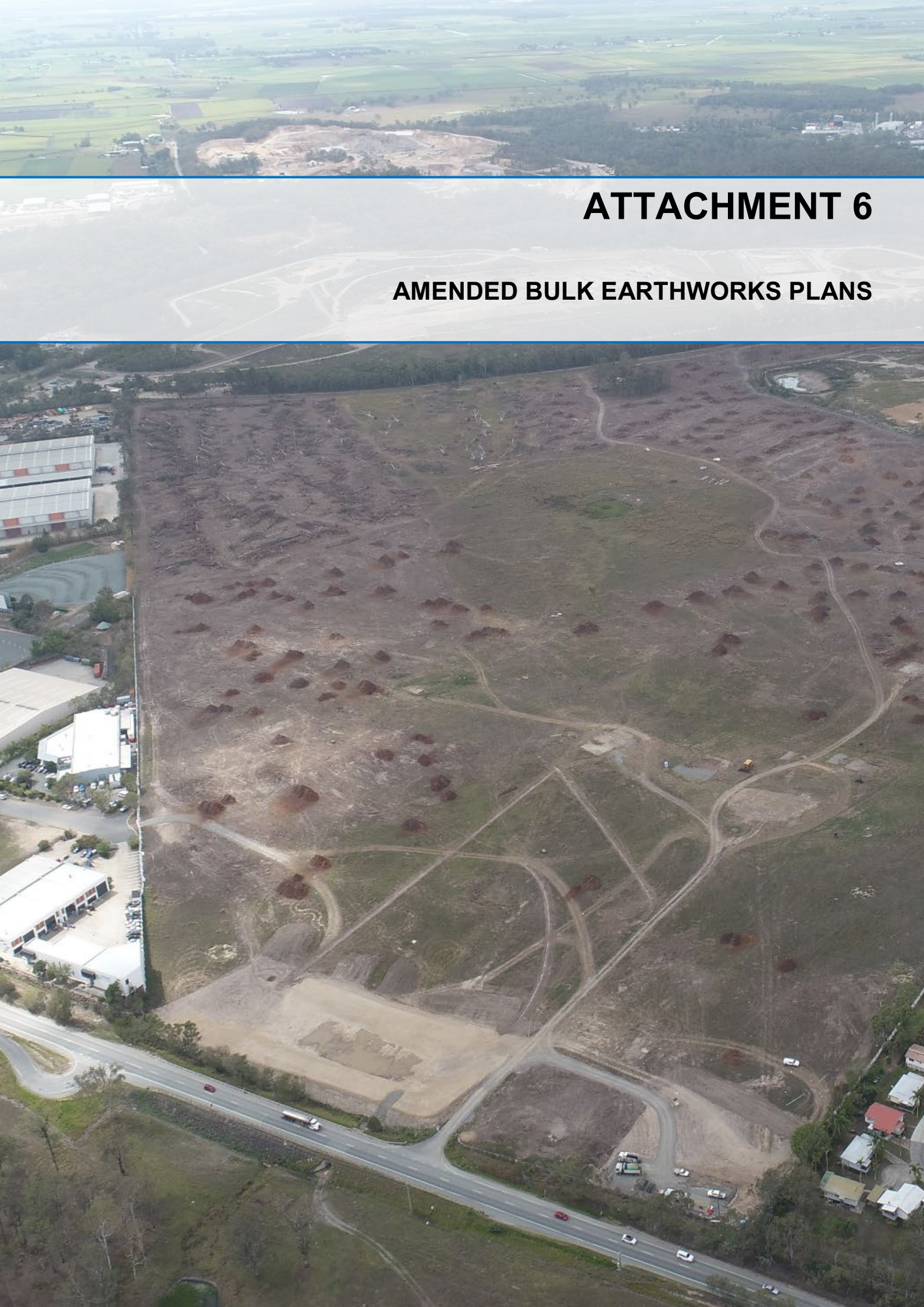




ATTACHMENT 6

AMENDED BULK EARTHWORKS PLANS

DOCUMENT TRANSMITTAL SCHEDULE

To: **City of Gold Coast Council**

Address : **47 Nerang Street
Southport QLD 4215**

Attention: **Development Assessment**

PROJECT:

OPERATIONAL WORKS APPLICATION FOR CHANGE TO GROUND LEVEL M38 INDUSTRIAL PARK YATALA

Job No: 5941

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☐ Your Mess. ☐ Mail
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A										
P - Preliminary				C - Construction				T - Tender		
A - Approval				I - Information				O - Other		

Issued Media

EP										
D	- Disk			P	Print			CP	-CAD&PDF	
ED	- DWG/DXF			EP	- PDF					

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Drg/Doc No.	Title	Revision Issued
5941 ENG BE1 001	DRAWING INDEX AND LOCALITY PLAN	A
5941 ENG BE1 002	GENERAL NOTES SHEET 1 OF 2	A
5941 ENG BE1 003	GENERAL NOTES SHEET 2 OF 2	A
5941 ENG BE1 004	LEGEND	A
5941 ENG BE1 005	KEY PLAN LAYOUT	A
5941 ENG BE1 010	EXISTING SURFACE AND FEATURE PLAN	A
5941 ENG BE1 020	SEDIMENT AND EROSION CONTROL PLAN SHEET 1 OF 6	A
5941 ENG BE1 021	SEDIMENT AND EROSION CONTROL PLAN SHEET 2 OF 6	A
5941 ENG BE1 022	SEDIMENT AND EROSION CONTROL PLAN SHEET 3 OF 6	A
5941 ENG BE1 023	SEDIMENT AND EROSION CONTROL PLAN SHEET 4 OF 6	A
5941 ENG BE1 024	SEDIMENT AND EROSION CONTROL PLAN SHEET 5 OF 6	A
5941 ENG BE1 025	SEDIMENT AND EROSION CONTROL PLAN SHEET 6 OF 6	A
5941 ENG BE1 026	CONSTRUCTION PHASE SEDIMENT BASIN 1 LAYOUT	A
5941 ENG BE1 027	CONSTRUCTION PHASE SEDIMENT BASIN 1 SECTIONS	A
5941 ENG BE1 028	CONSTRUCTION PHASE SEDIMENT BASIN 2 LAYOUT	A
5941 ENG BE1 029	CONSTRUCTION PHASE SEDIMENT BASIN 2 SECTIONS	A
5941 ENG BE1 030	SEDIMENT AND EROSION TYPICAL DETAILS	A
5941 ENG BE1 050	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 1 OF 6	A
5941 ENG BE1 051	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 2 OF 6	A
5941 ENG BE1 052	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 3 OF 6	A
5941 ENG BE1 053	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 4 OF 6	A
5941 ENG BE1 054	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 5 OF 6	A
5941 ENG BE1 055	BULK EARTHWORKS CUT & FILL LAYOUT PLAN SHEET 6 OF 6	A
5941 ENG BE1 100	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 1 OF 6	A
5941 ENG BE1 101	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 2 OF 6	A
5941 ENG BE1 102	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 3 OF 6	A
5941 ENG BE1 103	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 4 OF 6	A
5941 ENG BE1 104	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 5 OF 6	A
5941 ENG BE1 105	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 6 OF 6	A
5941 ENG BE1 150	FINISHED EARTHWORKS CROSS SECTIONS SHEET 1 OF 11	A
5941 ENG BE1 151	FINISHED EARTHWORKS CROSS SECTIONS SHEET 2 OF 11	A
5941 ENG BE1 152	FINISHED EARTHWORKS CROSS SECTIONS SHEET 3 OF 11	A
5941 ENG BE1 153	FINISHED EARTHWORKS CROSS SECTIONS SHEET 4 OF 11	A
5941 ENG BE1 154	FINISHED EARTHWORKS CROSS SECTIONS SHEET 5 OF 11	A
5941 ENG BE1 155	FINISHED EARTHWORKS CROSS SECTIONS SHEET 6 OF 11	A
5941 ENG BE1 156	FINISHED EARTHWORKS CROSS SECTIONS SHEET 7 OF 11	A
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5941 ENG BE1 158	FINISHED EARTHWORKS CROSS SECTIONS SHEET 9 OF 11	A
5941 ENG BE1 159	FINISHED EARTHWORKS CROSS SECTIONS SHEET 10 OF 11	A
5941 ENG BE1 160	FINISHED EARTHWORKS CROSS SECTIONS SHEET 11 OF 11	A
5941 ENG BE1 161	BULK EARTHWORKS ROAD TYPICAL SECTIONS	A
5941 ENG BE1 400	CONTROL LINE LAYOUT PLAN SHEET 1 OF 2	A

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Southport QLD 4215

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DATE OF ISSUE	Day	20																		
	Month	12																		
	Year	19																		

Distribution:																			
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CoGC COUNCIL	DEVELOPMENT ASSESSMENT	1xPDF																	

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5941 ENG BE1 448	ROAD 03 (1) BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 3	A																	
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5941 ENG BE1 450	ROAD 03 (2) BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 2	A																	
5941 ENG BE1 451	ROAD 03 (2) BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 2	A																	
5941 ENG BE1 452	EMERI STREET EXT. BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 2	A																	
5941 ENG BE1 453	EMERI STREET EXT. BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 2	A																	
5941 ENG BE1 454	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 11	A																	
5941 ENG BE1 455	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 11	A																	
5941 ENG BE1 456	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 3 OF 11	A																	
5941 ENG BE1 457	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 4 OF 11	A																	
5941 ENG BE1 458	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 5 OF 11	A																	
5941 ENG BE1 459	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 6 OF 11	A																	
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5941 ENG BE1 470	PRE DEVELOPED 1% AEP FLOOD STORAGE VOLUME ASSESSMENT	A																	
5941 ENG BE1 471	POST DEVELOPED 1% AEP FLOOD STORAGE VOLUME ASSESSMENT	A																	
5941 ENG BE1 570	OPERATIONAL PHASE BIORETENTION BASIN SHEET 1 OF 2	A																	
5941 ENG BE1 571	OPERATIONAL PHASE BIORETENTION BASIN SHEET 2 OF 2	A																	

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Name & Company: Signed: Dated: / /

Project Manager: mitchell@gassman.com.au Sent by: mitchell@gassman.com.au

OPERATIONAL WORKS APPLICATION FOR CHANGE TO GROUND LEVEL M38 INDUSTRIAL PARK YATALA



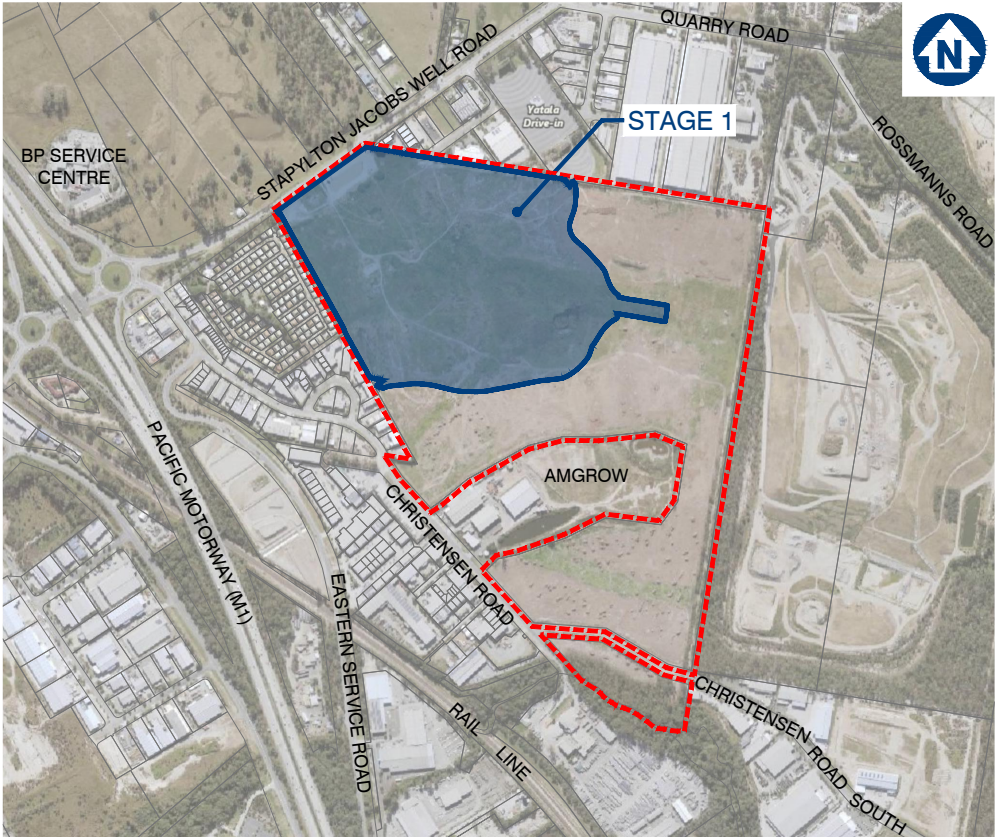
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DRAWING INDEX		
DRAWING No.	REV No.	SHEET TITLE
594I ENG BEI 001	A	DRAWING INDEX AND LOCALITY PLAN
594I ENG BEI 002	A	GENERAL NOTES SHEET 1 OF 2
594I ENG BEI 003	A	GENERAL NOTES SHEET 2 OF 2
594I ENG BEI 004	A	LEGEND
594I ENG BEI 005	A	KEY PLAN LAYOUT
594I ENG BEI 010	A	EXISTING SURFACE AND FEATURE PLAN
594I ENG BEI 020	A	SEDIMENT AND EROSION CONTROL PLAN SHEET 1 OF 6
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594I ENG BEI 022	A	SEDIMENT AND EROSION CONTROL PLAN SHEET 3 OF 6
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594I ENG BEI 024	A	SEDIMENT AND EROSION CONTROL PLAN SHEET 5 OF 6
594I ENG BEI 025	A	SEDIMENT AND EROSION CONTROL PLAN SHEET 6 OF 6
594I ENG BEI 026	A	CONSTRUCTION PHASE SEDIMENT BASIN 1 LAYOUT
594I ENG BEI 027	A	CONSTRUCTION PHASE SEDIMENT BASIN 1 SECTIONS
594I ENG BEI 028	A	CONSTRUCTION PHASE SEDIMENT BASIN 2 LAYOUT
594I ENG BEI 029	A	CONSTRUCTION PHASE SEDIMENT BASIN 2 SECTIONS
594I ENG BEI 030	A	SEDIMENT AND EROSION TYPICAL DETAILS
594I ENG BEI 050	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 1 OF 6
594I ENG BEI 051	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 2 OF 6
594I ENG BEI 052	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 3 OF 6
594I ENG BEI 053	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 4 OF 6
594I ENG BEI 054	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 5 OF 6
594I ENG BEI 055	A	BULK EARTHWORK CUT & FILL LAYOUT PLAN SHEET 6 OF 6
594I ENG BEI 100	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 1 OF 6
594I ENG BEI 101	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 2 OF 6
594I ENG BEI 102	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 3 OF 6
594I ENG BEI 103	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 4 OF 6
594I ENG BEI 104	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 5 OF 6
594I ENG BEI 105	A	FINISHED BULK EARTHWORKS SURFACE LEVEL PLAN SHEET 6 OF 6
594I ENG BEI 150	A	FINISHED EARTHWORKS CROSS SECTIONS SHEET 1 OF 11
594I ENG BEI 151	A	FINISHED EARTHWORKS CROSS SECTIONS SHEET 2 OF 11
594I ENG BEI 152	A	FINISHED EARTHWORKS CROSS SECTIONS SHEET 3 OF 11
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594I ENG BEI 401	A	CONTROL LINE LAYOUT PLAN SHEET 2 OF 2
594I ENG BEI 402	A	ROAD CONTROL LINE SETOUT TABLES SHEET 1 OF 3
594I ENG BEI 403	A	ROAD CONTROL LINE SETOUT TABLES SHEET 2 OF 3
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594I ENG BEI 405	A	SWALE DRAIN CONTROL LINE SETOUT TABLES
594I ENG BEI 410	A	ROAD 01 LONGITUDINAL SECTION SHEET 1 OF 3
594I ENG BEI 411	A	ROAD 01 LONGITUDINAL SECTION SHEET 2 OF 3
594I ENG BEI 412	A	ROAD 01 LONGITUDINAL SECTION SHEET 3 OF 3
594I ENG BEI 413	A	ROAD 02 LONGITUDINAL SECTION SHEET 1 OF 2
594I ENG BEI 414	A	ROAD 02 LONGITUDINAL SECTION SHEET 2 OF 2
594I ENG BEI 415	A	ROAD 03 (1) LONGITUDINAL SECTION
594I ENG BEI 416	A	ROAD 03 (2) LONGITUDINAL SECTION

DRAWING INDEX		
DRAWING No.	REV No.	SHEET TITLE
594I ENG BEI 417	A	EMERI STREET EXT. LONGITUDINAL SECTION
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594I ENG BEI 419	A	SWALE DRAIN A LONGITUDINAL SECTION SHEET 2 OF 2
594I ENG BEI 420	A	SWALE DRAIN B LONGITUDINAL SECTION
594I ENG BEI 421	A	BOULDER RETAINING WALL CONTROL LINE LAYOUT PLAN
594I ENG BEI 422	A	BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 1 OF 6
594I ENG BEI 423	A	BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 2 OF 6
594I ENG BEI 424	A	BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 3 OF 6
594I ENG BEI 425	A	BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 4 OF 6
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594I ENG BEI 428	A	BOULDER RETAINING WALL SETOUT TABLES SHEET 1 OF 2
594I ENG BEI 429	A	BOULDER RETAINING WALL SETOUT TABLES SHEET 2 OF 2
594I ENG BEI 430	A	ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 11
594I ENG BEI 431	A	ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 11
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594I ENG BEI 436	A	ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 7 OF 11
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594I ENG BEI 440	A	ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 11 OF 11
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594I ENG BEI 446	A	ROAD 02 BULK EARTHWORKS CROSS SECTIONS SHEET 6 OF 6
594I ENG BEI 447	A	ROAD 03 (1) BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 3
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594I ENG BEI 452	A	EMERI STREET EXT. BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 2
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594I ENG BEI 456	A	SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 3 OF 11
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594I ENG BEI 470	A	PRE DEVELOPED 1% AEP FLOOD STORAGE VOLUME ASSESSMENT
594I ENG BEI 471	A	POST DEVELOPED 1% AEP FLOOD STORAGE VOLUME ASSESSMENT
594I ENG BEI 570	A	OPERATIONAL PHASE BIORETENTION BASIN SHEET 1 OF 2
594I ENG BEI 571	A	OPERATIONAL PHASE BIORETENTION BASIN SHEET 2 OF 2



LOCALITY PLAN

SCALE 1: 8000 (A1)

CLIENT



**FRASERS
PROPERTY**

**FRASERS PROPERTY
(AUSTRALIA) PTY. LTD.**

SITE ADDRESS

**60 STAPYLTON JACOBS WELL ROAD
STAPYLTON QLD 4207**

DWG No. 594I ENG BEI 001 – REV A

DECEMBER 2019

GENERAL NOTES

1. **CONTRACT DOCUMENTATION**
ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE CONTRACT SPECIFICATION AND CoGC STANDARD DRAWINGS AND SPECIFICATIONS.
2. **DATUM**
LEVELS SHOWN ON THE PLANS ARE A.H.D.
3. **SURVEY SETOUT**
THE SURVEY SET OUT INFORMATION TO ALLOW THE CONTRACTOR TO ACCURATELY SET OUT THE WORKS HAS BEEN ESTABLISHED ON SITE BY THE PRINCIPAL’S SURVEYOR. THE CONTRACTOR IS NOT TO SCALE FROM THESE PLANS AS A MEANS OF OBTAINING SETOUT INFORMATION.
4. **EXISTING SURVEY CONTROL STATIONS**
IT IS THE CONTRACTOR’S RESPONSIBILITY TO ENSURE THAT EXISTING SURVEY CONTROL STATIONS ARE NOT DISTURBED OR DAMAGED BY CONSTRUCTION ACTIVITIES. SHOULD THE CONTRACTOR IDENTIFY ANY CONFLICT BETWEEN EXISTING SURVEY CONTROL AND THE REQUIRED CONSTRUCTION ACTIVITIES THE SUPERINTENDENT IS TO BE NOTIFIED IMMEDIATELY.
5. **EXISTING SERVICES**
THE LOCATION OF EXISTING SERVICES WHERE SHOWN ON THE PLANS ARE INDICATIVE ONLY. IT IS THE CONTRACTOR’S RESPONSIBILITY TO CONTACT THE RELEVANT SERVICE AUTHORITIES TO ASCERTAIN THE EXACT LOCATION OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORKS AND TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO THE EXISTING SERVICES.
6. **SITE ACCESS**
THE CONTRACTOR SHALL ONLY GAIN ACCESS TO THE SITE VIA ACCESS LOCATIONS APPROVED BY THE SUPERINTENDENT. FREEDOM OF ACCESS TO OTHER WORK AREAS ON THE SITE SHALL BE MAINTAINED AT ALL TIMES.
7. **PROVISION FOR TRAFFIC**
PROVISION FOR TRAFFIC ON LOCAL ROADS SHALL BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND CoGC COUNCIL REQUIREMENTS.
8. **WORK EXTENT**
THE CONTRACTOR IS TO RESTRICT ACTIVITIES TO THOSE AREAS DESIGNATED AS WORKS AREAS UNDER THE CONTRACT. AT NO TIME IS THE CONTRACTOR TO ENTER ADJOINING PROPERTIES OR CONTRACT AREAS WITHOUT THE WRITTEN AUTHORISATION OF THE SUPERINTENDENT.
9. **TESTING**
ALL TESTING IS TO BE CARRIED OUT BY AN APPROVED N.A.T.A TESTING AUTHORITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND REQUIREMENTS OF CoGC COUNCIL.
10. **"AS CONSTRUCTED" SURVEY**
"AS CONSTRUCTED" SURVEY SHALL BE CARRIED OUT BY THE PRINCIPAL’S SURVEYOR AS WORK PROCEEDS. THE CONTRACTOR IS TO PROVIDE ADEQUATE NOTICE TO THE PRINCIPAL’S SURVEYOR ON WHEN THIS IS REQUIRED TO ENSURE COMPLIANCE WITH THE REQUIREMENTS OF CoGC COUNCIL.
11. **MAINTENANCE OF SITE CONDITION**
AT THE COMPLETION OF WORKS THE SITE IS TO BE LEFT IN A CLEAN AND TIDY CONDITION TO THE SATISFACTION OF THE SUPERINTENDENT AND CoGC.

EARTHWORKS

1. **PRECEDENCE**
EARTHWORKS SPECIFICATION PREPARED BY PROJECT GEOTECHNICAL ENGINEER TO TAKE PRECEDENCE OVER STANDARD COUNCIL EARTHWORKS NOTES.
2. **TOPSOIL STRIPPING**
TOPSOIL SHALL BE STRIPPED ACROSS THE ENTIRE LIMIT OF THE EARTHWORKS CUT AND FILL AREAS AND SHALL BE STOCKPILED IN A LOCATION APPROVED BY THE SUPERINTENDENT. THE EXISTING STRATA IS TO BE TREATED IN ACCORDANCE WITH THE SPECIFICATION PRIOR TO PLACING ANY FILL.
3. **EARTHWORKS LEVELS**
EARTHWORKS LEVELS SHOWN ON THE DRAWING ARE TO FINISHED SURFACE LEVELS AND INCLUDE 100mm OF TOPSOIL. _THE CONTRACTOR SHALL VERIFY BENCH MARK LEVELS AND ADVISE THE SUPERINTENDENT OF ANY DISCREPANCY BEFORE COMMENCEMENT OF CONSTRUCTION.
4. **UNDESIRABLE MATERIAL**
THE ENTIRE SITE/WORK AREAS SHALL BE CLEARED OF ALL UNDESIRABLE MATTER. THIS SHALL INCLUDE DEAD TIMBER, GRASS, OLD FOUNDATIONS, CONCRETE, MASONRY REMAINS, GARBAGE, DEBRIS AND ALL OTHER OBSTRUCTIONS TO THE WORKS UNLESS NOTED OTHERWISE. HOLES LEFT BY THE REMOVAL OF ANY OF THE ABOVE SHALL BE FILLED WITH APPROVED COMPACTED MATERIAL WITH PROPERTIES AT LEAST SIMILAR TO INSITU SOILS.
5. **COMPACTION STANDARD**
FILL MATERIAL SHALL BE COMPACTED TO THE FOLLOWING STANDARD, WHERE DRY DENSITY RATIO IS DETERMINED IN ACCORDANCE WITH AS 1289 USING STANDARD COMPACTION METHODS.

a. 100% DRY DENSITY RATIO IN COHESIVE MATERIAL OR 80% IN COHESIONLESS MATERIAL FOR ROAD SUBGRADE.

b. 98% DRY DENSITY RATIO IN COHESIVE MATERIAL OR 65% IN COHESIONLESS MATERIAL FOR ALL AREAS OTHER THAN THE ROADWAY AND BUILDING PADS.

c. 98% DRY DENSITY RATIO IN COHESIVE MATERIAL OR 70% IN COHESIONLESS MATERIAL FOR BUILDING PADS.
5. **PAVEMENT DEPTHS**
EARTHWORKS VOLUMES DO NOT INCLUDE DESIGN PAVEMENT DEPTHS AS INDICATED ON THE TYPICAL BULK EARTHWORKS ROAD SECTION.
6. **TESTING**
ALL EARTHWORKS TO BE CARRIED OUT UNDER LEVEL 1 SUPERVISION IN ACCORDANCE WITH AUSTRALIAN STANDARDS AS 3798 UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL COMPACTION TESTING SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A TESTING AUTHORITY.
7. **ROCK**
THE CONTRACTOR IS TO INCLUDE ROCK EXCAVATION AS PART OF THEIR EARTHWORKS RATES UNLESS SCHEDULED OTHERWISE WITHIN THE CONTRACT DOCUMENT.

8. **DAMS AND PONDS**
WHERE POSSIBLE, WATER FROM DAMS AND PONDS SHALL BE MAINTAINED AND UTILISED FOR CONSTRUCTION PURPOSES AND DUST SUPPRESSION. DAMS AND PONDS NOT TO BE RETAINED SHALL BE DEWATERED, CLEARED OF ANY FOREIGN MATTER AND ORGANIC MATERIAL WITH THIS MATERIAL TO BE REMOVED OFF SITE.
9. **RETAINING STRUCTURES**
THE DESIGN AND STRUCTURAL CERTIFICATION OF RETAINING STRUCTURES SHALL BE UNDERTAKEN BY THE CONTRACTOR’S STRUCTURAL ENGINEER (RPEQ) IN CONSULTATION WITH THE PROJECT’S CIVIL ENGINEER AND LANDSCAPE CONSULTANT. THE CONTRACTOR IS RESPONSIBLE FOR THE SUBMISSION AND APPROVAL COORDINATION OF THE ASSOCIATED DRAWINGS AND CERTIFICATION TO GCCC. A COPY OF THIS SUBMISSION IS TO BE PROVIDED TO THE SUPERINTENDENT.
10. **TOPSOIL REPLACEMENT**
ALL BATTERS AND ALLOTMENT CUT & FILL AREAS SHALL BE TOP SOILED FROM ONSITE STOCKPILES. IF DIRECTED BY THE SUPERINTENDENT THE TOPSOIL SHALL BE SCREENED PRIOR TO PLACING. THE CONTRACTOR SHALL ALLOW IN THEIR RATE FOR SCREENING AND THE DISPOSAL OF REJECT MATERIAL TO TIP OFFSITE INCLUDING ALL FEES. THE CONTRACTOR MUST ENSURE THAT THE STRIPPING SHALL BE UNDERTAKEN IN SUCH A MANNER AS TO AVOID CONTAMINATION BY OVER CUTTING. IF TOPSOIL IS CONTAMINATED BY OVER CUTTING AND DETERMINED NOT SUITABLE FOR REUSE BY THE SUPERINTENDENT, THE CONTRACTOR SHALL BEAR THE COST OF REMOVAL FROM SITE OF ALL CONTAMINATED TOPSOIL AND THE COST TO SUPPLY AND IMPORT SUITABLE TOPSOIL FOR RE–SPREADING.
11. **GRASSING / SEEDING**
ALL CUT & FILL AREAS AND DISTURBED AREAS SHALL BE GRASSED OR SEEDED TO THE SATISFACTION OF THE SUPERINTENDENT.
12. **STOCKPILES**
ALL MATERIAL/SPOIL ARISING FROM WORKS ON SITE SHALL BE COMPACTED TO AN APPROPRIATE STANDARD WITHIN THE FILL AREAS OF FUTURE STAGES AS NOMINATED BY THE SUPERINTENDENT. THE CONTRACTOR IS NOT TO CREATE STOCKPILES OF SURPLUS MATERIALS UNLESS WRITTEN AUTHORIZATION IS RECEIVED FROM THE SUPERINTENDENT.

SEDIMENT AND EROSION

1. THE OBJECTIVES OF THE EROSION AND SEDIMENT CONTROL PROGRAM ARE:

a. ALLOW STORMWATER TO PASS THROUGH THE SITE IN A CONTROLLED MANNER AT NON–EROSIVE FLOW VELOCITIES.

b. MINIMISE SOIL EROSION FROM WATER AND WIND

c. MINIMISE ADVERSE EFFECTS OF SEDIMENT RUNOFF.

d. MINIMISE OR PREVENT ENVIRONMENTAL HARM ASSOCIATED WITH DISCHARGE FROM THE CONSTRUCTED SITE.

e. ENSURE THAT THE VALUE AND USE OF RESIDENTIAL AND INDUSTRIAL PROPERTIES ADJACENT TO THE DEVELOPMENT ARE NOT DIMINISHED AS A RESULT OF THE MIGRATION OF SEDIMENT FROM THE DEVELOPMENT.
2. THE EROSION AND SEDIMENT CONTROL PROGRAM SHALL COMPLY WITH THE ENVIRONMENTAL BEST ENGINEERING GUIDELINES FOR QUEENSLAND CONSTRUCTION SITES. THE CURRENT INSTITUTION OF ENGINEERS AUSTRALIA AND LOCAL AUTHORITY GUIDELINES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION AND DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTIONS INCLUDING THE MAINTENANCE PERIOD. NOTWITHSTANDING THE FINISHED EARTHWORK DESIGN SHOWN ON THE DRAWINGS THE CONTRACTOR IS RESPONSIBLE TO IMPLEMENT ADDITIONAL SEDIMENT CONTROL MEASURES AND DEVICES USING BEST PRACTICES AS NECESSARY TO MINIMISE THE QUANTITY LEAVING THE SITE DURING CONSTRUCTION AND UPON COMPLETION OF EARTHWORKS.
3. THE CONTRACTOR IS TO FOLLOW CONSTRUCTION PHASE AS OUTLINED IN THE CONSTRUCTION SEQUENCE/SILT MANAGEMENT PROGRAM. ALL SEDIMENT CONTROL DEVICES SHALL BE MONITORED, CLEANED AND/OR REPLACED WHENEVER THE ACCUMULATED SEDIMENT REDUCES THE CAPACITY BY 50%. ALL PERIMETER BANK/SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET. AT ALL TIMES THE CONTRACTOR SHALL MONITOR THE PREVAILING WEATHER CONDITIONS AND PROTECT ANY DOWNSTREAM CONSTRUCTION AND GULLY INLETS. INLETS TO HAVE SILT PROTECTION IN ACCORDANCE WITH KERB INLET PROTECTION DETAIL AT LOCATIONS SHOWN OR AS INDICATED BY THE ENGINEER.
4. PRIOR TO THE COMMENCEMENT OF EARTHWORKS, THE CONTRACTOR IS TO CARRY OUT SOIL TESTING (IF REQUIRED BY SUPERINTENDENT) TO DETERMINE THE DISPERSIVE CHARACTERISTICS OF THE SOIL AND RESULTS TO BE GIVEN TO THE ENGINEERS SO THE FINALIZATION OF THE EROSION AND SEDIMENT CONTROL PLAN CAN BE COMPLETE.
5. TOPSOIL SHALL BE STRIPPED AND STOCKPILED IN LOCATIONS AGREED WITH THE SUPERINTENDENT. CLEARING OF SITE AND STOCKPILE AREAS TO BE AS DIRECTED BY THE SUPERVISING ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROLLING DUST AT ALL TIMES INCLUDING WEEKENDS AND PUBLIC HOLIDAYS.
6. SUITABLE ACCESS SHALL BE PROVIDED TO ALLOW MAINTENANCE OF ALL SEDIMENT CONTROL DEVICES (IT IS TO BE NOTED THAT CLEARING SHALL ONLY OCCUR IN AREAS WHERE THERE IS NO OTHER ALTERNATIVE TO GAIN ACCESS TO THE LOCATION OF THE SEDIMENT CONTROL DEVICES). APPROVAL FOR REMOVAL OF PROTECTED SIZE VEGETATION MUST BE OBTAINED PRIOR TO CLEARING.
7. ROCK BUNDS TO BE PLACED AROUND ALL HEADWALLS DURING CONSTRUCTION.
8. 0.8m TURF IS TO BE PLACED BEHIND ON ALL BATTERS WITHIN PRIVATE OPEN SPACE STEEPER THAN 1:4 UNLESS OTHERWISE NOTED. THE EXTENT OF GRASSING SHALL BE DETERMINED BY THE ENGINEER AND SHALL BE SEEDED, AS SPECIFIED, WITHIN 7 DAYS OF FINAL TRIMMING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT GRASS STRIKE RATES ARE ACHIEVED AT ON AND OFF MAINTENANCE INSPECTION IN ACCORDANCE WITH COUNCIL REQUIREMENTS.
9. TURF IS TO BE PLACED FROM BACK OF KERB TO ROAD RESERVE BOUNDARY ON ALL ROADS AFTER EARTHWORKS ARE COMPLETE.
10. GEO–FABRIC LINING OF CHANNELS AND CHECK DAMS MAY BE REQUIRED SUBJECT TO THE SITE CONDITIONS.
11. FILLING AND OR MAINTENANCE OF EXISTING AND OR SEDIMENT BASINS MAY REQUIRE FLOCCULATION.
12. BATTERS WITHIN PUBLIC OPEN SPACE TO BE VEGETATED IN ACCORDANCE WITH THE APPROVED OPEN SPACE MANAGEMENT PLAN (OSMP).
13. IT IS THE CONTRACTOR’S RESPONSIBILITY TO CLEAN OUT GPT’S, SEDIMENT FOREBAYS AND ALL OTHER SEDIMENT CONTROL DEVICES DURING CONSTRUCTION AND PRIOR BOTH ON AND OFF MAINTENANCE INSPECTIONS WITH CoGC. THE CONTRACTOR SHALL ALLOW FOR THE COST OF THESE WORKS WITHIN THEIR SUBMITTED TENDER PRICE.

CONSTRUCTION SEQUENCE/SILT MANAGEMENT PROGRAM

1. **PRE START**

a. ERECT SITE SIGNAGE, CONSTRUCT ENTRY AND EXIT POINT AS INDICATED CONSTRUCT VEHICLE WASH–DOWN AREA AND ASSOCIATED SILT MANAGEMENT DEVICES.

b. CONSTRUCT SITE OFFICE AND STORAGE COMPOUND AREA

c. ERECT SILT FENCE AT LOW POINTS OF THE SITE AS DEMONSTRATED

d. ERECT TEMPORARY TREE PROTECTION FENCING FOR VEGETATION TO BE RETAINED IN ACCORDANCE WITH AN OPW (TREE CLEARING) APPROVAL OR IN ACCORDANCE WITH AS4970 PROTECTION OF TREES ON DEVELOPMENT SITE.

e. CONSTRUCT ROCK CHECK DAMS AND SILT FENCE DOWN STREAM OF BASIN.

f. CONSTRUCT BASIN TO FULL DEPTH.

g. CONSTRUCT BALANCE OF BASIN IN CONJUNCTION WITH CLEARING AND BULK EARTHWORKS OPERATIONS.

h. BASIN TO BE UTILISED AS A TEMPORARY SEDIMENT BASIN. DO NOT FILL IN FILTRATION MATERIAL UNTIL CONSTRUCTION OF DEVELOPMENT IS COMPLETE.
2. **CLEARING AND BULK EARTHWORKS**
THERE SHALL BE NO CLEARING OF PROTECTED SITE VEGETATION WITHOUT AN APPROVED TREE CLEARING PLAN WHICH SHALL BE IN ACCORDANCE WITH AS4970. SILT FENCE, SAND BAGS AND EARTH RILLS WITHIN ROADS TO BE ERECTED AS INDICATED OR REQUIRED DURING CLEARING & EARTHWORKS. SUPERINTENDENT TO CONFIRM THE EXTENT OF CLEARING PRIOR TO COMMENCEMENT OF WORKS.
3. **CONSTRUCTION OF SEWER/ROOFWATER / STORMWATER /SERVICES**
EXCAVATED MATERIAL TO BE PLACED ON HIGH SIDE OF TRENCH AND TO PROTECT PIPE WORK AND DIRECT SURFACE MATERIAL AWAY FROM EXCAVATIONS. TOPSOIL AND GRASS SEED AREAS IN ALLOTMENTS IMMEDIATELY AFTER COMPLETING THE SEWER AND ROOFWATER DRAINAGE CONSTRUCTION. DEPRESS GROUND AROUND TEMPORARY FIELD INLETS TO CREATE SILT POND.
4. **CONSTRUCTION – SEDIMENT BASINS**
SEDIMENT BASIN TO BE CONSTRUCTED TO THE EARTHWORK PROFILES SHOWN. STORMWATER OUTLET PIPES TO BE TEMPORARY BLOCKED OFF UNTIL DECOMMISSIONING OF SEDIMENT BASIN (SUBSEQUENT TO CONSTRUCTION OF ALL STAGES). PLACE SPOIL FROM SEDIMENT BASIN INTO ALLOCATED AREAS AS ENGINEERED FILL IN ACCORDANCE WITH THE STAGING ORDER. SEDIMENT BASIN SHALL ONLY BE REMOVED AFTER APPROVAL BY SUPERINTENDENT AND COUNCIL.
5. **CONSTRUCTION – STOCKPILING**
TEMPORARY SILT FENCE TO BE ERECTED 5m FROM TOE OF BATTER ON LOW SIDE OF STOCKPILING. STOCKPILE SITE TO BE CLEARED OF ADJACENT PROPERTY BOUNDARIES SO AS NOT TO CAUSE NUISANCE TO ADJOINING PROPERTIES. NO STOCKPILES ARE TO BE LOCATED WITHIN THE DRIP ZONE OR STRUCTURAL ROOT ZONE OF ANY RETAINED VEGETATION.
6. **CONSTRUCTION – ROADWORKS**
SILT FENCES TO ALLOTMENTS TO BE ERECTED. KERB INLET PROTECTION TO BE PROVIDED TO ALL GULLIES.
7. **CONSTRUCTION – ALLOTMENTS**
TOPSOIL AND SEED ALLOTMENTS. SILT FENCES TO ALLOTMENTS TO BE RE–ERECTED. COVERS TO GULLY GRATES TO BE REMOVED IF THE SUPERINTENDENT INDICATE THE GRASS STRIKE IS SUFFICIENT (80% WITHIN 30 CALENDAR DAYS OF FINAL ALLOTMENT RIMMING).
8. **POST CONSTRUCTION – ALLOTMENTS**
TOPSOIL AND GRASS SEED ALL ALLOTMENTS. COVERS TO GULLY GRATES TO BE REMOVED IF THE SUPERINTENDENT INDICATES THE GRASS STRIKE IS SUFFICIENT (80% WITHIN 30 CALENDAR DAYS OF FINAL ALLOTMENT TRIMMING).
9. **POST CONSTRUCTION – BASIN**
BASIN TO CONTINUE ACTING AS SEDIMENT BASIN UNTIL COMPLETION OF ALL STAGES.
10. **POST CONSTRUCTION – ROAD RESERVES**
TOPSOIL AND TURFING IS TO BE PROVIDED BEHIND KERB.
11. **MAINTENANCE (PRE TO POST CONSTRUCTION)**
THE SILT FENCES ARE TO BE INSPECTED WEEKLY. ANY REPAIRS REQUIRED ARE TO BE EFFECTED IMMEDIATELY. SILT AFTER RAIN IS TO BE CLEANED FROM STREETS AND ALLOTMENTS IMMEDIATELY AND CORRECTIVE ACTION TAKEN TO AVOID A RE–OCCURRENCE OF THE FAILURE.
12. **BASIN CONSTRUCTION**
PRIOR TO COMMENCING CONSTRUCTION OF THE DETENTION BASIN THE DIVERSION OF SURFACE WATER FROM THE PROPOSED WORK AREAS, USING MEASURES SUCH AS OPEN DRAINS/SUMPS, ARE REQUIRED TO AID IN SITE DE–WATERING. BASIN TO CONTINUE ACTING AS SEDIMENT BASIN UNTIL 85% OF CATCHMENT CONSTRUCTION IS COMPLETE. THE CLAY FILLING FOR THE BASIN WALLS SHALL BE PLACED IN HORIZONTAL LAYERS OF 200mm THICKNESS AND COMPACTED TO DENSITY RATIO WITHIN THE RANGE 98%–102% STANDARD COMPACTION (AS 1289.5.1.1). PLACEMENT MOISTURE CONTENT SHOULD BE WITHIN THE RANGE OMC –1% TO OMC –2% (WHERE OMC = OPTIMUM MOISTURE CONTENT FOR STANDARD COMPACTION). CONTRACTOR TO PROVIDE SAFETY FENCING TO BASIN DURING CONSTRUCTION AND APPROPRIATE SIGNAGE (PERMANENT OR TEMPORARY).



HES BASIN GENERAL NOTES

AUTO DOSER

1. PROVIDED AS EITHER 'FLOC BOX' OR 'FOD-RAIN' DOSING UNIT OR APPROVED EQUIVALENT TO MANUFACTURERS SPECIFICATION.
2. DOSER AND SUPPLY OF FLOCCULANT TO BE PROVIDED ON LEVEL PAD 4mX4m WITHIN 10m OF DOSING POINT.
3. ALL-WEATHER ACCESS TRACK TO BE PROVIDED TO DOSER.
4. FLOCCULANT PROVIDED AS TURBICLEAR (ACH) OR APPROVED EQUIVALENT. IF ALTERNATIVE FLOCCULANT USED THEN THE BASIN SIZE IS TO BE INCREASED ACCORDING TO JAR SETTLEMENT TEST (REFER TO TABLE BELOW).

JAR SETTLEMENT AFTER 15 MINS	MULTIPLICATION FACTOR TO SETTLING ZONE
(mm)	VOLUME
50	x3.0
75	x2.0
100	x1.5
150	x1.0

BASIN CONSTRUCTION

MATERIALS

5. EARTH FILL: CLEAN SOIL WITH EMERSION CLASS 2 (I), 3, 4 OR 5 AND FREE OF ROOTS, WOODY VEGETATION, ROCKS AND OTHER UNSUITABLE MATERIAL. SOIL WITH EMERSION CLASS 4 AND 5 MAY NOT BE SUITABLE DEPENDING ON PARTICLE SIZE DISTRIBUTION AND DEGREE OF DISPERSION. CLASS 2 (I) SHOULD ONLY BE USED UPON RECOMMENDATION FROM GEOTECHNICAL SPECIALIST.
6. SPILLWAY ROCK: HARD, ANGULAR, DURABLE, WEATHER RESISTANT AND EVENLY GRADED ROCK WITH 50% BY WEIGHT LARGER THAN THE SPECIFIED NOMINAL (D50) ROCK SIZE. LARGE ROCK SHOULD DOMINATE, WITH SUFFICIENT SMALL ROCK TO FILL THE VOIDS BETWEEN LARGER ROCK. THE DIAMETER OF THE LARGEST ROCK SHOULD BE NO LARGER THAN 1.5 TIMES THE NOMINAL ROCK SIZE. THE SPECIFIC GRAVITY SHOULD BE AT LEAST 2.5.
7. GEOTEXTILE FABRIC: HEAVY DUTY, NEEDLE-PUNCHED, NON-WOVEN CLOTH, MINIMUM 'BIDIM' A24 OR EQUIVALENT.

CONSTRUCTION

8. NOTWITHSTANDING ANY DESCRIPTION CONTAINED WITH APPROVED PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SATISFYING THEMSELVES AS TO THE NATURE AND EXTENT OF THE SPECIFIED WORKS AND THE PHYSICAL AND LEGAL CONDITIONS UNDER WHICH THE WORKS WILL BE CARRIED OUT. THIS SHALL INCLUDE MEANS OF ACCESS, EXTENT OF CLEARING, NATURE OF THE MATERIALS TO BE EXCAVATED, TYPE AND SIZE OF MECHANICAL PLANT REQUIRED, LOCATION AND SUITABILITY OF WATER SUPPLY FOR CONSTRUCTION AND TESTING PURPOSES, AND ANY OTHER LIKELY MATTERS AFFECTING THE CONSTRUCTION OF THE WORKS.
9. REFER TO APPROVED PLANS FOR LOCATION, DIMENSIONS, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
10. BEFORE STARTING ANY CLEARING OR CONSTRUCTION, ENSURE ALL THE NECESSARY MATERIALS AND COMPONENTS ARE ON THE SITE TO AVOID DELAYS IN COMPLETING THE SEDIMENT BASIN ONCE WORKS BEGIN.
11. INSTALL REQUIRED SHORT TERM SEDIMENT CONTROL MEASURES DOWNSTREAM OF THE PROPOSED EARTHWORKS TO CONTROL SEDIMENT RUNOFF DURING CONSTRUCTION OF THE BASIN.
12. THE AREA TO BE COVERED BY THE EMBANKMENT, BORROW PITS AND INCIDENTAL WORKS, TOGETHER WITH AN AREA EXTENDING BEYOND THE LIMITS OF AREA FOR A DISTANCE NOT EXCEEDING FIVE (5) METRES ALL AROUND MUST BE CLEARED OF ALL TREES, SCRUB, STUMPS, ROOTS, DEAD TIMBER AND RUBBISH AND DISPOSED OF IN A SUITABLE MANNER, DELAY CLEARING THE MAIN BASIN AREA UNTIL THE EMBANKMENT IS COMPLETE.
13. ENSURE ALL HOLES MADE BY GRUBBING WITHIN THE EMBANKMENT FOOTPRINT ARE FILLED WITH SOUND MATERIAL, ADEQUATELY COMPACTED, AND FINISHED FLUSH WITH THE NATURAL SURFACE.

CUT-OFF TRENCH

14. BEFORE CONSTRUCTION OF THE CUT-OFF TRENCH OR ANY ANCILLARY WORKS WITHIN THE EMBANKMENT FOOTPRINT, ALL GRASS GROWTH AND TOPSOIL MUST BE REMOVED FROM THE AREA TO BE OCCUPIED BY THE EMBANKMENT AND MUST BE DEPOSITED CLEAR OF THIS AREA AND RESERVED FOR TOPDRESSING THE COMPLETED EMBANKMENT.

15. EXCAVATE A CUT-OFF TRENCH ALONG THE CENTRE LINE OF THE EARTH FILL EMBANKMENT. CUT THE TRENCH TO STABLE SOIL MATERIAL, BUT IN NO CASE MAKE IT LESS THAN 600mm DEEP. THE CUT-OFF TRENCH MUST EXTEND INTO BOTH ABUTMENTS TO AT LEAST THE ELEVATION OF THE OUTLET SPILLWAY CREST. MAKE THE MINIMUM BOTTOM WIDTH WIDE ENOUGH TO PERMIT OPERATION OF THE EXCAVATION AND COMPACTION EQUIPMENT, BUT IN NO CASE LESS THAN 600mm. MAKE THE SIDE SLOPES OF THE TRENCH NO STEEPER THAN 1:2 (H: V).
16. ENSURE ALL WATER, LOOSE SOIL, AND ROCK ARE REMOVED FROM THE TRENCH BEFORE BACKFILLING COMMENCES. THE CUT-OFF TRENCH MUST BE BACKFILLED WITH SELECT EARTH—FILL OF THE TYPE SPECIFIED FOR THE EMBANKMENT, AND THIS SOIL MUST HAVE A MOISTURE CONTENT AND DEGREE OF COMPACTION THE SAME AS SPECIFIED FOR THE CORE ZONE.
17. MATERIAL EXCAVATED FROM THE CUT-OFF TRENCH MAY BE USED IN THE CONSTRUCTION OF THE EMBANKMENT PROVIDED IT IS SUITABLE AND IT IS PLACED IN THE CORRECT ZONE ACCORDING TO ITS CLASSIFICATION.

EMBANKMENT

18. SCARIFY AREAS ON WHICH FILL IS TO BE PLACED BEFORE PLACING THE FILL.
19. ENSURE ALL FILL MATERIAL USED TO FORM THE EMBANKMENT MEETS THE SPECIFICATIONS CERTIFIED BY A SOIL SCIENTIST OF GEOTECHNICAL SPECIALIST.
20. THE FILL MATERIAL MUST CONTAIN SUFFICIENT MOISTURE SO IT CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBLING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN 150 TO 200mm CONTINUOUS LAYERS OVER THE ENTIRE LENGTH OF THE FILL AREA AND THEN COMPACT BEFORE PLACEMENT OF FURTHER FILL.
21. UNLESS SPECIFIED ON THE APPROVED PLANS, COMPACT THE SOIL AT ABOUT 1% TO 2% WET OPTIMUM AND TO 95% MODIFIED OR 100% STANDARD COMPACTION.
22. WHERE BOTH DISPERSIVE AND NON-DISPERSIVE CLASSIFIED EARTH-FILL MATERIALS ARE AVAILABLE, NON-DISPERSIVE EARTH-FILL MUST BE USED IN THE CORE ZONE. THE REMAINING CLASSIFIED EARTH-FILL MATERIALS MUST ONLY BE USED AS DIRECTED BY THE SITE SUPERINTENDENT.
23. WHERE SPECIFIED, CONSTRUCT THE EMBANKMENT TO AN ELEVATION 10% HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLING; OTHERWISE FINISHED DIMENSIONS OF THE EMBANKMENT AFTER SPREADING OF TOPSOIL MUST CONFORM TO THE DRAWING WITH A TOLERANCE OF 75mm FROM SPECIFIED DIMENSIONS.
24. ENSURE DEBRIS AND OTHER UNSUITABLE BUILDING WASTE IS NOT PLACED WITHIN THE EARTH EMBANKMENT.
25. AFTER COMPLETION OF THE EMBANKMENT ALL LOOSE UNCOMPACTED EARTH-FILL MATERIAL ON THE UPSTREAM AND DOWNSTREAM BATTER MUST BE REMOVED PRIOR TO SPREADING TOPSOIL.
26. TOPSOIL AND RE-VEGETATE/STABILISE ALL EXPOSED EARTH AS DIRECTED WITHIN THE APPROVED PLANS.

ESTABLISHING THE SETTLING POND

27. THE AREA TO BE COVERED BY THE STORED WATER OUTSIDE OF THE LIMITS OF THE BORROW PITS MUST BE CLEARED OF RUBBISH. TREES MUST BE CUT DOWN STUMP HIGH AND REMOVED FROM THE IMMEDIATE VICINITY OF THE WORK.
28. ESTABLISH ALL REQUIRED INFLOW CHUTES AND INLET BAFFLES IF SPECIFIED TO ENABLE WATER TO DISCHARGE INTO THE BASIN IN A MANNER THAT WILL NOT CAUSE SOIL EROSION OR THE RE-SUSPENSION OF SETTLED SEDIMENT.
29. INSTALL A SEDIMENT STORAGE LEVEL MARKER POST WITH A CROSS MEMBER SET JUST BELOW THE TOP OF THE SEDIMENT STORAGE ZONE (AS SPECIFIED ON THE APPROVED PLANS). USE AT LEAST A 75mm WIDE POST FIRMLY SET INTO THE BASIN FLOOR.
30. IF SPECIFIED, INSTALL INTERNAL SETTLING POND BAFFLES. ENSURE THE CREST OF THESE BAFFLES IS SET LEVEL WITH, OR JUST BELOW, THE ELEVATION OF THE EMERGENCY SPILLWAY.
31. INSTALL ALL APPROPRIATE MEASURES TO MINIMISE SAFETY RISK TO ON-SITE PERSONNEL AND THE PUBLIC CAUSED BY THE PRESENCE OF THE SETTLING POND. AVOID STEEP, SMOOTH INTERNAL SLOPES. APPROPRIATELY FENCE THE SETTLING POND AND POST WARNING SIGNS IF UNSUPERVISED PUBLIC ACCESS IS LIKELY OR THERE IS CONSIDERED TO BE AN UNACCEPTABLE RISK TO THE PUBLIC.

SPILLWAY CONSTRUCTION

3. THE SPILLWAY MUST BE EXCAVATED AS SHOWN ON THE PLANS, AND THE EXCAVATED MATERIAL IF CLASSIFIED AS SUITABLE, MUST BE USED IN THE EMBANKMENT, AND IF NOT SUITABLE IT MUST BE DISPOSED OF INTO SPOIL HEAPS.
33. ENSURE EXCAVATED DIMENSIONS ALLOW ADEQUATE BOXING—OUT SUCH THAT THE SPECIFIED ELEVATIONS, GRADES, CHUTE WIDTH, AND ENTRANCE AND EXIT SLOPES FOR THE EMERGENCY SPILLWAY WILL BE ACHIEVED AFTER PLACEMENT OF THE ROCK OR OTHER SCOUR PROTECTION MEASURES AS SPECIFIED IN THE PLANS.
34. PLACE SPECIFIED SCOUR PROTECTION MEASURES ON THE EMERGENCY SPILLWAY. ENSURE THE FINISHED GRADE BLENDS WITH THE SURROUNDING AREA TO ALLOW A SMOOTH FLOW TRANSITION FROM SPILLWAY TO DOWNSTREAM CHANNEL.
35. IF A SYNTHETIC FILTER FABRIC UNDERLAY IS SPECIFIED, PLACE THE FABRIC DIRECTLY ON THE PREPARED FOUNDATION. IF MORE THAN 1 SHEET OF FILTER FABRIC IS REQUIRED, OVERLAP THE EDGES BY AT LEAST 300mm AND PLACE ANCHOR PINS AT MINIMUM 1M SPACING ALONG THE OVERLAP. BURY THE UPSTREAM END OF THE FILTER FABRIC A MINIMUM 300mm BELOW GROUND AND WHERE NECESSARY, BURY THE LOWER END OF THE FABRIC OR OVERLAP A MINIMUM 300mm OVER THE NEXT DOWNSTREAM SECTION AS REQUIRED. ENSURE THE FILTER FABRIC EXTENDS AT LEAST 1000mm UPSTREAM OF THE SPILLWAY CREST.
36. TAKE CARE NOT TO DAMAGE THE FABRIC DURING OR AFTER PLACEMENT. IF DAMAGE OCCURS, REMOVE THE ROCK AND REPAIR THE SHEET BY ADDING ANOTHER LAYER OF FABRIC WITH A MINIMUM OVERLAP OF 300mm AROUND THE DAMAGED AREA. IF EXTENSIVE DAMAGE IS SUSPECTED, REMOVE AND REPLACE THE ENTIRE SHEET.
37. WHERE LARGE ROCK IS USED, OR MACHINE PLACEMENT IS DIFFICULT, A MINIMUM 100mm LAYER OF FINE GRAVEL, AGGREGATE, OR SAND MAY BE NEEDED TO PROTECT THE FABRIC.
38. PLACEMENT OF ROCK SHOULD FOLLOW IMMEDIATELY AFTER PLACEMENT OF THE FILTER FABRIC. PLACE ROCK SO THAT IT FORMS A DENSE, WELL GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE DESIRED DISTRIBUTION OF ROCK THROUGHOUT THE MASS MAY BE OBTAINED BY SELECTIVE LOADING AT THE QUARRY AND CONTROLLED DUMPING DURING FINAL PLACEMENT.
39. THE FINISHED SLOPE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS. HAND PLACING MAY BE NECESSARY TO ACHIEVE THE PROPER DISTRIBUTION OF ROCK SIZES TO PRODUCE A RELATIVELY SMOOTH, UNIFORM SURFACE. THE FINISHED GRADE OF THE ROCK SHOULD BLEND WITH THE SURROUNDING AREA. NO OVER FALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
40. ENSURE THAT THE FINAL ARRANGEMENT OF THE SPILLWAY CREST WILL NOT PROMOTE EXCESSIVE FLOW THROUGH THE ROCK SUCH THAT THE WATER CAN BE RETAINED WITHIN THE SETTLING BASIN AT THE ELEVATION NO LESS THAN 50mm ABOVE OF BELOW THE NOMINATED SPILLWAY CREST ELEVATION.

	OVERLAND FLOW PATH/SWALE
	CATCH DRAIN (NOT LINED)
	DIVERSION CHANNEL
	TABLE DRAIN
	STREAM INVERT
	CATCH DRAIN (CONCRETE LINED)
	SUBSOIL DRAINAGE
	SAWCUT
	SEDIMENT FENCE
	CHAINWIRE FENCE
	WOODEN FENCE
	BRIVEN WIRE SAFETY BARRIER
	GUARDRAIL (STANDARD)
	RETAINING WALL (PILED)
	RETAINING WALL (WITH FOOTINGS)
	RETAINING WALL
	ROCKBLOCK RETAINING WALL
	TOP OF BATTER / BERM
	NOISE WALL
	EDGE OF VEGETATION
	PROPERTY LINE
	PROPERTY LINE WITH FENCE
	PROPOSED KERB, FOOTPATH
	CONTROL LINE / CENTER OF ROAD
	RAILWAY (MAJOR)
	RAILWAY (MINOR)
	EXISTING PROPERTY LINE
	EXISTING PROPERTY LINE WITH FENCE
	EXISTING KERB, FOOTPATH
	EXISTING EDGE OF BITUMEN
	EXISTING RAILWAY (MAJOR)
	EXISTING RAILWAY (MINOR)
	LIMIT OF WORKS
	LIMIT OF SITE
	CATCHMENT BOUNDARY
	EXISTING CONTOURS
	DESIGN CONTOURS

RM	RM	RM	PROPOSED RISING MAIN
S	S	S	PROPOSED SEWER
SW	SW	SW	PROPOSED STORMWATER
SW	SW	SW	PROPOSED ROOFWATER
SS	SS	SS	PROPOSED ROOFWATER
SS	SS	SS	PROPOSED SUBSOIL
W	W	W	PROPOSED WATER
W	W	W	PROPOSED RECYCLED WATER
OIL	OIL	OIL	PROPOSED OIL
F	F	F	PROPOSED FUEL
G	G	G	PROPOSED GAS
P	P	P	PROPOSED PIPELINE
HV	HV	HV	PROPOSED HIGH VOLTAGE ELECTRICITY
E	E	E	PROPOSED UNDERGROUND ELECTRICITY
E	E	E	PROPOSED OVERHEAD ELECTRICITY
L	L	L	PROPOSED LIGHTING
T	T	T	PROPOSED TELSTRA
C	C	C	PROPOSED COMMUNICATIONS
GE	GE	GE	PROPOSED GAS, ELECT
GT	GT	GT	PROPOSED GAS, TELSTRA
ET	ET	ET	PROPOSED ELECT, TELSTRA
GET	GET	GET	PROPOSED GAS, ELECTRICITY, TELSTRA
RM	RM	RM	EXISTING RISING MAIN
S	S	S	EXISTING SEWER
SW	SW	SW	EXISTING STORMWATER
SW	SW	SW	EXISTING ROOFWATER
SS	SS	SS	EXISTING SUBSOIL
W	W	W	EXISTING WATER
W	W	W	EXISTING RECYCLED WATER
OIL	OIL	OIL	EXISTING OIL
F	F	F	EXISTING FUEL
G	G	G	EXISTING GAS
P	P	P	EXISTING PIPELINE
HV	HV	HV	EXISTING HIGH VOLTAGE ELECTRICITY
E	E	E	EXISTING UNDERGROUND ELECTRICITY
E	E	E	EXISTING OVERHEAD ELECTRICITY
L	L	L	EXISTING LIGHTING
T	T	T	EXISTING TELSTRA
C	C	C	EXISTING COMMUNICATIONS
GE	GE	GE	EXISTING GAS, ELECT
GT	GT	GT	EXISTING GAS, TELSTRA
ET	ET	ET	EXISTING ELECT, TELSTRA
GET	GET	GET	EXISTING GAS, ELECTRICITY, TELSTRA

— RM — X — RM — X — RM — X — RM — X —	DEMOLISH RISING MAIN
— S — X — S — X — S — X — S — X —	DEMOLISH SEWER
— SW — X — SW — X — SW — X — SW — X —	DEMOLISH STORMWATER
— SS — X — SS — X — SS — X — SS — X —	DEMOLISH SUBSOIL
— W — X — W — X — W — X — W — X —	DEMOLISH WATER
— OIL — X — OIL — X — OIL — X — OIL — X —	DEMOLISH OIL
— F — X — F — X — F — X — F — X —	DEMOLISH FUEL
— HV — X — HV — X — HV — X — HV — X —	DEMOLISH HIGH VOLTAGE ELECTRICITY
— E — X — E — X — E — X — E — X —	DEMOLISH UNDERGROUND ELECTRICITY
— E — X — E — X — E — X — E — X —	DEMOLISH OVERHEAD ELECTRICITY
— L — X — L — X — L — X — L — X —	DEMOLISH LIGHTING
— G — X — G — X — G — X — G — X —	DEMOLISH GAS
— P — X — P — X — P — X — P — X —	DEMOLISH PIPELINE
— T — X — T — X — T — X — T — X —	DEMOLISH TELSTRA
— C — X — C — X — C — X — C — X —	DEMOLISH COMMUNICATIONS

BK(A)	BARRIER KERB (A)
BK(B)	BARRIER KERB (B)
BK(C)	BARRIER KERB (C)
MK(D)	MOUNTABLE KERB (D)
SMK(C)	SEMI MOUNTABLE KERB (C)
ER(E)	EDGE RESTRAINT (E)
KER(F)	KERB EDGE RESTRAINT (F)
RK&C(H)	ROLL TOP KERB & CHANNEL (H)
BK&C(J)	BARRIER KERB & CHANNEL (J)
ERH	KERB EDGE RESTRAINT (HIGH)
ERL	KERB EDGE RESTRAINT (LOW)
CS(K/L)	CHANNEL SECTION (K/L)
PMB	PRECAST MOTOR BED
DD	DISH DRAIN
K&G	KERB AND GUTTER
K&T	KERB AND TOE
KO	KERB ONLY
MK	MOUNTABLE KERB
RK	ROLL KERB
	EXISTING SIGN
	PROPOSED SIGN
	PROPOSED ROAD EDGE GUIDE POST
	EXISTING BIN
	EXISTING BIN
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● PP	POWER POLE
⚡ PP	POWER POLE WITH LIGHT
⚡ LP	LIGHT POLE
● SP	STAY POLE
⚡	LIGHT POLE WITH EXTENSION
E	ELECTRICAL INSPECTION BOX
⚡	ELECTRICAL POLE
⚡	ELECTRICAL TURRET
DOTS	TRAFFIC SIGNAL
MRD	MAIN ROADS PIT
○	TANGENT POINT
KRD	KERB RETURN NO.
PRAM	PRAM RAMP
GRAVEL ROCK CHECK DAM	
MESH & GRAVEL INLET FILTER	
STORMWATER INLET FILTER	
DIRECTION OF OVERLAND FLOW	
VEHICLE SHAKEDOWN	
GATE	
NOT IN SCOPE OF WORKS	
DEMOLITION	
PROPOSED CONCRETE FOOTPATH	
SCOUR PROTECTION	
TREES	
TADPOLE	

Project: M38 INDUSTRIAL
PARK YATALA

Site Address:
60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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Lot:	501
Plan:	SP295994
Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RL:	-

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LEGEND

A	20-12-2019	ORIGINAL ISSUE	JRG	MG
Issue	Date	Description	DRN	CHK

NOT APPLICABLE

Scale at A1: NOT APPLICABLE

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
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Drawing No:	Rev. No:
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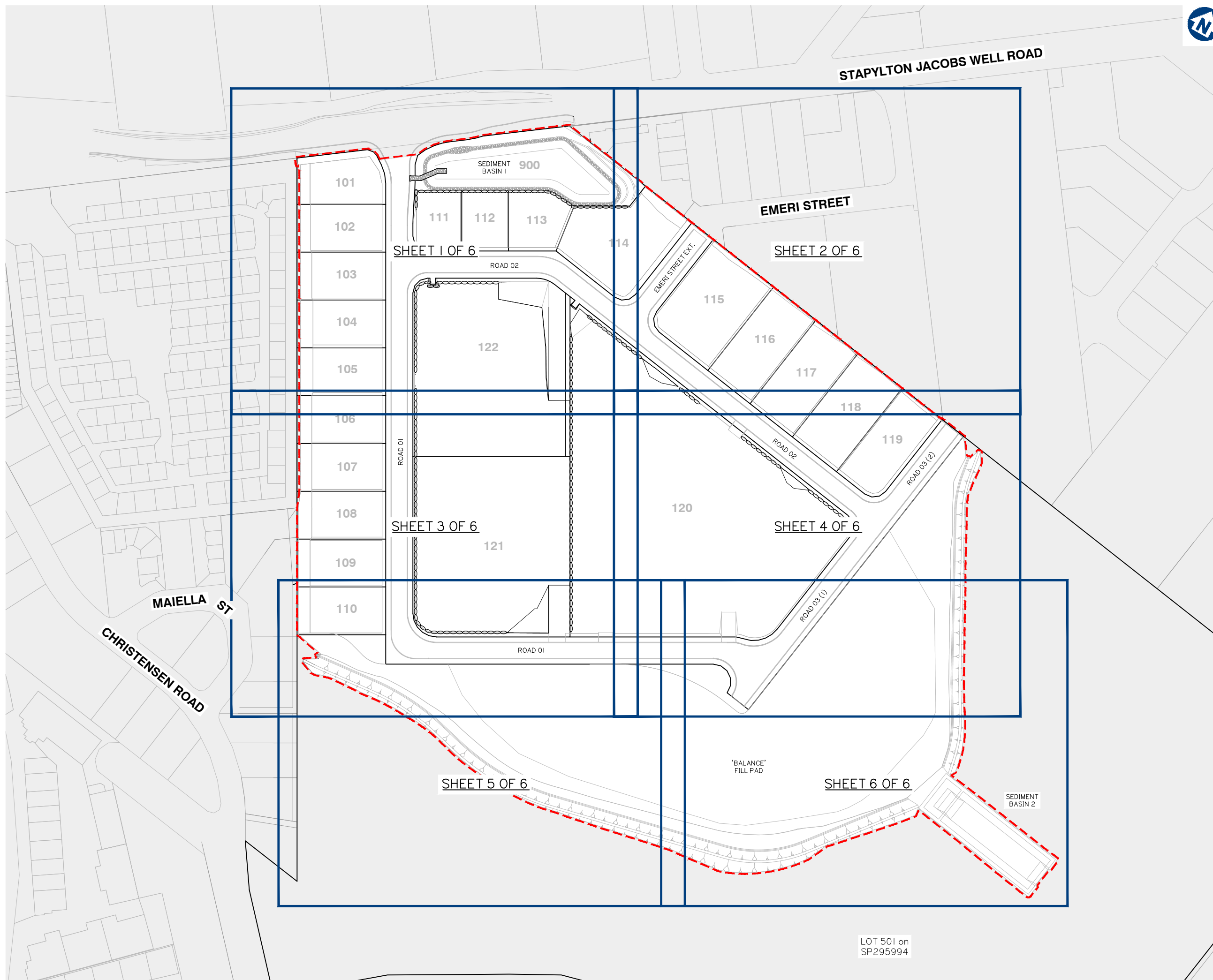
KEY PLAN LAYOUT

A	20-12-2019		ORIGINAL ISSUE	JRG	MG
Issue	Date		Description	DPR	CH

Scale	Number of Pages
1:1500 (FULL SIZE A1)	60
1:3000 (HALF SIZE A3)	90
1:6000 (QUARTER SIZE A4)	120

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Drafted:	JRG
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5941 ENG BE1 005	A



KEY PLAN LAYOUT



Client:



Project:

M38 INDUSTRIAL PARK YATALA
Site Address: 60 STAPYLTON JACOBS WELL ROAD, STAPYLTON QLD 4207

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DRAWING TITLE

EXISTING SURFACE AND
FEATURE PLAN

				</

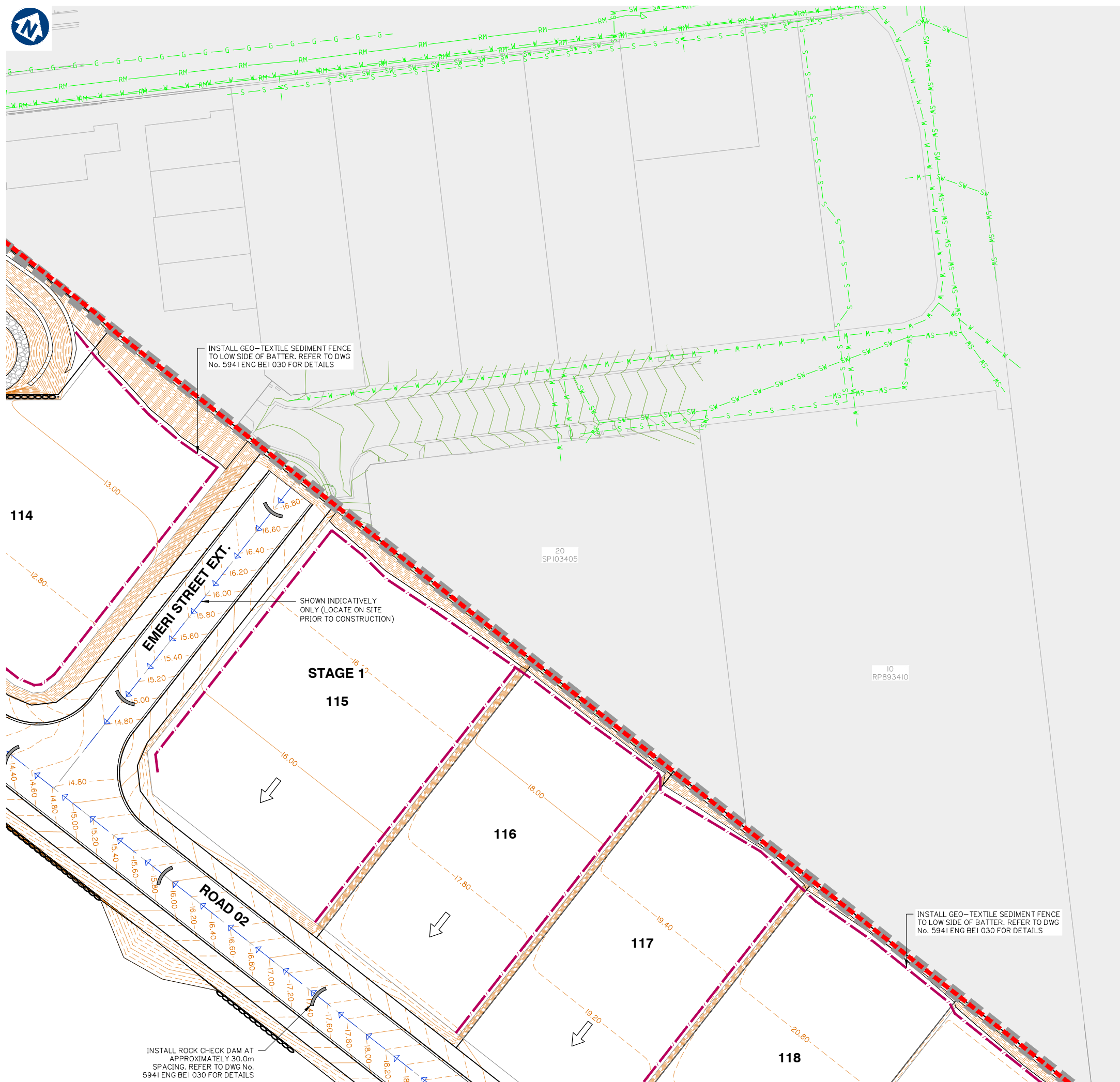
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1:1500 (FULL SIZE A1)
1:3000 (HALF SIZE A3)

Scale at A1:	1:1500
Designed:	IG
Drafted:	JRG
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Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 010	A



1. SEDIMENT AND EROSION CONTROL PLAN IS INDICATIVE ONLY. THE CONTRACTOR MUST TAKE ADDITIONAL MEASURES IF REQUIRED ONSITE DURING CONSTRUCTION AND MAINTENANCE PERIODS.
2. CONTRACTOR EROSION AND SEDIMENT CONTROL PLAN SHOULD COMPLY WITH ALL COUNCIL AND STATE REQUIREMENTS AND BE IN LINE WITH IECA BEST PRACTICE GUIDELINES.
3. CONTRACTOR TO OBTAIN SEDIMENT AND EROSION CONTROL PLAN APPROVAL FROM RELEVANT AUTHORITY BEFORE THE COMMENCEMENT OF WORKS.
4. CONTRACTOR TO CONSTRUCT CATCHMENT /VEE DRAINS TOWARDS THE PROPOSED SEDIMENT BASINS DURING EARTHWORKS PHASE.

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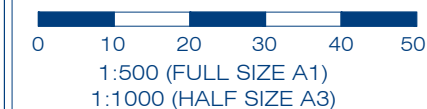
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DRAWING TITLE
SEDIMENT AND
EROSION CONTROL
PLAN SHEET 2 OF 6

[illegible]

SCALE IN METRES



Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

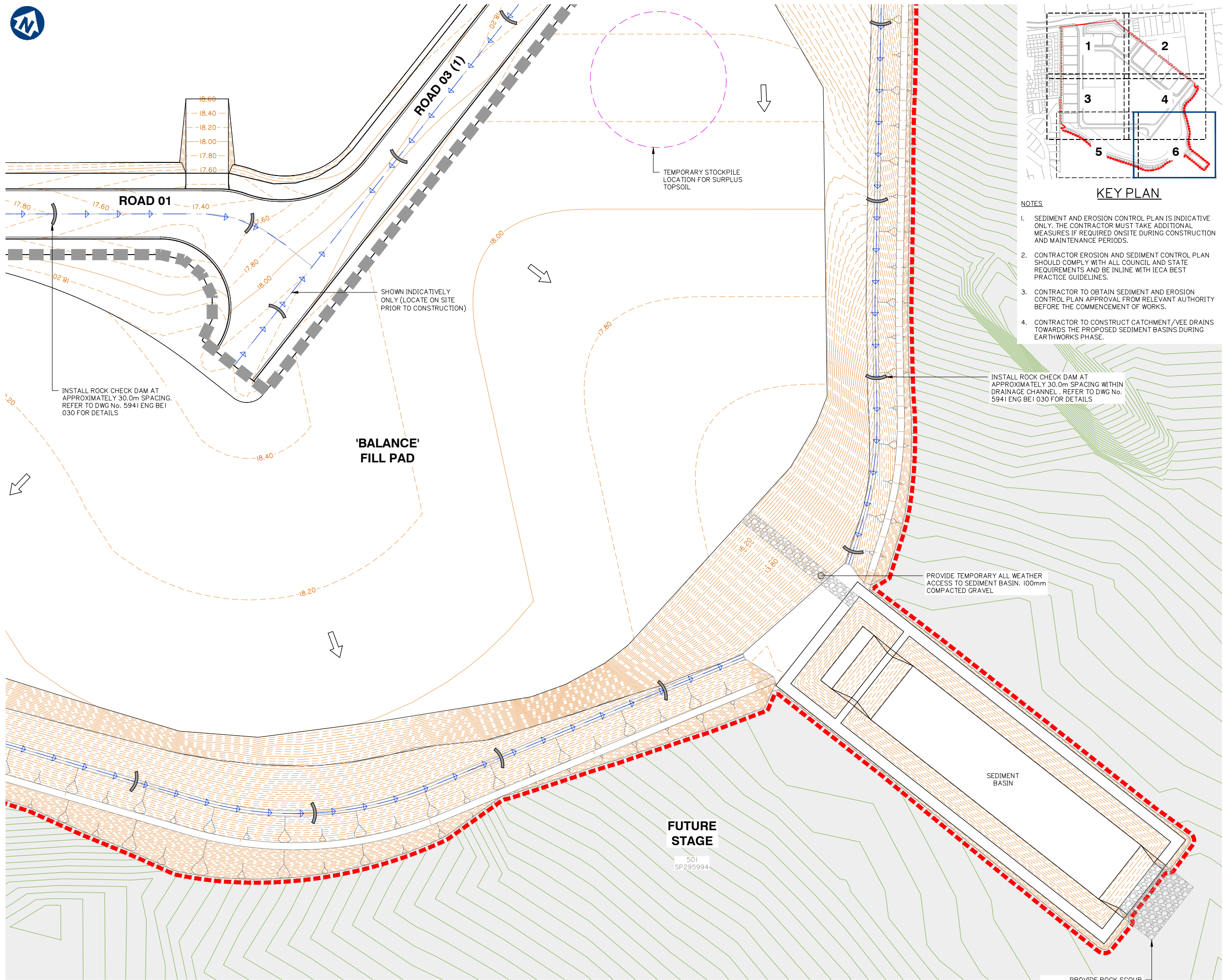
Drawing No:
5941 ENG BE1 021

Rev. No:
A









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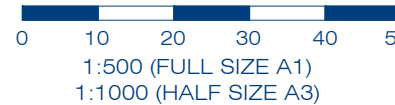
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DRAWING TITLE
SEDIMENT AND
EROSION CONTROL
PLAN SHEET 6 OF 6

A Issue	20-12-2019 Date		ORIGINAL ISSUE Description	JRG DRN

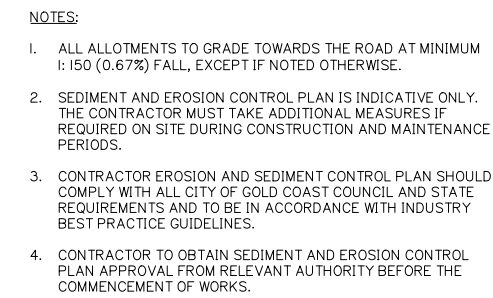
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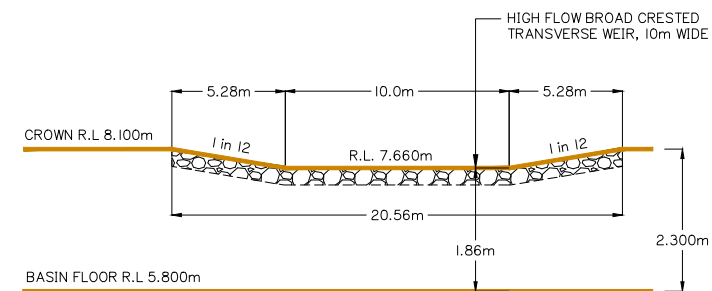
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Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 025	A



BASIN I – DESIGN PARAMETERS	
I (1 YEAR, 120hr)	1.46
K1	33.5
K2	14.2
R (Y%, 5-DAY)	63.11
C _v	0.29
A (Ha)	15.071
SETTLING ZONE VOLUME (V _s)	2758
SEDIMENT ZONE VOLUME (V _{sed})	1379

BASIN I – DESIGN RESULTS			
SEDIMENT ZONE		SETTLING ZONE	
I: 3 BATTER CALC		I: 3 BATTER CALC	
INPUT NOMINATED BASIN BASE AREA	2886	INPUT NOMINATED BASIN AREA	3351
INPUT NOMINATED SEDIMENT HEIGHT	0.47	INPUT NOMINATED SETTLING HEIGHT	0.78
INPUT OUTSIDE BOUNDARY LENGTH OF BASIN	326	INPUT OUTSIDE BOUNDARY LENGTH OF BASIN	335
SEDIMENT VOLUME CHECK, V_{sed}	1464	SETTLING VOLUME CHECK, V_s	2920



3.0m

1:2 (MAX)

1:3 (MAX)

150mm THICK BASE COURSE GRAVEL (CLASS IB CBR 60) PROVISIONAL 300mm THICK CBR 15 REPLACEMENT



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Project:

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Site Address:

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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 1
LAYOUT

A	20-12-2019	ORIGINAL ISSUE	JRG	MG
Issued by:	Date:	Description:	(DR)	(CR)

SCALE IN METRES



Scale at A1:	1:500
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Designed:	IG
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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 1
SECTIONS

A	20-12-2019			JRG	MG
Issue	Date	Description		DRN	CHI

NOT TO SCALE

Scale at A1:	NTS
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Designed:	IG
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Drafted:	JRG
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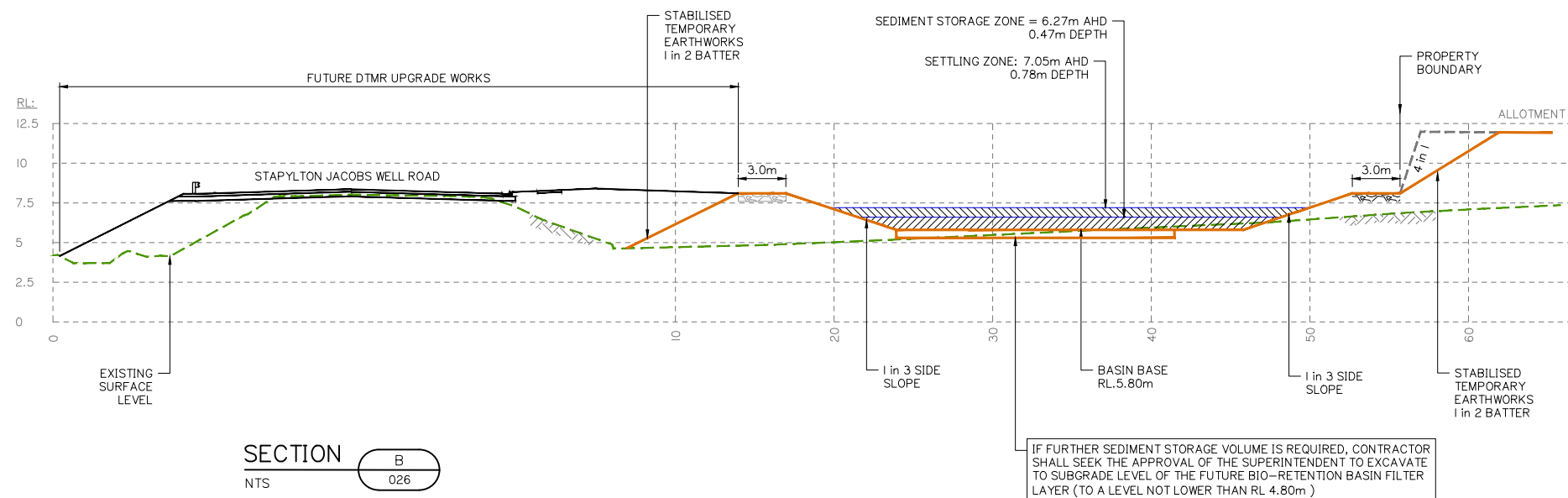
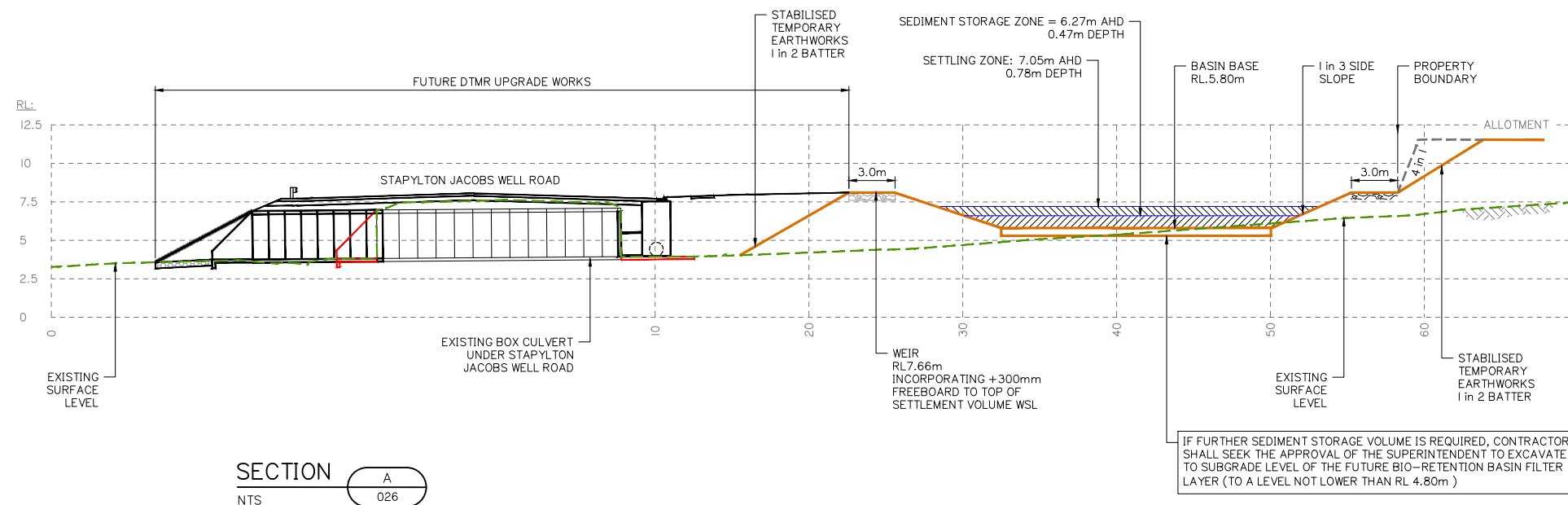
Approved:	MG
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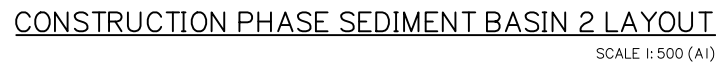
RPEQ:	1693
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Signed:	
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Date:	20-12-2019
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Drawing No:	Rev. No:
5941 ENG BE1 027	A





	SPILLWAY										
BASIN ID	BASIN DESIGN LIFE	DESIGN ARI	C ₀	C	t _c	I	Q	HEAD OVER SPILLWAY	SPILLWAY CREST LENGTH	SPILLWAY CREST RL	MIN EMBANKMENT RL
		yr				(mm/hr)	(m ³ /s)	(m)	(m)	(m)	(m)
No. >	> 12 MONTHS	1: 50	0.88	1.01	25.00	143.00	4.81	0.28	19.10	9.81	10.54

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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 2
LAYOUT

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MG CHK

SCALE IN METRES



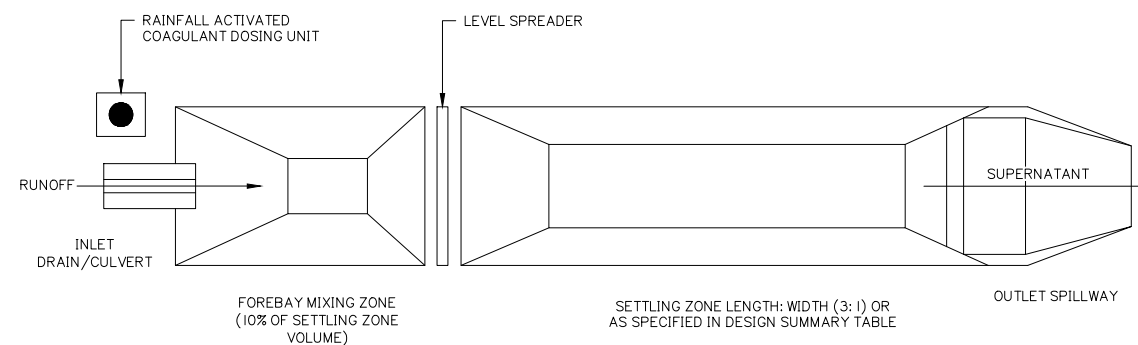
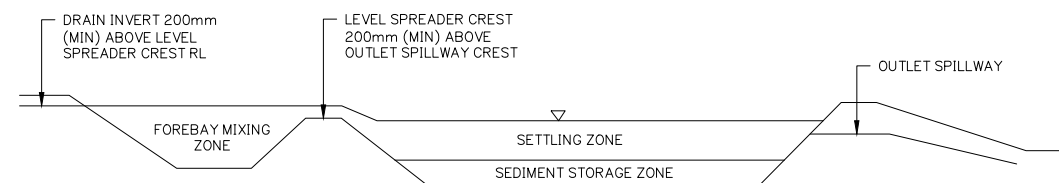
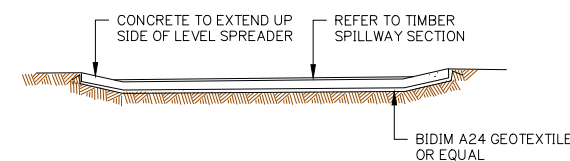
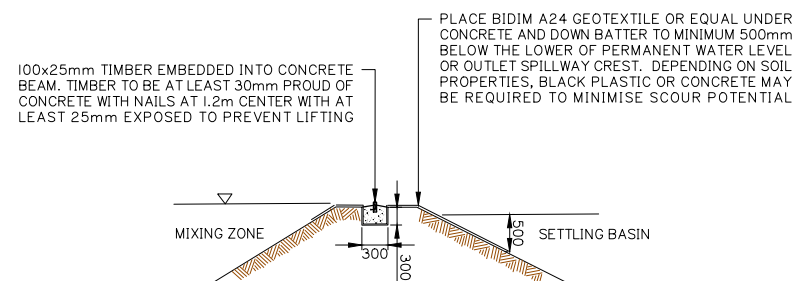
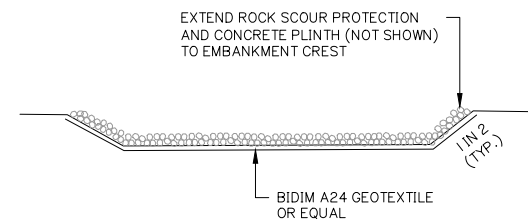
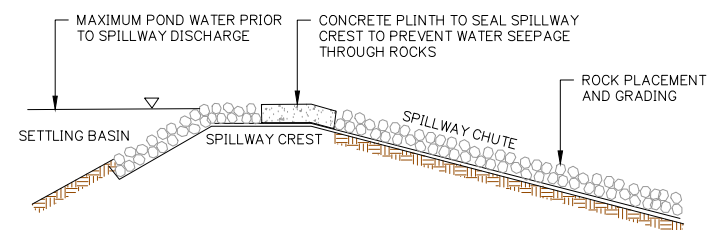
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1:1000 (HALF SIZE A3)

Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
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RPEQ:	16939
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5941 ENG BE1 028

Rev. No:
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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 2
SECTIONS

A	20-12-2019		ORIGINAL ISSUE	JRG MG
Issue Date			DPR CH	

SCALE IN METRES

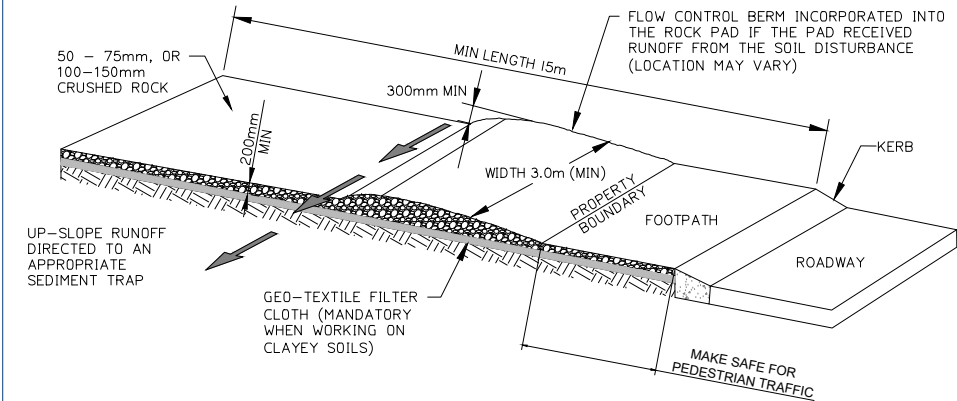


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Scale at A1: 1:500

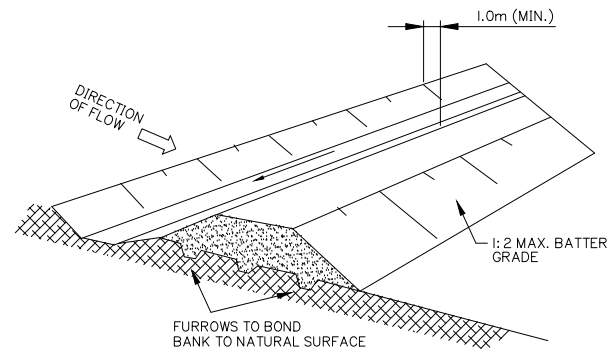
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Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 029	A



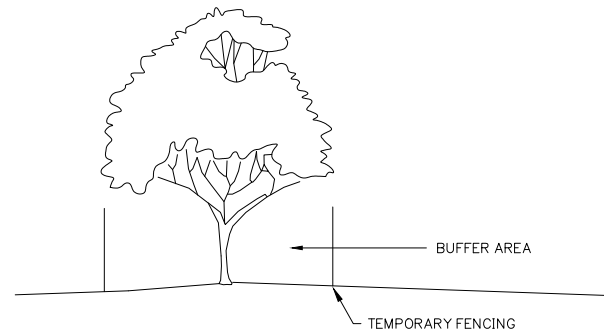
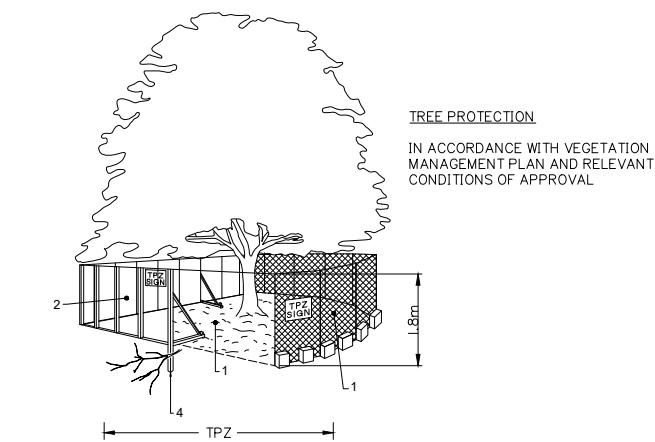
ENTRY/EXIT PAD FOR CONSTRUCTION SITE

NOT TO SCALE



DIVERSION DRAIN

NOT TO SCALE



FENCING AS PER AS: 4970

1. CHAIN WIRE MESH PANELS WITH SHADE CLOTH (IF REQUIRED) ATTACHED, HELD IN PLACE WITH CONCRETE FEET.
2. ALTERNATIVE PLYWOOD OR WOODEN PALING FENCE PANELS. THIS FENCING MATERIAL ALSO PREVENTS BUILDING MATERIALS OR SOIL ENTERING THE TPZ.
3. MULCH INSTALLATION ACROSS SURFACE OF TPZ (AT THE DISCRETION OF THE PROJECT ARBORIST.) NO EXCAVATION, CONSTRUCTION ACTIVITY, GRADE CHANGES, SURFACE TREATMENT OR STORAGE OF MATERIALS OF ANY KIND IS PERMITTED WITHIN THE TPZ.
4. BRACING IS PERMITTED WITHIN THE TPZ. INSTALLATION OF SUPPORTS SHOULD AVOID DAMAGING ROOTS.
5. THE CONSTRUCTION CONTRACTOR IS NOT TO UNDERTAKE ANY PRUNING OF TREES. TREE MANAGEMENT IS TO BE UNDERTAKEN BY A SUITABLY QUALIFIED ARBORIST.
6. NO STOCKPILE/S ARE PERMITTED WITHIN THE ZONE OF ANY RETAINED VEGETATION WITHOUT SUPERVISION AND AUTHORIZATION OF THE SUPERVISING ARBORIST.
7. NO CLEARING OF PROTECTED SIZE VEGETATION IS TO OCCUR WITHOUT APPROVAL FROM LOGAN CITY COUNCIL.

