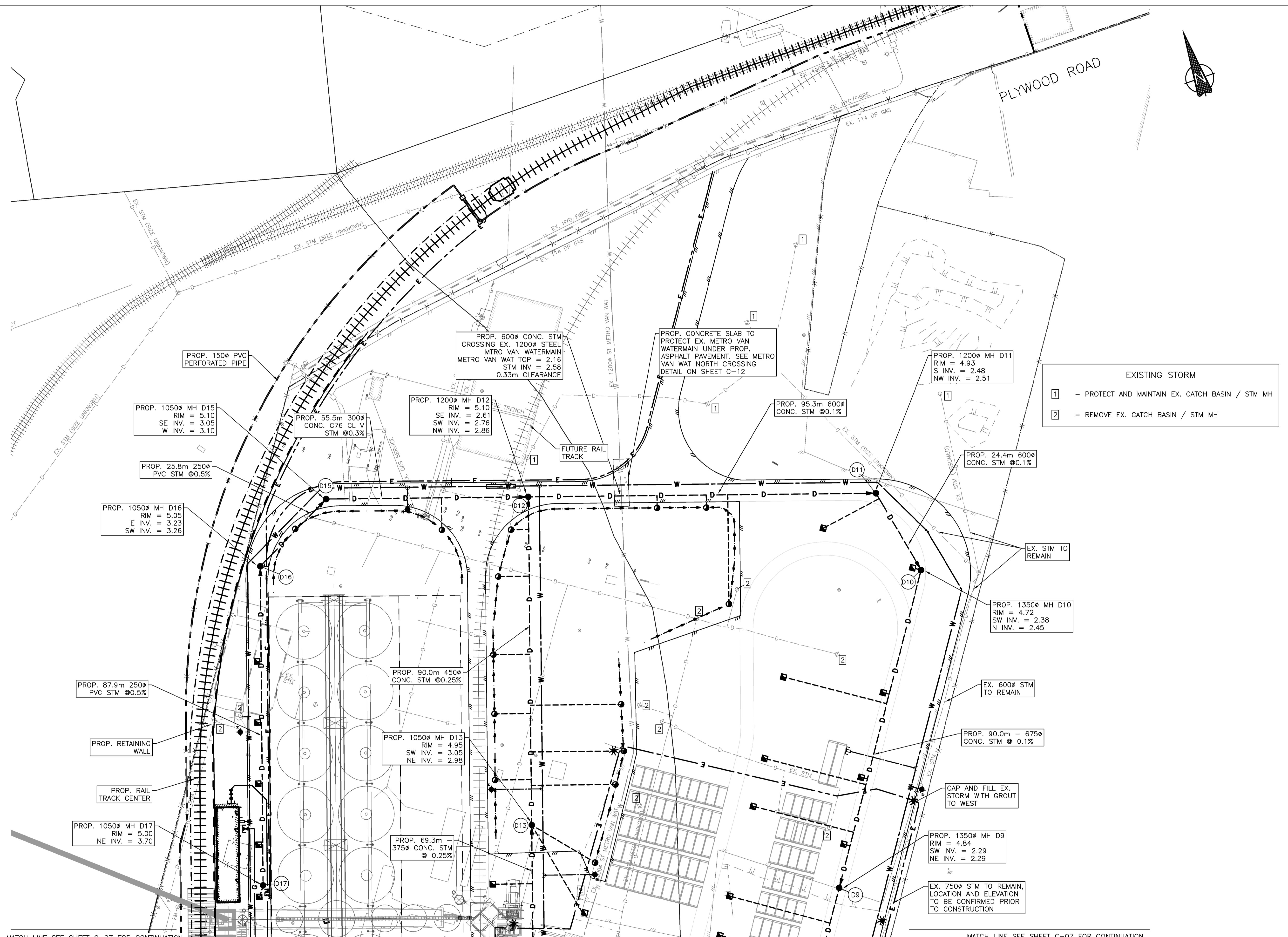


PLYWOOD ROAD



**EXISTING STORM**  
 1 - PROTECT AND MAINTAIN EX. CATCH BASIN / STM MH  
 2 - REMOVE EX. CATCH BASIN / STM MH

MATCH LINE SEE SHEET C-07 FOR CONTINUATION

MATCH LINE SEE SHEET C-07 FOR CONTINUATION

- NOTES:**
1. ALL PVC PIPES TO BE PVC DR35.
  2. ALL CONCRETE PIPES TO BE C76 CL III OR C76 CL V WHERE SHOWN AT RAIL.
  3. ALL MANHOLES AND CATCH BASINS TO BE OCEAN CLASS HD525 OR EQUIVALENT.

