED TREES IS OF PRIME IMPORTANCE. WHEN WORKING IN PROXIMITY TO A DESIGNATED TREE OR WHEN ROOTS ARE ENCOUNTERED, THE CONTRACTOR SHALL CONSULT A CERTIFIED ARBORIST BEFORE PROCEEDING TO PREVENT DAMAGE TO TREES.
26. THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO ENSURE THAT NO SILT IS DISCHARGED TO THE STORM DRAINAGE SYSTEM, ROADWAYS OR ADJACENT PROPERTIES DURING THE COURSE OF CONSTRUCTION IN ACCORDANCE WITH DFO/MOELP'S 'LAND DEVELOPMENT GUIDELINES FOR THE PROTECTION OF AQUATIC HABITAT'. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL & MAINTAIN ALL EROSION & SEDIMENT CONTROL WORKS.
27. FOR BC HYDRO, TELUS, AND FORTIS INSTALLATION, SEE APPROPRIATE UTILITY COMPANY DRAWINGS AND SPECIFICATIONS. CONTRACTOR TO NOTIFY ENGINEER IMMEDIATELY SHOULD SITE CONDITIONS BECOME ALTERED FROM EXPECTATION.
28. SEE LANDSCAPE DRAWINGS FOR PLANTING, SOFTSCAPE AND DECORATIVE PAVEMENT DETAILS.
29. SEE ELECTRICAL ENGINEER DRAWINGS FOR STREETLIGHT & TRAFFIC SIGNAL DESIGNS.
30. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSURE THEY ARE WORKING FROM THE MOST UP TO DATE DESIGN PACKAGE INCLUDING DRAWINGS AND REPORTS.
31. A PORTION OF THE CONTRACT DOCUMENTS IS INCLUDED BY REFERENCE. COPIES OF THESE DOCUMENTS HAVE BEEN REFERENCED IN THE TENDER PACKAGE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT CURRENT RELEVANT COPIES OF ALL DRAWINGS AND CONTRACT DOCUMENTS ARE FORWARDED TO SURVEYORS, TESTING AGENCIES, SUBCONTRACTORS, SUPERINTENDENTS, ESTIMATORS, PROJECT MANAGERS, SITE STAFF AND ANY OTHER RELEVANT PARTIES. CONTRACTOR CONFIRMS THEY HAVE REVIEWED SAME PRIOR TO SUBMITTING TENDER.
32. SUB-CONTRACTORS SHALL NOT COMMUNICATE WITH THE ENGINEERS OR OWNER DIRECTLY ON ANY CONTRACTUAL OR TECHNICAL ISSUE. THEY SHALL DIRECT THEIR ISSUES TO THE CONTRACTOR DIRECTLY WHOSE RESPONSIBILITY IT TO DEAL WITH THESE ISSUES ON THEIR BEHALF WITH THE ENGINEER. REVIEW AND APPROVAL OF ANY CONTRACTUAL MATTER INCLUDING PROGRESS PAYMENT, CHANGE ORDER, PAYMENT OF HOLDBACK, FINAL PAYMENT, INSURANCE AND WARRANTY, ETC. SHALL DIRECTED TO THE ENGINEER. CONTRACTOR MUST ONLY TAKE DIRECTION FROM THE ENGINEER IN REGARDS TO CHANGES TO DESIGN OR EXTRA WORKS.
33. UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS OR NOTIFIED TO THE CONTRARY BY THE ENGINEER, THE CONTRACTOR IS THE 'PRIME CONTRACTOR' FOR THE PURPOSE OF ALL APPLICABLE LAWS RELATIVE TO OCCUPATIONAL HEALTH AND SAFETY, INCLUDING THE DISCHARGE OF ALL DUTIES OF THE 'PRIME CONTRACTOR' UNDER THE WORKERS COMPENSATION ACT (BRITISH COLUMBIA), NOTWITHSTANDING THAT THE ENGINEER, THE OWNER OR ANOTHER CONTRACTOR MAY PROVIDE FROM TIME TO TIME SOME OF THE SERVICES NORMALLY PROVIDED BY SUCH 'PRIME CONTRACTOR'. IN THIS SECTION 'PRIME CONTRACTOR' MEANS THE CONTRACTOR SO DEFINED UNDER THE WORKERS COMPENSATION ACT (BRITISH COLUMBIA).



**DRAWING LEGEND**

	EXISTING	PROP.	TO BE REMOVED
LEGAL LINE EASEMENT	---	---	---
WATERMAIN	---	---	---
SANITARY	---	---	---
STORM	---	---	---
HYDRO	---	---	---
TEL	---	---	---
STREETLIGHT	---	---	---
GAS	---	---	---
<b>EXISTING PROP. TO BE REMOVED</b>			
FIRE HYDRANT	⊗	⊗	⊗
GATE VALVE	⊗	⊗	⊗
AIR VALVE	⊗	⊗	⊗
REDUCER	⊗	⊗	⊗
INSPECTION CHAMBER	⊗	⊗	⊗
CATCHBASIN (STD/SI)	⊗	⊗	⊗
CAP	⊗	⊗	⊗
MANHOLE	⊗	⊗	⊗
POWER POLE	⊗	⊗	⊗
STREETLIGHT	⊗	⊗	⊗



client  
**SYMPHONY GROUP OF COMPANIES**

project  
 229-231 W 15th ST.  
 NORTH VANCOUVER, BC

title  
**KEY PLAN**

no.	(y/m/d)	revision	chn/d
2	22-07-18	RE-ISSUED FOR DEVELOPMENT PERMIT	BEM
1	22/03/25	ISSUED FOR DEVELOPMENT PERMIT	AFG

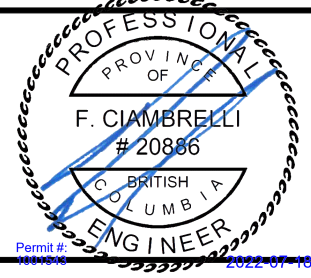
engineer of record	FMC	scales	hor: 1:150	vert:
designed by	AFG	file no.	21311	
drawn by	AFG	drawing no.	KEY	
date	22/03/14			

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current rev. #  
**2**



	EXISTING	PROP.	TO BE REMOVED
LEGAL LINE EASEMENT	---	---	---
WATERMAIN	---	---	---
SANITARY	---	---	---
STORM	---	---	---
HYDRO	---	---	---
TEL	---	---	---
STREETLIGHT	---	---	---
GAS	---	---	---
FIRE HYDRANT	---	---	---
GATE VALVE	---	---	---
AIR VALVE	---	---	---
REDUCER	---	---	---
INSPECTION CHAMBER	---	---	---
CATCH BASIN (STD/SI)	---	---	---
CAP	---	---	---
MANHOLE	---	---	---
POWER POLE	---	---	---
STREETLIGHT	---	---	---



client  
**SYMPHONY GROUP OF COMPANIES**

project  
**229-231 W 15th ST.  
 NORTH VANCOUVER, BC**

title  
**SERVICING PLAN**

no.	(y/m/d)	revision	chk'd
2	22-07-18	RE-ISSUED FOR DEVELOPMENT PERMIT	BEM
1	22/03/25	ISSUED FOR DEVELOPMENT PERMIT	AFG

engineer of record	FMC	scales	hor: 1:150	vert:
designed by	AFG	file no.	21311	
drawn by	AFG	drawing no.	SERV	
date	22/03/14			

SEE DRAWING KEY FOR GENERAL NOTES  
 SEE DRAWING R-1 FOR ROADWORKS NOTES  
 SEE DRAWING SERV FOR WATERWORKS NOTES  
 SEE DRAWING SERV FOR STORM & SANITARY NOTES

CONTRACTOR TO VERIFY & LOCATE EXISTING MAINS & SERVICE CONNECTIONS & NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO BEGINNING CONSTRUCTION