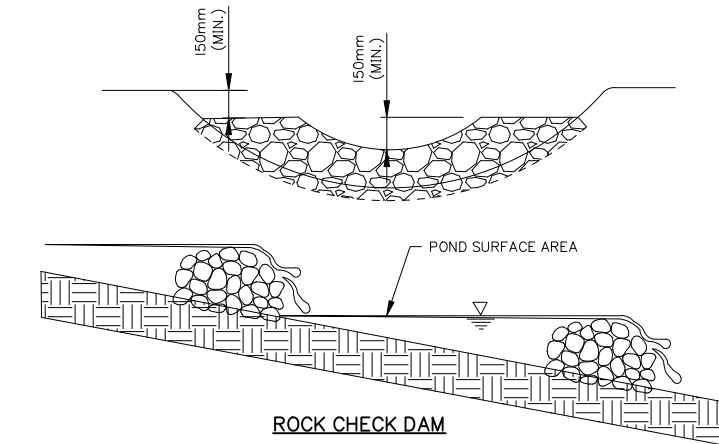
DETERMINING THE TPZ

THE RADIUS OF THE TPZ IS CALCULATED FOR EACH TREE BY MULTIPLYING ITS DBH X 12 = TRUNK DIAMETER MEASURED AT 1.4M ABOVE GROUND. RADIUS IS MEASURED FROM THE CENTRE OF THE STEM AT GROUND LEVEL.

A TPZ SHOULD NOT BE LESS THAN 2M NOR GREATER THAN 15M (EXCEPT WHERE CROWN PROTECTION IS REQUIRED). THE TPZ OF PALMS, OTHER MONOCOTS, CYCADS AND TREE FERNS SHOULD NOT BE LESS THAN 1M OUTSIDE THE CROWN PROJECTION.

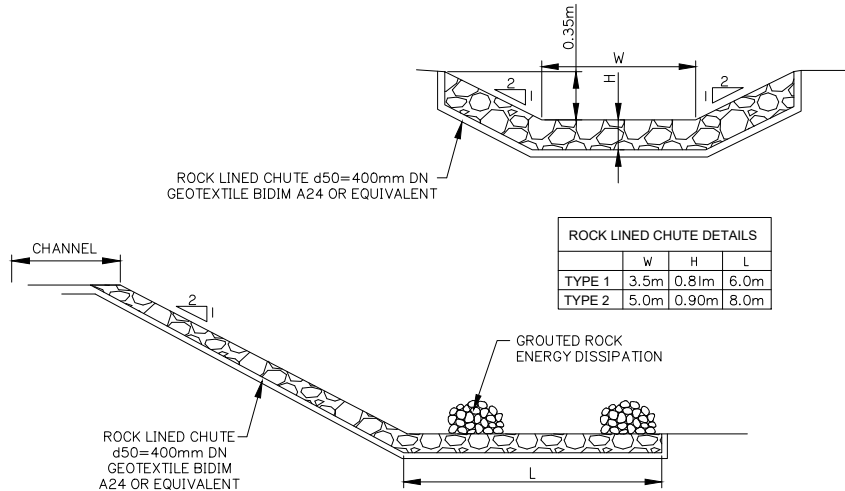
PROTECTIVE FENCING

NOT TO SCALE



ROCK CHECK DAM

NOT TO SCALE

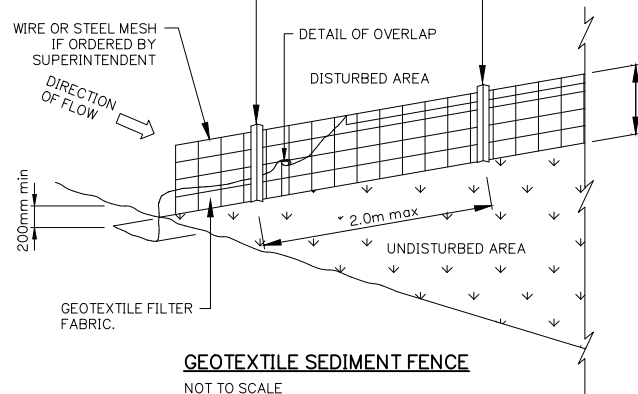


ROCK LINED CHUTE

NOT TO SCALE

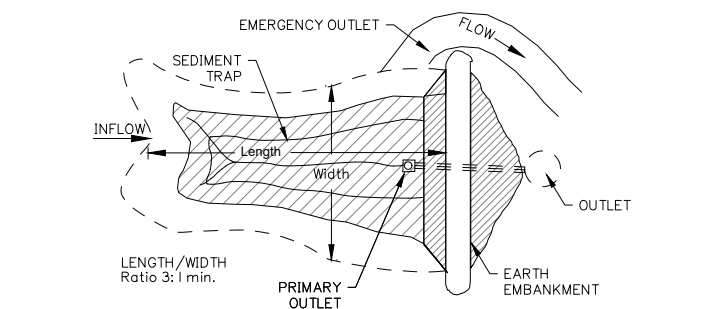
	W	H	L
TYPE 1	3.5m	0.81m	6.0m
TYPE 2	5.0m	0.90m	8.0m

DRAINAGE AREA 0.6ha. MAX.
SLOPE GRADIENT 1:2 MAX.
SLOPE LENGTH 60m MAX.



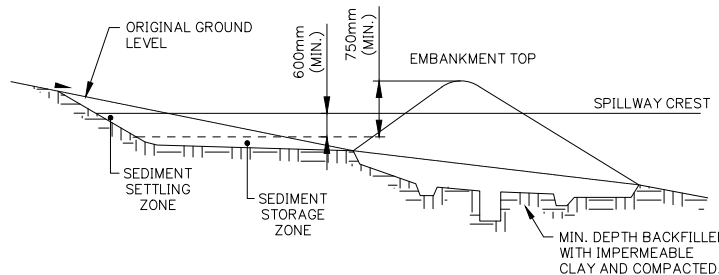
GEOTEXTILE SEDIMENT FENCE

NOT TO SCALE



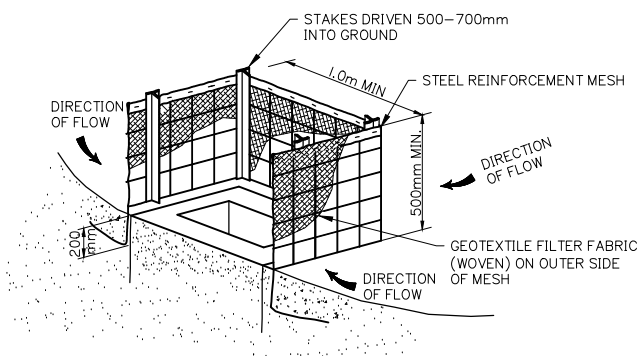
TYPICAL SEDIMENT BASIN

NOT TO SCALE



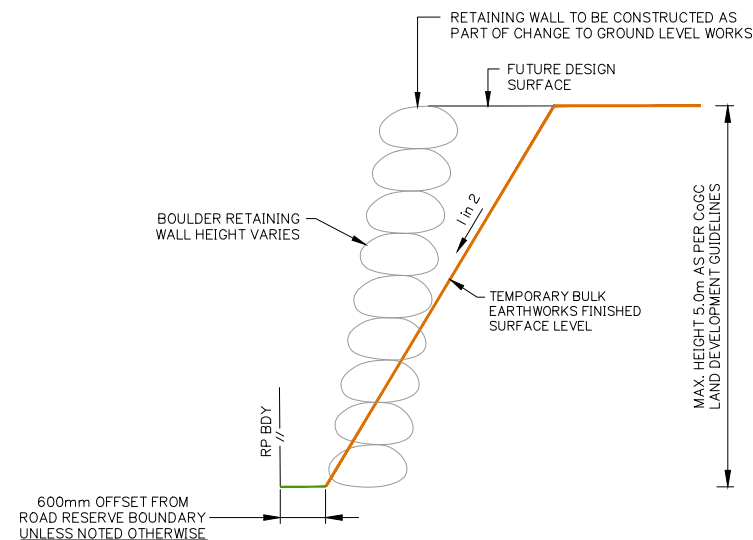
TYPICAL SECTION VEE DRAIN

NOT TO SCALE



STORMWATER INLET - SEDIMENT TRAP

NOTE:
FOURTH SIDE OF TRAP NOT SHOWN FOR CLARITY



TEMPORARY BATTER LOCATION FOR RETAINING WALLS

NOT TO SCALE

Client:

Project:

M38 INDUSTRIAL PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO BE PRINTED IN COLOUR

RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
RL: -

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DRAWING TITLE

SEDIMENT AND EROSION TYPICAL DETAILS

Issue	Date	Description	JRG	MG
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

SCALE IN METRES

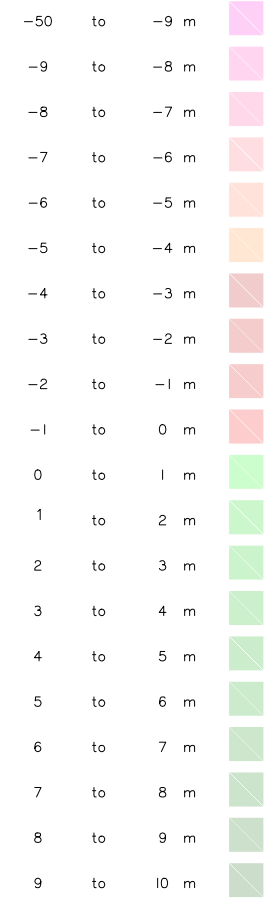
NOT APPLICABLE

Scale at A1:

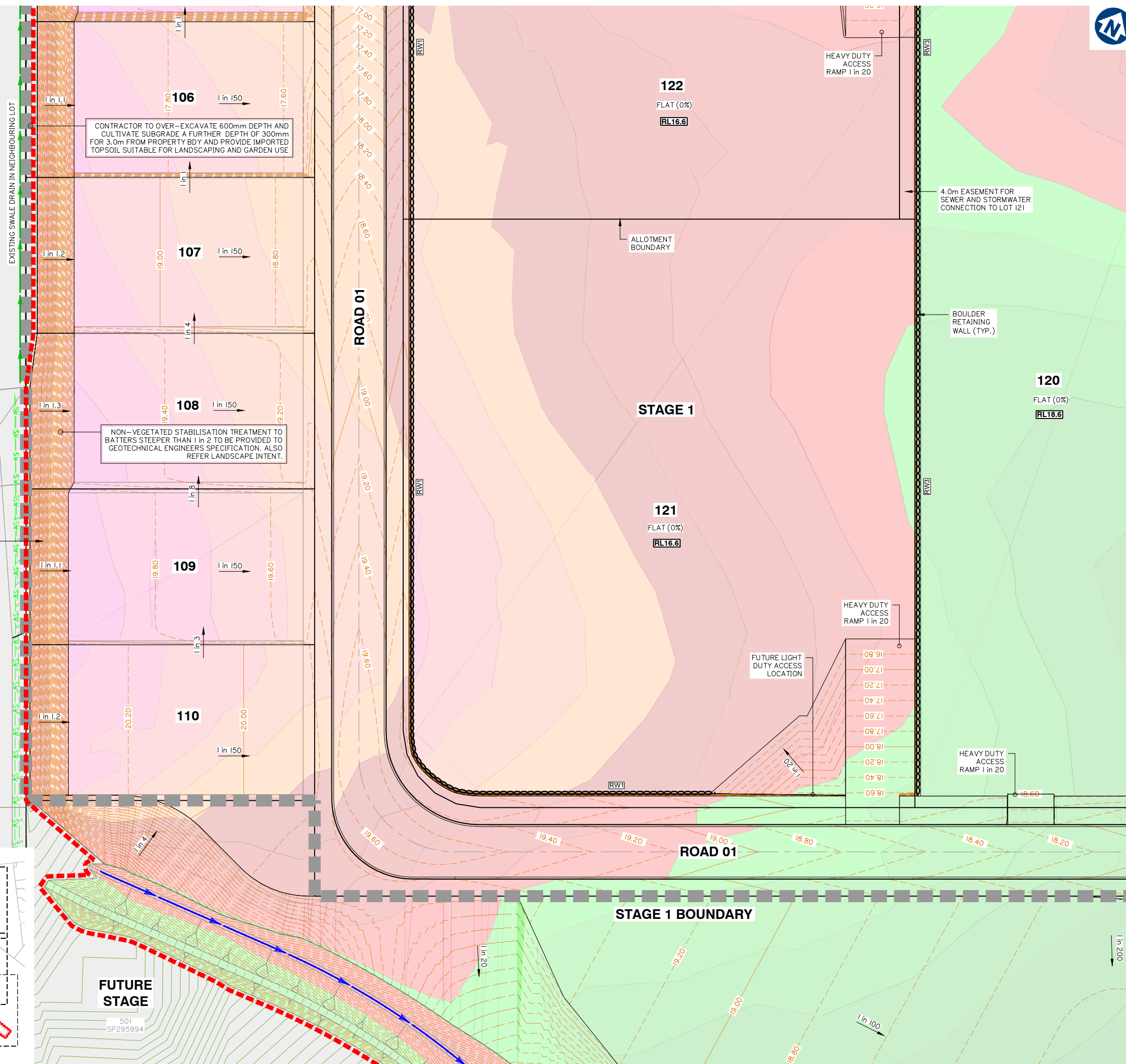
NOT APPLICABLE

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	<i>Michael</i>
Date:	20-12-2019

Drawing No: 5941 ENG BE1 030 Rev. No: A



1. EARTHWORKS VOLUMES ARE CALCULATED TO THE UNDERSIDE OF BASIN FILTER MEDIA / DRAINAGE LAYERS (–1.0m FROM IL / FLOOR OF BASIN)
2. EARTHWORKS VOLUMES ARE CALCULATED TO THE STRIPPED SURFACE (i.e. 0.100m OF TOPSOIL REMOVED OVER THE TOTAL FOOTPRINT OF EARTHWORKS EXTENT)
3. EARTHWORKS VOLUMES ARE CALCULATED TO PAVEMENT SUBGRADE LEVEL ASSUMING –.440m IN CUT AREAS AND –0.290m IN FILL AREAS.
4. A 10% BULKING FACTOR HAS BEEN APPLIED TO THE ACCUMULATIVE EXCAVATION (CUT) VOLUME AT DEPTHS 5.0m OR GREATER
5. RETAINING WALLS DO NOT EXCEED 5.0m IN HEIGHT, AND ARE NOT BENCHED / TIERED



A	20-12-2019	ORIGINAL ISSUE	JRG	MQ
log up	Date	Description	DRN	OZK

1:500 (FULL SIZE A1)

1:1000 (HALF SIZE A3)

Scale at A1:	1:500
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Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 052	A



Client



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Projects

M38 INDUSTRIAL
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Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
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DRAWING TITLE

BULK EARTHWORK CUT &
FILL LAYOUT PLAN SHEET
5 OF 6

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MCH

SCALE IN METRES



1:500 (FULL SIZE A1)
1:1000 (HALF SIZE A3)

Scale at A1: 1:500

Designed:	IG
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Drafted:	JRG
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Approved:	MG
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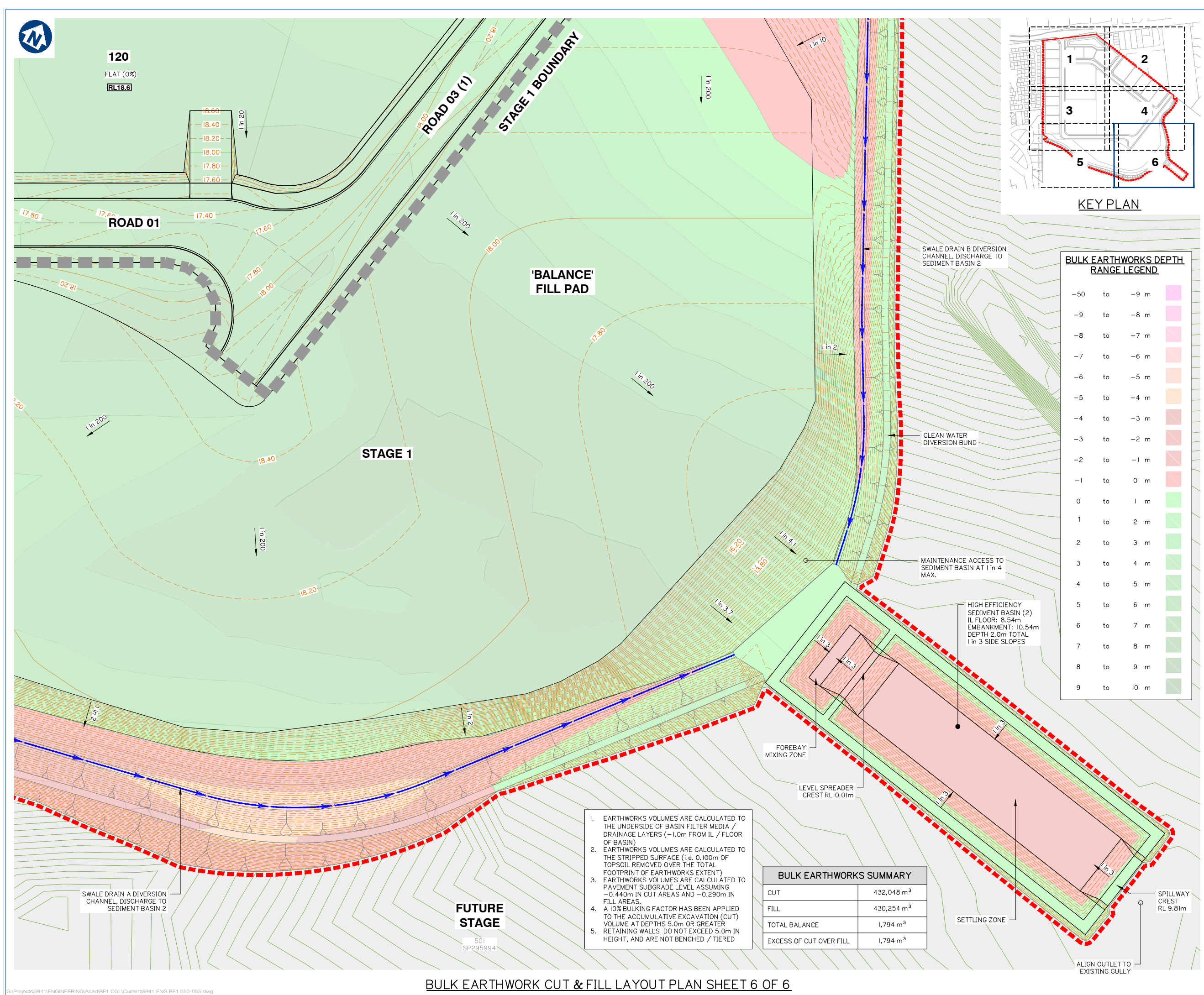
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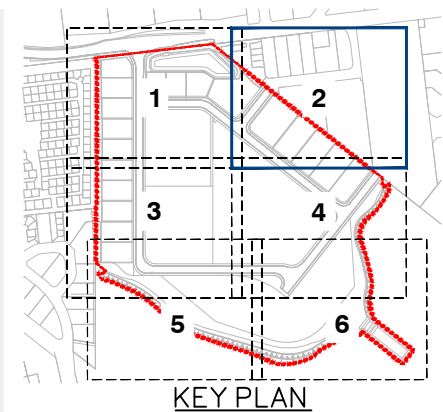
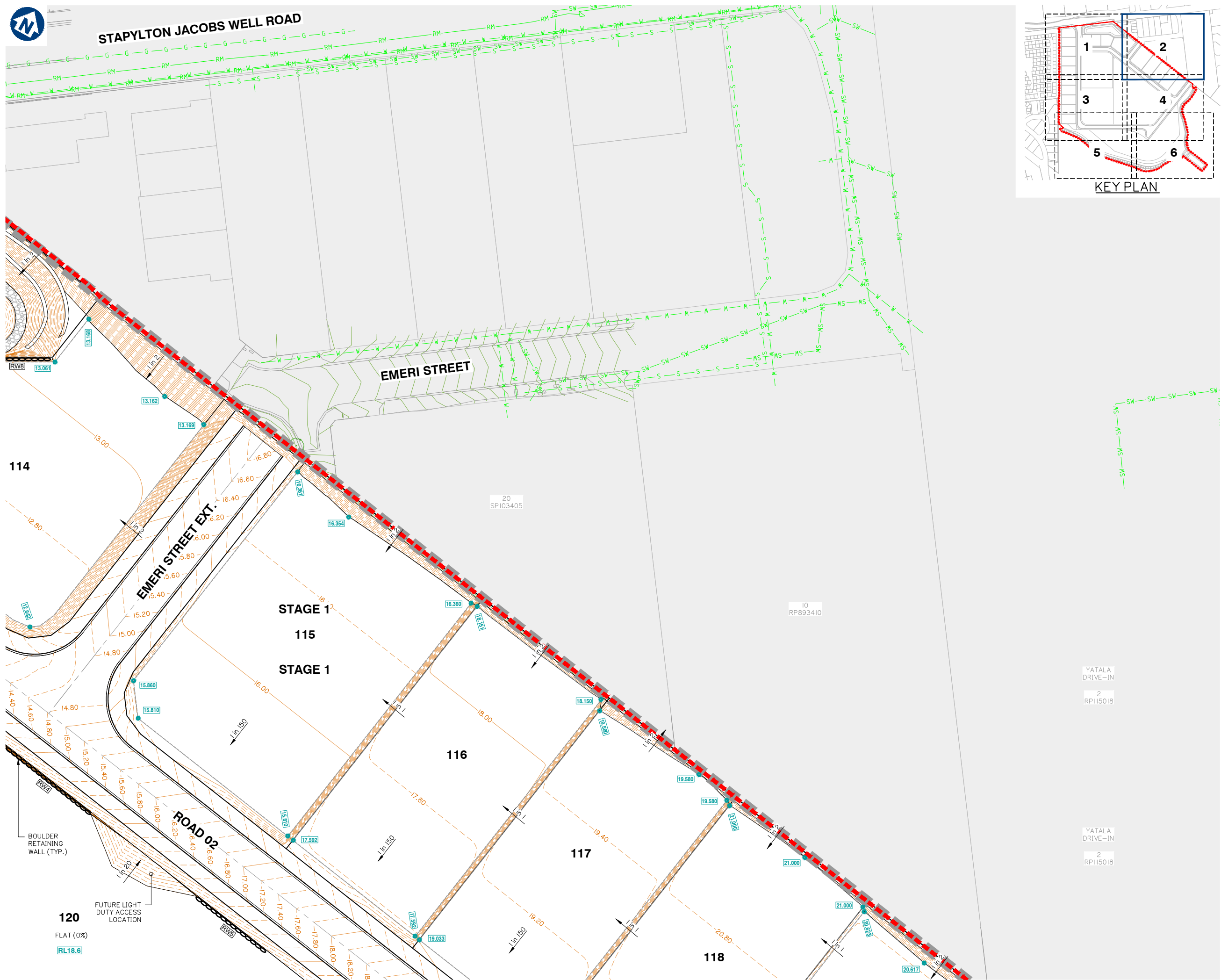
Signed: 

Date: 20-12-2019

Drawing No:
5941 ENG BE1 054

Rev. No:
A





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Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

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ROAD, STAPYLTON QLD 4207

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RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
RL: -

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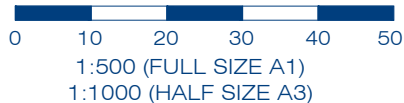
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DRAWING TITLE

FINISHED BULK
EARTHWORKS SURFACE
LEVEL PLAN SHEET 2 OF 6

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MG CHI

SCALE IN METRES



Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 101

Rev. No:
A



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RPD:
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 DSM: -
 L: -

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DRAWING TITLE

FINISHED BULK
EARTHWORKS SURFACE
LEVEL PLAN SHEET 3 OF 6

20-12-2019	ORIGINAL ISSUE		JRG
Date	Description		DRN

SCALE IN METRES

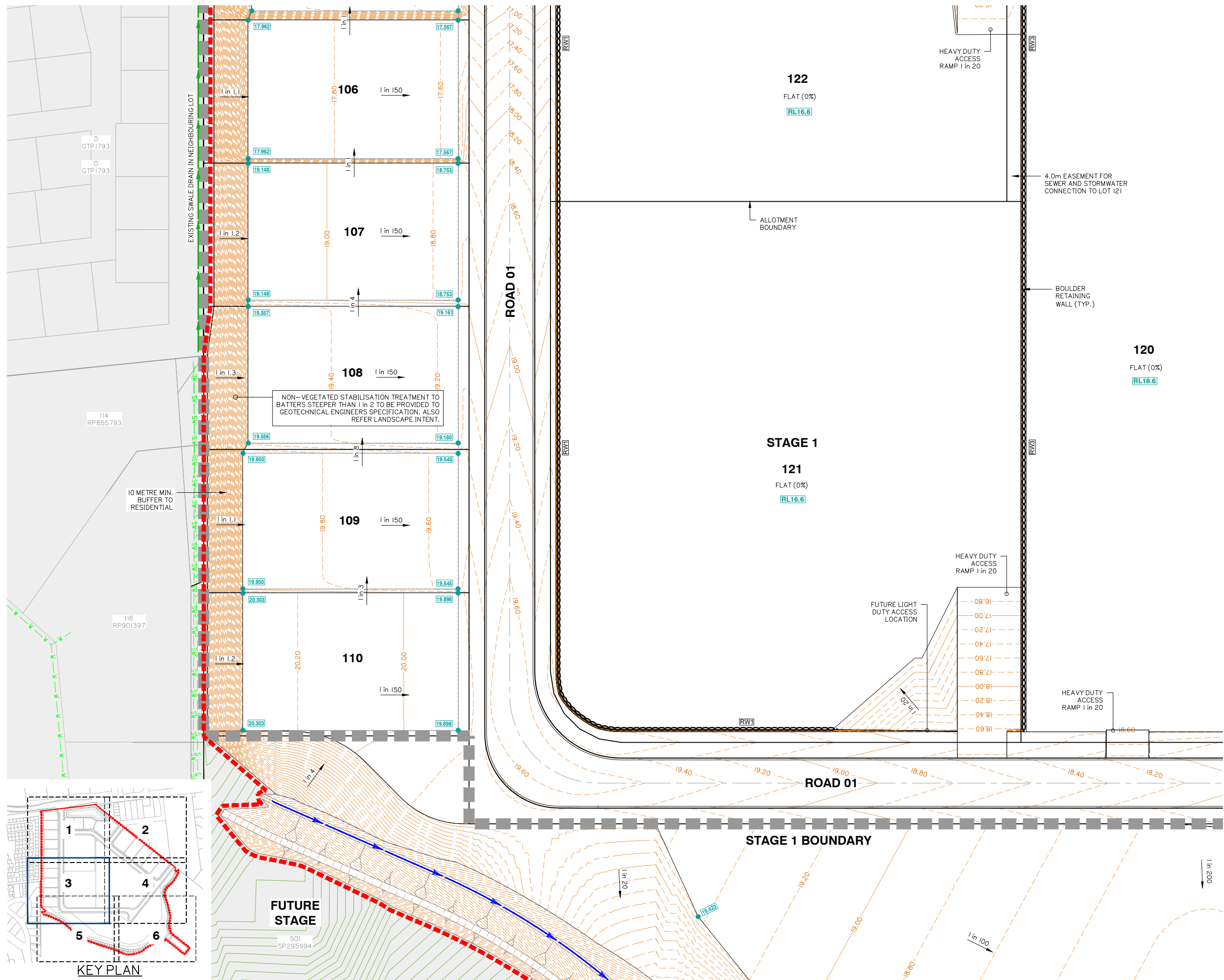


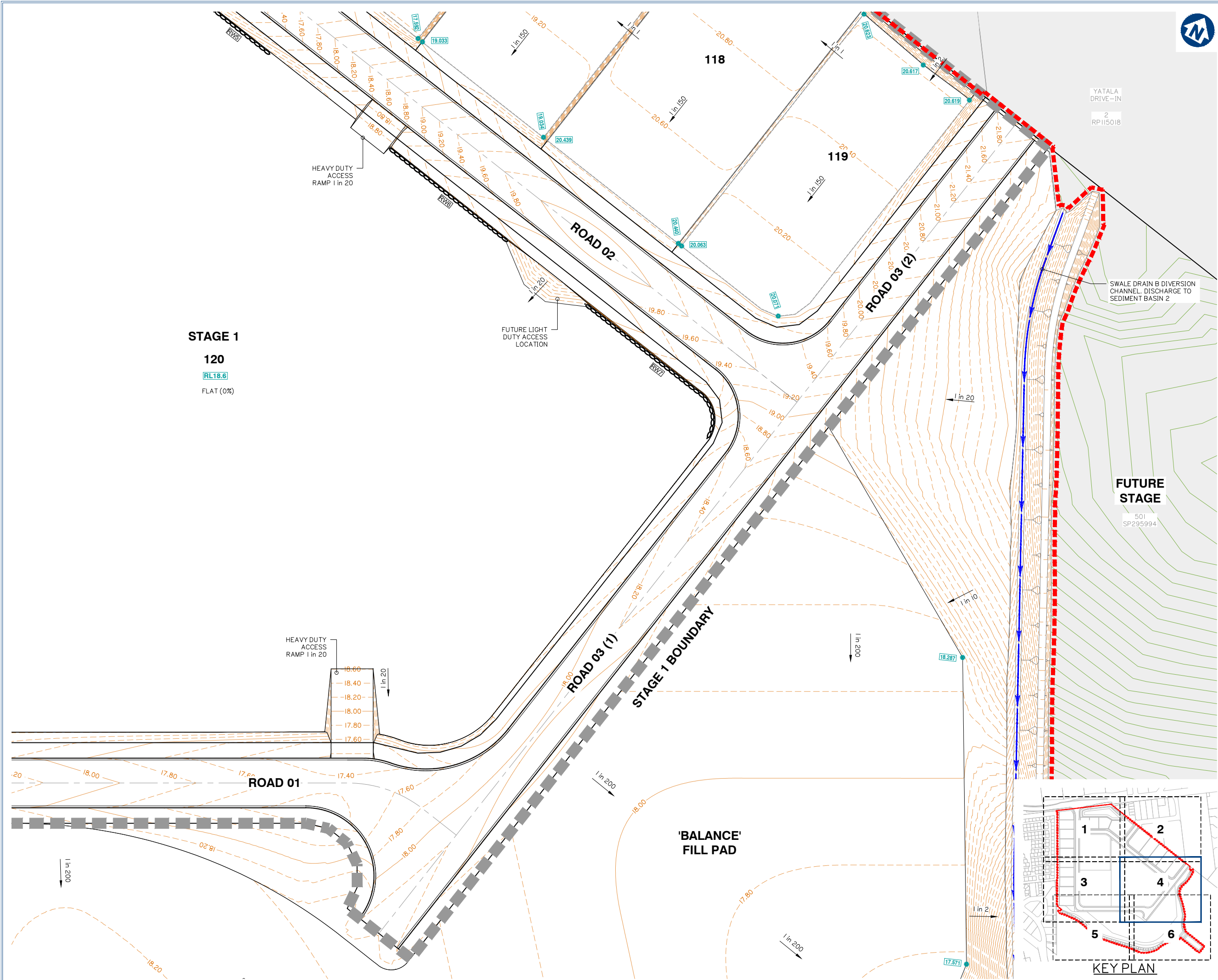
10 20 30 40 50

1:500 (FULL SIZE A1)
1:1000 (HALF SIZE A3)

Scale at A1:	1:500
Designed:	IG
Drafted:	JRG
Approved:	MG
PEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. N
041 ENG BE1 102	A





Client:



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PARK YATALA

Site Address:

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ROAD, STAPYLTON QLD 4207

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RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
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Level Datum: AHD
Meridian: -
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RL: -

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DRAWING TITLE
FINISHED BULK
EARTHWORKS SURFACE
LEVEL PLAN SHEET 4 OF 6

Issue	Date	Original Issue Description	JRG DRN	MG CHK
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

SCALE IN METRES



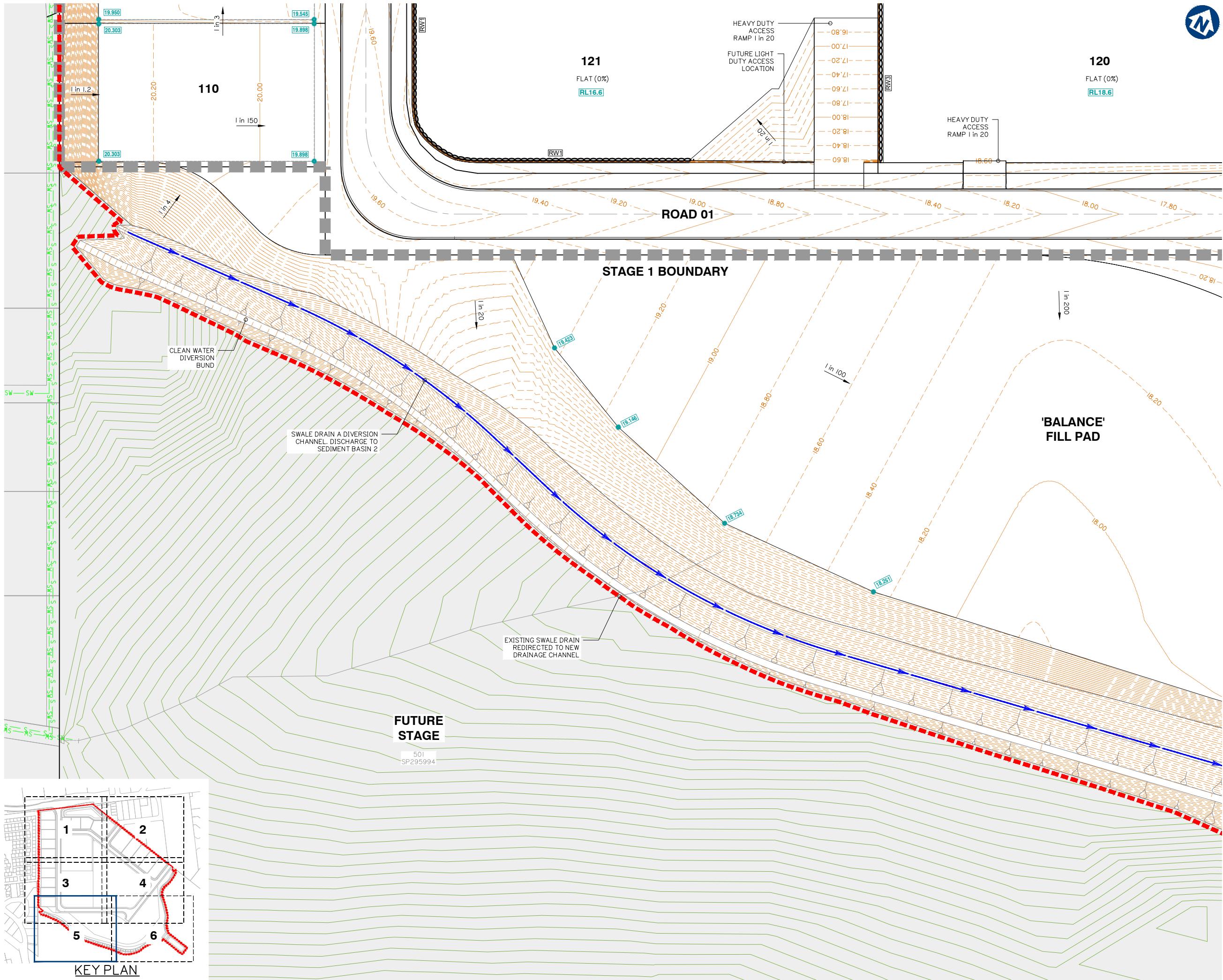
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1:1000 (HALF SIZE A3)

Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 103

Rev. No:
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Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
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Level Datum: AHD
Meridian: -
Contour interval: -
PSM: -
RL: -

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DRAWING TITLE
FINISHED BULK
EARTHWORKS SURFACE
LEVEL PLAN SHEET 5 OF 6

Issue	Date	Original Issue Description	JRG DRN	MG CHK
A	20-12-2019	ORIGINAL ISSUE		

SCALE IN METRES



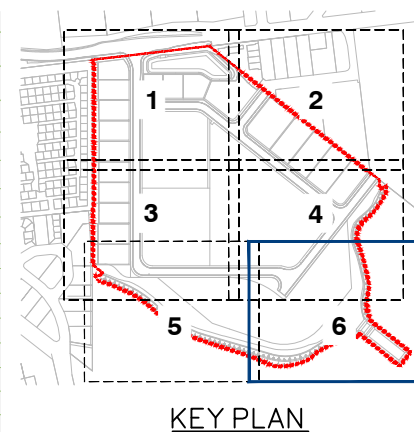
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1:1000 (HALF SIZE A3)

Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 104

Rev. No:
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M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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RPD:

Lot:	501
Plan:	SP295994
Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RL:	-

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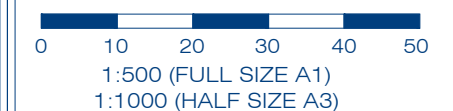
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DRAWING TITLE

FINISHED BULK
EARTHWORKS SURFACE
LEVEL PLAN SHEET 6 OF 6

A	20-12-2019	ORIGINAL ISSUE	JRG	MQ
Issue Date			DRN	OZIK

SCALE IN METRES



Scale at A1:	1:500
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Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 105	A





Site Address:
60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

RPD:
 Lot: 501
 Plan: SP295994
 Local Authority: CITY OF GOLD COAST
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 Level Datum: AHD
 Meridian: -
 Contour Interval: -
 DSM: -
 L: -

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DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
3 OF 11

[illegible]

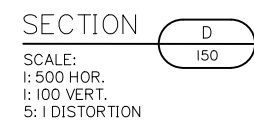
Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
PEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. N
041 ENG BE1 152	A



FINISHED EARTHWORKS CROSS SECTIONS SHEET 3 OF 11



A	20-12-2019	ORIGINAL ISSUE	JRG	MG
Issue	Date	Description	DRN	CHK

SCALE IN METRES

Scale 1:500 - Lengths are in Metres.

HOZ:

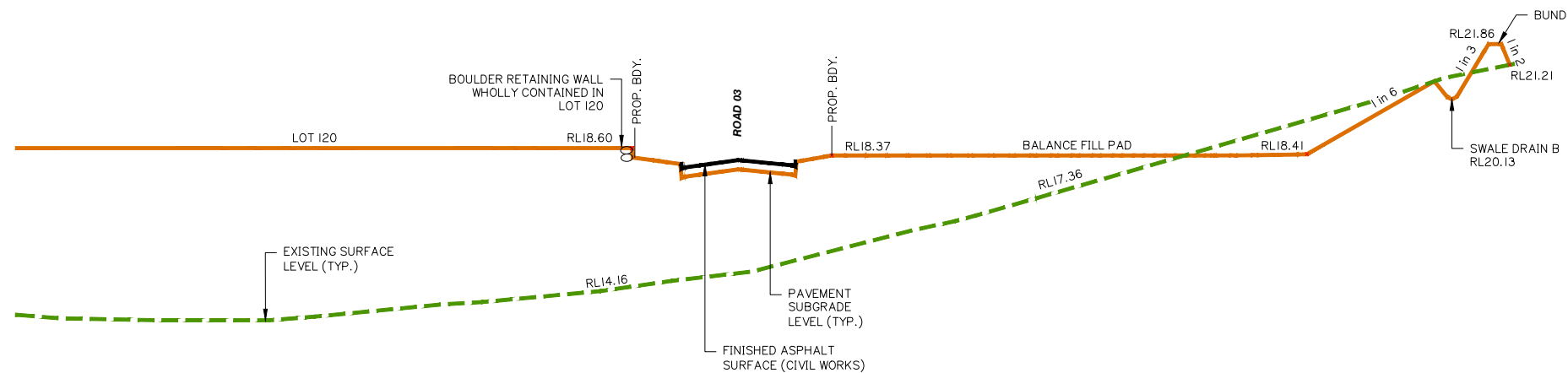
Scale 1:100 - Lengths are in Metres.

VERT: 

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 153	A



SECTION E
150

SCALE:
1: 500 HOR.
1: 100 VERT.
5: 1 DISTORTION



Client:



Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL

Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RI :	-

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DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
5 OF 11

SCALE IN METRES

Scale 1:500 - Lengths are in Metres.

HOZ: 

VERT:

Scale at A1:

AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 154

Rev. No:
A



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M38 INDUSTRIAL
PARK YATALA

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Lot:	501
Plan:	SP295994
Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RL:	-

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DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
7 OF 11

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JAG DRN	MG CHK

Scale 1:500 - Lengths are in Metres.

HOZ:

Scale 1:100 - Lengths are in Metres.

VERT: 

Scale at A1: AS SHOWN

Designed:	IG
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Designed:	IG
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Drafted:	JRG
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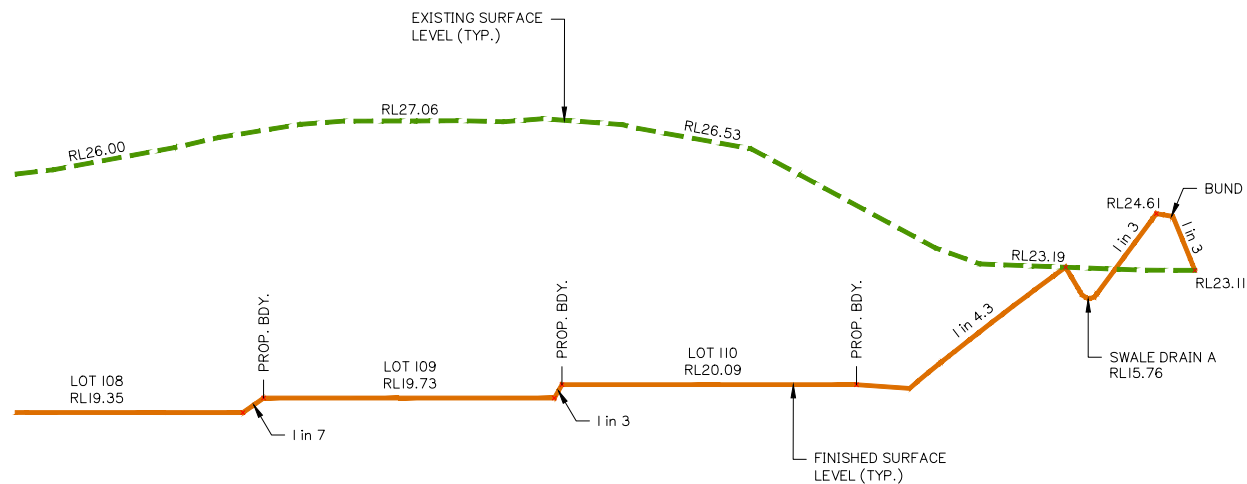
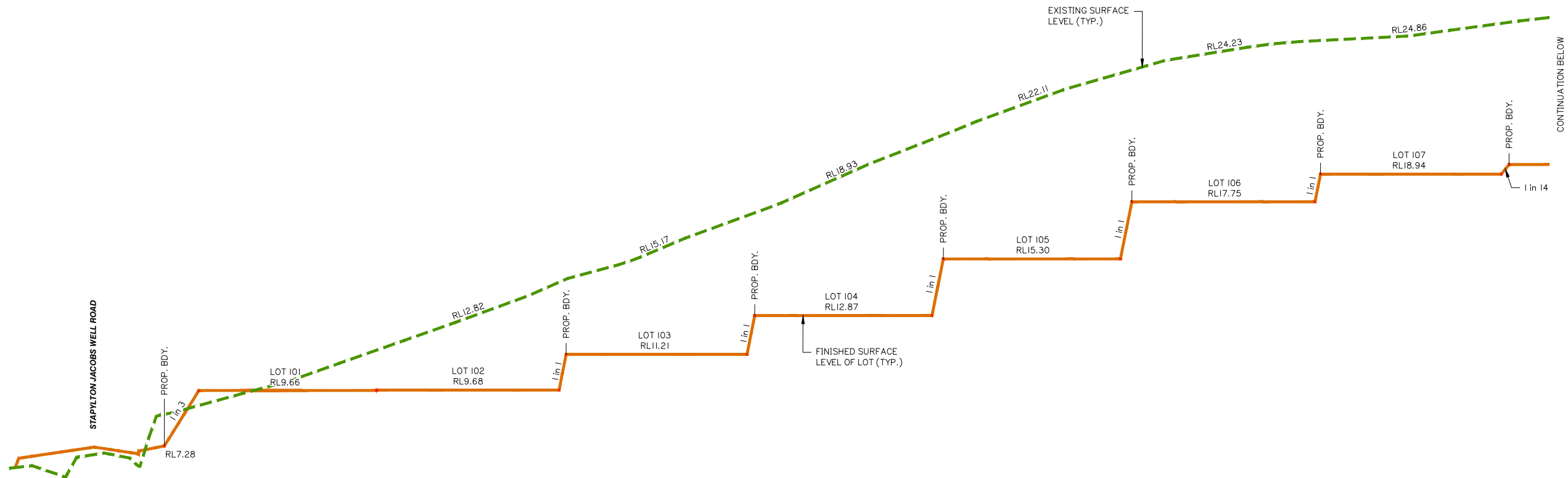
Approved:	MG
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RPEQ:	169
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Signed:	
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Date:	20-12-2019
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Drawing No:	Rev. No:
5941 ENG BE1 156	A



SECTION _____

SCALE:
1: 500 HOR.
1: 100 VERT.
5: 1 DISTORTION

G
150



Project: M38 INDUSTRIAL
PARK YATALA

Site Address:
60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO
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RPD:
 Lot: 501
 Plan: SP295994
 Local Authority: CITY OF GOLD COAST
 COUNCIL
 Level Datum: AHD
 Meridian: -
 Contour Interval: -
 DSM: -
 L: -

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DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
8 OF 11

[illegible]

SCALE IN METRES

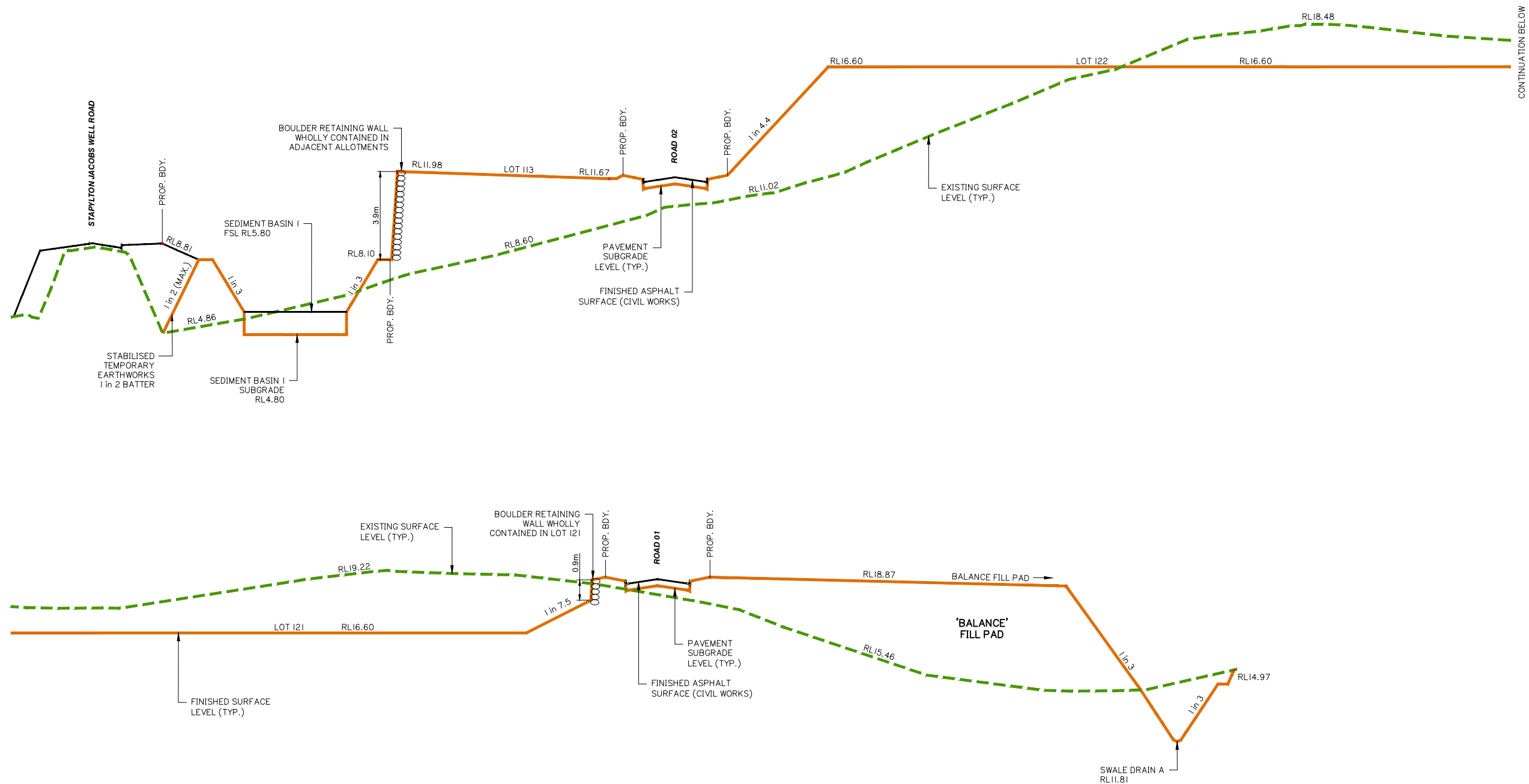
Scale 1:500 - Lengths are in Metres.

VERT: 

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
PEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. N
041 ENG BE1 157	A



SECTION _____

SCALE:
 1: 500 HOR.
 1: 100 VERT.
 5: 1 DISTORTION



M38 INDUSTRIAL
PARK YATALA

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

Level Datum:	AHD
Meridian:	-
Contour Interval:	-
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[illegible]

A	20-12-2019	ORIGINAL ISSUE	JRG	MC
Issue	Date	Description	DRN	CH

Scale 1:500 - Lengths are in Metres.

HOZ:

HOZ:

Scale 1:100 - Lengths are in Metres.

VERT:

Scale at A1: AS SHOWN

Designed:	IG
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Drafted:	JRG
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Approved:	MG
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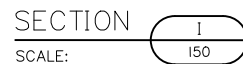
RPEQ:	16939
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Signed:	
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Date:	20-12-2019
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Drawing No:
5941 ENG BE1 158

Rev. No:
A



SCALE:
1: 500 HOR.
1: 100 VERT.
5: 1 DISTORTION



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M38 INDUSTRIAL
PARK YATALA

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO
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Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
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DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
10 OF 11

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN	MCH

Scale 1:500 - Lengths are in Metres.

HOZ:

Scale 1:100 - Lengths are in Metres.

VERT: 

AS SHOWN

IG

JRG

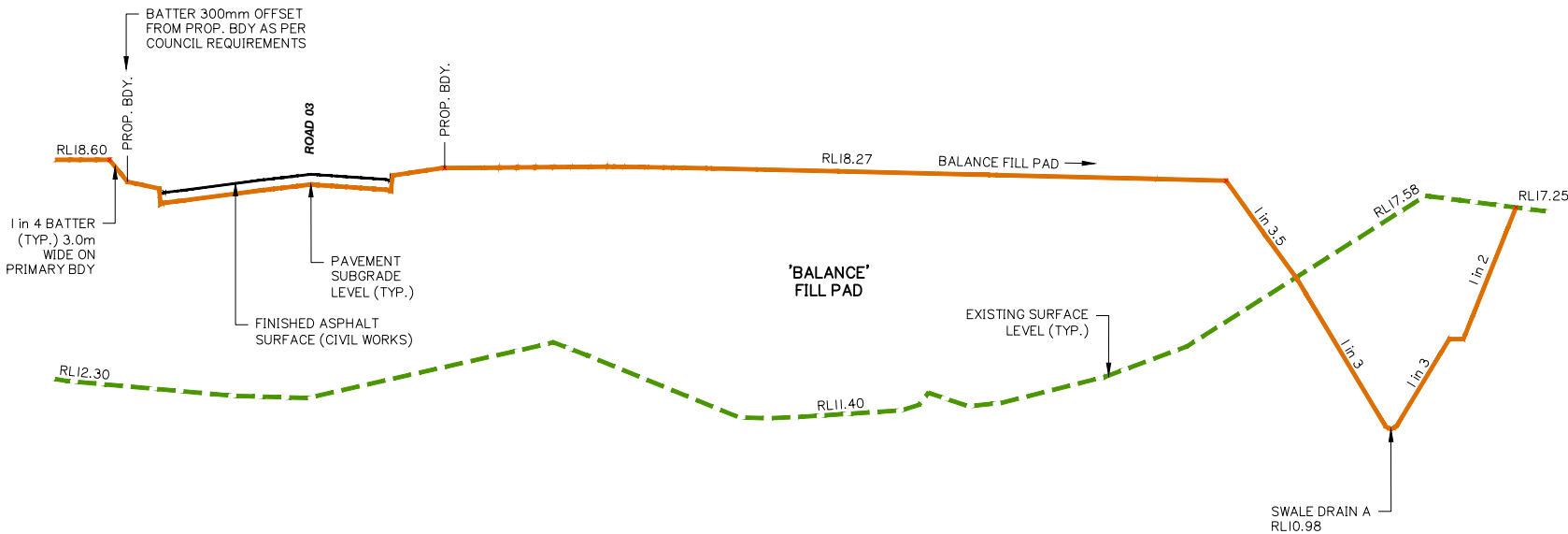
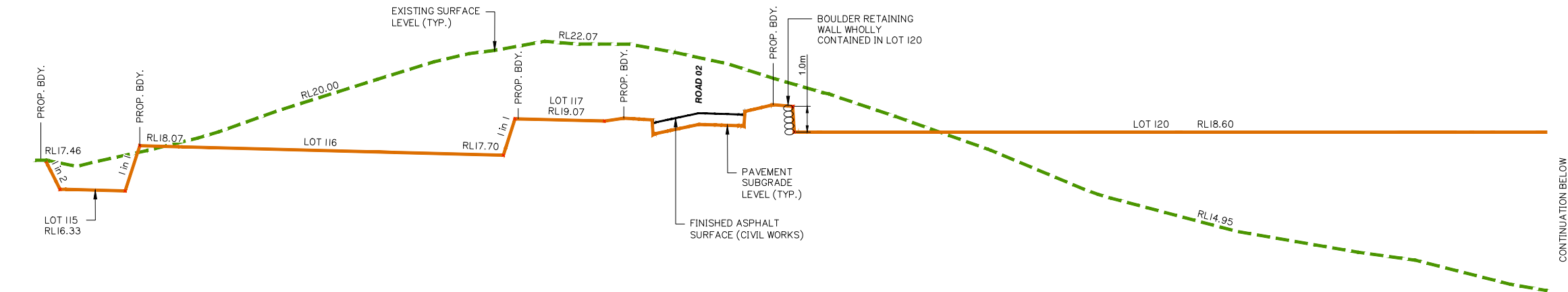
MG

16939

Michael

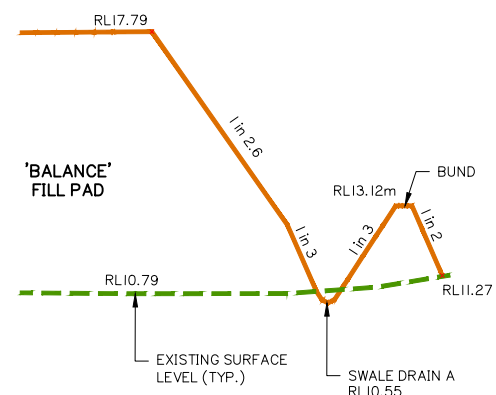
20-12-2019

Rev. No:
A



J

SCALE:
1: 500 HOR.
1: 100 VERT.
5: 1 DISTORTION



FINISHED EARTHWORKS CROSS SECTIONS SHEET 11 OF 11

ONLY THE BULK EARTHWORKS IS APPLICABLE.
A SEPARATE APPLICATION WILL BE SUBMITTED
FOR THE CIVIL ROADWORKS ASSOCIATED WITH
THE RECONFIGURATION OF LOTS.



Client:



Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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DRAWING TITLE

BULK EARTHWORKS ROAD TYPICAL SECTIONS

A	20-12-2019	ORIGINAL ISSUE		JRG	MG
Issue	Date	Description		DRN	CHK

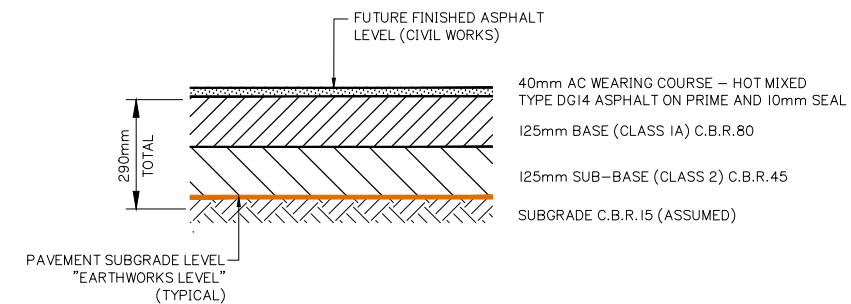
NOT APPLICABLE

Scale at A1:

NOT APPLICABLE

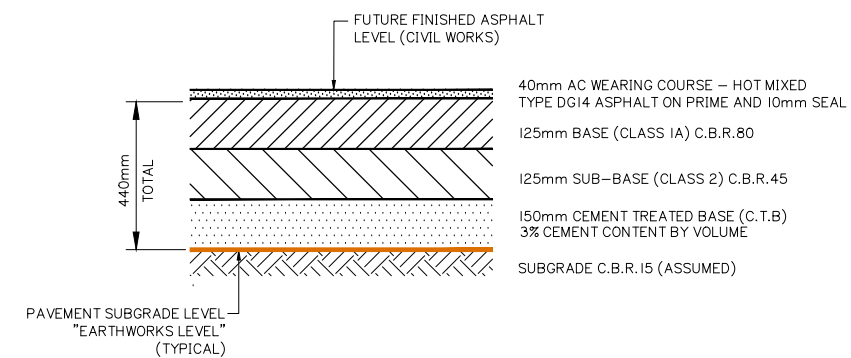
Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 161	A



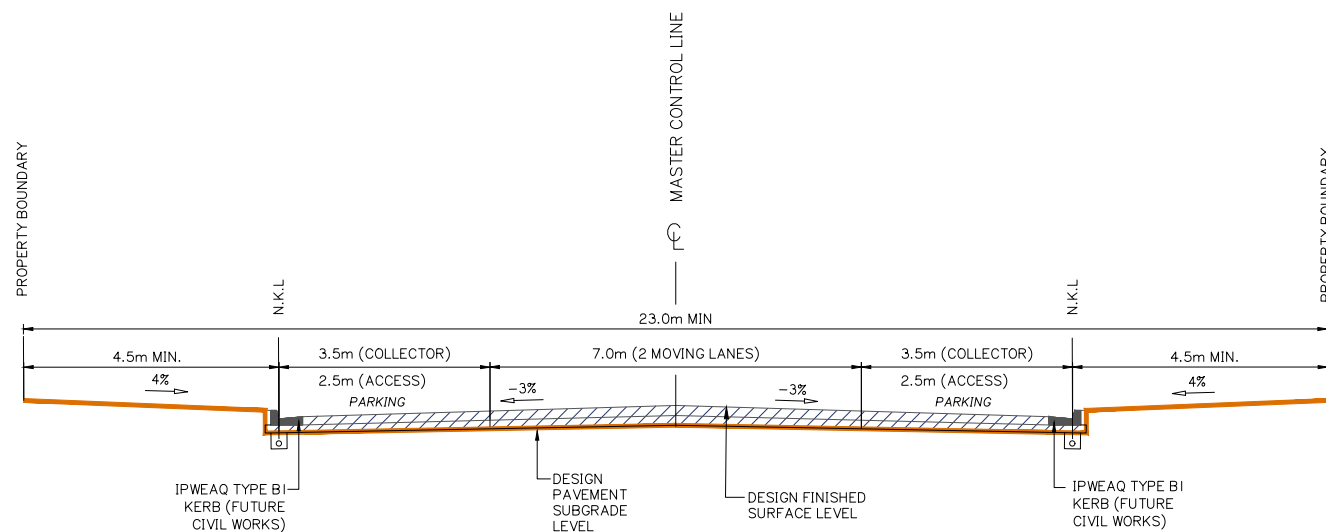
NOMINAL ROAD PAVEMENT DETAIL – IN FILL AREAS
INDUSTRIAL COLLECTOR & ACCESS STREET

PAVEMENT DESIGN SUBJECT TO IN-SITU CBR TESTING AND
FURTHER COUNCIL APPROVAL.
N.T.S



NOMINAL ROAD PAVEMENT DETAIL – IN CUT AREAS
INDUSTRIAL COLLECTOR & ACCESS STREET

PAVEMENT DESIGN SUBJECT TO IN-SITU CBR TESTING AND
FURTHER COUNCIL APPROVAL.
N.T.S

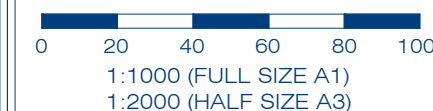


TYPICAL CROSS SECTION – INDUSTRIAL / COMMERCIAL
COLLECTOR AND ACCESS STREETS (23.0m)

ROAD 01, ROAD 02, ROAD 03, EMERI STREET EXT.

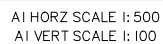
REFER ALSO GCCC STD DWG 05-02-2004 FOR DETAILS

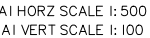
A	20-12-2019	ORIGINAL ISSUE	JRG	MC	



Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019







Client



Projects

M38 INDUSTRIAL
PARK YATALA

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DRAWING TITLE

ROAD 01 LONGITUDINAL
SECTION SHEET 3 OF 3

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MG CH

SCALE IN METRES

HOZ: Scale 1:500 - Lengths are in Metres.



0 5 10 15 20 25 30 35 40

VERT: Scale 1:100 - Lengths are in Metres.

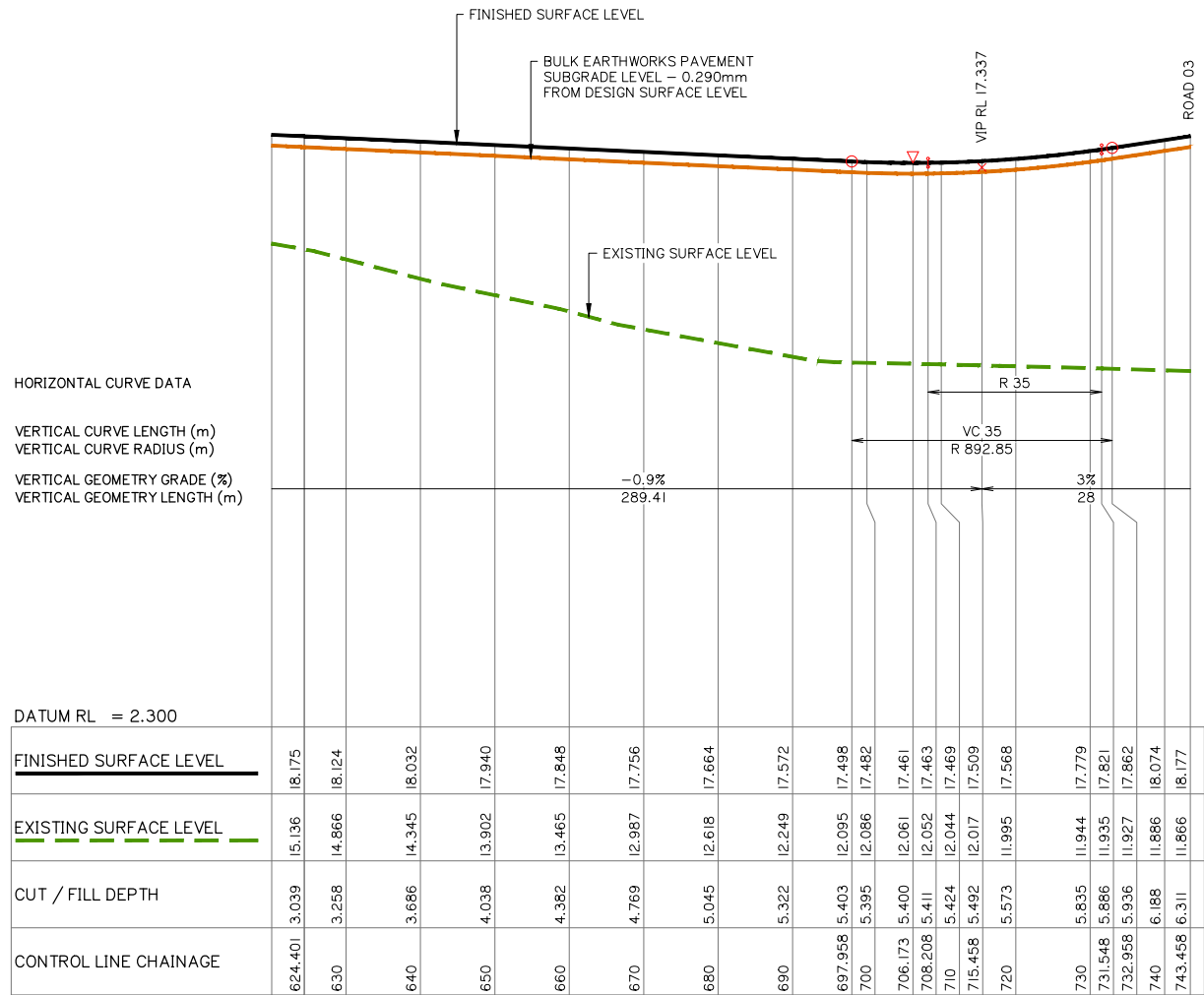


0 1 2 3 4 5 6 7 8

Scale at A1: AS SHOWN

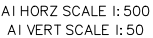
Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 412	A



ROAD 01 LONGITUDINAL SECTION SHEET 3 OF 3

AI HORIZ SCALE 1:500
AI VERT SCALE 1:100





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ROAD 02 LONGITUDINAL
SECTION SHEET 2 OF 2

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN	MCH

Scale 1:500 - Lengths are in Metres.

HOZ: 

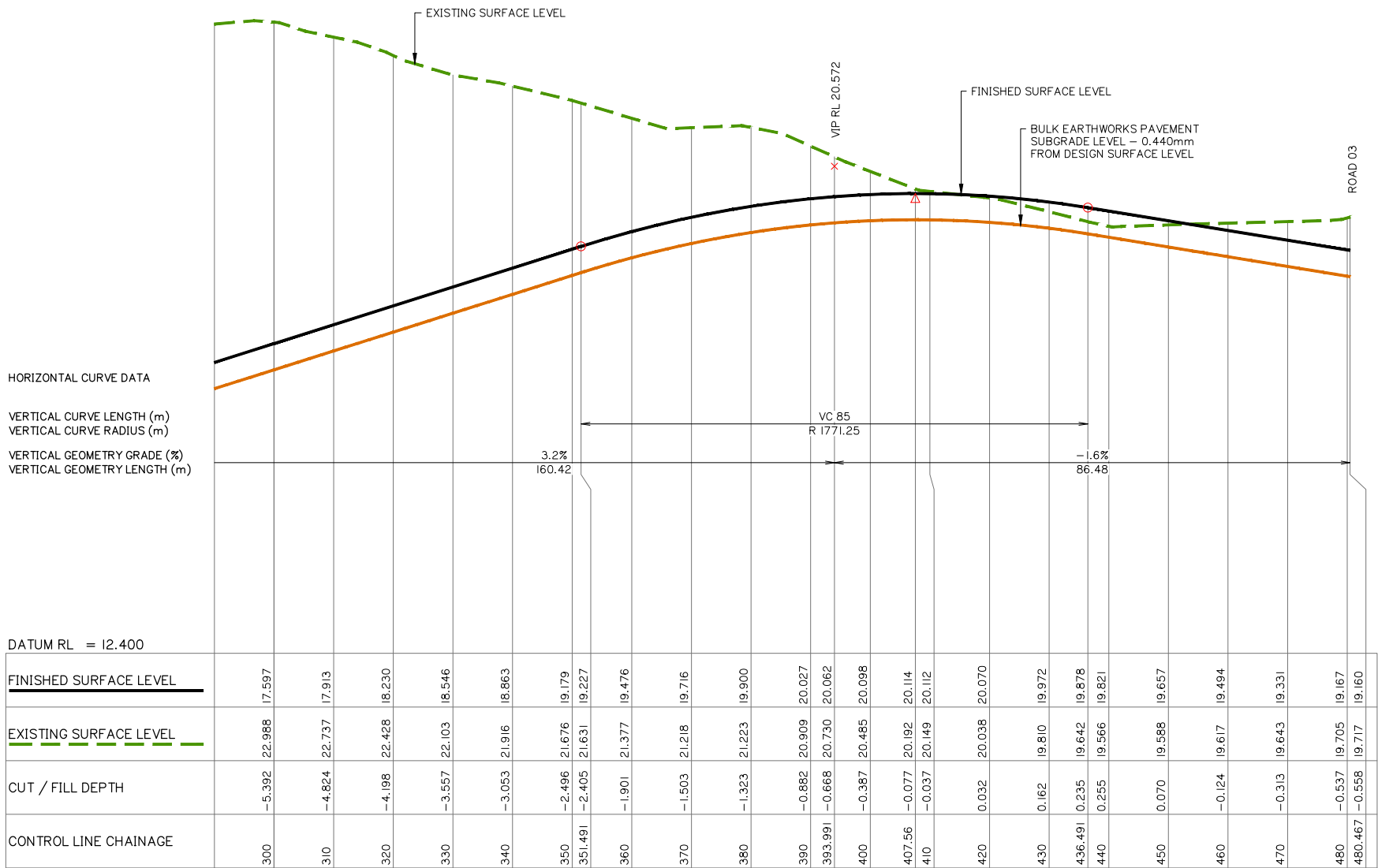
VERT: 

AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 414

Rev. No:
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ROAD 02 LONGITUDINAL SECTION SHEET 2 OF 2

AI HORZ SCALE 1: 500
AI VERT SCALE 1: 50



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ROAD 03 (1) LONGITUDINAL SECTION

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN	MCH

Scale 1:500 - Lengths are in Metres.

HOZ:

VERT:

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 415

Rev. No:
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AI HORZ SCALE 1: 500
AI VERT SCALE 1: 50



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ROAD 03 (2) LONGITUDINAL SECTION

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JAG DRN	MG CHK

Scale 1:500 - Lengths are in Metres.

HOZ:

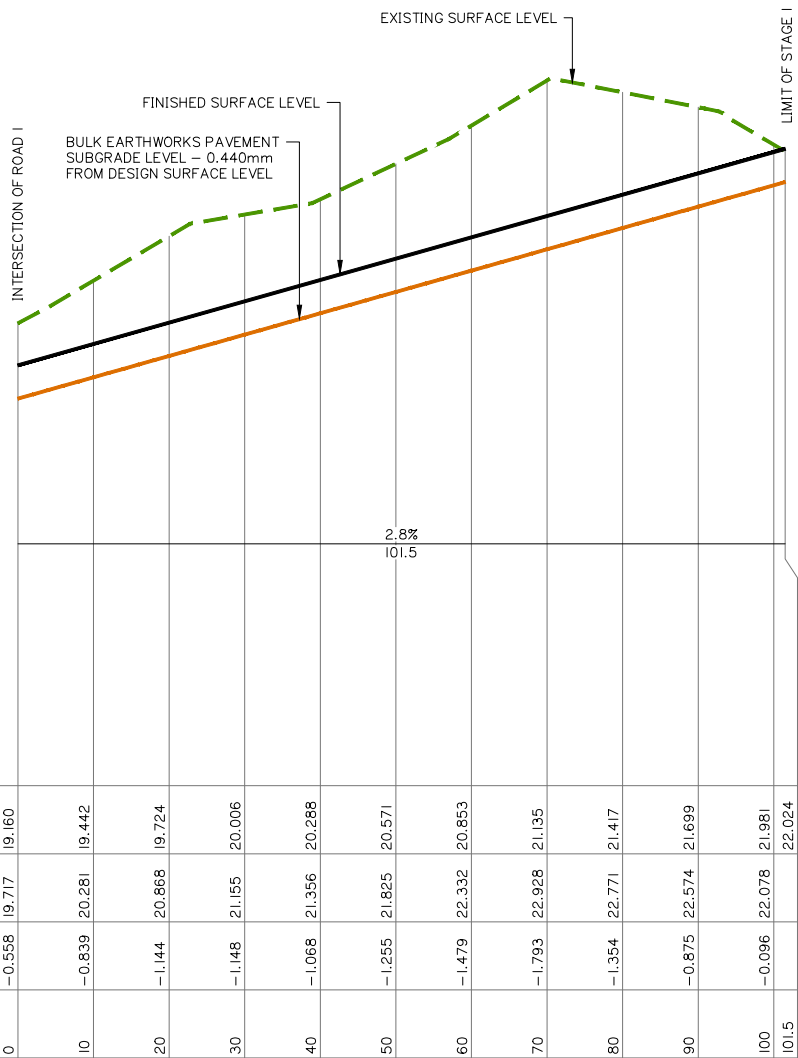
VERT: 

AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

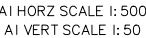
Drawing No:
5941 ENG BE1 416

Rev. No:
A



ROAD 03 (2) LONGITUDINAL SECTION

AI HORZ SCALE 1: 500
AI VERT SCALE 1: 50



20-12-2019	ORIGINAL ISSUE	JRG
Date	Description	DRN

scale at A1: AS SHOWN

rafted:	JRG
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PEQ:	16939
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Signed:	
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ate:	20-12-2019
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Drawing No: Rev. M041 ENG BE1 420 A

AI HORZ SCALE 1: 500
AI VERT SCALE 1: 50

EXTERNAL INTERSECTION
DESIGN SHOWN FOR
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Site Address:

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Lot: 501
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DRAWING TITLE
BOULDER RETAINING
WALL CONTROL LINE
LAYOUT PLAN

Issue	Date	Original Issue Description	JRG DRN	MG CHK
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

SCALE IN METRES



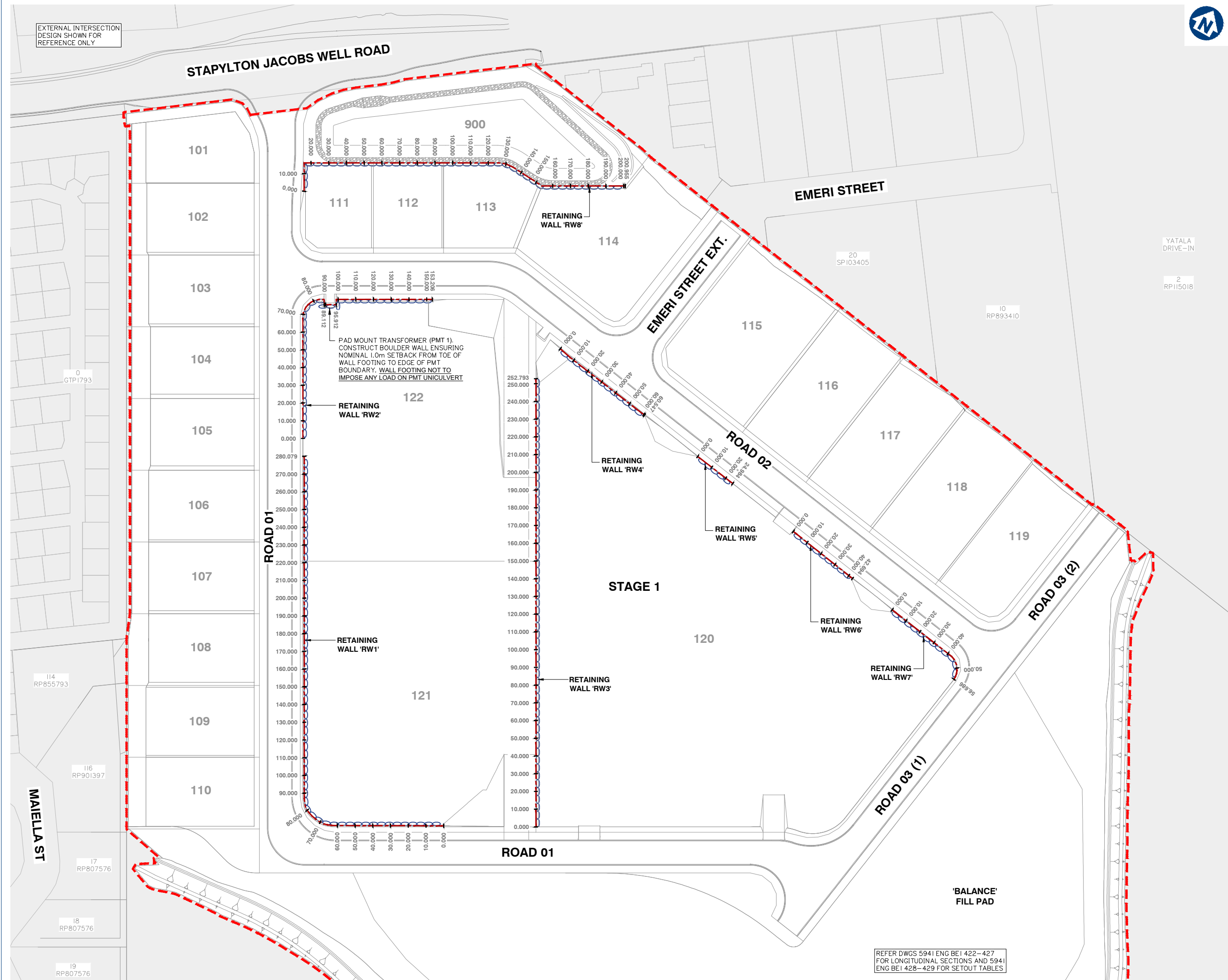
1:1000 (FULL SIZE A1)
1:2000 (HALF SIZE A3)

Scale at A1: 1:1000

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 422

Rev. No:
A



REFER DWGS 5941 ENG BE1 422-427
FOR LONGITUDINAL SECTIONS AND 5941
ENG BE1 428-429 FOR SETOUT TABLES

BOULDER RETAINING WALL CONTROL LINE LAYOUT PLAN



Project:

Site Address:

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Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
RL: -

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[illegible]

SCALE IN METRES



AS NOTED

IG

JRG

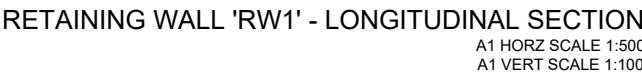
MG

Michelle K...