No.	DESCRIPTION	BY	DATE
6	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
5	UPDATE PROJECT TITLE FOR DP AMENDMENT	DWF	MAY29/18
4	RE-ISSUED FOR DP AMENDMENT	DWF	MAY11/18
3	ISSUED FOR DP AMENDMENT	DWF	MAY03/18
2	REVISED CONCEPT DESIGN	DWF	APR17/18
1	CONCEPT DESIGN	DWF	MAR29/18

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Scale  
**1:500**

**FRASER GRAIN TERMINAL**  
**NEW GRAIN EXPORT FACILITY**  
 11041 ELEVATOR ROAD, SURREY

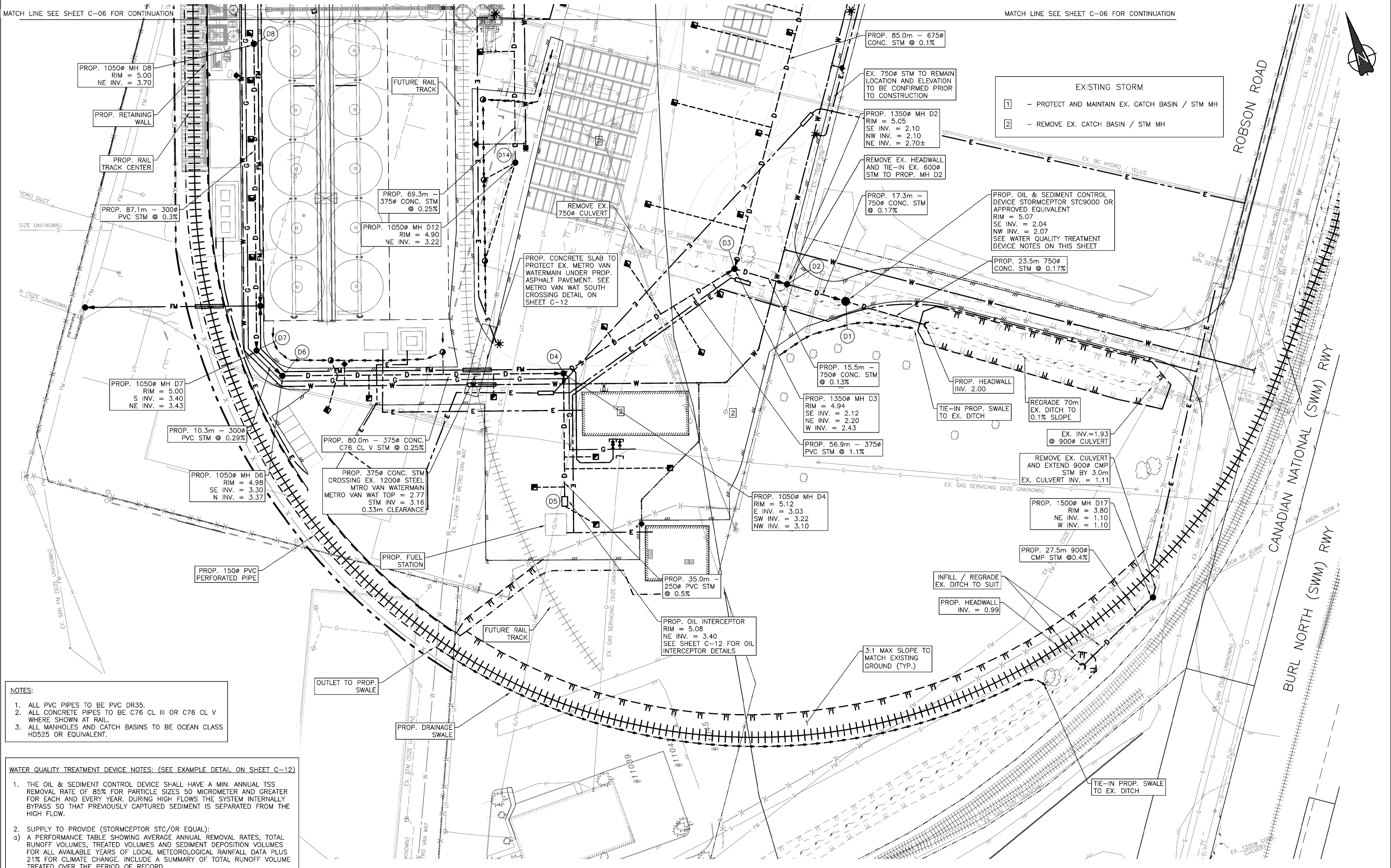
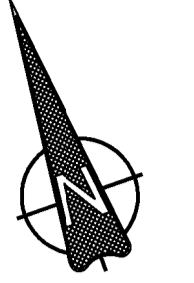
Drawn: DWF Design Checked: **SJV** Date: **MAR 2018**  
 Designed: DWF Discipline Review: **SJV** Date: **MAR 2018**

**NORTH DRAINAGE PLAN**

Drawing No.  
**32022 C-06**  
 Sheet No.  
**06**

MATCH LINE SEE SHEET C-06 FOR CONTINUATION

MATCH LINE SEE SHEET C-06 FOR CONTINUATION



- NOTES:**
1. ALL PVC PIPES TO BE PVC DR35.
  2. ALL CONCRETE PIPES TO BE C76 CL III OR C76 CL V WHERE SHOWN AT RAIL.
  3. ALL MANHOLES AND CATCH BASINS TO BE OCEAN CLASS HD525 OR EQUIVALENT.