**LEGAL DESCRIPTION**

LOT F, EAST PART OF BLOCK 48; DL 548;  
 GROUP 1; PLAN 16457; NWD

**BENCHMARK INFORMATION**

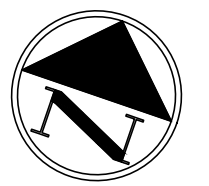
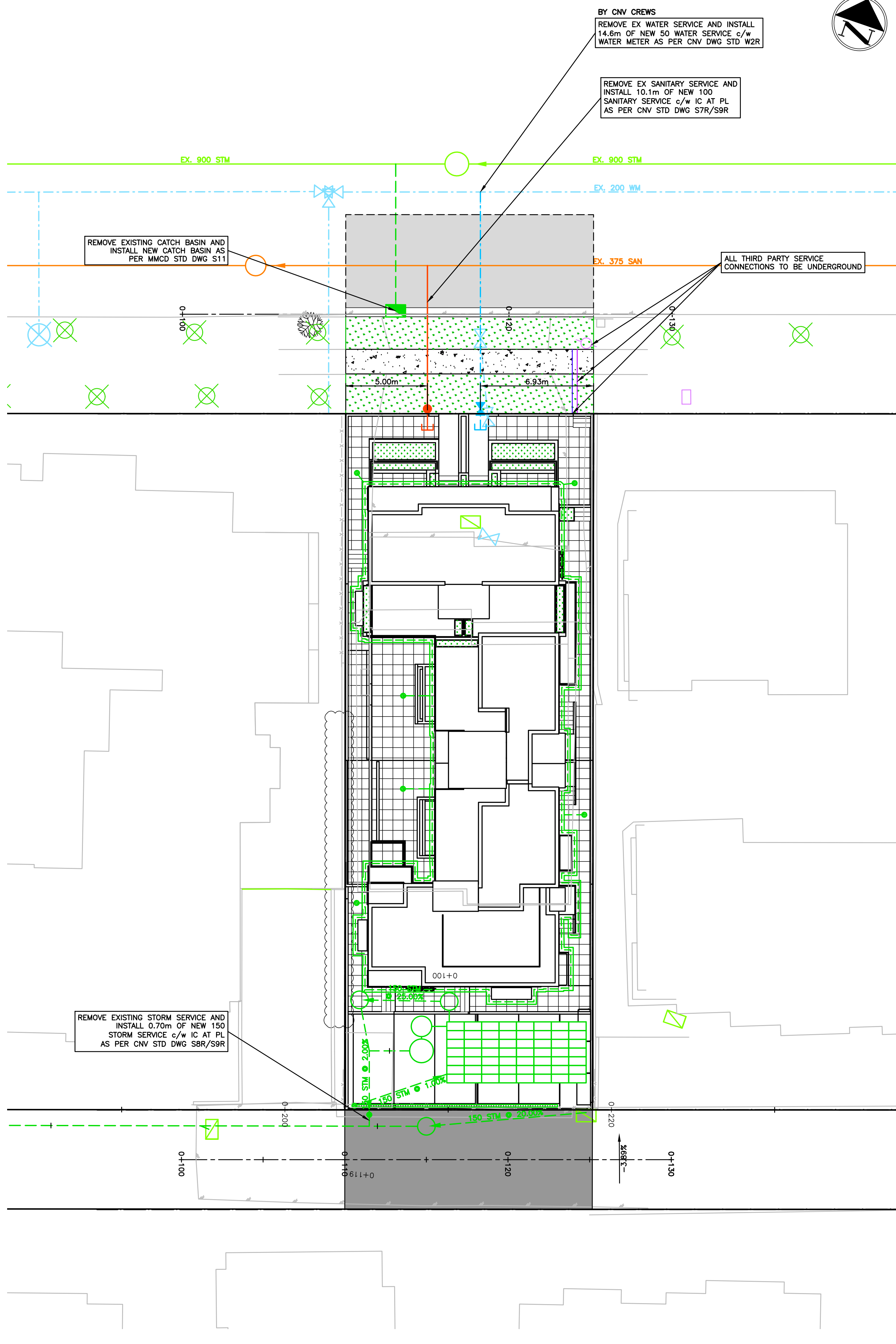
ELEVATIONS ARE METRIC, GEODETIC DATUM, AND DERIVED FROM CONTROL MONUMENT 73H1020  
 EL: 87.13m (285.86')

**STORM AND SANITARY SEWER NOTES**

- SANITARY GRAVITY SEWERS TO BE PVC SDR 28 FOR SERVICE CONNECTIONS AND SDR 35 FOR MAIN LINES WHEN TESTED IN ACCORDANCE WITH ASTM D3034 & CSA B182.1. PIPE STIFFNESS (1/y) SHALL BE 314 kPa AT 2.5% DEFLECTION WHEN TESTED IN ACCORDANCE WITH ASTM D2412 UNLESS NOTED OTHERWISE.
- STORM GRAVITY SEWERS TO BE EITHER PVC SDR 28 FOR SERVICE CONNECTIONS AND SDR 35 FOR MAIN LINES AND CB LEADS WHEN TESTED IN ACCORDANCE WITH ASTM D3034 & CSA B182.1 (PIPE STIFFNESS (1/y) SHALL BE 314 kPa AT 2.5% DEFLECTION WHEN TESTED IN ACCORDANCE WITH ASTM D2412 UNLESS NOTED OTHERWISE) OR CONCRETE AND SHALL MEET ASTM C14 CLASS 3 OR IF INDICATED ON DRAWINGS SDR 35 FOR MAIN LINES WHEN TESTED IN ACCORDANCE WITH ASTM D3034 & CSA B182.1 (PIPE STIFFNESS (1/y) SHALL BE 314 kPa AT 2.5% DEFLECTION WHEN TESTED IN ACCORDANCE WITH ASTM D2412 UNLESS NOTED OTHERWISE).
- SANITARY FORCEMAINS ARE TO BE PVC TO AWWA C900 CLASS 150 OR HIGH DENSITY POLYETHYLENE SERIES 100 (DR17) OR BETTER, TO ASTM F714-85 & ASTM D-1248-84.
- STORM SERVICES TO BE MINIMUM SDR28 P.V.C. 150mm MIN C/W INSPECTION CHAMBER AT PROPERTY LINE AS PER MMCD STD. DWG S7
- SANITARY SERVICES TO BE MINIMUM SDR28 P.V.C. 100mm MIN C/W INSPECTION CHAMBER AT PROPERTY LINE AS PER MMCD STD. DWG S7
- MINIMUM GRADE ON STORM SERVICE CONNECTIONS AND CATCH BASIN LEADS TO BE 2%, UNLESS NOTED OTHERWISE. MINIMUM GRADE ON SAN SERVICE CONNECTIONS TO BE 2.5%, UNLESS NOTED OTHERWISE.
- CATCH BASIN RIMS TO BE SET 25mm BELOW GUTTER LINE ELEVATION.
- CONTRACTOR TO INSURE TESTING OF SEWER MAINS TO BE PERFORMED IN THE PRESENCE OF THE ENGINEER OF RECORD. CONTRACTORS TO PROVIDE MINIMUM OF 48 HOURS NOTICE. ALL MAINS AND SERVICES ARE TO BE TESTED AS PER MMCD SPECIFICATIONS WITH THE RESULTS FORWARDED TO THE CITY OF NORTH VANCOUVER.
- ALL SEWER MAINS AND LATERALS TO BE CCTV INSPECTED. CCTV INSPECTIONS TO BE ARRANGED BY CONTRACTOR AT CONTRACTOR'S EXPENSE. CONTRACTOR TO FORWARD VIDEO FILES TO ENGINEER WITHIN TWO WEEKS OF INSPECTION.
- CONTRACTOR TO PROVIDED TEMPORARY BYPASS AND RECONNECTION OF ANY SERVICES DISRUPTED BY CONSTRUCTION ACTIVITIES.
- WHERE SANITARY PIPE GRADE EXCEEDS 15%, PIPE TO BE ANCHORED AS PER MMCD STD. DWG G8.
- PIPE BEDDING TO CONFORM WITH MMCD STANDARDS AND BE COMPACTED TO 95% MODIFIED PROCTOR PRIOR TO BACKFILLING TRENCH. SEE MMCD STD. DWG G4.
- ALL CONNECTIONS TO EXISTING PIPES OR TO PIPES OF DIFFERING MATERIAL TO USE FLEX SEAL ADJUSTABLE SHIELDED COUPLINGS.
- ALL MANHOLES TO BE TO MMCD STD DWG S1, MINIMUM 1050 UNLESS OTHERWISE NOTED.
- EXCAVATION AND PAVEMENT RESTORATION TO BE COMPLETED BY CONTRACTOR PER REGULATORY AUTHORITY REQUIREMENTS, MMCD STANDARDS AND CONTRACT DOCUMENTS. CONTRACTOR TO GIVE NOTICE PRIOR TO COMPLETING WORKS
- SERVICE CONNECTIONS TO BE MARKED WITH A 40mm x 90mm POST PAINTED RED FOR SANITARY AND GREEN FOR STORM AT TERMINATION. SERVICES TO BE TERMINATED 1m BEYOND THE PROPERTY LINE, UNLESS OTHERWISE NOTED.
- SITE SERVICING WORKS TO COMMENCE ONLY AFTER OFFSITE SERVICE CONNECTION HAS BEEN INSTALLED & VERIFIED.