20-12-2019

Rev. No:

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BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 1 OF 6

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DRAWING TITLE
BOULDER RETAINING
WALL LONGITUDINAL
SECTION SHEET 2 OF 6

A	20-12-2019		ORIGINAL ISSUE	JRG	MG
Issue	Date		Description	DRN	CHK

SCALE IN METRES



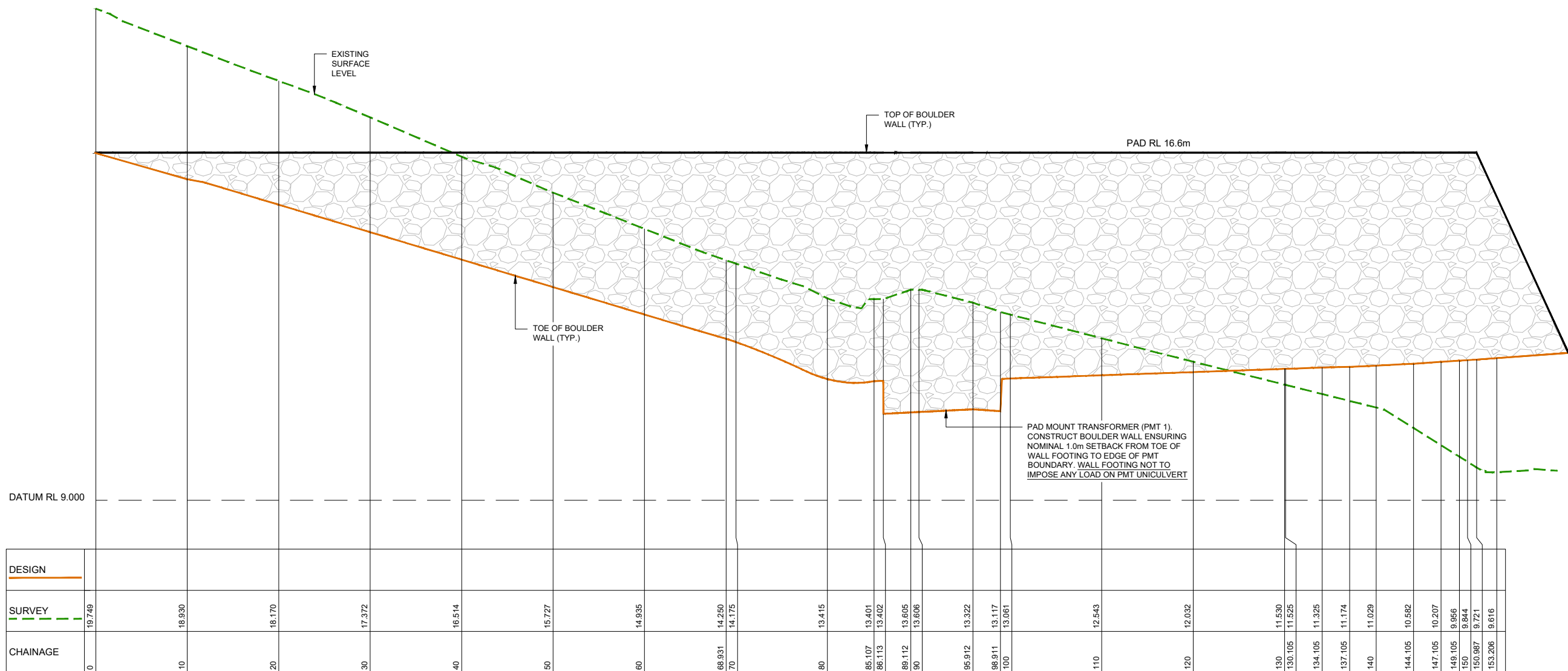
HOR. 1:250 (FULL SIZE A1)
VER. 1:50 (FULL SIZE A1)

Scale at A1:

AS NOTED

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 423	A



RETAINING WALL 'RW2' - LONGITUDINAL SECTION
A1 HORZ SCALE 1:250
A1 VERT SCALE 1:50

BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 2 OF 6



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DRAWING TITLE
BOULDER RETAINING
WALL LONGITUDINAL
SECTION SHEET 3 OF 6

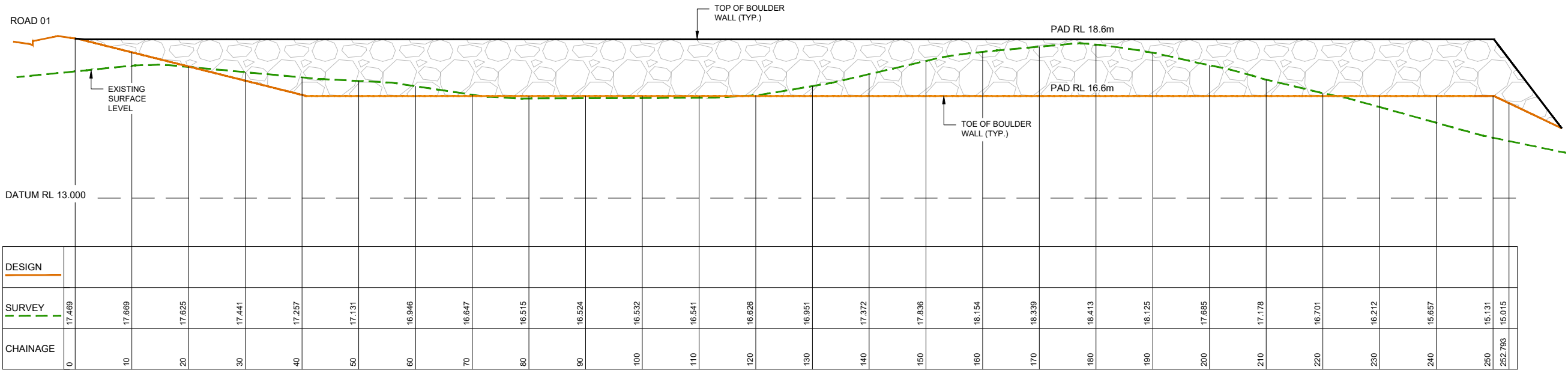
A Issue	20-12-2019 Date	ORIGINAL ISSUE			JRG DRN	MG CHK
		Description				

HOR. 1:400 (FULL SIZE A1)
VER. 1:80 (FULL SIZE A1)

AS NOTED

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Approved:	MG
RPEQ:	16939
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RETAINING WALL 'RW3' - LONGITUDINAL SECTION
A1 HORZ SCALE 1:400
A1 VERT SCALE 1:80

BOULDER RETAINING WALL LONGITUDINAL SECTION SHEET 3 OF 6



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DRAWING TITLE
BOULDER RETAINING
WALL LONGITUDINAL
SECTION SHEET 5 OF 6

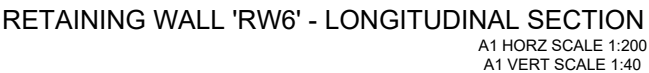
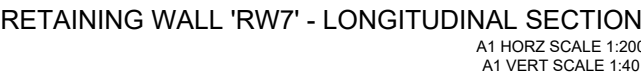
[illegible]

HOR. 1200 (FULL SIZE A1)
VER. 1:40 (FULL SIZE A1)

AS NOTED

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RPEQ:	16939
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DRAWING TITLE
BOULDER RETAINING
WALL LONGITUDINAL
SECTION SHEET 6 OF 6

A	20-12-2019	ORIGINAL ISSUE		JRG	MG
Issue	Date	Description		DRN	CHK

SCALE IN METRES



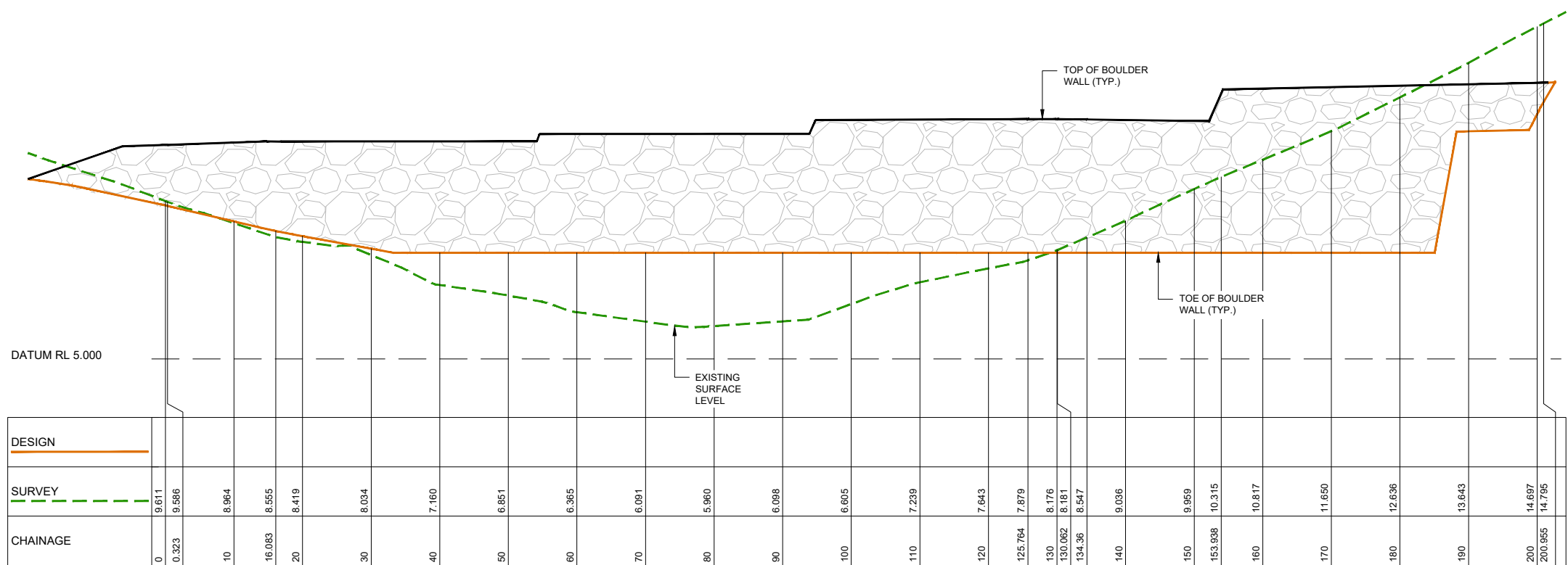
HOR. 1:400 (FULL SIZE A1)
VER. 1:80 (FULL SIZE A1)

Scale at A1:

AS NOTED

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 427	A



RETAINING WALL 'RW8' - LONGITUDINAL SECTION
A1 HORZ SCALE 1:400
A1 VERT SCALE 1:80



AI HORIZ SCALE 1:100
AI VERT SCALE 1:100

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DRAWING TITLE

ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 11

[illegible]

SCALE IN METRES

Scale 1:100 - Lengths are in Metres.

Scale 1:100 - Lengths are in Metres.

VERT:

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

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5941 ENG BE1 430

Rev. No:
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A	20-12-2019	ORIGINAL ISSUE	JRG
ue	Date	Description	DRI

Scale at A1:	AS SHOWN
Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019



ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 4 OF 11

AI HORIZ SCALE 1:100
AI VERT SCALE 1:100



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Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO
BE PRINTED IN COLOUR

RPD:

Lot:	501
Plan:	SP295994
Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RL:	-

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DRAWING TITLE
ROAD 01 BULK
EARTHWORKS CROSS
SECTIONS SHEET 4 OF 11

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MCH

SCALE IN METRES

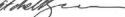
Scale 1:100 - Lengths are in Metres.

HOZ: 

Scale 1:100 - Lengths are in Metres.

VERT: 

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 433

Rev. No:
A

20-12-2019	ORIGINAL ISSUE	JRG
Date	Description	DRN

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
PEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. N
041 ENG BE1 434	A



ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 5 OF 11

AI HORIZ SCALE 1:100
AI VERT SCALE 1:100



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M38 INDUSTRIAL
PARK YATALA

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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DRAWING TITLE
ROAD 01 BULK
EARTHWORKS CROSS
SECTIONS SHEET 6 OF 11

A	20-12-2019	ORIGINAL ISSUE						JPG	MG
Issue	Date	Description						DRI	CHK

Scale 1:100 - Lengths are in Metres.

HOZ:

Scale 1:100 - Lengths are in Metres.

VERT:

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JRG

MG

16939

Mitchell

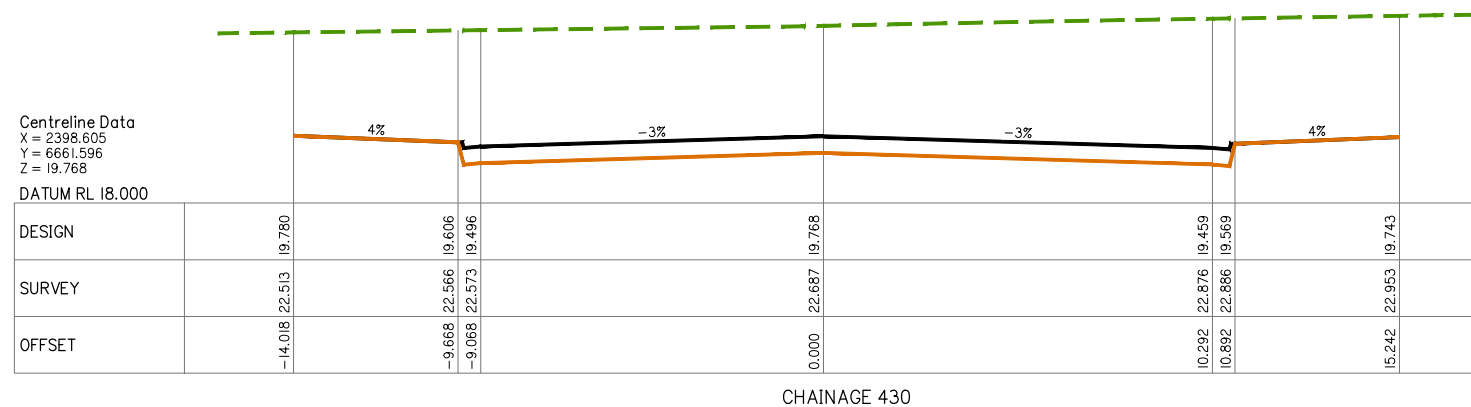
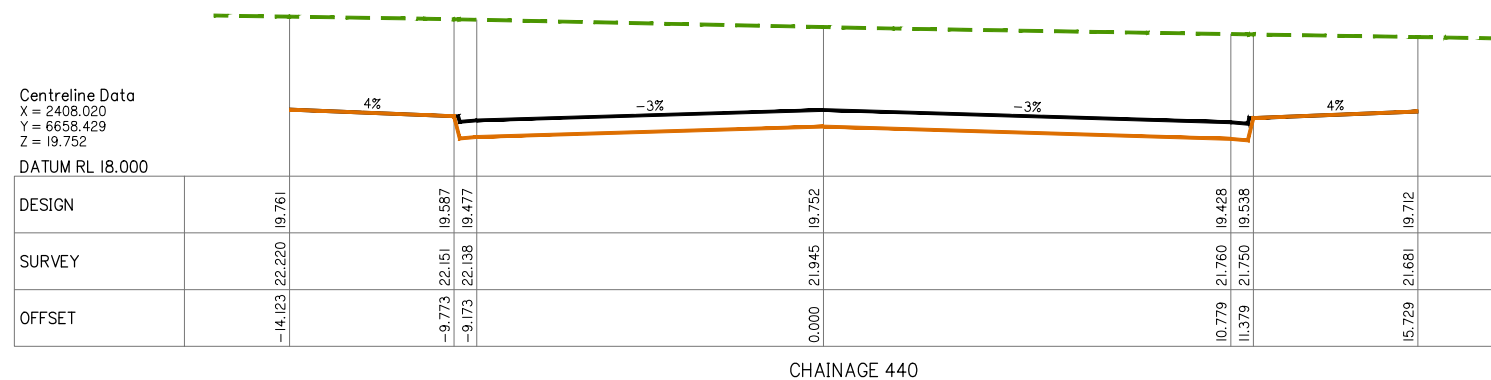
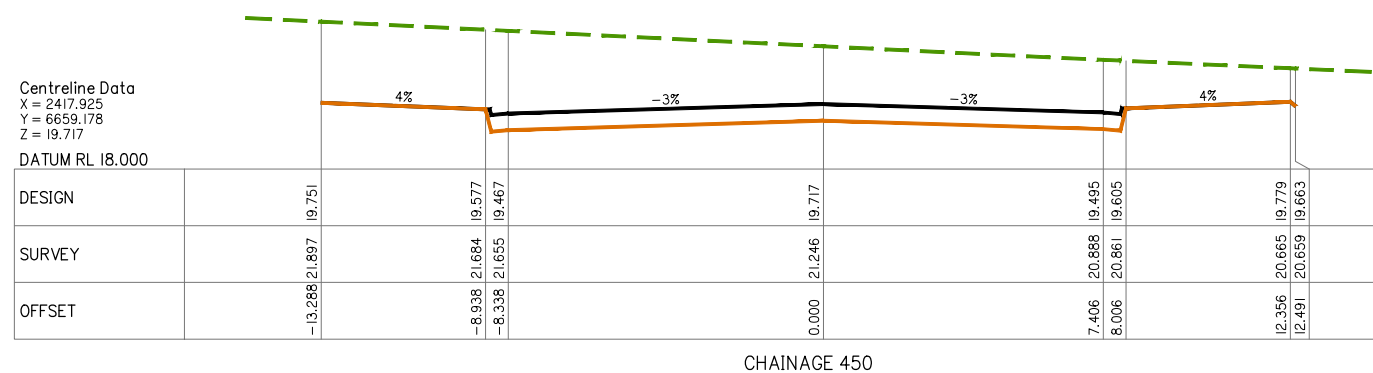
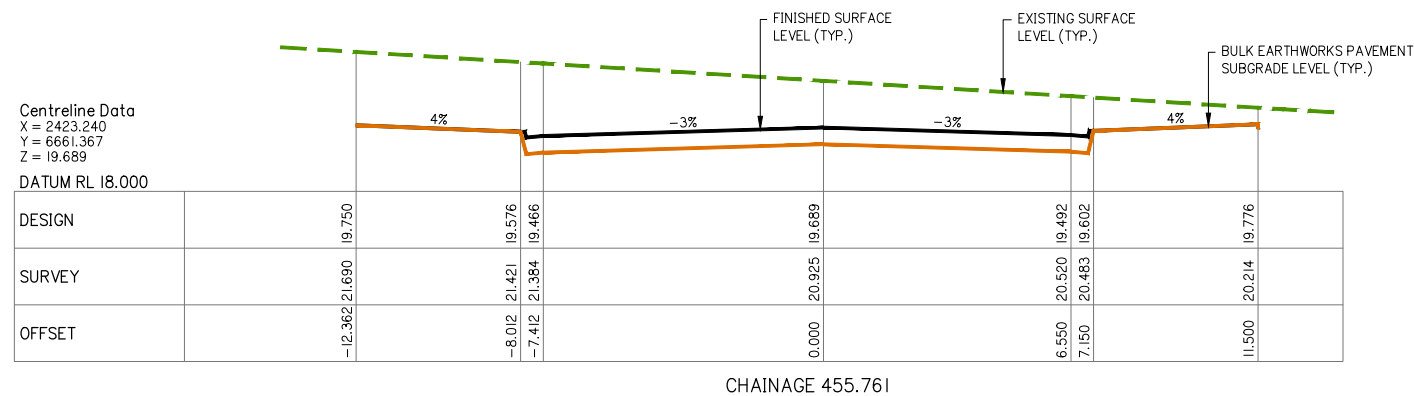
20-12-2019

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ROAD 01 BULK EARTHWORKS CROSS SECTIONS SHEET 6 OF 11

AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



Client:



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M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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DRAWING TITLE
ROAD 01 BULK
EARTHWORKS CROSS
SECTIONS SHEET 7 OF 11

A	20-12-2019	ORIGINAL ISSUE	JRG	M
Issue	Date	Description	DRN	CH

SCALE IN METRES

Scale 1:100 - Lengths are in Metres.

HOZ: 

VERT: 

Scale at A1: AS SHOWN

Designed:	IC
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Drafted:	JBG
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Approved:	MG
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RPEQ:	16939
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Date:	20-12-2019
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Drawing No:
5941 ENG BE1 436

Rev. No:
A



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Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:
60 STAPYLTON JACOBS WEL
ROAD, STAPYLTON QLD 420

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RPD:

Lot:	501
Plan:	SP295994
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DRAWING TITLE
ROAD 01 BULK
EARTHWORKS CROSS
SECTIONS SHEET 10 OF 1

SCALE IN METRES

HOZ:  Scale 1:100 - Lengths are in Metres.

VERT:  Scale 1:100 - Lengths are in Metres.

Scale at A1: AS SHOWN

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Drafted:	JRG
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RPEQ:	16939
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Date:	20-12-2019

Drawing No: 5941 ENG BE1 439 Rev. M A



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A	20-12-2019	ORIGINAL ISSUE	JRG	MO
Issue	Date	Description	DRN	CH

Scale 1:100 - Lengths are in Metres.

HOZ:

Scale 1:100 - Lengths are in Metres.

VERT:

Scale at A1: AS SHOWN

Designed:	IG
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Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Rev. No:
A



AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100

20-12-2019	ORIGINAL ISSUE	JRG
Date	Description	DRI

SCALE IN METRES

Scale 1:100 - Lengths are in Metres.

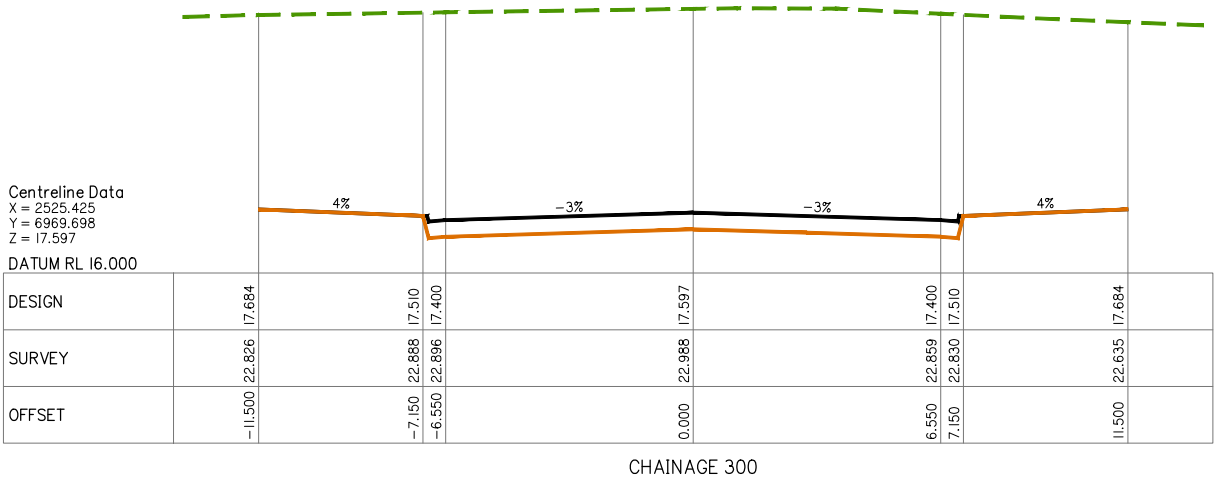
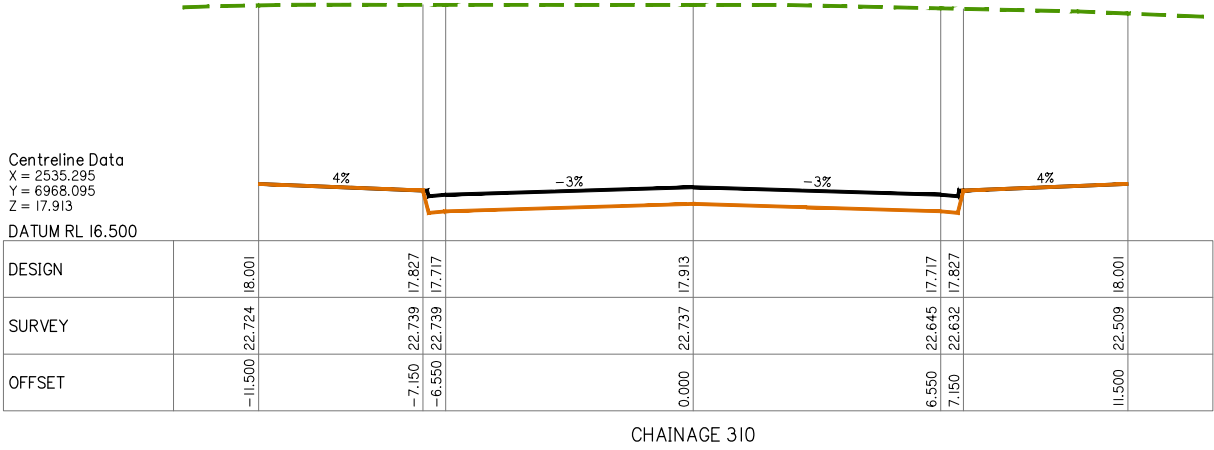
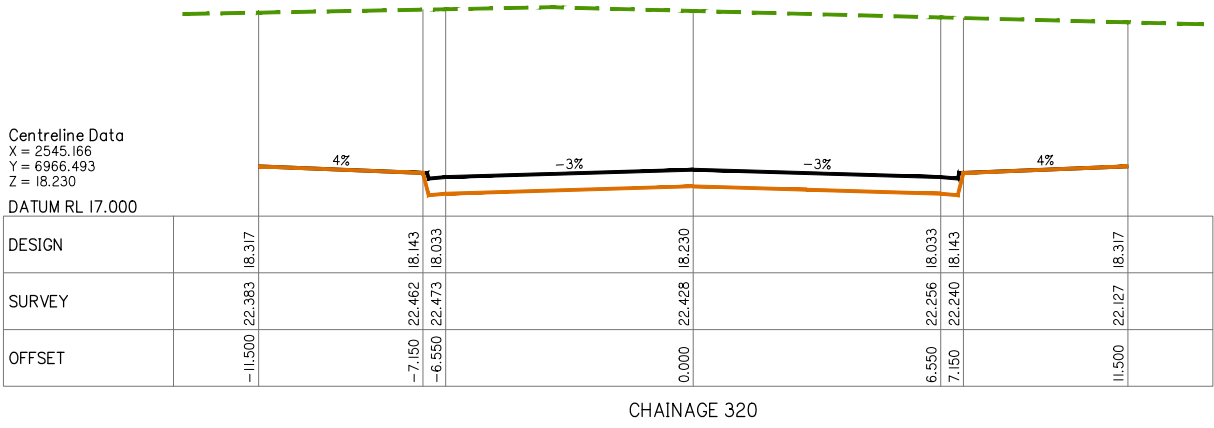
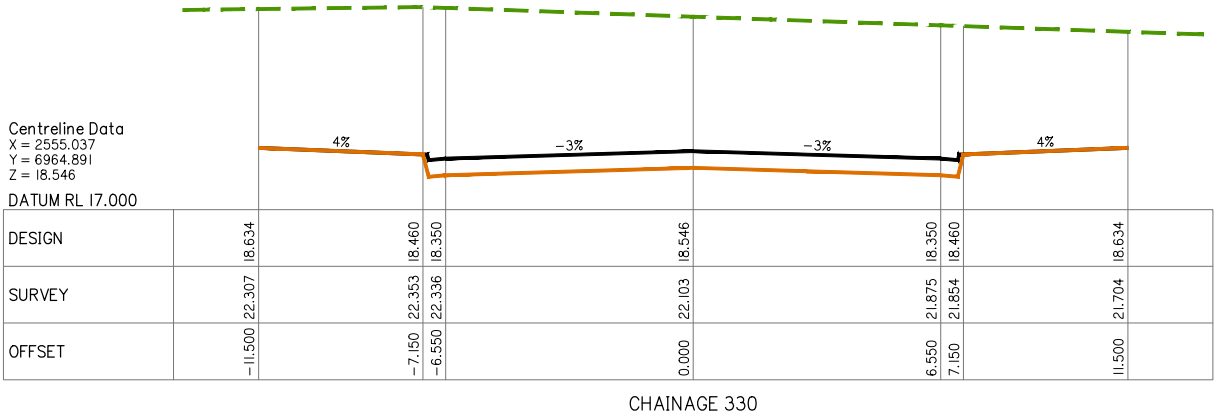
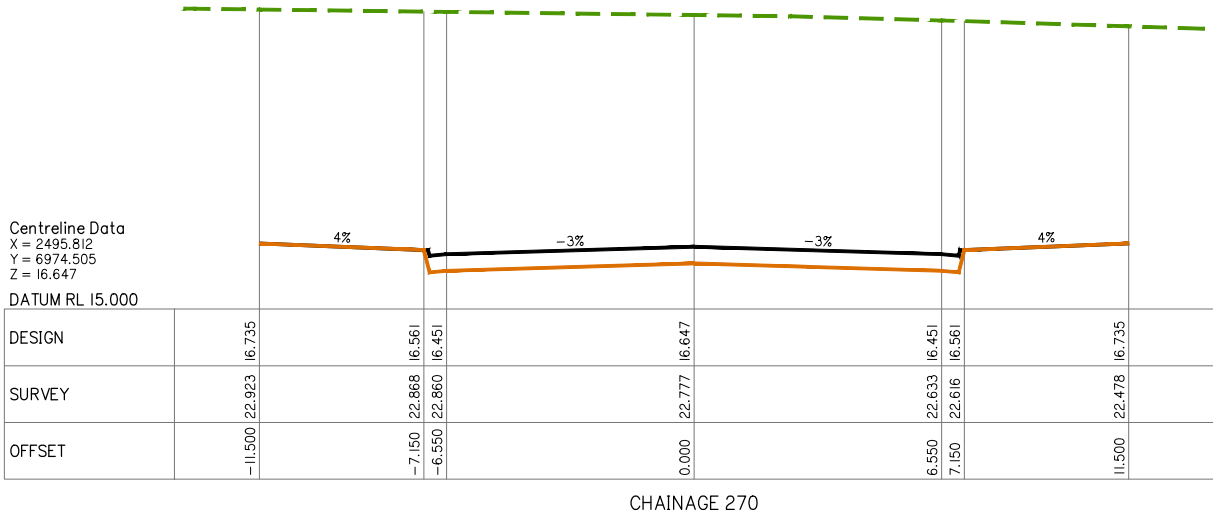
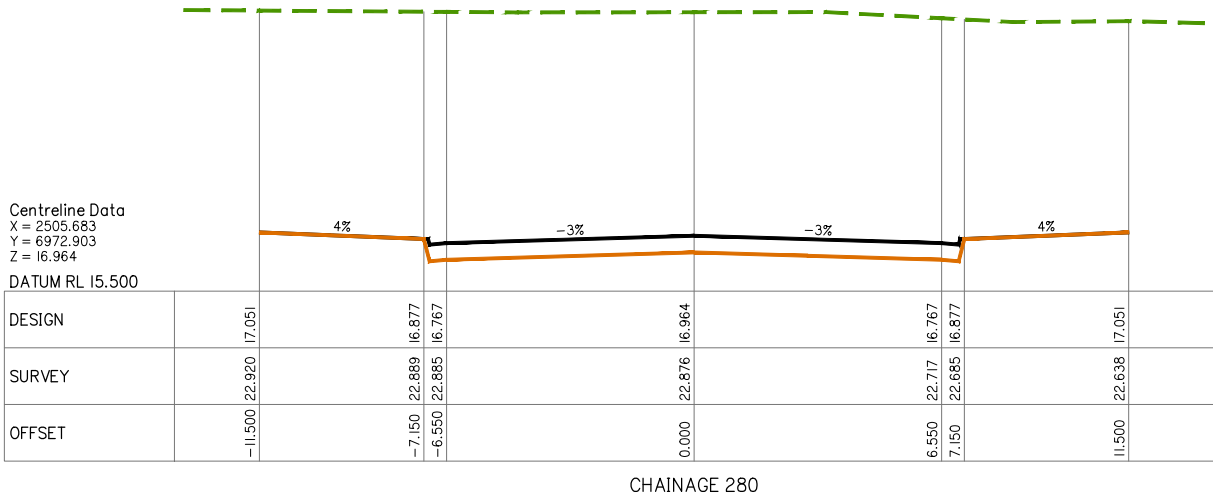
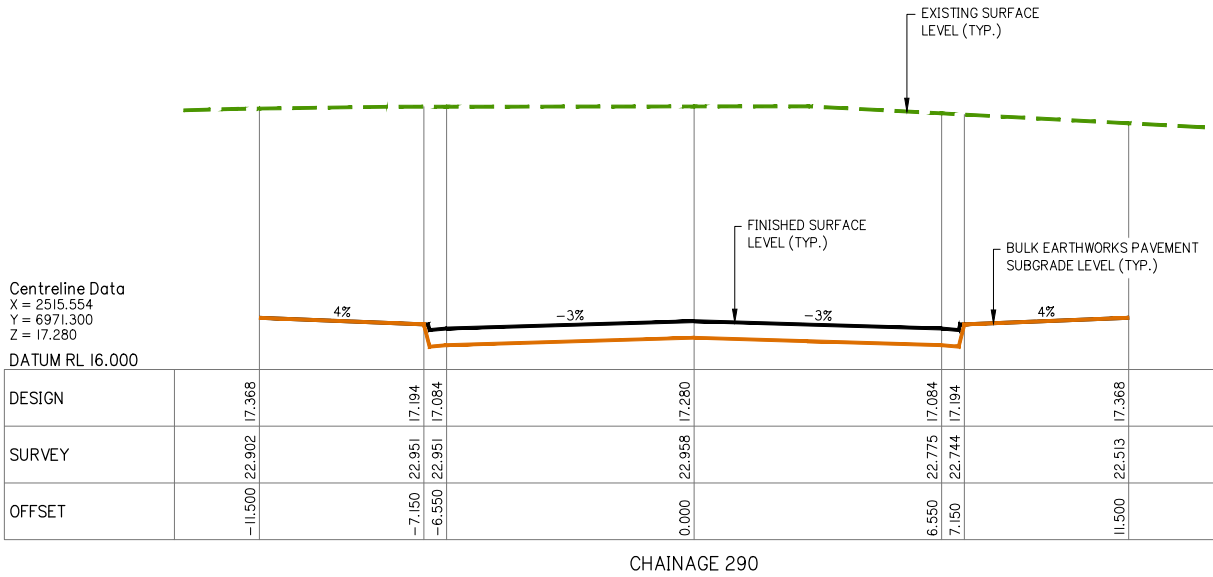
HOZ: 

VERT: 

Designed:	IG
Drafted:	JRG
Approved:	MG
PEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No: 041 ENG BE1 443 Rev. M A







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ROAD 02 BULK
EARTHWORKS CROSS
SECTIONS SHEET 6 OF 6

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MCH

Scale 1:100 - Lengths are in Metres.

HOZ:

VERT: 

Scale at A1:

AS SHOWN

Designed:

IG

Drafted:

JRG

Approved:

MG

Signed:

Mitchell

Date:

20-12-2019

Drawing No:

Rev. No:

5941 ENG BE1 446

A



AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100

A	20-12-2019	ORIGINAL ISSUE	JRG
e	Date	Description	DNR

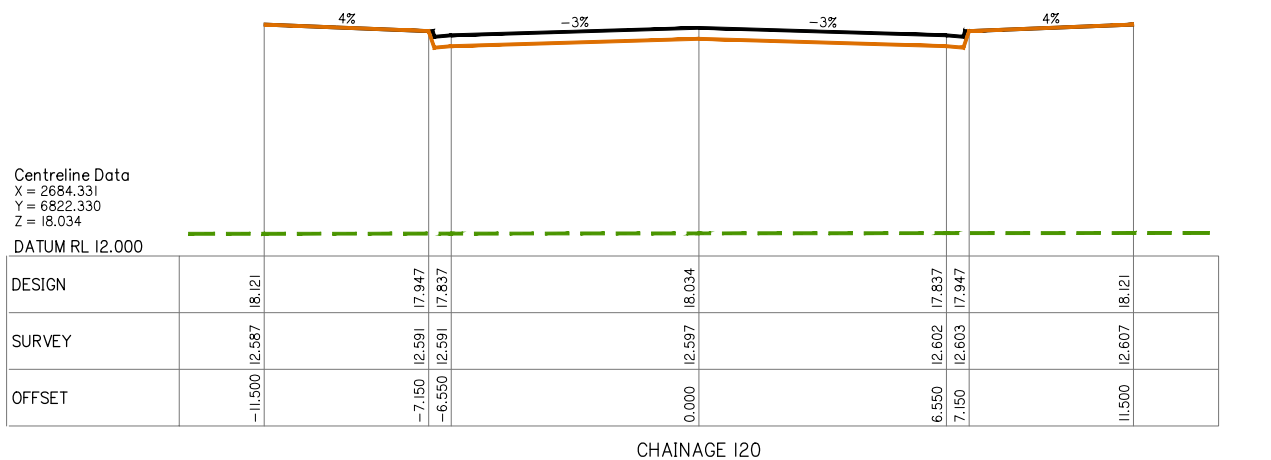
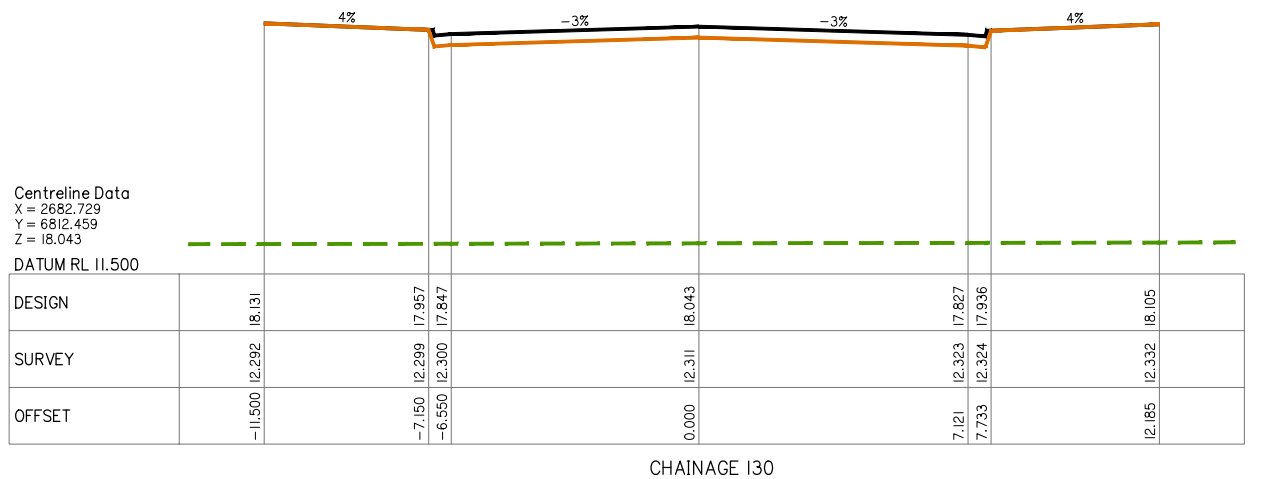
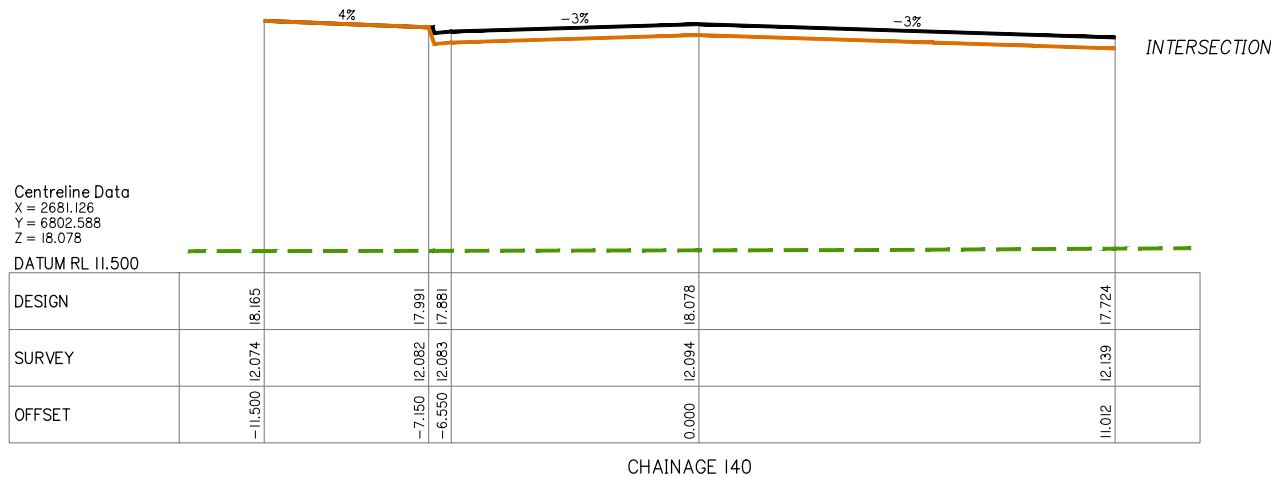
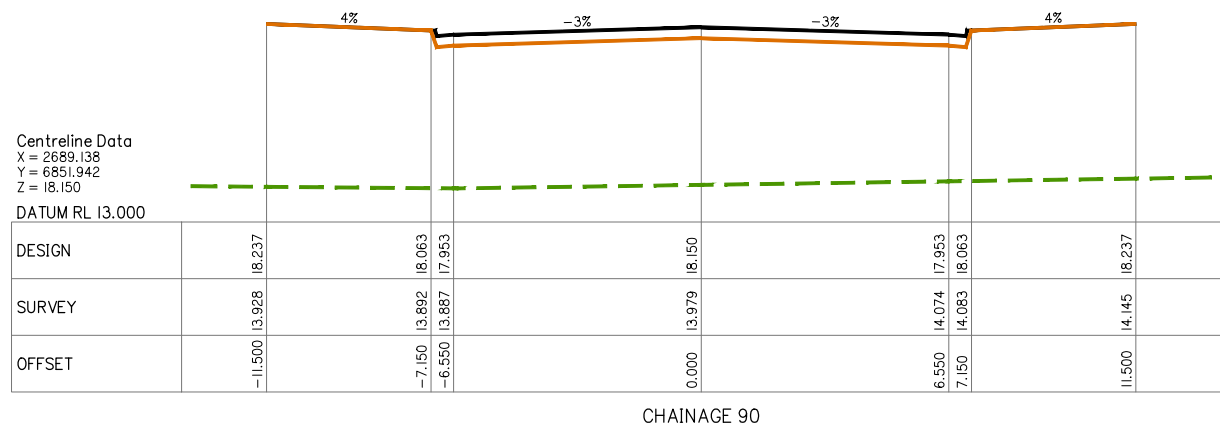
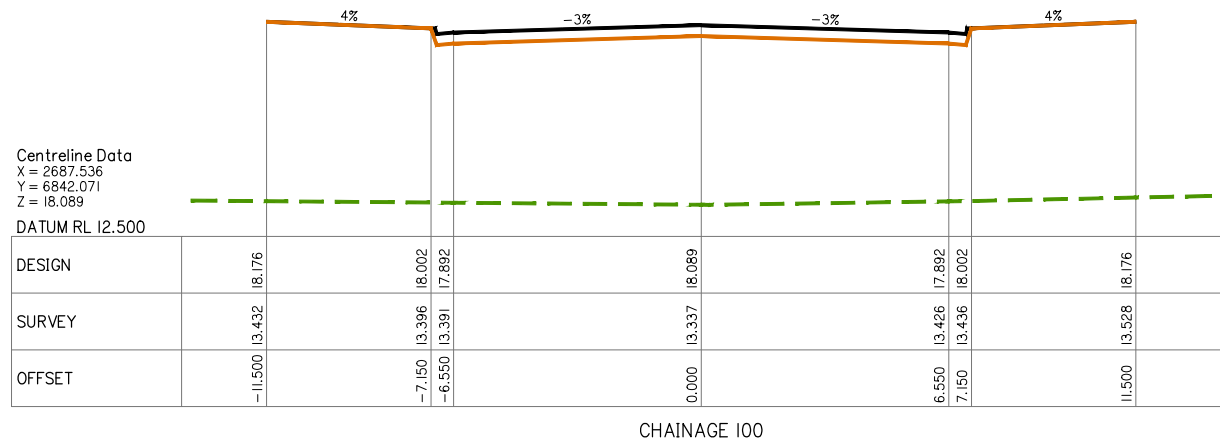
Scale 1:100 - Lengths are in Metres.

HOZ:

Scale at A1: AS SHOWN

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Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
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5941 ENG BE1 448	A





M38 INDUSTRIAL
PARK YATALA

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[illegible]

SCALE IN METRES

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IG

JRG

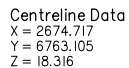
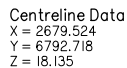
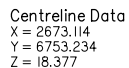
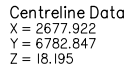
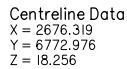
MG

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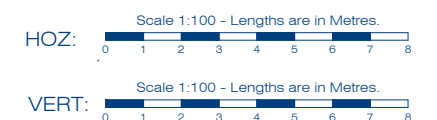
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AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRM	MG CHK



Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019



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DRAWING TITLE
ROAD 03 (2) BULK
EARTHWORKS CROSS
SECTIONS SHEET 2 OF 2

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MCH

Scale 1:100 - Lengths are in Metres.

HOZ: 

Scale 1:100 - Lengths are in Metres.

VERT:

Scale at A1: AS SHOWN

Designed:	IG
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Drafted:	JRG
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Approved:	MG
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Date:	20-12-2019
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Drawing No:	Rev. No:
5941 ENG BE1 451	A



AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



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PARK YATALA

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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AI VERT SCALE 1: 100



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DRAWING TITLE
EMERI STREET EXT. BULK
EARTHWORKS CROSS
SECTIONS SHEET 2 OF 2

A	20-12-2019	ORIGINAL ISSUE		JRG	MG
Issue	Date	Description		DRN	CHK

Scale 1:100 - Lengths are in Metres.

HOZ:

VERT:

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
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Date:	20-12-2019

Drawing No:
5941 ENG BE1 453

Rev. No:
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EMERI STREET EXT. BULK EARTHWORKS CROSS SECTIONS SHEET 2 OF 2

AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



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SWALE DRAIN A BULK
EARTHWORKS CROSS
SECTIONS SHEET 1 OF 1

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN	MCH

Scale 1:100 - Lengths are in Metres.

HOZ: 

Scale 1:100 - Lengths are in Metres.

VERT:

Scale at A1: AS SHOWN

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Approved:	MG
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Rev. No:
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SWALE DRAIN A BULK EARTHWORKS CROSS SECTIONS SHEET 1 OF 11

AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



RPD:

Lot:	501
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A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN	MCH

Scale 1:100 - Lengths are in Metres.

HOZ:

Scale 1:100 - Lengths are in Metres.

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RPEQ:	16939
Signed:	
Date:	20-12-2019

CHAINAGE 130

AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



M38 INDUSTRIAL
PARK YATALA

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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Contour Interval: -
PSM: -
RL: -

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Scale 1:100 - Lengths are in Metres.

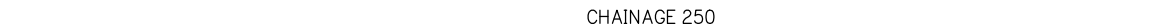
VERT: 

20-12-2019

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AI HORZ SCALE 1: 100
AI VERT SCALE 1: 100



Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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DRAWING TITLE
SWALE DRAIN A BULK
EARTHWORKS CROSS
SECTIONS SHEET 4 OF 11

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MG CH

SCALE IN METRES

HOZ:  Scale 1:100 - Lengths are in Metres.

Scale 1:100 - Lengths are in Metres.

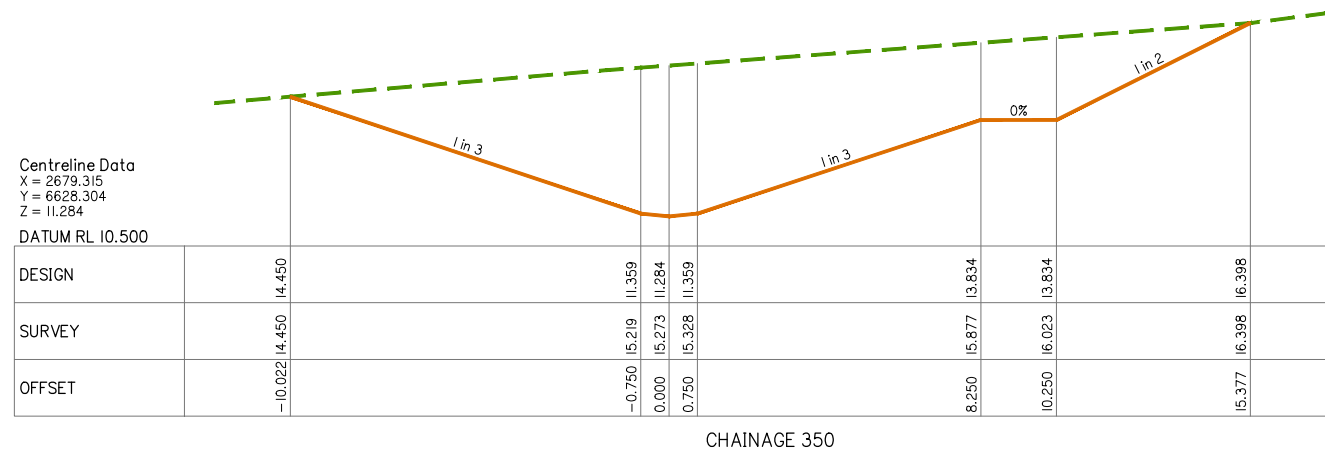
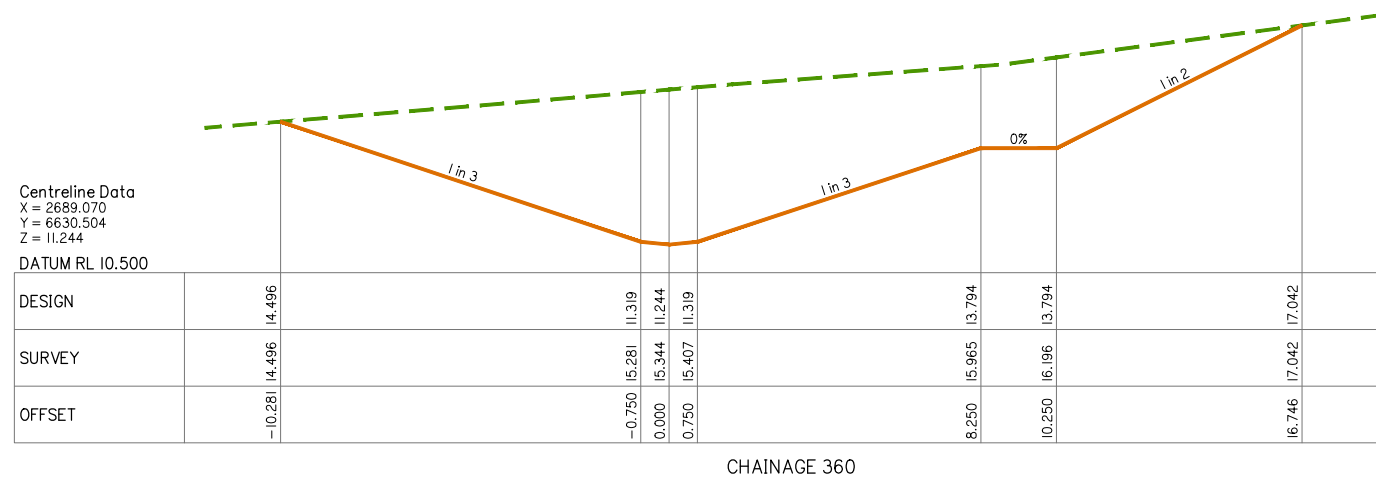
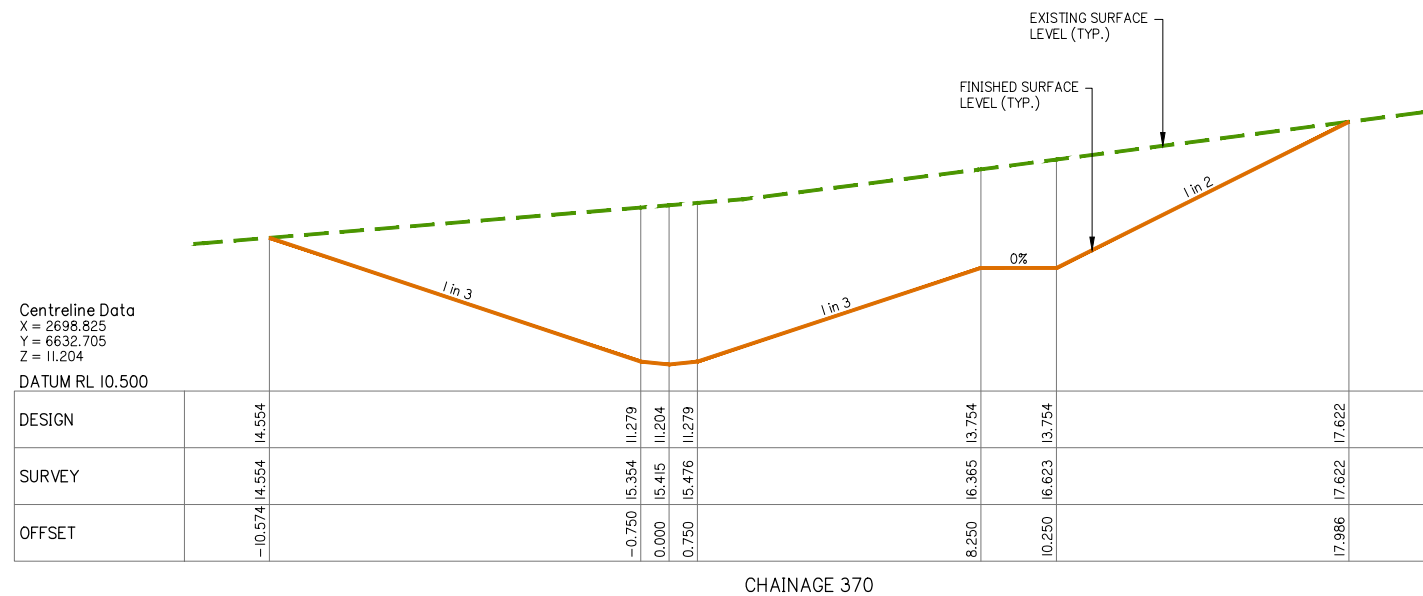
VERT: 

Scale at A1: AS SHOWN

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:
5941 ENG BE1 457

Rev. No:
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Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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RPD:

Lot:	501
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Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
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Contour Interval:	-
PSM:	-
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DRAWING TITLE
SWALE DRAIN A BULK
EARTHWORKS CROSS
SECTIONS SHEET 6 OF 11

A	20-12-2019	ORIGINAL ISSUE	JRG	MG	
Issue	Date	Description	DRN	GKX	

SCALE IN METRES

HOZ: 

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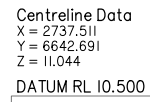
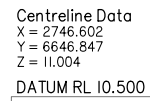
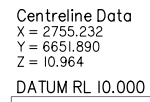
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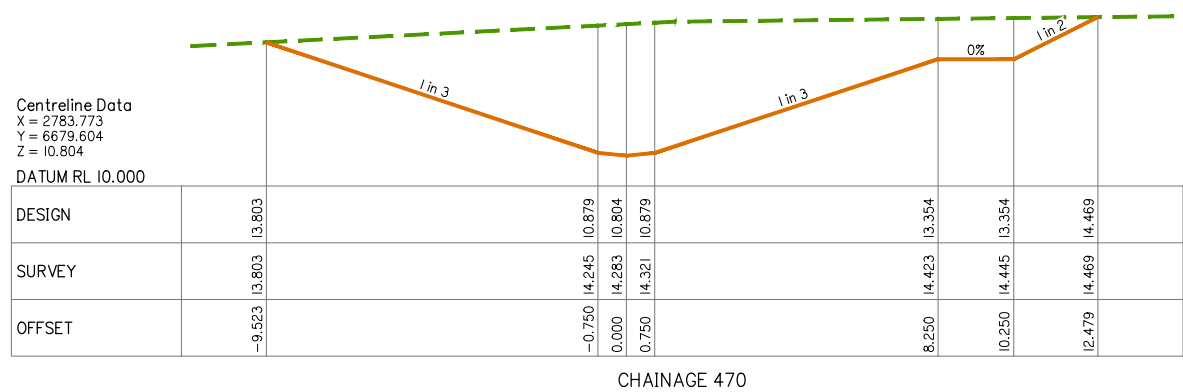
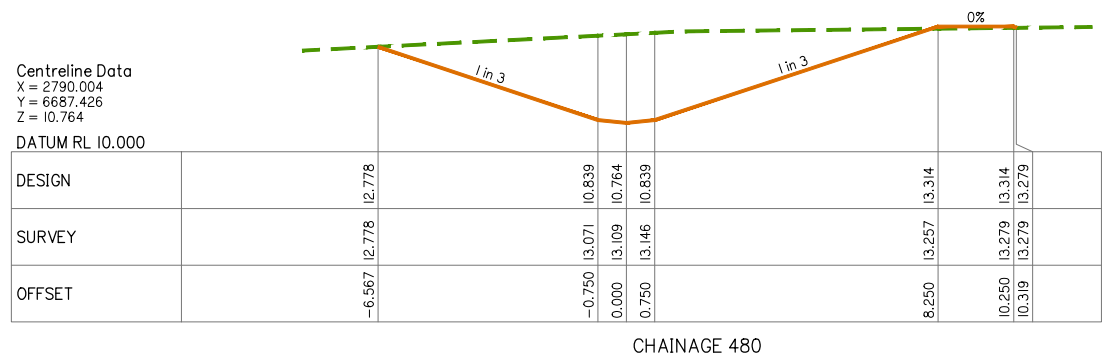
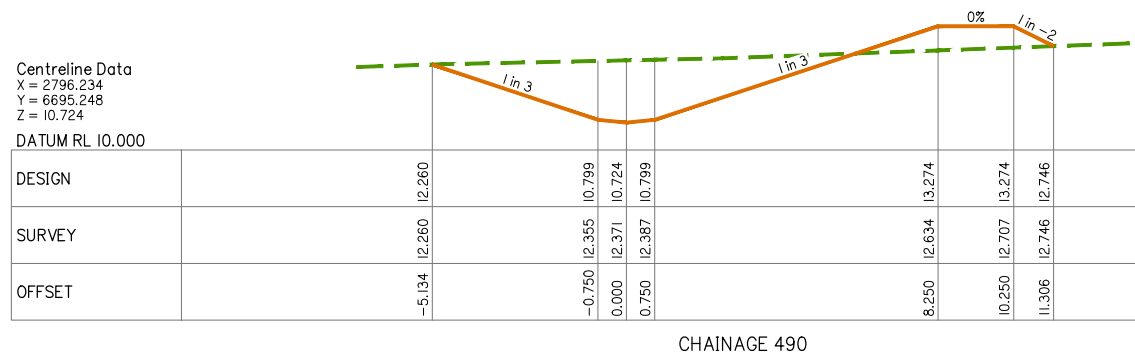
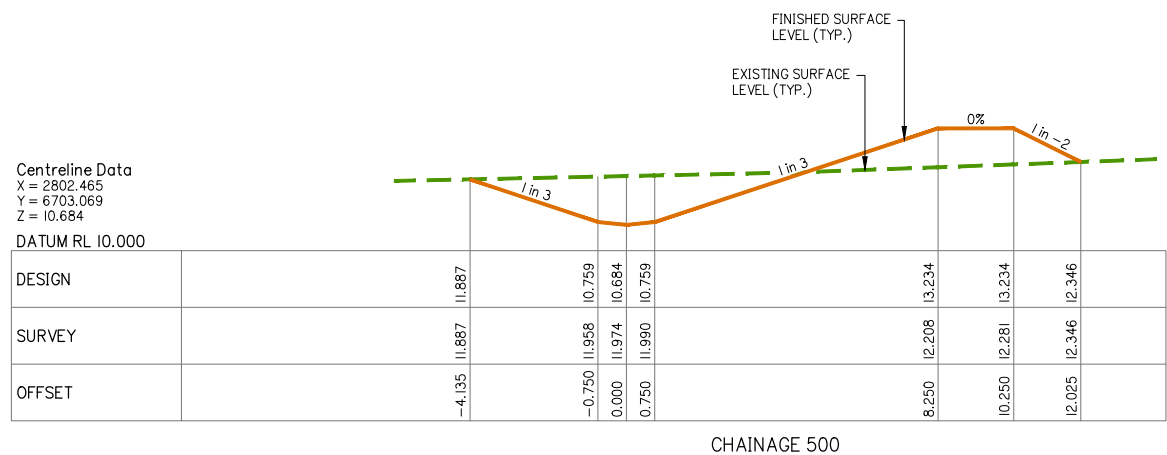
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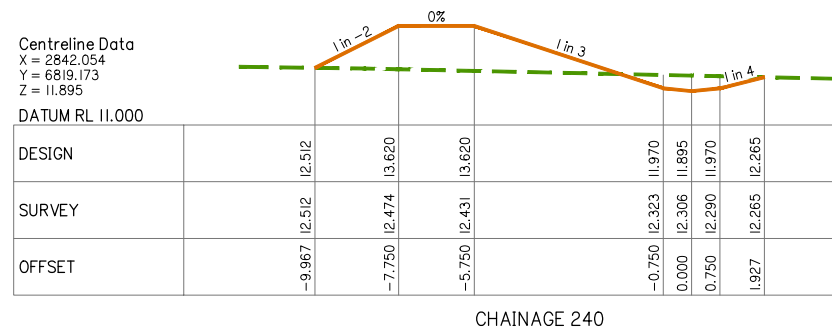
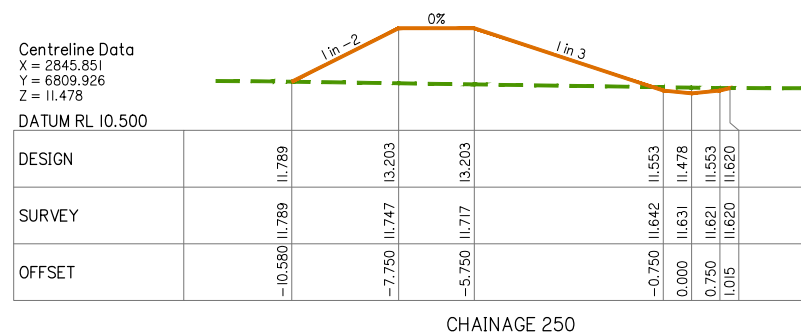
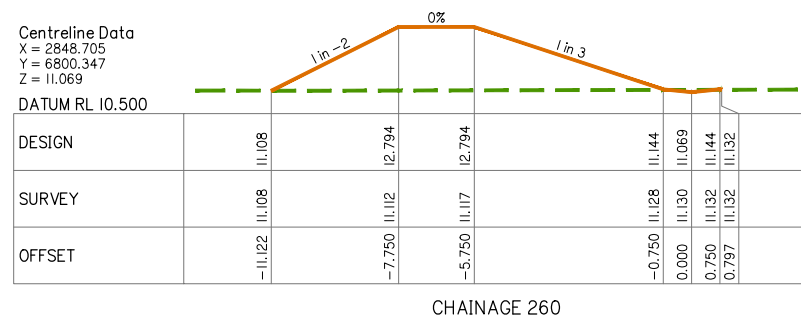
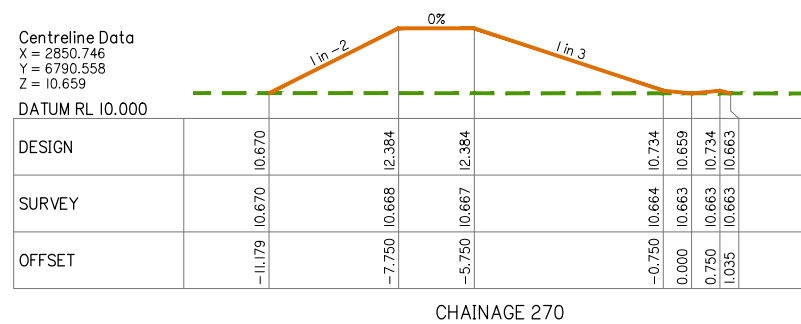
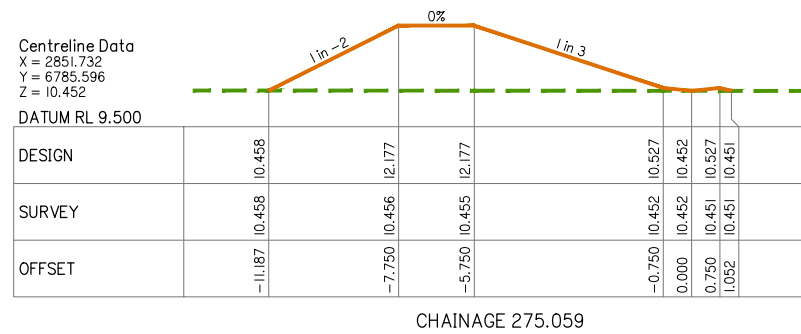
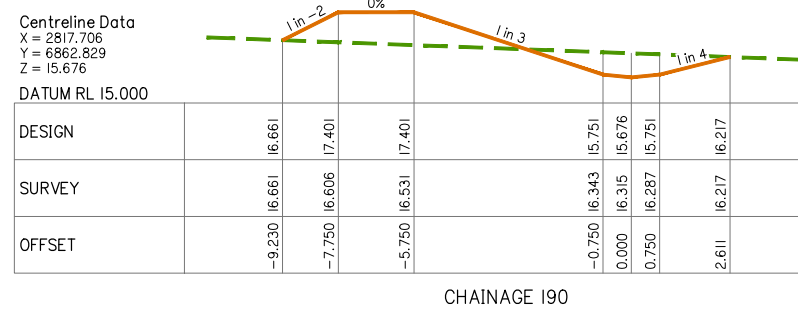
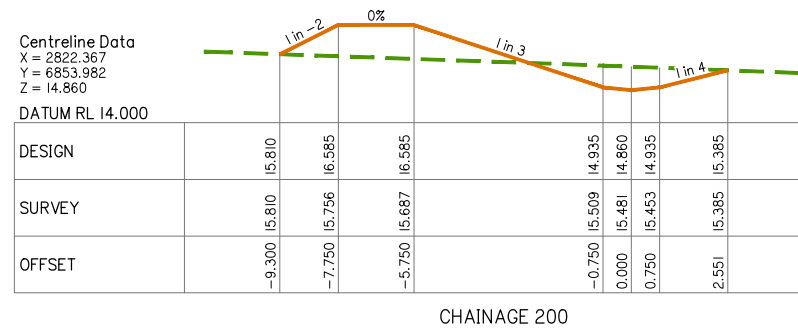
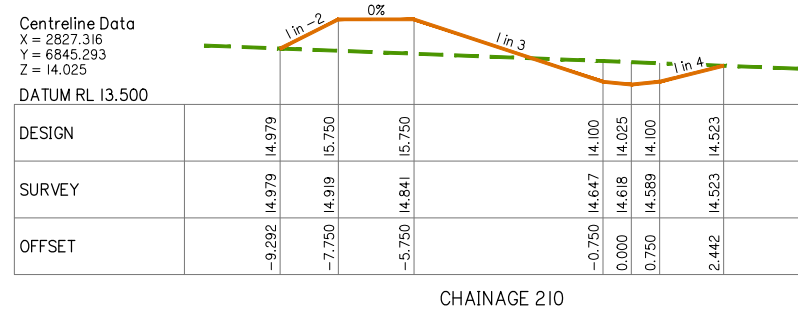
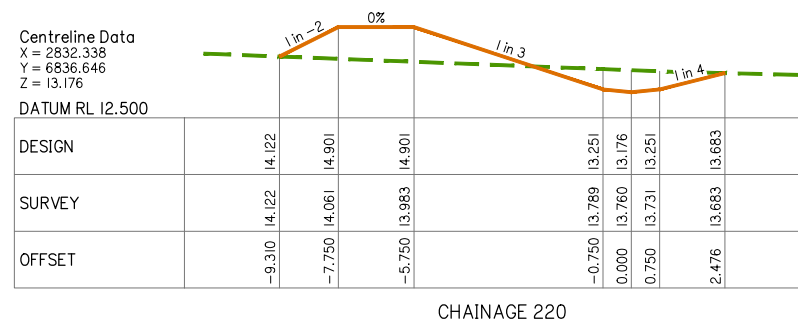
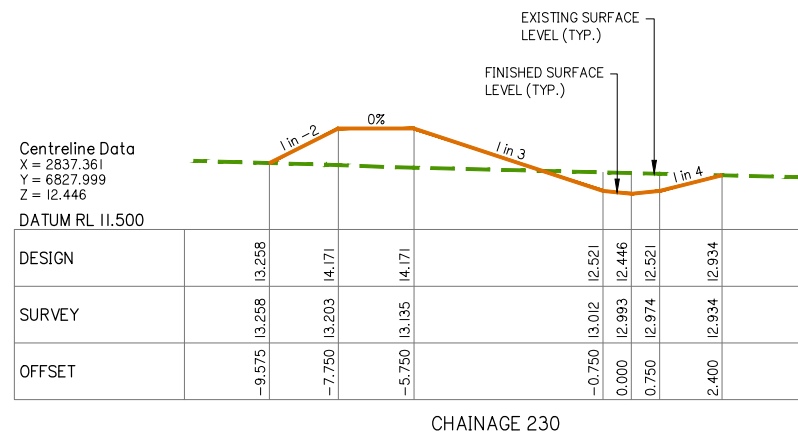
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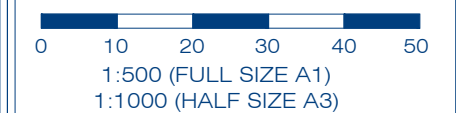
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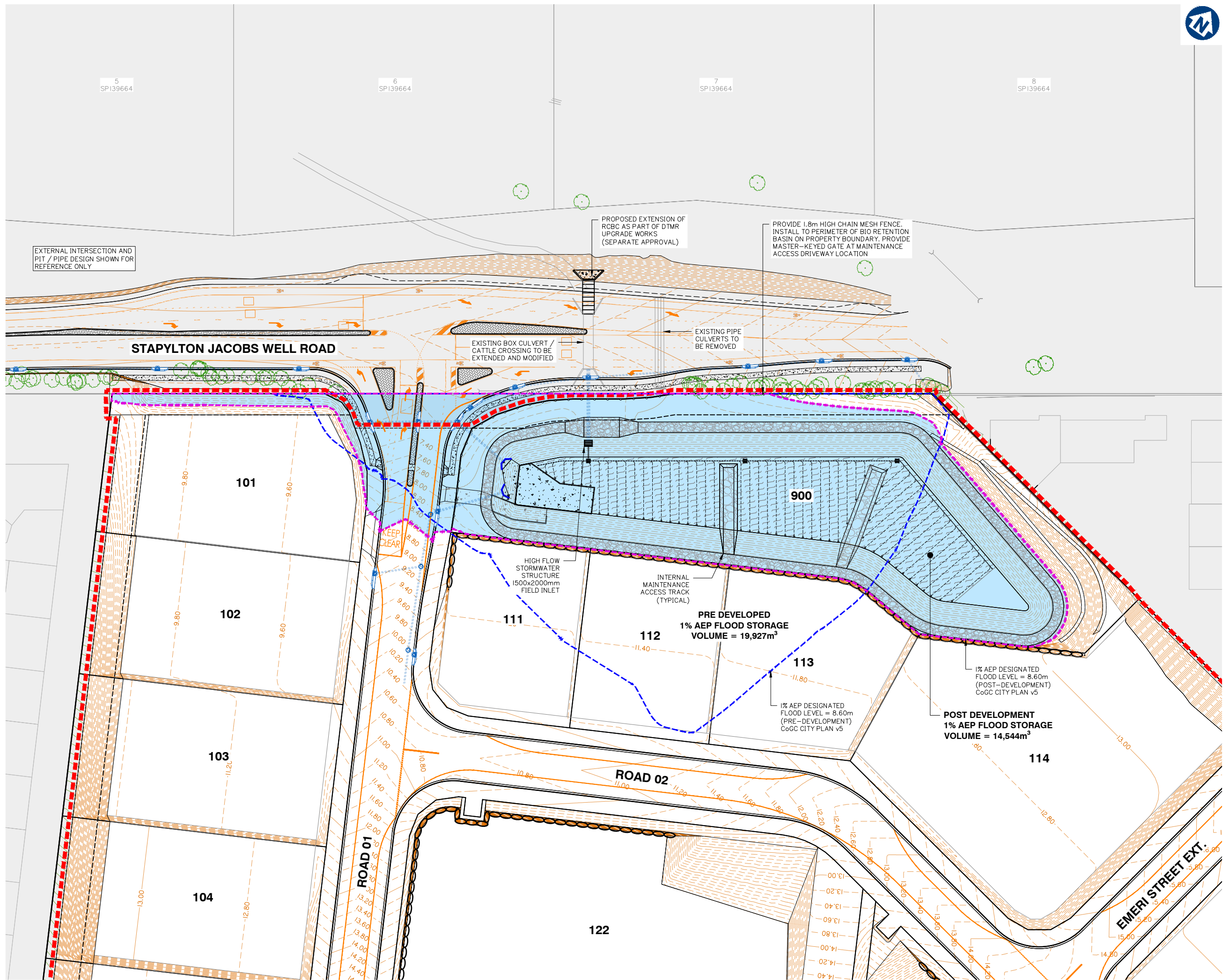
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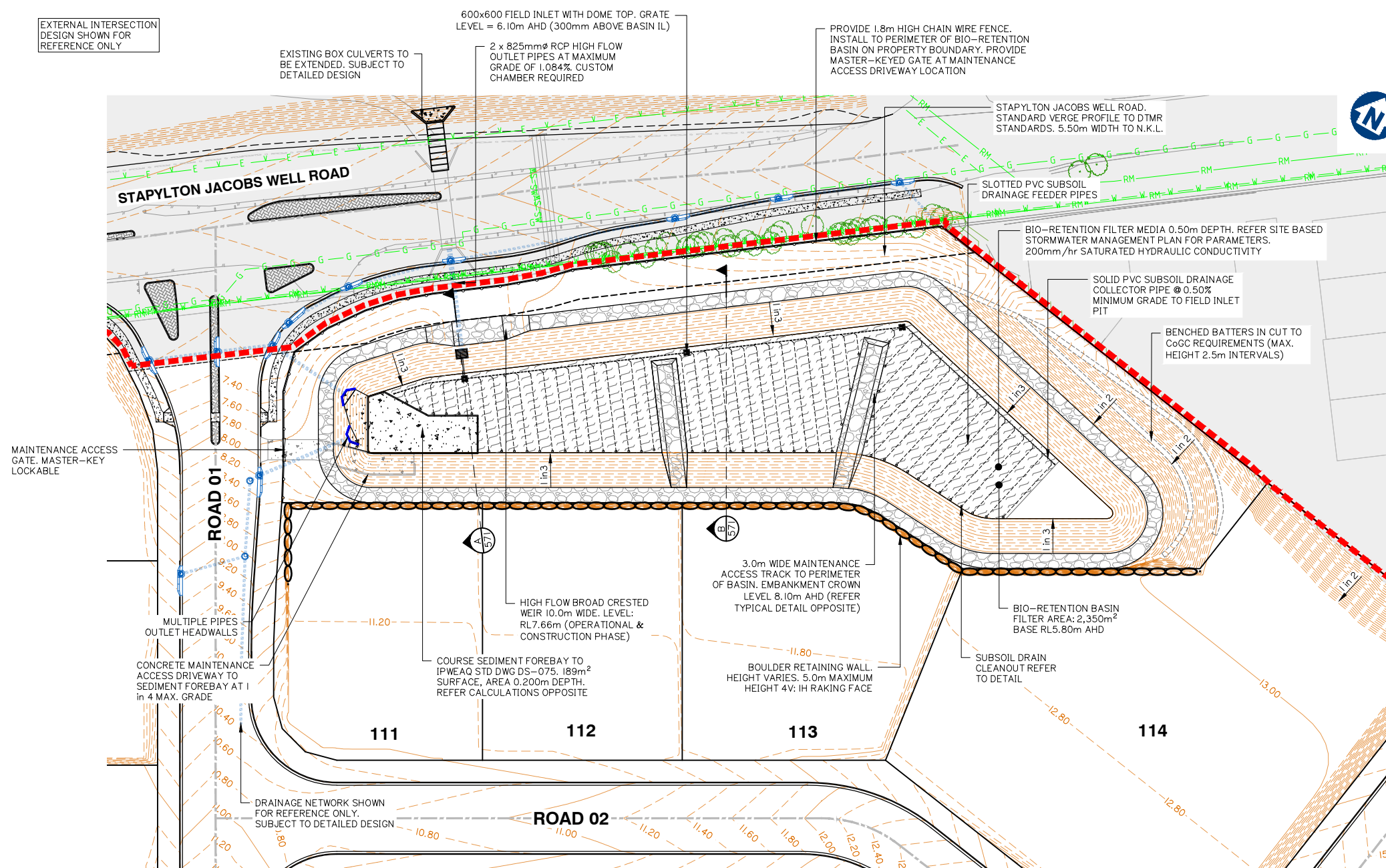
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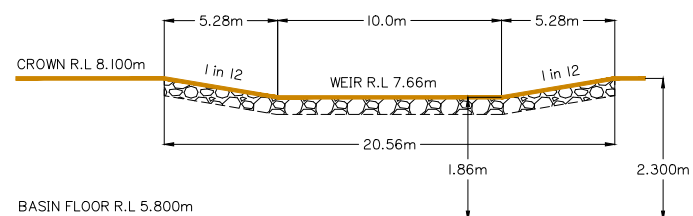
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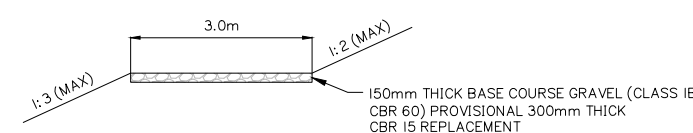
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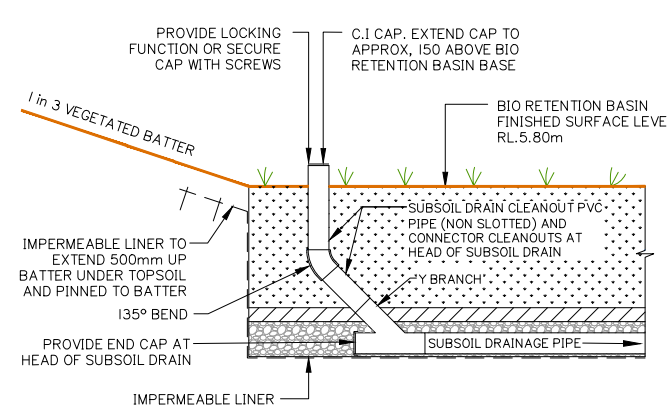
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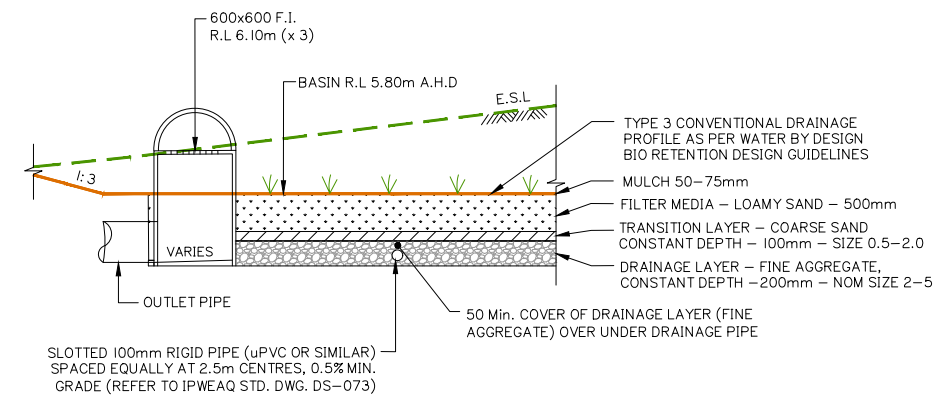
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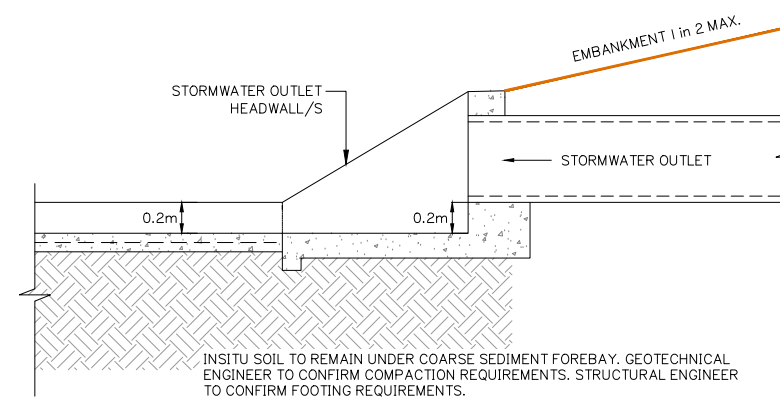
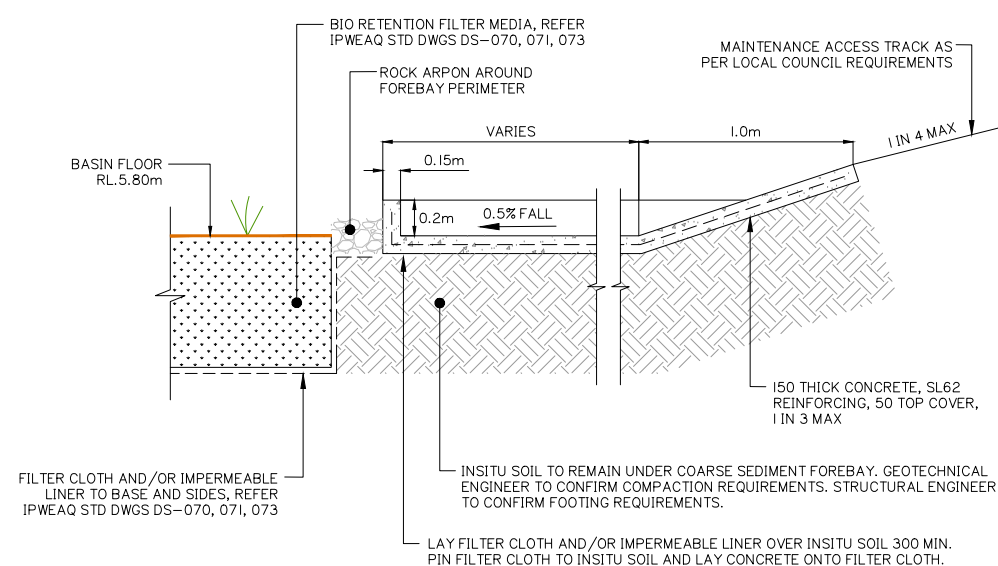
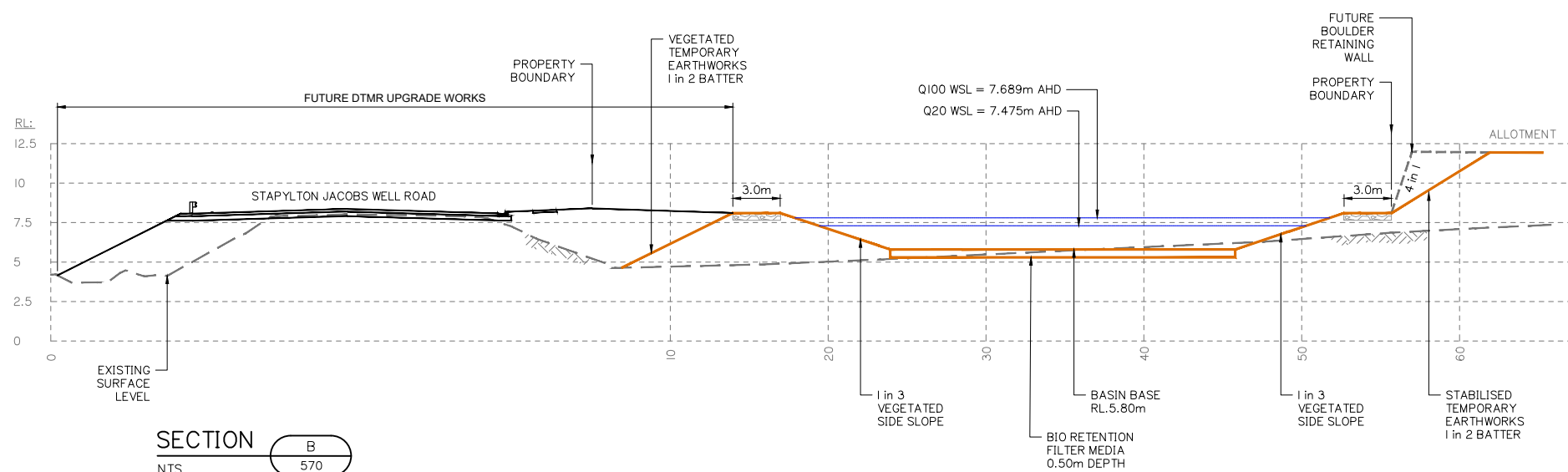
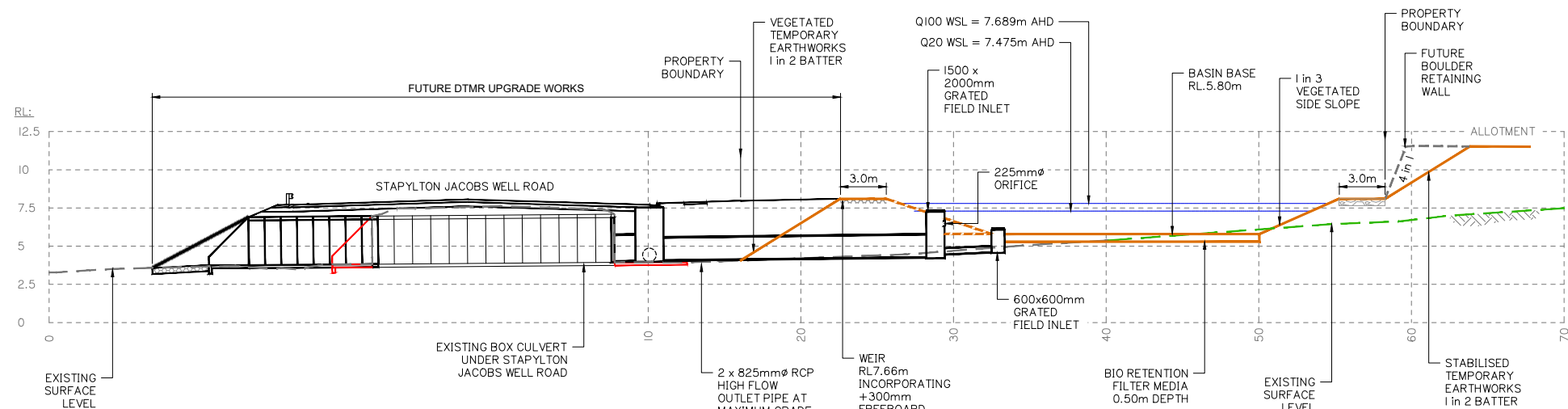
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TYPICAL BIO-RETENTION BASIN DETAIL

N.T.S



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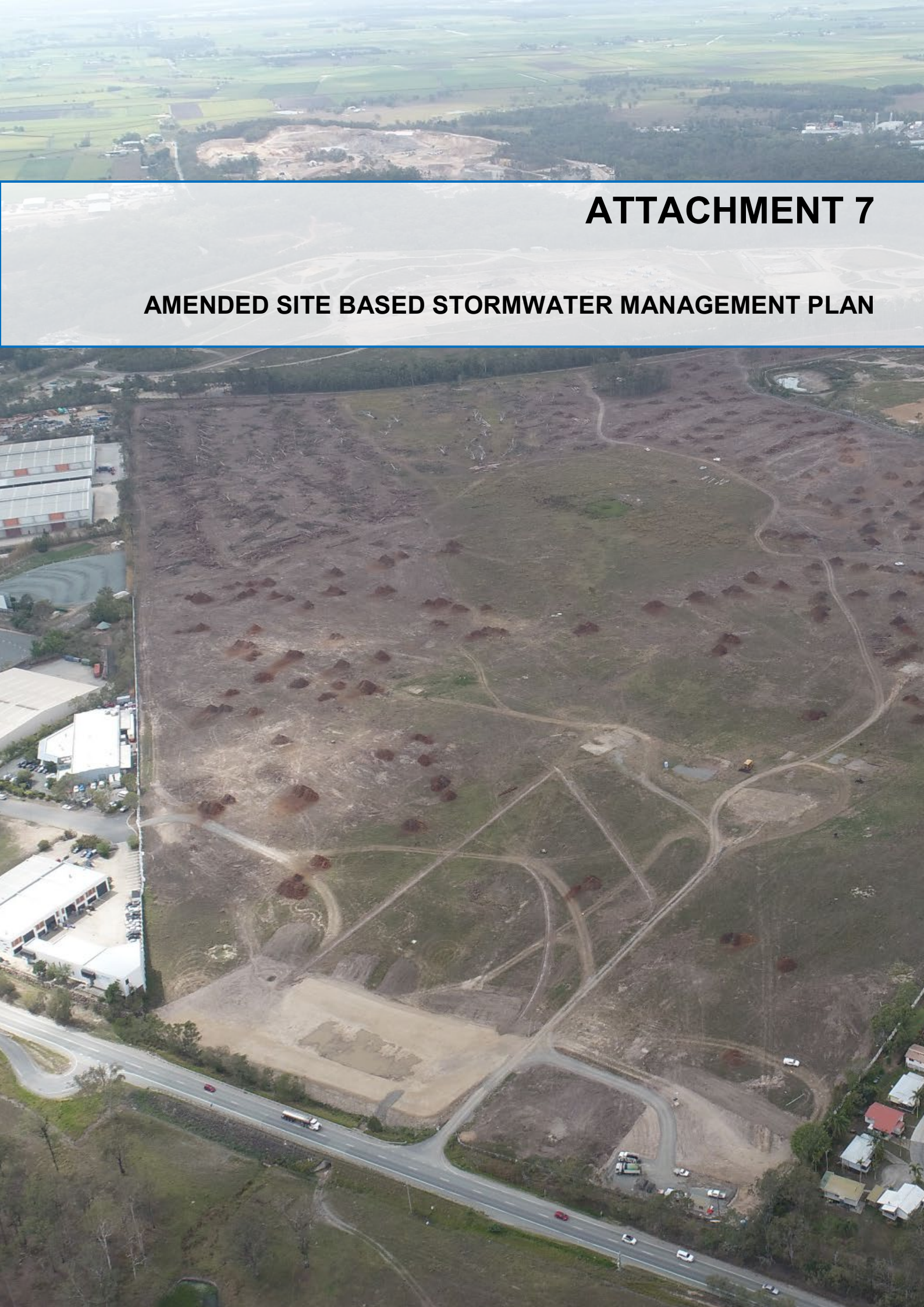
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ATTACHMENT 7

AMENDED SITE BASED STORMWATER MANAGEMENT PLAN

SITE BASED STORMWATER MANAGEMENT PLAN

CHANGE APPLICATION TO ROL201800079 STAGE 1 22 INDUSTRIAL LOTS

ADDRESS

60 Stapylton Jacobs Well Road, Stapylton

REAL PROPERTY DESCRIPTION

Lot 501 on SP295994

PREPARED FOR

Frasers Property (Australia) Pty Ltd

December 2019 (Rev. 1)



gassman
development
perspectives

project coordination
urban + regional planning
landscape + urban design
engineering services
environmental management
visualisation + spatial services
surveying services
advisory services

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Revision / Checking History

No.	Author	Reviewer	Date
INTERNAL DRAFT	Ian Grieves	Mitchell Gassman	16 December 2019
1.	Ian Grieves	Mitchell Gassman	20 December 2019

Approval for Issue

Rev. No.	Name	Position	Signature	Date
1.	Mitchell Gassman	Civil Project Engineer RPEQ 16939		20 December 2019

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City of Gold Coast Council (Assessment Manager)	1 electronic copy
GDP File	1 electronic copy

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1.0 INTRODUCTION

Gassman Development Perspectives (GDP) has been engaged by Frasers Property (Australia) Pty Ltd (Client) to prepare a Site Based Stormwater Management Plan over land situated at 60 Stapylton Jacobs Well Road, Stapylton (Lot 501 on SP295994) being the 'subject site'.