- WATER QUALITY TREATMENT DEVICE NOTES: (SEE EXAMPLE DETAIL ON SHEET C-12)**
1. THE OIL & SEDIMENT CONTROL DEVICE SHALL HAVE A MIN. ANNUAL TSS REMOVAL RATE OF 85% FOR PARTICLE SIZES 50 MICROMETER AND GREATER FOR EACH AND EVERY YEAR. DURING HIGH FLOWS THE SYSTEM INTERNALLY BYPASS SO THAT PREVIOUSLY CAPTURED SEDIMENT IS SEPARATED FROM THE HIGH FLOW.
  2. SUPPLY TO PROVIDE (STORMCEPTOR STC/OR EQUAL):
    - a) A PERFORMANCE TABLE SHOWING AVERAGE ANNUAL REMOVAL RATES, TOTAL RUNOFF VOLUMES, TREATED VOLUMES AND SEDIMENT DEPOSITION VOLUMES FOR ALL AVAILABLE YEARS OF LOCAL METEOROLOGICAL RAINFALL DATA PLUS 21% FOR CLIMATE CHANGE. INCLUDE A SUMMARY OF TOTAL RUNOFF VOLUME TREATED OVER THE PERIOD OF RECORD.
    - b) CALCULATIONS/INFORMATION SHOWING HOW AVERAGE ANNUAL REMOVAL RATES (85% FOR PARTICLE SIZES 50 MICROMETER OR GREATER) WERE ACHIEVED OR MODELED.
    - c) CALCULATIONS/INFORMATION DEMONSTRATING HOW THE ONE YEAR OF SEDIMENT STORAGE CAPACITY WAS DERIVED.
  3. SUBMISSION TO BE SIGNED AND SEALED BY ENGINEER REGISTERED IN BRITISH COLUMBIA.
  4. AN OPERATION AND MAINTENANCE (O&M) MANUAL AND SAMPLE MAINTENANCE LOG ARE TO BE PROVIDED TO THE OWNER.

No.	DESCRIPTION	BY	DATE
6	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
5	UPDATE PROJECT TITLE FOR DP AMENDMENT	DWF	MAY29/18
4	RE-ISSUED FOR DP AMENDMENT	DWF	MAY11/18
3	ISSUED FOR DP AMENDMENT	DWF	MAY03/18
2	REVISED CONCEPT DESIGN	DWF	APR17/18
1	CONCEPT DESIGN	DWF	MAR29/18

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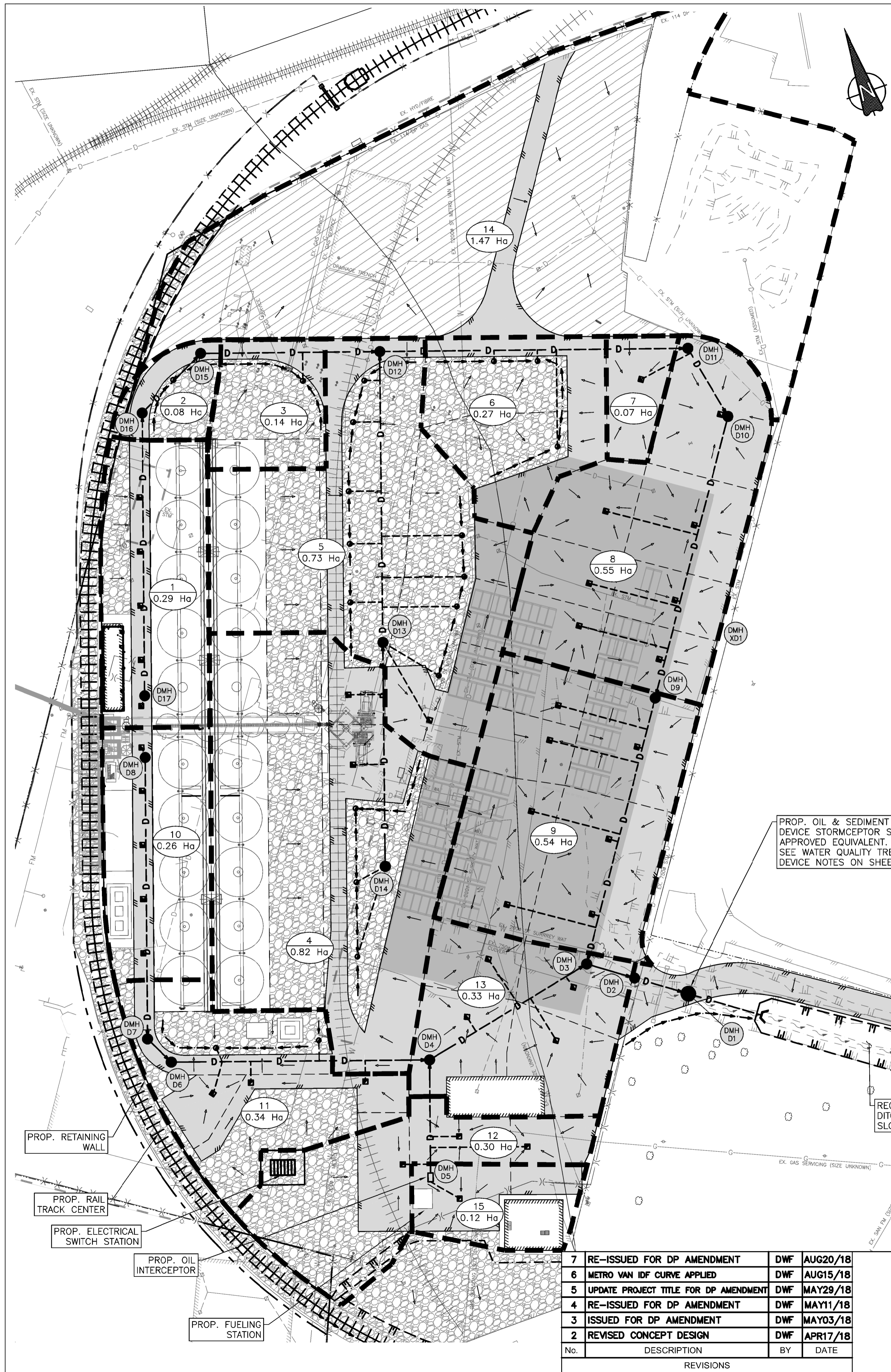
**FRASER GRAIN TERMINAL**