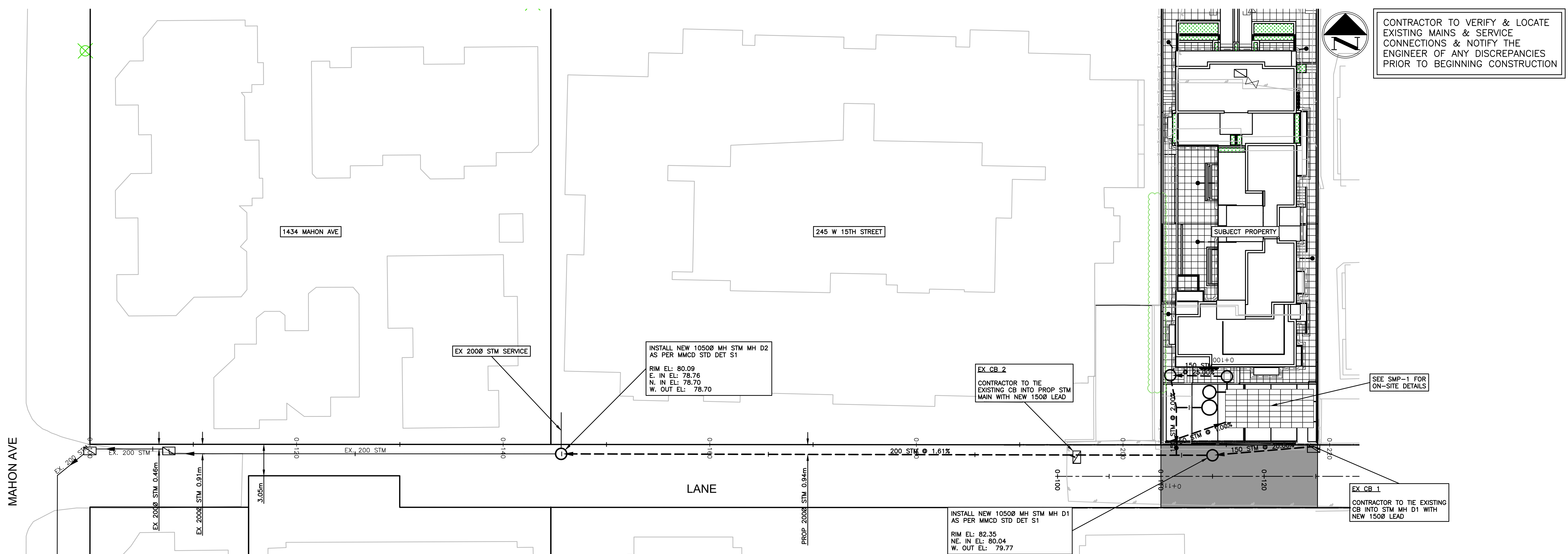
**WATERWORKS NOTES**

- THE C.N.V. SHALL MAKE TIE-IN(S) TO THE EXISTING WATERMAIN(S) AT THE COST OF THE DEVELOPER. CONTRACTOR TO ADVISE C.N.V. 48 HOURS PRIOR TO TIE-IN.
- ALL WORKS TO BE PER MMCD (LATEST EDITION), MUNICIPAL REQUIREMENTS, CONTRACT DOCUMENTS AND ALSO, THE BCBC (LATEST EDITION) WITHIN PROPERTY LIMITS.
- ALL WATERMAIN PIPING TO BE DUCTILE IRON (D.I.) WATERMAIN CLASS 50 TO AWWA C151, CEMENT MORTAR LINED TO AWWA C104, UNLESS NOTED OTHERWISE. TYTON JOINTS TO AWWA C111 AND ASTM D313.9 & GASKET TO ASTM F377.
- ALL FITTINGS TO BE DUCTILE IRON TO AWWA C153, CEMENT MORTAR LINED TO AWWA C104, TYTON JOINTS TO AWWA C111, WITH CLOSED LUGS OR CAST IRON TO AWWA C110, TYTON JOINTS TO AWWA C111, CLOSED LUG.
- ALL CONNECTIONS TO BE TYPE K ANNEALED COPPER TO ASTM B88M UP TO 75mm AND SIZED AS SPECIFIED. SERVICE CONNECTIONS 100mm AND UP TO BE DUCTILE IRON TO THE SAME SPECIFICATION AS THE WATERMAIN NOTED ABOVE.
- SERVICE CONNECTIONS TO BE MARKED WITH A 40mm x 90mm POST PAINTED BLUE AT TERMINATION. SERVICES TO BE TERMINATED 1m BEYOND THE PROPERTY LINE, UNLESS OTHERWISE NOTED.
- HYDRANTS TO TERMINAL CITY TO#1 TO C.N.V. STD. DWG SA1-32BA-W(W2). VALVE TO BE MMCD STD. & LEADS TO BE PVC
- HYDRANTS TO BE SURROUNDED BY 1.0m RADIUS ASPHALT APRON. HYDRANTS TO BE PAINTED WHITE WITH RED BONNET AND CAP. HYDRANT PUMPER PORT TO BE 0.5m TO 1.0m ABOVE FINISHED GRADE. HYDRANT BODY SHALL BE INSTALLED 150mm ABOVE FINISHED GRADE.
- FOR PROPOSED FIRE HYDRANTS DURING CONSTRUCTION, AND AT ANY TIME PRIOR TO ACCEPTANCE AND PRESSURING OF MAINS, THE CONTRACTOR SHALL PLACE A 0.3m SQUARE 20mm SHEET OF PLYWOOD OVER THE PUMPER NOZZLE OF THE HYDRANT TO INDICATE THE HYDRANT IS NOT IN USE.
- PIPE BEDDING TO CONFORM WITH MMCD STANDARDS. SEE MMCD STD. DWG G4 AND BE COMPACTED TO 95% MODIFIED PROCTOR PRIOR TO BACKFILLING TRENCH.
- INSTALLATION, TESTING AND CHLORINATING TO BE PERFORMED IN ACCORDANCE WITH C.N.V., MMCD CONSTRUCTION SPECIFICATIONS, AWWA C600 AND AWWA C651. ENGINEER AND CITY TO BE GIVEN 48 HOURS NOTICE PRIOR TO TESTING AND CONTRACTOR TO INSURE TESTING IS COMPLETED IN THE PRESENCE OF THE ENGINEER.
- MINIMUM COVER ON WATERMAIN = 1.2m. UNLESS NOTED OTHERWISE
- COVERS FOR INSPECTION CHAMBERS, VALVE RISERS AND METER CHAMBERS LOCATED WITHIN DRIVEWAYS SHALL BE SUITABLE FOR H2O TRAFFIC LOADING.
- VALVES TO BE RESILIENT SEATED VALVES TO MMCD SPECIFICATIONS, TO AWWA C509.
- WATERMAIN TO BE CONSTRUCTED A MINIMUM OF 0.5m ABOVE STORM OR SANITARY SEWERS AND MAINTAIN 3.0m HORIZONTAL CLEARANCE. IN AREAS WHERE LESS THAN 0.5m VERTICAL OR 3.0m HORIZONTAL CLEARANCE CAN NOT BE MAINTAINED, ALL JOINTS TO BE HEAT SHRINK WRAPPED OR TAPE WRAPPED AS PER MINISTRY OF HEALTH STANDARDS; ANSI/AWWA C214 (FACTORY APPLIED), ANSI/AWWA C209 (FIELD APPLIED) ANSI/AWWA C217-90 (PETROLIUM TAPE) ALL TO MINISTRY OF HEALTH STANDARDS. WATERMAIN CROSSINGS OF STORM OR SANITARY SEWER TO BE MADE AT MIDPOINT OF PIPE.
- WHERE SEWER MAIN CROSSES WATERMAIN AND CLEARANCE IS LESS THAN 0.5m, THE UPPER PIPE SHALL BE CONCRETE ENCASED PER MMCD STD DWG G6 AND WRAPPED AS PER NOTE ABOVE.
- WHERE WATERMAIN PIPE GRADE EXCEEDS 15% PIPE TO BE ANCHORED AS PER MMCD STD DWG G8. JOINT RESTRAINTS TO MMCD SPECIFICATION SECTION 02666 TO BE INSTALLED WHERE GRADE EXCEEDS 20%.
- ALL ONSITE WATERMAIN PIPING TO BE PVC DR18 PIPE TO AWWA C900 FOR PIPE 100mm TO 300mm DIAMETER AND AWWA C905 FOR PIPE LARGER THAN 300mm. ALL PIPE TO BE CSA B137.3 CERTIFIED.
- ONSITE WATER SERVICES LESS THAN 100mm TO BE POLYETHYLENE TO AWWA C901 OR ENGINEER APPROVED ALTERNATIVE UNLESS OTHERWISE NOTED.
- C.N.V. TO PROVIDE ALL MATERIALS & FITTINGS INCLUDING VALVES FOR WORKS PROVIDED BY THEIR CREWS
- SITE SERVICING WORKS TO COMMENCE ONLY AFTER OFFSITE SERVICE CONNECTION HAS BEEN INSTALLED & VERIFIED.



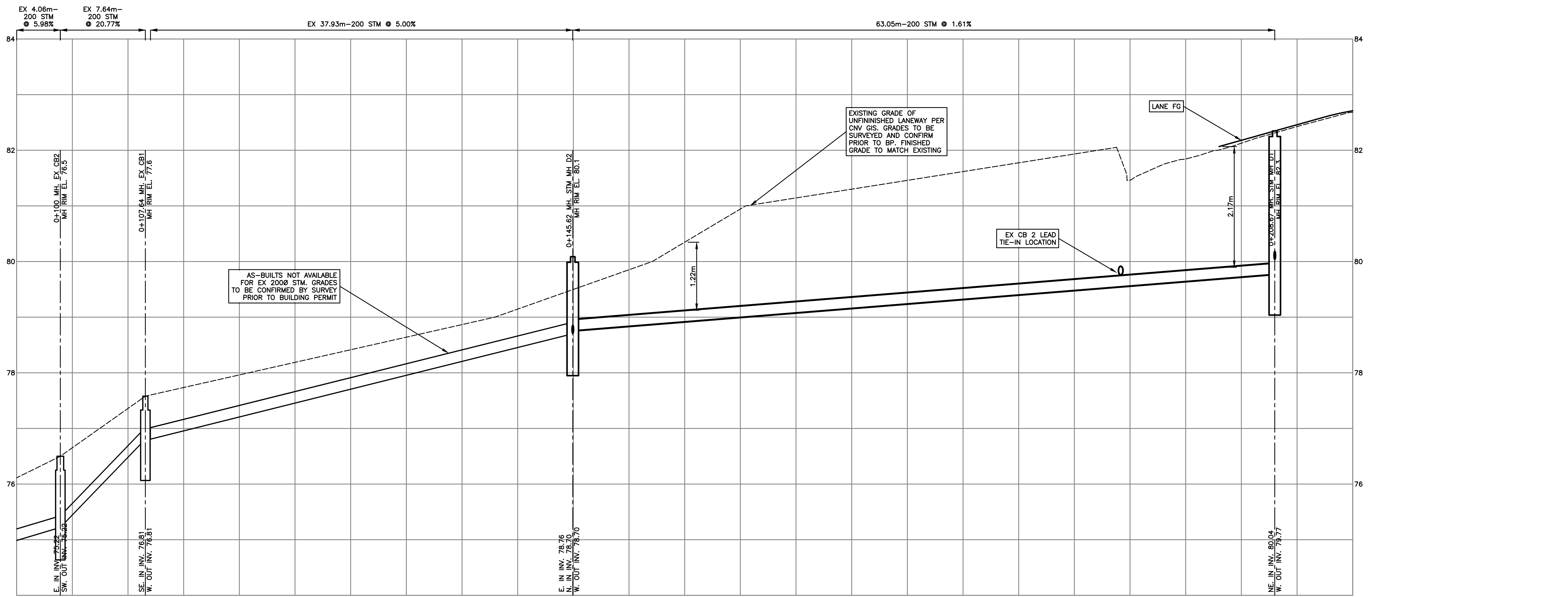


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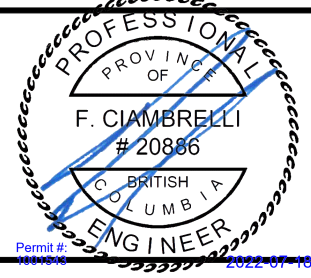