This report has been prepared for submission to City of Gold Coast Council (Council) as part of a Change Application to the existing Development Permit for Reconfiguration of Lot (Council Ref: ROL201800079) with the intent of investigating and addressing the stormwater quantity and stormwater quality requirements for the proposed development in accordance with the applicable State and Local Government standards.

Stormwater quantity is addressed through pre and post development scenarios modelled in XPSTORM software utilising temporal pattern inputs from the Australian Rainfall & Runoff (AR&R) Data Hub and the AR&R Storm Generator.

A strategy for managing post development peak flows discharging from the site and the required attenuation measures are provided to demonstrate that any increase in peak flows can be managed within the subject site as not to measurably impact neighbouring properties.

Stormwater quality analysis is also undertaken through the use of MUSIC software to confirm the adequacy of proposed Stormwater Quality Improvement Devices (SQIDs) required to meet the State Planning Policy's (SPP 2017) Water Quality Objectives (WQOs) and the pollutant removal targets set by City of Gold Coast Council.

It is noted that the extent of the proposed stormwater quantity and quality basin servicing the changed Stage 1 layout is consistent with the approved management plan being "Site Based Stormwater Management Plan – Development Application for Reconfiguration of Lot Revision 3" prepared by Gassman Development Perspectives dated 30 August 2018 (Job No. 5738).

A copy of the XP-STORM and MUSIC modelling data files can be provided upon request.

2.0 SITE CHARACTERISTICS

2.1 LOCATION

The subject site is located within the City of Gold Coast Council local government boundaries.

The subject site is bounded by Stapylton Jacobs Well Road and existing industrial uses to the north, Christensen Road and existing industrial uses to the west and City of Gold Coast Council's land fill facility to the east.

The site has recently been cleared of all vegetation under existing Operation Works approval obtained from Council.



Figure 2.1: Site Locality Plan, Source: QLD Globe 2019

2.2 SITE AREA

The current area of the site is 64.239 Ha of which the proposed bulk earthworks change to ground level works for Stage 1 makes up approximately 27.681 Ha, (19.34 Ha development stage area including the drainage reserve). Refer to **Appendix J** for the proposed Reconfiguration of a Lot (ROL) plan.

2.3 EXISTING TOPOGRAPHY AND SITE DRAINAGE

Along the south-eastern boundary of the subject site is the existing high point of 29.23m AHD with a ridge line extending through to the properties' northern boundary. This existing topography defines the existing catchments of the site and current stormwater discharge locations along the northern and eastern boundaries. These low points are visible within **Appendix A – Site Survey Plan** of the report with the pre development catchments defined within **Appendix B – Pre and Post Development Catchment Plans**.

2.4 EXISTING LAND USAGE

The subject land is vacant following the clearing of all vegetation in 2019.

2.5 PLANNING PROVISIONS AND PROPOSED DEVELOPMENT

The subject site is zoned “Low Impact Industry, Future Precinct” and “Medium Impact Industry, Future Precinct” under Council’s current City Plan. The current proposal involves creating further industrial lots created within the subject site which will require large scale bulk earthworks necessary to facilitate clear and flat earthwork pads suitable for this land use.

2.6 FLOODING

The subject site is located within the extent of the Flood Overlay as defined in Council’s City Plan Interactive Mapping – Version 7.

Compensatory earthworks within private property located off Yellowwood Road to the north was undertaken in 2019 to balance flood storage where fill within the subject site is proposed below the Designated Flood Level of RL8.60m AHD (Q₁₀₀) utilising CoGC City Plan v5 which was current at the time of the existing approval.

On-site regional flood storage volumes have been calculated for the site based on Council’s provided flood level of 8.60m AHD (*City Plan v5*) and the existing surface levels within the property boundary. The volume of on-site regional flood storage is equal to 19,927m³. In summary, the compensatory balance flood storage works was provided as follows:

Site Address	Available Q ₁₀₀ Flood Storage Volume	
	Pre Developed	Post Developed
60 Stapyllton Jacobs Well Road, Stapyllton	19,927 m ³	14,544 m ³
Shortfall of Flood Storage at Subject Site	5,383 m ³	
Earthworks below Q ₁₀₀ at Yellowwood Rd	5,769 m ³ *	

* A gain of 386 m³ of flood storage has been achieved in the post development scenario.

Appendix D provides detailed drawings of the bulk earthworks undertaken and that a flood storage balance between the pre and post development scenario has been achieved.



3.0 CONVEYANCE MANAGEMENT AND PRE AND POST DEVELOPMENT CATCMENTS

3.1 LAWFUL POINT OF DISCHARGE

The *Queensland Urban Drainage Manual* (QUDM) 1992 edition *formerly* set criteria that defined a lawful point of discharge for a proposed development. The term described a two-point test. This criterion is obsolete.

The meaning defined in QUDM 2017 is different from the more general term 'lawful discharge of stormwater' because it *“requires the stormwater to be released at a location that is under the lawful control of the local government or other statutory authority from whom permission to discharge has been received.”*

The revised criteria for determining a lawful point of discharge are: (taken from QUDM 2017)

- i) Will the proposed development alter the sites stormwater discharge characteristics in a manner that may substantially damage a third party property?

- ii) Is the location of the discharge from the development site under the lawful control of the local government or other statutory authority from whom permission to discharge has been received?
- iii) An authority to discharge over affected properties will be necessary. In descending order of certainty, an authority may be in the form of: a) dedication of a drainage reserve or park, b) a registered easement for stormwater discharge / works or written discharge approval.

The subject development proposal will utilise one (1) lawful point of discharge being to the northern boundary of the site; utilising the existing 2.70m x 3.00m RCBC “cattle crossing” located under Stapylton Jacobs Well Road. The existing structure – historically used for paddock-to-paddock farm access is an asset of DTMR. An extension to this structure is required to accommodate for the widened carriageway of the ultimate DTMR signalised intersection upgrade which provides vehicular access to the development. Please refer to **Appendix M** for the detailed functional layout plans of the intersection.

Modifications works to the upstream side of the cattle crossing culvert are required to provide a suitable utility services corridor within the upgraded verge. Modifications will involve reducing the height of the box culvert cell by replacing with multiple pipe culverts in conjunction with the basin outlet configuration works.

3.2 PRE DEVELOPMENT CATCHMENTS

The existing natural slope currently dictates the overland flow and drainage pattern of the subject site as illustrated in the pre development stormwater catchment plan within **Appendix B**. The flow patterns generally follow the ridgeline falling towards the existing low points of the site.

3.3 POST DEVELOPMENT CATCHMENTS

The intent of the proposed bulk earthworks outlined within this Stormwater Management Plan is to generally follow the pre development conditions to ensure no worsening of stormwater impacts downstream both during and post the construction period.

Whilst the proposed bulk earthworks over the site generally flatten the existing steep grades of the land as part of creating the earthworked pads, the increase in impervious areas associated with the proposed land use mean that a hydrologic review is required to determine the changes in discharge characteristics (i.e. peak flow, water quality) from the site and to identify suitable attenuation measures that need to be implemented to mitigate any potential downstream impacts.

The post development catchments are illustrated within the post development catchment plan included within **Appendix B**.

4.0 HYDROLOGICAL ASSESSMENT

4.1 TEMPORAL PATTERNS AND RAINFALL DATA

Rainfall data for use in XPSTORM software has been sourced from the Australian Rainfall & Runoff 2016 Storm Generator and the AR&R Data Hub. This application generates rainfall data for the various design storm hydrographs which have been utilised in the below modelling of stormwater runoff from the subject site.

Appendix H contains a copy of the Intensity-Frequency-Duration (IFD) data sourced from the Bureau of Meteorology (BoM) utilised for the hydraulic analysis and sediment basin sizing.

Appendix I contains a copy of the AR&R Data Hub rainfall data utilised for the XPSTORM hydrological analysis. It is noted that the predicted climate change factors, and pre-burst losses are incorporated into the data for analysis.

4.2 CATCHMENTS

As discussed within Section 3 of this report the pre and post development stormwater catchments (refer **Appendix B**) have been determined using a combination of the site based Contour and Detail survey undertaken by Gassman Development Perspectives (refer **Appendix A**) along with LiDAR survey of the surrounding area to identify any potential external catchments.

A summary of the parameters assigned to these sub-catchments used to assess the pre and post development flows is contained within *Tables 4.2A, 4.2B and 4.2C* below which aligns with the two scenarios assessed within this reporting.

Parameter		Sub-Catchments (Pre Development - Total Site)		
Name		CAT-X1	CAT-X2	CAT-1
Area (Ha)		1.637	2.182	12.715
Vectored Slope (%)		1.00	1.00	5.41
Impervious Area (%)		90.00	90.00	5.00
Pervious Area (%)		10.00	10.00	95.00
Roughness (n)		0.020	0.020	0.080
Parameter		Catchments (Pre Development - Total Site)		
Name		CAT-2	CAT-3	CAT-4
Area (Ha)		7.114	3.015	8.666
Vectored Slope (%)		5.95	5.54	5.80
Impervious Area (%)		1.00	0.00	0.00
Pervious Area (%)		99.00	100.00	100.00
Roughness (n)		0.050	0.080	0.100
Parameter		Catchments (Pre Development - Total Site)		
Name		CAT-5	CAT-6	CAT-6A
Area (Ha)		4.144	6.474	4.767
Vectored Slope (%)		4.02	3.91	3.50
Impervious Area (%)		0.00	0.00	35.00
Pervious Area (%)		100.00	100.00	65.00
Roughness (n)		0.050	0.100	0.030
Parameter		Catchments (Pre Development - Total Site)		
Name		CAT-7	CAT-7A	CAT-8
Area (Ha)		9.981	3.410	2.481
Vectored Slope (%)		3.51	2.50	3.00
Impervious Area (%)		0.00	85.00	0.00
Pervious Area (%)		100.00	15.00	100.00
Roughness (n)		0.060	0.020	0.060
Parameter		Catchments (Pre Development - Total Site)		
Name		CAT-9	CAT-10	
Area (Ha)		2.210	8.523	
Vectored Slope (%)		2.21	6.75	
Impervious Area (%)		0.00	9.50	
Pervious Area (%)		100.00	90.50	
Roughness (n)		0.060	0.030	

Table 4.2A: Pre Development Catchment Parameters

Parameter		Catchments (Total Site)	
Reporting Location	LPoD-1	LPoD-2	LPoD-3
Contributing Sub Catchments	CAT-1, CAT-2, CAT-3, CAT-X2, CAT-4, CAT-5, CAT-6, CAT-6A, and CAT-X1	CAT-7 and CAT-7A	CAT-8
Area (Ha)	50.714	13.391	2.481
Vectored Slope (%)	4.01	3.01	3.00
Impervious Area (%)	3.10	2.50	0.00
Pervious Area (%)	96.90	97.50	100.00
Roughness (n)	0.059	0.059	0.060
Initial Loss (mm)	17.20	17.20	17.20
Continuing Loss (mm/hr)	1.10	1.10	1.10

Parameter		Catchments (Total Site)	
Reporting Location	LPoD-4	LPoD-5	
Contributing Sub Catchments	CAT-9	CAT-10	
Area (Ha)	2.21	8.523	
Vectored Slope (%)	2.21	6.75	
Impervious Area (%)	0.00	9.50	
Pervious Area (%)	100.00	90.50	
Roughness (n)	0.060	0.030	
Initial Loss (mm)	17.20	5.00	
Continuing Loss (mm/hr)	1.10	2.50	

Table 4.2B: Contributing Catchment Parameters to Reporting Locations

Parameter		Catchments (Post Development - Stage 1)	
Name		DEV-5 <i>Impervious Catchment</i>	DEV-5 <i>Pervious Catchment</i>
Total Area (Ha)		15.071 (81% Impervious, 19% Pervious)	
Area Split (Ha)		12.208	2.863
Vectored Slope (%)		1.70	1.70
Impervious Area (%)		100.00	0.00
Roughness (n) for Impervious Area		0.020	-
Pervious Area (%)		0.00	100.00
Roughness (n) for Pervious Area		-	0.035
Initial Loss (mm)		0.00	17.20
Continuing Loss (mm/hr)		2.50	1.10

Table 4.2C: Post Development Catchment Parameters

4.3 LAND USE

Land uses were mapped within the pre and post development catchments with the varying hydraulic roughness and hydrological losses input into the XPSTORM model summarised in *Table 4.3 below*.

Land Use Type DEV-5 ONLY	Initial Loss (mm)	Continuing Loss (mm/hr)
Pre Developed		
Pervious	5.00	2.50
Impervious	0.00	2.50

Land Use Type DEV-5 ONLY	Initial Loss (mm)	Continuing Loss (mm/hr)
Post Developed		
Pervious	17.20	1.10
Impervious	0.00	2.50

Land Use Type	Initial Loss (mm)	Continuing Loss (mm/hr)
Pre Developed		
Pervious	17.20	1.10
Impervious	0.00	1.10

Land Use Type	Initial Loss (mm)	Continuing Loss (mm/hr)
Post Developed		
Pervious	17.20	1.10
Impervious	0.00	1.10

Table 4.3: Summary of Adopted Initial & Continuing Losses (AR&R Data-HUB 2016)

4.4 PRE AND POST DEVELOPMENT FLOW CALCULATIONS

XPSTORM modelling software was utilised to determine the pre and post development discharge flow rate for each catchment based on the parameters listed above.

The computations were undertaken for the standard Average Exceedance Probabilities (AEP) 63.2%, 50%, 20%, 10%, 5%, 2% and 1%.

Catchment runoff volumes to the respective existing Lawful Points of Discharge (reporting locations) are summarised in *Table 4.4*.

Catchment	Peak Flow Rates for Average Exceedance Probability (m ³ /s)						
Pre Developed Condition	63.2%	50%	20%	10%	5%	2%	1%
LPOD-1	3.962	5.027	8.634	10.998	13.938	15.758	18.356
LPOD-2	1.161	1.493	2.540	3.136	3.844	4.541	5.336
LPOD-3	0.278	0.351	0.555	0.665	0.789	0.991	1.150
LPOD-4	0.219	0.283	0.465	0.563	0.676	0.808	0.923
LPOD-5	1.769	2.049	2.919	3.571	4.148	4.818	5.487

Catchment	Peak Flow Rates for Average Exceedance Probability (m ³ /s)						
Post Developed Condition	63.2%	50%	20%	10%	5%	2%	1%
LPOD-5	3.913	4.427	6.106	7.253	8.358	9.717	10.723

Table 4.4: Flow Rates Calculated Using the Laurenson Method in XPSTORM

Figure 4.12 below contains the pre-developed peak flow rate hydrographs per reporting location / lawful point of discharge:

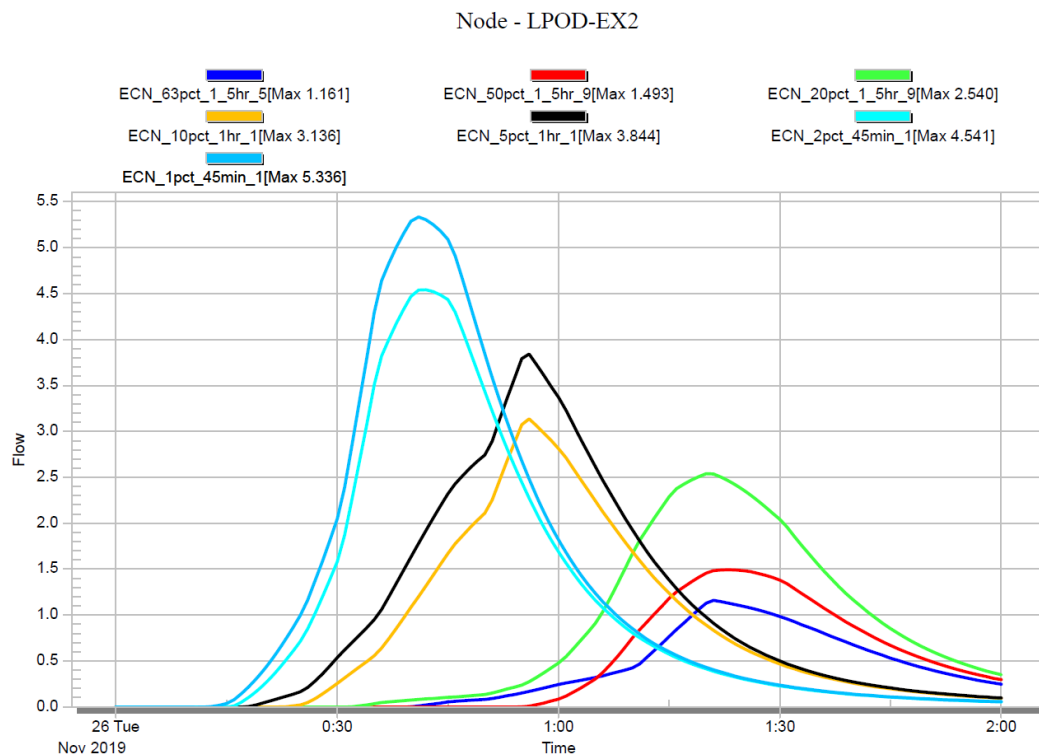
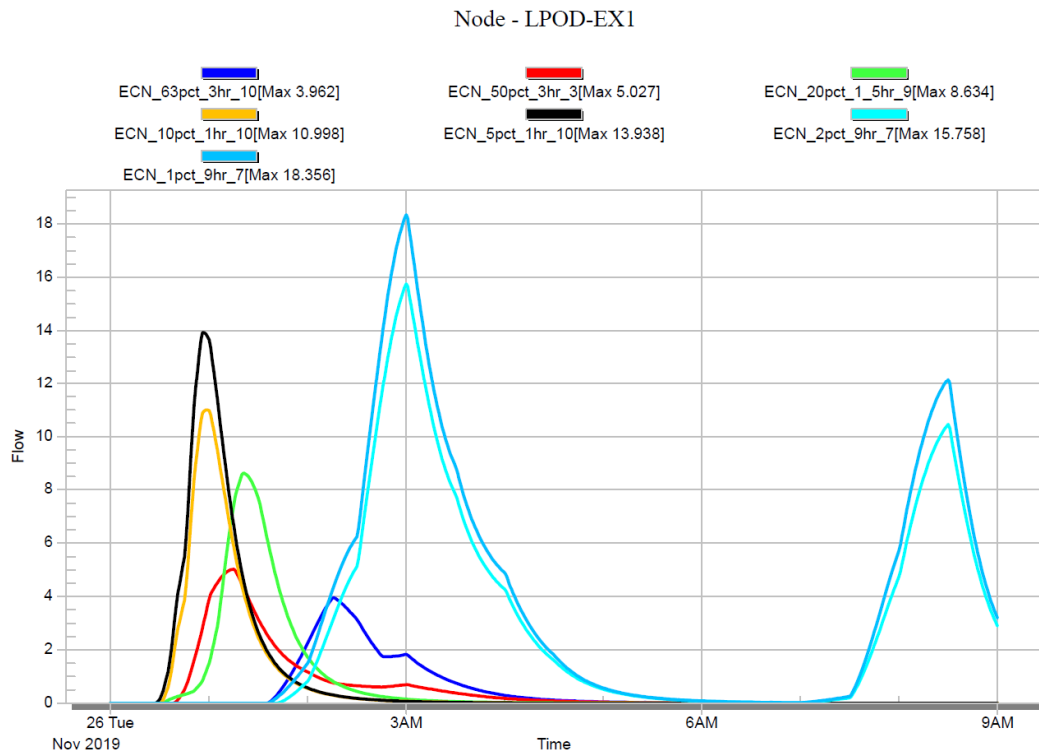


Figure 4.12: Pre Developed Peak Flow Rate Hydrographs

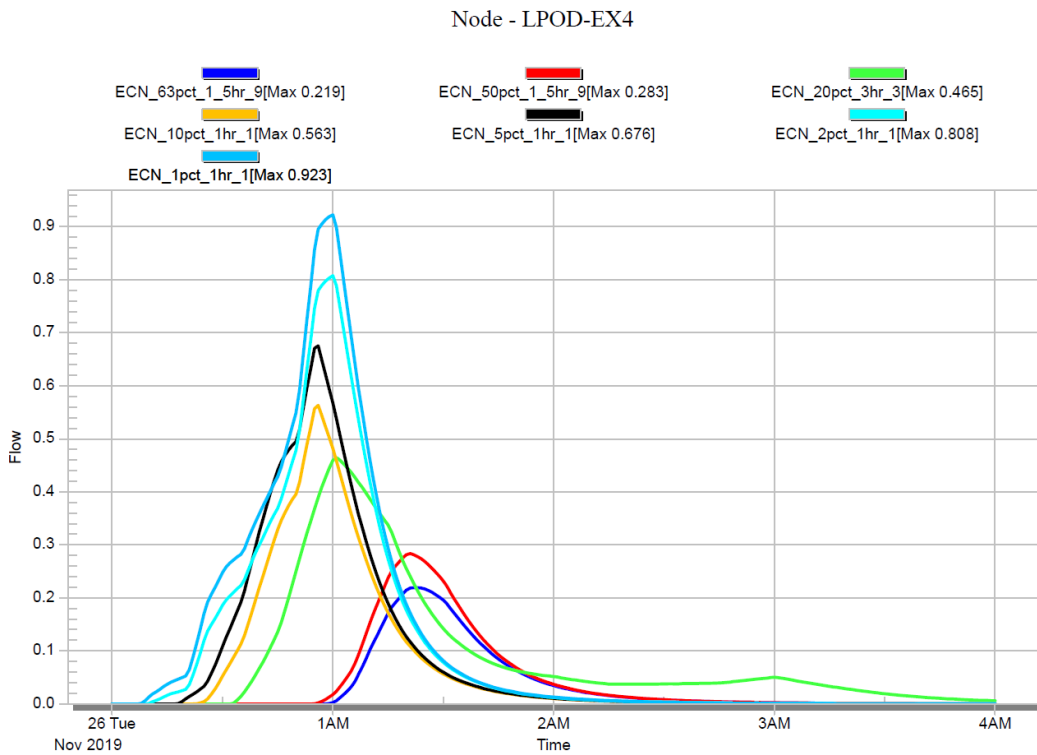
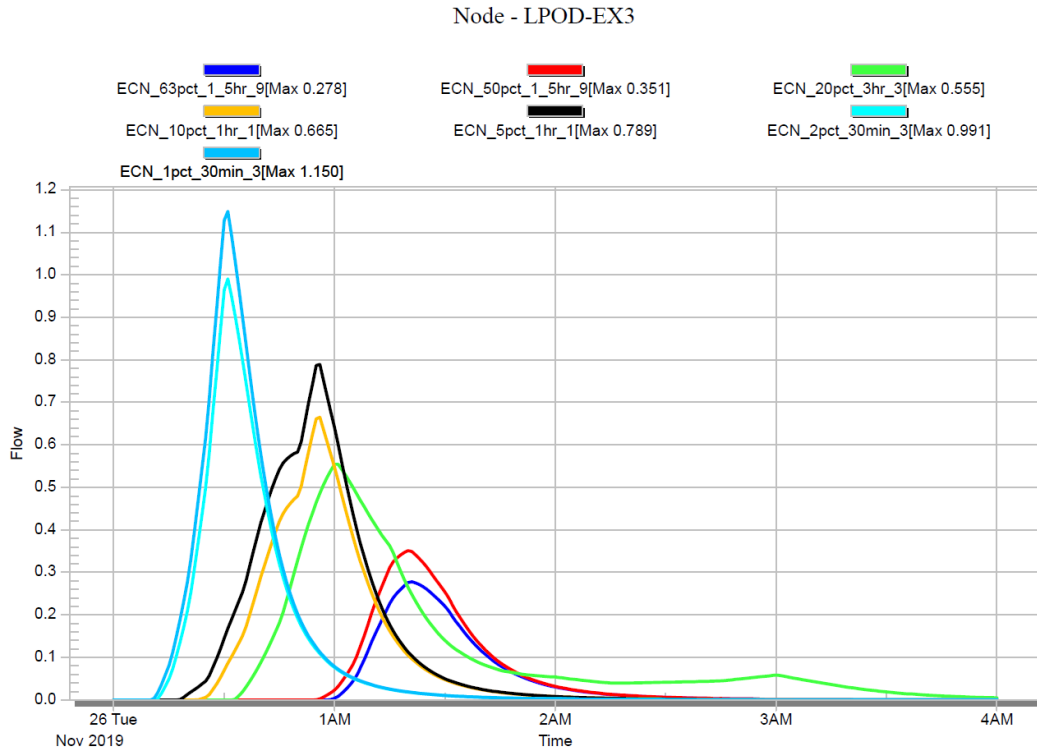


Figure 4.12: Pre Developed Peak Flow Rate Hydrographs (cont.)

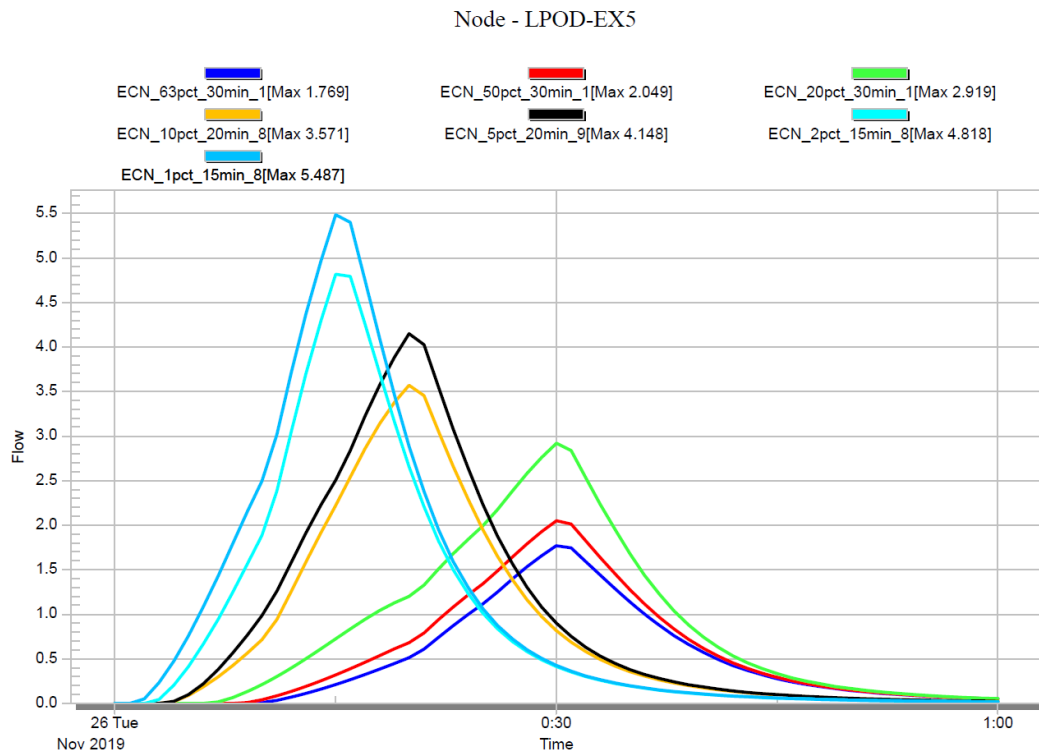


Figure 4.12: Pre Developed Peak Flow Rate Hydrographs (cont.)

Figure 4.13 below contains the *post* developed peak flow rate hydrograph at the reporting location / lawful point of discharge (CAT-10A / LPoD-5):

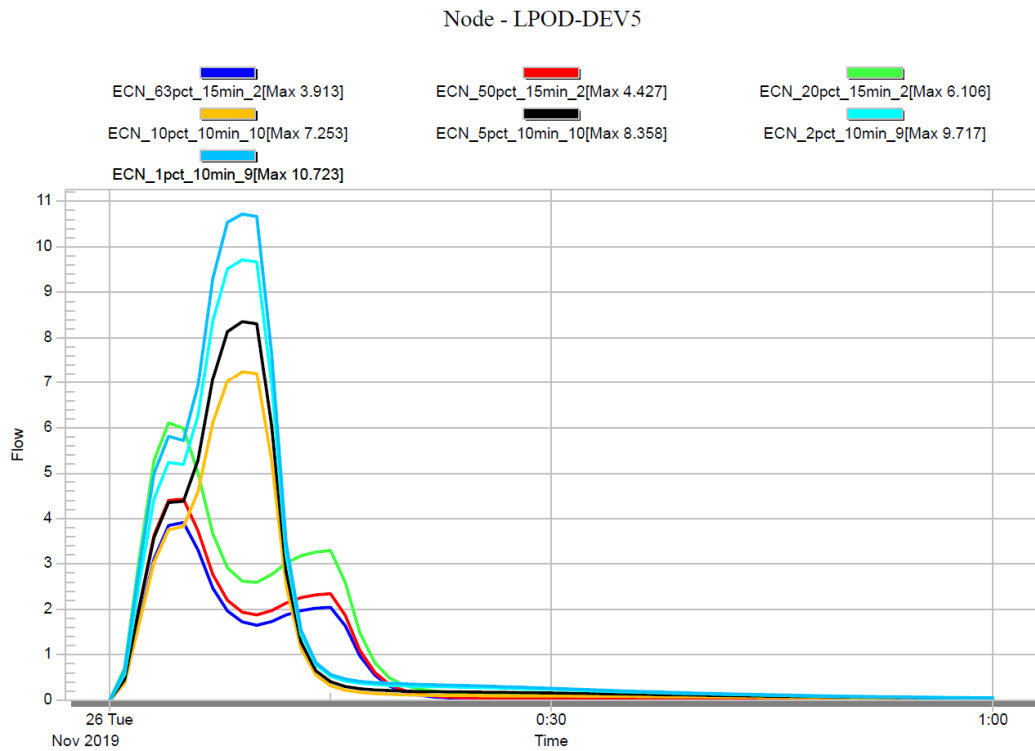


Figure 4.13: Post Developed Peak Flow Rate Hydrograph

5.0 STORMWATER QUANTITY, DETENTION & HYDRAULIC DESIGN

5.1 ATTENUATION OF DEVELOPED FLOWS

To ensure that the increased flow rates from the developed site have minimal impact on downstream property, the following hydrological objective has been set for stormwater exiting the subject site;

- *No increase in peak discharge flow rates from the developed site to downstream infrastructure.*

To achieve this objective, stormwater discharge from the development site must be detained to pre-development flow rates for all storms events up to and including the 1% AEP (equiv. to Q_{100}). The following sections provide a summary of the procedure used to design the onsite detention system at subject site.

5.2 METHODOLOGY

For the site catchment identified as having increase in peak flow rates when developed, a hydrologic model was created using XPSTORM. The model was then used to route post-development runoff through various proposed detention structures to determine the most efficient on-site detention system.

5.2.1 MODEL CONDITIONS

In XPSTORM three (3) hydraulic conditions were modelled in order to demonstrate the stormwater quantity, detention and hydraulic objective;

1. Existing Condition - Current condition of site with all the external catchments to assess the natural hydrology.
2. Developed Condition - Future condition of site when developed with all the external catchments. The main changes in hydrology as part of development include; increase in impervious area of the subject site due to the construction of the hardstand and other impervious areas and reduction in Manning's roughness coefficient for sections of the site to be developed.
3. Mitigated Condition - Future condition of site when developed with proposed detention structures in place with all the external catchments *where applicable*.

5.2.2 CRITICAL STORM EVENT AND DURATIONS

An analysis of storm events ranging from 63.2% AEP to 1% AEP was undertaken to determine the critical storm event and the critical storm duration per catchment. The determined critical storm events for the pre developed and post developed condition are indicated in *Table 5.2.2* below.

MODEL CONDITION	CRITICAL STORM EVENT	PEAK DURATION	PEAK FLOW
Pre Developed	AEP / Storm Ensemble #	(mins)	(m ³ /s)
LPOD-1	1% / 7	540 mins (9 Hrs)	18.356
LPOD-2	1% / 1	45 mins	5.336
LPOD-3	1% / 3	30 mins	1.150
LPOD-4	1% / 1	60 mins	0.923
LPOD-5	1% / 8	15 mins	5.487

MODEL CONDITION	CRITICAL STORM EVENT	PEAK DURATION	PEAK FLOW
Post Developed	AEP / Storm Ensemble #	(mins)	(m ³ /s)
LPOD-5	1% / 9	10 mins	10.723

Table 5.2.2: Critical Storm Event and Duration Summary Table

Critical storm duration hydrographs per model condition are indicated in *Figures 5.2.1 and 5.2.2*.

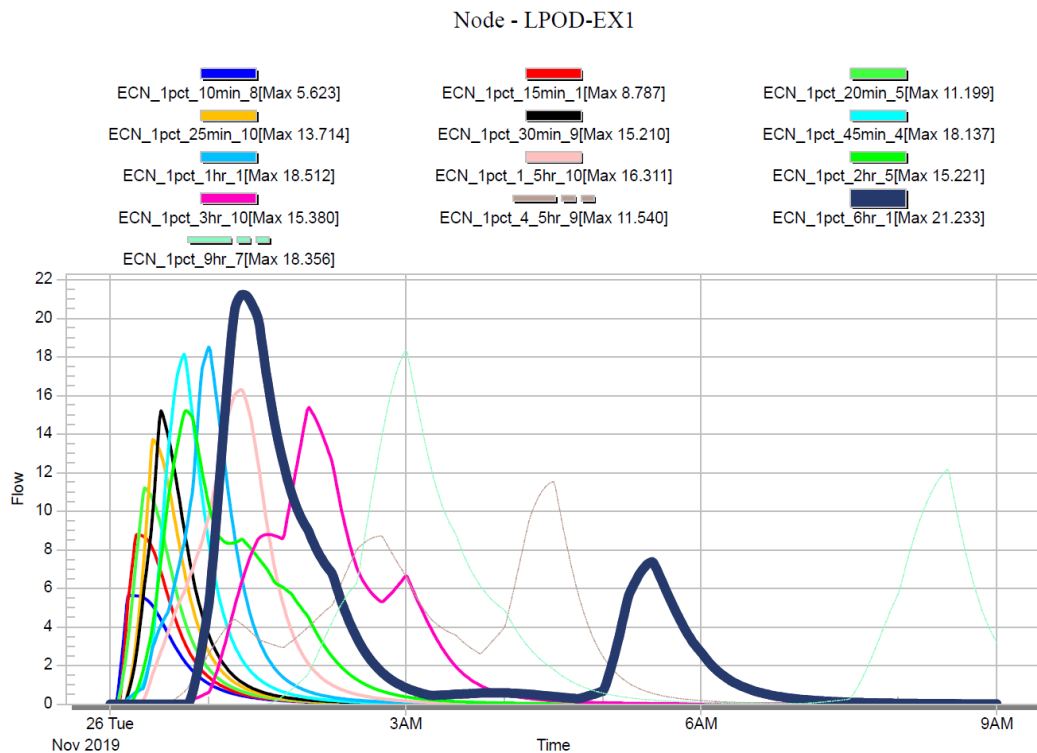
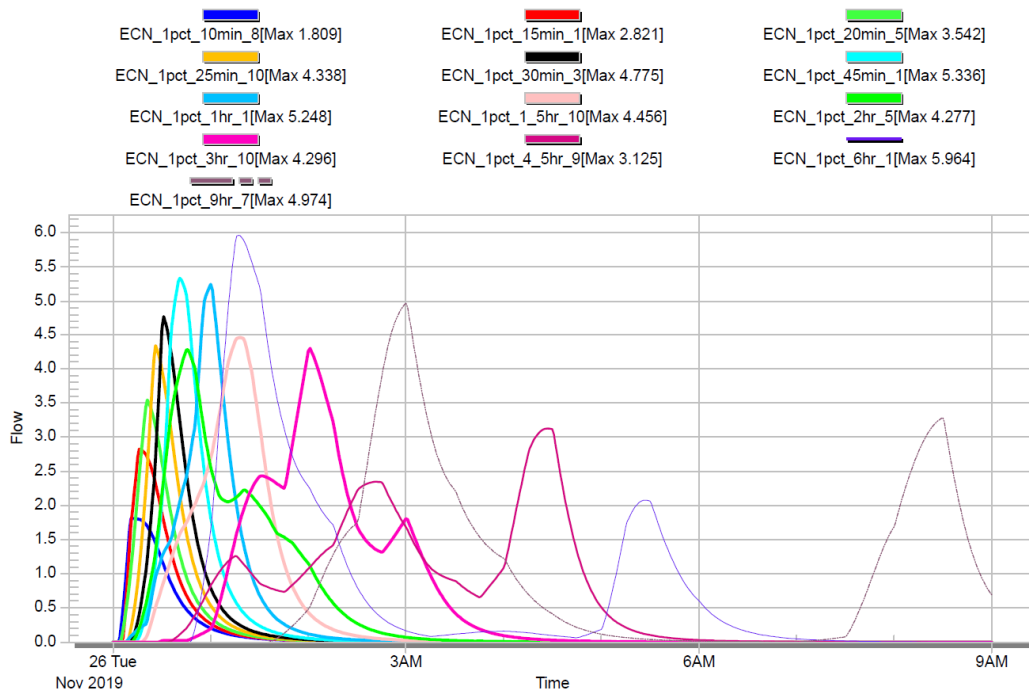


Figure 5.2.1: Critical Storm Event Durations for *Pre Developed* Catchments

Node - LPOD-EX2



Node - LPOD-EX3

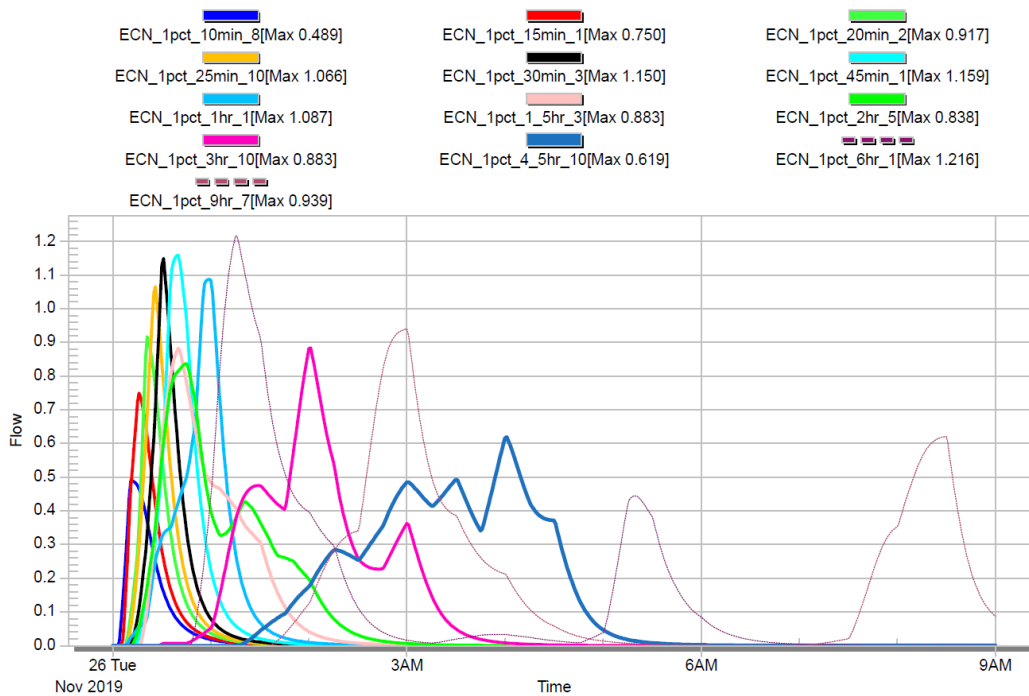
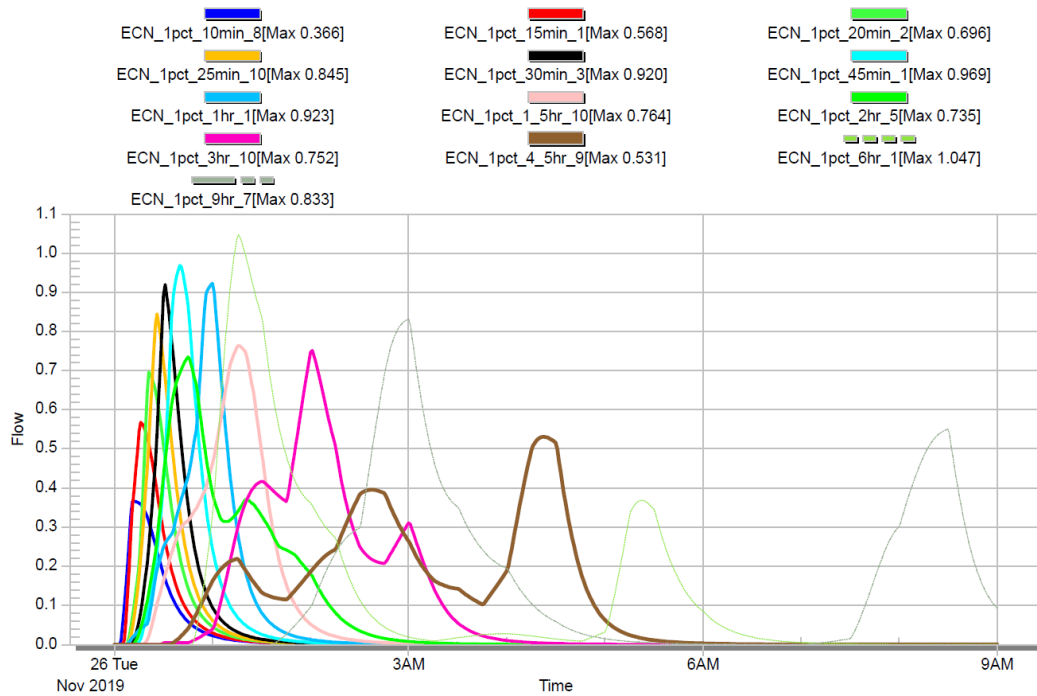


Figure 5.2.1: Critical Storm Event Durations for *Pre Developed* Catchments (cont.)

Node - LPOD-EX4



Node - LPOD-EX5

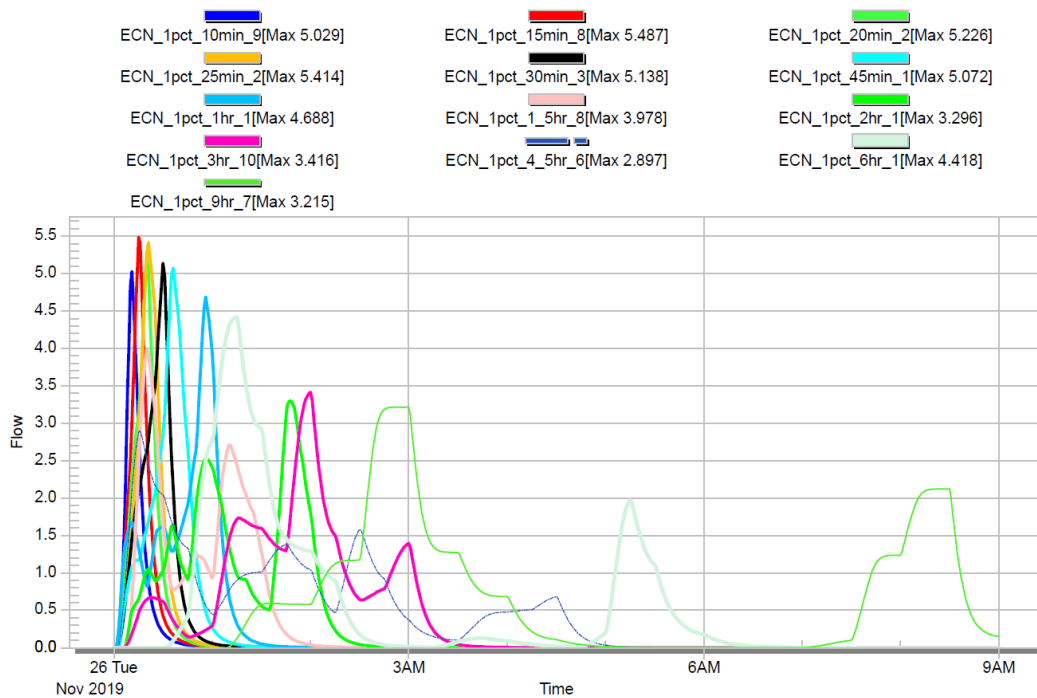


Figure 5.2.1: Critical Storm Event Durations for *Pre Developed* Catchments (cont.)

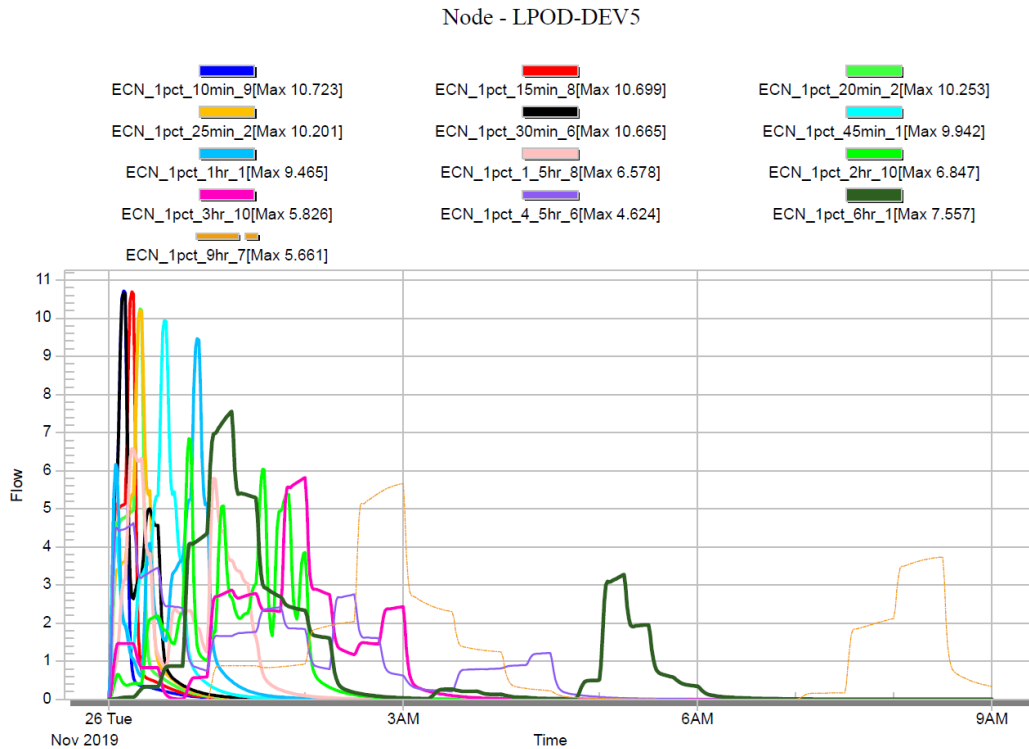


Figure 5.2.2: Critical Storm Event Durations for *Post Developed* Catchment (LPOD-5)

Refer **Appendix K** of this report which presents the detailed XPSTORM Box & Whisker plots for the above hydrological assessments.

5.2.3 DETENTION SYSTEM DESIGN

Detention devices capture and temporarily store stormwater runoff during major / critical storm events and release to the Lawful Point of Discharge (LPoD) at a controlled rate. Hence, detention devices act to mitigate potential downstream flooding impacts and also provide minor water quality treatment.

Therefore, to achieve the objective of zero post development flow rate increase to pre-developed 63.2% AEP (equiv. Q_1) to the 1% AEP (equiv. Q_{100}) flow rates at the downstream reporting location (outfall), on-site detention basins are introduced with low and high flow outlet configurations.

Table 5.2.3 includes the design details for the proposed on site detention system for Stage 1.

Parameter	Value
Catchment	DEV-5
Type	Detention basin (in ground)
Internal Batter Slope on Basin Sides	1 in 3
Basin Floor RL	5.800 m AHD
Basin Embankment / Crown R.L	8.100 m AHD
Basin Transverse Weir Crest RL	7.660 m AHD
Freeboard to Crown	0.440m
Detention Volume Depth	1.689m to 1% AEP WSL (<i>measured from floor / IL of basin</i>)
Detention Volume to Crown	8,458 m ³ to RL 8.100m (<i>deducting 0.30m extended detention</i>)
Detention Volume to 1% AEP WSL	5,498 m ³ to RL 7.489m (<i>deducting 0.30m extended detention</i>)
Detention Volume to Weir Crest	6,208 m ³ to RL 7.660m (<i>deducting 0.30m extended detention</i>)
Low Flow Outlets	3 / 600mm x 600mm grated field inlet pits <i>Top of grate levels set at 0.300m above basin floor at RL6.10m AHD</i> 225mm dia. circular orifice <i>IL at 0.600m above basin floor at IL6.40m AHD</i>
High Flow Outlets	1 / 1500 x 2000mm grated field inlet pit <i>1.175m above basin floor at RL6.975m AHD</i> 10 metre wide broad crested transverse weir <i>1.860m above basin floor at RL7.660m AHD</i> <i>1.70 discharge coefficient for transverse weir</i> 2 / 825mm RCP laid at max. grade of 1.084%

Table 5.2.3: Summary of Design Parameters of Proposed Detention System for Stage 1

5.2.4 MODEL RESULTS

Table 5.2.4.1 presents the results obtained from XPSTORM modelling as a result of implementing the above detention system for flow mitigation.

PRE-DEVELOPED PEAK FLOWS FOR CAT-10							
AEP	63.2%	50%	20%	10%	5%	2%	1%
LPOD-5 (CAT-10)	1.769	2.049	2.919	3.571	4.148	4.818	5.487

POST-DEVELOPED PEAK FLOWS (MITIGATED) FOR DEV-5							
AEP	63.2%	50%	20%	10%	5%	2%	1%
Mitigated Flow (m3/sec)	1.095	1.225	1.746	3.441	4.138	4.598	5.231
Max Water Elevation RL	6.635	6.720	7.057	7.179	7.256	7.357	7.489
Peak Duration (min)	30	180	180	60	60	360	360
Depth to WSL (m)	0.835	0.920	1.257	1.379	1.456	1.557	1.689

Table 5.2.4.1: Summary of XPSTORM Hydrologic / Hydraulic Results Catchment CAT-10 / DEV-5

Table 5.2.4.2 sums the mitigated discharges and compares directly against the pre developed hydrology condition across a range of standard storm events.

MITIGATED DISCHARGE SUMMARY FOR PROPOSED DETENTION BASIN (DEV-5)							
AEP	63.2%	50%	20%	10%	5%	2%	1%
1500 x 2000mm F.I. (m ³ /s)	0	0	0.136	1.708	2.309	2.671	3.164
600 x 600mm F.I. (1) (m ³ /s)	0.352	0.379	0.471	0.503	0.529	0.552	0.589
600 x 600mm F.I. (2) (m ³ /s)	0.352	0.379	0.471	0.503	0.529	0.552	0.589
600 x 600mm F.I. (3) (m ³ /s)	0.352	0.379	0.471	0.503	0.529	0.552	0.589
225mm dia. Orifice (m ³ /s)	0.041	0.090	0.199	0.223	0.243	0.272	0.302
10m Emergency Weir (m ³ /s)	0 *	0 *	0 *	0 *	0 *	0 *	0 *
TOTAL (m³/s)	1.095	1.225	1.746	3.441	4.138	4.598	5.231

Flow Mitigation from Existing Condition (m ³ /s)	0.674	0.824	1.173	0.130	0.011	0.220	0.256
Attenuation Achieved (Y/N)	Y	Y	Y	Y	Y	Y	Y
Flow Mitigation Achieved	38.1%	40.2%	40.2%	3.6%	0.3%	4.6%	4.7%

Table 5.2.4.2: Summary of Mitigated Discharges from XPSTORM Hydrologic / Hydraulic Results

* The emergency weir does not activate in a 1% AEP storm event – with predicted water surface levels only reaching RL7.489m. Freeboard of 0.171m is achieved in the major storm event to provide sufficient serviceability of the adjacent DTMR footpath to which emergency overflows are directed from the detention basin. Furthermore, the lowest allotment pad (Lot 101) adjacent the basin is proposed to be constructed +1.8 metres above the emergency weir crest level. Allotment pads 111, 112, 113 and 114 are proposed to be constructed +3.5 metres above the emergency weir crest level.

5.2.5 DISCUSSION ON MODELLING OUTCOMES

The above hydraulic modelling has confirmed that there is no increase in peak discharge flow rates from the development site to existing infrastructure or downstream / neighbouring properties by implementing the proposed designed detention measures. All AEP's ranging from 63.2% (equiv. Q₁) to 1% (equiv. Q₁₀₀) achieve mitigation.

Refer important note below.

Important Note:

Due to the predicted water surface elevations and depths – it is proposed that the bio-retention basin be fenced at its perimeter to restrict public access for safety. Fencing is proposed as the City of Gold Coast Council's standard chain wire type fencing (or approved equivalent) at a height of 1.80 metres above finished ground level.

Details of the fence type, embellishments and colour will be confirmed at the detailed design phase. Provision shall be made for a master-keyed gate location to enable access for Council staff to the maintenance track adjoining the internal entry road in Stage 1.

6.0 STORMWATER QUALITY

Stormwater quality analysis has been undertaken through the use of MUSIC software to confirm the adequacy of proposed Stormwater Quality Improvement Devices (SQIDs) required to meet the State Planning Policy's (SPP) Water Quality Objectives (WQOs) and the pollutant removal targets set by the City of Gold Coast Council. A suitable treatment strategy addressing the typical pollutant types generated during construction and operation of an industrial development are outlined within this section of reporting.

6.1 POLLUTANTS OF CONCERN

There are a number of pollutants typically generated during the operational phase (following construction) of an industrial development. These include:

- **Litter / gross pollutants**
- **Sediment**
- Toxic materials
- Heavy metals
- Hydrocarbons
- **Nutrients (i.e. nitrogen & phosphorous)**
- Pathogens / faecal coliforms
- Oxygen demanding substance
- Surfactants
- Acid or alkaline substances
- Organochlorines & organophosphates
- Thermal pollution

The key pollutants highlighted in **bold** above represent those that will be further addressed within this report. This will be done through the use of MUSIC modelling software which will assist in estimating the generation of the pollutants in the developed condition and the associated treatment measures requiring implementation in order to meet the stormwater quality objectives as defined within Section 6.2 of this report.

6.2 STORMWATER QUALITY OBJECTIVES (OPERATIONAL PHASE)

City of Gold Coast Council have set stormwater quality objectives with the intent of "protecting receiving water quality by limiting the quantity (loads) of stormwater pollutants discharged into receiving waters from development" such as that proposed over the subject site.

These are summarised in *Table 4.10 of SC6.11.4 Stormwater Drainage and Water Sensitive Urban Design standards* of Council's City Plan Version 7, and outlined below:

Pollutant Type	Load Reduction Objective (in mean annual load)
Gross Pollutants (>5mm)	90%
Total Suspended Solids (TSS)	80%
Total Phosphorous (TP)	60%
Total Nitrogen (TN)	45%

Table 6.2: CoGC's Stormwater Quality Objectives (Source: City Plan v7, Schedule SC6.11.4)

6.3 PROPOSED STORMWATER QUALITY MANAGEMENT STRATEGY

Development over the subject site has the potential to introduce increased pollutant loads and concentrated stormwater runoff into existing downstream waterways. To mitigate any potential increase in the export of pollutants from the subject site, suitable stormwater treatment devices will be utilised throughout the developed area as part of the integrated design of the road and stormwater drainage networks.

The implementation of a site-specific stormwater treatment train prior to the discharge of stormwater from the site will ensure the quality objectives outlined in Section 6.2 of this report are achieved.

6.3.1 BIO RETENTION BASINS

Due to the spatial allowances over the subject site and the proposed development type being an Industrial Estate, bio retention basins have been identified as a suitable Stormwater Quality Improvement Device (SQID) to reduce the off-site discharge of pollutants in line with the operational phase stormwater quality objectives identified within this report.

Bio retention basins are designed to treat conveyed stormwater by filtering contaminated runoff through various layers of vegetation, biologically active sands and loam filter media which capture the pollutants as the water percolates down through the system.

The treated water is then conveyed through a series of perforated pipes to downstream drainage systems. A typical configuration of a bio retention system is outlined in Figure 6.3.1 below.

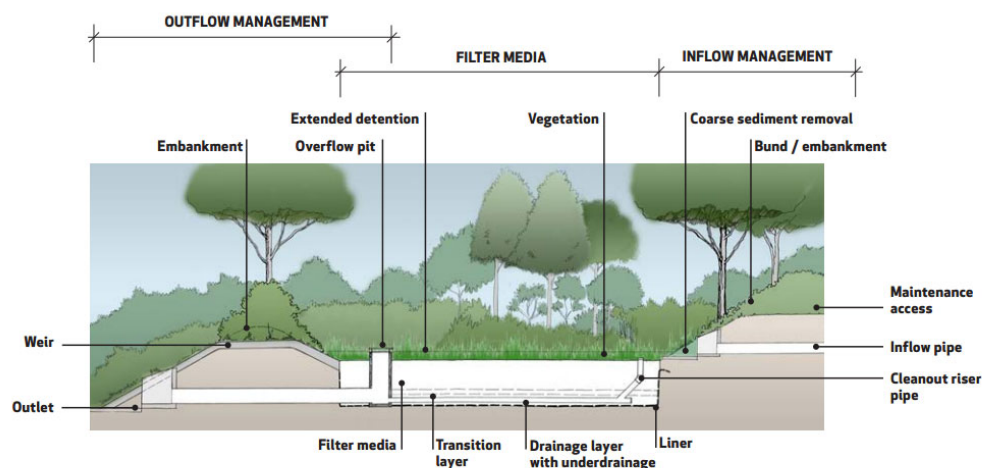


Figure 6.3.1: Components of a Typical Bio Retention System (Source: Water by Design, Bio Retention Technical Design Guidelines Version 1.1 Oct 2014)

The bio retention basin for the subject site has been designed in accordance with *Bio Retention Technical Design Guidelines (2014)* with the properties as outlined in *Table 6.3.1* below.

Outlet structures within the basin are designed to ensure an extended detention depth of 300mm is maintained over the filter media. The required surface area and filter media profile required to adequately treat the contributing developed catchment is discussed within Section 6.4 of this report.

Parameter	Value
Geofabric Lining to Base	Yes
Hydraulic Conductivity <i>Normal Analysis</i>	200 mm/hr
Hydraulic Conductivity <i>Sensitivity Analysis</i>	50 mm/hr
Orthophosphate Content	30 mg/kg
Filter Media's TN Content	400 mg/kg
Vegetation Properties	Basin to be vegetated with effective nutrient removal plants

Table 6.3.1: Summary of Adopted Bio Retention Parameters

6.4 MUSIC MODELLING METHODOLOGY FOR THE DEVELOPMENT SITE

MUSIC Version 6.3.0 was utilised for the water quality modelling of the proposed development in accordance with *Water by Design's MUSIC Modelling Guidelines 3.0 (2018)*.

Modelling of the developed scenario with the nominated SQIDs in place was undertaken replicate the transfer of pollutants through a stormwater drainage system and to assist in determining the effectiveness of the proposed stormwater treatment train in meeting the City of Gold Coast Stormwater Quality Objectives.

6.4.1 METEOROLOGICAL DATA

The meteorological data required for input into MUSIC software was obtained through CoGC's predetermined MUSIC-link v6.32 software application for Beenleigh Bowls Club (Stn No. 040406). The data utilised is in the form of 6-minute pluviographic data for a 10-year period from 01st January 1990 to 31st December 1999. The mean average rainfall for this period was 1,105mm.

Daily potential evapo-transpiration (PET) data (01/01/1990 to 31/12/1999) from the above-mentioned station has been used.

A summary of the information is indicated below:

Catchment Name: 5941 CoGC Industrial Development, Yatala MUSIC Model
Rainfall Station: 40406 BEENLEIGH
ET Station: User-defined monthly PET
Start Date: 1/01/1990 12:00 AM
End Date: 31/12/1999 11:54 PM
Modelling Time Step: 6 Minutes

	Rainfall/6 Minutes	Evapo-Transpiration
mean	0.013	4.086
median	0.000	3.600
maximum	22.100	6.290
minimum	0.000	2.000
10 percentile	0.000	2.033
90 percentile	0.001	6.194
mean annual	1105	1492

6.4.2 SOURCE NODES

MUSIC modelling has utilised the *City of Gold Coast (North) MUSIC-Link data (Version 6.32)* to define the parameters assigned to the pollutant source node inputs for the MUSIC model. Refer images on the following page. No calibration was undertaken to CoGC source nodes.

Refer **Appendix E** for the MUSIC Catchment Allocation Plans relevant to the modelling.

CITY OF GOLDCOAST™
City of Gold Coast (Central)
City of Gold Coast Central.mlb
City of Gold Coast (North)
City of Gold Coast North.mlb
City of Gold Coast (South)
City of Gold Coast South.mlb

Current Project Version	
Music Version	6.3.0
MUSIC-link Data Version	6.32
Authority	City of Gold Coast
Area	City of Gold Coast (North)
Scenario	City of Gold Coast (North)

The intended industrial land use allows the developed catchment parameters to be conservatively assumed with the catchments broken down into a number of major surface types being ground level, roads (includes entire road reserve) and roofs.

These surface types were allocated an impervious area (%) and further refined through the MUSIC modelling process via the “split” catchment approach in accordance with the *Healthy Waterways MUSIC Modelling Guidelines Version 3.0 – 2018 Table 3.4 and 3.6*.

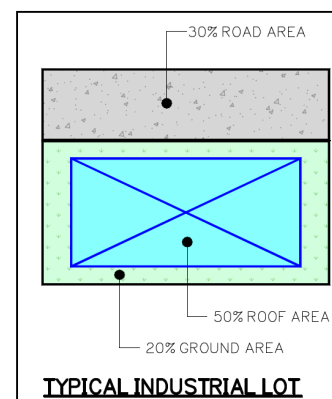
The below table and figures summarise the imperviousness of the allocated source nodes within the MUSIC model for Stage 1. Where a proposed architectural design was available for the site, the MUSIC modelling has assumed these areas to be exact. However, in the absence of an architectural layout, the modelling has been guided by *Table 3.4 Typical Surface-Type Splits* for Industrial Development type – where the surface splits are defined below:

Road – 30%

Roof – 50%

Ground – 20% (extract from *Healthy Waters V3.0*)

External catchments that are conveyed through the site are assumed to be treated on site by the relevant upstream lot owner prior to entering the subject site.



Surface Type: Industrial	MUSIC Source Node	Modelling Approach	Area (Ha)	Impervious %
(Percentage of Contributing Catchment)	Stage 1 (DEV-5) Total Catchment = 15.453 Ha			
Impervious (81%)	Road	Split	6.224	75
	Roof	Split	6.296	100
Pervious (19%)	Ground	Split	2.933	60
	Total		15.453	

Table 6.4: MUSIC Modelling Summary of Source Node Impervious Allocations

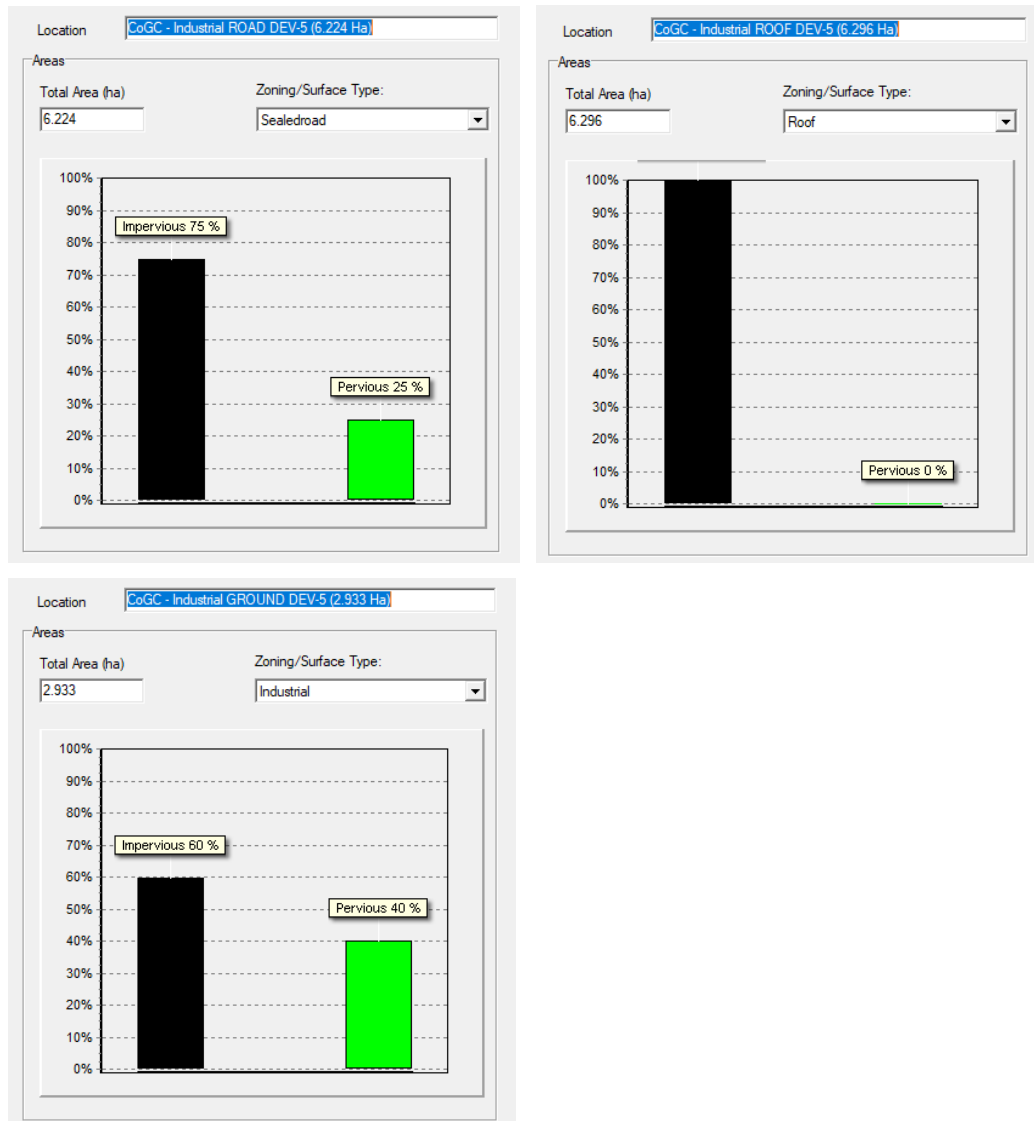


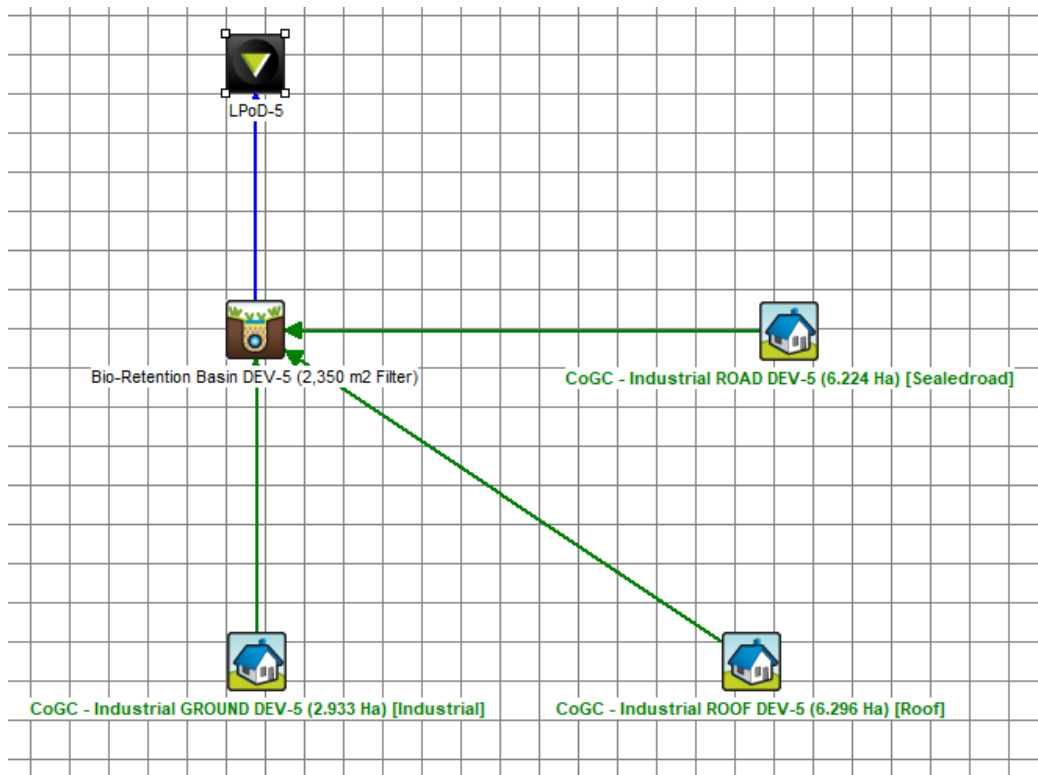
Figure 6.4.1: MUSIC Modelling Source Node Impervious Allocations

6.4.3 DRAINAGE LINKS

No routing has been adopted for the drainage links within the modelling that has been undertaken. This approach is believed to provide more conservative results.

6.4.4 MUSIC MODEL LAYOUT AND RESULTS

The diagrammatic representation of the source nodes, modelling configuration and results of pollutant reduction are outlined in Figure 6.4.4-1 below for the post developed catchment.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	134	127	4.8
Total Suspended Solids (kg/yr)	23900	3970	83.3
Total Phosphorus (kg/yr)	49.6	13.9	72
Total Nitrogen (kg/yr)	284	155	45.2
Gross Pollutants (kg/yr)	3350	0	100

SENSITIVITY ANALYSIS @ 50mm/hr SATURATED HYDRAULIC CONDUCTIVITY. The sensitive analysis returns a satisfactory result for meeting the SPP Water Quality Objectives. Refer above image for modelling outcomes.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	134	128	4.6
Total Suspended Solids (kg/yr)	23800	2340	90.2
Total Phosphorus (kg/yr)	49.9	8.59	82.8
Total Nitrogen (kg/yr)	285	115	59.6
Gross Pollutants (kg/yr)	3350	0	100

NORMAL ANALYSIS @ 200mm/hr SATURATED HYDRAULIC CONDUCTIVITY. The normal analysis returns a satisfactory result for meeting the SPP Water Quality Objectives. Refer above image for modelling outcomes.

Figure 6.4.4-1: Catchment DEV-5 MUSIC Layout and Results

The reduction in target pollutants to meet City of Gold Coast Council's requirements are achieved based on the below bio retention measures being implemented for the catchment.

Parameter	Value
	DEV-5
Filter Area (m2)	2,350
Filter Media Depth (m)	0.50
Extended Detention Depth (m)	0.30
Weir Crest Width (m)	10.00

Refer also **Appendix F** for the CoGC MUSIC-Link summary report card to support the modelling outcomes described in this section.

Inlet Properties	
Low Flow By-pass (cubic metres per sec)	0.000
High Flow By-pass (cubic metres per sec)	100.000
Storage Properties	
Extended Detention Depth (metres)	0.30
Surface Area (square metres)	2350.00
Filter and Media Properties	
Filter Area (square metres)	2350.00
Unlined Filter Media Perimeter (metres)	0.01
Saturated Hydraulic Conductivity (mm/hour)	200.00
Filter Depth (metres)	0.50
TN Content of Filter Media (mg/kg)	400
Orthophosphate Content of Filter Media (mg/kg)	30.0
Infiltration Properties	
Exfiltration Rate (mm/hr)	0.00

NORMAL ANALYSIS

Table 6.4.4: Summary of Proposed Bio Retention Measures

Lining Properties	
Is Base Lined?	☒ Yes ☐ No
Vegetation Properties	
☒ Vegetated with Effective Nutrient Removal Plants ☐ Vegetated with Ineffective Nutrient Removal Plants ☐ Unvegetated	
Outlet Properties	
Overflow Weir Width (metres)	10.00
Underdrain Present?	☒ Yes ☐ No
Submerged Zone With Carbon Present?	☐ Yes ☒ No
Depth (metres)	0.45

NORMAL ANALYSIS

Table 6.4.4: Summary of Proposed Bio Retention Measures (cont.)

CATCHMENT DRAINING TO THE SOUTH OF STAGE 1 (DEV-1 part)

Part of the developed catchment for Stage 1 has been designed to discharge to the south of Stage 1 into the future Stage 2 basin. MUSIC modelling was undertaken to determine the required bio-filtration media area to sufficiently treat the contributing runoff in line with the WQO's outlined in Section 6.2.

In the ultimate developed scenario – the stormwater quality and quantity basin is proposed to be located along the eastern boundary of the site (adjacent the CoGC Stapylton landfill buffer) catering for the entire future (Stage 2) industrial development proposal. As Council's policy requires that 80% of the total catchment must be developed prior to installation of the filter media, it is proposed that filter media associated with the part of Stage 1 will be bonded as uncompleted works with Council for the purpose of plan sealing of Stage 1 allotments and the temporary sediment basin as documented in the Change to Ground Level detailed Engineering Drawings. Servicing this part of the catchment will stay in place until such time as Stage 2 is developed to facilitate installation of the required stormwater quality treatment measures.

The modelling undertaken below is for the contributing Stage 1 *balance* catchment only, not the ultimate catchment.

Surface Type: Industrial	MUSIC Source Node	Modelling Approach	Area (Ha)	Impervious %
(Percentage of Contributing Catchment)	Stage 1 Balance (DEV-1 part) Total Catchment = 4.380 Ha			
Impervious (79%)	Road	Split	2.140	75
	Roof	Split	1.311	100
Pervious (21%)	Ground	Split	0.929	60
	Total		4.380	

Table 6.5: MUSIC Modelling Summary of Source Node Impervious Allocations (DEV-1 part.)

The reduction in target pollutants to meet City of Gold Coast Council's requirements are achieved based on the below bio retention measures being implemented for the catchment.

Parameter	Value
	DEV-1 part
Filter Area (m2)	660
Filter Media Depth (m)	0.50
Extended Detention Depth (m)	0.30
Weir Crest Width (m)	5.00

Refer also **Appendix F** for the CoGC MUSIC-Link summary report card to support the modelling outcomes described in this section.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	36.9	35.1	4.9
Total Suspended Solids (kg/yr)	8150	1350	83.4
Total Phosphorus (kg/yr)	15.5	4.16	73.2
Total Nitrogen (kg/yr)	78.2	42.8	45.3
Gross Pollutants (kg/yr)	933	0	100

SENSITIVITY ANALYSIS @ 50mm/hr SATURATED HYDRAULIC CONDUCTIVITY. The sensitive analysis returns a satisfactory result for meeting the SPP Water Quality Objectives. Refer above image for modelling outcomes.

7.0 CONSTRUCTION, OPERATIONAL MANAGEMENT & MAINTENANCE

7.1 CONSTRUCTION PHASE SEDIMENT AND EROSION CONTROL

The operational phase detention basin (within Stage 1) is proposed to be utilised as a sediment basin during the construction phase of the development. The sizing of this basin has been determined using the ICEA Best Practice Erosion and Sediment Control Guidelines.

A High Efficiency Sediment (HES) basin is proposed off the balance fill pad to the immediate south of the development stage boundary. The sizing of the sediment basins have been undertaken in accordance with the requirements of the SPP.

Refer to **Appendix C** which contains copies of the sediment basin designs and calculations.

Where ultimate detention basin sizing does not align with the volumetric requirements of International Erosion Control Association's (IECA) Best Practice Guidelines, temporary construction phase sediment basins will be implemented.

Monitoring and maintenance of both the construction phase sediment basins and associated sediment and erosion control measures implemented over the site will be in accordance with IECA's Best Practice Guidelines and City of Gold Coast Council's standards.

7.2 ASSET OWNERSHIP AND HANDOVER

The SQIDs have been designed in accordance with QUDM standards and City of Gold Coast Council's Land Development Guidelines and in doing so aim to provide suitable and safe vehicular access for future maintenance.

The current development proposal retains the SQIDs as assets of the developer though a formal handover from the Contractor to the Asset Owner will be required to ensure the SQIDs have been built in accordance with the requirements

7.3 MAINTENANCE OF BIO RETENTION BASINS DURING OPERATIONAL PHASE

Inspections and maintenance are to be carried out on a yearly basis to determine if the SQIDs are functioning as intended.

The WSUD Technical Design Guideline for South East Queensland incorporates Maintenance Checklists (*Refer **Appendix G***) covering the items to be inspected and should be utilised and kept on record to ensure that a mechanism is in place to log the continued effectiveness of the SQIDs.

Inspections and any required maintenance will be the responsibility of the asset owner.

8.0 CONCLUSION

Gassman Development Perspectives have prepared this Site Based Stormwater Management Plan to support an application for *Reconfiguration of Lot* over Lot 501 on SP295994 (60 Stapylton Jacobs Well Road, Stapylton).

The purpose of which is to address and manage stormwater quantity and quality requirements of the proposed development over the subject site in accordance with the relevant State and Local Authority's legislation and regulatory guidelines.

The key outcomes achieved through the analysis and modelling undertaken within this report are demonstrated in the stormwater bio-retention and sediment basin designs within **Appendix C**, and are as described below:

Stormwater Quantity

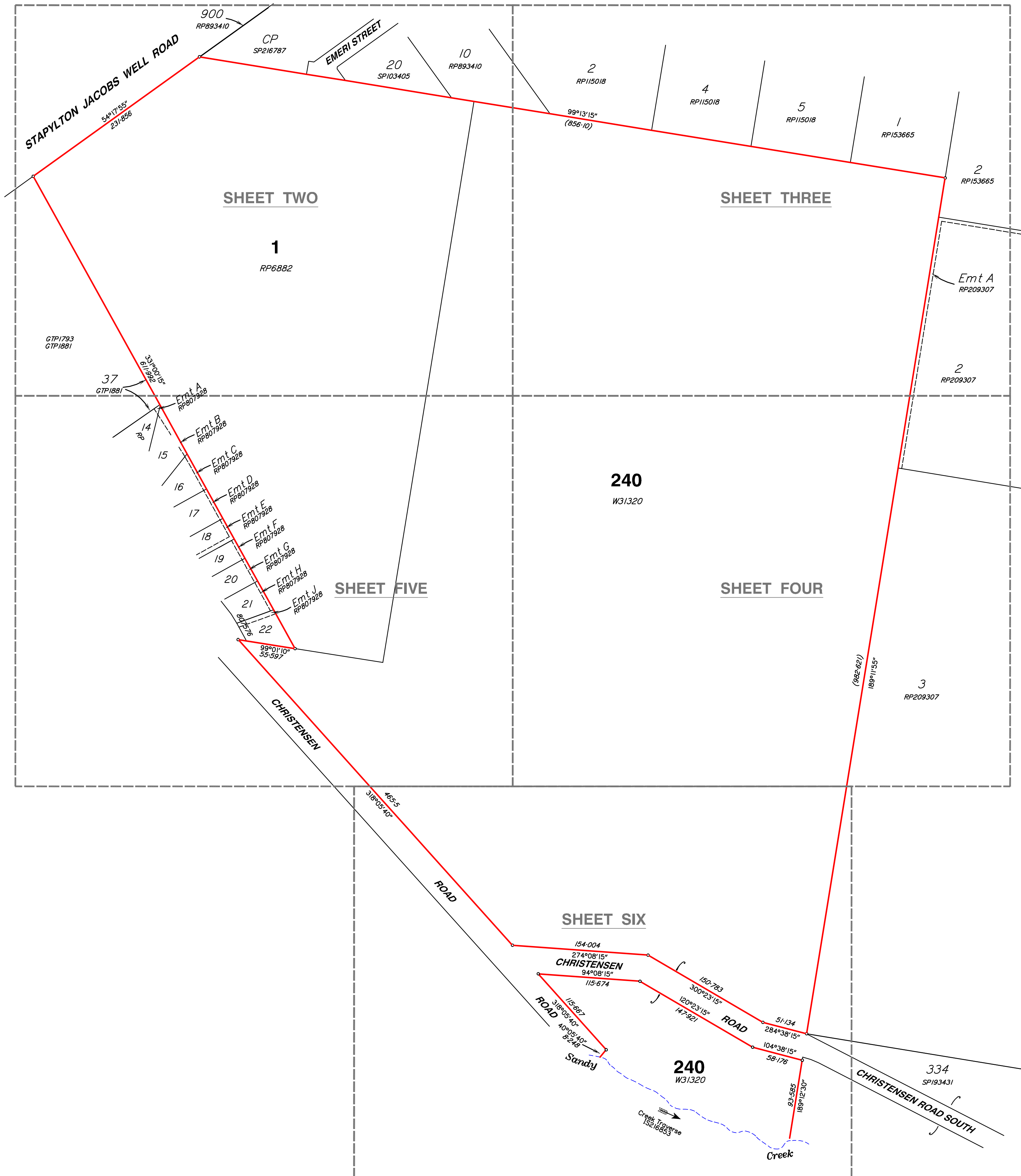
Suitable attenuation measures are able to be incorporated into the proposed development to ensure there is no adverse impacts to downstream properties, waterways or infrastructure as a result of an increase in peak stormwater flow rates discharging from the subject site upon development.

This is achieved through the design of an appropriately sized detention basin that complies with City of Gold Coast Council's Land Development Guidelines and the Queensland Urban Drainage Manual (QUDM).

Stormwater Quality

Stormwater quality objectives for the subject site are achieved through the design of a suitable stormwater treatment train that implements all necessary steps to ensure that the quality of stormwater discharging from the subject site meets the necessary standards to comply with City of Gold Coast Council's Water Sensitive Urban Design (WSUD) requirements, Queensland Urban Drainage Manual (QUDM) and the performance objectives of the Queensland State Planning Policy (SPP).

Appendix A – Site Survey Plan



Notes

This plan has been prepared for the exclusive use and purposes of the client as stated on this plan and should not be used by any other person or corporation and for any other purpose.

Property boundaries have not been defined by this survey and have been compiled from 15216853.

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CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

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Contour Interval	0.2	Drawn	S. Holt
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Origin	PSM 133471	Checked	
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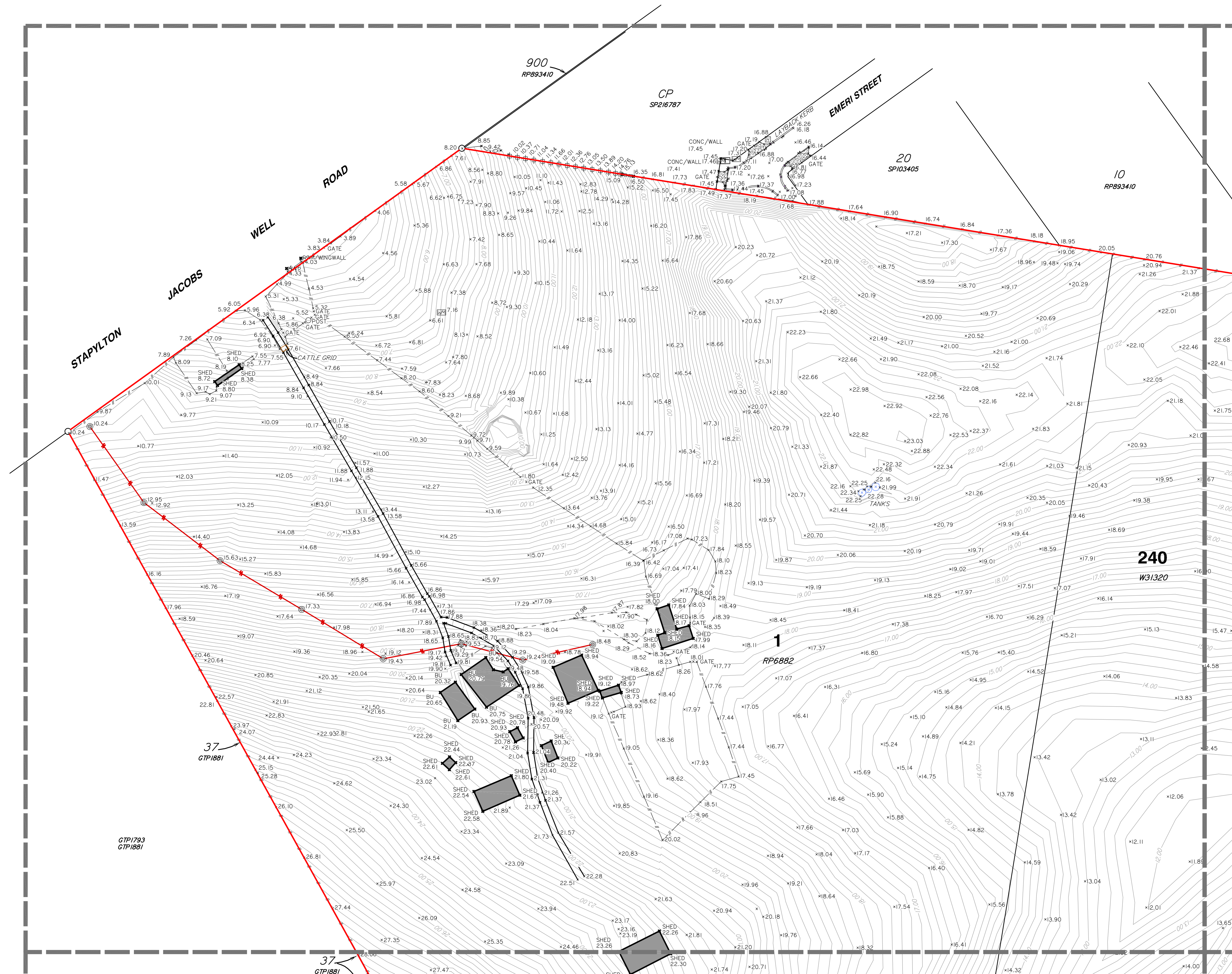
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PLAN No. **5093 S CD 01**



Scale 1:1000 - Lengths are in Metres.
0 10 20 30 40 50 60 70 80

- LEGEND**
- PERMANENT MARK
 - SEWER MANHOLE
 - SEWER INSPECTION OUTLET
 - ELECTRICITY PILLAR
 - ELECTRICITY POLE
 - ELECTRICITY POLE WITH LIGHT
 - TELSTRA PIT
 - MANHOLE
 - STORMWATER MANHOLE
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 - FIRE HYDRANT
 - VALVE
 - GATE
 - BOLLARD
 - CONCRETE
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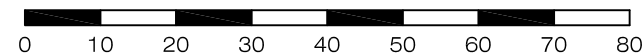


SEE SHEET THREE



SEE SHEET SIX

Scale 1:1000 - Lengths are in Metres.