**NEW GRAIN EXPORT FACILITY**  
11041 ELEVATOR ROAD, SURREY

Drawn: DWF Design Checked: **SJV** Date: **MAR 2018**  
Designed: DWF Discipline Review: **SJV** Date: **MAR 2018**

**SOUTH DRAINAGE PLAN**

Drawing No. **32022 C-07**  
Sheet No. **07**



PROJECT LOCATION: City of Surrey  
 DESIGN RETURN PERIOD: 5 Year Return - Metro Vancouver Regional Zone 4 + 21% for Climate Change

	TIME (min)	I (mm/hr)
POINT 1	5	66.7
POINT 2	120	13.6

PIPE LINE		PIPELINE PARAMETERS							RATIONAL METHOD							REMARKS		
FROM	TO	LENGTH (m)	SLOPE %	DIA Calc. (mm)	DIA Prop. (mm)	n	V (m/s)	Tf (min)	INC (ha)	SUM (ha)	Tc (min)	I (mm/hr)	INCR	SUM	R		5 Years Qest. (cms)	Qcap. Proposed (cms)
D17	D16	87.9	0.50	209.8	250	0.013	0.86	1.71	0.29	0.29	15.00	38.5	0.25	0.25	0.85	0.026	0.042	Catchment No. 1
D16	D15	25.8	0.50	223.1	250	0.013	0.86	0.50	0.08	0.37	16.71	36.5	0.06	0.31	0.75	0.031	0.042	Catchment No. 2
D15	D12	55.5	0.30	269.2	300	0.013	0.75	1.23	0.14	0.51	17.21	35.9	0.09	0.40	0.65	0.040	0.053	Catchment No. 3
D14	D13	69.3	0.25	336.7	375	0.013	0.79	1.46	0.82	0.82	15.00	38.5	0.62	0.62	0.75	0.066	0.088	Catchment No. 4
D13	D12	90.0	0.25	420.1	450	0.013	0.90	1.67	0.73	1.55	16.46	36.8	0.55	1.16	0.75	0.119	0.143	Catchment No. 5
D12	D11	95.3	0.10	570.7	600	0.013	0.69	2.31	0.27	2.33	18.45	34.7	0.20	1.76	0.75	0.170	0.194	Catchment No. 6
D11	D10	24.4	0.10	565.6	600	0.013	0.69	0.59	0.07	2.40	20.76	32.7	0.06	1.83	0.9	0.166	0.194	Catchment No. 7
D10	D9	90.0	0.10	615.6	675	0.013	0.74	2.02	0.55	2.95	21.35	32.3	0.50	2.32	0.9	0.208	0.266	Catchment No. 8
D9	D3	85.0	0.10	650.0	675	0.013	0.74	1.91	0.54	3.49	23.37	30.8	0.49	2.81	0.9	0.240	0.266	Catchment No. 9
D8	D7	87.1	0.30	221.6	300	0.013	0.75	1.94	0.26	0.26	15.00	38.5	0.22	0.22	0.85	0.024	0.053	Catchment No. 10
D7	D6	10.3	0.29	218.0	300	0.013	0.74	0.23	0.00	0.26	16.94	36.2	0.00	0.22	0.9	0.022	0.052	No contributing area
D6	D4	80.0	0.25	298.2	375	0.013	0.79	1.68	0.34	0.60	17.17	36.0	0.26	0.48	0.75	0.048	0.088	Catchment No. 11
									0.12	0.12			0.10	0.10	0.85			Catchment No. 15
D5	D4	35.0	0.50	241.1	250	0.013	0.86	0.68	0.30	0.42	15.00	38.5	0.26	0.36	0.85	0.038	0.042	Catchment No. 12
D4	D3	56.9	1.10	306.9	375	0.013	1.66	0.57	0.33	1.35	18.85	34.3	0.30	1.13	0.9	0.108	0.184	Catchment No. 13
D3	D2	15.5	0.13	692.2	750	0.013	0.91	0.28	0.00	4.84	25.28	29.6	0.00	3.94	0.9	0.324	0.401	No contributing area
XD1	D2	111.1	0.10	404.9	750	0.013	0.80	2.32	1.47	1.47	20.00	33.3	0.74	0.74	0.5	0.068	0.352	Ex. 750mm diameter pipe, location and slope assumed. Catchment No. 14
D2	D1	17.3	0.17	700.4	750	0.013	1.04	0.28	0.00	6.31	25.56	29.5	0.00	4.67	0.9	0.383	0.459	No contributing area
D1	Outlet	23.5	0.17	699.0	750	0.013	1.04	0.38	0.00	6.31	25.84	29.3	0.00	4.67	0.5	0.381	0.459	No contributing area