### DRAWING LEGEND

	EXISTING	PROP.	TO BE REMOVED
LEGAL LINE	---	---	---
EASEMENT	---	---	---
WATERMAIN	---	---	---
SANITARY	---	---	---
STORM	---	---	---
HYDRO	---	---	---
TEL	---	---	---
STREETLIGHT	---	---	---
GAS	---	---	---
	EXISTING	PROP.	TO BE REMOVED
FIRE HYDRANT	⊗	⊗	⊗
GATE VALVE	⊗	⊗	⊗
AIR VALVE	⊗	⊗	⊗
REDUCER	⊗	⊗	⊗
INSPECTION CHAMBER	⊗	⊗	⊗
CATCHBASIN (STD/SI)	⊗	⊗	⊗
CAP	⊗	⊗	⊗
MANHOLE	⊗	⊗	⊗
POWER POLE	⊗	⊗	⊗
STREETLIGHT	⊗	⊗	⊗



LANE - PROP. STORM MAIN  
 H. SCALE: 1:200  
 V. SCALE: 1:40



client  
**SYMPHONY GROUP OF COMPANIES**

project  
 229-231 W 15th ST.  
 NORTH VANCOUVER, BC

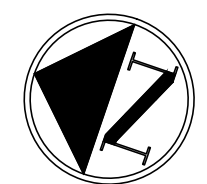
title  
**STORM MAIN EXTENSION**

no.	(y/m/d)	revision	chk'd
1	22-07-18	RE-ISSUED FOR DP	BEM

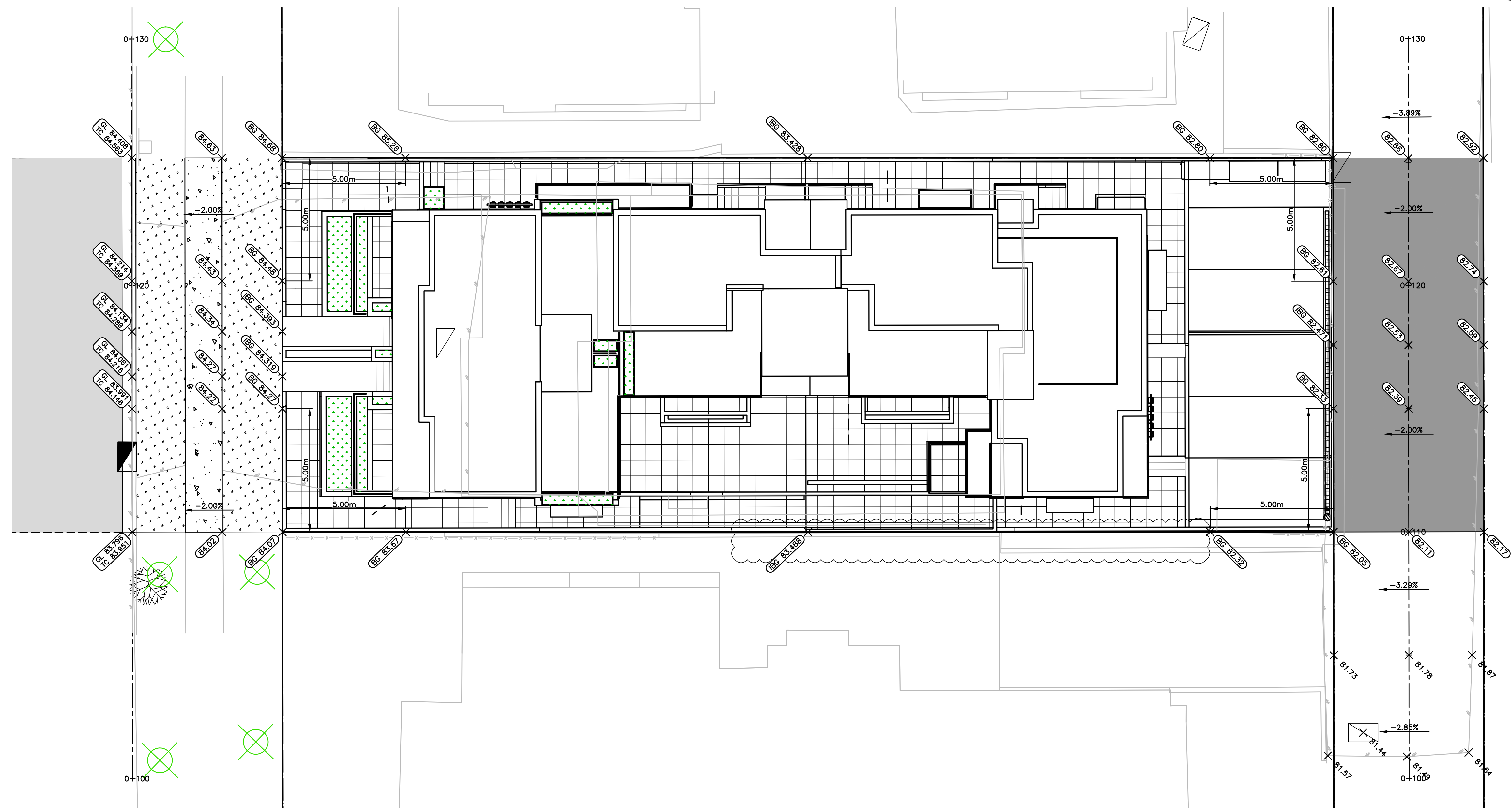
engineer of record	FMC	scales	hor: 1:200	vert: -
designed by	FMC	file no.	21311	
drawn by	BEM	drawing no.	D-1	
date	22/03/14			

SEE DRAWING KEY FOR GENERAL NOTES  
 SEE DRAWING R-1 FOR ROADWORKS NOTES  
 SEE DRAWING SERV FOR WATERWORKS NOTES  
 SEE DRAWING SERV FOR STORM & SANITARY NOTES

SEE DRAWING X-X-X FOR GENERAL NOTES  
 SEE DRAWING X-X-X FOR ROADWORKS NOTES  
 SEE DRAWING X-X-X FOR WATERWORKS NOTES  
 SEE DRAWING X-X-X FOR STORM & SANITARY NOTES



CONTRACTOR TO VERIFY & LOCATE  
 EXISTING MAINS & SERVICE  
 CONNECTIONS & NOTIFY THE  
 ENGINEER OF ANY DISCREPANCIES  
 PRIOR TO BEGINNING CONSTRUCTION



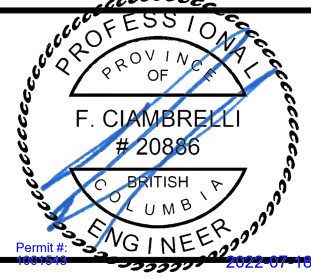
# CREUS Engineering

Civil Engineers & Project Managers  
 #610 EAST TOWER - 221 ESPLANADE WEST, NORTH VANCOUVER BC, V7M3J3  
 PH: 604-987-9070 WEBSITE: www.creus.ca

PERMIT TO PRACTICE # 1001543

### DRAWING LEGEND

	EXISTING	PROP.	TO BE REMOVED
LEGAL LINE	---	---	---
EASEMENT	---	---	---
WATERMAIN	---	---	---
SANITARY	---	---	---
STORM	---	---	---
HYDRO	---	---	---
TEL.	---	---	---
STREETLIGHT	---	---	---
GAS	---	---	---
	EXISTING	PROP.	TO BE REMOVED
FIRE HYDRANT	⊗	⊗	⊗
GATE VALVE	⊗	⊗	⊗
AIR VALVE	⊗	⊗	⊗
REDUCER	⊗	⊗	⊗
INSPECTION CHAMBER	⊗	⊗	⊗
CATCHBASIN (STD/SI)	⊗	⊗	⊗
CAP	⊗	⊗	⊗
MANHOLE	⊗	⊗	⊗
POWER POLE	⊗	⊗	⊗
STREETLIGHT	⊗	⊗	⊗