LEGEND

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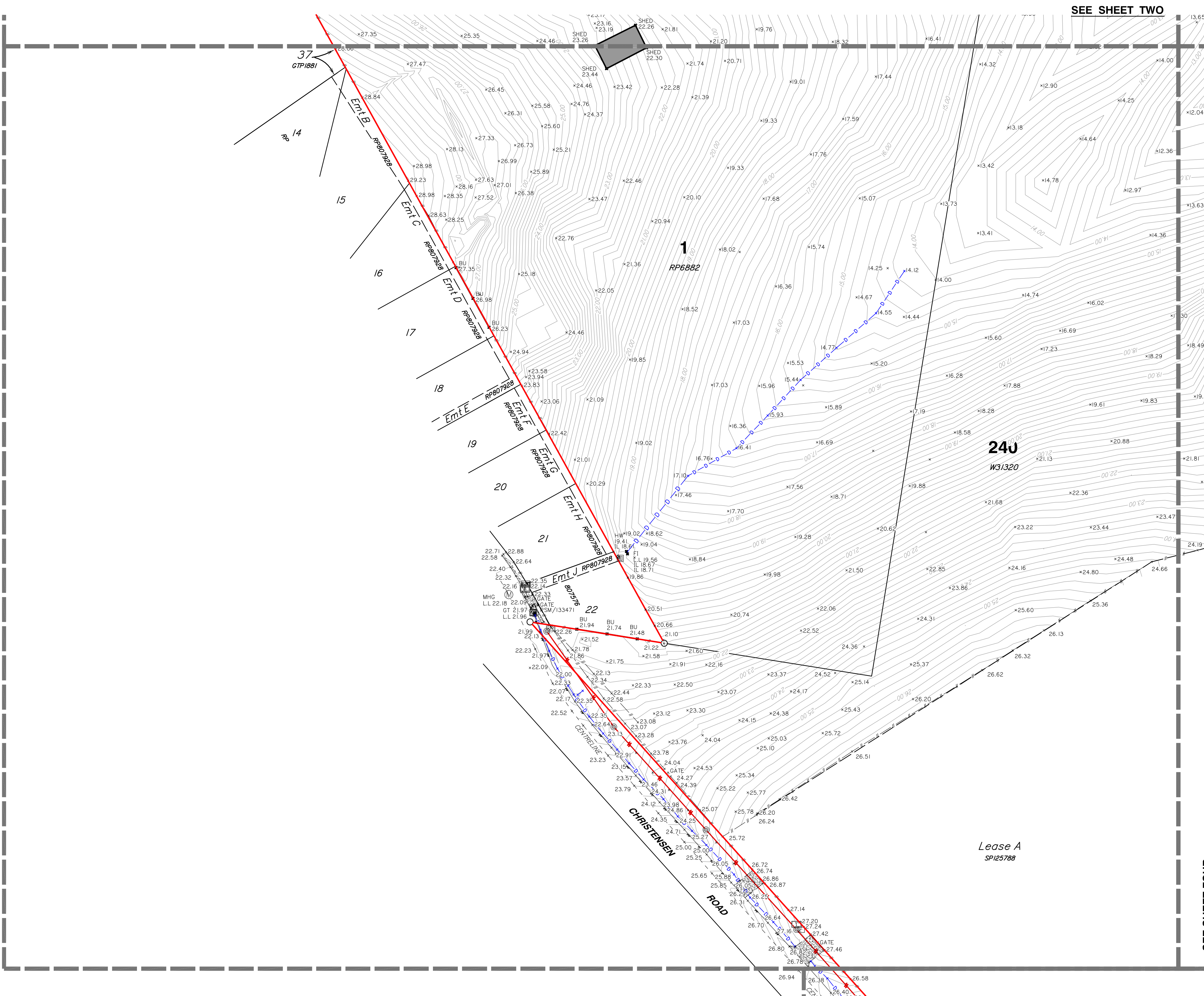
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76 Business Street Yatala Q. 4207
t: (07) 38073333
f: (07) 32975461
e: mail@gassman.com.au
w: www.gassman.com.au

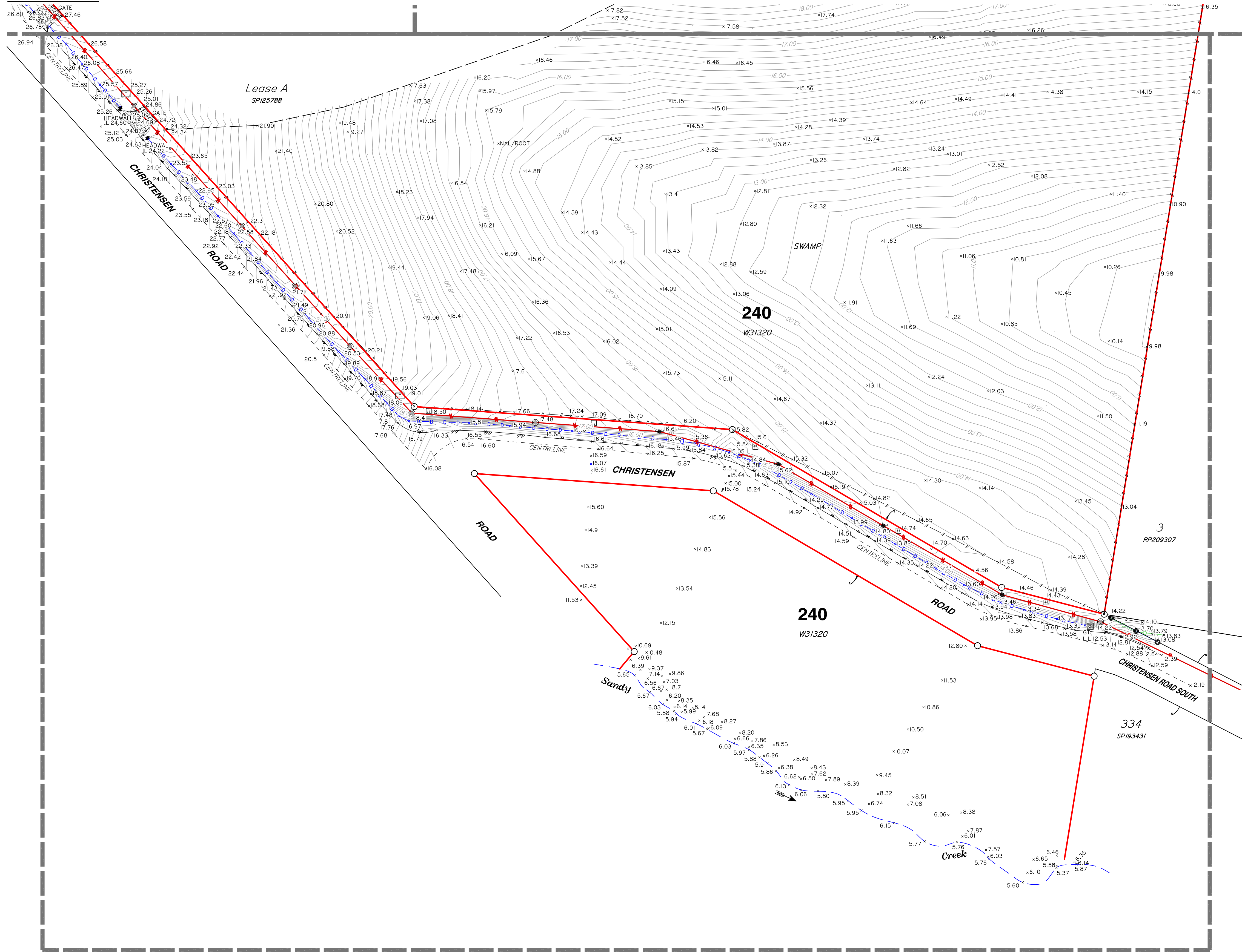
REFERENCE No. **5093-10**

PLAN No. **5093 S CD 01**



SEE SHEET FIVE

SEE SHEET FOUR



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
- TELSTRA PIT
- MANHOLE
- STORMWATER MANHOLE
- GULLY TRAP
- WATER METER
- FIRE HYDRANT
- VALVE
- GATE
- BOLLARD
- CONCRETE
- EDGE OF BITUMEN
- FENCE
- OVERHEAD ELECTRICITY
- OPEN DRAIN
- RETAINING WALL
- EDGE OF GARDEN
- CONTOUR LEVEL

Notes

This plan has been prepared for the exclusive use and purposes of the client as stated on this plan and should not be used by any other person or corporation and for any other purpose.

Property boundaries have not been defined by this survey and have been compiled from IS216853.

Only those underground features and services as shown on this plan have been located by this survey. Prior to any construction, demolition or excavation on the site, the relevant authority should be contacted for the location of any further underground services and detailed location of all services.

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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	IS216853	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	
	RL 22.169		

Scale (on A1 original)	Designed
1:1000	Date Designed

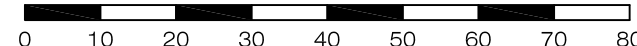


ACN 010 752 388
Brisbane Office
Level 13
97 Creek Street Brisbane Q. 4000
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Gold Coast and Logan Office
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76 Business Street Yatala Q. 4207
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f: (07) 32975461
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w: www.gassman.com.au

REFERENCE No. **5093-10**

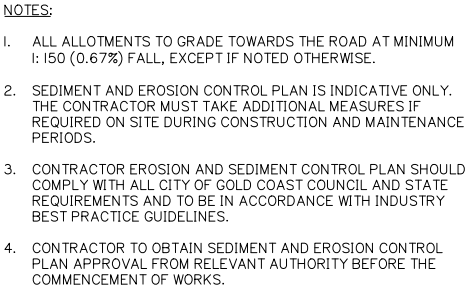
PLAN No. **5093 S CD 01**

Scale 1:1000 - Lengths are in Metres.



Appendix B – Pre and Post Development Catchment Plans

Appendix C – Design of Stormwater Quantity and Quality Basin



BASIN I – DESIGN PARAMETERS	
I (I YEAR, 120hr)	1.46
K1	33.5
K2	14.2
R (Y% 5-DAY)	63.11
C _v	0.29
A (Ha)	15.071
SETTLING ZONE VOLUME (V _s)	2758
SEDIMENT ZONE VOLUME (V _{sed})	1379

CROWN R.L. 8.100m

5.28m 10.0m 5.28m

1 in 2 R.L. 7.660m 1 in 2

20.56m

HIGH FLOW BROAD CRESTED TRANSVERSE WEIR, 10m WIDE

1.86m

2.300m

BASIN FLOOR R.L. 5.800m

3.0m

1:3 (MAX)

1:2 (MAX)

150mm THICK BASE COURSE GRAVEL (CLASS IB CBR 60) PROVISIONAL 300mm THICK CBR 15 REPLACEMENT



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Gold Coast & Logan | 716 Business Street, Yatala QLD | PO Box 392, Beerleigh 4207

Client:

 **FRASERS
PROPERTY**

FRASERS PROPERTY
(AUSTRALIA) PTY. LTD.

Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

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RPD:

Lot:	501
Plan:	SP295994
Local Authority:	CITY OF GOLD COAST COUNCIL
Level Datum:	AHD
Meridian:	-
Contour Interval:	-
PSM:	-
RL:	-

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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 1
LAYOUT

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description		JRG DRN
				MCH

SCALE IN METRES



Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No:	Rev. No:
5941 ENG BE1 026	A



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DRAWING TITLE
CONSTRUCTION PHASE
SEDIMENT BASIN 1
SECTIONS

A	20-12-2019		ORIGINAL ISSUE	JRG	MO
Issue	Date		Description	DPR	CH

NOT TO SCALE

Scale at A1: NTS

Designed:	IG
-----------	----

Drafted:	JRG
----------	-----

Approved:	MG
-----------	----

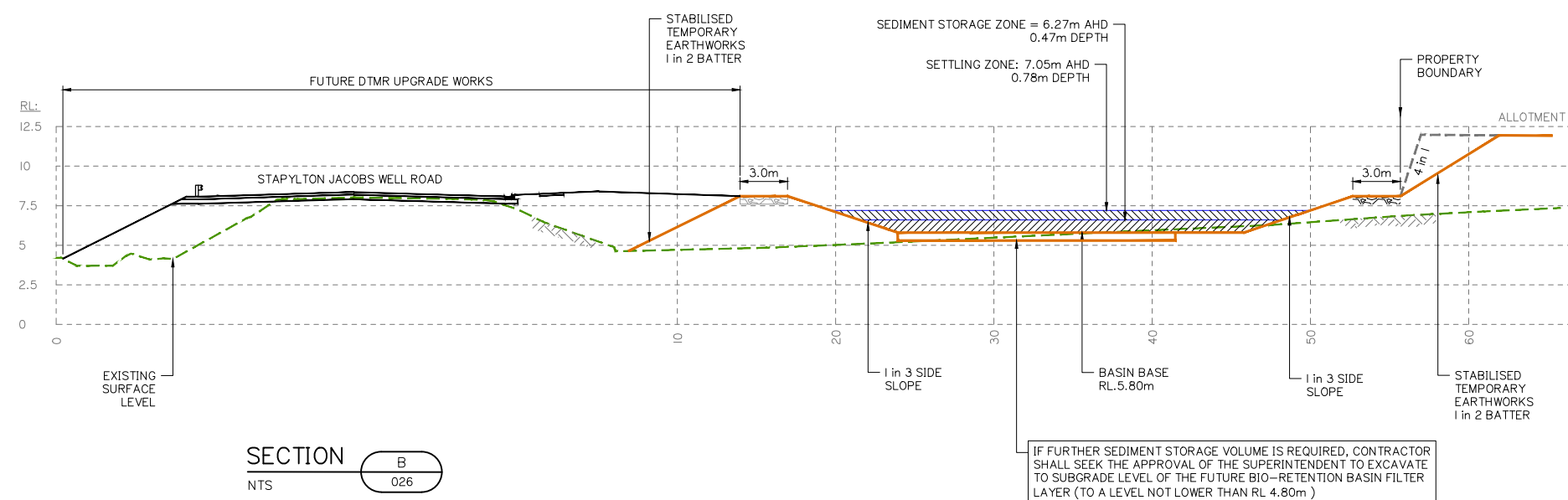
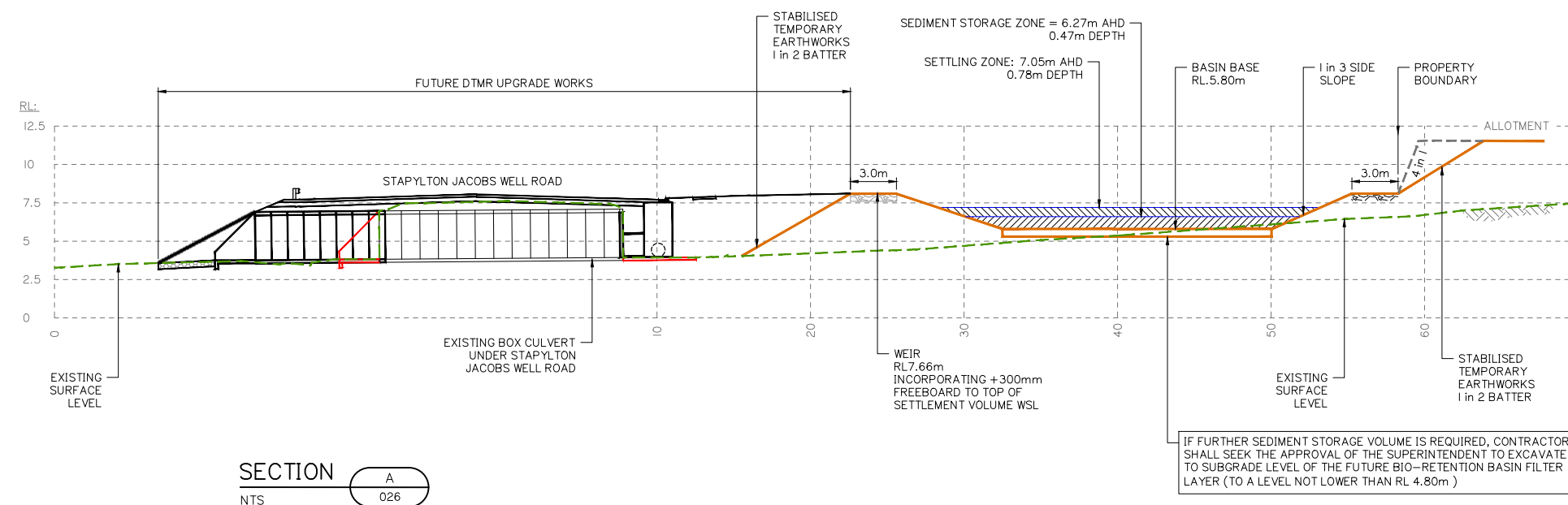
RPEQ:	1693
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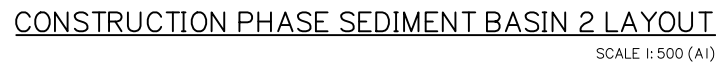
Signed:	
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Date:	20-12-2019
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Drawing No:	R
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Drawing No:	Rev. No:
5941 ENG BE1 027	A





		SPILLWAY									
BASIN ID	BASIN DESIGN LIFE	DESIGN ARI	C ₀	C	t _c	I	Q	HEAD OVER SPILLWAY	SPILLWAY CREST LENGTH	SPILLWAY CREST RL	MIN EMBANKMENT RL
		yr				(mm/hr)	(m ³ /s)	(m)	(m)	(m)	(m)
No. >	> 12 MONTHS	1: 50	0.88	1.01	25.00	143.00	4.81	0.28	19.10	9.81	10.54

Client:



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Plan: SP295994
Local Authority: CITY OF GOLD COAST
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Level Datum: AHD
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PSM: -
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CONSTRUCTION PHASE
SEDIMENT BASIN 2
LAYOUT

A Issue	20-12-2019 Date	ORIGINAL ISSUE Description	JRG DRN	MG CHK

SCALE IN METRES



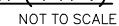
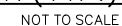
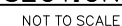
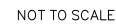
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1:1000 (HALF SIZE A3)

Scale at A1: 1:500

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

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Rev. No:
A



Drawing No:	Rev. No:
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Client:



Project:

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Level Datum:	AHD
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PSM:	-
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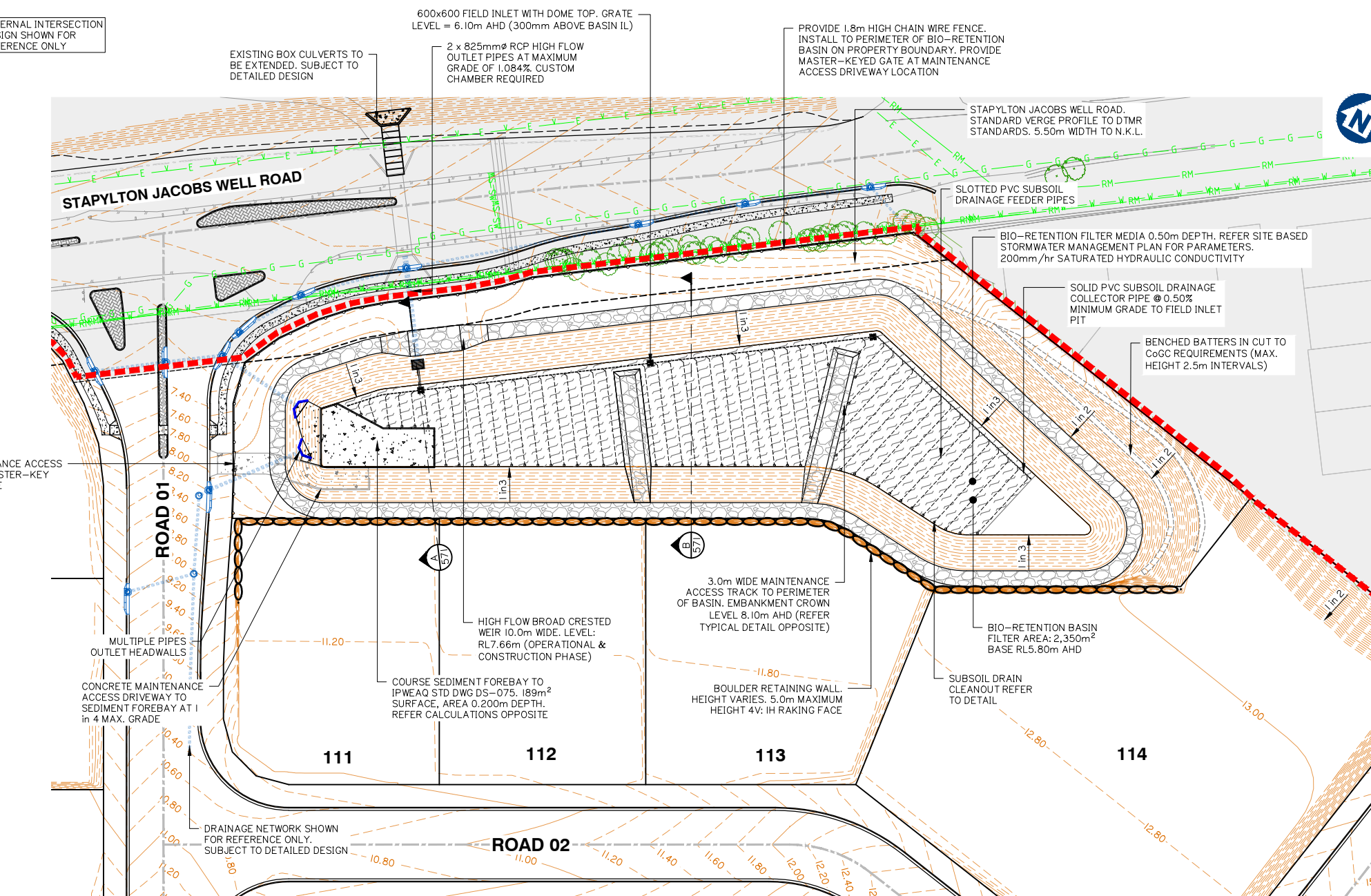
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DRAWING TITLE
OPERATIONAL PHASE
BIORETENTION BASIN
SHEET 1 OF 2

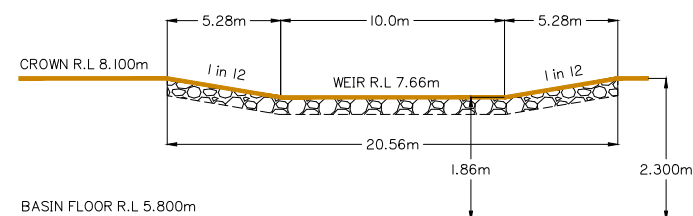
BIO RETENTION – COURSE SEDIMENT FOREBAY SIZING GUIDE CALCULATIONS	
$V_s = A_c \times R \times L_o \times F$	$= 7.234 \text{ m}^3$
$R = 1 - \left[1 + \frac{1}{n} \times \frac{V_s}{Q/A_f} \right]^{-n}$	
$0.8 = 1 - \left[\frac{1 + \frac{0.10}{0.5 \times 2.423/A_f}}{1} \right]^{-0.5}$	$A_f = 234.72 \text{ m}^2$
$D_s = \frac{V_s}{A_f}$	$D_s = \frac{7.234}{234.72} = 0.031 \text{ m}$
OPTIMIZATION OF MINIMUM FOREBAY SIZE:	
$D_s = \frac{7.234 \text{ m}^3}{189.00 \text{ m}^2}$	$= 0.038 \text{ m}$
$V_s = 7.234 \text{ m}^3$ (Workings Above) $A_c = 15.071 \text{ ha}$ (Refer Catchment Plans) UNMITIGATED POST–DEVELOPMENT FLOW $Q = 1.956 \text{ m}^3/\text{s}$ (3 month ARI = $0.5 \times 63.2\%$ AE) $V_s = 0.1 \text{ m/s}$ (Recommended for Imm Particle) $R = 0.8$ (Recommended 80% Capture) $L_o = 0.6$ (From Healthy Waterways Guide) $n = 0.5$ (Recommended Turbulence) $F_c = 1.0$ (Frequency of Clean Out / Yr)	
REFER TO BIO RETENTION TECHNICAL DESIGN GUIDELINES FOR FURTHER INFORMATION	

AEP (%)	MAX. WATER ELEVATION (m) A.H.D	MAX. WATER DEPTH (m)
63.2	6.635	0.835
50	6.720	0.920
20	7.057	1.257
10	7.179	1.379
5	7.256	1.456
2	7.357	1.557
1	7.489	1.689

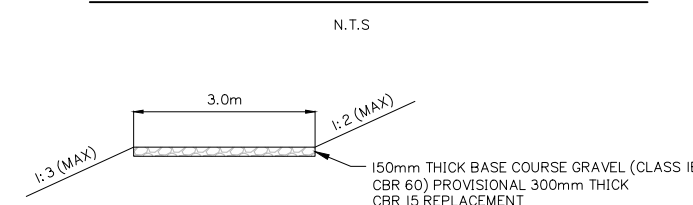


BIORETENTION BASIN LAYOUT PLAN

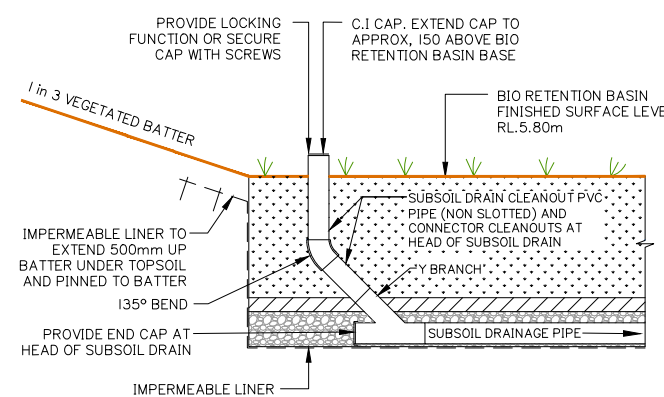
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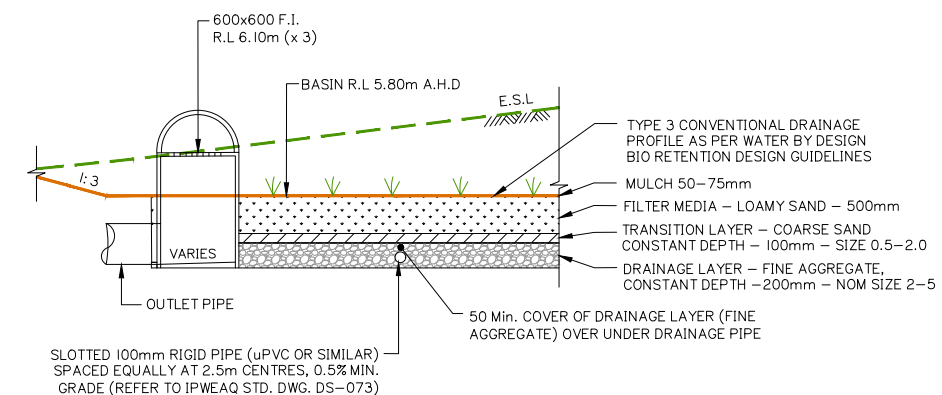
EMERGENCY WEIR – TYPICAL ELEVATION



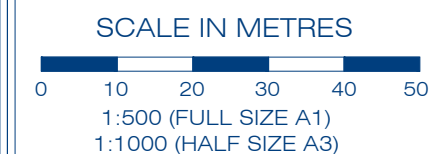
MAINTENANCE ACCESS TRACK – TYPICAL SECTION



SUBSOIL DRAIN CLEANOUT – IN BASIN



TYPICAL BIO-RETENTION BASIN DETAIL



Scale at A1:	1:500
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Designed:	IG
-----------	----

Drafted:	JBG
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Approved:	MG
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RPEQ:	169.39
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Signed:	<i>Michelle</i>
---------	-----------------

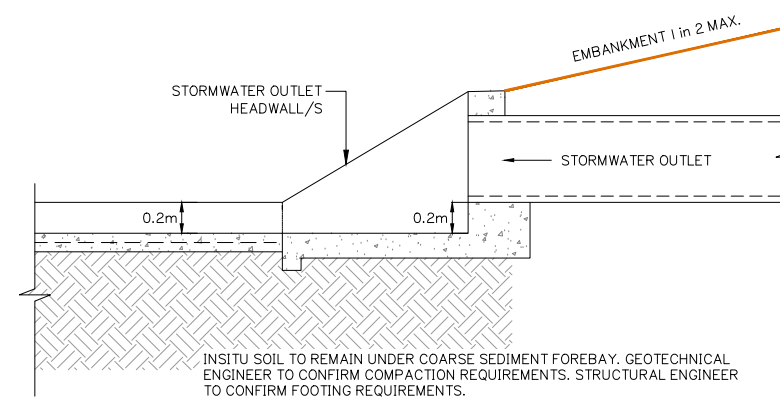
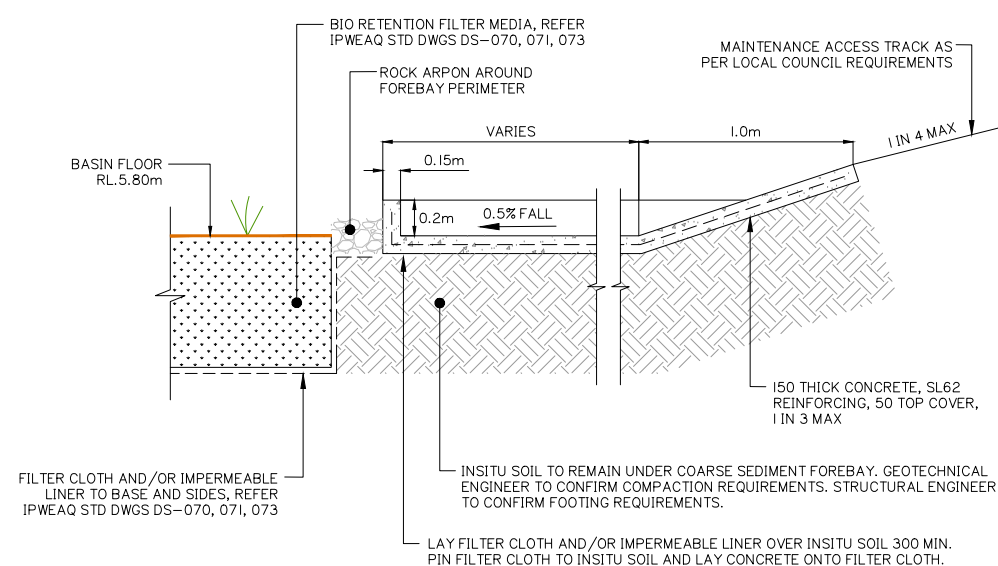
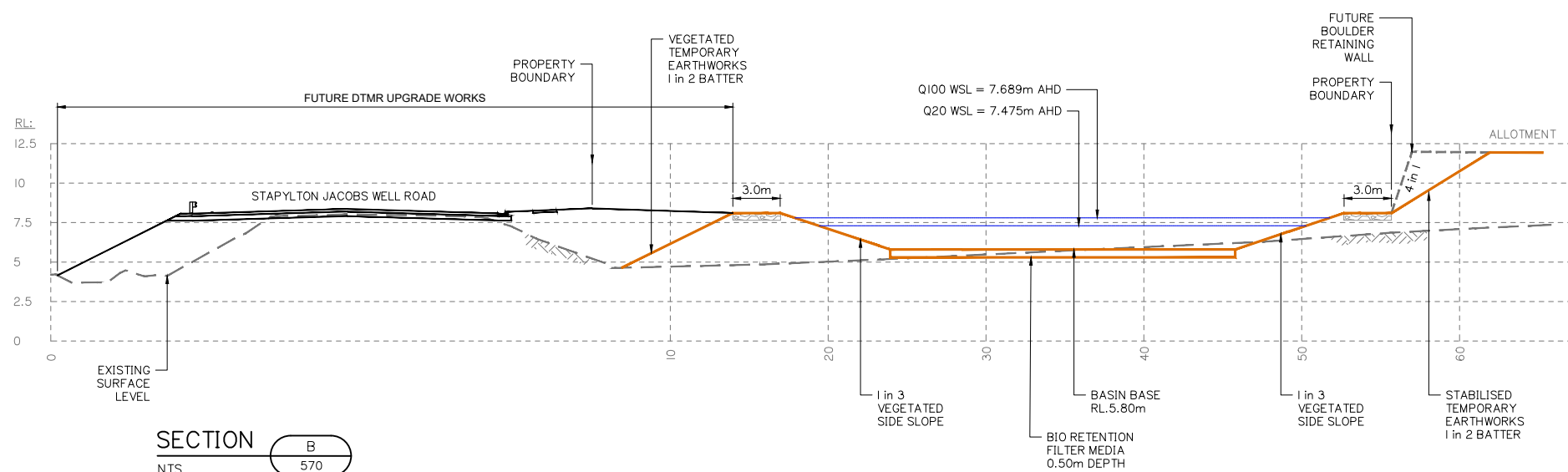
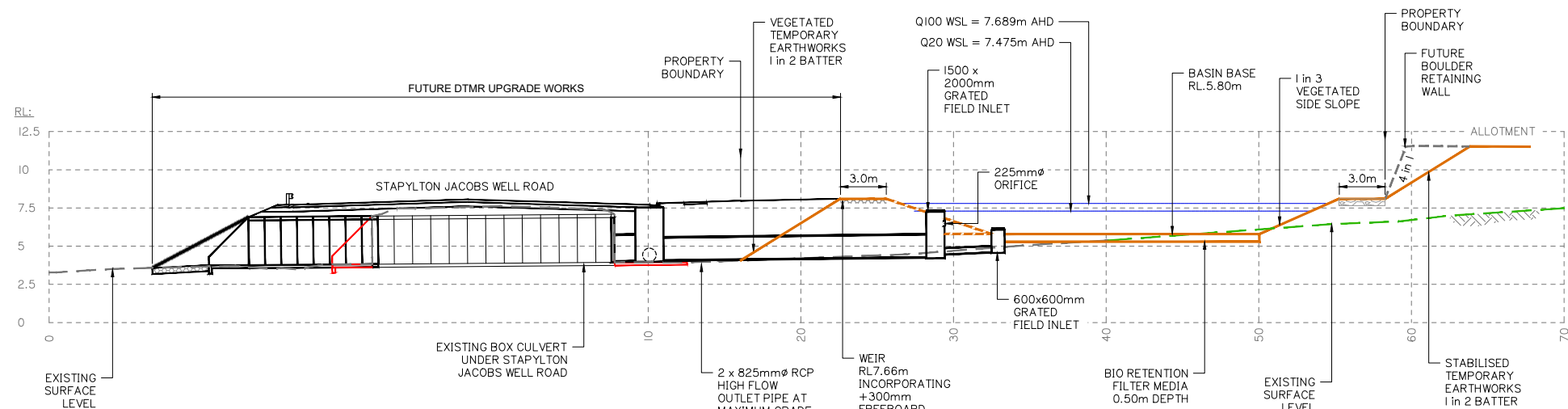
Date:	20-12-2020
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Drawing No:

5941 ENG BE1 570

Rev. No:

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Project:

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DRAWING TITLE
OPERATIONAL PHASE
BIORETENTION BASIN
SHEET 2 OF 2

A	20-12-2019	ORIGINAL ISSUE	JRG	MG
Issue	Date	Description	DRN	G/K

NOT TO SCALE

Scale at A1: NTS

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Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

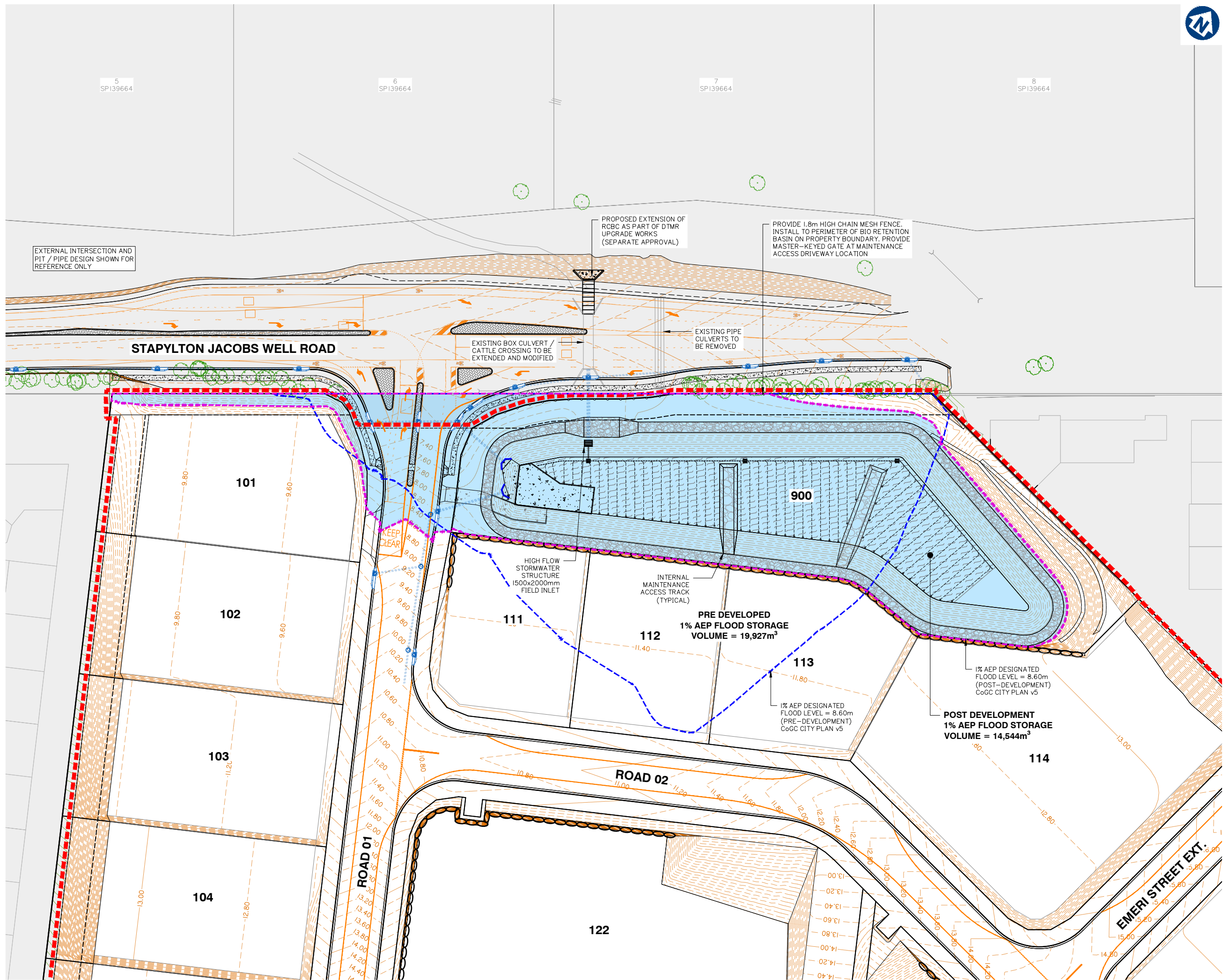
Drawing No:	Rev. No:
5941 ENG BE1 571	A

Appendix D – Balance Earthworks Below Defined Flood Event Level



A	20-12-2019	ORIGINAL ISSUE	JRG	MG	
Issue	Date	Description	DRN	CHK	





Client:

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Project:

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Site Address:

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Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
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Level Datum: AHD
Meridian: -
Contour interval: -
PSM: -
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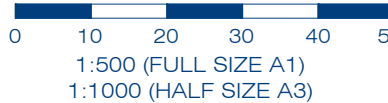
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DRAWING TITLE

POST DEVELOPED 1%
AEP FLOOD STORAGE
VOLUME ASSESSMENT

Issue	Date	Original Issue Description	JRG	MG
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

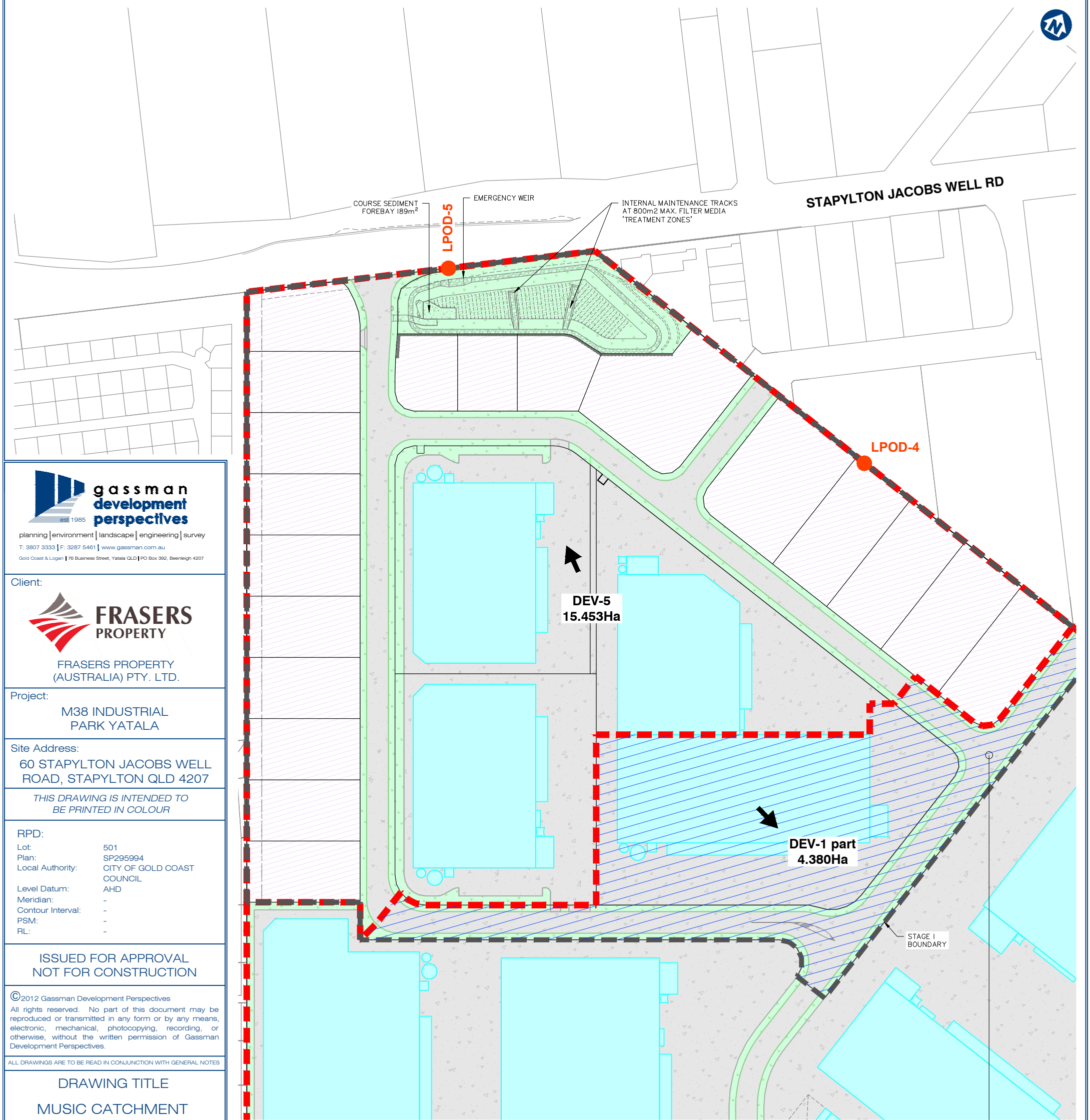
SCALE IN METRES



Scale at A1:	1:500
Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No: 5941 ENG BE1 471
Rev. No: A

Appendix E – MUSIC Catchment Allocation Plan



BIO RETENTION BASIN (DEV-I part) DETAILS

- 660m² FILTER AREA.
- 0.50m FILTER DEPTH.
- 300mm EXTENDED DETENTION.
- 660m² EXTENDED DETENTION SURFACE AREA.
- 200mm/hr HYDRAULIC CONDUCTIVITY.
- 400mg/kg TN CONTENT OF FILTER MEDIA.
- 30mg/kg ORTHOPHOSPHATE CONTENT OF FILTER MEDIA.
- BASE OF BASIN IS LINED.
- BASIN IS VEGETATED WITH EFFECTIVE NUTRIENT REMOVAL PLANTS.
- 5.0m BROAD CRESTED WEIR ASSUMED.
- PERFORATED AND SOLID UNDER DRAINAGE IS PRESENT.

(REFER BLUE CROSS-HATCHED AREA)

MUSIC CATCHMENT ALLOCATION PLAN STAGE I

Appendix F – MUSIC Link Report

MUSIC-link Report

Project Details		Company Details	
Project:	5941 Frasers Property Yatala DEV-1 part	Company:	Gassman Development Perspectives Pty. Ltd
Report Export Date:	19/12/2019	Contact:	Mitchell Gassman
Catchment Name:	5941 CoGC M88	Address:	c/o 76 Business Street Yatala 4207
Catchment Area:	4.38ha	Phone:	0738073333
Impervious Area*:	79.19%	Email:	mitchell@gassman.com.au
Rainfall Station:	40406 BEENLEIGH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1990 - 31/12/1999 11:54:00 PM		
Mean Annual Rainfall:	1105mm		
Evapotranspiration:	1492mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.32		
Study Area:	City of Gold Coast (North)		
Scenario:	City of Gold Coast (North)		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: LPoD-1 (part)	Reduction	Node Type	Number	Node Type	Number
Flow	4.88%	Bio Retention Node	1	Urban Source Node	3
TSS	83.4%				
TP	73.2%				
TN	45.3%				
GP	100%				

Comments

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Exfiltration Rate (mm/hr)	None	None	0
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Extended detention depth (m)	None	1	0.3
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Filter depth (m)	0.4	1	0.5
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Orthophosphate Content in Filter (mg/kg)	None	None	30
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	PET Scaling Factor	2.1	2.1	2.1
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Saturated Hydraulic Conductivity (mm/hr)	50	200	50
Bio	Bio-Retention Basin DEV-1 part (660 m2 Filter)	Total Nitrogen Content in Filter (mg/kg)	None	None	400
Receiving	LPoD-1 (part)	% Load Reduction	None	None	4.88
Receiving	LPoD-1 (part)	GP % Load Reduction	90	None	100
Receiving	LPoD-1 (part)	TN % Load Reduction	45	None	45.3
Receiving	LPoD-1 (part)	TP % Load Reduction	60	None	73.2
Receiving	LPoD-1 (part)	TSS % Load Reduction	80	None	83.4
Urban	CoGC - Industrial GROUND DEV-1 part (0.929 Ha)	Area Impervious (ha)	None	None	0.555
Urban	CoGC - Industrial GROUND DEV-1 part (0.929 Ha)	Area Pervious (ha)	None	None	0.373
Urban	CoGC - Industrial GROUND DEV-1 part (0.929 Ha)	Total Area (ha)	None	None	0.929
Urban	CoGC - Industrial ROAD DEV-1 part (2.140 Ha)	Area Impervious (ha)	None	None	1.602
Urban	CoGC - Industrial ROAD DEV-1 part (2.140 Ha)	Area Pervious (ha)	None	None	0.537
Urban	CoGC - Industrial ROAD DEV-1 part (2.140 Ha)	Total Area (ha)	None	None	2.14
Urban	CoGC - Industrial ROOF DEV-1 part (1.311 Ha)	Area Impervious (ha)	None	None	1.311
Urban	CoGC - Industrial ROOF DEV-1 part (1.311 Ha)	Area Pervious (ha)	None	None	0
Urban	CoGC - Industrial ROOF DEV-1 part (1.311 Ha)	Total Area (ha)	None	None	1.311

Only certain parameters are reported when they pass validation

MUSIC-link Report

Project Details		Company Details	
Project:	5941 Frasers Property Yatala DEV-5	Company:	Gassman Development Perspectives Pty. Ltd
Report Export Date:	13/12/2019	Contact:	Mitchell Gassman
Catchment Name:	5941 CoGC M88	Address:	c/o 76 Business Street Yatala 4207
Catchment Area:	15.453ha	Phone:	0738073333
Impervious Area*:	82.24%	Email:	mitchell@gassman.com.au
Rainfall Station:	40406 BEENLEIGH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1990 - 31/12/1999 11:54:00 PM		
Mean Annual Rainfall:	1105mm		
Evapotranspiration:	1492mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.32		
Study Area:	City of Gold Coast (North)		
Scenario:	City of Gold Coast (North)		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: LPoD-5	Reduction	Node Type	Number	Node Type	Number
Flow	4.62%	Bio Retention Node	1	Urban Source Node	3
TSS	90.2%				
TP	82.8%				
TN	59.6%				
GP	100%				

Comments

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Exfiltration Rate (mm/hr)	None	None	0
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Extended detention depth (m)	None	1	0.3
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Filter depth (m)	0.4	1	0.5
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Orthophosphate Content in Filter (mg/kg)	None	None	30
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	PET Scaling Factor	2.1	2.1	2.1
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Saturated Hydraulic Conductivity (mm/hr)	50	200	200
Bio	Bio-Retention Basin DEV-5 (2_350 m2 Filter)	Total Nitrogen Content in Filter (mg/kg)	None	None	400
Receiving	LPoD-5	% Load Reduction	None	None	4.62
Receiving	LPoD-5	GP % Load Reduction	90	None	100
Receiving	LPoD-5	TN % Load Reduction	45	None	59.6
Receiving	LPoD-5	TP % Load Reduction	60	None	82.8
Receiving	LPoD-5	TSS % Load Reduction	80	None	90.2
Urban	CoGC - Industrial GROUND DEV-5 (2.933 Ha)	Area Impervious (ha)	None	None	1.753
Urban	CoGC - Industrial GROUND DEV-5 (2.933 Ha)	Area Pervious (ha)	None	None	1.179
Urban	CoGC - Industrial GROUND DEV-5 (2.933 Ha)	Total Area (ha)	None	None	2.933
Urban	CoGC - Industrial ROAD DEV-5 (6.224 Ha)	Area Impervious (ha)	None	None	4.660
Urban	CoGC - Industrial ROAD DEV-5 (6.224 Ha)	Area Pervious (ha)	None	None	1.563
Urban	CoGC - Industrial ROAD DEV-5 (6.224 Ha)	Total Area (ha)	None	None	6.224
Urban	CoGC - Industrial ROOF DEV-5 (6.296 Ha)	Area Impervious (ha)	None	None	6.296
Urban	CoGC - Industrial ROOF DEV-5 (6.296 Ha)	Area Pervious (ha)	None	None	0
Urban	CoGC - Industrial ROOF DEV-5 (6.296 Ha)	Total Area (ha)	None	None	6.296

Only certain parameters are reported when they pass validation

Appendix G – WSUD Bio Retention Basin Maintenance Checklists

BIORETENTION BASIN CONSTRUCTION INSPECTION CHECKLIST											
Asset I.D.					Inspected By:						
Site:					Date:						
					Time:						
Constructed By:					Weather:						
					Contact During Visit:						
Items inspected		Checked		Satisfactory		Items inspected		Checked		Satisfactory	
		Y	N	Y	N			Y	N	Y	N
DURING CONSTRUCTION & ESTABLISHMENT											
A. FUNCTIONAL INSTALLATION						Structural components					
Preliminary Works						15. Location and configuration of inflow systems as designed					
1. Erosion and sediment control plan adopted						16. Location and levels of overflow pits as designed					
2. Temporary traffic/safety control measures						17. Under-drainage connected to overflow pits as designed					
3. Location same as plans						18. Concrete and reinforcement as designed					
4. Site protection from existing flows						19. Set down to correct level for flush kerbs (streetscape applications only)					
Earthworks and Filter Media						20. Kerb opening width as designed					
5. Bed of basin correct shape and slope											
6. Batter slopes as plans						B. SEDIMENT & EROSION CONTROL (IF REQUIRED)					
7. Dimensions of bioretention area as plans						21. Stabilisation immediately following earthworks and planting of terrestrial landscape around basin					
8. Confirm surrounding soil type with design						22. Silt fences and traffic control in place					
9. Confirm filter media specification in accordance with Step 4						23. Temporary protection layers in place					
9. Provision of liner (if required)											
10. Under-drainage installed as designed						C. OPERATIONAL ESTABLISHMENT					
11. Drainage layer media as designed						24. Temporary protection layers and associated silt removed					
12. Transition layer media as designed (if required)						Vegetation					
14. Extended detention depth as designed						25. Planting as designed (species and densities)					
						26. Weed removal and watering as required					
FINAL INSPECTION											
1. Confirm levels of inlets and outlets						6. Check for uneven settling of banks					
2. Confirm structural element sizes						7. Under-drainage working					
3. Check batter slopes						8. Inflow systems working					
4. Vegetation as designed						9. Maintenance access provided					
5. Bioretention filter media surface flat and free of clogging											
COMMENTS ON INSPECTION											
ACTIONS REQUIRED											
Inspection officer signature:											

BIORETENTION BASIN MAINTENANCE CHECKLIST				
Inspection Frequency:	1 to 6 monthly	Date of Visit:		
Location:				
Description:				
Asset I.D.				
Site Visit by:				
INSPECTION ITEMS:	Y	N	Action Required (details)	
Sediment accumulation at inflow points?				
Litter within basin?				
Erosion at inlet or other key structures?				
Traffic damage present?				
Evidence of dumping (e.g. building waste)?				
Vegetation condition satisfactory (density, weeds etc)?				
Watering of vegetation required?				
Replanting required?				
Mowing/slashing required?				
Clogging of drainage points (sediment or debris)?				
Evidence of ponding?				
Damage/vandalism to structures present?				
Surface clogging visible?				
Drainage system inspected?				
Resetting of system required?				
COMMENTS				

BIORETENTION BASIN ASSET TRANSFER CHECKLIST			
Asset I.D.			
Asset Location:			
Construction by:			
'On-maintenance' Period:			
TREATMENT	Y	N	
System appears to be working as designed visually?			
No obvious signs of under-performance?			
MAINTENANCE	Y	N	
Maintenance plans and indicative maintenance costs provided for each asset?			
Vegetation establishment period completed (2 years)?			
Inspection and maintenance undertaken as per maintenance plan?			
Inspection and maintenance forms provided?			
ASSET INSPECTED FOR DEFECTS AND/OR MAINTENANCE ISSUES AT TIME OF ASSET TRANSFER	Y	N	
Sediment accumulation at inflow points?			
Litter within basin?			
Erosion at inlet or other key structures?			
Traffic damage present?			
Evidence of dumping (e.g. building waste)?			
Vegetation condition satisfactory (density, weeds etc)?			
Watering of vegetation required?			
Replanting required?			
Mowing/slashing required?			
Clogging of drainage points (sediment or debris)?			
Evidence of ponding?			
Damage/vandalism to structures present?			
Surface clogging visible?			
Drainage system inspected?			
COMMENTS/ACTIONS REQUIRED FOR ASSET TRANSFER			
ASSET INFORMATION	Y	N	
Design Assessment Checklist provided?			
As constructed plans provided?			
Copies of all required permits (both construction and operational) submitted?			
Proprietary information provided (if applicable)?			
Digital files (e.g. drawings, survey, models) provided?			
Asset listed on asset register or database?			

Appendix H – Bureau of Meteorology Rainfall Data



Location

Label: 60 Stapylton Road FRASERS

Latitude: -27.736 [Nearest grid cell: 27.7375 (S)]

Longitude: 153.238 [Nearest grid cell: 153.2375 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 13 December 2019

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

[FAQ for New ARR probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	155	175	239	281	323	378	419
2 min	127	144	200	240	281	339	386
3 min	119	135	187	224	261	313	354
4 min	114	130	178	212	246	292	328
5 min	110	124	170	202	233	275	307
10 min	90.5	102	139	163	187	217	240
11 min	87.4	98.9	134	158	180	209	230
15 min	76.8	86.8	118	138	158	183	202
20 min	66.7	75.5	103	121	138	160	177
25 min	59.2	67.0	91.1	107	123	143	159
30 min	53.3	60.3	82.3	97.1	112	131	145
45 min	41.5	47.0	64.6	76.6	88.6	105	117
1 hour	34.4	39.0	53.9	64.2	74.7	88.9	100
1.5 hour	26.2	29.7	41.4	49.8	58.3	70.1	79.5
2 hour	21.5	24.5	34.3	41.4	48.8	59.0	67.3
3 hour	16.4	18.7	26.4	32.1	38.0	46.3	53.1
4.5 hour	12.6	14.4	20.5	25.0	29.7	36.4	41.8
6 hour	10.5	12.0	17.2	21.0	25.0	30.7	35.3
9 hour	8.14	9.38	13.5	16.6	19.8	24.3	27.9
12 hour	6.85	7.92	11.5	14.1	16.8	20.6	23.7
18 hour	5.38	6.24	9.11	11.2	13.4	16.4	18.8
24 hour	4.53	5.27	7.72	9.51	11.4	13.9	16.0
30 hour	3.95	4.60	6.76	8.35	10.0	12.2	14.0
36 hour	3.53	4.11	6.05	7.48	8.98	11.0	12.6
48 hour	2.92	3.41	5.04	6.24	7.51	9.20	10.6
72 hour	2.19	2.56	3.79	4.72	5.71	7.01	8.07
96 hour	1.76	2.04	3.03	3.79	4.59	5.65	6.51

120 hour	1.46	1.69	2.51	3.14	3.82	4.70	5.41
144 hour	1.24	1.44	2.13	2.66	3.24	3.98	4.58
168 hour	1.08	1.24	1.83	2.29	2.79	3.42	3.93

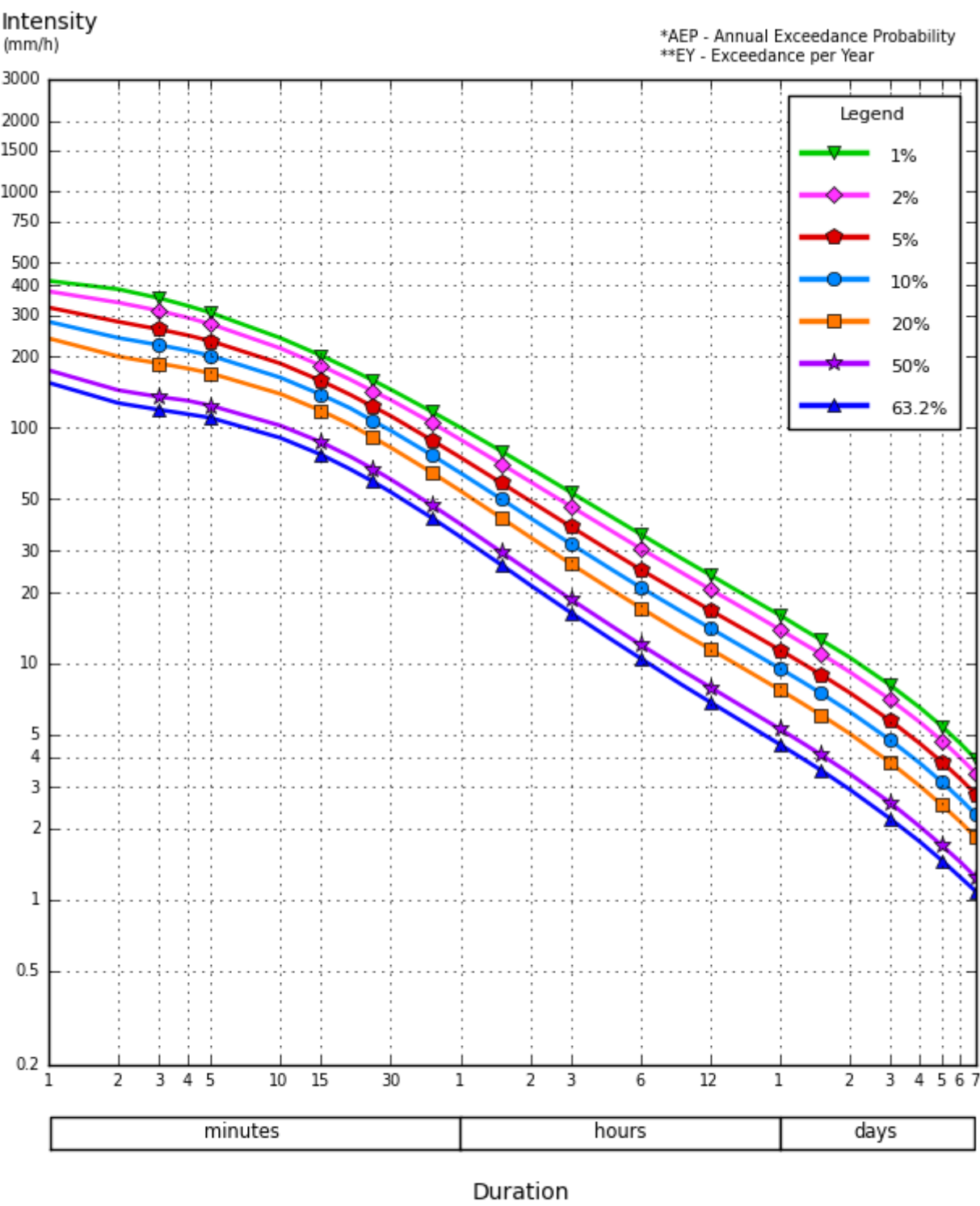
Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

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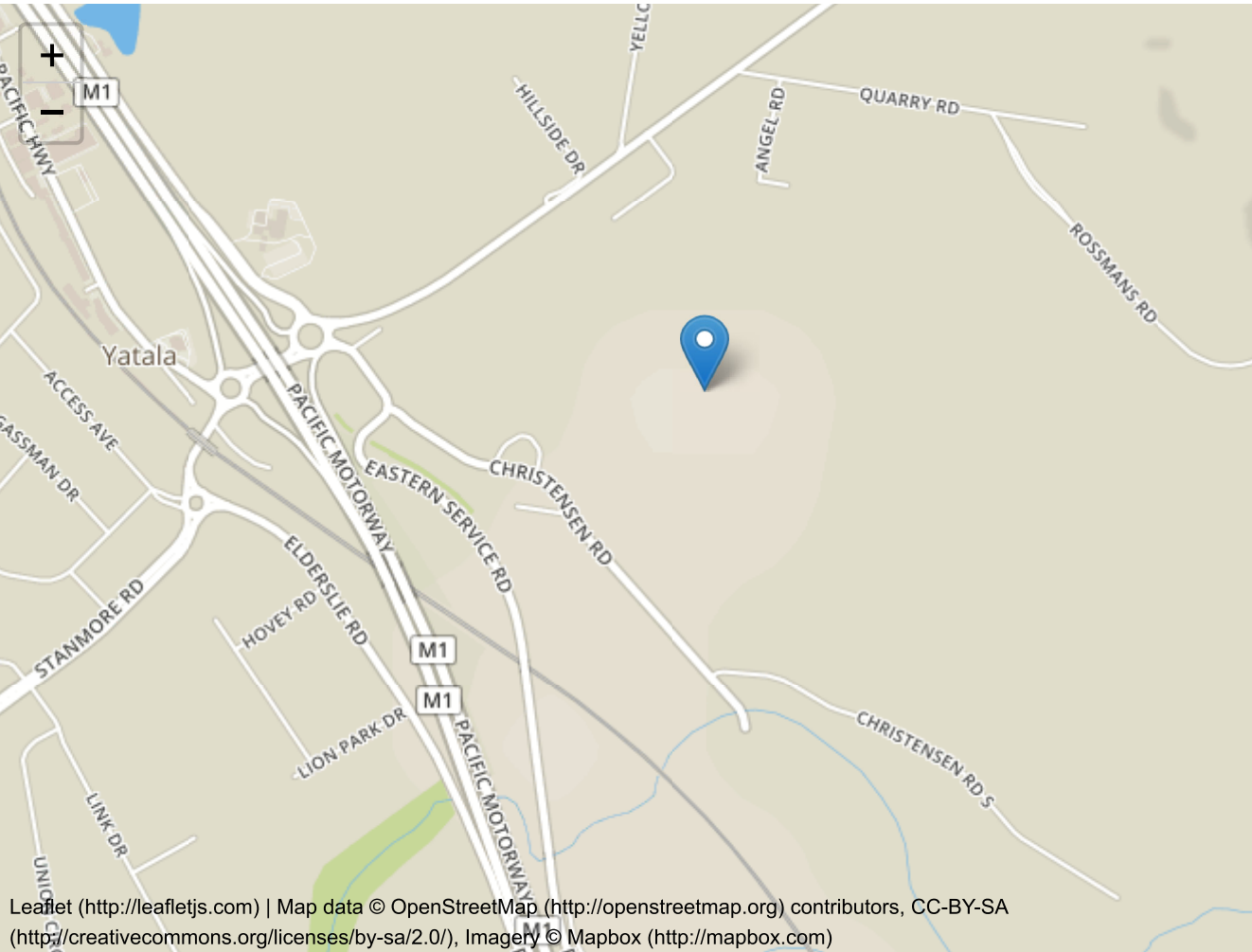
Appendix I – AR&R 2016 Storm Loss Data

ATTENTION: This site was updated recently, changing some of the functionality. Please see the changelog ([./changelog](#)) for further information

Australian Rainfall & Runoff Data Hub - Results

Input Data

Longitude	153.238
Latitude	-27.736
Selected Regions (clear)	
River Region	show
ARF Parameters	show
Storm Losses	show
Temporal Patterns	show
Areal Temporal Patterns	show
BOM IFDs	show
Median Preburst Depths and Ratios	show
10% Preburst Depths	show
25% Preburst Depths	show
75% Preburst Depths	show
90% Preburst Depths	show
Interim Climate Change Factors	show
Baseflow Factors	show



Data

River Region

Division	North East Coast
River Number	45
River Name	Logan-Albert Rivers

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2016_v1

ARF Parameters

$$ARF = Min \left\{ 1, \left[1 - a \left(Area^b - c \log_{10} Duration \right) Duration^{-d} \right. \right. \\ \left. \left. + e Area^f Duration^g \left(0.3 + \log_{10} AEP \right) \right. \right. \\ \left. \left. + h 10^{i Area \frac{Duration}{1440}} \left(0.3 + \log_{10} AEP \right) \right] \right\}$$

Zone	a	b	c	d	e	f	g	h	i
East Coast North	0.327	0.241	0.448	0.36	0.00096	0.48	-0.21	0.012	-0.0013

Short Duration ARF

$$ARF = Min \left[1, 1 - 0.287 \left(Area^{0.265} - 0.439 \log_{10} (Duration) \right) . Duration^{-0.36} \right. \\ \left. + 2.26 \times 10^{-3} \times Area^{0.226} . Duration^{0.125} \left(0.3 + \log_{10} (AEP) \right) \right. \\ \left. + 0.0141 \times Area^{0.213} \times 10^{-0.021 \frac{(Duration-180)^2}{1440}} \left(0.3 + \log_{10} (AEP) \right) \right]$$

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2016_v1

Storm Losses

Note: Burst Loss = Storm Loss - Preburst

Note: These losses are only for rural use and are **NOT FOR DIRECT USE** in urban areas

ID	27987.0
Storm Initial Losses (mm)	27.0
Storm Continuing Losses (mm/h)	1.6

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2016_v1

Temporal Patterns | Download (.zip) (static/temporal_patterns/TP/ECnorth.zip)

code	ECnorth
Label	East Coast North

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2016_v2

Areal Temporal Patterns | Download (.zip)
(./static/temporal_patterns/Areal/Areal_ECnorth.zip)

code	ECnorth
arealabel	East Coast North

Layer Info

Time Accessed	26 November 2019 12:45PM
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Version	2016_v2
---------	---------

BOM IFDs

Click here (http://www.bom.gov.au/water/designRainfalls/revise-ifd/?year=2016&coordinate_type=dd&latitude=-27.736&longitude=153.238&sadmin=true&sdhr=true&sdday=true&user_label=) to obtain the IFD depths for catchment centroid from the BoM website

Layer Info

Time Accessed	26 November 2019 12:45PM
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Median Preburst Depths and Ratios

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	2.5 (0.064)	4.6 (0.085)	6.0 (0.093)	7.3 (0.098)	8.7 (0.098)	9.8 (0.098)
90 (1.5)	2.8 (0.063)	10.7 (0.172)	15.9 (0.213)	20.9 (0.239)	16.8 (0.160)	13.8 (0.115)
120 (2.0)	2.6 (0.053)	9.9 (0.144)	14.8 (0.178)	19.4 (0.199)	20.9 (0.177)	21.9 (0.163)
180 (3.0)	3.8 (0.067)	13.4 (0.169)	19.8 (0.205)	25.9 (0.227)	32.8 (0.236)	38.0 (0.238)
360 (6.0)	5.8 (0.080)	19.3 (0.187)	28.2 (0.223)	36.8 (0.245)	64.4 (0.350)	85.1 (0.401)
720 (12.0)	6.0 (0.063)	19.6 (0.142)	28.6 (0.169)	37.2 (0.184)	61.7 (0.250)	80.1 (0.282)
1080 (18.0)	7.1 (0.063)	15.9 (0.097)	21.8 (0.108)	27.3 (0.113)	47.7 (0.162)	63.0 (0.186)
1440 (24.0)	7.0 (0.055)	12.7 (0.069)	16.5 (0.072)	20.2 (0.074)	32.0 (0.096)	40.9 (0.107)
2160 (36.0)	0.0 (0.000)	6.6 (0.030)	10.9 (0.041)	15.1 (0.047)	28.6 (0.072)	38.8 (0.086)
2880 (48.0)	0.0 (0.000)	5.5 (0.023)	9.1 (0.030)	12.6 (0.035)	23.2 (0.053)	31.1 (0.061)
4320 (72.0)	0.0 (0.000)	0.9 (0.003)	1.4 (0.004)	2.0 (0.005)	10.2 (0.020)	16.3 (0.028)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

10% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.9 (0.004)	1.5 (0.005)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

25% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.1 (0.003)	0.3 (0.005)	0.4 (0.006)	0.5 (0.007)	0.7 (0.008)	0.9 (0.009)
90 (1.5)	0.0 (0.000)	0.7 (0.011)	1.2 (0.016)	1.6 (0.019)	1.0 (0.009)	0.5 (0.004)
120 (2.0)	0.0 (0.000)	1.2 (0.017)	2.0 (0.024)	2.7 (0.028)	1.7 (0.014)	1.0 (0.007)
180 (3.0)	0.0 (0.000)	0.9 (0.012)	1.6 (0.016)	2.2 (0.019)	3.6 (0.026)	4.7 (0.029)
360 (6.0)	0.0 (0.000)	1.8 (0.017)	2.9 (0.023)	4.0 (0.027)	5.6 (0.030)	6.8 (0.032)
720 (12.0)	0.0 (0.000)	2.5 (0.018)	4.2 (0.025)	5.8 (0.029)	20.8 (0.084)	32.0 (0.113)
1080 (18.0)	0.0 (0.000)	2.2 (0.013)	3.7 (0.018)	5.1 (0.021)	9.5 (0.032)	12.7 (0.038)
1440 (24.0)	0.0 (0.000)	0.3 (0.002)	0.5 (0.002)	0.7 (0.002)	6.9 (0.021)	11.6 (0.030)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	1.7 (0.004)	3.0 (0.007)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	2.0 (0.005)	3.5 (0.007)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

75% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	26.3 (0.675)	35.6 (0.661)	41.8 (0.650)	47.7 (0.639)	45.7 (0.514)	44.2 (0.441)
90 (1.5)	25.6 (0.573)	56.5 (0.909)	77.0 (1.031)	96.6 (1.105)	96.4 (0.917)	96.2 (0.806)
120 (2.0)	27.1 (0.554)	61.6 (0.896)	84.3 (1.017)	106.2 (1.089)	143.2 (1.213)	171.0 (1.270)
180 (3.0)	39.7 (0.708)	71.9 (0.907)	93.3 (0.969)	113.7 (0.999)	150.7 (1.085)	178.5 (1.120)
360 (6.0)	36.5 (0.507)	70.0 (0.678)	92.2 (0.730)	113.4 (0.755)	146.0 (0.792)	170.3 (0.803)
720 (12.0)	27.3 (0.287)	66.3 (0.481)	92.0 (0.544)	116.8 (0.578)	175.7 (0.710)	219.8 (0.773)
1080 (18.0)	37.0 (0.329)	56.1 (0.342)	68.7 (0.340)	80.8 (0.335)	114.2 (0.387)	139.2 (0.411)
1440 (24.0)	31.0 (0.245)	46.9 (0.253)	57.4 (0.251)	67.5 (0.247)	91.4 (0.274)	109.3 (0.285)
2160 (36.0)	10.3 (0.070)	30.1 (0.138)	43.1 (0.160)	55.7 (0.172)	89.0 (0.225)	114.0 (0.251)
2880 (48.0)	6.0 (0.037)	30.3 (0.125)	46.4 (0.155)	61.8 (0.171)	89.8 (0.203)	110.8 (0.219)
4320 (72.0)	0.1 (0.000)	17.4 (0.064)	28.9 (0.085)	40.0 (0.097)	57.9 (0.115)	71.4 (0.123)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

90% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	69.8 (1.790)	104.6 (1.942)	127.6 (1.987)	149.7 (2.005)	191.9 (2.160)	223.6 (2.234)
90 (1.5)	118.2 (2.648)	152.7 (2.458)	175.6 (2.353)	197.6 (2.261)	245.2 (2.333)	280.9 (2.354)
120 (2.0)	99.3 (2.026)	145.0 (2.112)	175.3 (2.115)	204.4 (2.096)	264.9 (2.244)	310.3 (2.304)
180 (3.0)	130.9 (2.333)	181.1 (2.284)	214.4 (2.227)	246.3 (2.163)	291.9 (2.102)	326.0 (2.046)
360 (6.0)	106.3 (1.476)	150.2 (1.455)	179.2 (1.420)	207.1 (1.378)	259.5 (1.409)	298.8 (1.409)
720 (12.0)	75.3 (0.792)	135.6 (0.984)	175.5 (1.037)	213.8 (1.059)	267.1 (1.080)	307.1 (1.080)
1080 (18.0)	86.2 (0.767)	131.6 (0.802)	161.6 (0.801)	190.4 (0.790)	215.9 (0.732)	235.1 (0.694)
1440 (24.0)	73.3 (0.580)	110.6 (0.597)	135.3 (0.593)	159.0 (0.582)	201.0 (0.602)	232.5 (0.607)
2160 (36.0)	38.4 (0.260)	82.9 (0.380)	112.3 (0.417)	140.6 (0.435)	184.6 (0.467)	217.5 (0.480)
2880 (48.0)	25.8 (0.158)	81.8 (0.338)	118.8 (0.396)	154.3 (0.428)	180.1 (0.408)	199.4 (0.393)
4320 (72.0)	6.5 (0.035)	44.8 (0.164)	70.2 (0.206)	94.5 (0.230)	107.5 (0.213)	117.2 (0.202)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

Interim Climate Change Factors

	RCP 4.5	RCP6	RCP 8.5
2030	0.869 (4.3%)	0.783 (3.9%)	0.983 (4.9%)
2040	1.057 (5.3%)	1.014 (5.1%)	1.349 (6.8%)
2050	1.272 (6.4%)	1.236 (6.2%)	1.773 (9.0%)
2060	1.488 (7.5%)	1.458 (7.4%)	2.237 (11.5%)
2070	1.676 (8.5%)	1.691 (8.6%)	2.722 (14.2%)
2080	1.810 (9.2%)	1.944 (9.9%)	3.209 (16.9%)
2090	1.862 (9.5%)	2.227 (11.5%)	3.679 (19.7%)

Layer Info

Time Accessed	26 November 2019 12:45PM
Version	2019_v1
Note	ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.

Baseflow Factors

Downstream	0
Area (km2)	3779.48325962
Catchment Number	7250
Volume Factor	0.150296
Peak Factor	0.04523

Layer Info

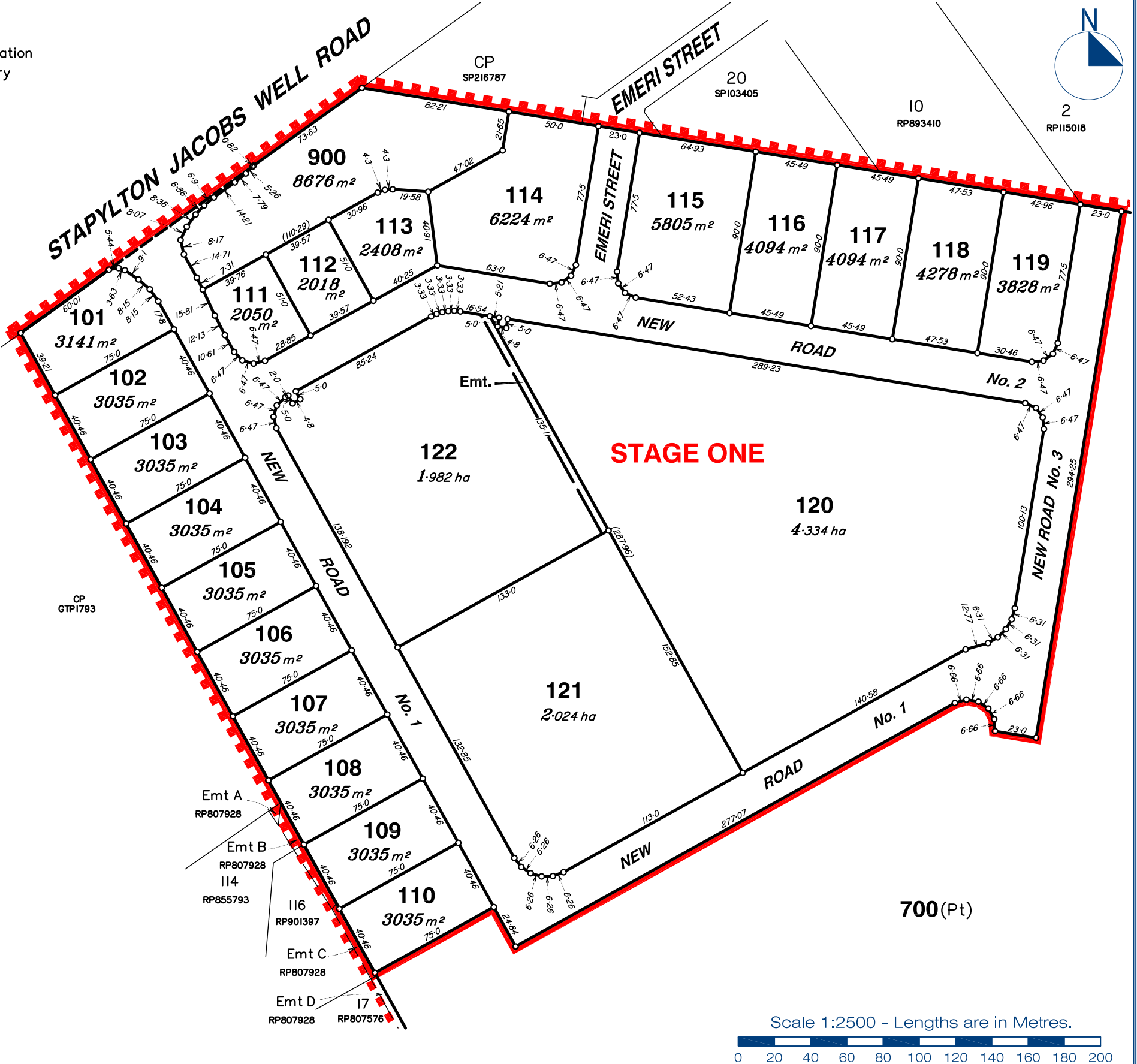
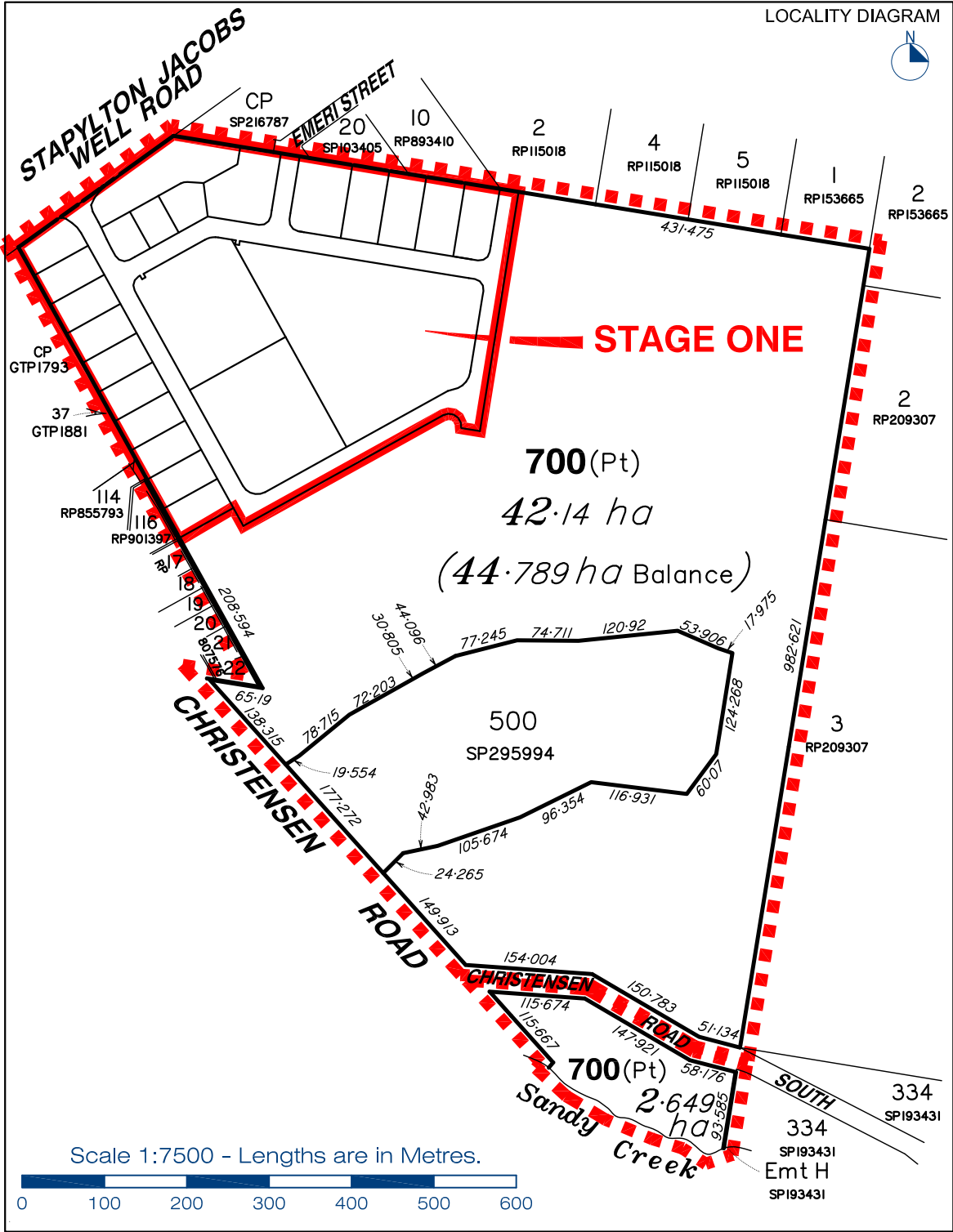
Time Accessed	26 November 2019 12:45PM
Version	2016_v1

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- Download JSON (downloads/5e94d649-e516-45a9-b4fb-f374cf5791a5.json)
- Generating PDF... (downloads/579e9dd3-c6b7-4ec5-8a64-fc262213ce3d.pdf)

Appendix J – Proposed Reconfiguration of a Lot Plan

DEVELOPMENT SUMMARY				
Total Site Area 64.239Ha				
LOT YIELD	STAGE AREA	LOT DENSITY	AVERAGE LOT SIZE	APPROX. AREA & LENGTH OF NEW ROAD
22 Lots	19.34 ha	1.13 Lots/ha	6742m ²	3.636 Ha 1,560m

--- Limit of Application
— Stage Boundary



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Scale at A3:		1:2500			
Date:		18-12-19			
Design:		ICG			
Drawn:		SJH			
Checked:		AWG			
A	18/12/2019	ADD PMTS IN LOTS 120 & 122		SJH	AWG
	14/11/2019	ORIGINAL ISSUE		SJH	AWG
Issue	Date	Description		DRN	CHK

Project:

M38 INDUSTRIAL PARK
YATALA

Client:

FRASERS PROPERTY AUSTRALIA

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Drawing Title:

Proposed Staged
Reconfiguration of
Land STAGE ONE

Cancelling Lot 501 on SP295994

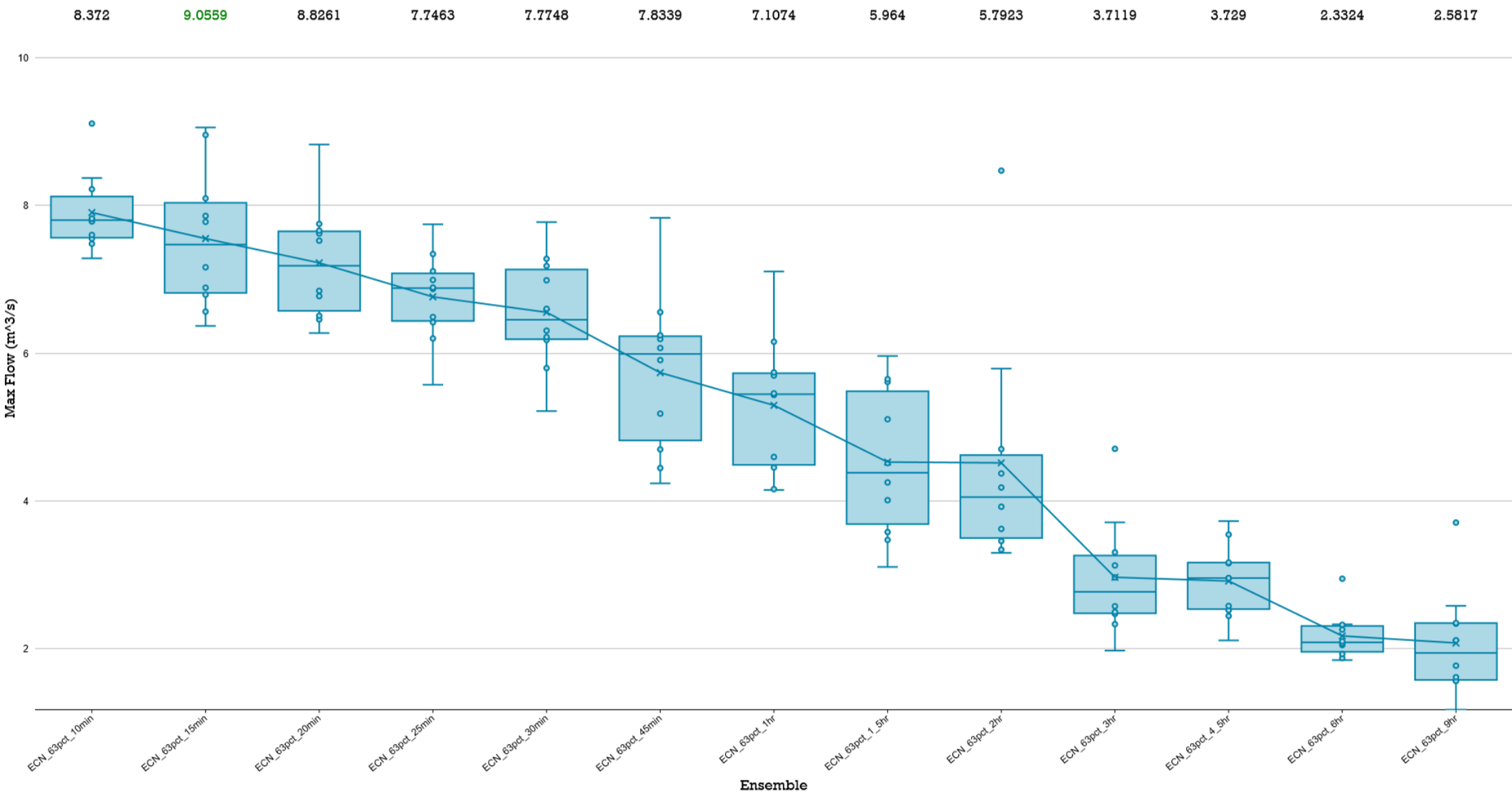
Drawing No:
5941 S ROL 01 A

Revision No:

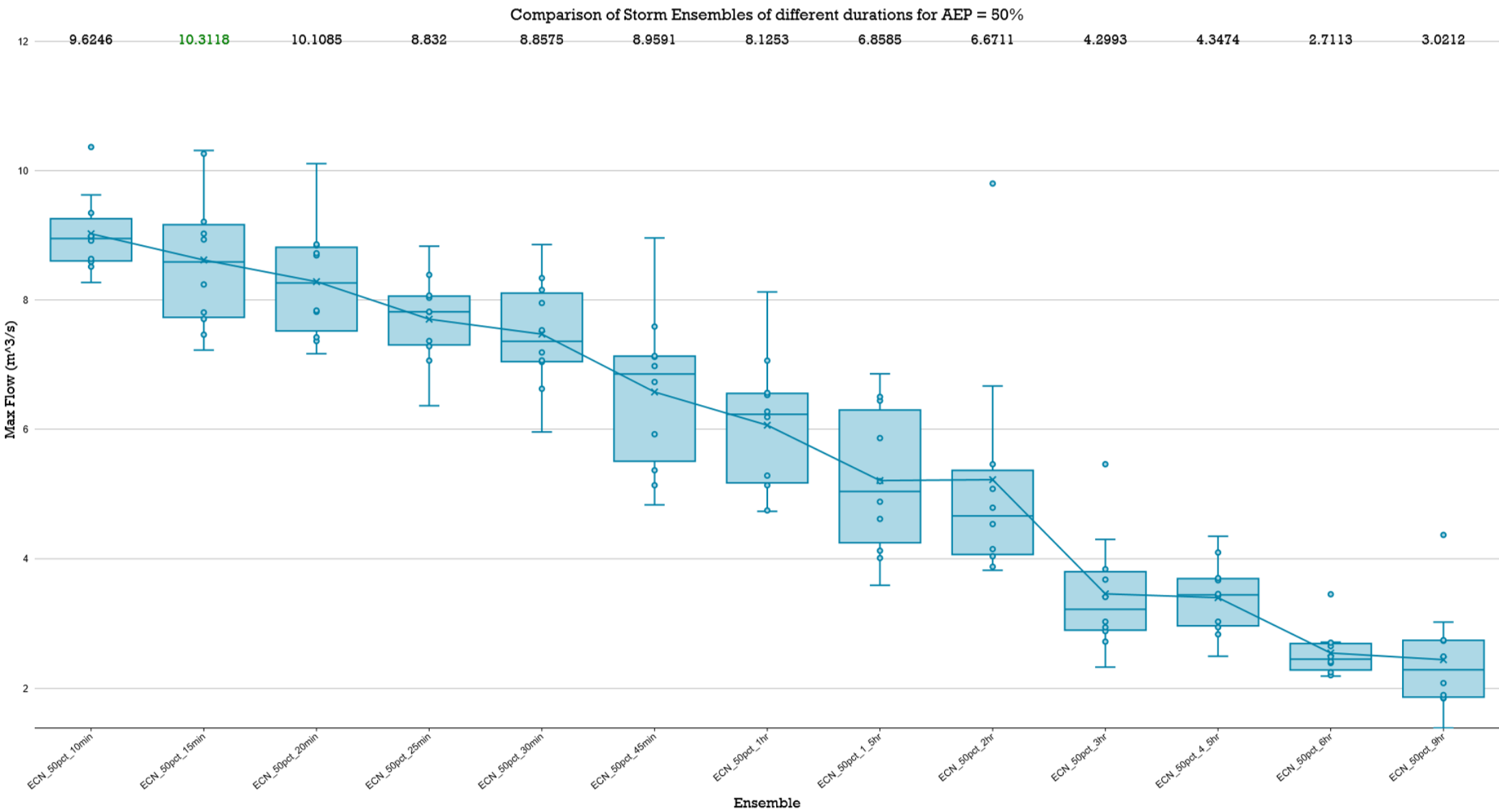
Appendix K – Pre and Post Development Hydrographs