PROP. OIL & SEDIMENT CONTROL DEVICE STORMCEPTOR STC9000 OR APPROVED EQUIVALENT. SEE WATER QUALITY TREATMENT DEVICE NOTES ON SHEET C-7

REGRADE EX. DITCH TO 0.1% SLOPE

**LEGEND:**

- CATCHMENT BOUNDARY
- GRADE BREAK LINE
- BUILDING OUTLINE
- SURFACE FLOW DIRECTION
- MH No.
- CATCHMENT NUMBER/AREA
- CATCHBASIN
- LAWNBASIN
- MANHOLE LID
- TYPICAL PAVEMENT AREA
- HEAVY LOAD PAVEMENT AREA
- EXISTING PAVEMENT AREA
- PROPOSED GRAVEL AREA

No.	DESCRIPTION	BY	DATE
7	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
6	METRO VAN IDF CURVE APPLIED	DWF	AUG15/18
5	UPDATE PROJECT TITLE FOR DP AMENDMENT	DWF	MAY29/18
4	RE-ISSUED FOR DP AMENDMENT	DWF	MAY11/18
3	ISSUED FOR DP AMENDMENT	DWF	MAY03/18
2	REVISED CONCEPT DESIGN	DWF	APR17/18

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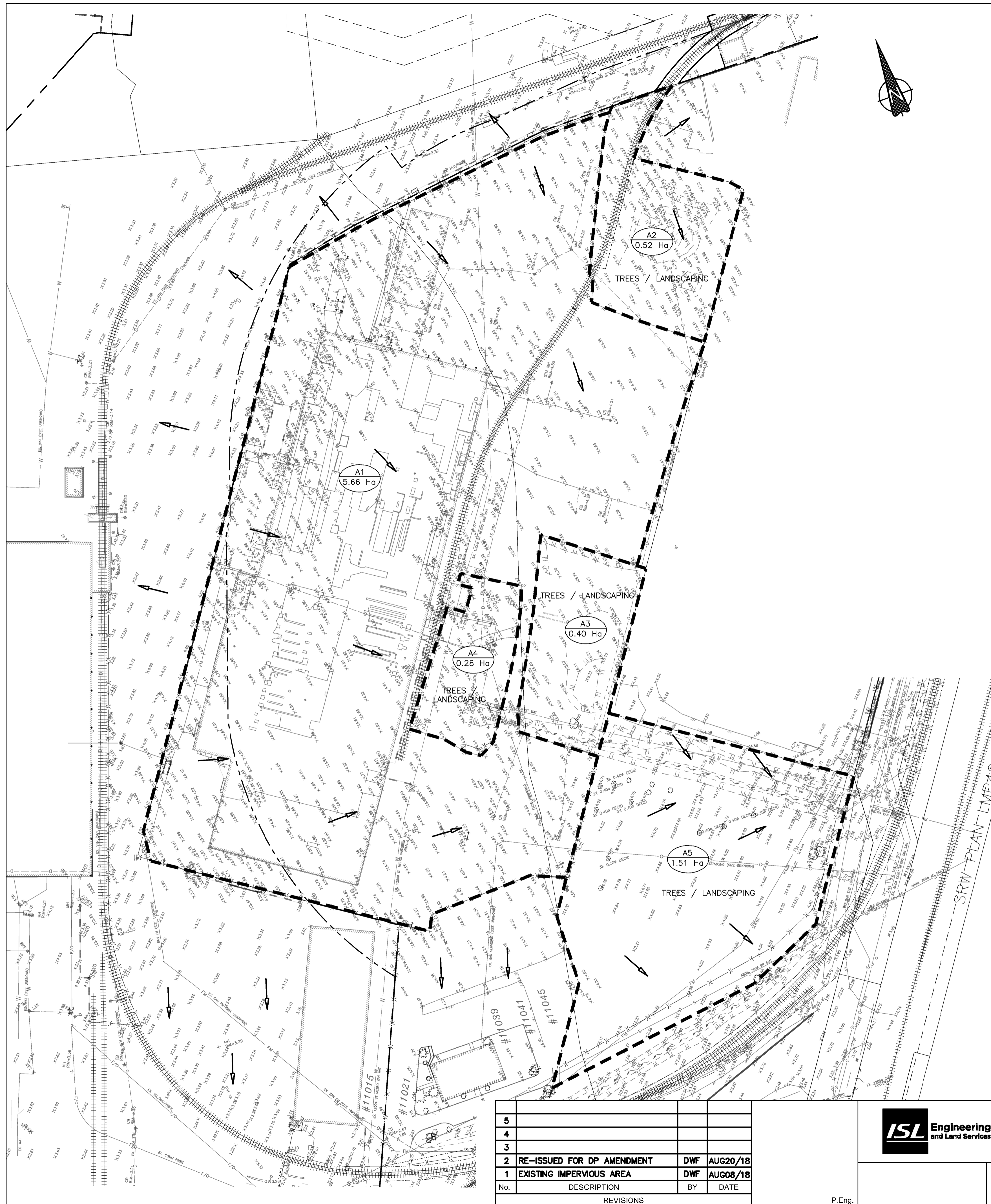
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**FRASER GRAIN TERMINAL**  
**NEW GRAIN EXPORT FACILITY**  
 11041 ELEVATOR ROAD, SURREY