client  
**SYMPHONY GROUP OF COMPANIES**

project  
**229-231 W 15th ST.  
 NORTH VANCOUVER, BC**

title  
**BUILDING GRADES**

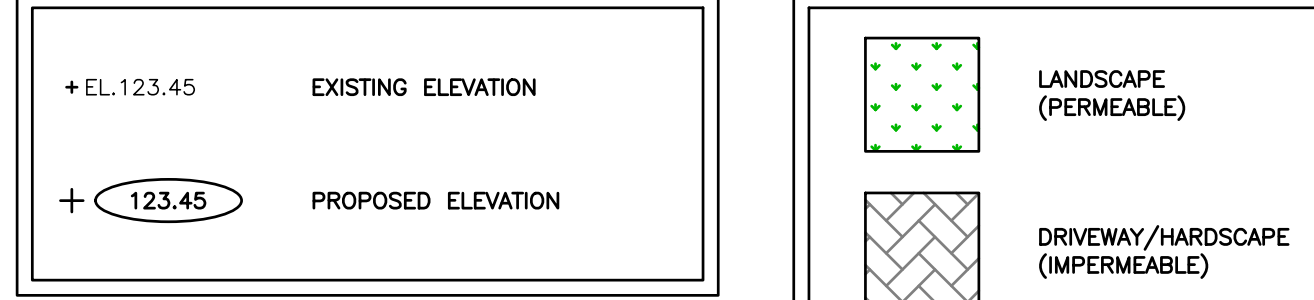
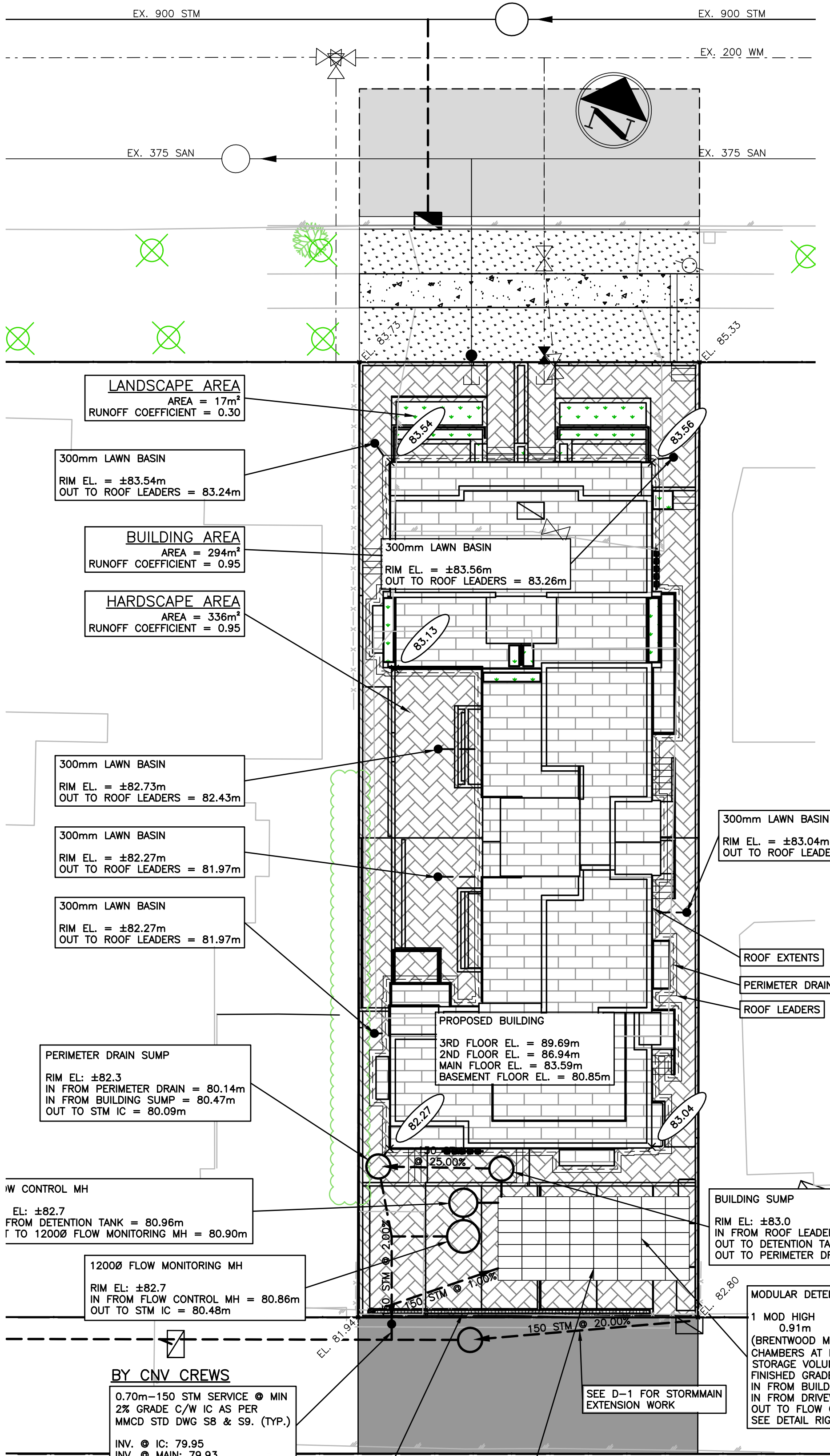
no.	(y/m/d)	revision	chk'd
2	22-07-18	RE-ISSUED FOR DEVELOPMENT PERMIT	BEM
1	22/03/25	ISSUED FOR DEVELOPMENT PERMIT	AFG

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engineer of record	FMC	scales hor: 1:100 vert:
designed by	AFG	file no. <b>21311</b>
drawn by	AFG	drawing no. <b>BG</b>
date	22/03/14	

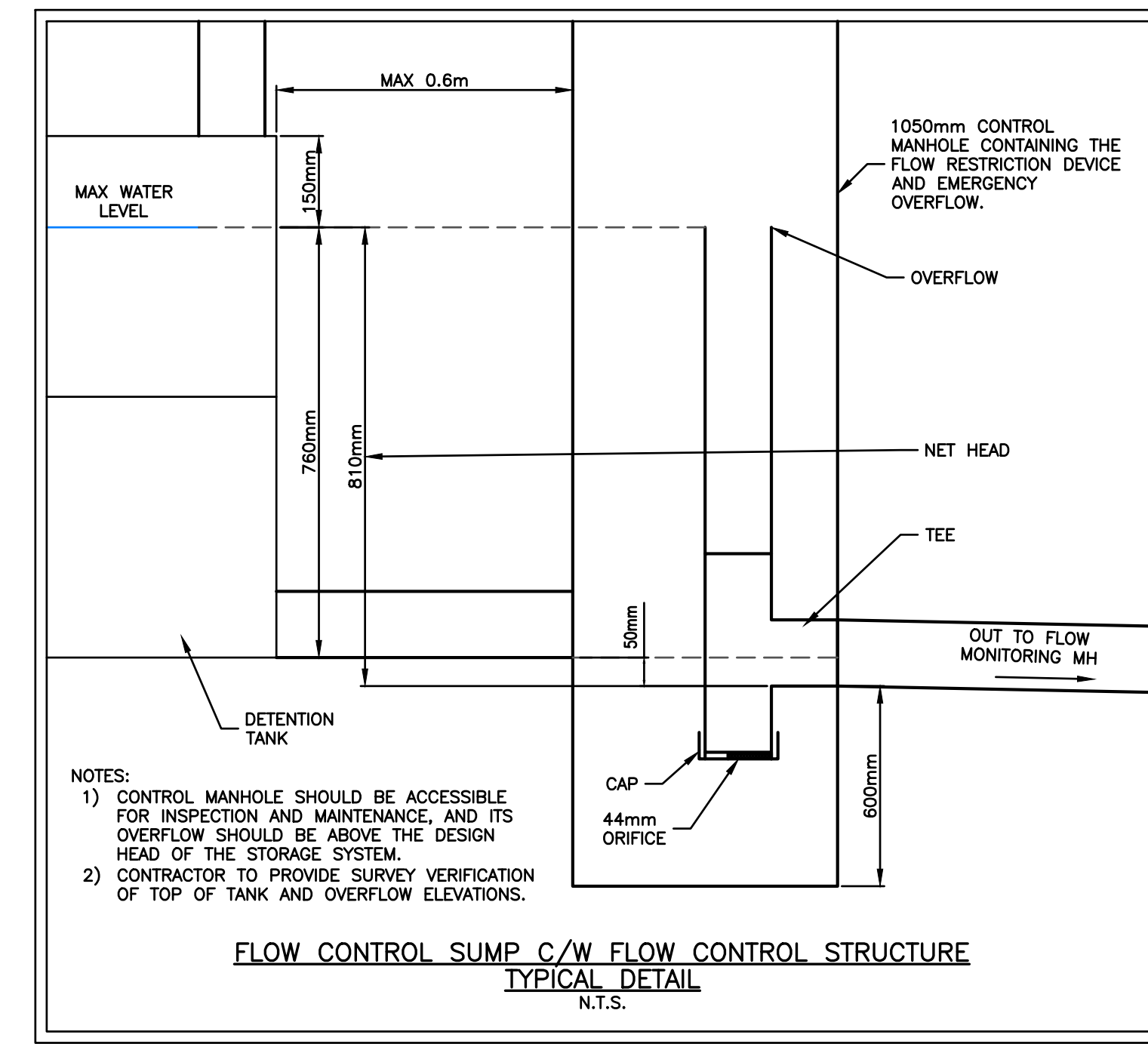
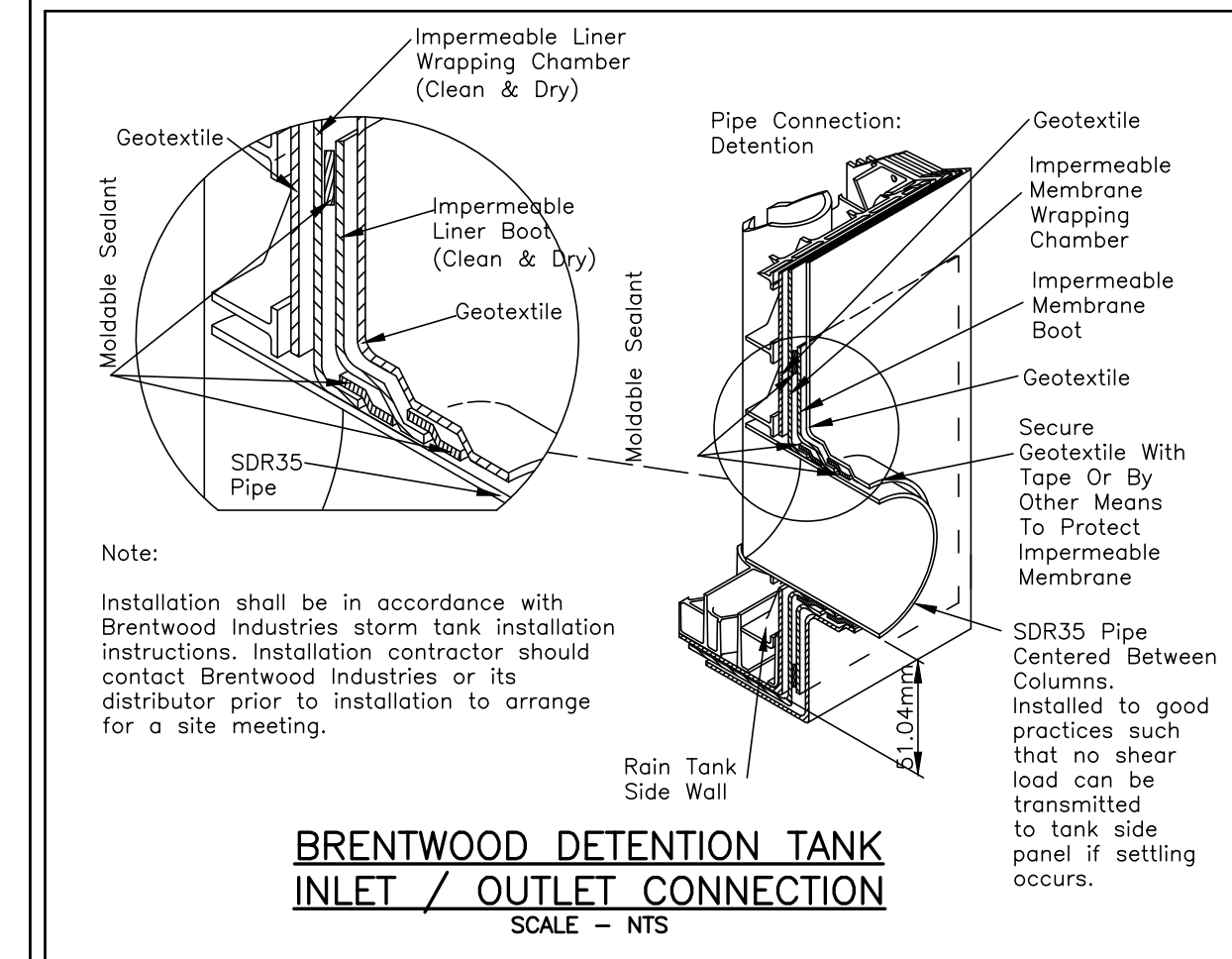