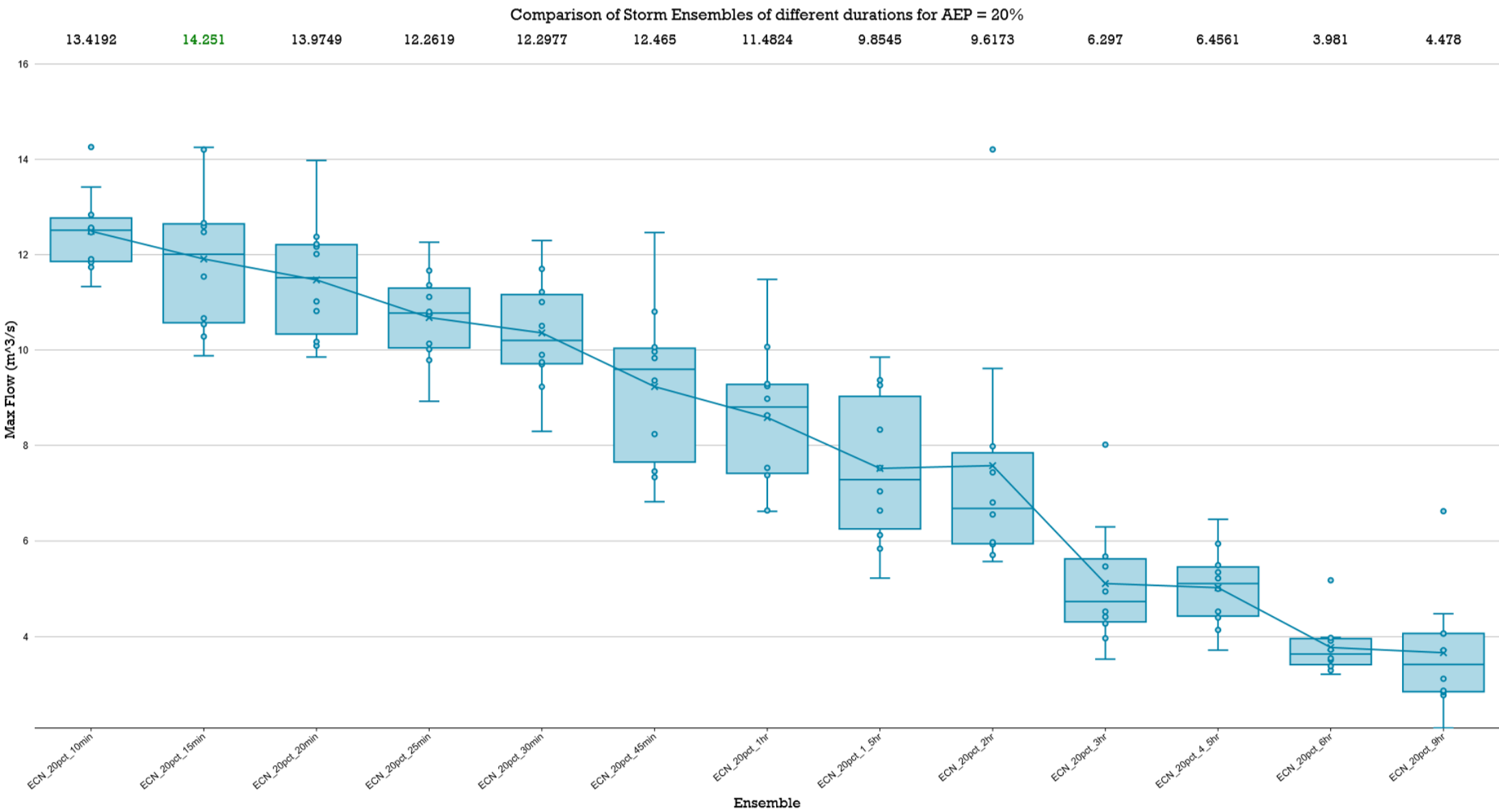
LPoD 1 POST-DEVELOPMENT

Comparison of Storm Ensembles of different durations for AEP = 63.2%

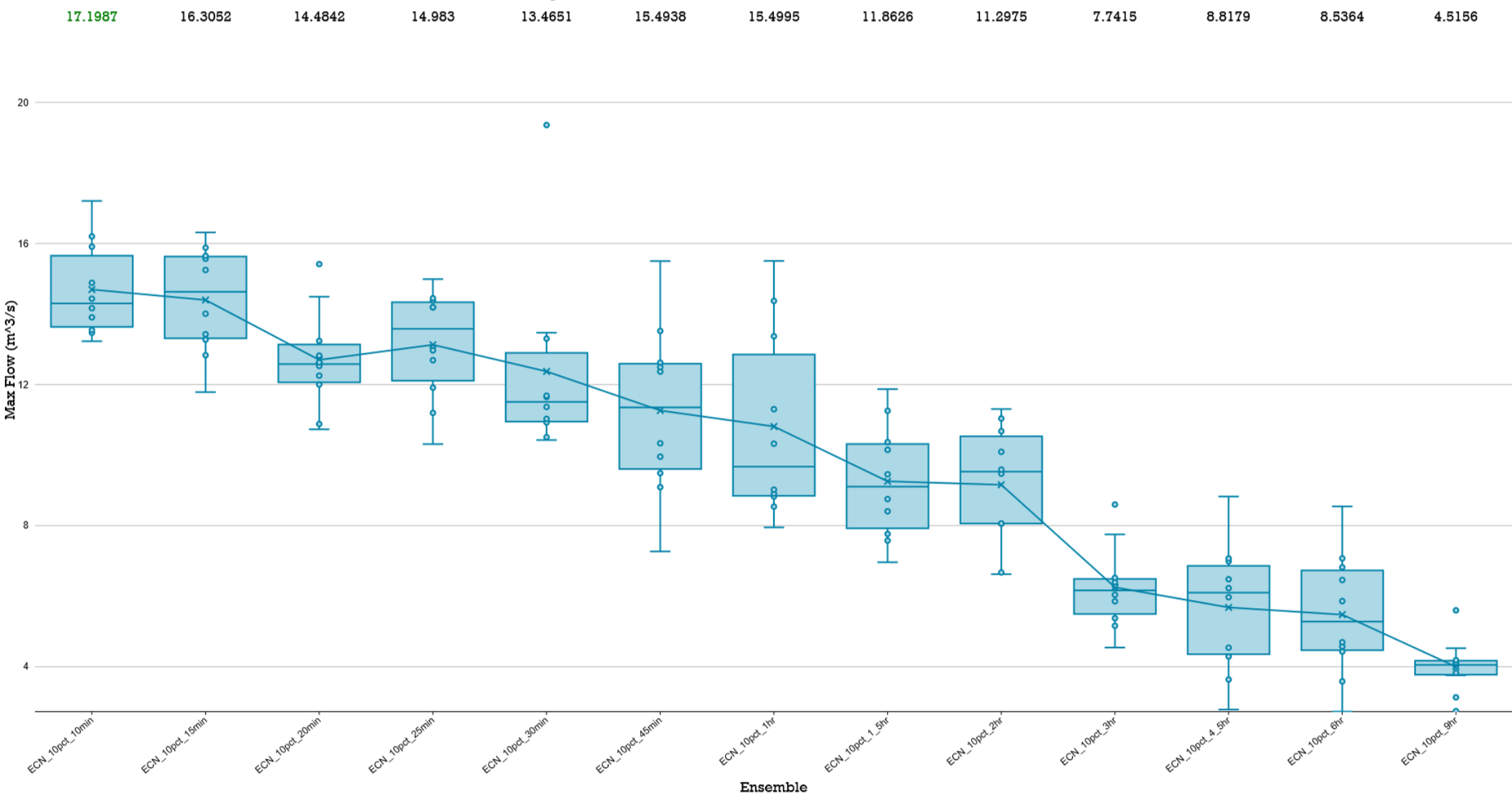


BOX & WHISKER PLOTS

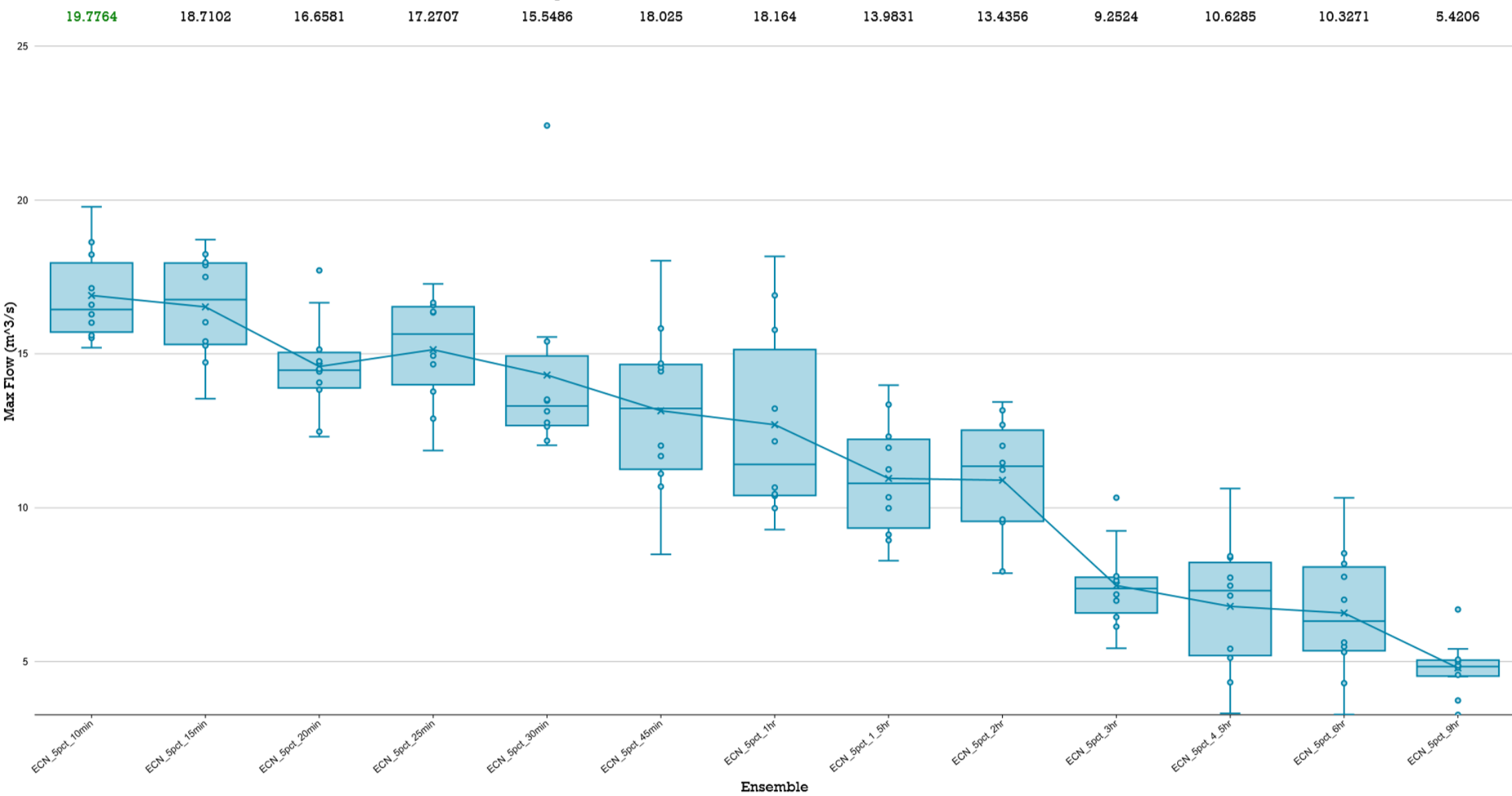




Comparison of Storm Ensembles of different durations for AEP = 10%

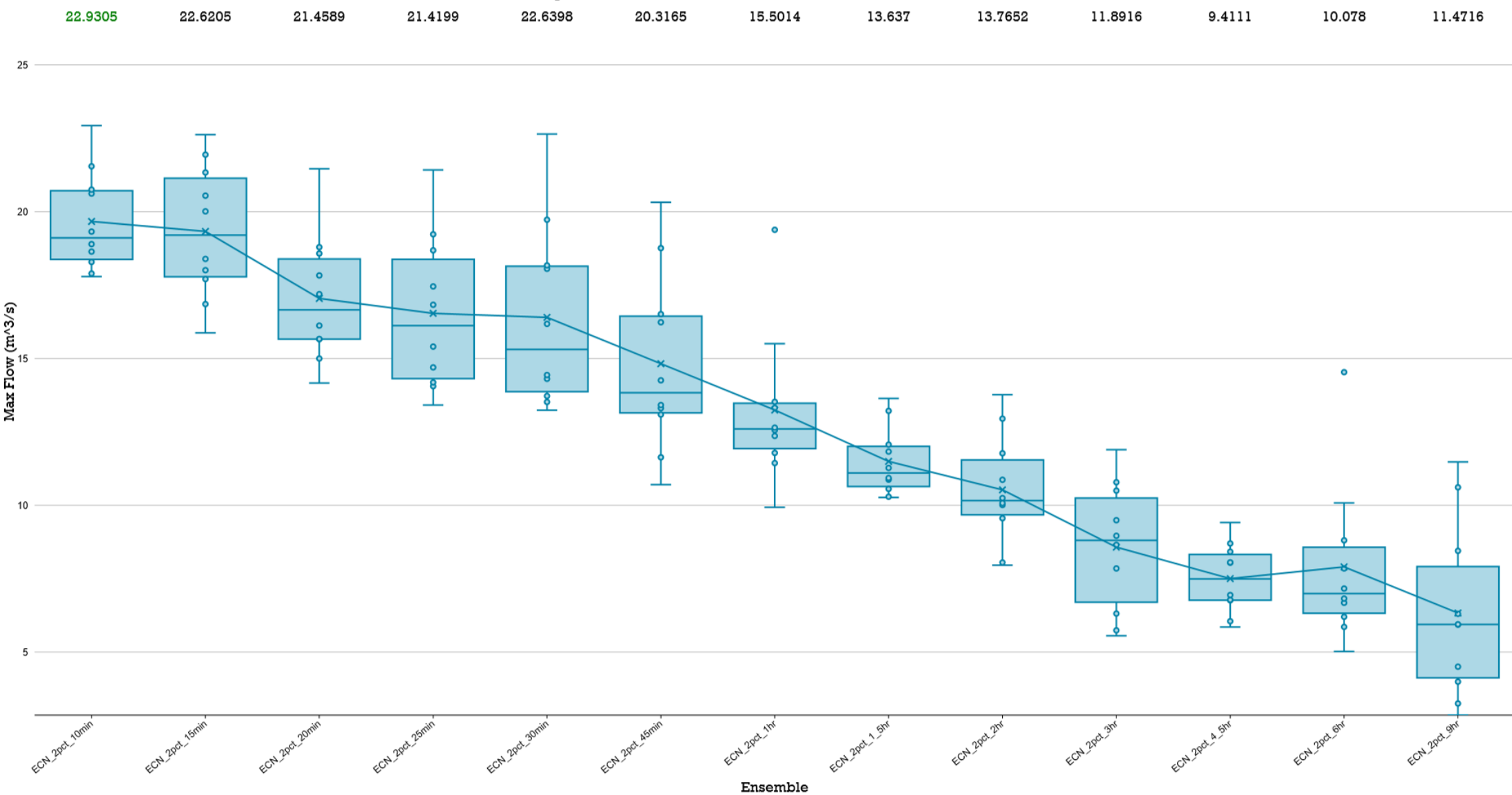


Comparison of Storm Ensembles of different durations for AEP = 5%

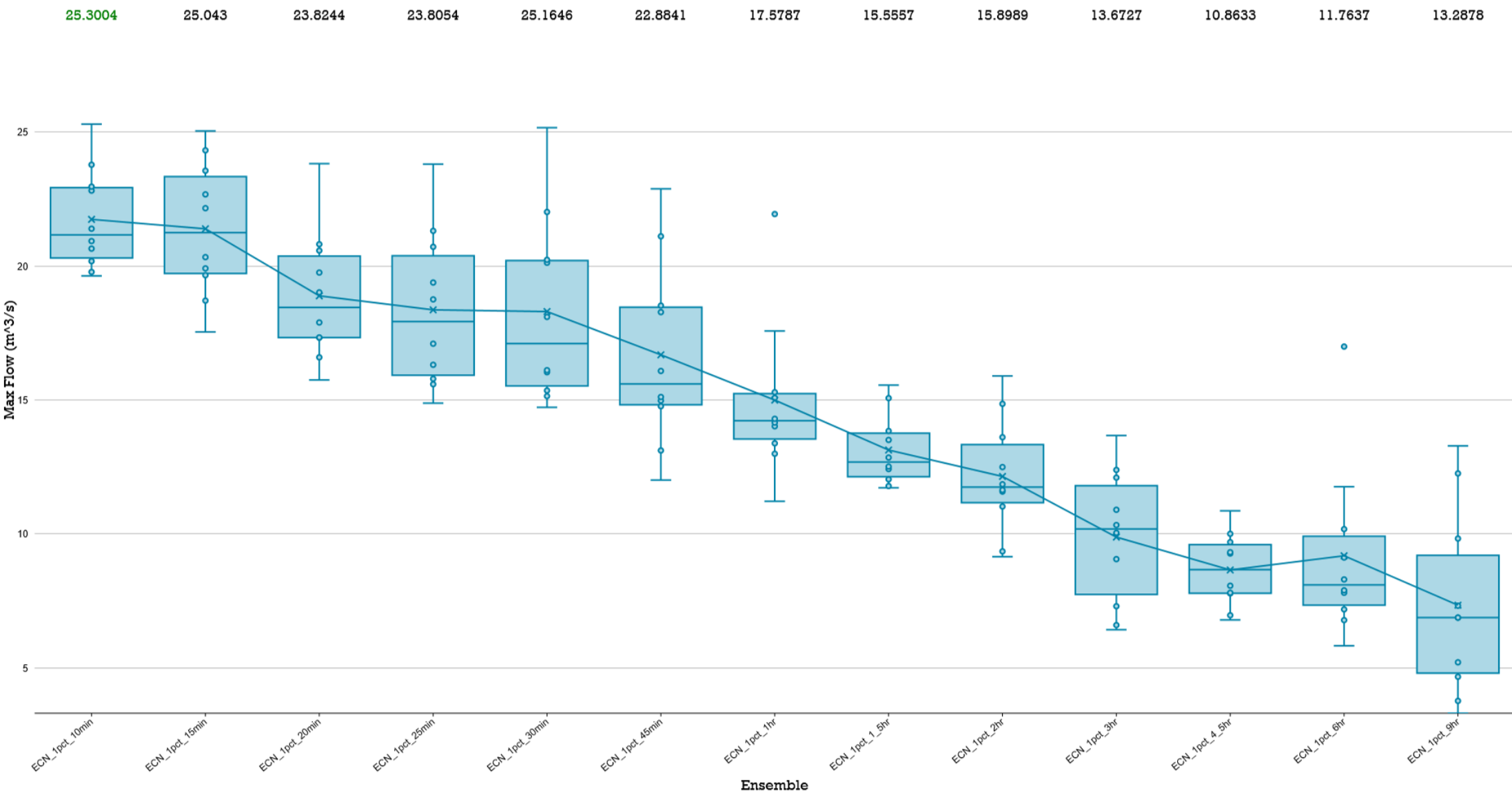


BOX & WHISKER PLOTS

Comparison of Storm Ensembles of different durations for AEP = 2%

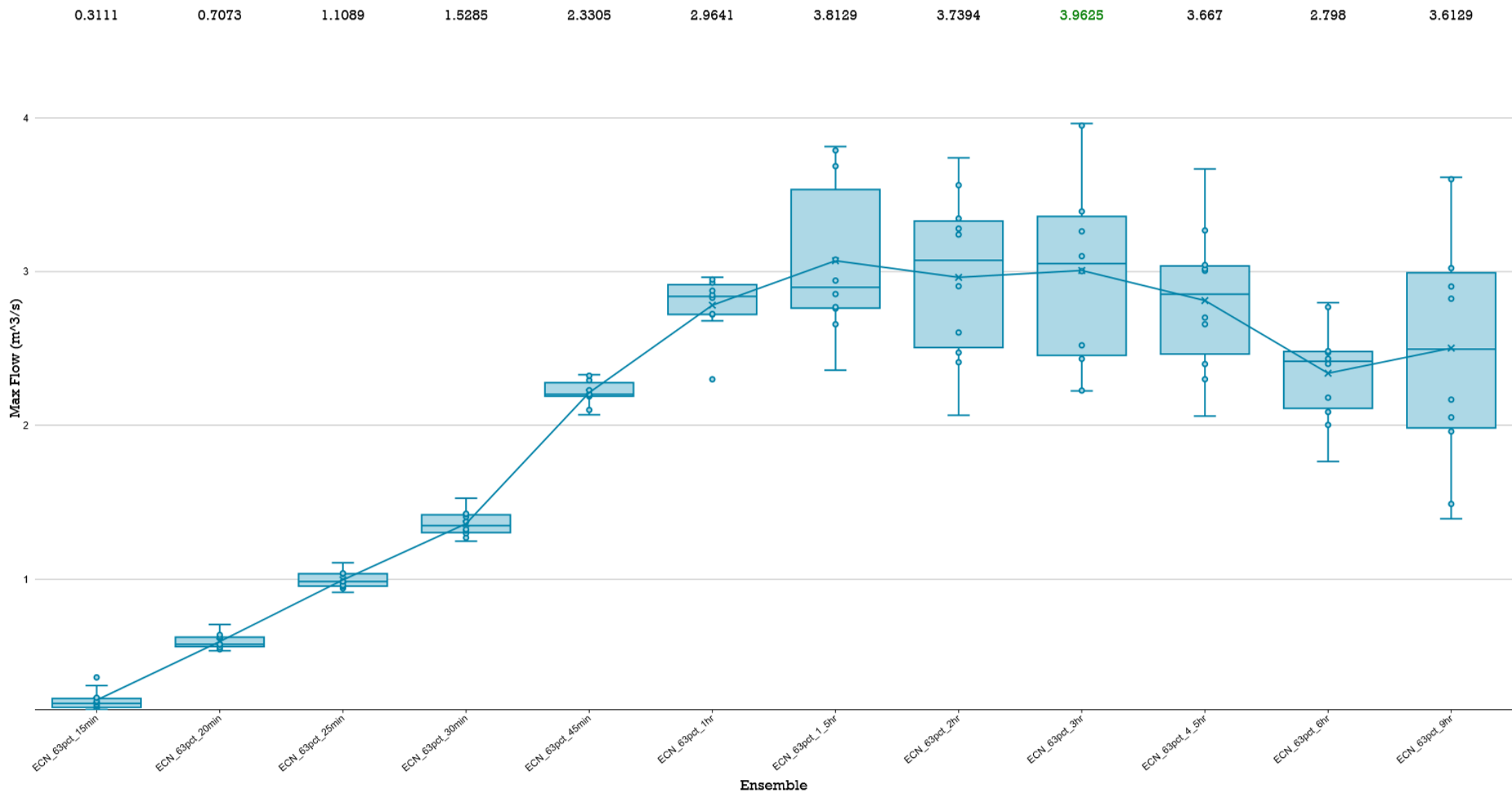


Comparison of Storm Ensembles of different durations for AEP = 1%

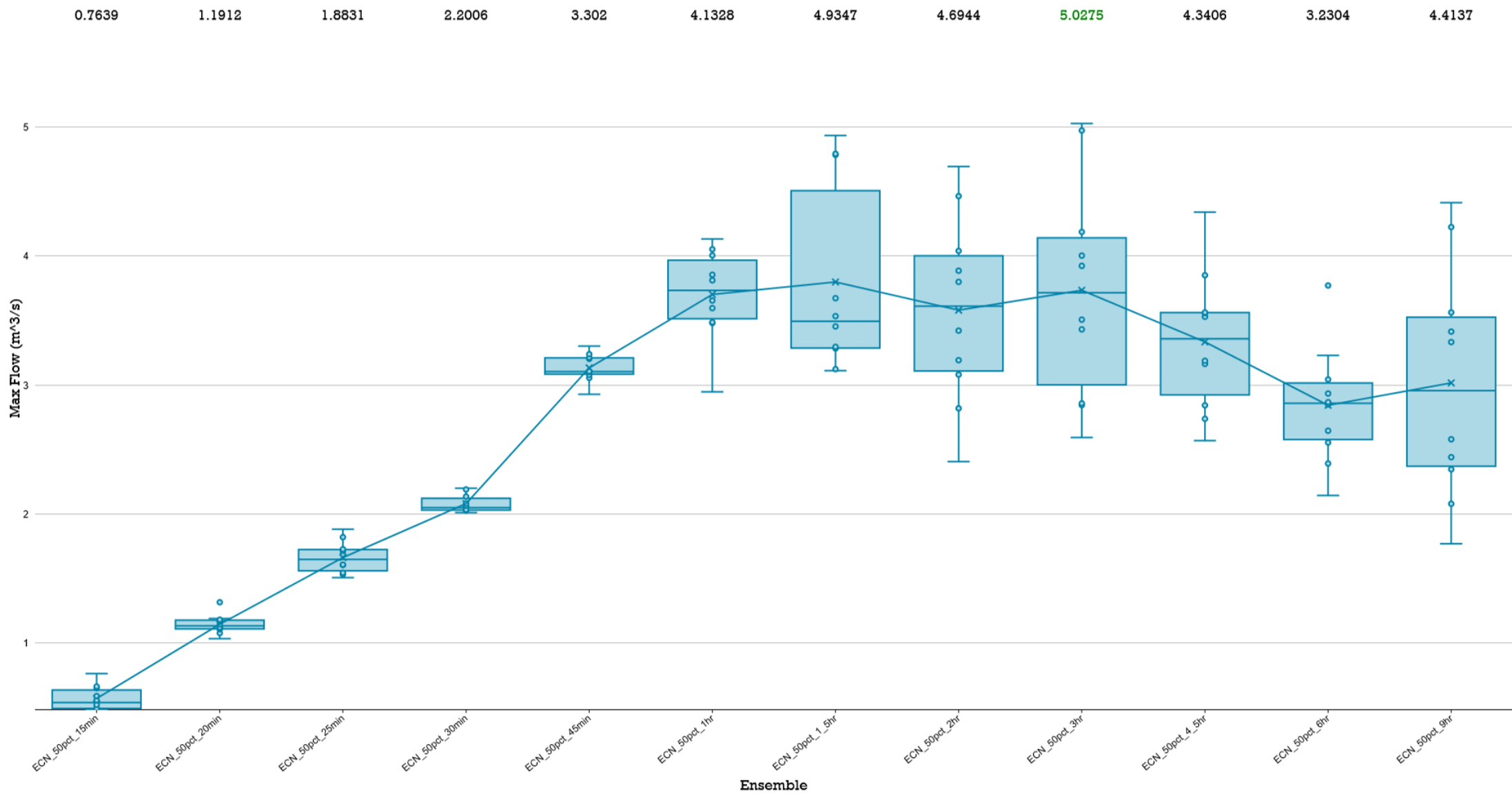


LPoD 1 PRE-DEVELOPMENT

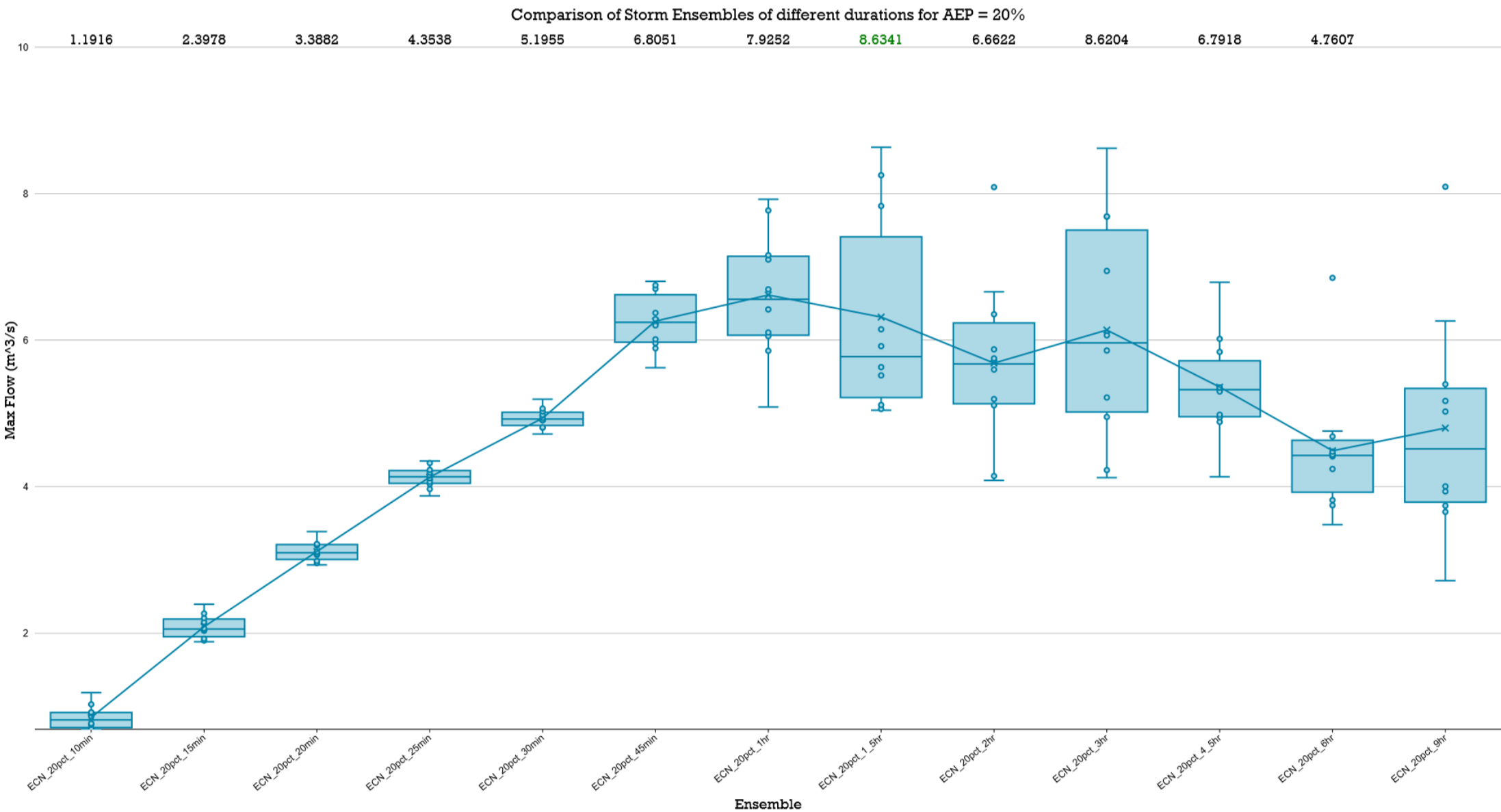
Comparison of Storm Ensembles of different durations for AEP = 63.2%

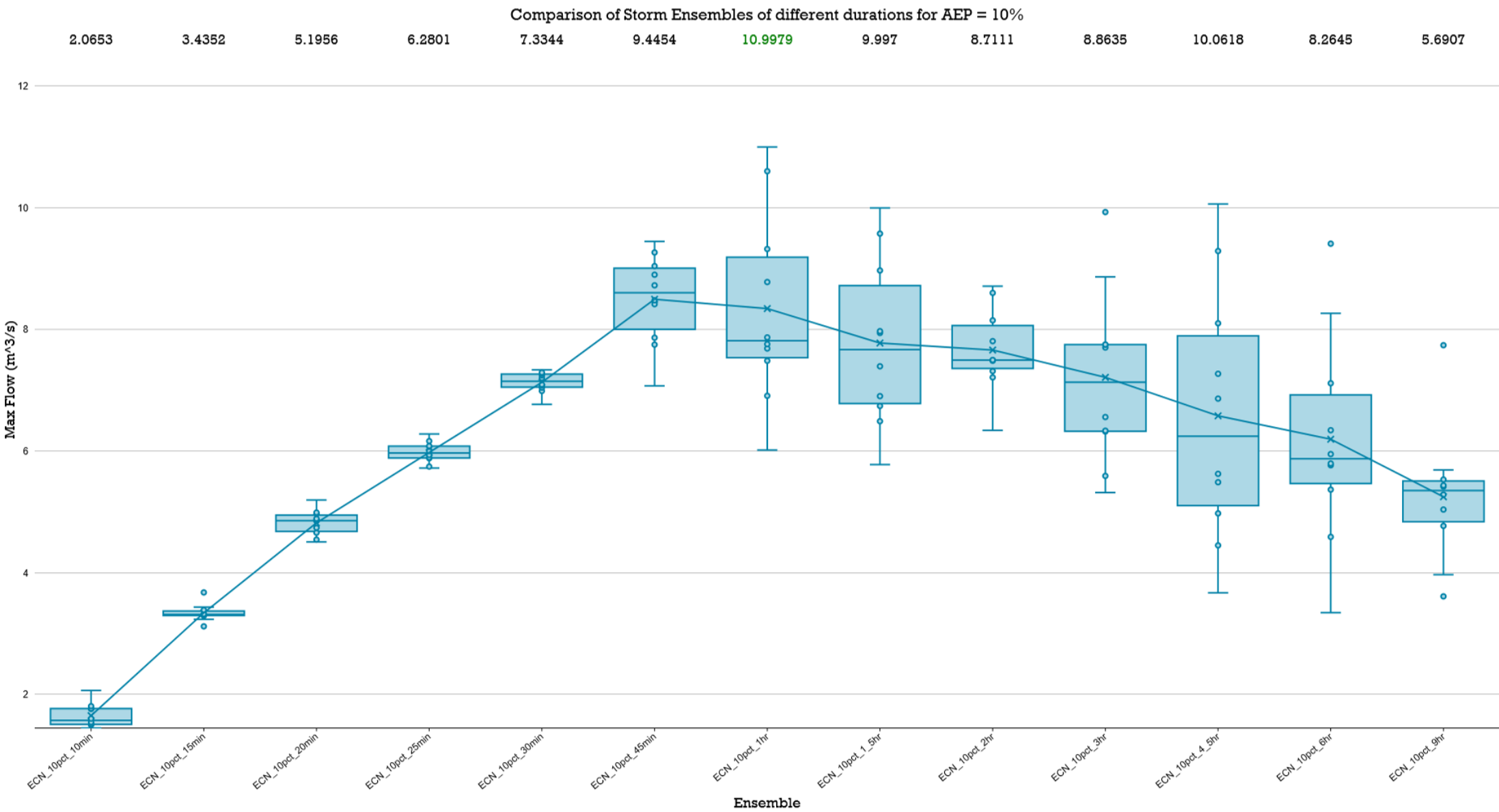


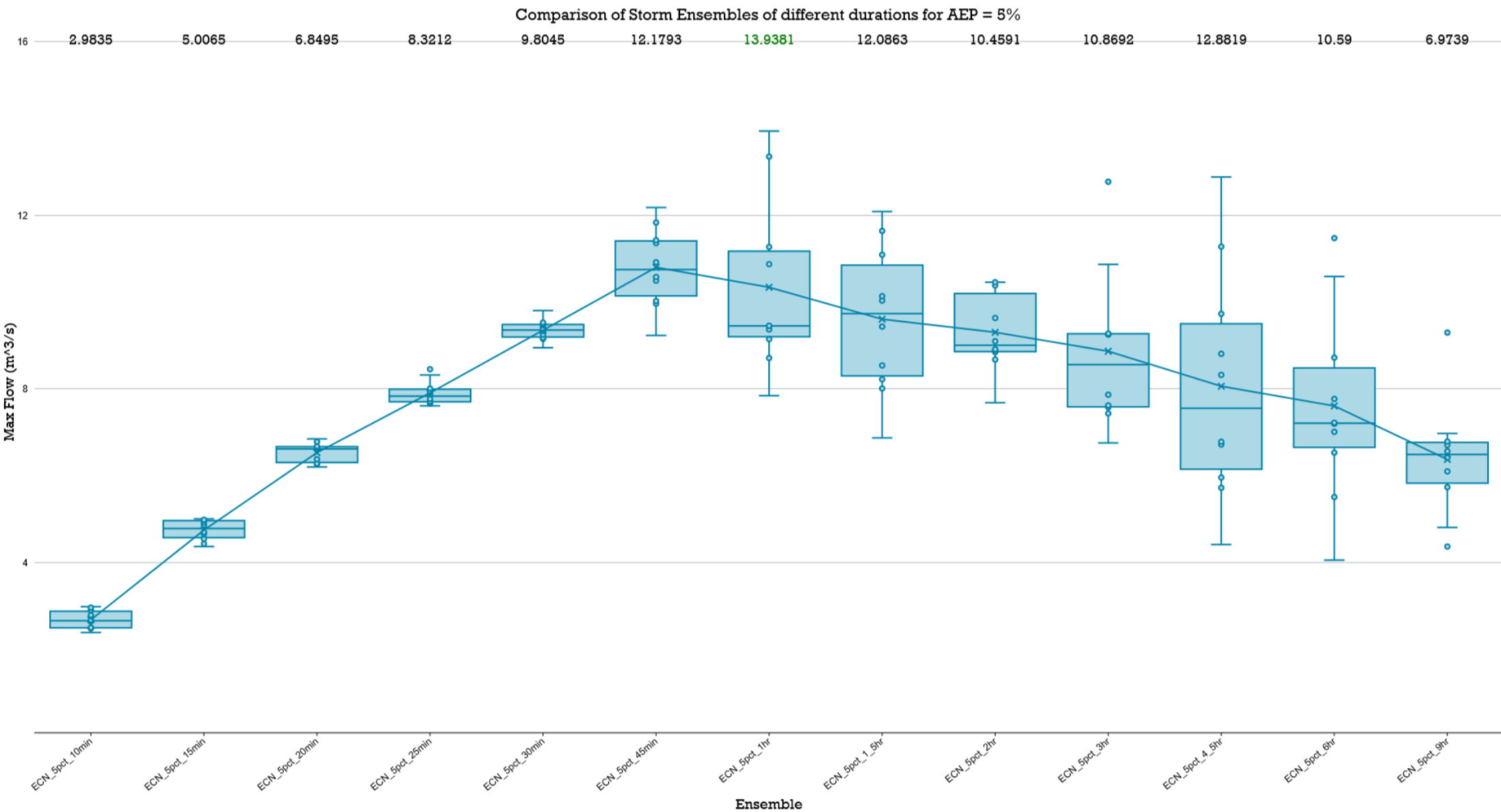
Comparison of Storm Ensembles of different durations for AEP = 50%



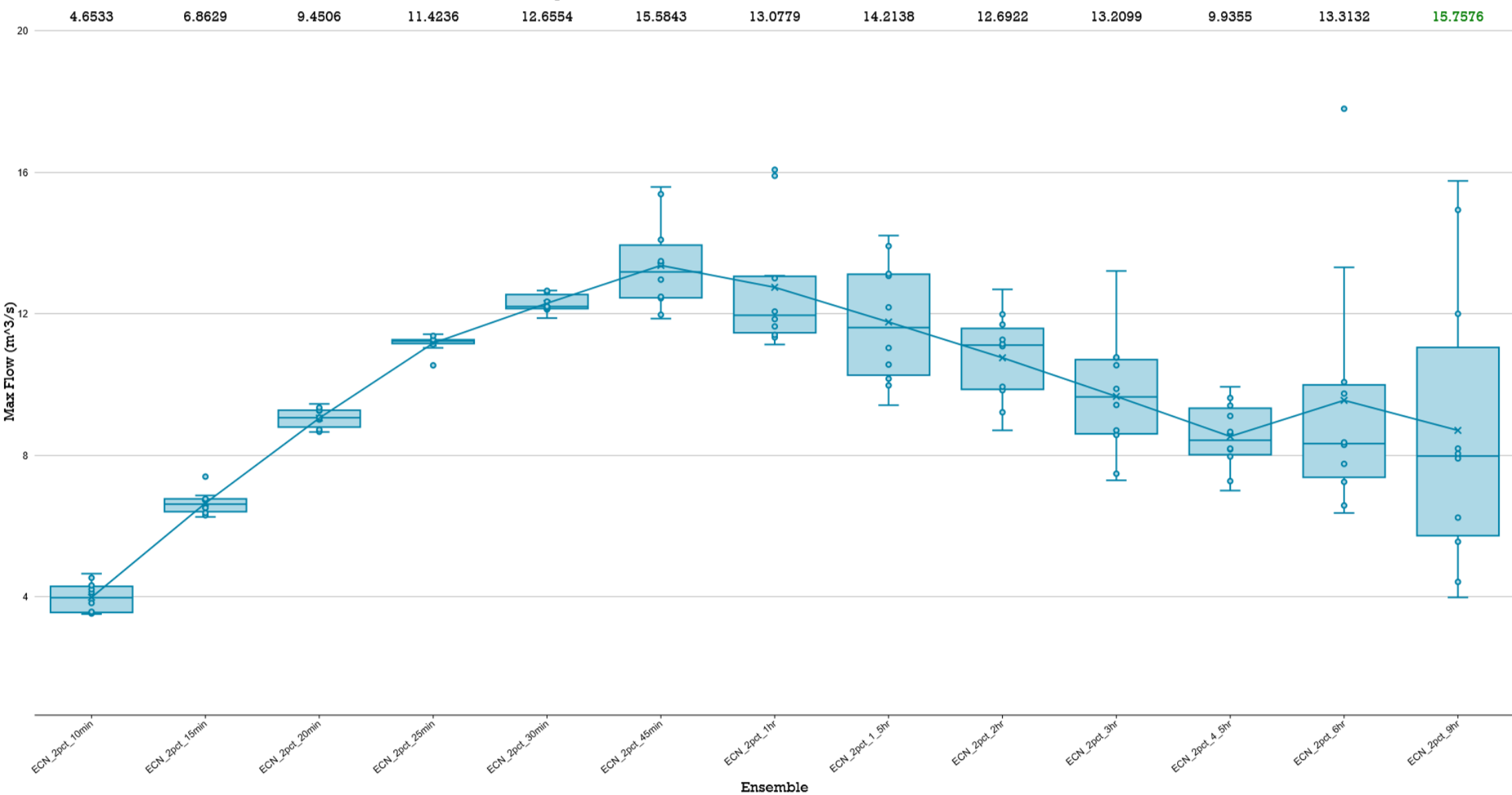
BOX & WHISKER PLOTS





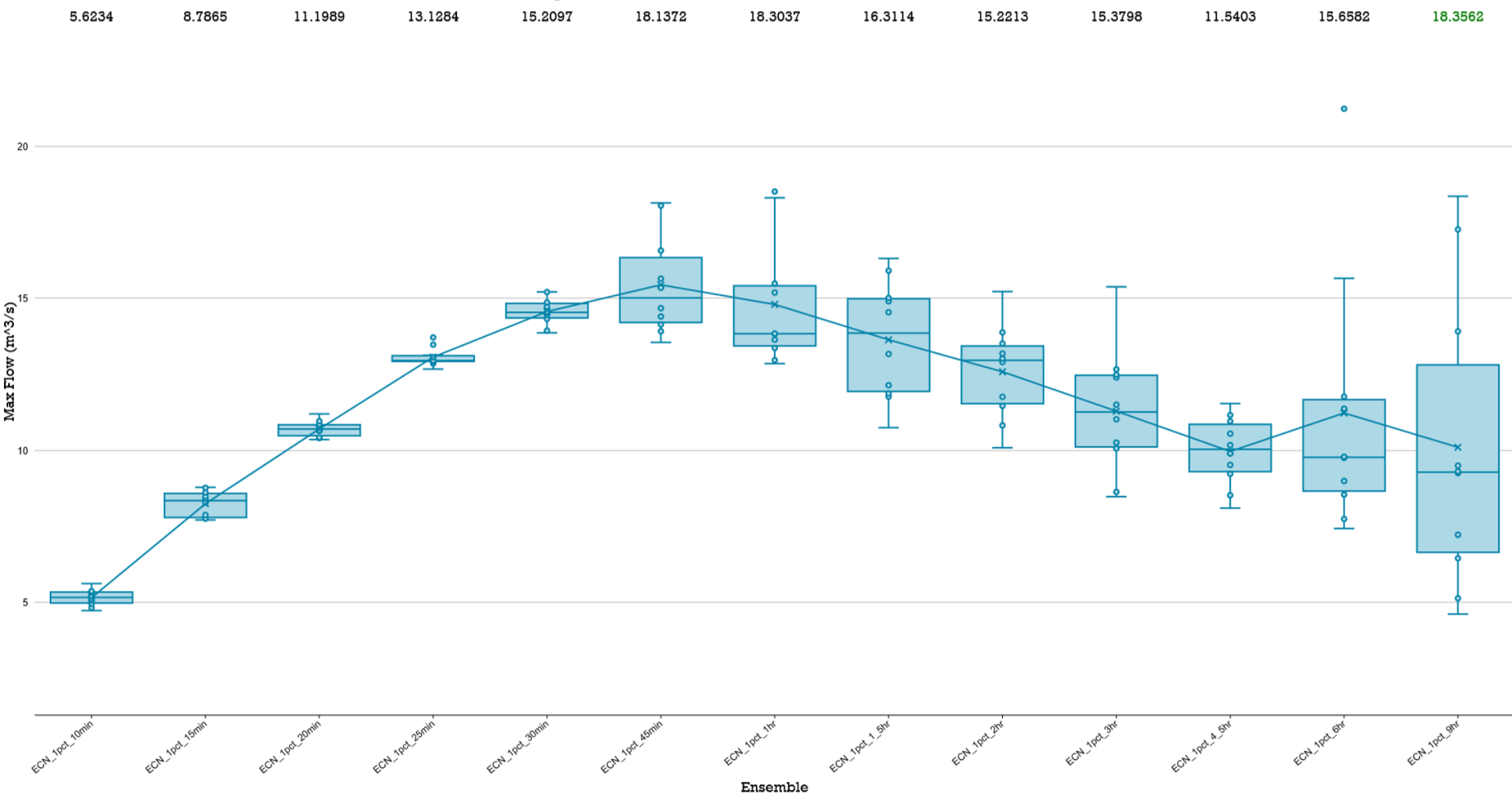


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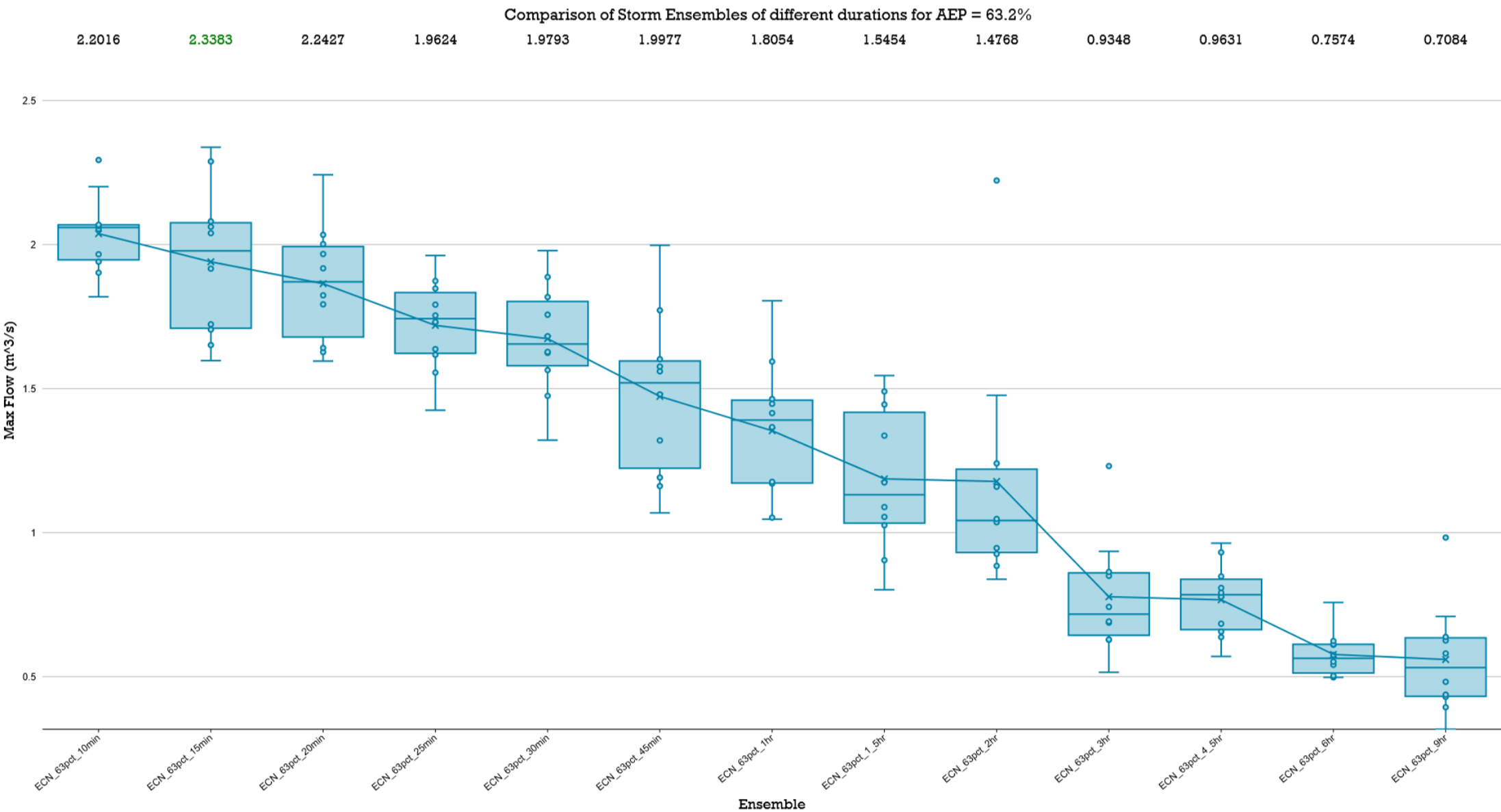


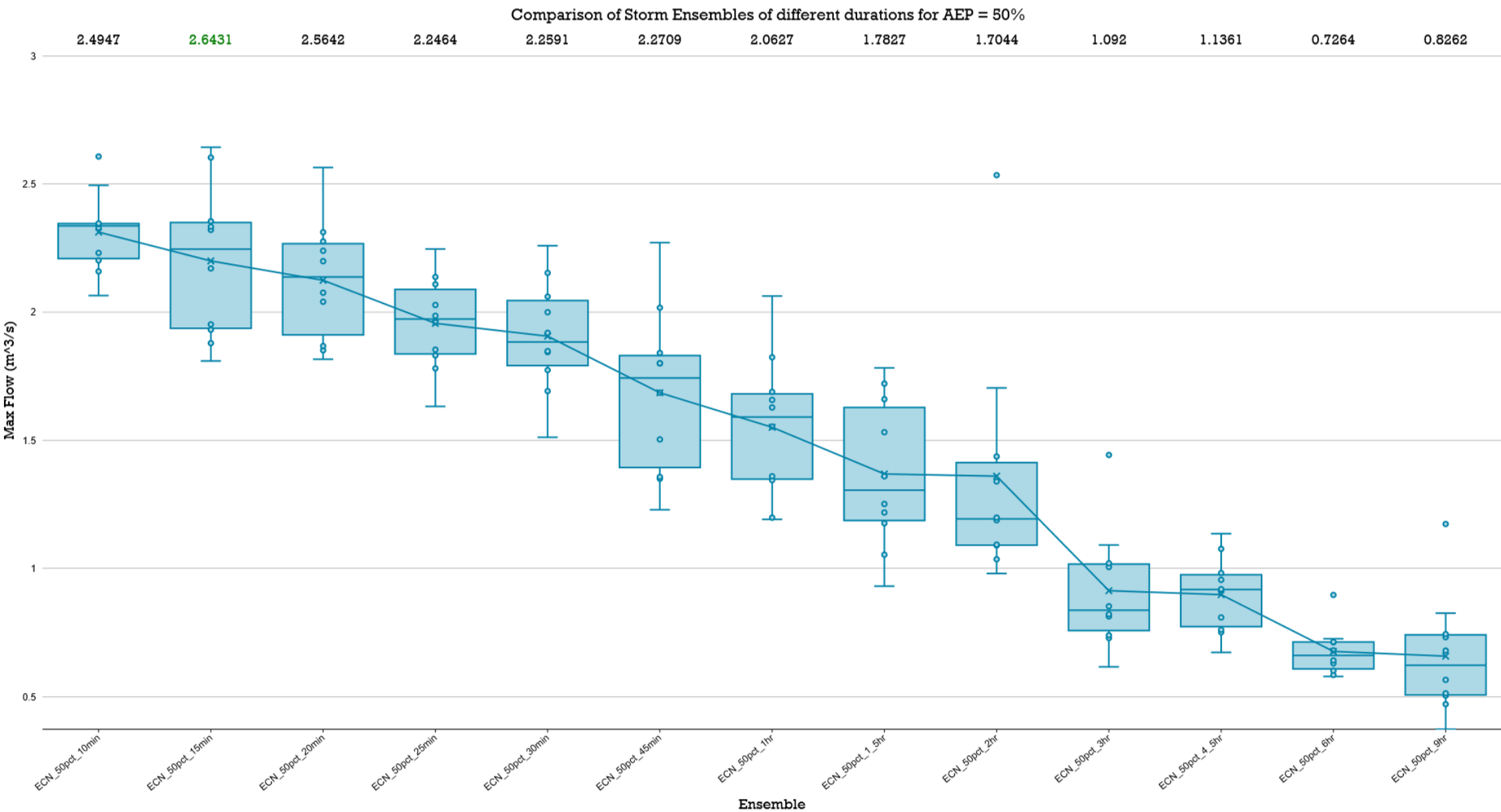
BOX & WHISKER PLOTS

Comparison of Storm Ensembles of different durations for AEP = 1%

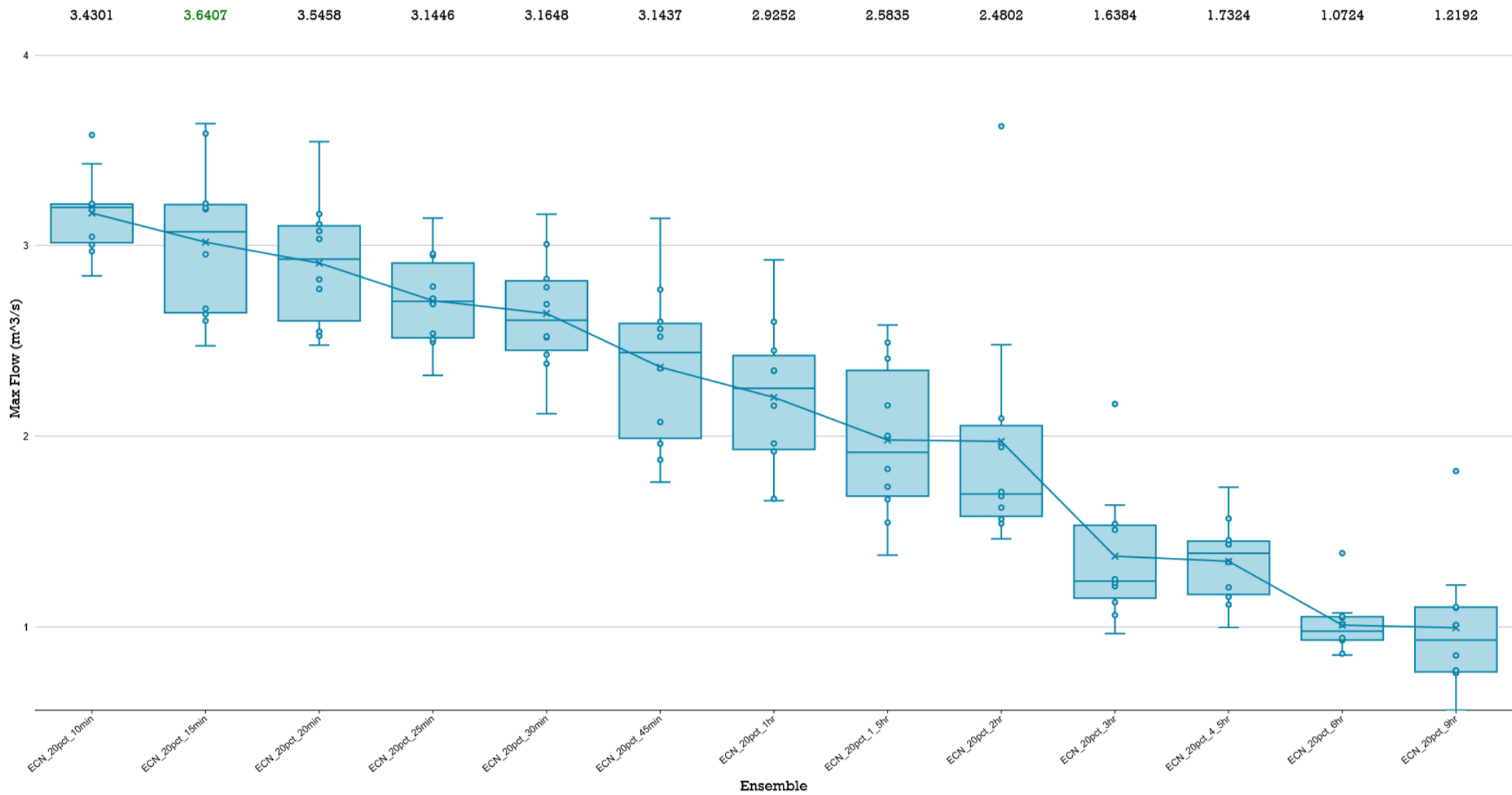


LPoD 2 POST-DEVELOPMENT



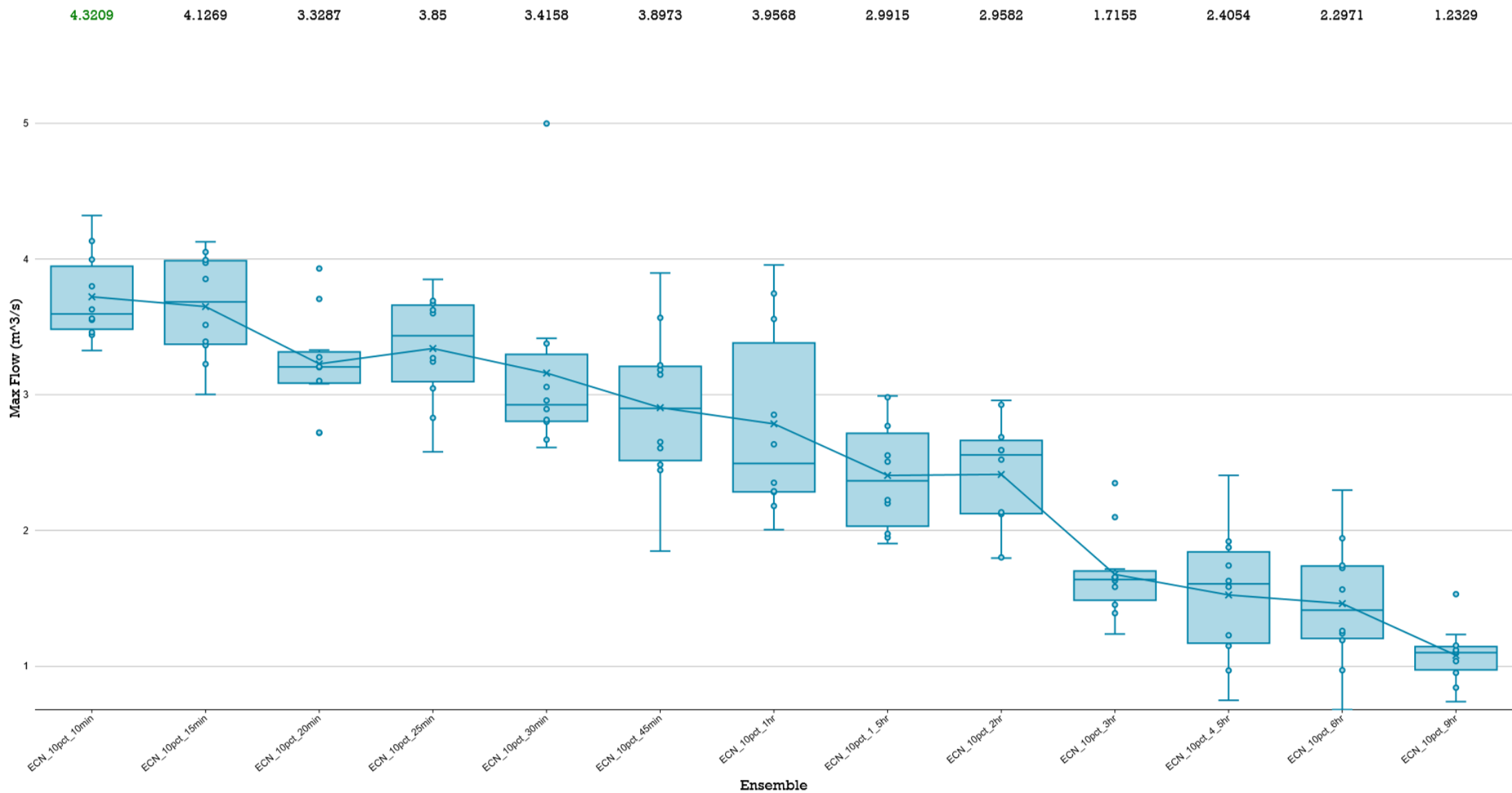


Comparison of Storm Ensembles of different durations for AEP = 20%

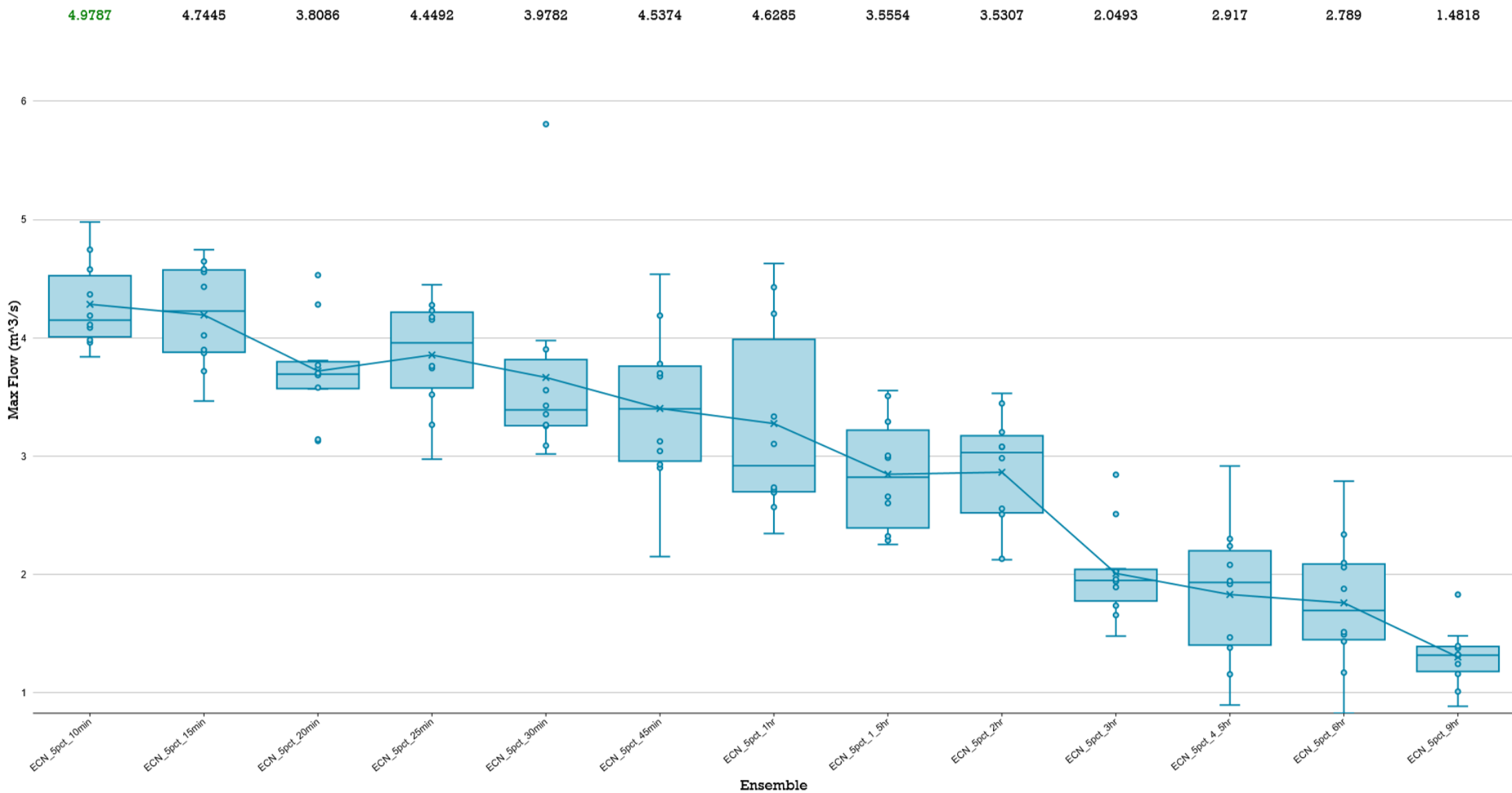


BOX & WHISKER PLOTS

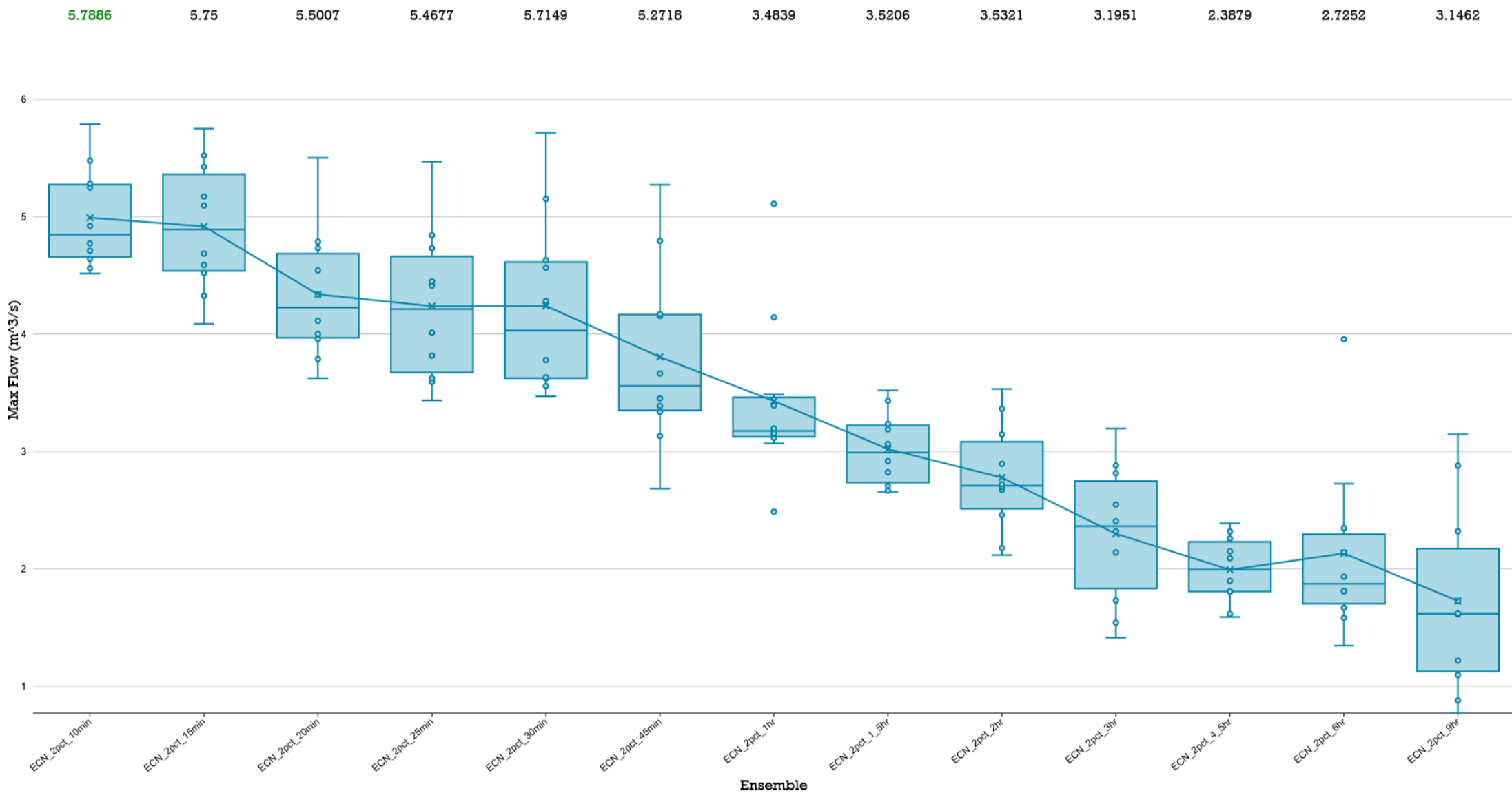
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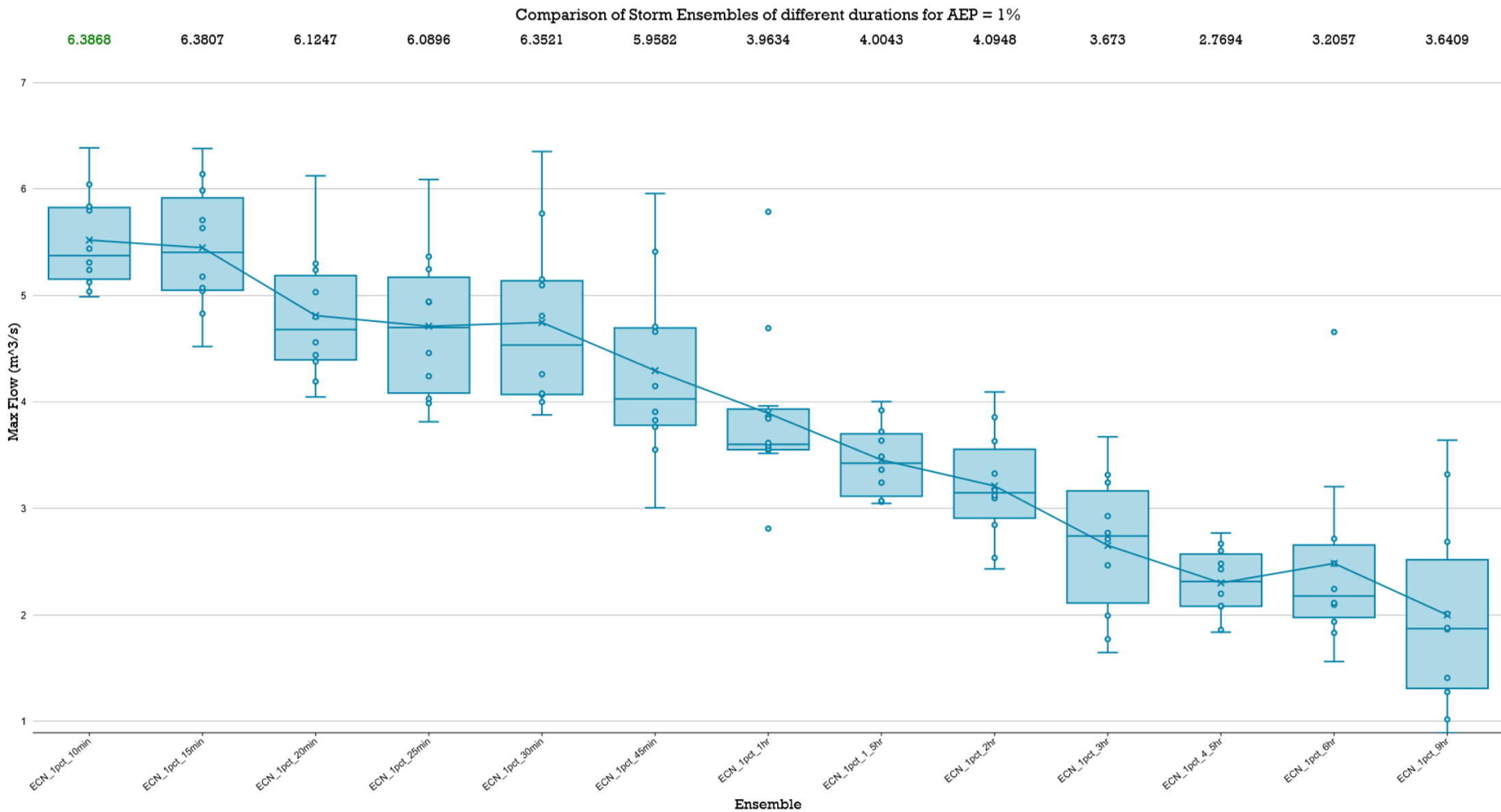
Comparison of Storm Ensembles of different durations for AEP = 5%



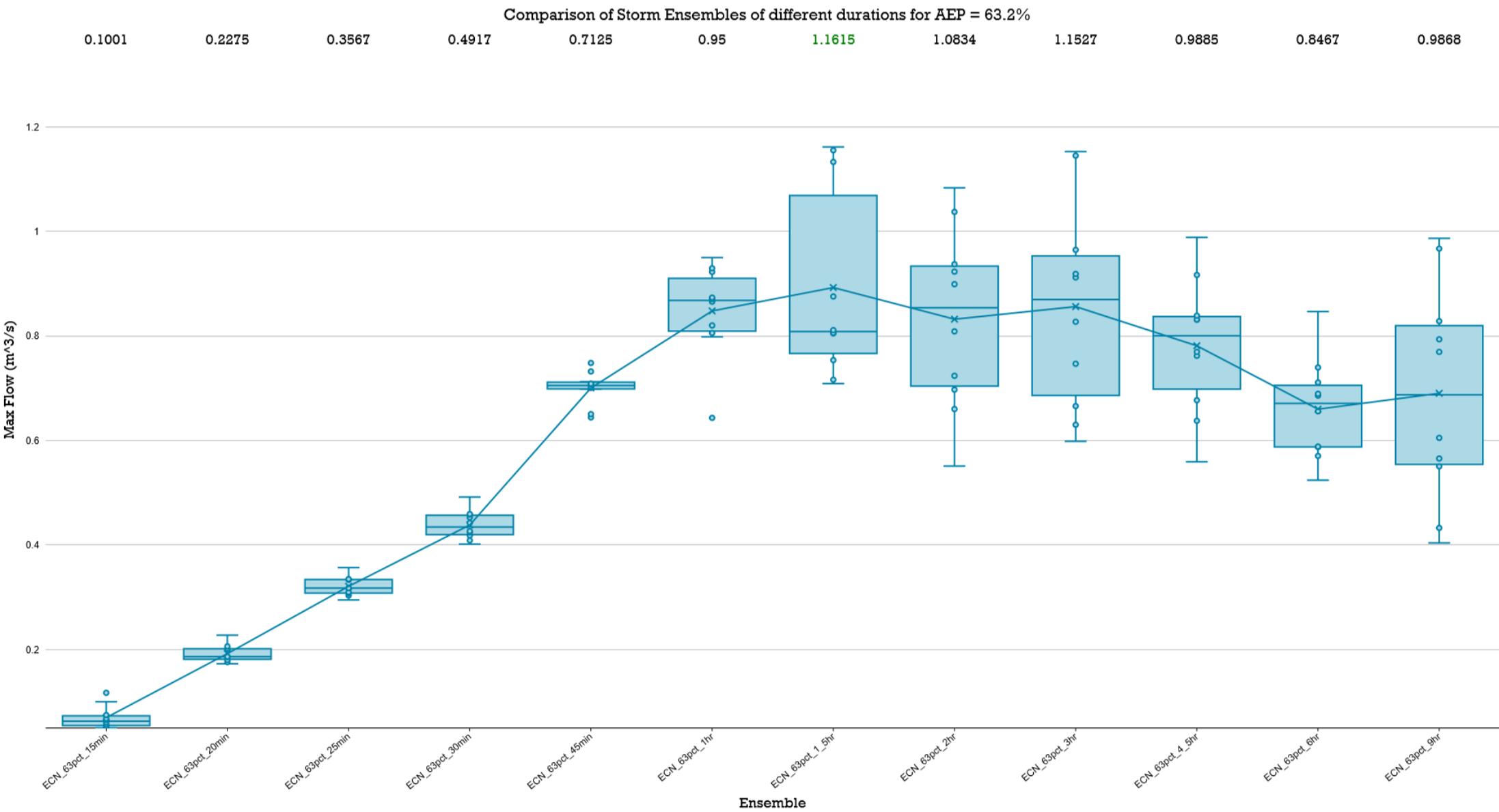
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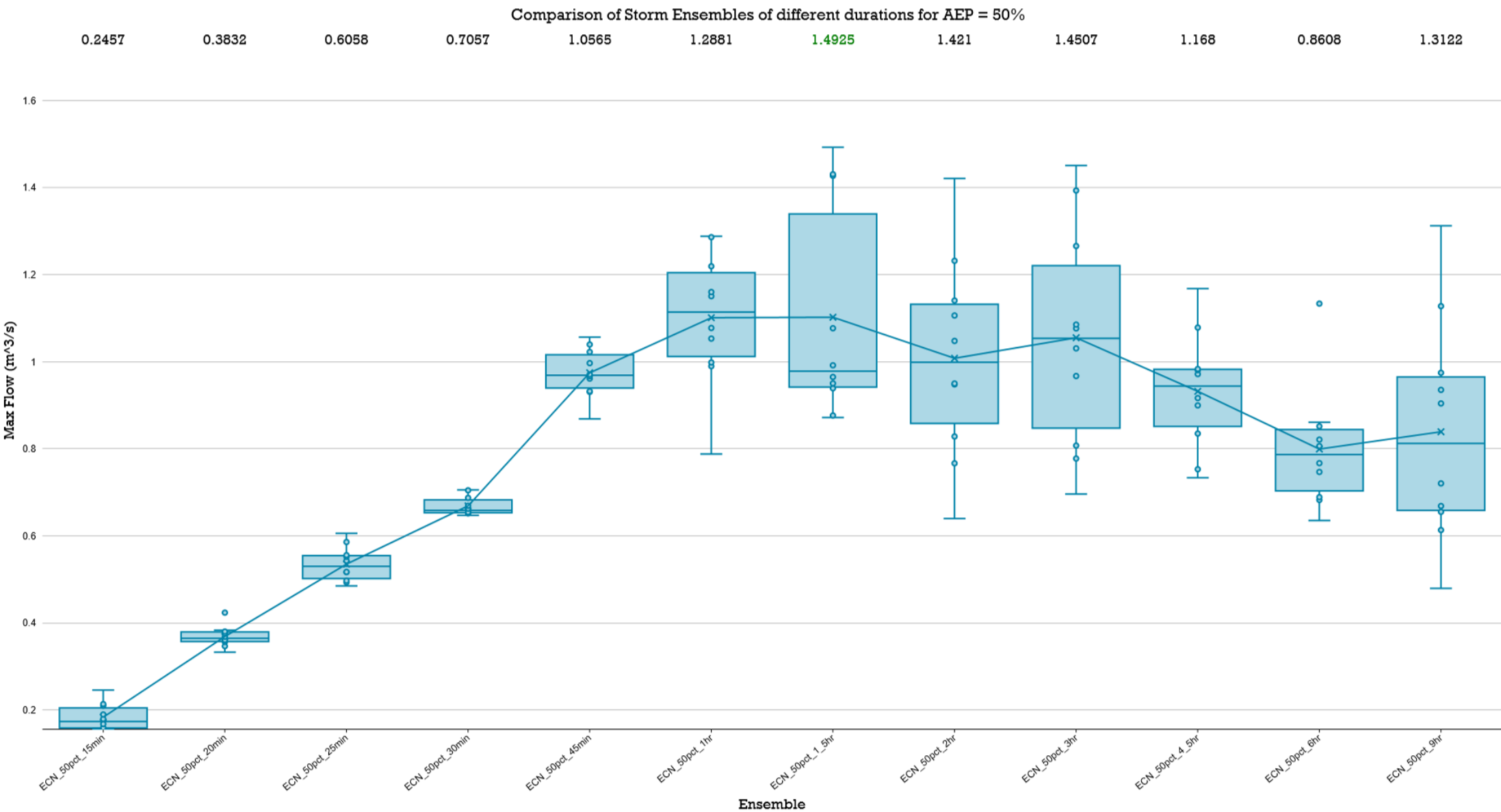