Drawn: DWF Design Checked: **SJV** Date: **MAR 2018**  
 Designed: DWF Discipline Review: **SJV** Date: **MAR 2018**

**STORM WATER MANAGEMENT PLAN**

Drawing No. **32022 C-08**  
 Sheet No. **08**



**EXISTING IMPERVIOUS AREA CALCULATOIN:**

1. IMPERVIOUS AREA A1 = 5.66 Ha, RUNOFF COEFFICIENT R = 0.9
2. TREES / LANDSCAPING AREA A2 = 0.52 Ha, A3 = 0.40 Ha, A4 = 0.28 Ha, & A5 = 1.51 Ha, RUNOFF COEFFICIENT R = 0.25
3. TOTAL AREA = 8.37 Ha, COMBINED WEIGHTED IMPERVIOUS AREA = 5.77 Ha
4. OVERALL NET IMPERVIOUS SURFACE RUNOFF COEFFICIENT = 0.689
5. SEE SHEET C-08B FOR PROPOSED IMPERVIOUS AREA CALCULATION

**LEGEND:**

- SURFACE BOUNDARY
- SURFACE FLOW DIRECTION
- A1  
5.94 Ha CATCHMENT NUMBER/AREA

5			
4			
3			
2	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
1	EXISTING IMPERVIOUS AREA	DWF	AUG08/18
No.	DESCRIPTION	BY	DATE
REVISIONS			

P.Eng.

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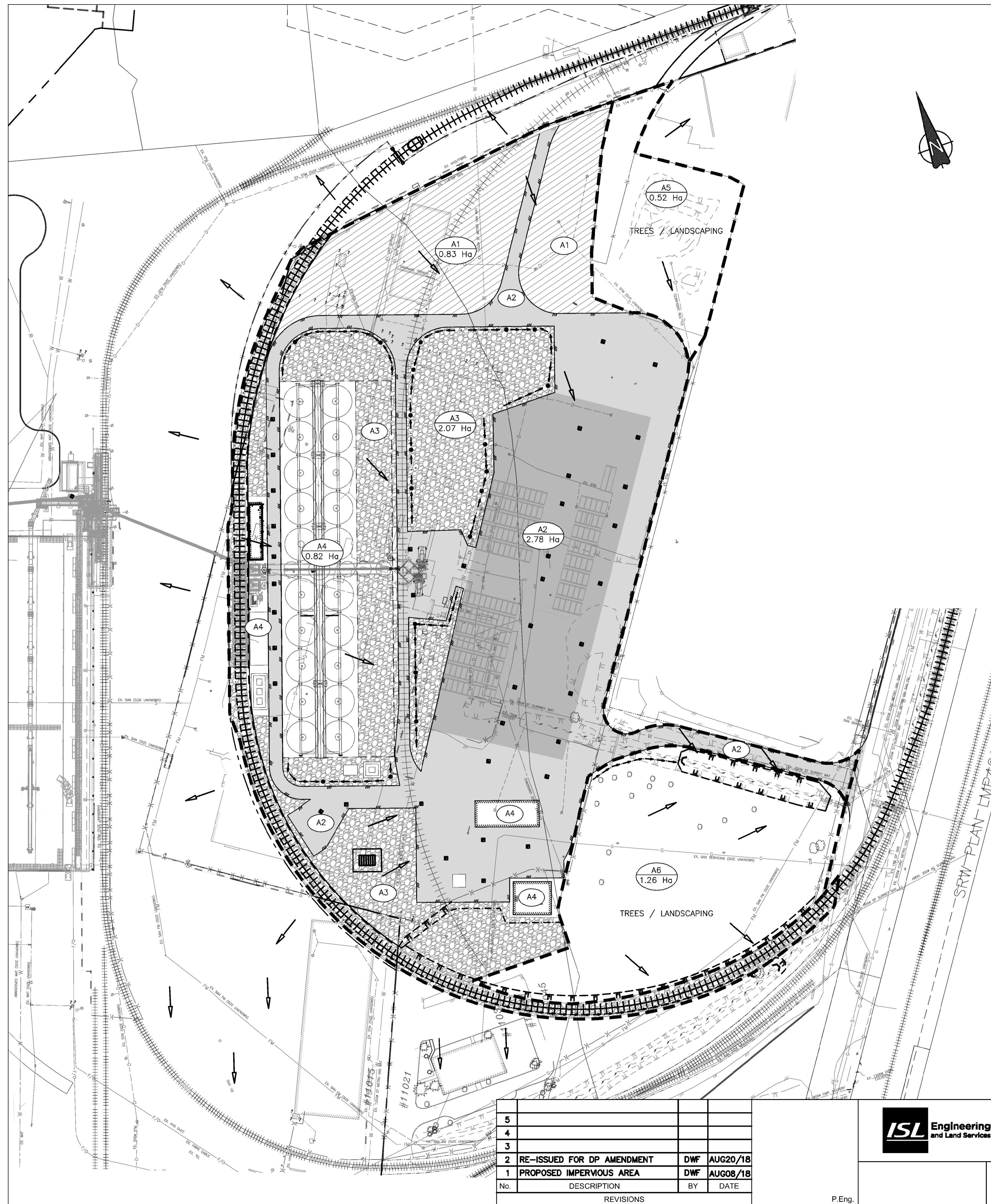
**FRASER GRAIN TERMINAL**  
**NEW GRAIN EXPORT FACILITY**  
 11041 ELEVATOR ROAD, SURREY