SEE DRAWING KEY FOR GENERAL NOTES  
 SEE DRAWING R-1 FOR ROADWORKS NOTES  
 SEE DRAWING SERV FOR WATERWORKS NOTES  
 SEE DRAWING SERV FOR STORM & SANITARY NOTES

- NOTES:**
- SITE GRADES SHOWN FOR REFERENCE ONLY. DETAILED SITE GRADING BY OTHERS
  - SITE DRAINAGE SHOWN RELATES TO STORMWATER MANAGEMENT ONLY. CONTRACTOR TO ENSURE ADEQUATE DRAINAGE PROVIDED.
  - ALL WORKS TO CONFORM TO CURRENT MUNICIPAL, BC BUILDING & PLUMBING CODE REQUIREMENTS.
  - DETENTION TANK LOCATION AND EXTENTS TO BE COORDINATED IN FIELD WITH ENGINEER.
  - MUNICIPAL SERVICE CONNECTION IS TO BE INSTALLED & VERIFIED PRIOR TO THE INSTALLATION OF THE STORMWATER MANAGEMENT SYSTEM.
  - ONSITE AREA DRAIN LOCATIONS MAY VARY DEPENDING ON SITE CONDITIONS.
  - ENGINEER TO APPROVE ANY ALTERNATE INFILTRATION/DETENTION TANK PRODUCTS.



CONTRACTOR TO VERIFY & LOCATE EXISTING MAINS & SERVICE CONNECTIONS & NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO BEGINNING CONSTRUCTION



**LANDSCAPE AREA**  
AREA = 17m<sup>2</sup>  
RUNOFF COEFFICIENT = 0.30

**300mm LAWN BASIN**  
RIM EL. = ±83.54m  
OUT TO ROOF LEADERS = 83.24m

**BUILDING AREA**  
AREA = 294m<sup>2</sup>  
RUNOFF COEFFICIENT = 0.95

**HARDSCAPE AREA**  
AREA = 336m<sup>2</sup>  
RUNOFF COEFFICIENT = 0.95

**300mm LAWN BASIN**  
RIM EL. = ±82.73m  
OUT TO ROOF LEADERS = 82.43m

**300mm LAWN BASIN**  
RIM EL. = ±82.27m  
OUT TO ROOF LEADERS = 81.97m

**300mm LAWN BASIN**  
RIM EL. = ±82.27m  
OUT TO ROOF LEADERS = 81.97m

**PROPOSED BUILDING**  
3RD FLOOR EL. = 89.69m  
2ND FLOOR EL. = 86.94m  
MAIN FLOOR EL. = 83.59m  
BASEMENT FLOOR EL. = 80.85m

**PERIMETER DRAIN SUMP**  
RIM EL. ±82.3  
IN FROM PERIMETER DRAIN = 80.14m  
IN FROM BUILDING SUMP = 80.47m  
OUT TO STM IC = 80.09m