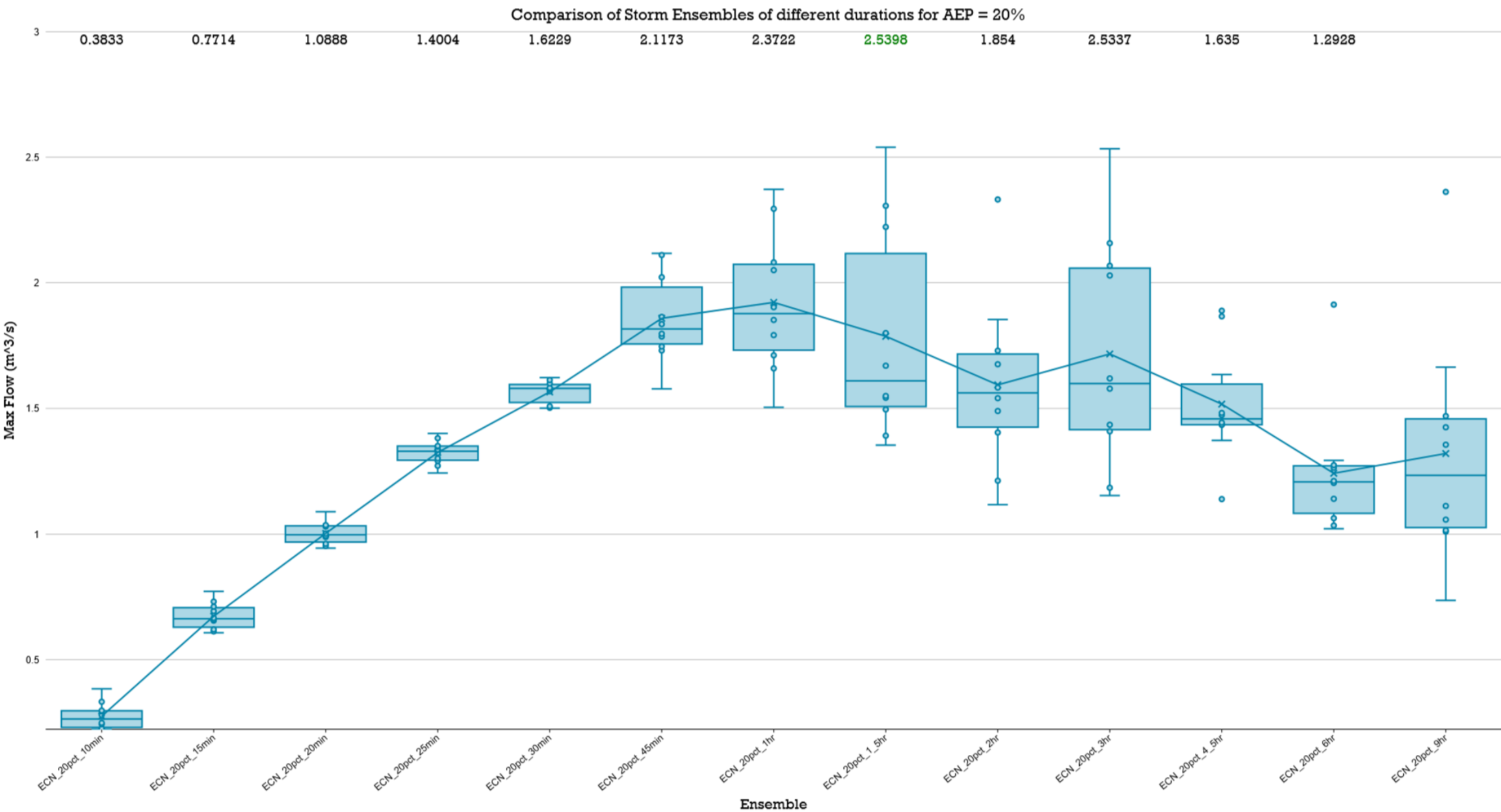
BOX & WHISKER PLOTS



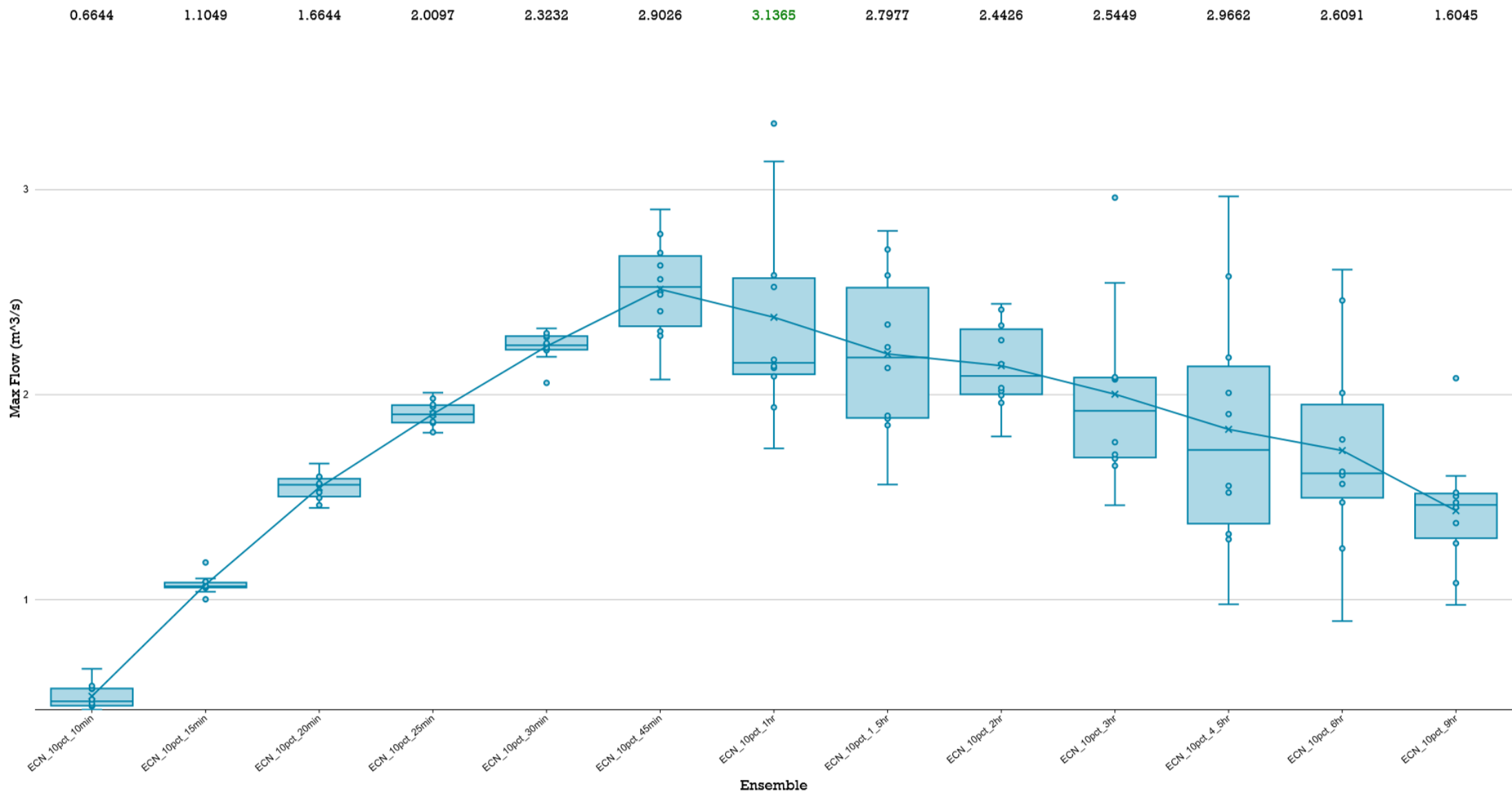
LPoD 2 PRE-DEVELOPMENT





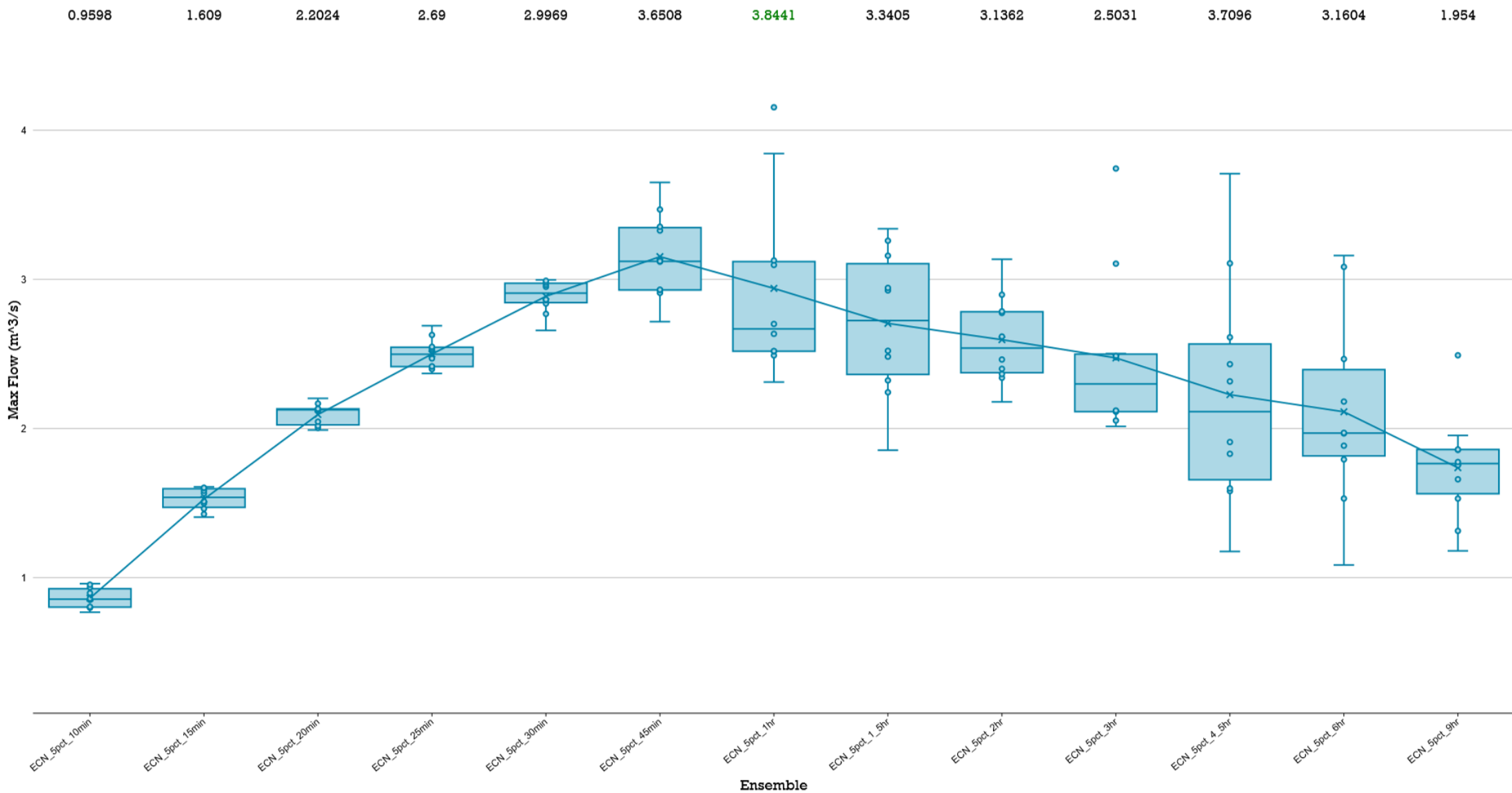


Comparison of Storm Ensembles of different durations for AEP = 10%



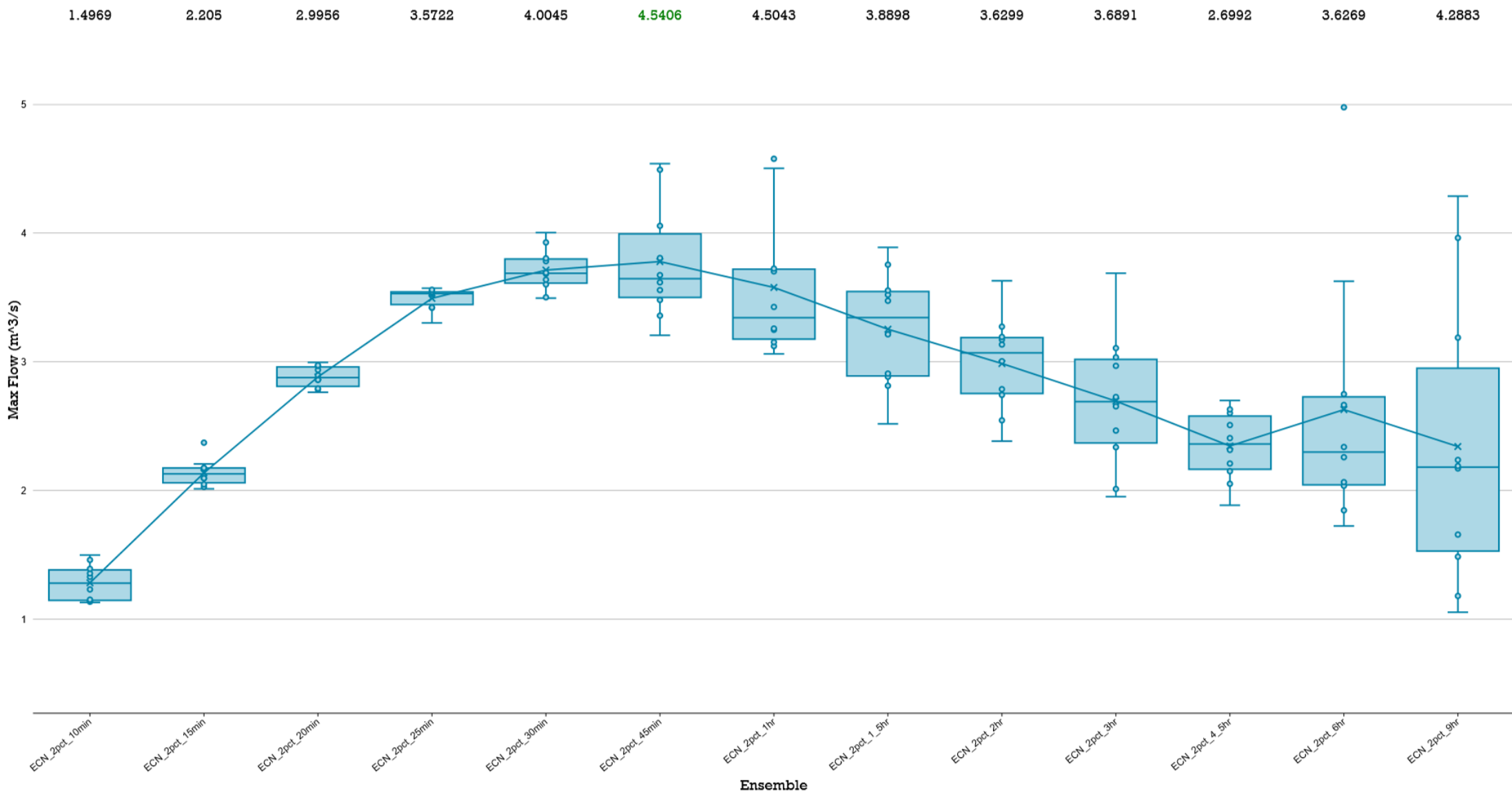
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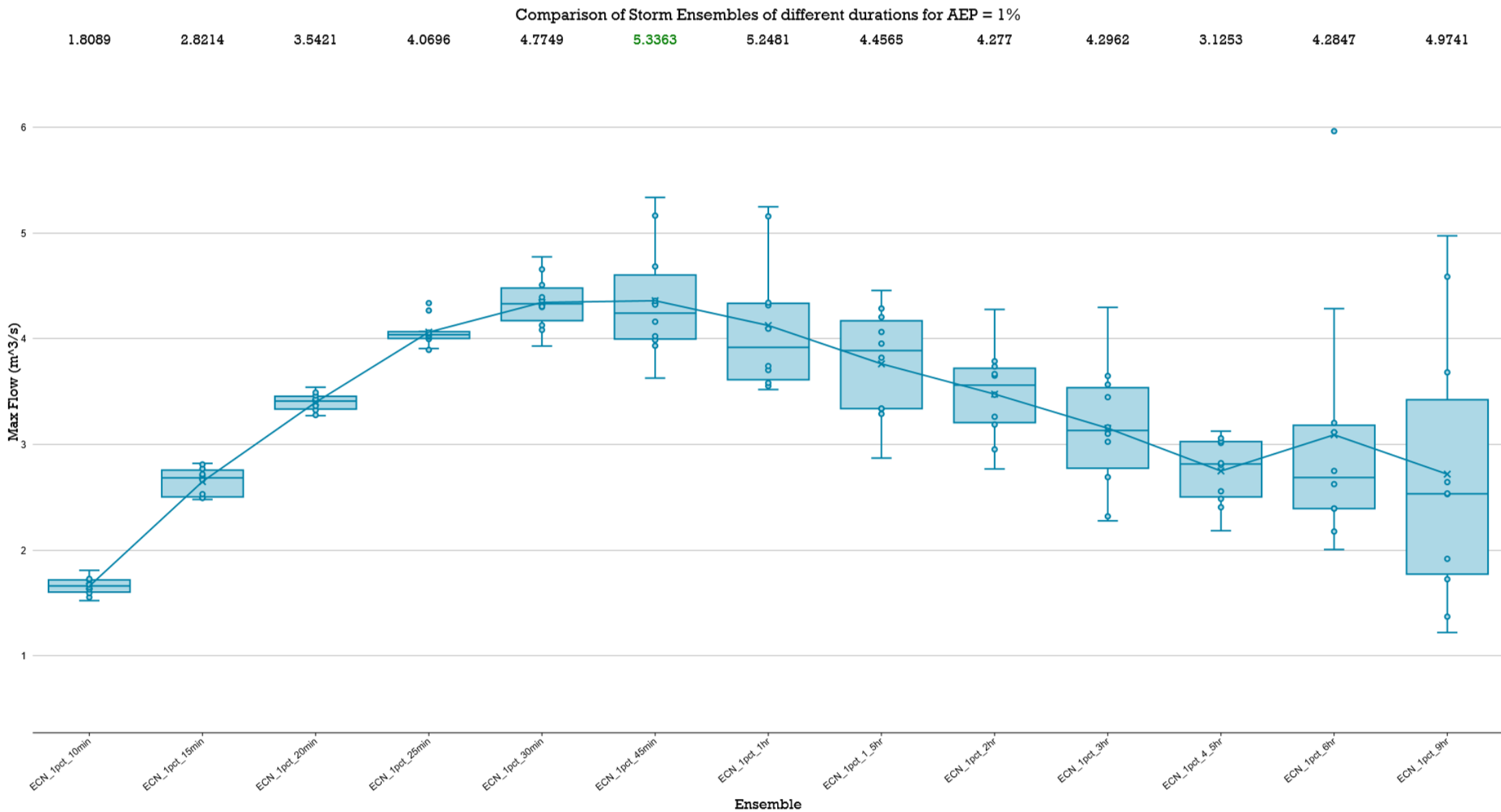
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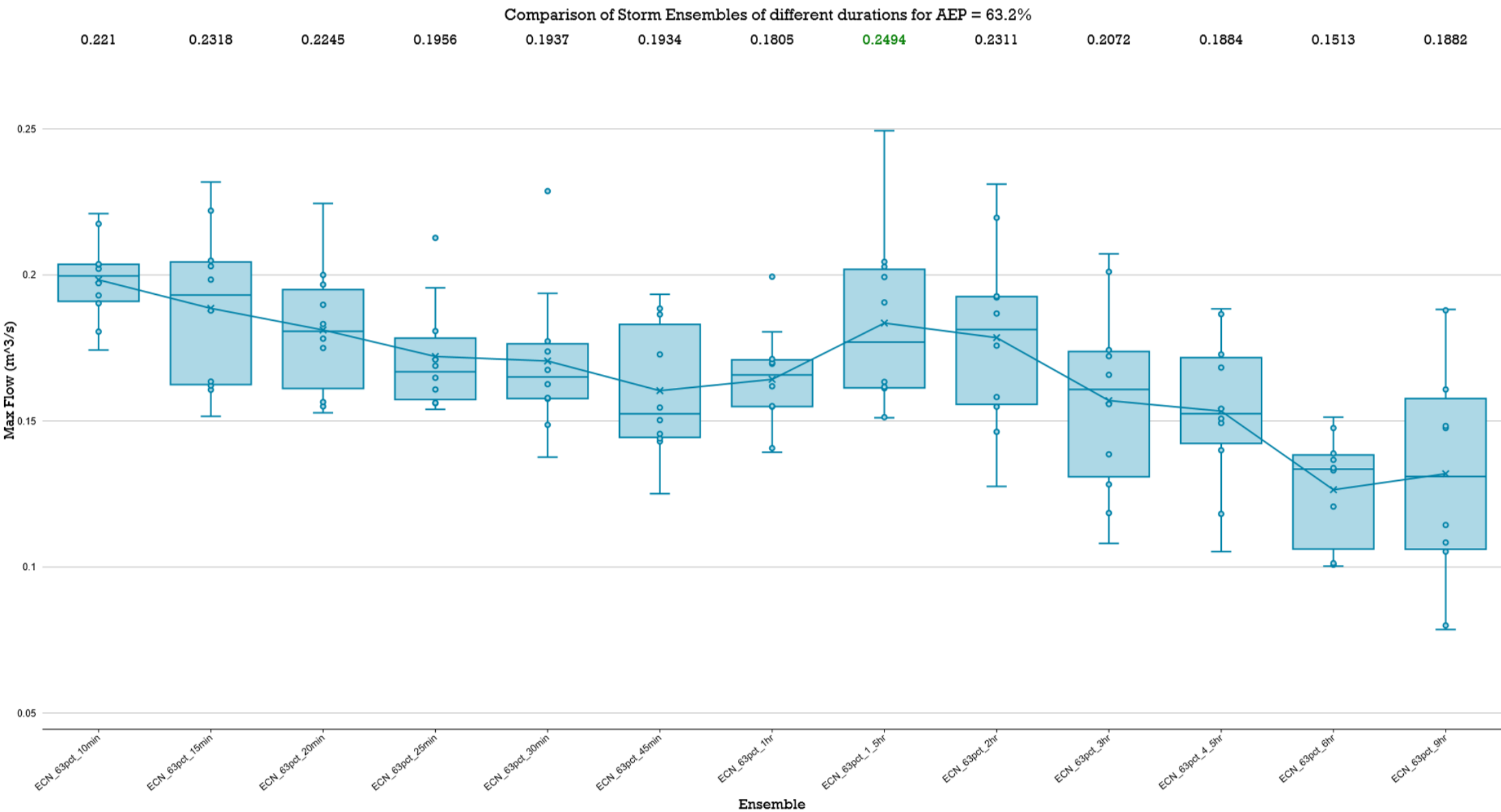
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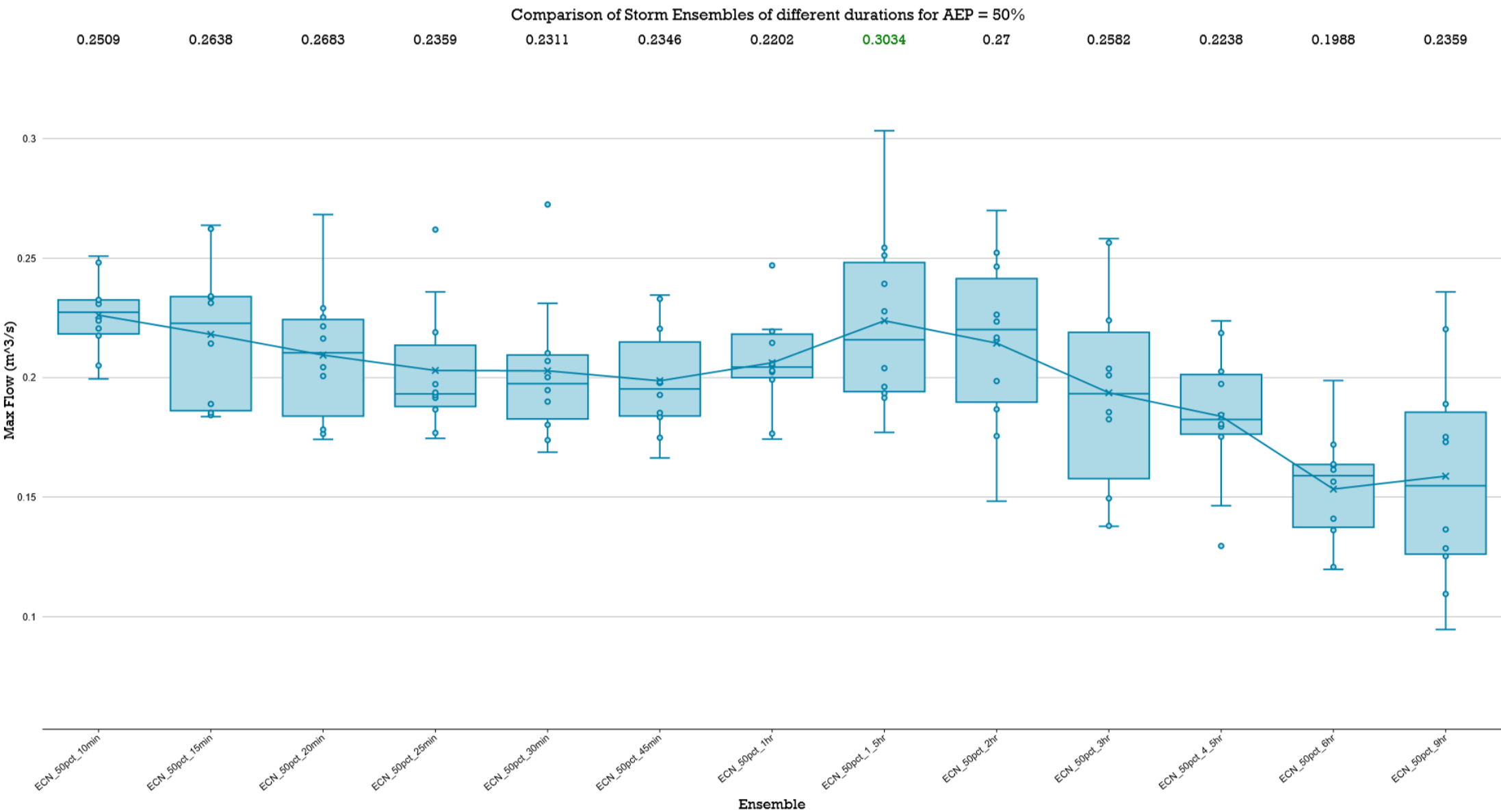
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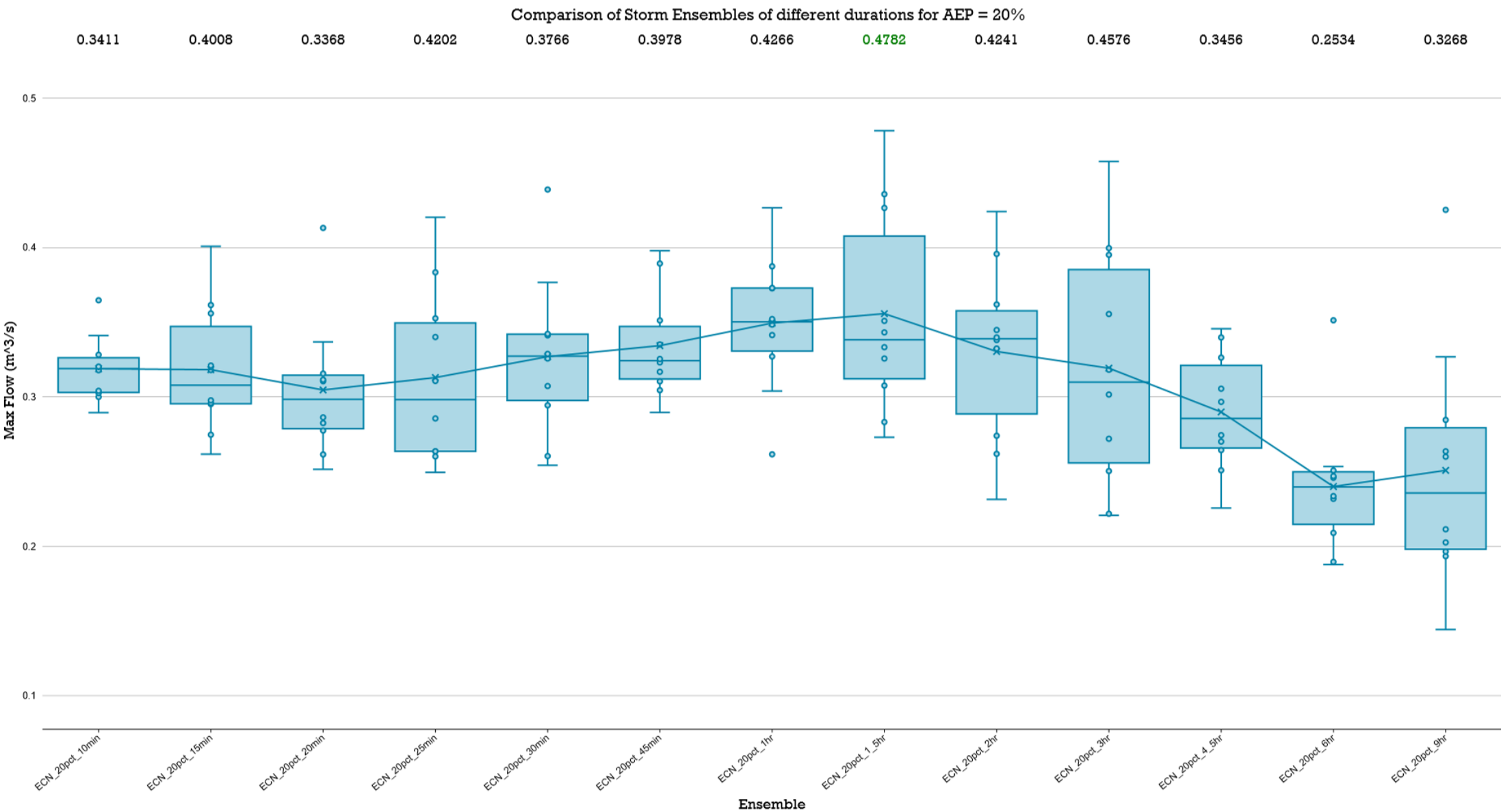


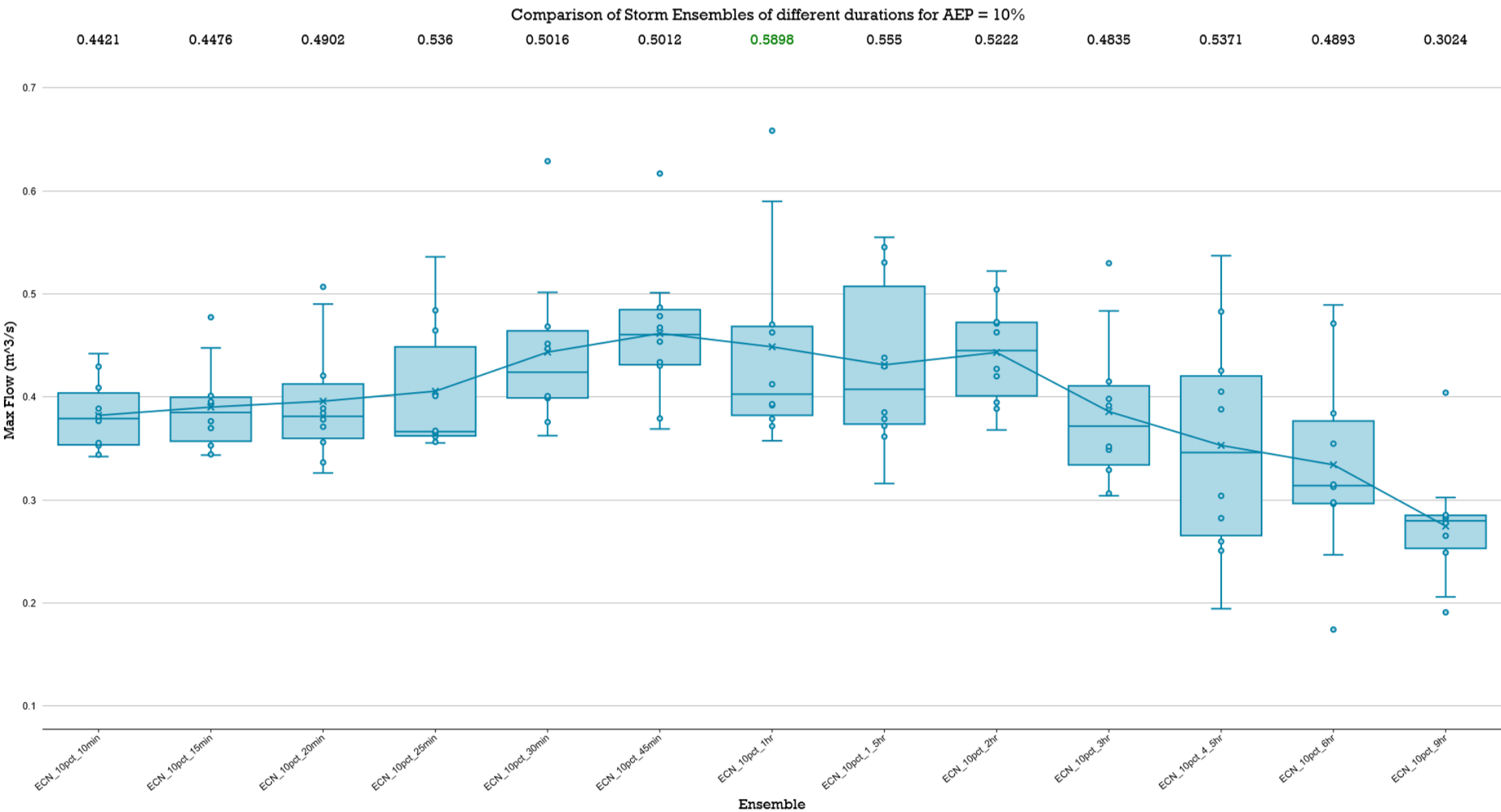


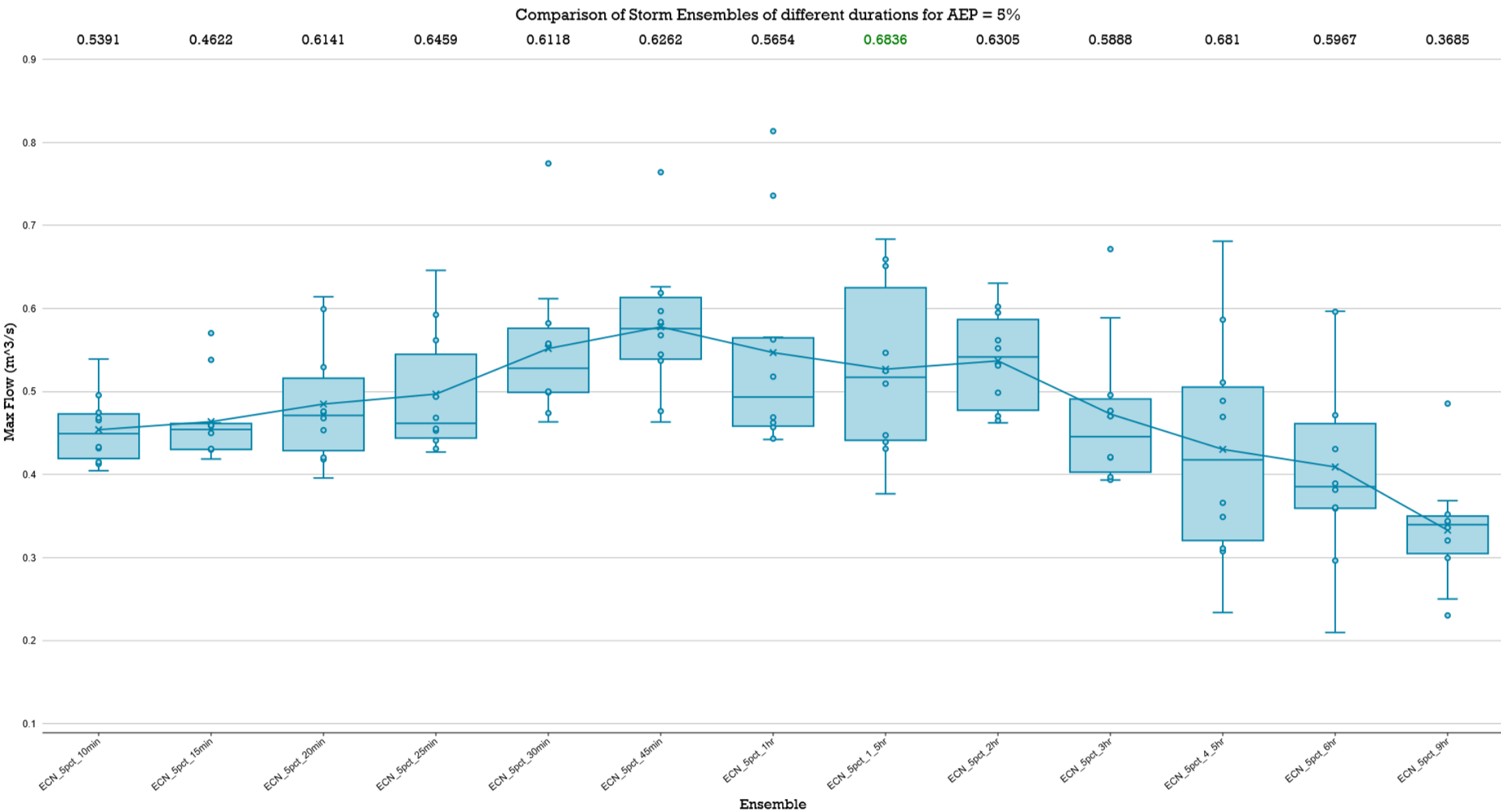
LPoD 3 POST-DEVELOPMENT

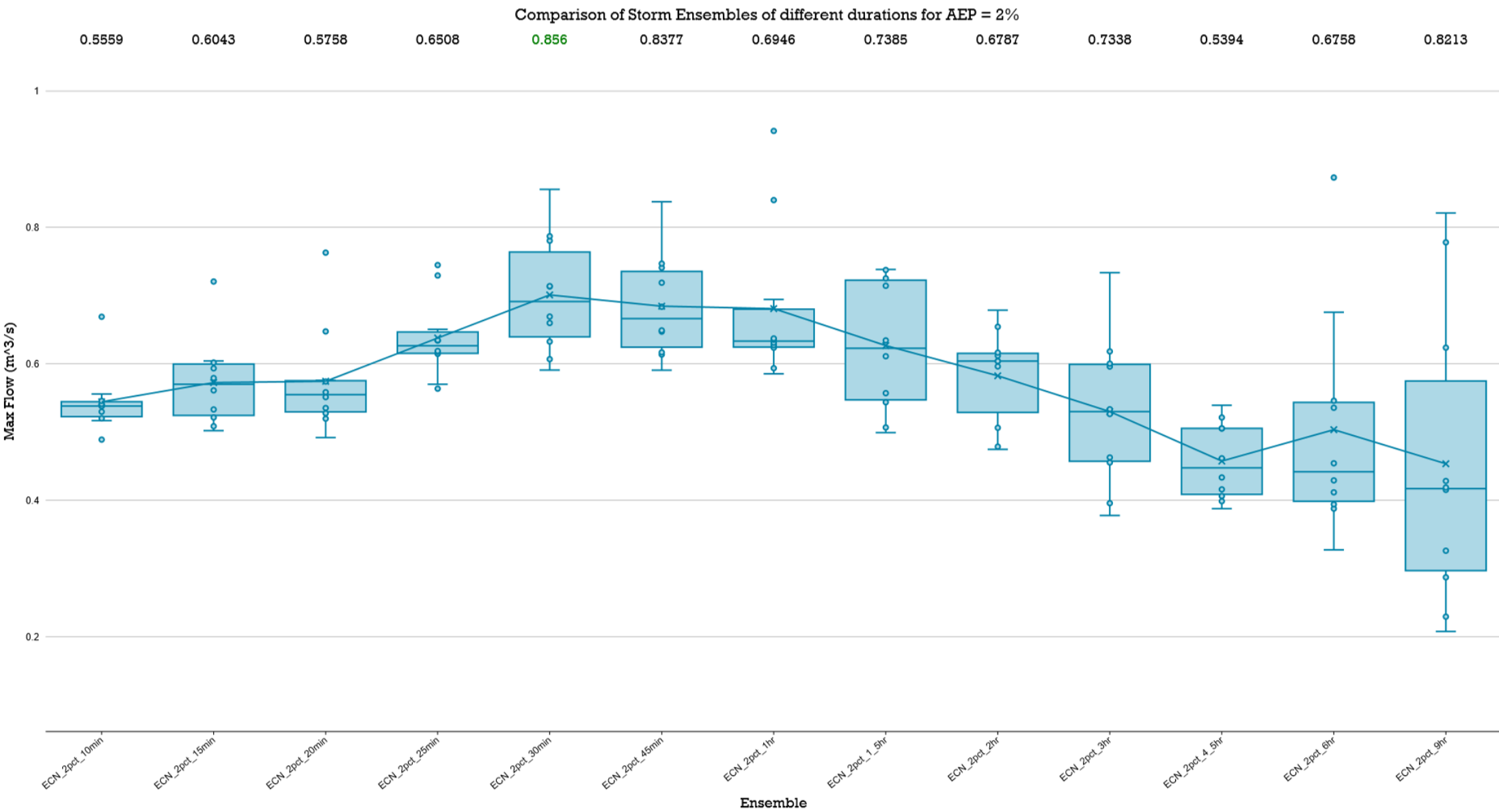


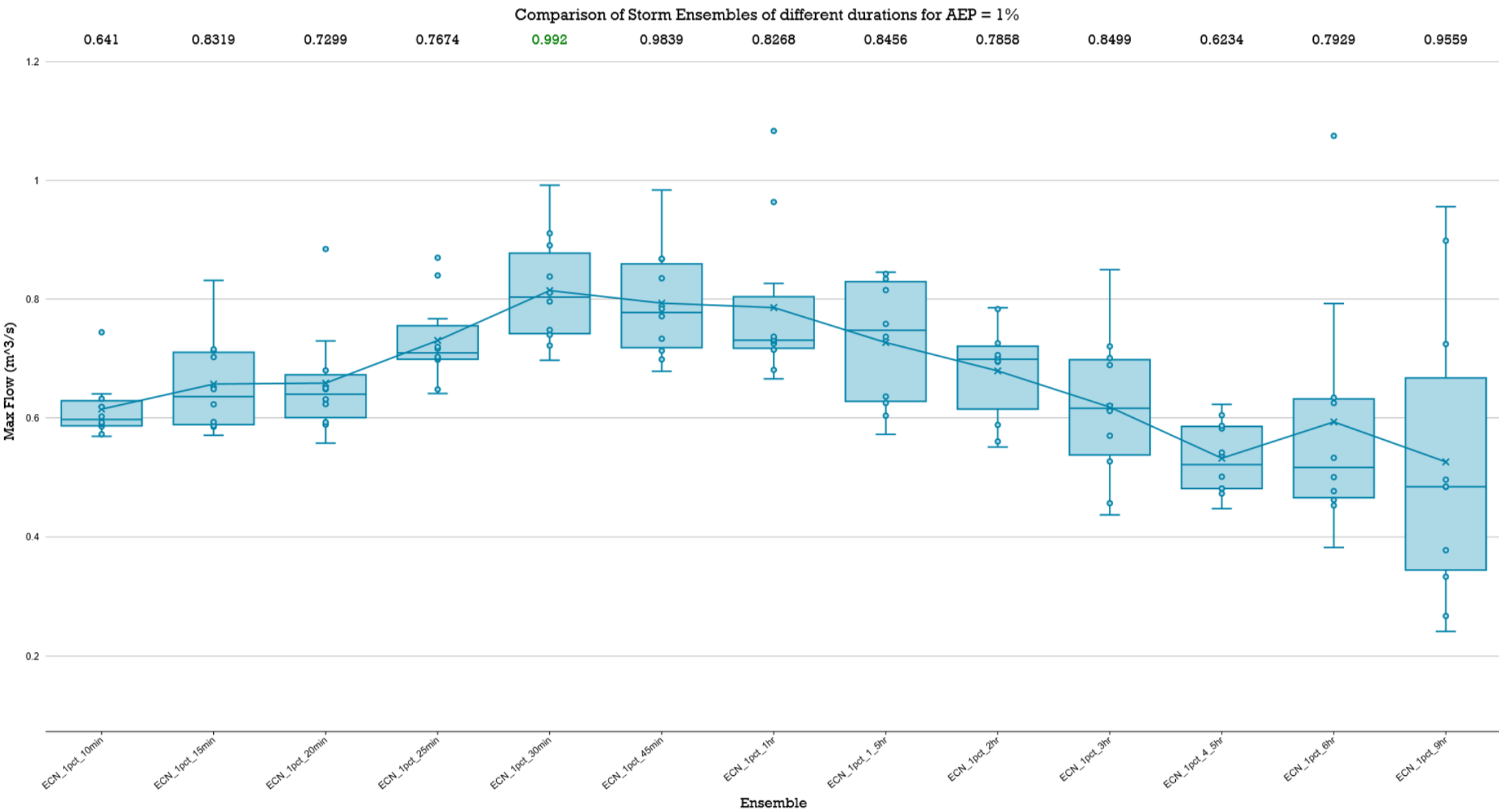




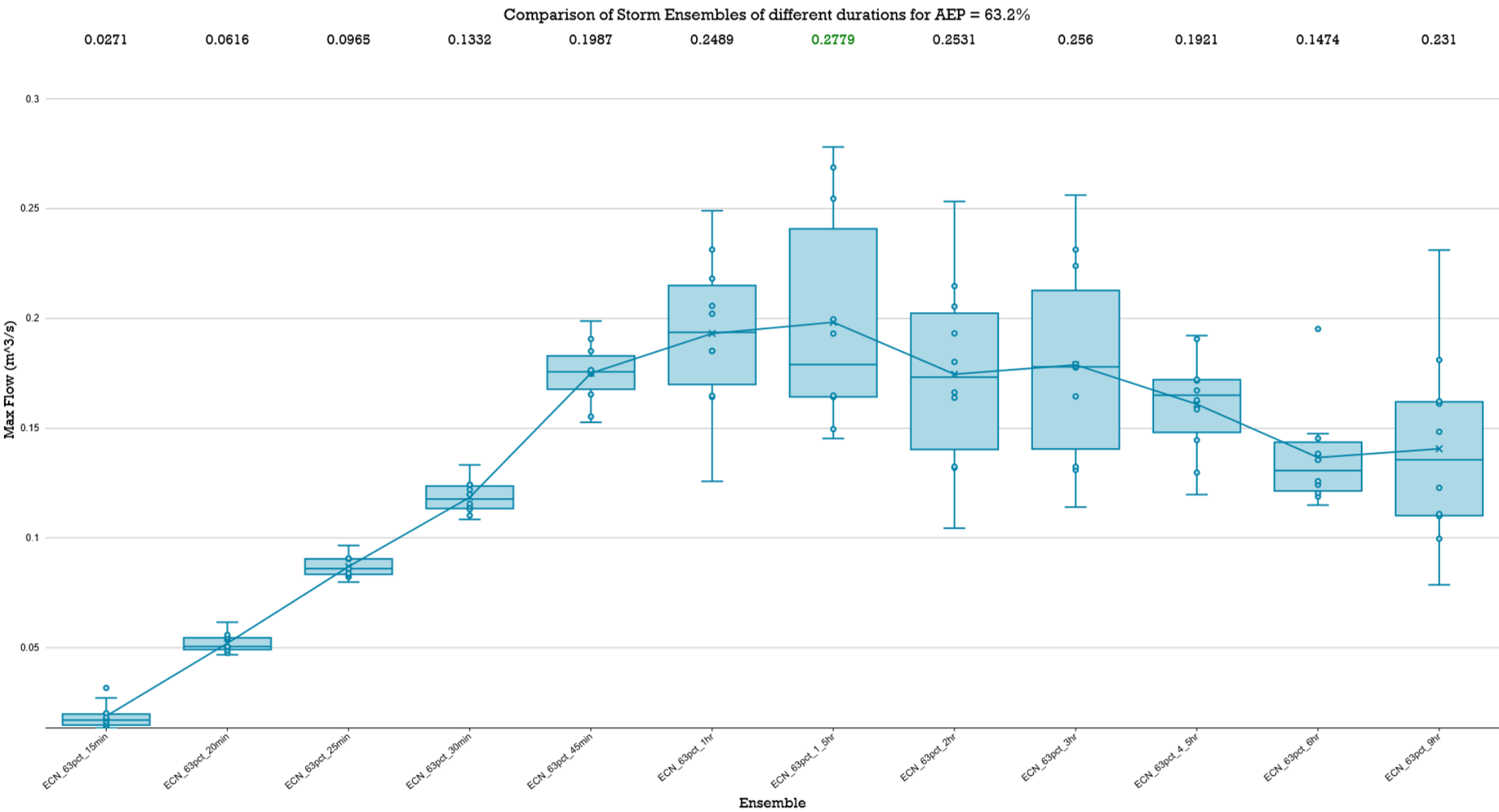


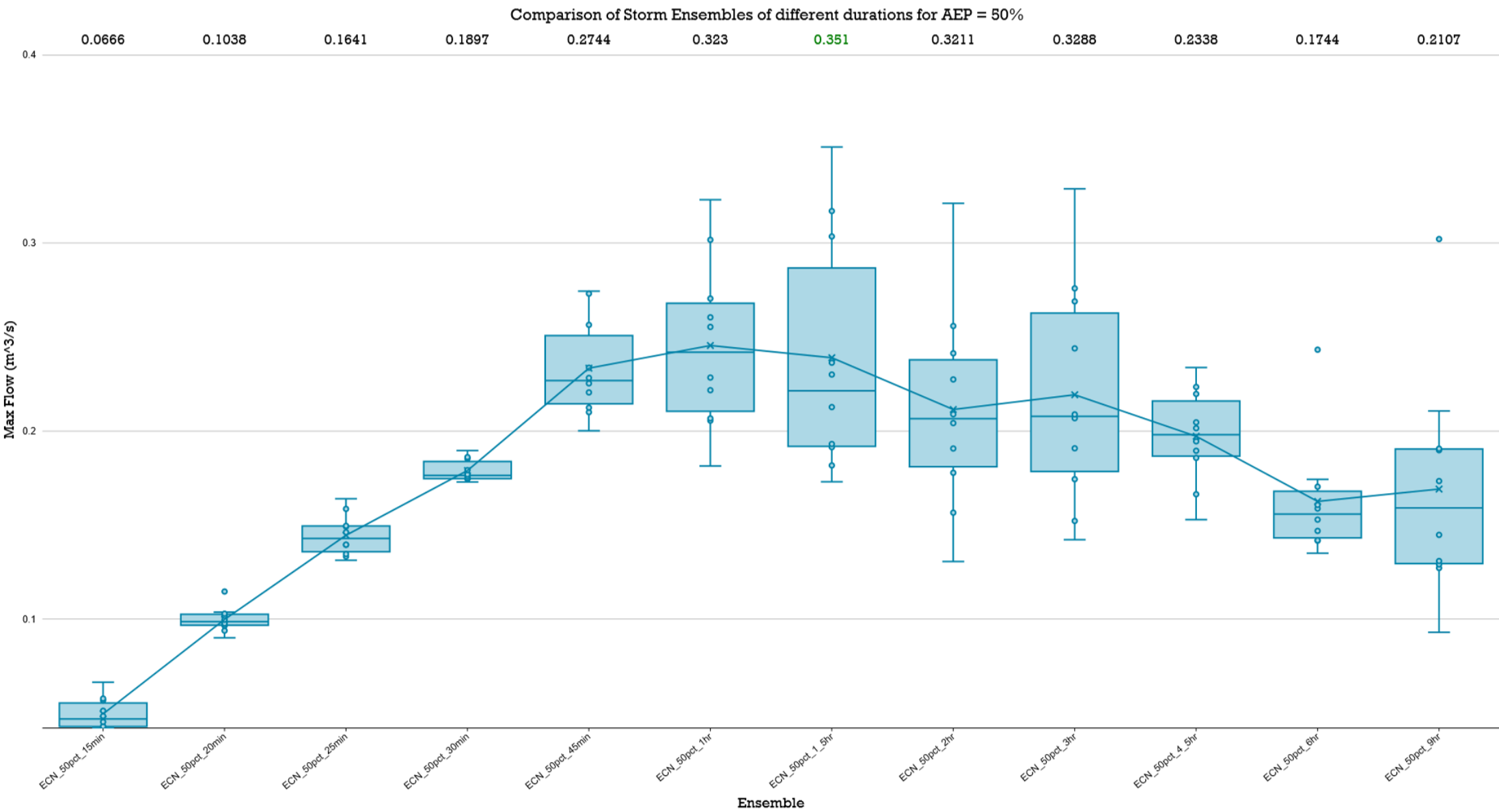


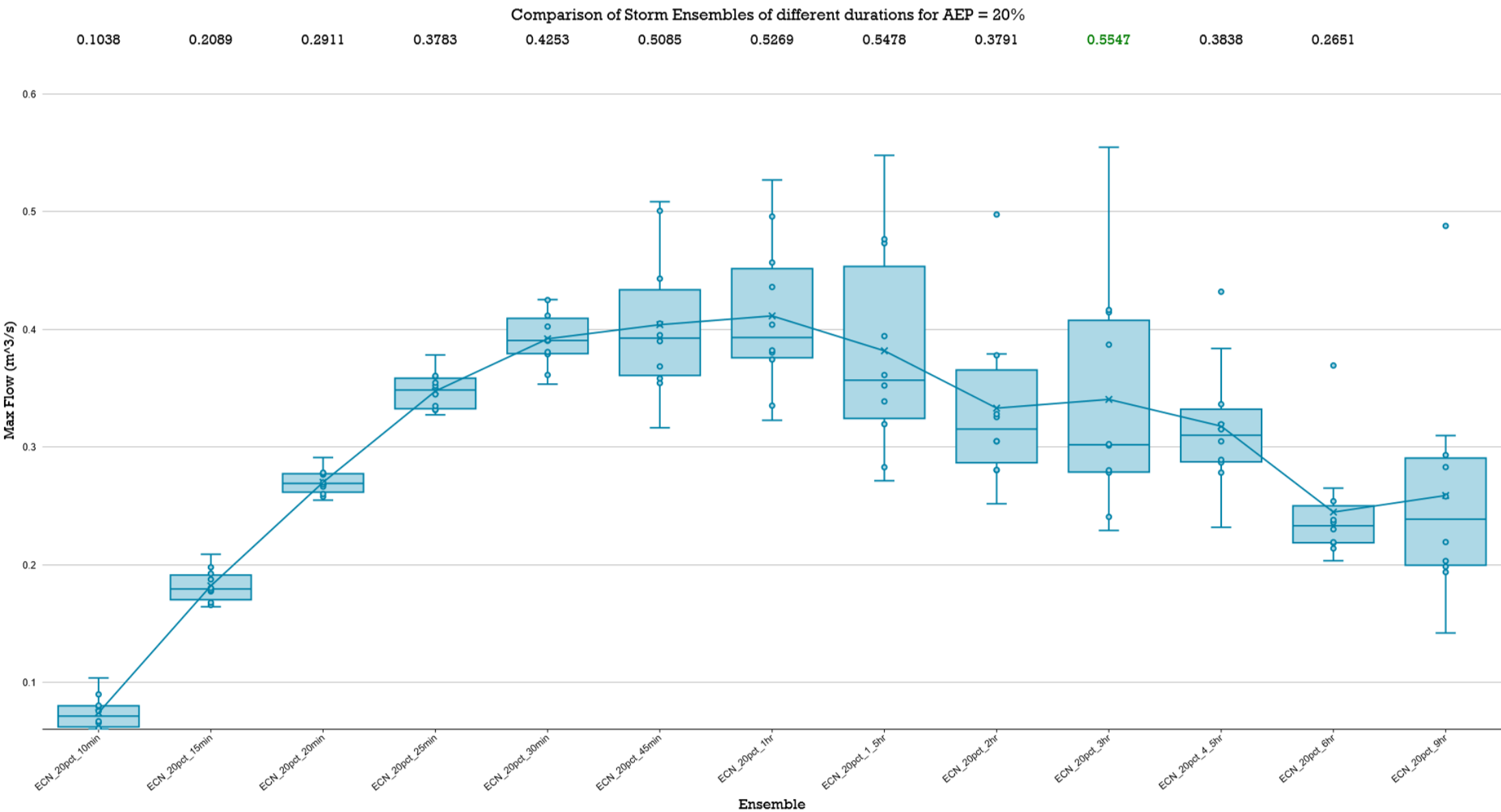


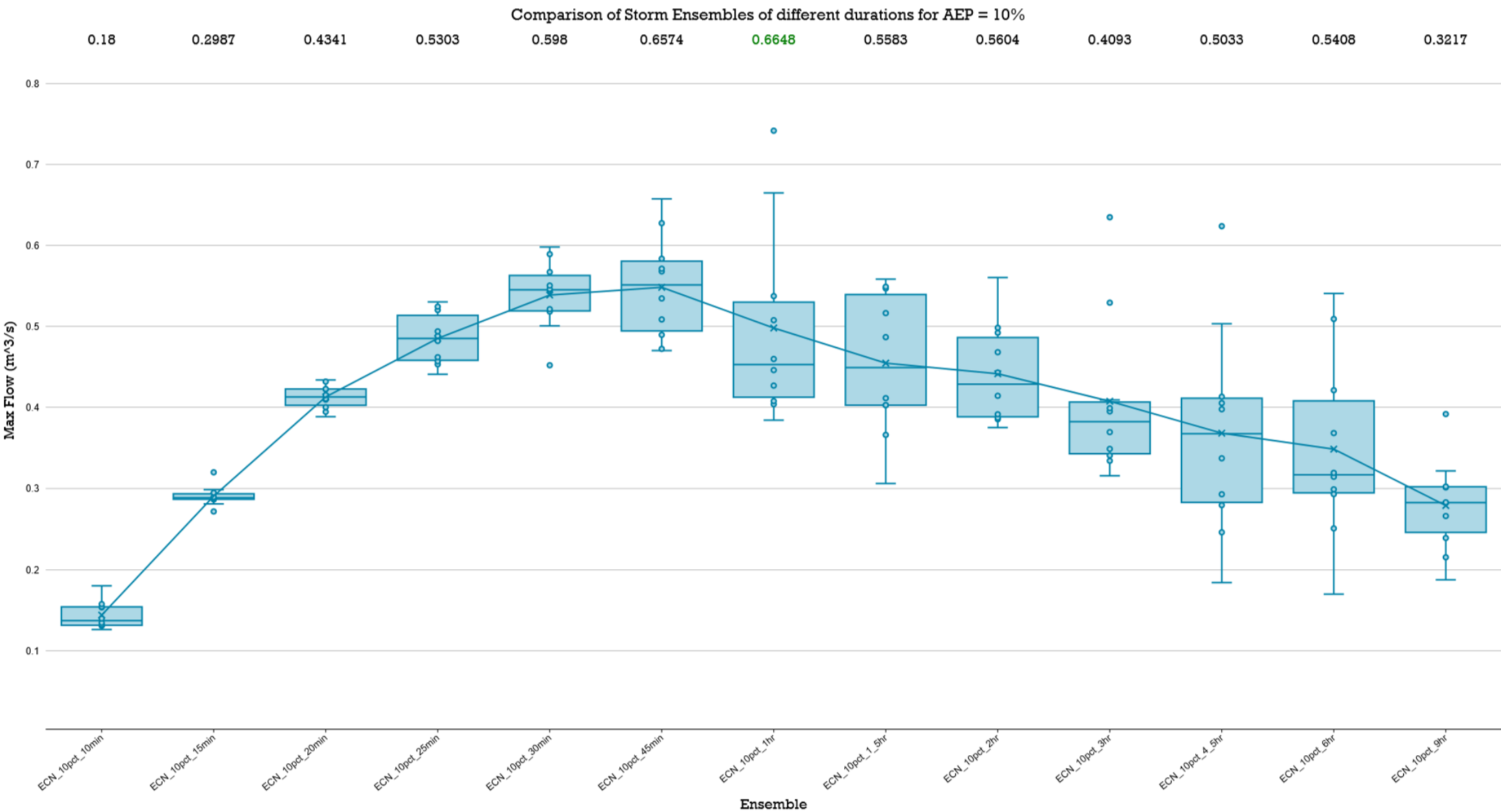


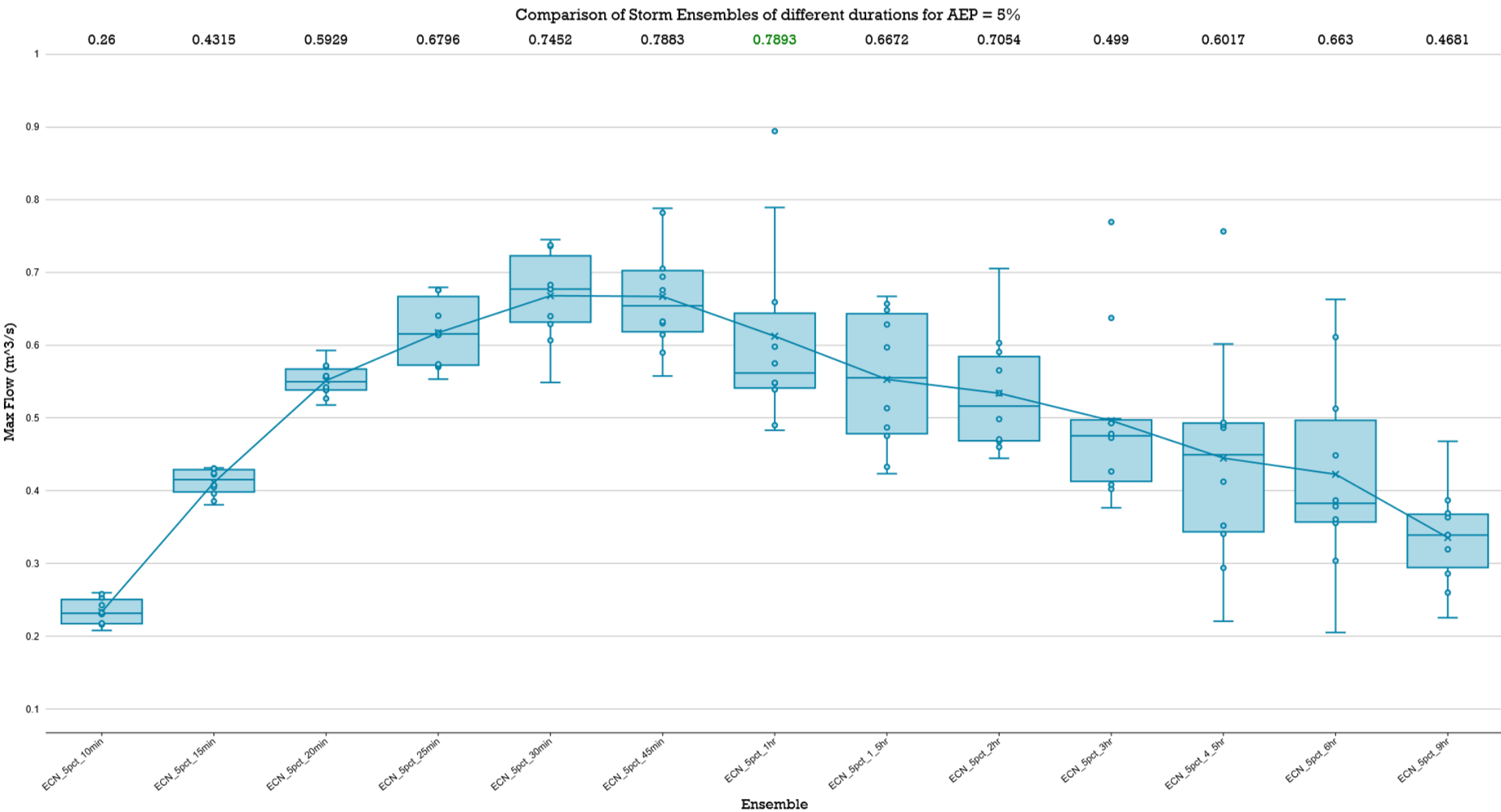
LPoD 3 PRE-DEVELOPMENT

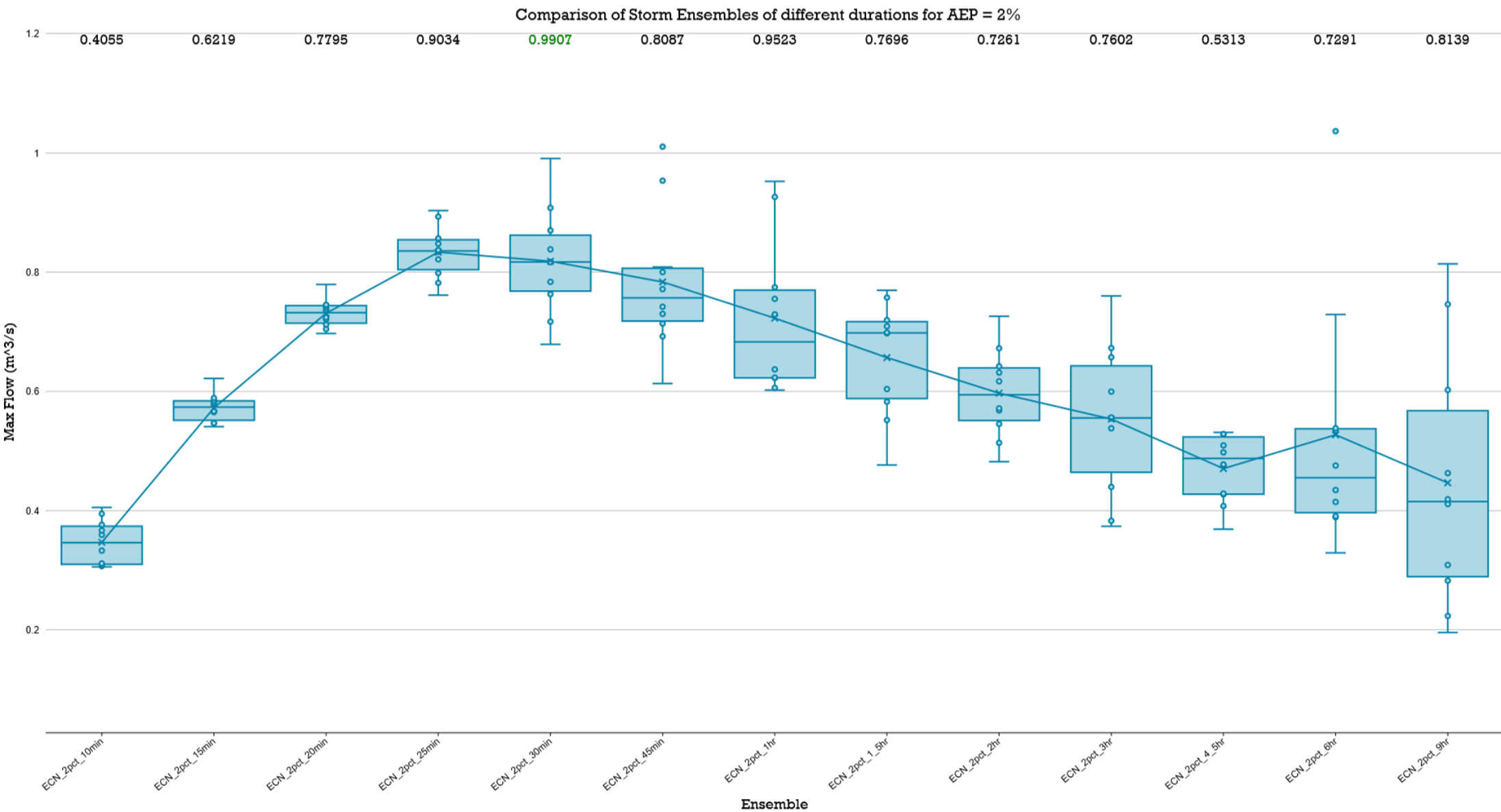


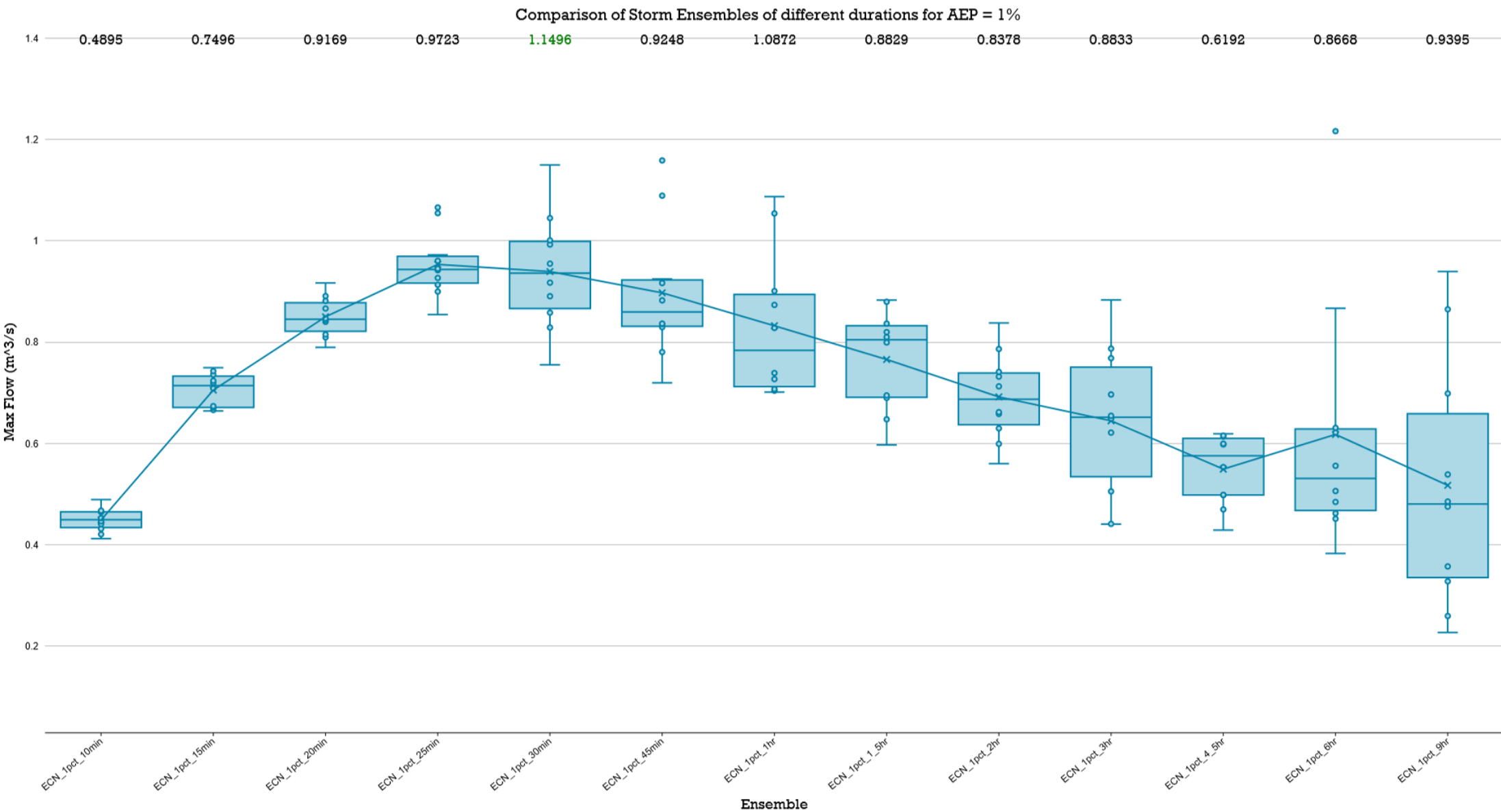




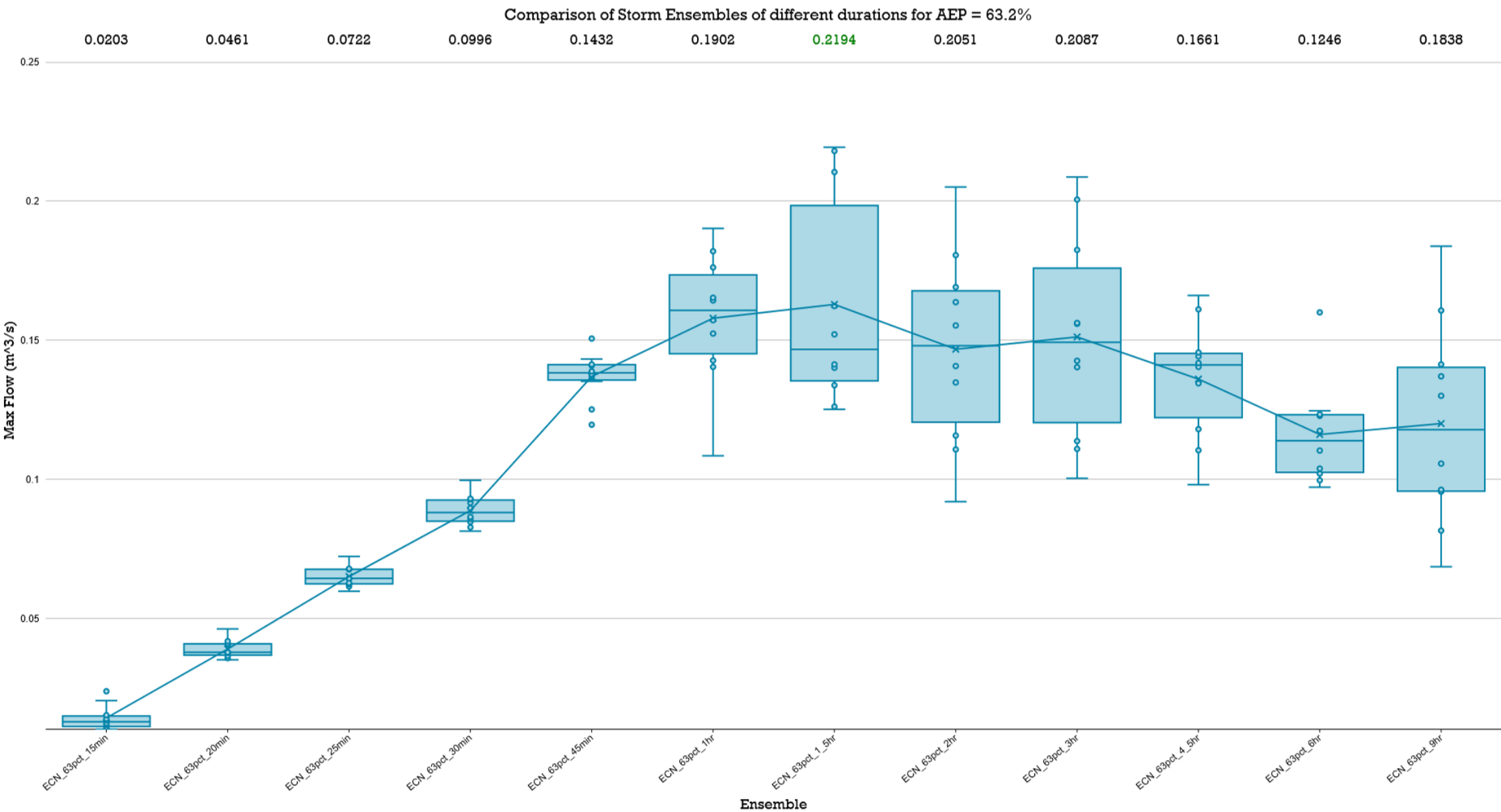


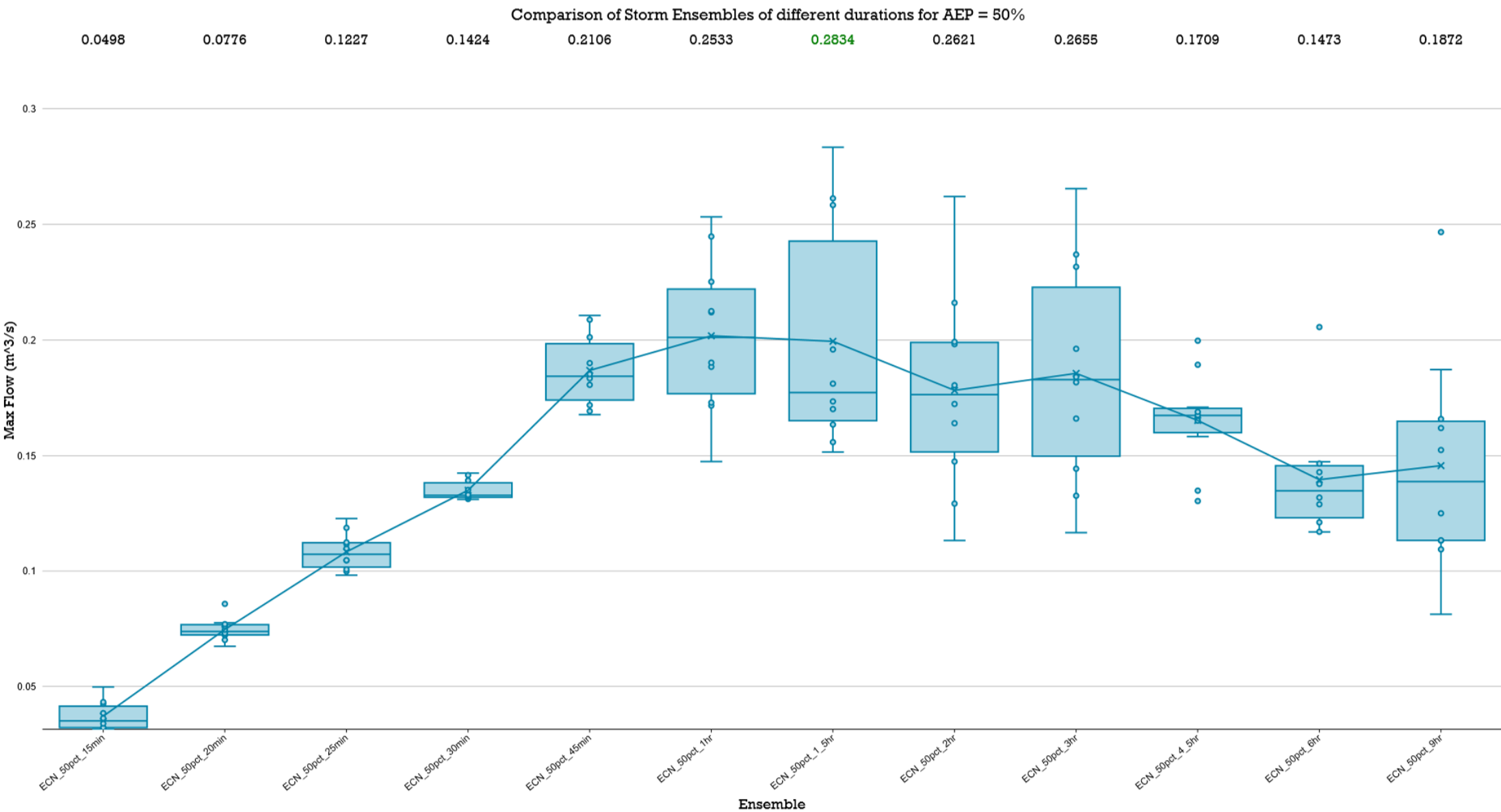


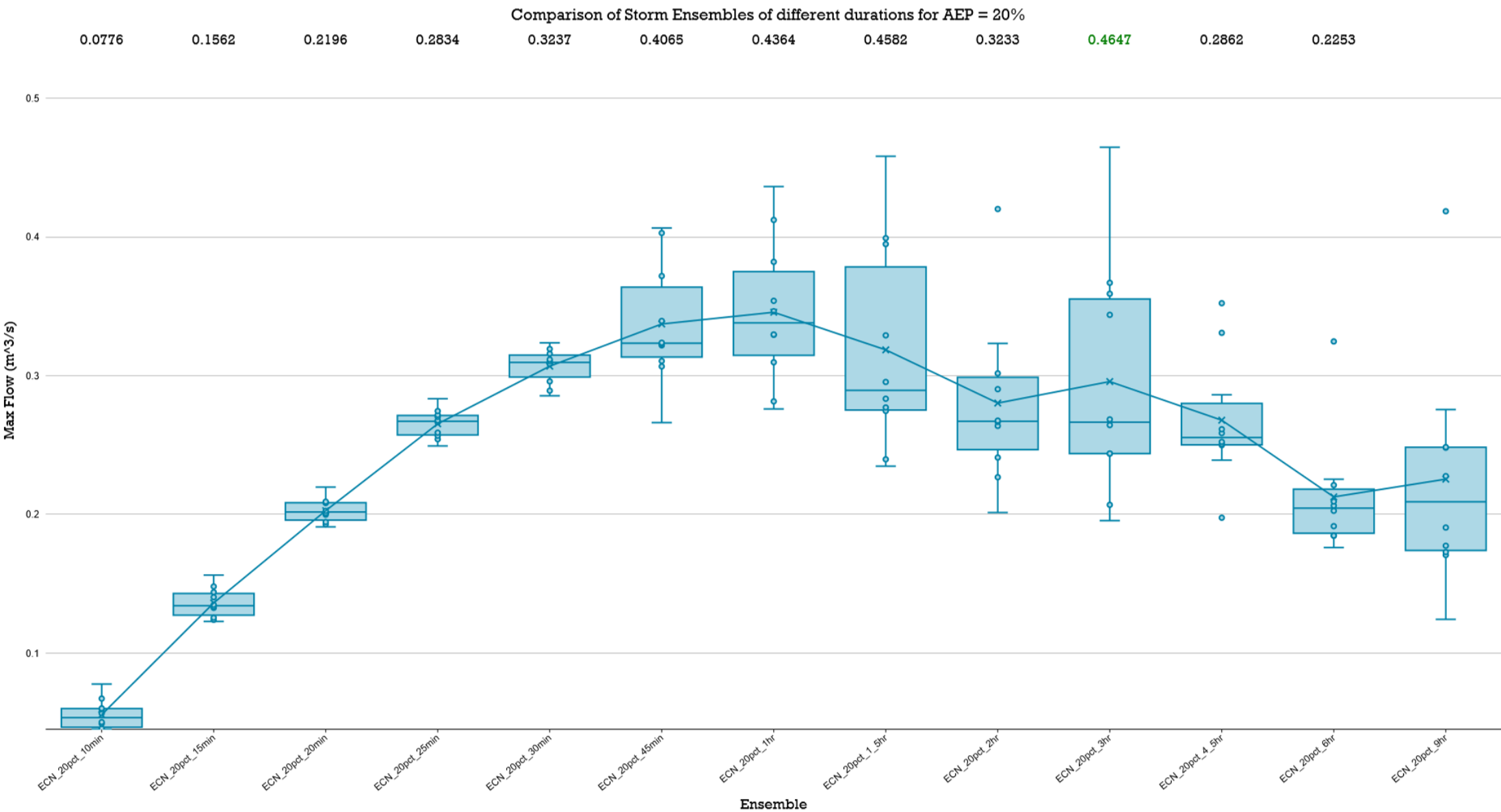


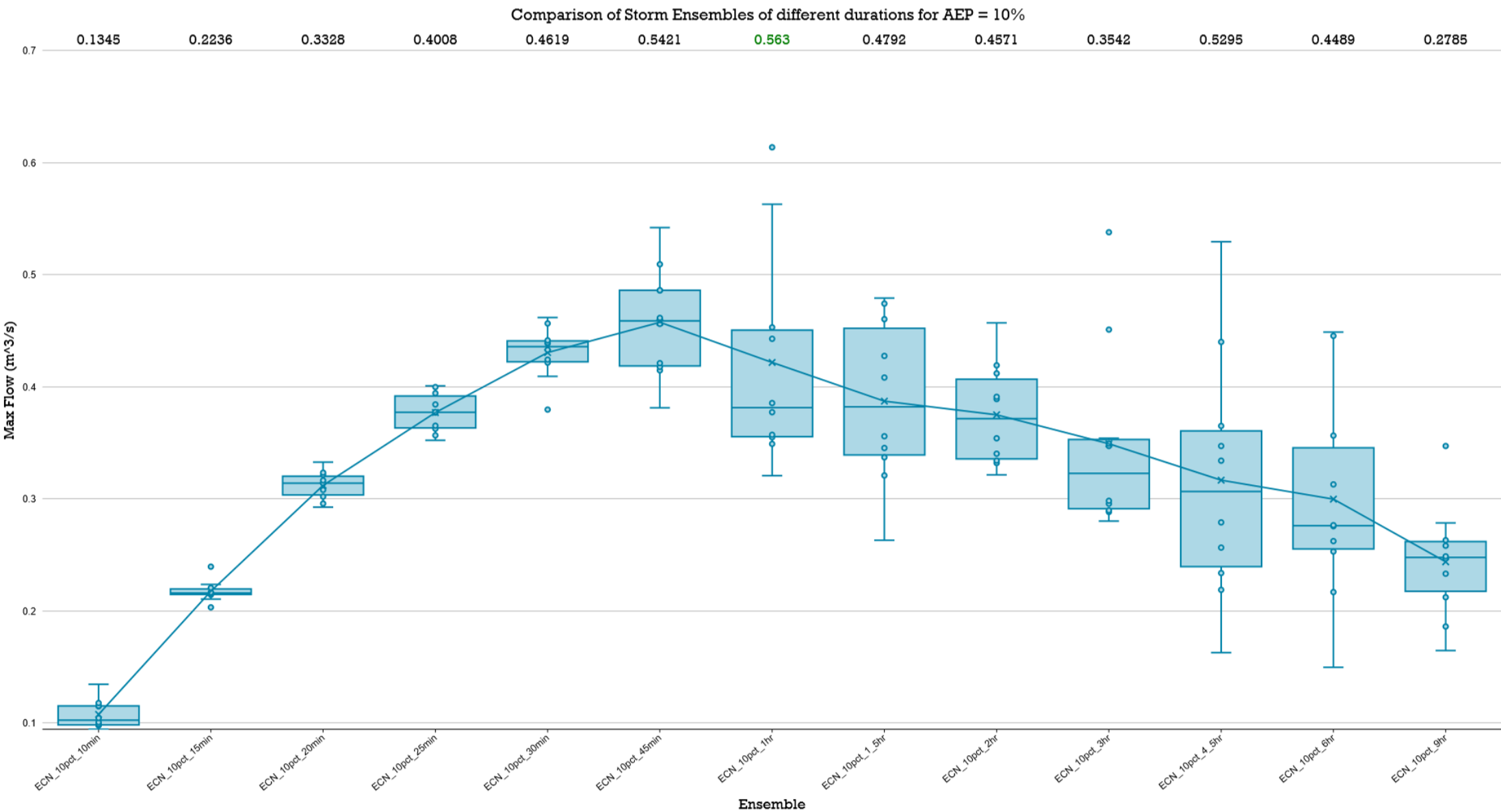


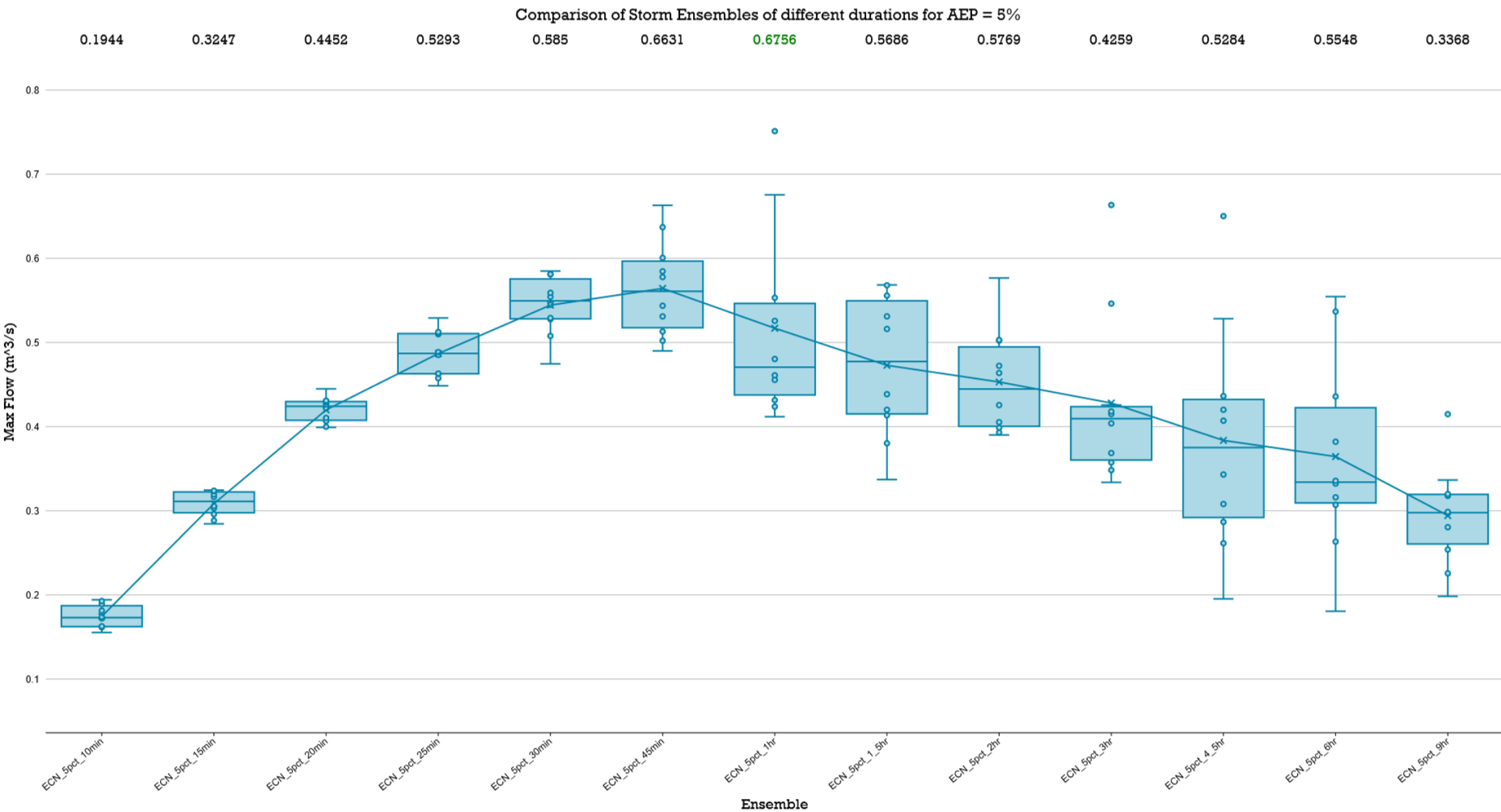
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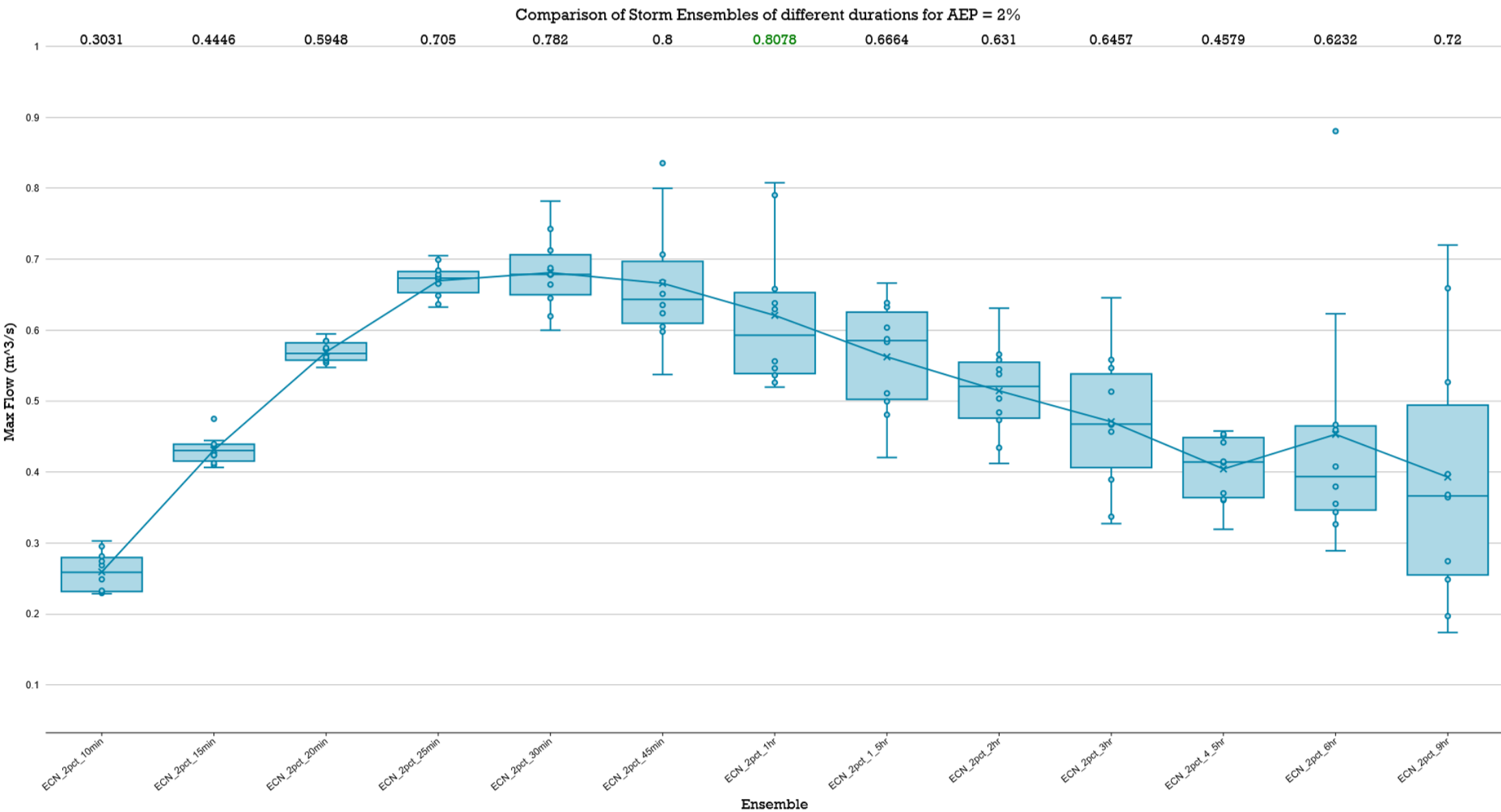