Drawn: DWF    Design Checked: **SJV**    Date: **MAR 2018**  
 Designed: DWF    Discipline Review: **SJV**    Date: **MAR 2018**

**EXISTING IMPERVIOUS AREA**

Drawing No.  
**32022 C-08A**

Sheet No.  
**09**



**PROPOSED IMPERVIOUS AREA CALCULATION:**

- EXISTING PAVEMENT AREA A1 = 0.83 Ha, RUNOFF COEFFICIENT R = 0.9
- PROPOSED PAVEMENT AREA A2 = 2.78 Ha, RUNOFF COEFFICIENT R = 0.9
- PROPOSED GRAVEL AREA A3 = 2.04 Ha, RUNOFF COEFFICIENT R = 0.6
- BUILDING/CONCRETE SLAB AREA A4 = 0.82 Ha, RUNOFF COEFFICIENT R = 0.9
- TREE/LANDSCAPING AREA A5 = 0.52 Ha, A6 = 1.26 Ha, RUNOFF COEFFICIENT R = 0.25
- TOTAL AREA = 8.25 Ha, COMBINED WEIGHTED IMPERVIOUS AREA = 5.66 Ha
- OVERALL NET IMPERVIOUS SURFACE RUNOFF COEFFICIENT = 0.686

NOTE: SEE SHEET C-08A FOR EXISTING IMPERVIOUS AREA CALCULATION.

**LEGEND:**

- SURFACE BOUNDARY
- SURFACE FLOW DIRECTION
- CATCHMENT NUMBER/AREA
- RETAINING WALL
- TOP OF BANK
- TYPICAL PAVEMENT AREA
- HEAVY LOAD PAVEMENT AREA
- EXISTING PAVEMENT AREA
- PROPOSED GRAVEL AREA

No.	DESCRIPTION	BY	DATE
5			
4			
3			
2	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
1	PROPOSED IMPERVIOUS AREA	DWF	AUG08/18

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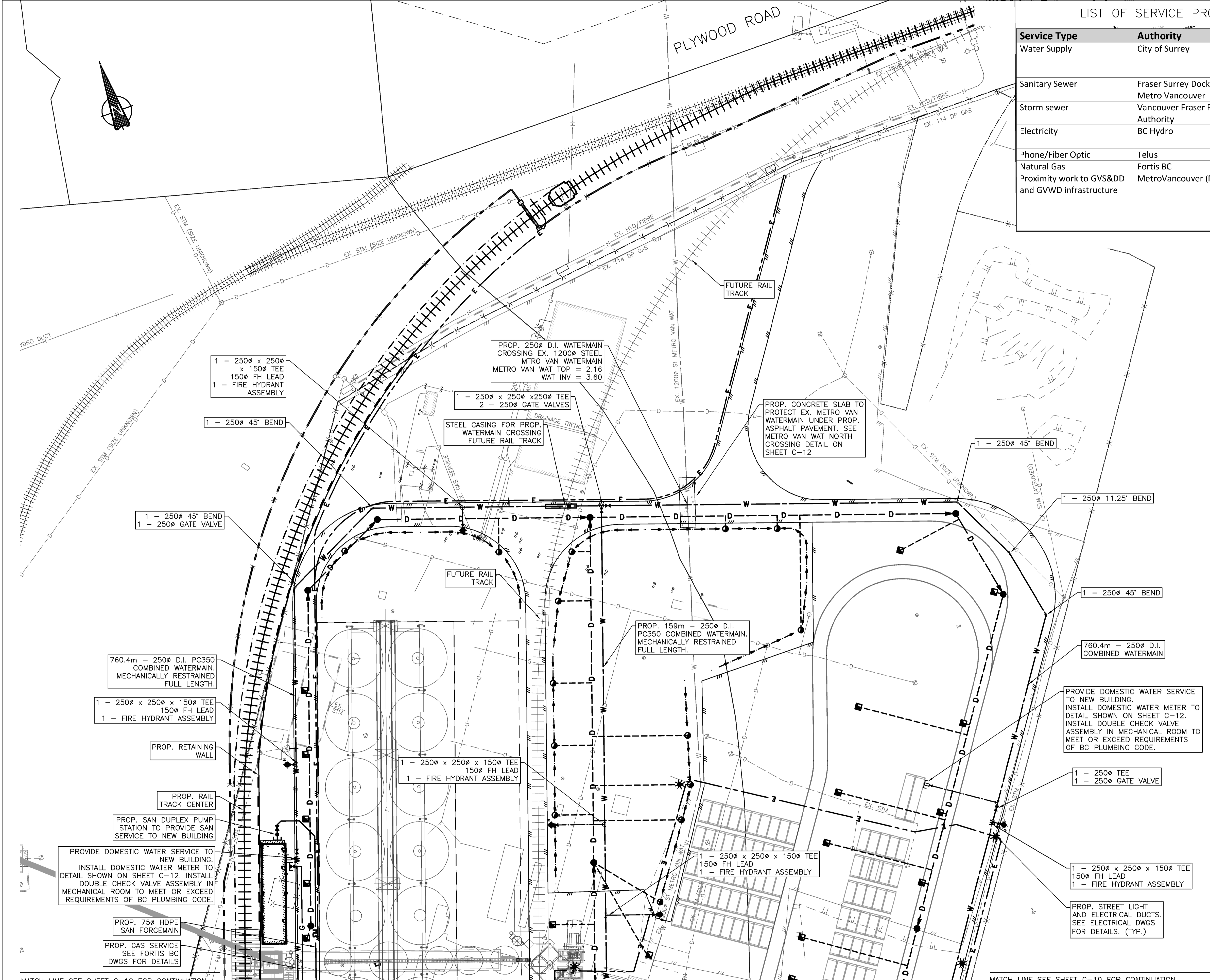
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**FRASER GRAIN TERMINAL**  
**NEW GRAIN EXPORT FACILITY**  
 11041 ELEVATOR ROAD, SURREY