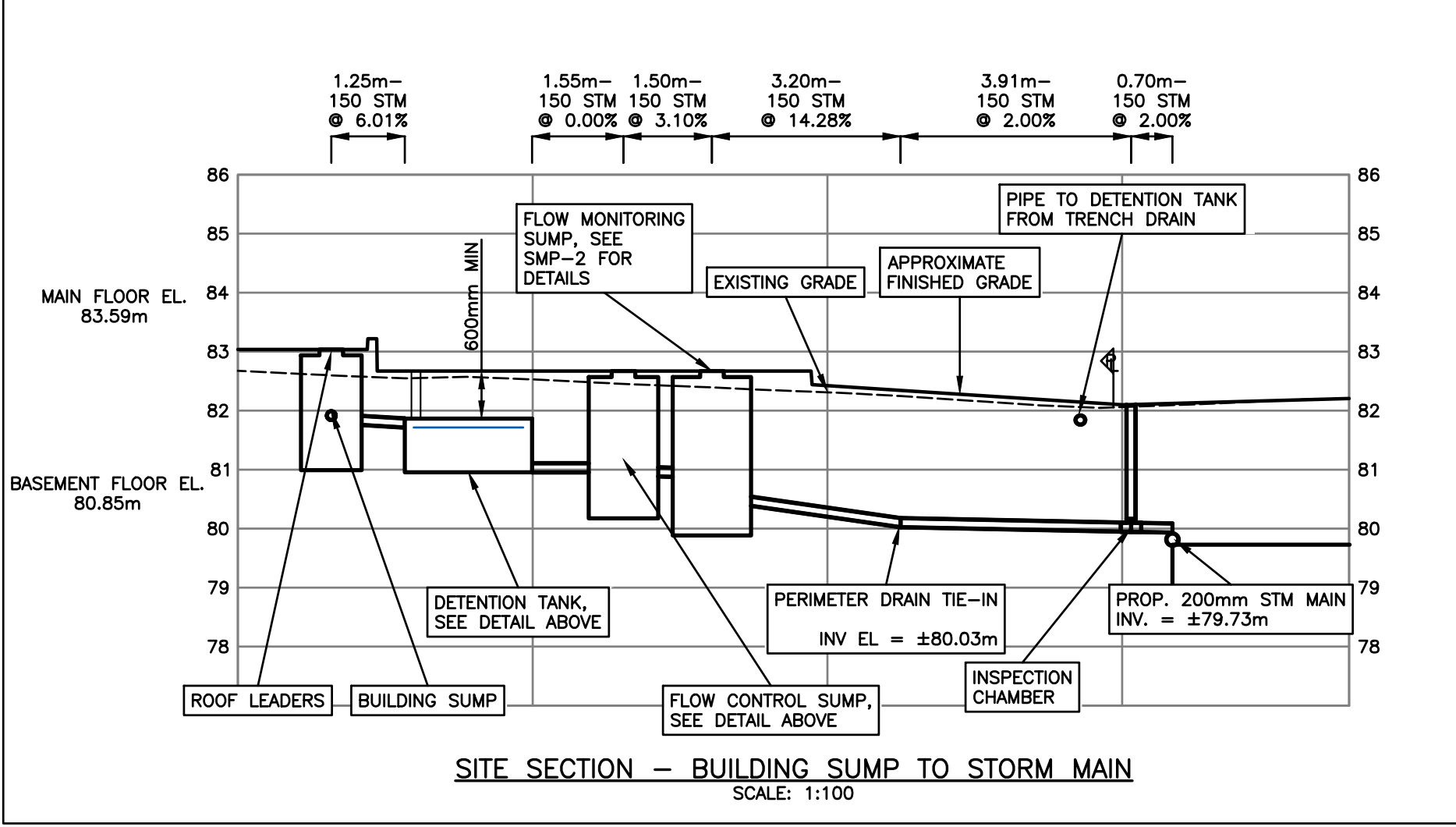
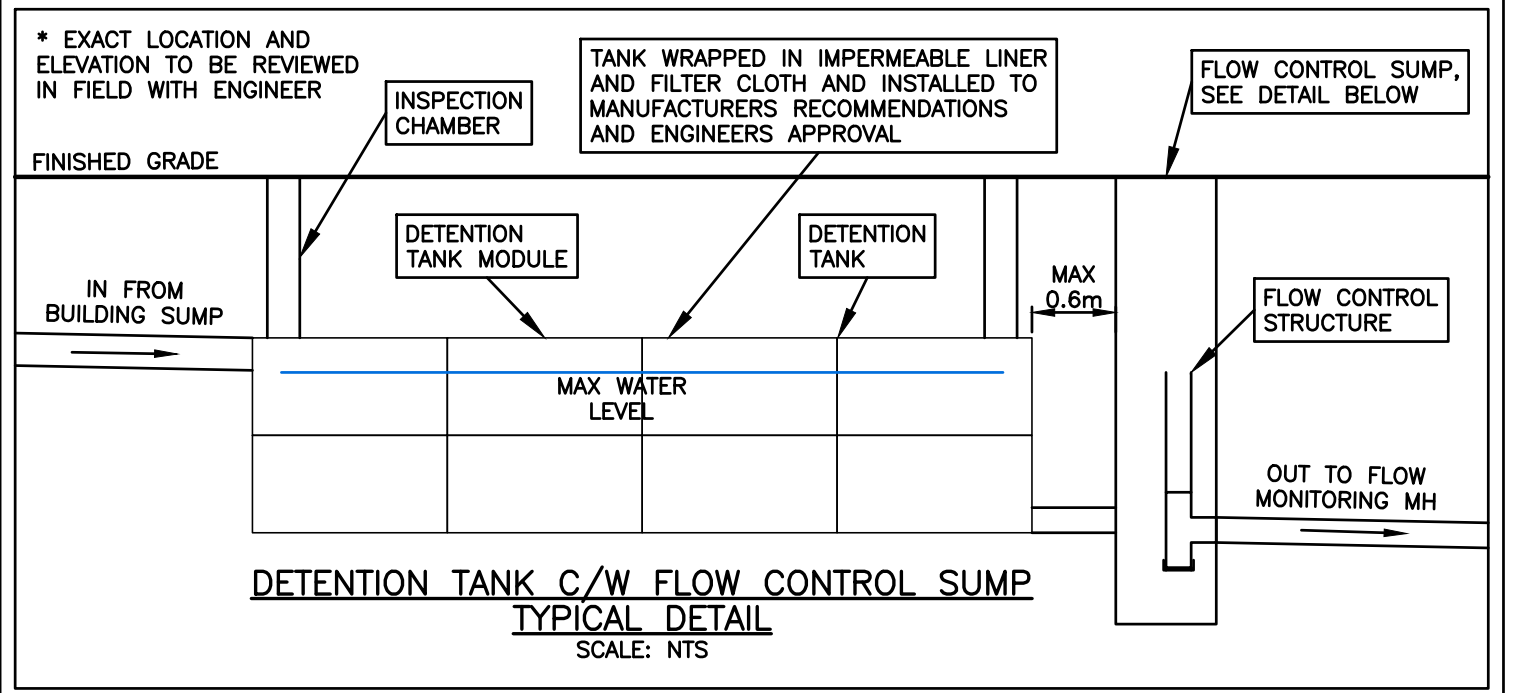
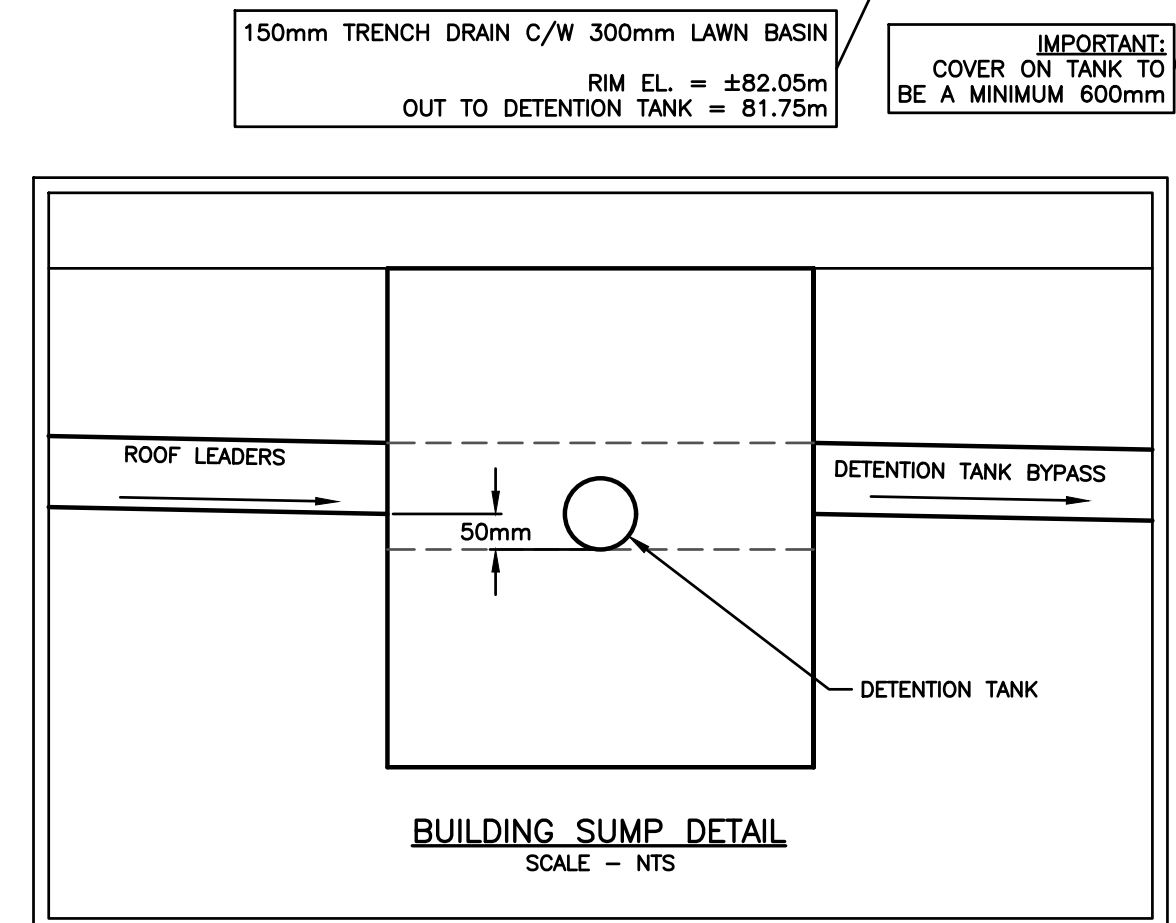
**EL. ±82.7 FROM DETENTION TANK = 80.96m**  
↑ TO 1200Ø FLOW MONITORING MH = 80.90m

**EL. ±82.7 IN FROM FLOW CONTROL MH = 80.86m**  
OUT TO STM IC = 80.48m

**BY CNV CREWS**  
0.70m-150 STM SERVICE @ MIN 2% GRADE C/W IC AS PER MMCD STD DWG S8 & S9. (TYP.)  
INV. @ IC: 79.95  
INV. @ MAIN: 79.93

**150mm TRENCH DRAIN C/W 300mm LAWN BASIN**  
RIM EL. = ±82.05m  
OUT TO DETENTION TANK = 81.75m

**IMPORTANT: COVER ON TANK TO BE A MINIMUM 600mm**



**CREUS Engineering Ltd**  
Civil Engineers

**Calculations**

Project: 229-231 W 15th Street File: 21311  
 Subject: Stormwater Management Plan Date: 2022-03-24  
 Section: SMP Source Control Calculations By: BEM

**Objective 1:**  
Capture The Runoff From The Gross Impervious Area During 50% of MAR Storm Event (Volume Control)  
 Limit Runoff From The 10-Year Storm Event To Pre Development Levels

Category	Value	Reference
Total Catchment Area	647 m <sup>2</sup>	(see SMP dwg)
Building Area (Impervious)	294 m <sup>2</sup>	(see SMP dwg)
Hardscape Area (Impervious)	336 m <sup>2</sup>	(see SMP dwg)
Landscape Area (Pervious)	17 m <sup>2</sup>	(see SMP dwg)
Total Percent Impervious	97%	
Total Catchment Area	647 m <sup>2</sup>	
MAR Rainfall Event	80 mm	
50% of MAR Rainfall Event	40 mm	
Total Impervious Area	630 m <sup>2</sup>	(As Above)
Rainfall on Area	= 25.2 m <sup>3</sup>	
Total Rainfall Volume To Be Captured	= 25.2 m <sup>3</sup>	

**Detention Tank Capture**

Detention Tank Depth	0.91 m	1 module
Detention Tank Width	3.73 m	7 modules
Detention Tank Length	8.54 m	8 modules
Tank Porosity	97%	
Storage Volume	= 28.1 m <sup>3</sup>	(Storage Volume)
Detention Tank Capture	= 28.1 m <sup>3</sup>	(Storage + Infiltration)
Available Runoff for Capture	= 25.2 m <sup>3</sup>	(Rainfall on Surface)
Total Rainfall Captured	= 25.2 m <sup>3</sup>	(Lesser of Above)

**Total Rainfall Volume To Be Captured**  
 = 25.2 m<sup>3</sup> (As Above)  
 Infiltration Tank Capture Volume = 25.2 m<sup>3</sup> (As Above)

**Runoff During Storm Event**  
 = 0 m<sup>3</sup> OKAY

**Pre Development Catchment Area**

Building/Roof Area (Impervious)	294 m <sup>2</sup>
Hardscape Area (Impervious)	91 m <sup>2</sup>
Landscape Area (Pervious)	288 m <sup>2</sup>
Total	673 m <sup>2</sup>

**Post Development Catchment Area**

Building/Roof Area (Impervious)	647 m <sup>2</sup>
Hardscape Area (Impervious)	336 m <sup>2</sup>
Landscape Area (Pervious)	17 m <sup>2</sup>
Total	1000 m <sup>2</sup>

Post Development Percent Impervious = 97%

**Pre Development Peak Flows**

Catchment Area (A)	647 m <sup>2</sup>	(As Above)
Weighted Average From Impervious And Pervious Areas		
Building/Roof Runoff Coefficient	0.95	for 294 m <sup>2</sup>
Hardscape Runoff Coefficient	0.95	for 91 m <sup>2</sup>
Landscape Runoff Coefficient	0.30	for 288 m <sup>2</sup>
Post Development Runoff Coefficient (C)	= 0.64	for 647 m <sup>2</sup>
Rainfall Intensity (I)		
Pre Development TOC	20 min	
From CNV City Hall IDF Curve,		
10yr Rainfall Intensity	33 mm/hr	
Pre Development Peak Flow (Q=CIA)	= 3.7 l/s	

**Post Development Peak Flows**

Catchment Area (A)	647 m <sup>2</sup>	(As Above)
Weighted Average From Impervious And Pervious Areas		
Building/Roof Runoff Coefficient	0.95	for 294 m <sup>2</sup>
Hardscape Runoff Coefficient	0.95	for 336 m <sup>2</sup>
Landscape Runoff Coefficient	0.30	for 17 m <sup>2</sup>
Post Development Runoff Coefficient (C)	= 0.93	for 647 m <sup>2</sup>
Rainfall Intensity (I)		
Pre Development TOC	20 min	
From CNV City Hall IDF Curve,		
10yr Rainfall Intensity	33 mm/hr	
Post Development Peak Flow (Q=CIA)	= 5.5 l/s	

**Detain The Post Development 10-Year Storm Event And Release At Pre Development Levels**

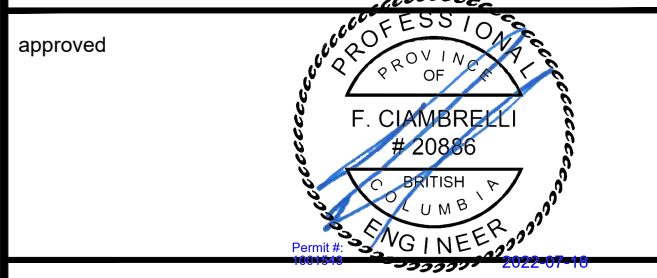
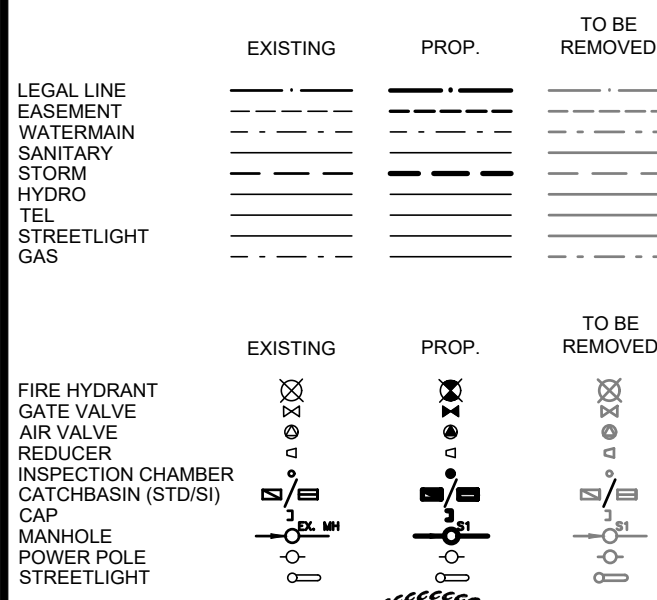
Duration (min)	Intensity (mm/hr)	Peak Flow (l/s)	Release Rate (l/s)	Difference (l/s)	Volume (m <sup>3</sup> )
5	62	10.3	3.7	6.6	1.2
10	45	7.5	3.7	3.8	1.8
20	33	5.5	3.7	1.7	2.1
30	27	4.5	3.7	0.8	1.7
40	20	3.3	3.7	-0.4	-0.6
120	12	2.4	3.7	-1.3	-1.7
180	12	2.0	3.7	-1.7	-16.2
240	10	1.8	3.7	-2.0	-25.5

Peak Storage Requirement = 28.1 m<sup>3</sup> > 2.1 m<sup>3</sup>  
 Storage Provided = OKAY

**Orifice Size**

Net Head	= 0.81 m	
Orifice Size	= 44 mm	
Flow Out of System	= 3.7 l/s	OKAY

**DRAWING LEGEND**



client: SYMPHONY GROUP OF COMPANIES

project: 229-231 W 15th ST, NORTH VANCOUVER, BC

**STORMWATER MANAGEMENT**

no.	(y/m/d)	revision	ch/d
2	22/07/18	RE-ISSUED FOR DEVELOPMENT PERMIT	BEM
1	22/03/25	ISSUED FOR DEVELOPMENT PERMIT	BEM

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current rev. # **2**

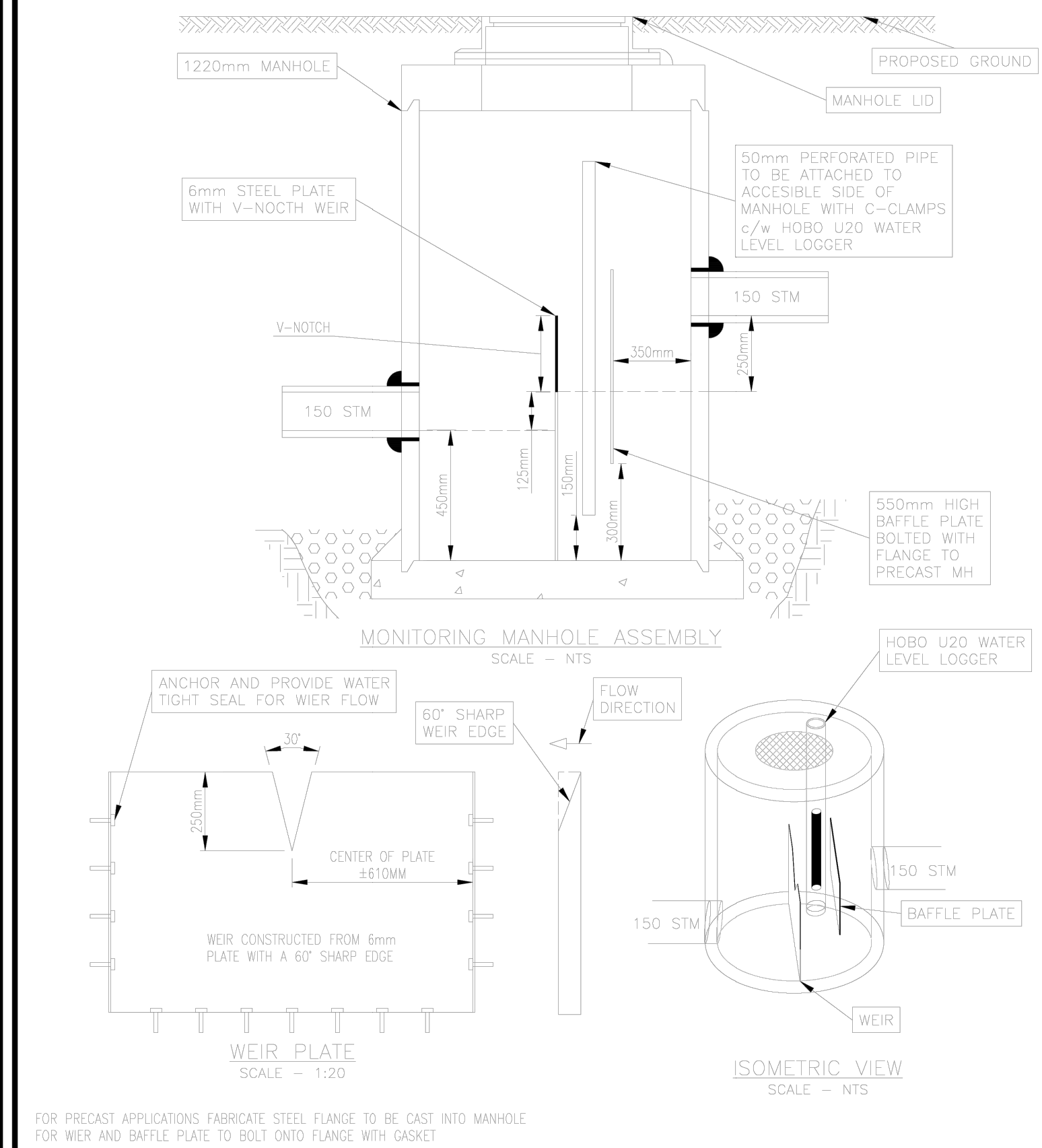
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designed by: FMC file no. **21311**

drawn by: BEM drawing no. **SMP-1**

date: 22/03/14





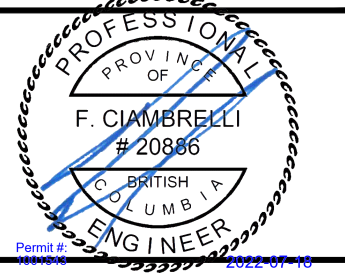
FOR PRECAST APPLICATIONS FABRICATE STEEL FLANGE TO BE CAST INTO MANHOLE FOR WEIR AND BAFFLE PLATE TO SOLL INTO FLANGE WITH GASKET

title **FLOW MONITORING MH - WEIR (CNV)** scale NTS  
drawing no. FM-1

PERMIT TO PRACTICE # 1001543

DRAWING LEGEND

	EXISTING	PROP.	TO BE REMOVED
LEGAL LINE EASEMENT	---	---	---
WATERMAIN	---	---	---
SANITARY	---	---	---
STORM	---	---	---
HYDRO	---	---	---
TEL	---	---	---
STREETLIGHT	---	---	---
GAS	---	---	---
	EXISTING	PROP.	TO BE REMOVED
FIRE HYDRANT	⊗	⊗	⊗
GATE VALVE	⊕	⊕	⊕
AIR VALVE	⊙	⊙	⊙
REDUCER	⊘	⊘	⊘
INSPECTION CHAMBER	⊠	⊠	⊠
CATCHBASIN (STD/SI)	⊠	⊠	⊠
CAP	⊠	⊠	⊠
MANHOLE	⊠	⊠	⊠
POWER POLE	⊠	⊠	⊠
STREETLIGHT	⊠	⊠	⊠



client  
**SYMPHONY GROUP OF COMPANIES**

project  
**229-231 W 15th ST.  
NORTH VANCOUVER, BC**

title  
**STORMWATER MANAGEMENT**

no.	(y/m/d)	revision	chk'd
2	22-07-18	RE-ISSUED FOR DEVELOPMENT PERMIT	BEM
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		2
engineer of record	FMC	scales hor: - vert: -
designed by	FMC	file no. 21311
drawn by	BEM	drawing no. SMP-2
date	22/03/14	