Drawn: DWF Design Checked: **SJV** Date: **MAR 2018**  
 Designed: DWF Discipline Review: **SJV** Date: **MAR 2018**

**PROPOSED IMPERVIOUS AREA**

Drawing No.  
**32022 C-08B**  
 Sheet No.  
**10**



LIST OF SERVICE PROVIDERS AND STATUS OF CONTACT

Service Type	Authority	Status
Water Supply	City of Surrey	ISL has discussed with COS, Par (sanitary and drainage superintendent) and John (waterworks superintendent), with respect to establishing service connections in May, 2018
Sanitary Sewer	Fraser Surrey Docks, Metro Vancouver	Proposed sanitary loading is less than previous tenant. Discussions with MV and FSD started May 31, 2018.
Storm sewer	Vancouver Fraser Port Authority	PER process has included review of storm sewer loading with VFPA. Proposed discharge is slightly less than existing.
Electricity	BC Hydro	Capacity to support project confirmed with FWS and Michael Massolin, Aug 16, 2018.
Phone/Fiber Optic	Telus	Capacity to support project confirmed with Ranjita Ravi, Aug 8, 2018.
Natural Gas	Fortis BC	Capacity support project confirmed with Jassa Sidhu, Aug 2, 2018.
Proximity work to GVS&DD and GVWD infrastructure	MetroVancouver (MV)	Meeting between FS and MV to present updated design and submit preliminary design documents held on May 31 <sup>st</sup> , 2018. MV Comments received Aug 8 <sup>th</sup> 2018 are under review. Follow-up meetings to be scheduled as required to discuss design details and provide additional info until work consent is obtained from MV.

EXISTING UTILITY LEGEND:

— W —	METRO VAN WAT	WATER MAIN OWNED BY METRO VANCOUVER
— W —	SURREY WAT	WATER MAIN OWNED BY CITY OF SURREY
— S —	METRO VAN SAN	SANITARY SEWER OWNED BY METRO VANCOUVER
— S —	SURREY SAN	SANITARY SEWER OWNED BY CITY OF SURREY
— FM —	METRO VAN SAN FM	SANITARY FORCEMAIN OWNED BY METRO VANCOUVER
— D —	SURREY STM	STORM MAIN OWNED BY CITY OF SURREY

NOTE: STORM, SANITARY, & WATERMAIN NOTED OTHERWISE OWNED BY VANCOUVER FRASER PORT AUTHORITY (VFPA)

— G —	GAS LINE		
— H —	HYDRO DUCT		
— O/H —	OVERHEAD HYDRO		
— UT —	UNDERGROUND TELEPHONE		
— F/O —	FIBRE / COMMUNICATION		
▣	CATCH BASIN	■	WATER METER
○	STORM / SANITARY MANHOLE	⊕	UTILITY POLE
⊕	POWER / UTILITY MANHOLE	⊙	STREET LIGHTING POLE
⊕	FIRE HYDRANT	▣	JUNCTION BOX
⊕	GATE VALVE		

PROPOSED UTILITY LEGEND:

— W —	WATER MAIN		
— FM —	SANITARY FORCEMAIN		
— D —	STORM MAIN		
— E —	ELECTRICAL LINE		
▣	CATCH BASIN	⊕	FIRE HYDRANT
○	LAWN BASIN	⊕	GATE VALVE
●	STORM / SANITARY MANHOLE	⊕	STREET LIGHTING

MATCH LINE SEE SHEET C-10 FOR CONTINUATION

MATCH LINE SEE SHEET C-10 FOR CONTINUATION

No.	DESCRIPTION	BY	DATE
6	RE-ISSUED FOR DP AMENDMENT	DWF	AUG20/18
5	UPDATE PROJECT TITLE FOR DP AMENDMENT	DWF	MAY29/18
4	RE-ISSUED FOR DP AMENDMENT	DWF	MAY11/18
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**FRASER GRAIN TERMINAL**  
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Designed: DWF	Discipline Review: <b>SJV</b>	Date: <b>MAR 2018</b>

**NORTH SANITARY & WATERMAIN PLAN**

Drawing No.  
**32022 C-09**  
 Sheet No.  
**11**