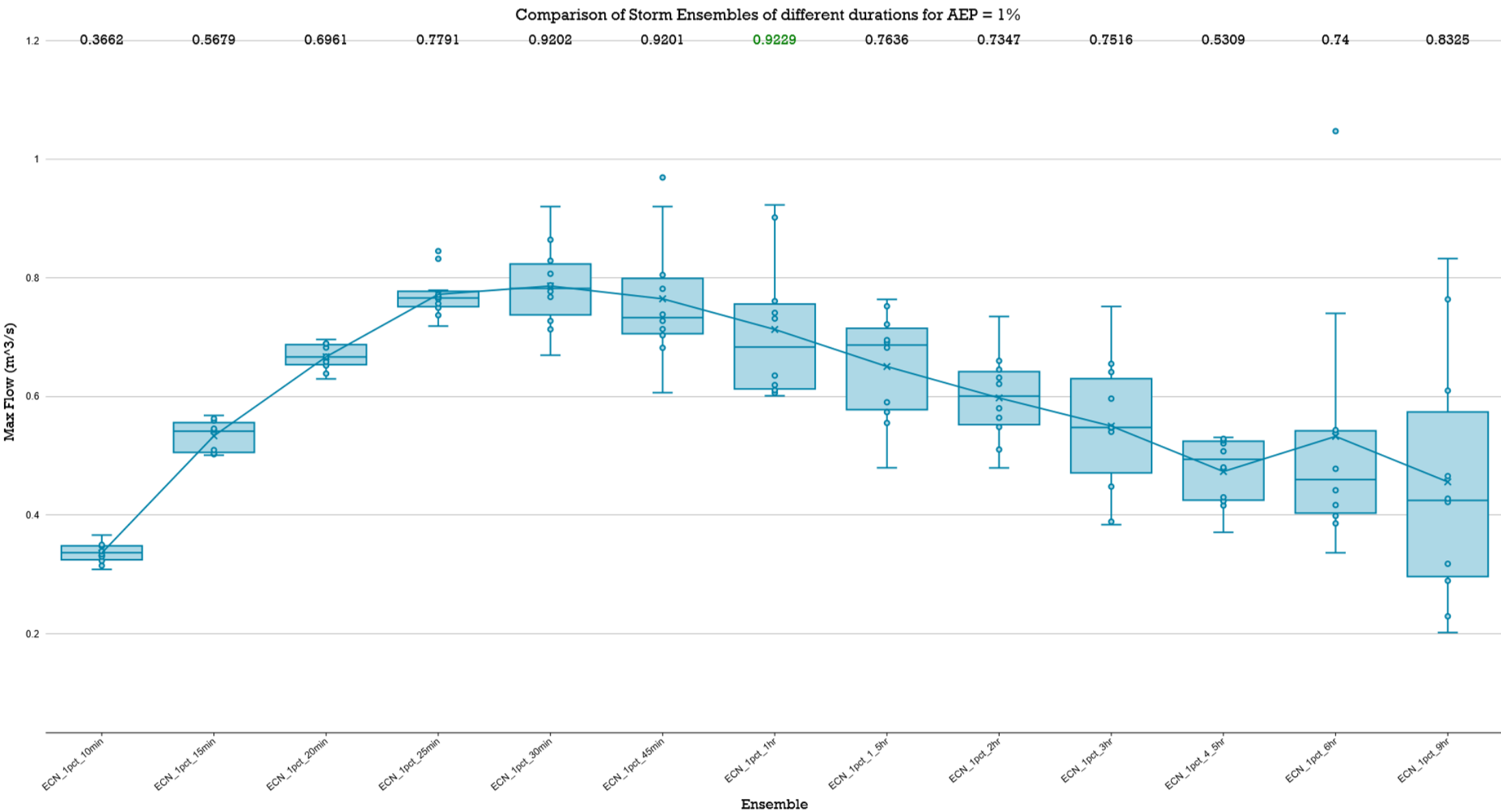






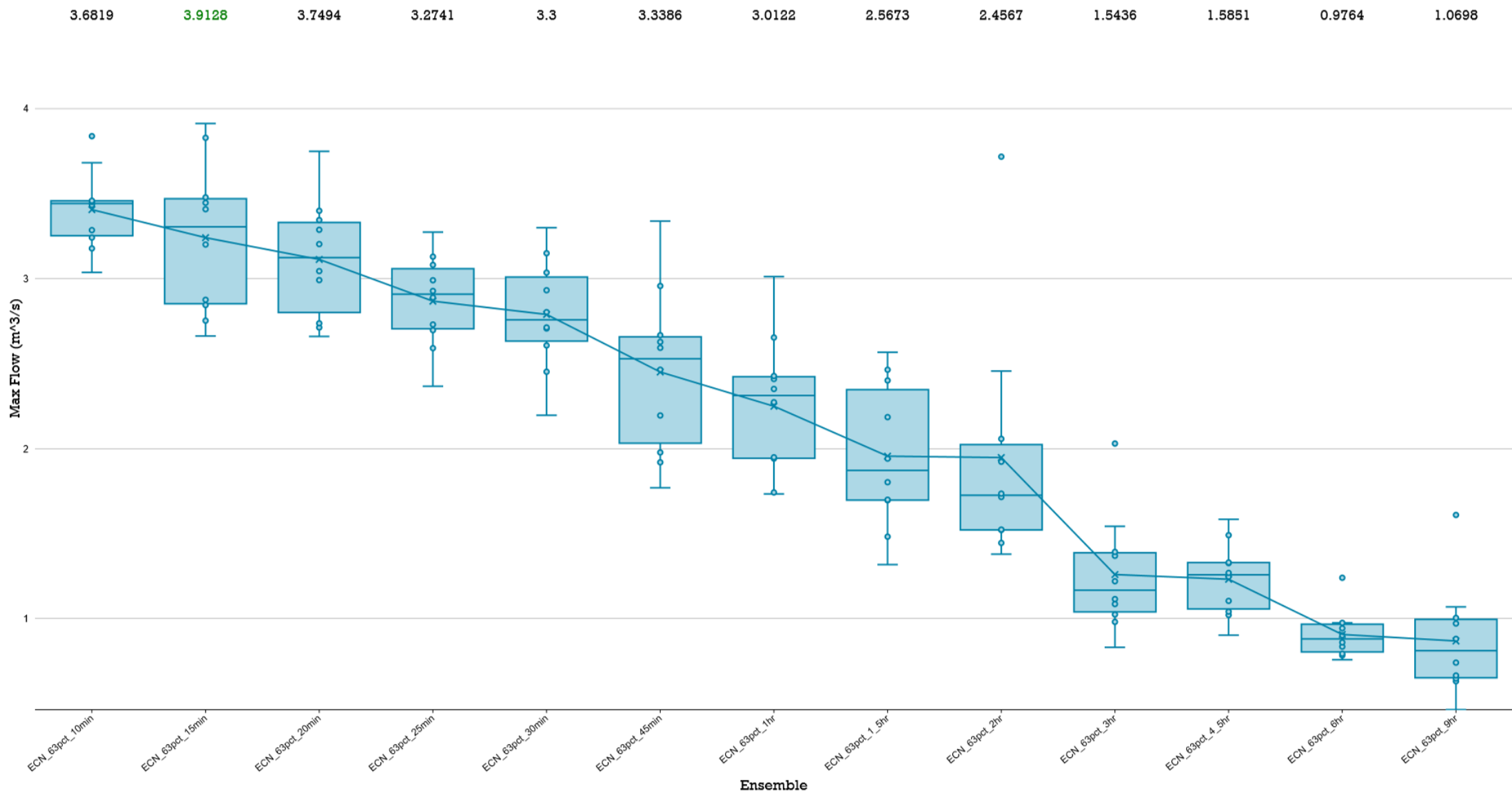


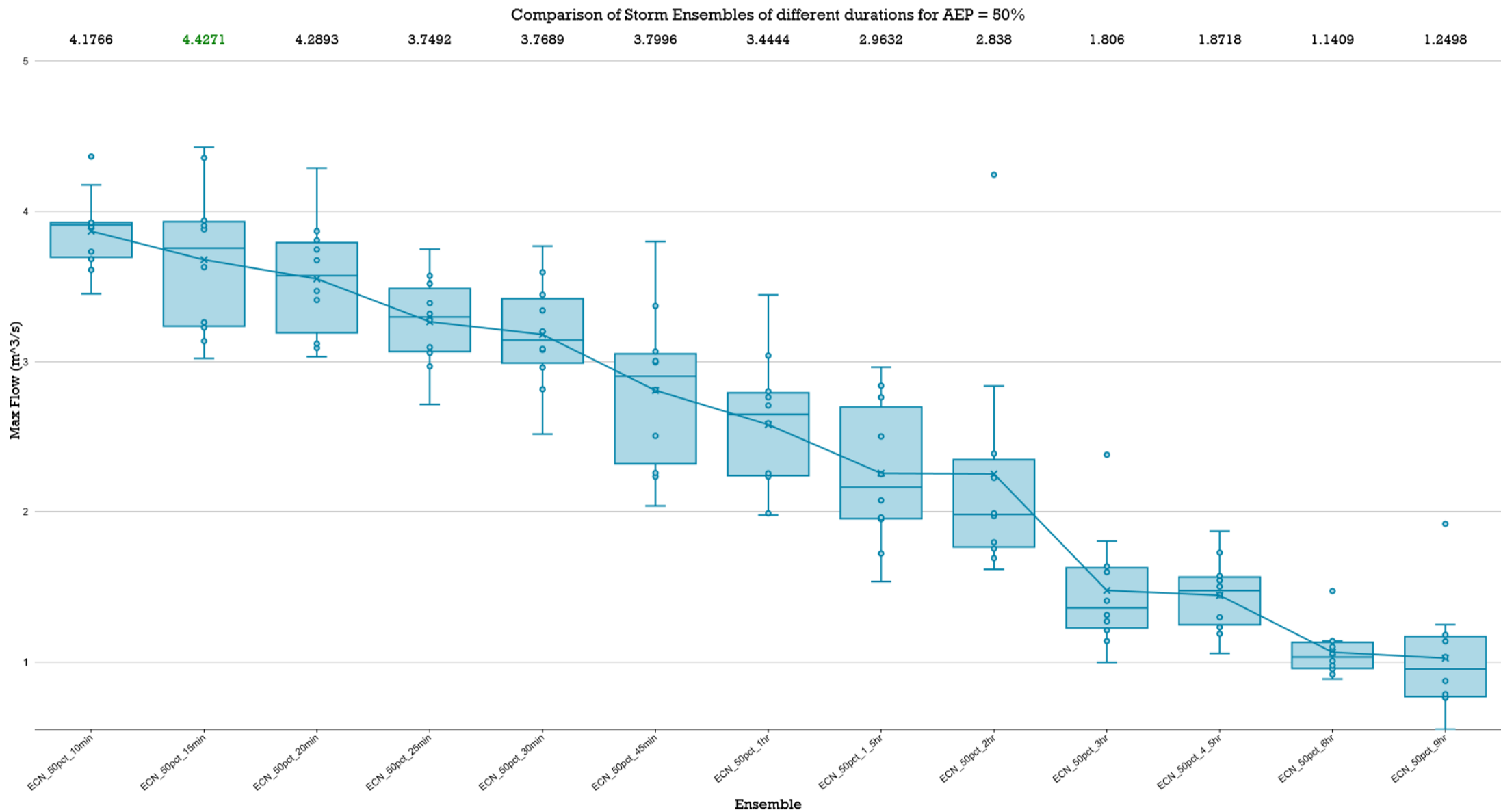


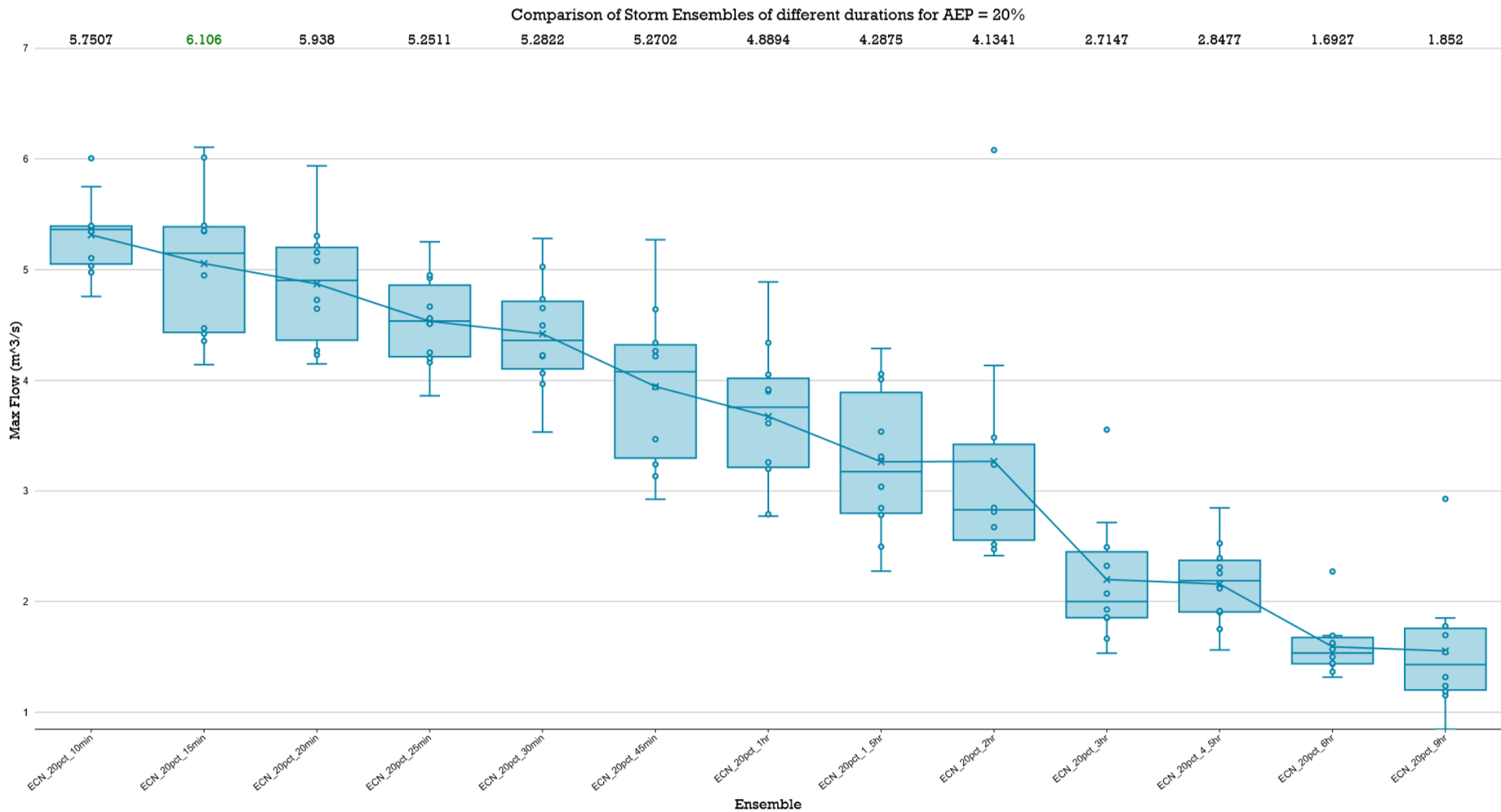


LPoD 5 POST-DEVELOPMENT

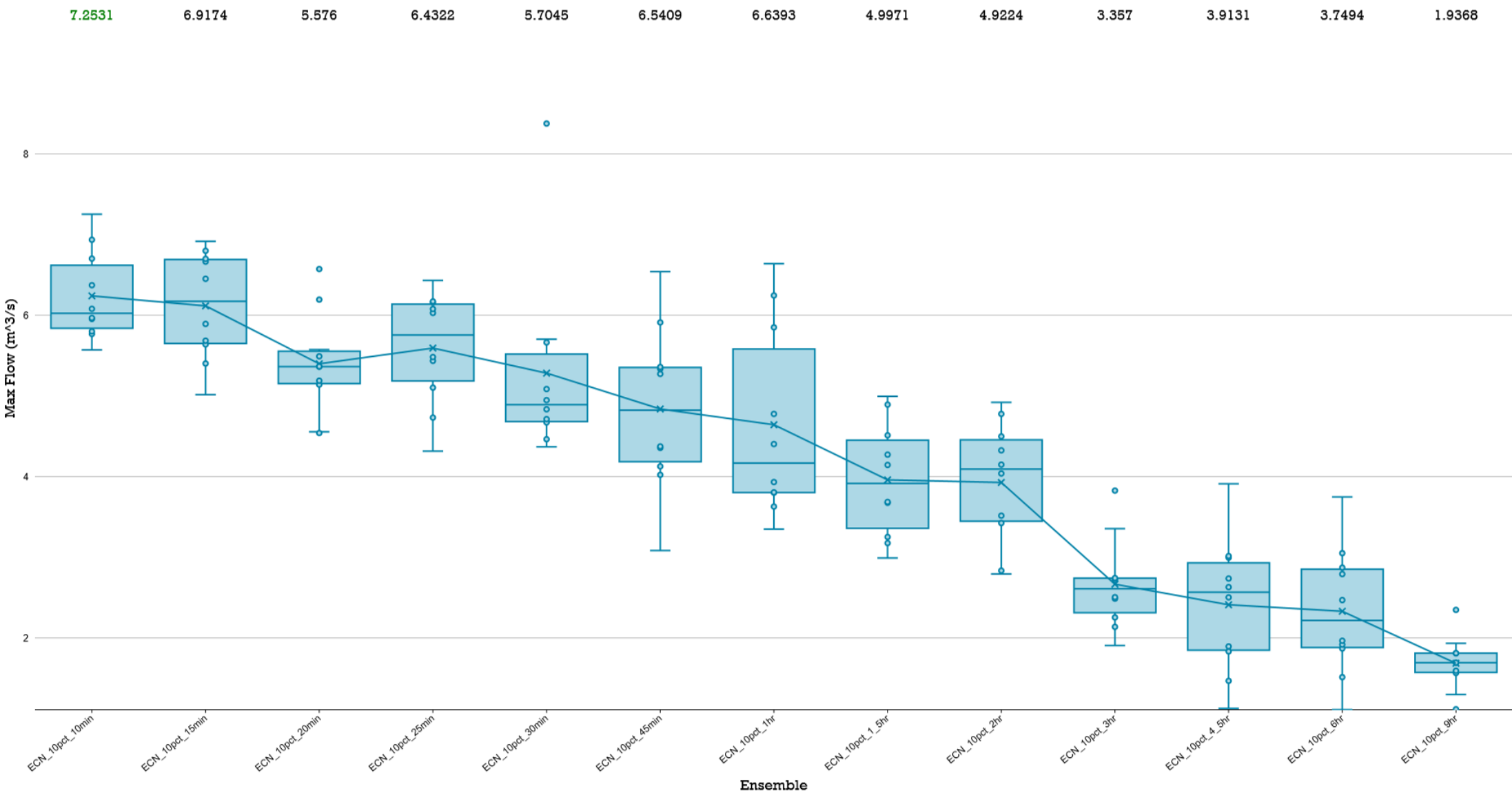
Comparison of Storm Ensembles of different durations for AEP = 63.2%



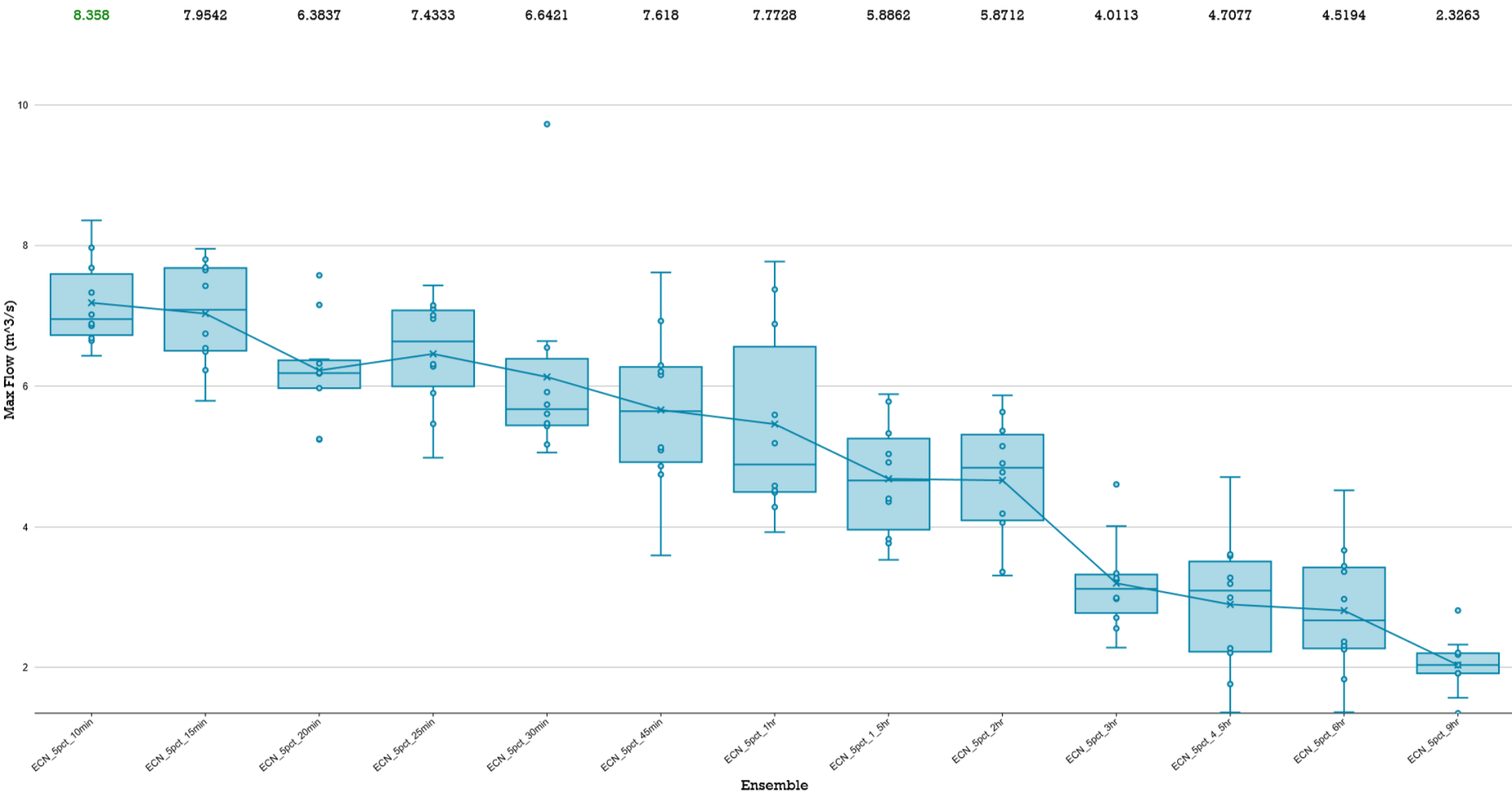




Comparison of Storm Ensembles of different durations for AEP = 10%

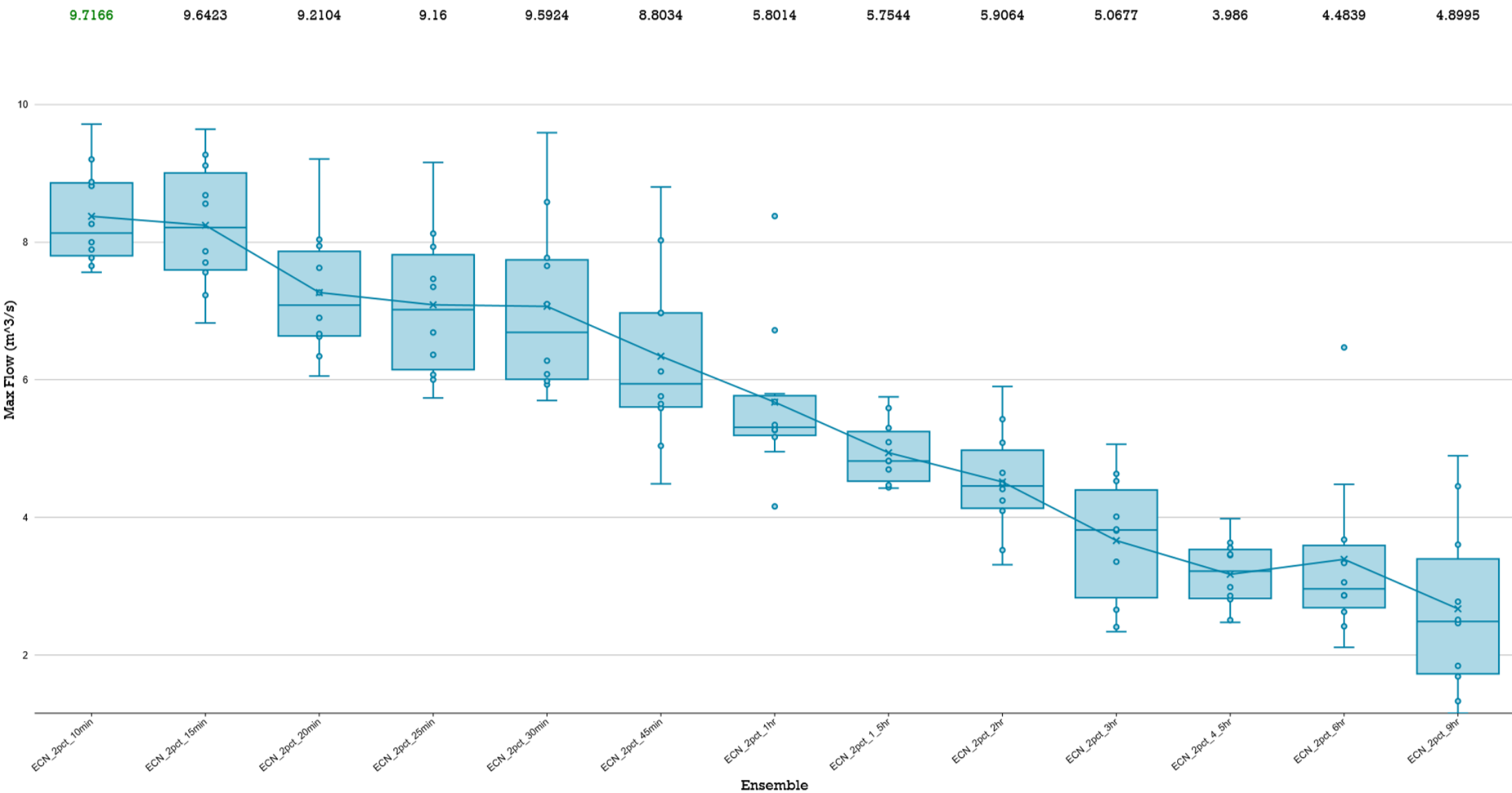


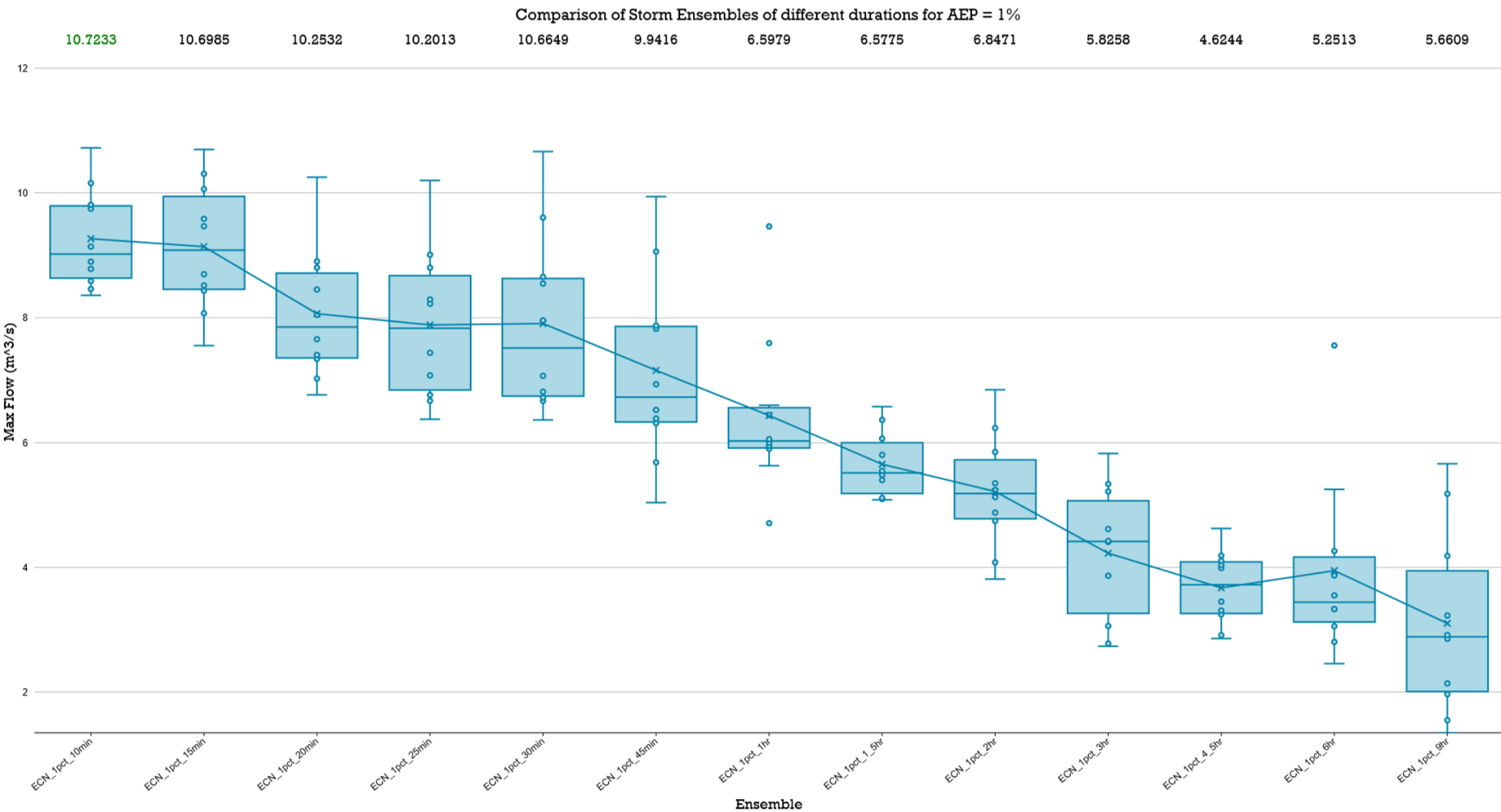
Comparison of Storm Ensembles of different durations for AEP = 5%



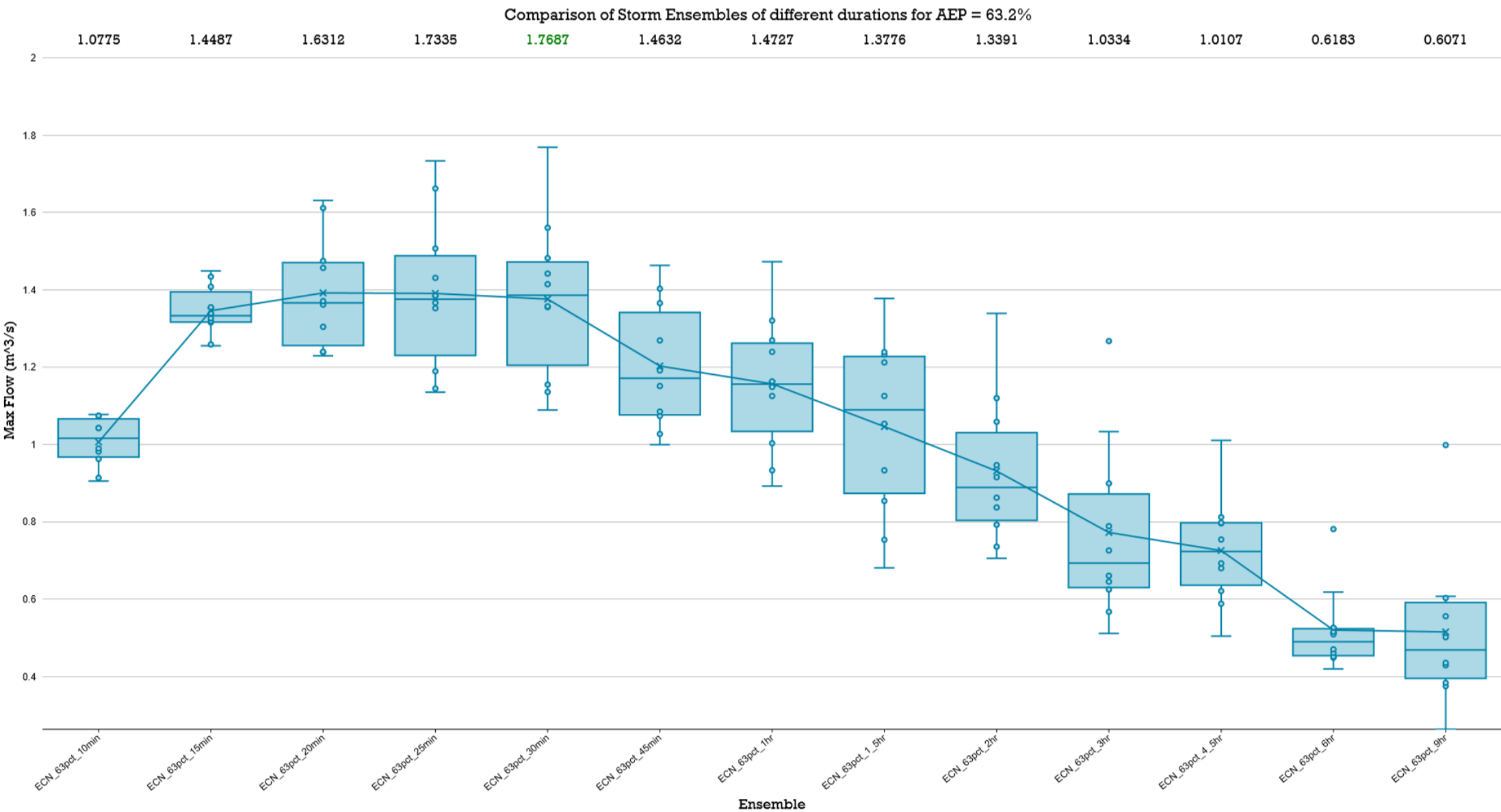
BOX & WHISKER PLOTS

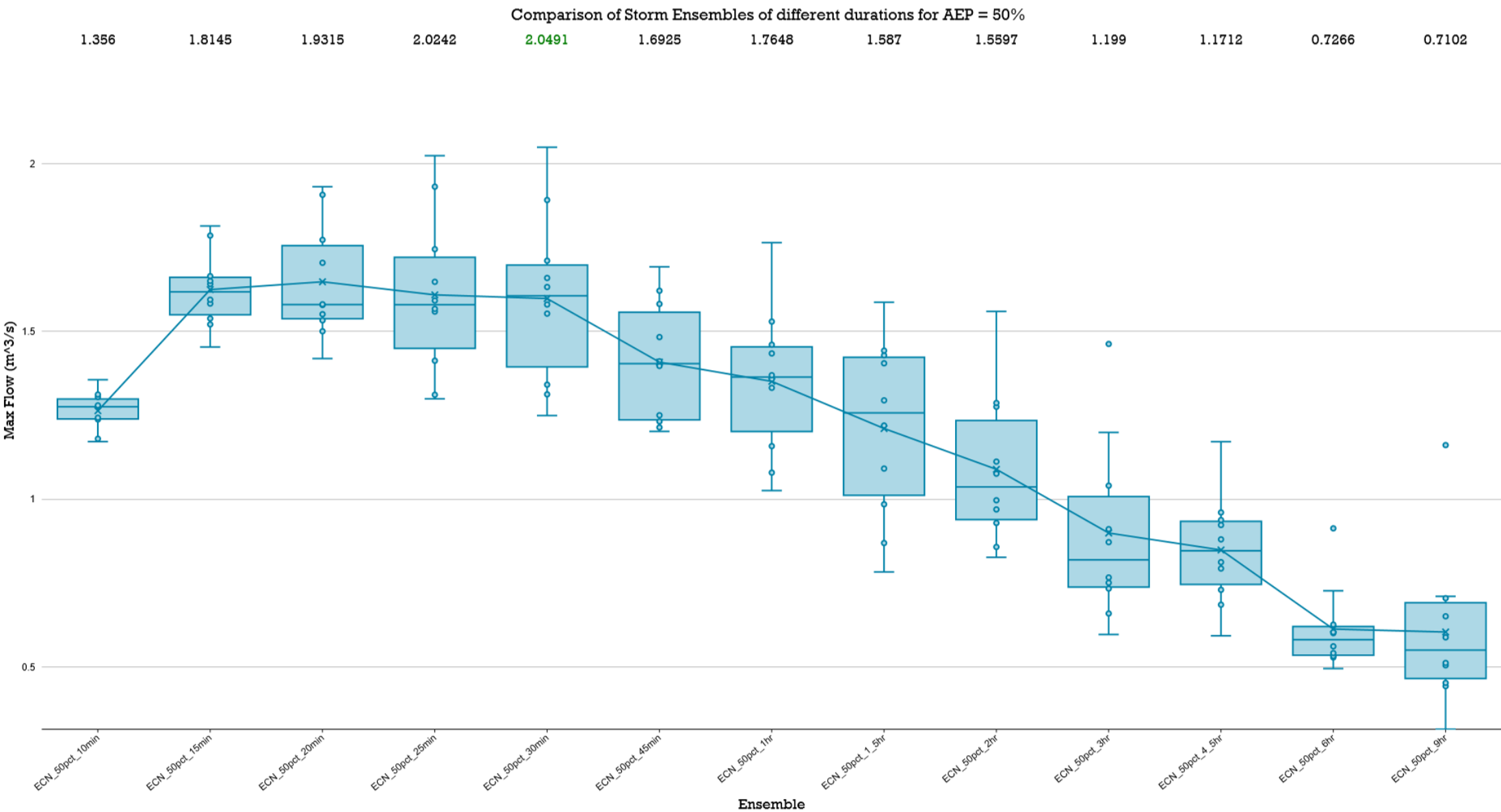
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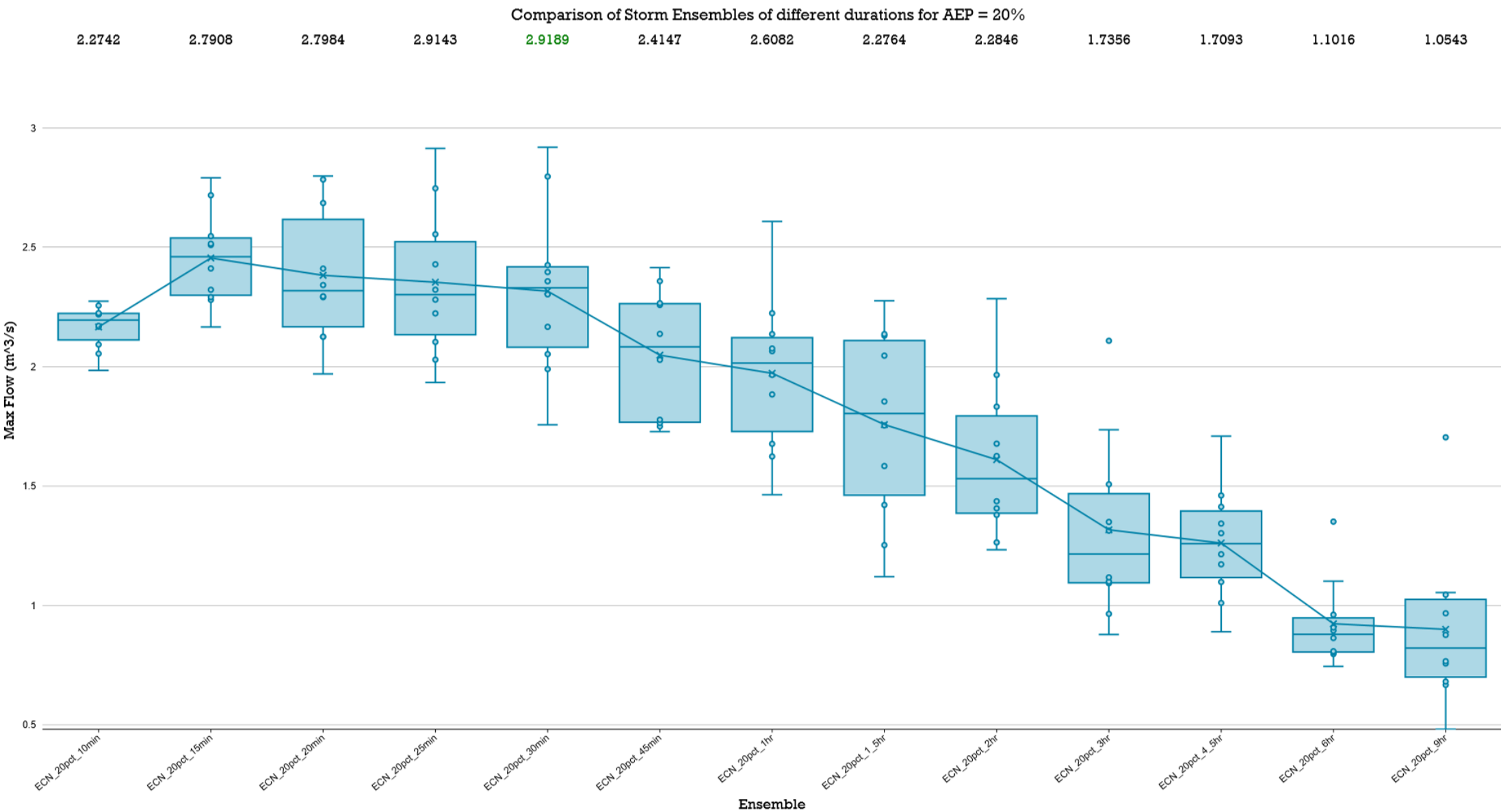


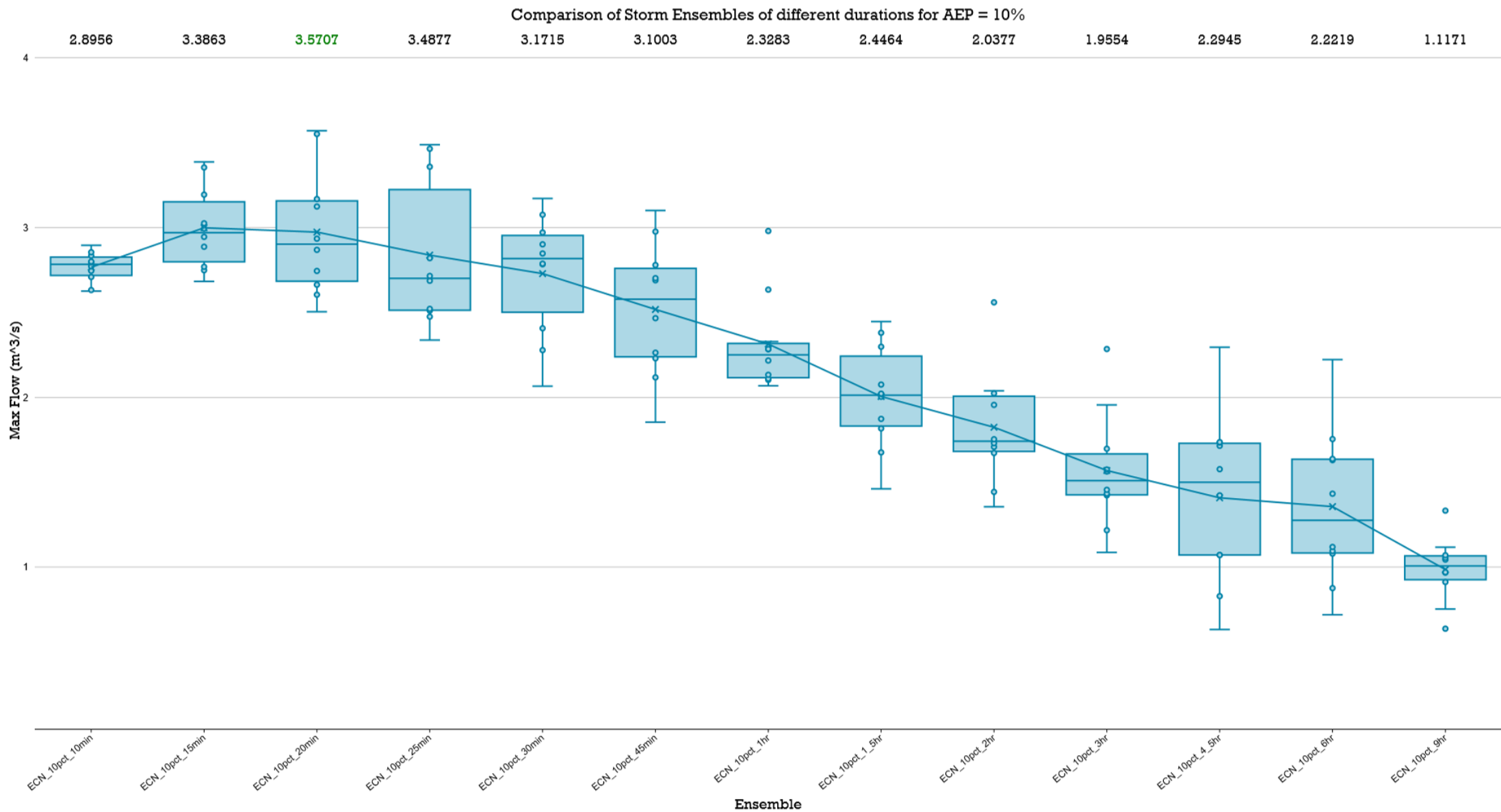


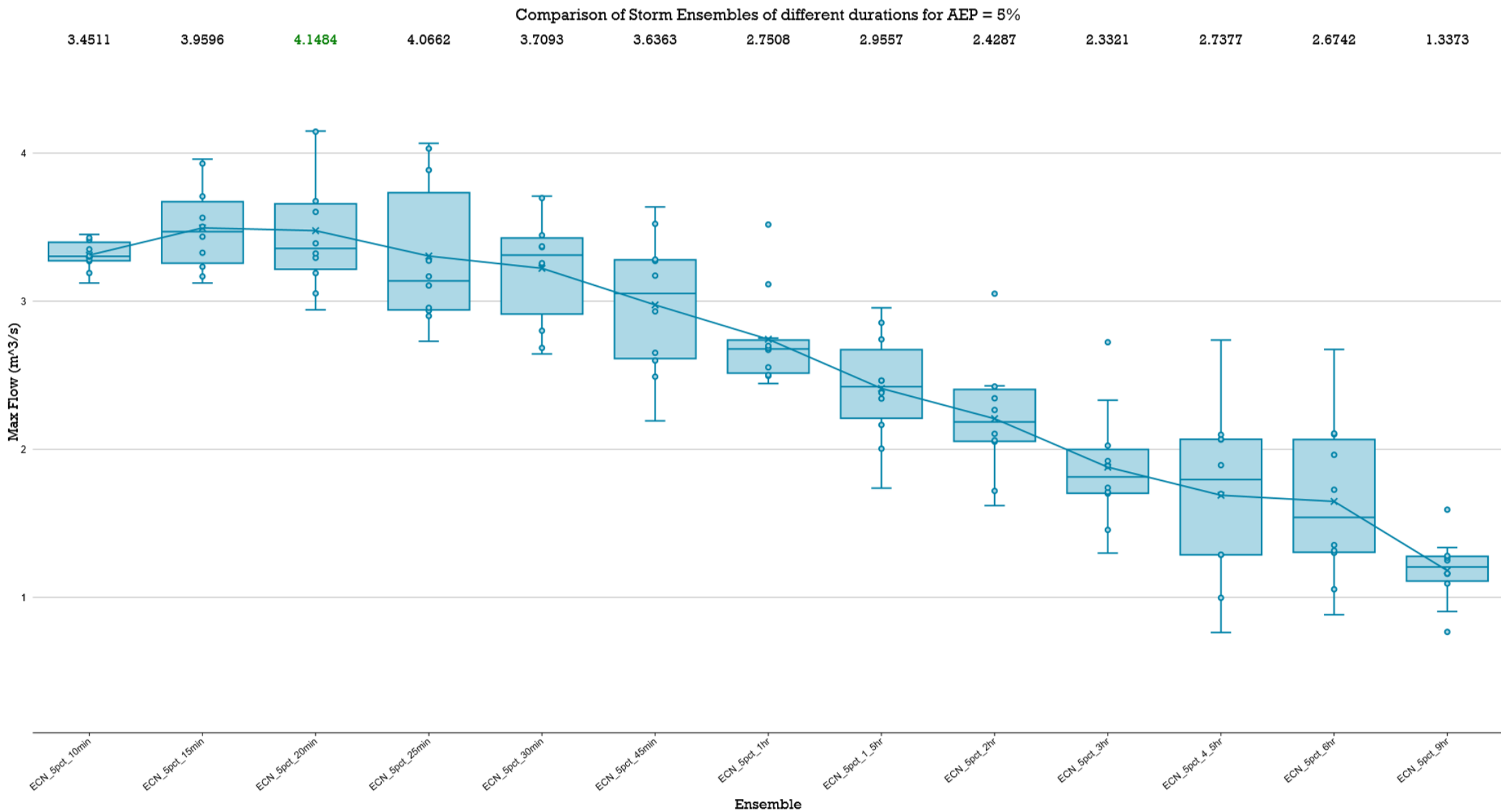
LPoD 5 PRE-DEVELOPMENT

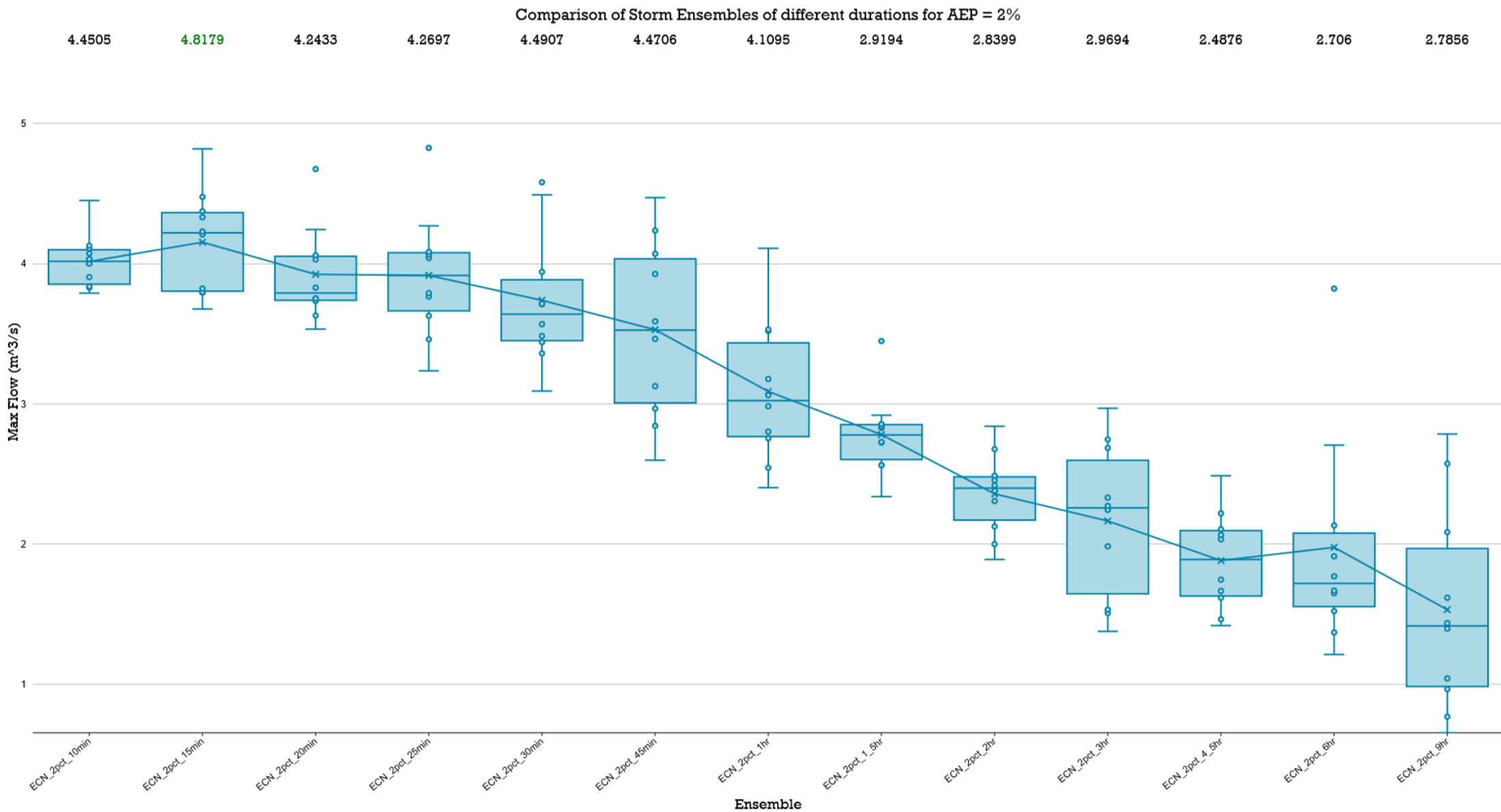


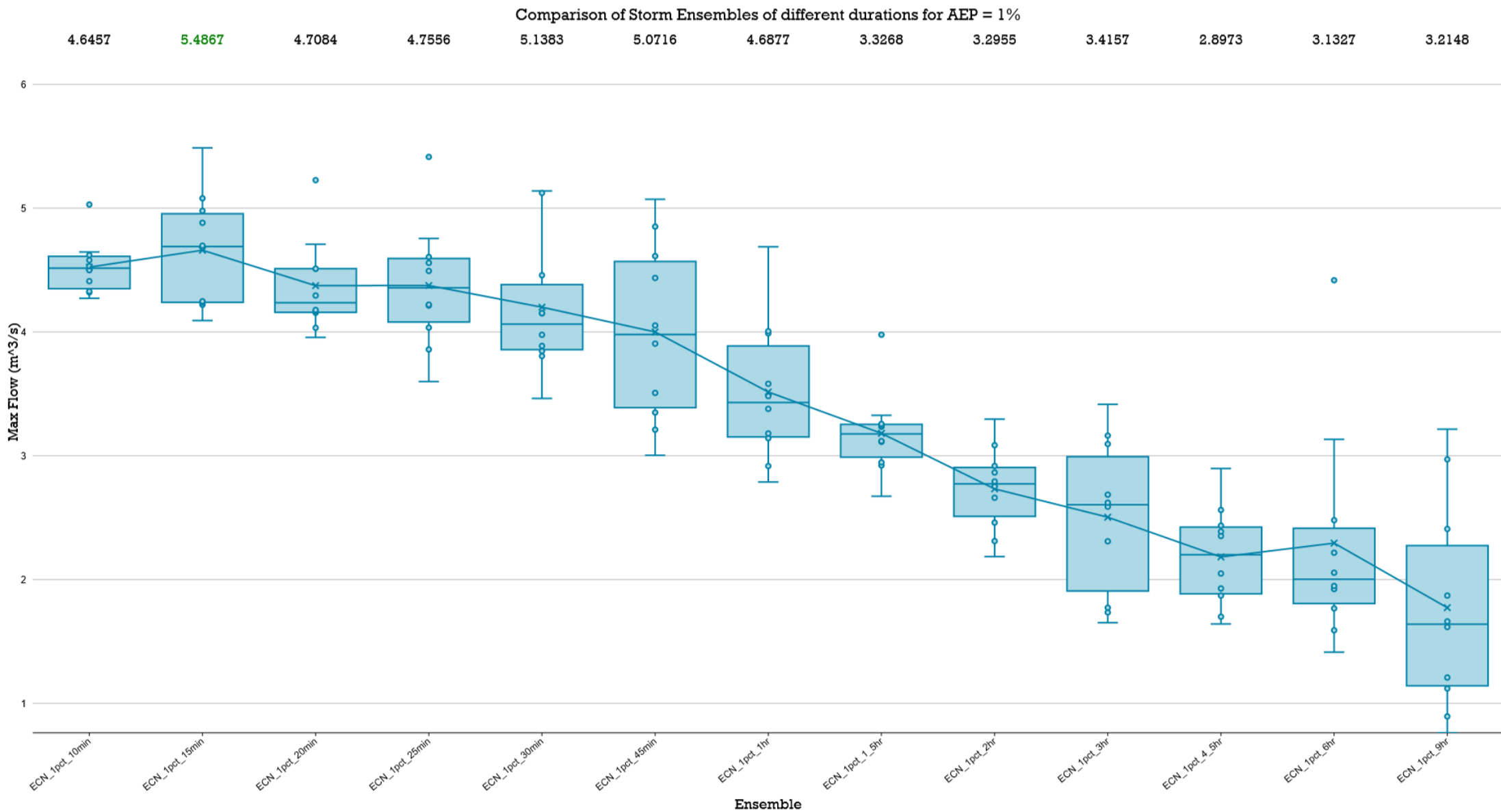












Appendix L – Mitigation Results

HYDROLOGICAL PEAK FLOW SUMMARY [STAGE 1] - CATCHMENT LPoD-5

EVENT	PEAK <i>UNMITIGATED</i> FLOW	PEAK <i>MITIGATED</i> FLOW m3/s	TARGET FLOW (PRE-DEV) m3/s	PRE-DEVELOPED PEAK STORM		PASS?	STORM	
				DURATION	ENSEMBLE #		DURATION	ENSEMBLE
63pct	3.913	1.095	1.769	ECN_63pct_30min	1	Yes	ECN_63pct_30min	Storm 1
50pct	4.427	1.225	2.049	ECN_50pct_30min	1	Yes	ECN_50pct_3hr	Storm 3
20pct	6.106	1.746	2.919	ECN_20pct_30min	1	Yes	ECN_20pct_3hr	Storm 3
10pct	7.253	3.441	3.571	ECN_10pct_20min	8	Yes	ECN_10pct_1hr	Storm 10
5pct	8.358	4.138	4.148	ECN_5pct_20min	9	Yes	ECN_5pct_1hr	Storm 1
2pct	9.717	4.598	4.818	ECN_2pct_15min	8	Yes	ECN_2pct_6hr	Storm 1
1pct	10.723	5.231	5.487	ECN_1pct_15min	8	Yes	ECN_1pct_6hr	Storm 1

BASIN OUTLET CONFIGURATION SUMMARY [STAGE 1]

OUTLET CONFIGURATION FLOWS PER CONDUIT (m3/s)							
1	2	3	4	5	6	7	TOTAL
0.000	0.000	0.352	0.352	0.352	0.041	0.000	1.095
0.000	0.000	0.379	0.379	0.379	0.090	0.000	1.225
0.000	0.136	0.471	0.471	0.471	0.199	0.000	1.746
0.000	1.708	0.503	0.503	0.503	0.223	0.000	3.441
0.000	2.309	0.529	0.529	0.529	0.243	0.000	4.138
0.000	2.671	0.552	0.552	0.552	0.272	0.000	4.598
0.000	3.164	0.589	0.589	0.589	0.302	0.000	5.231
EMERGENCY WEIR	F.I. 1.5 x 2.0m	F.I. (1) 0.6 x 0.6	F.I. (2) 0.6 x 0.6	F.I. (3) 0.6 x 0.6	225 dia ORIFICE	NOT USED	

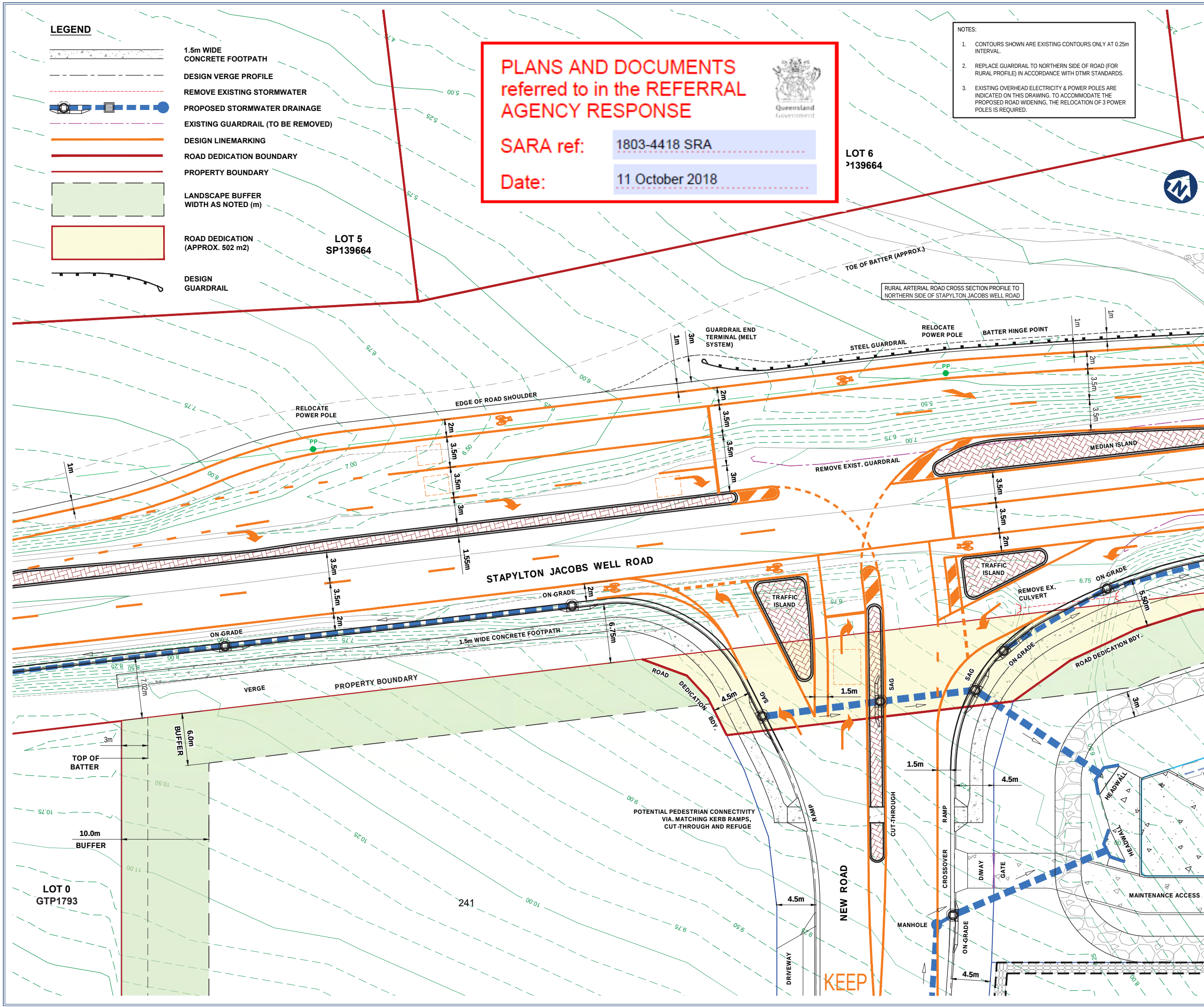
FLOW MITIGATION SUMMARY [STAGE 1]

EVENT	PEAK <i>MITIGATED</i> FLOW m3/s	TARGET FLOW (PRE-DEV) m3/s	MITIGATED BY m3/s	MITIGATED BY %	MITIGATED?
63pct	1.095	1.769	0.674	38.1%	Y
50pct	1.225	2.049	0.824	40.2%	Y
20pct	1.746	2.919	1.173	40.2%	Y
10pct	3.441	3.571	0.130	3.6%	Y
5pct	4.138	4.148	0.011	0.3%	Y
2pct	4.598	4.818	0.220	4.6%	Y
1pct	5.231	5.487	0.256	4.7%	Y

BASIN AND WATER LEVEL SUMMARY [STAGE 1]

DETENTION BASIN		BASIN INVERT LEVEL (IL)	IS WATER DEPTH COMPLIANT TO QUDM 2017 RECOMMENDATIONS?		PROPOSAL
Water Depth (m)	WSL R.L.				
0.835	6.635	5.800	N/A	N/A	PROVIDE CoGC STANDARD 1.8 METRE HIGH CHAINMESH FENCING TO PERIMETER OF DRAINAGE RESERVE TO RESTRICT PUBLIC ACCESS
0.920	6.720	5.800	N/A	N/A	
1.257	7.057	5.800	N/A	N/A	
1.379	7.179	5.800	N/A	N/A	
1.456	7.256	5.800	NO	D < 1.20m ?	
1.557	7.357	5.800	N/A	N/A	
1.689	7.489	5.800	NO	D < 1.50m ?	

Appendix M – Stapylton Jacobs Well Rd Approved Intersection Plans



PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE

SARA ref: 1803-4418 SRA

Date: 11 October 2018

- NOTES:
1. CONTOURS SHOWN ARE EXISTING CONTOURS ONLY AT 0.25m INTERVAL.
 2. REPLACE GUARDRAIL TO NORTHERN SIDE OF ROAD (FOR RURAL PROFILE) IN ACCORDANCE WITH DTMR STANDARDS.
 3. EXISTING OVERHEAD ELECTRICITY & POWER POLES ARE INDICATED ON THIS DRAWING. TO ACCOMMODATE THE PROPOSED ROAD WIDENING, THE RELOCATION OF 3 POWER POLES IS REQUIRED.

Client:

KS8 Pty. Ltd.

Site Address:

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

RPD:

Lot / Plan: 1 on RP6882
240 on W31320
4 on RP6843

Parish: Albert
County: Ward
Local Authority: City of Gold Coast
Council

Level Datum: AHD
Meridian: IS216853
Contour Interval: -
PSM: -
RL: -

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTES

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DRAWING TITLE

FUNCTIONAL ROAD
LAYOUT PLAN AND
STORMWATER DRAINAGE
LAYOUT PLAN
SHEET 1 OF 2

B	24-07-18	AMENDMENTS AS PER DTMR REQUEST	IG	MG
A	18-07-18	ORIGINAL ISSUE	IG	MG
Issue	Date	Description	DRN	CHK

SCALE IN METRES

0 2 4 6 8 10m

1:200 @ A1

Scale at A1: 1:200

Designed: IG

Drafted: IG

Approved: MG

RPEQ: 16939

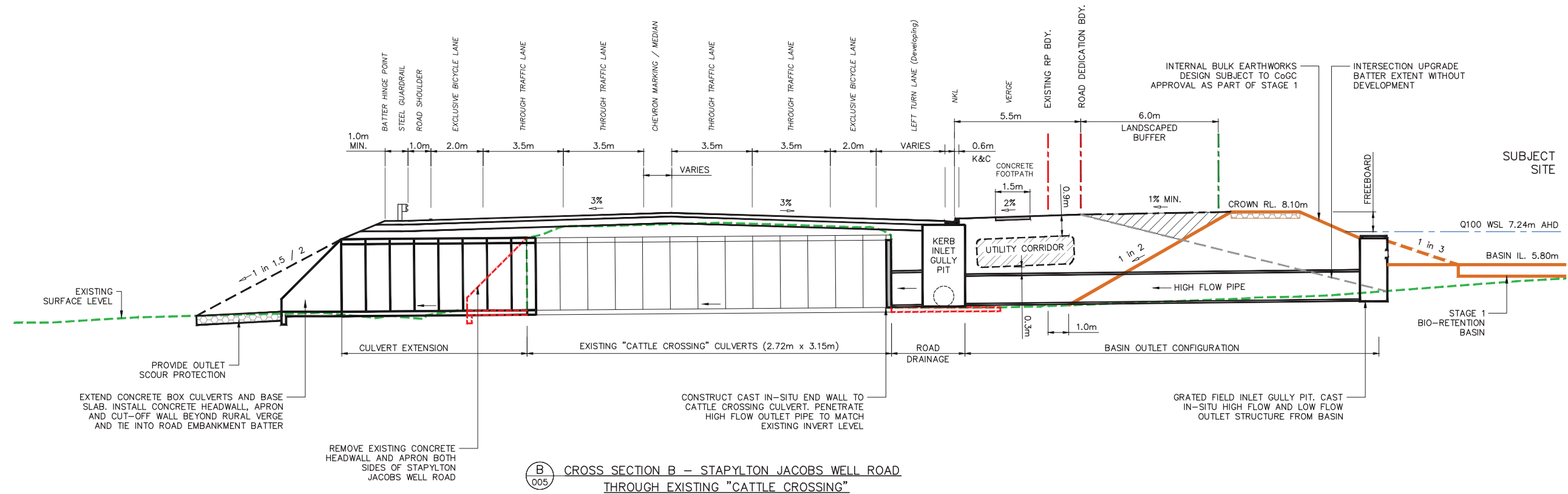
Signed:

Date: 24-07-18

Drawing No: 5738 ENG BE1 SK-004

Rev. No: B

DTMR WORKS
STAGE 1 BULK EARTHWORKS
EXISTING SURFACE LEVEL



CROSS SECTION B - STAPYLTON JACOBS WELL ROAD
THROUGH EXISTING "CATTLE CROSSING"



Queensland
Government

Date: 11 October 2018

Client: KS8 Pty. Ltd.

Site Address:

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

RPD:	
Lot / Plan:	1 on RP6882 240 on W31320 4 on RP6843
Parish:	Albert
County:	Ward
Local Authority:	City of Gold Coast Council
Level Datum:	AHD
Meridian:	IS216853
Contour Interval:	-
PSM:	
RL:	

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTES
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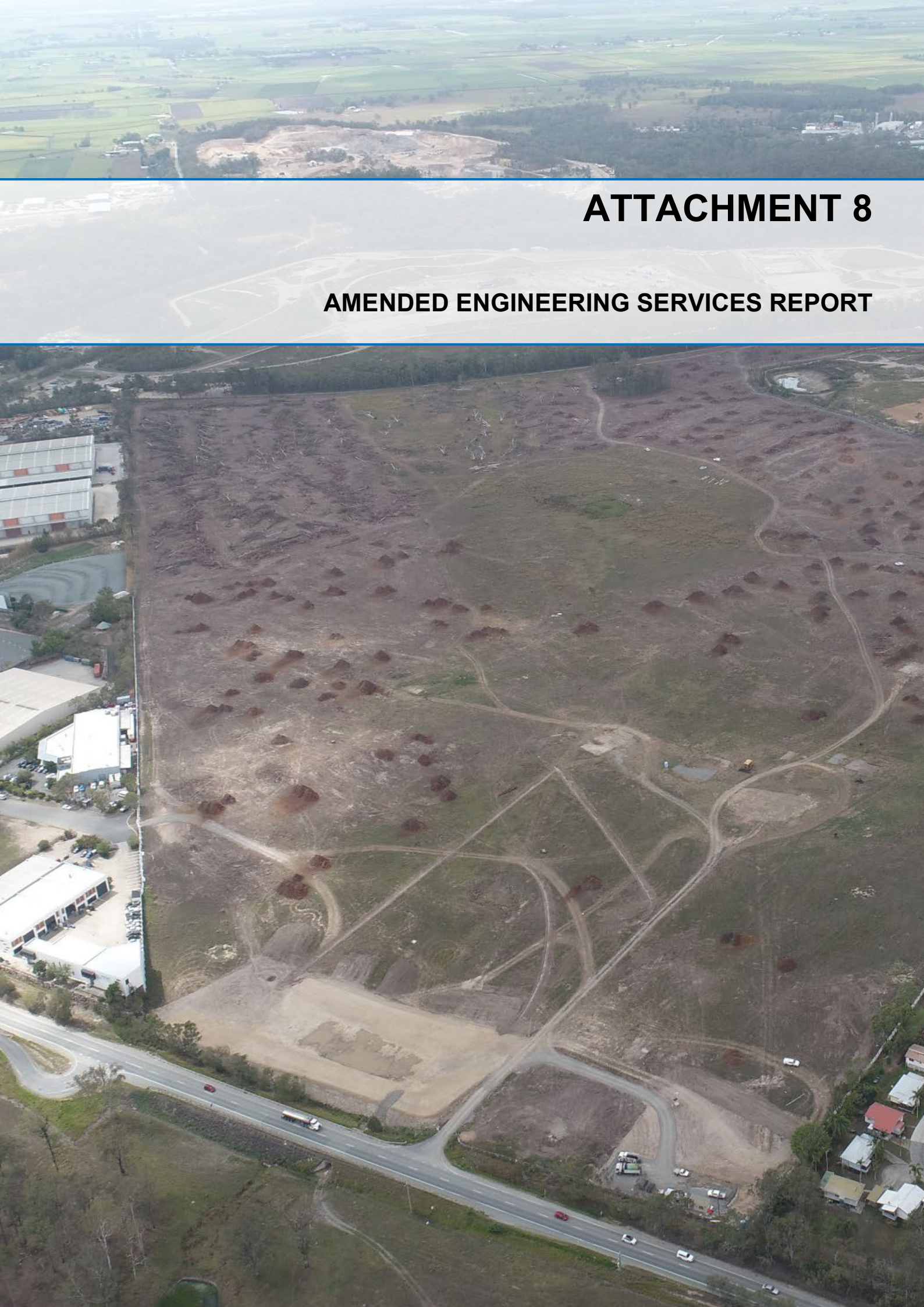
TYPICAL CROSS SECTIONS OF STAPYLTON JACOBS WELL ROAD

			</	

0 1 2 3 4 5m
1:100 @ A1

Date:	24-07-18
-------	----------

Drawing No:	Rev. No:
5738 ENG BE1 SK-006	B

An aerial photograph showing a large, cleared land area. The ground is mostly brown and uneven, with numerous mounds of dirt and tracks from heavy machinery. To the left, there are several large, white, rectangular buildings, possibly industrial or commercial. A road runs along the bottom edge of the image, with a few vehicles visible. The background shows a mix of green fields and some distant structures.

ATTACHMENT 8

AMENDED ENGINEERING SERVICES REPORT

ENGINEERING SERVICES REPORT

CHANGE APPLICATION TO
ROL201800079
(STAGE 1, 22 INDUSTRIAL
LOTS)

ADDRESS

60 Stapylton Jacobs Well Road, Stapylton

REAL PROPERTY DESCRIPTION

Lot 501 on SP295994

PREPARED FOR

Frasers Property (Australia) Pty. Ltd.

December 2019 (Rev. 1)



gassman
development
perspectives

project coordination
urban + regional planning
landscape + urban design
engineering services
environmental management
visualisation + spatial services
surveying services
advisory services

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In preparing this report we have made certain assumptions. We have assumed that all information and documents provided to us by the Client or as a result of a specific request or enquiry were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

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GDP DOCUMENT CONTROL

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Revision / Checking History

No.	Author	Reviewer
INTERNAL DRAFT	Ian Grieves	Mitchell Gassman
1.	Ian Grieves	Mitchell Gassman

Approval for Issue

Rev. No.	Name	Position	Signature	Date
1.	Mitchell Gassman	Civil Project Engineer RPEQ 16939		20 December 2019

Final Distribution

Frasers Property (Australia) Pty. Ltd. (Client)	1 electronic copy
City of Gold Coast Council (Assessment Manager)	1 electronic copy
GDP File	1 electronic copy

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1.0 INTRODUCTION

Gassman Development Perspectives (GDP) has been engaged by Frasers Property (Australia) Pty. Ltd. (Client) to prepare an Engineering Services Report over land situated at 60 Stapylton Jacobs Well Road, Stapylton (Lot 501 on SP295994) being the 'subject site'.

This report has been prepared for submission to City of Gold Coast Council (Council) as part of a Change Application to the existing Stage 1 Development Permit for Reconfiguration of Lot (22 industrial lots) (Council Ref: ROL201800079) (refer **Appendix A – Reconfiguration of Lot Plan**)

The purpose of this report is to supply information relating specifically to Civil Engineering infrastructure, services and issues over the subject site and how the proposed lot configuration changes still align with the previously approved servicing strategy for the subject site.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The subject site is located within the City of Gold Coast Council's (Council) local government boundaries, in Council's "Future Low Impact Industry" and "Future Medium Impact Industry" zone precinct. The subject site is bounded by Stapylton Jacobs Well Road to the north, Christensen Road and existing industrial uses to the west and Council's land fill facility to the south-east (refer to **Figure 2.1**).

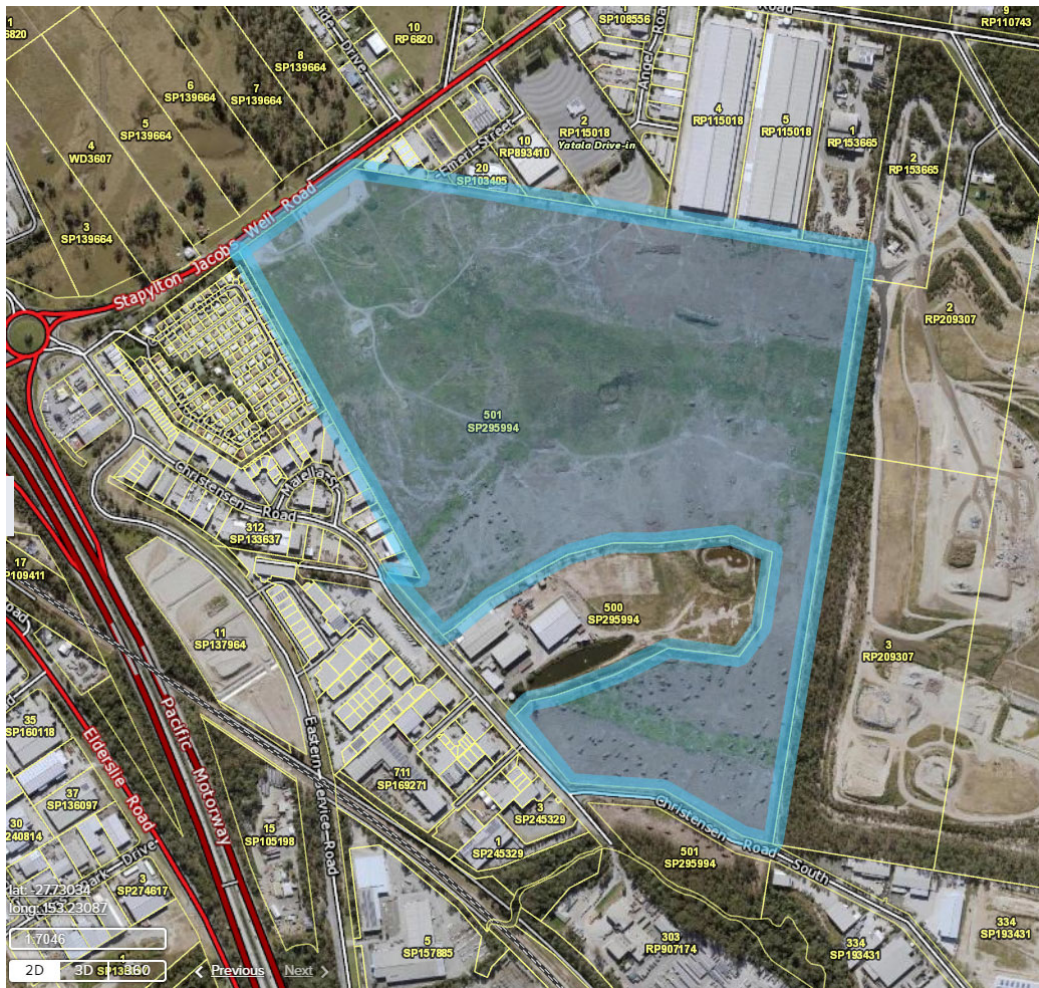


Figure 2.1: Site Locality Plan, Source: Google Earth 2017

2.2 LAND ENCUMBRANCES

There are no existing encumbrances over the subject site.

2.3 EXISTING LAND USES

The subject land is vacant following recent vegetation clearing.

2.4 TOPOGRAPHY

Along the south-eastern boundary of the subject site is the existing high point of 29.23m AHD with a ridge line extending through to the properties' northern boundary. This existing topography defines the existing catchments of the site and current stormwater discharge locations along the northern and eastern boundaries

2.5 EXISTING VEGETATION

The subject land is vacant of vegetation following recent clearing completed under Council approvals OPW201800486 and OPW201801219. A 10m retained vegetation buffer exists along the subject site's south-east boundary shared with Council's landfill facility but is outside the Stage 1 area.

2.6 CONTAMINATED LAND

The subject site is not known to be contaminated.

3.0 EARTHWORKS

Due to the existing topography of the subject site (refer **Appendix B**) major bulk earthworks will be required to provide generally flat pads suitable for the intended industrial use.

A bulk earthworks strategy has been developed by Gassman Development Perspectives over the subject site (refer **Appendix C**) to facilitate the creation of suitable flat earthworked pads capable of being serviced to City of Gold Coast Council standards. The current earthworks strategy is generally consistent with the existing Change to Ground Level approval (Council Ref: OPW201800485) for Stage 1 but has been altered to align with the revised Stage 1 lot layout and footprint.

4.0 ROADWORKS AND ACCESS

Stage 1 of the proposed development will gain access via construction of a signalised intersection along the subject site's frontage to Stapylton Jacobs Well Road. Due to the subject site's proximity to Exit 38 of the M1 Motorway the conceptual design of the external intersection has included access provisions for A-Double vehicular movements into the development. As Stapylton Jacobs Well Road is State-controlled, approval of the intersection layout and the subsequent detailed design will be subject to review by the Department of Transport and Main Roads (DTMR). Please refer **Appendix D** for the layout of the proposed signalised external intersection. It is noted that the signalised intersection works include dual lanes to Stapylton Jacobs Well Road in accordance with DTMR's ultimate design for the

frontage of the subject site. Adequate provision for these external works and any land dedication within the subject site to accommodate the ultimate design have been made within the ROL Plan for Stage 1 (refer **Appendix A**).

In accordance with the superseded planning scheme approval in place over the subject site, the internal road network will be constructed in accordance with the typical cross section shown on Council standard drawing 05-02-004 for an Industrial Collector Street (refer **Figure 4.1** below). It is noted this road reserve configuration has been applied to internal roads that would typically be classed as “Industrial Access Streets” to maintain greater access and manoeuvrability throughout the proposed development. In line with the design intent of the external signalised intersection, the radii of kerb returns throughout the estate have also been designed to accommodate A-Double vehicular movements.

The truncations to lot boundaries necessary to maintain minimum road verge widths through these kerb returns have been incorporated into the Reconfiguration of Lot plan for Stage 1

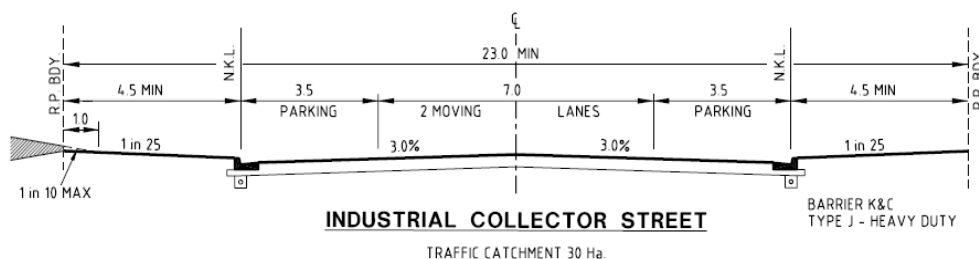


Figure 4.1: Proposed Internal Roads Cross Section, Source: CoGC Std Dwg 05-02-004

5.0 INFRASTRUCTURE SERVICES

5.1 SEWERAGE

Consultation has been undertaken with Gold Coast Water’s Sewer Catchment Planning officers to establish the Sewer Network Analysis Report that was approved as part of the original Stage 1 Development Permit for Reconfiguration of Lot. This involved the creation of an overall sewer strategy internal to the site along with outlining the key trunk sewer infrastructure upgrades required along Stapylton Jacobs Well Road through to the existing Sewer Pump Station (BE35) on the western side of the M1 Motorway.

As per the approved Sewer Network Analysis, the amended Stage 1 will continue to be serviced via the construction of an external gravity sewer main connecting to GCWW’s existing sewer pump station BE35 to the west of the M1 Motorway as per Condition 26 on Councils Decision Notice for ROL201800079.

5.2 WATER SUPPLY

A copy of Council's water reticulation as constructed plans has been obtained for roads within the vicinity of the subject site. These plans confirm that Stage 1 of the development will be serviced off Council's existing 225mm diameter potable water main located within the Stapylton Jacobs Well Road reserve.

GDP have previously completed a detailed Water Network Analysis as part of the original ROL application process in accordance with Council's requirements to confirm minimum service supply and fire demand can be met for the proposed lots.

5.3 ELECTRICITY AND TELECOMMUNICATIONS

A Dial-before-you-dig (DBYD) search was undertaken over the subject site (refer **Appendix F**) which confirmed the presence of electrical and communications reticulation to the subject site's road frontage.

The adequacy of this infrastructure in its current form along with the necessity for any augmentation or upgrades to cater for the proposed use will be confirmed through the detailed design process by the appointed electrical consultant.

6.0 SITE BASED STORMWATER MANAGEMENT

6.1 STORMWATER QUANTITY

A stormwater drainage network will be designed to ensure the proposed lot configuration adequately drains to a Lawful Point of Discharge. A Site Based Stormwater Management Plan has been prepared by Gassman Development Perspectives that demonstrates that attenuation measures are able to be incorporated into the proposed development to ensure there is no adverse impacts to downstream properties, waterways or infrastructure as a result of an increase in peak stormwater flow rates discharging from the subject site upon development.

This is achieved through the conceptual design of appropriately sized detention basins that comply with City of Gold Coast Council's Land Development Guidelines along with the Queensland Urban Drainage Manual (QUDM).

6.2 STORMWATER QUALITY

A suitable stormwater treatment train will need to be implemented to ensure the servicing of both the proposed industrial lots and surrounding public road reserves

A site based stormwater management plan for the subject site outlining how all necessary steps to ensure that the quality of stormwater discharging from the subject site meets the necessary standards to comply with City of Gold Coast Council's Water Sensitive Urban Design (WSUD) requirements, Queensland Urban Drainage Manual (QUDM) and the

performance objectives of the Queensland State Planning Policy (SPP) has been prepared by Gassman Development Perspectives and lodged under separate cover for Compliance Assessment by Council.

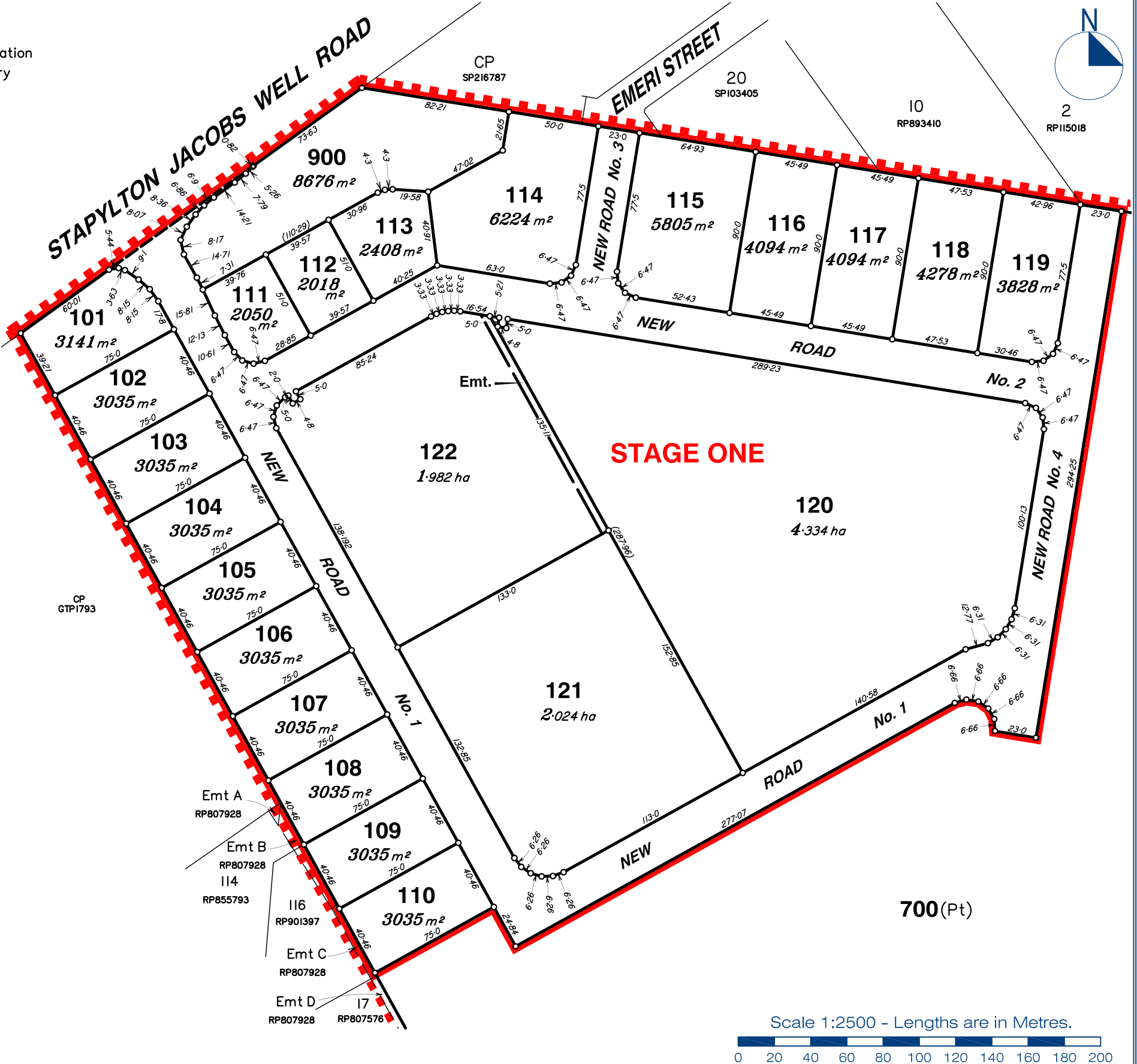
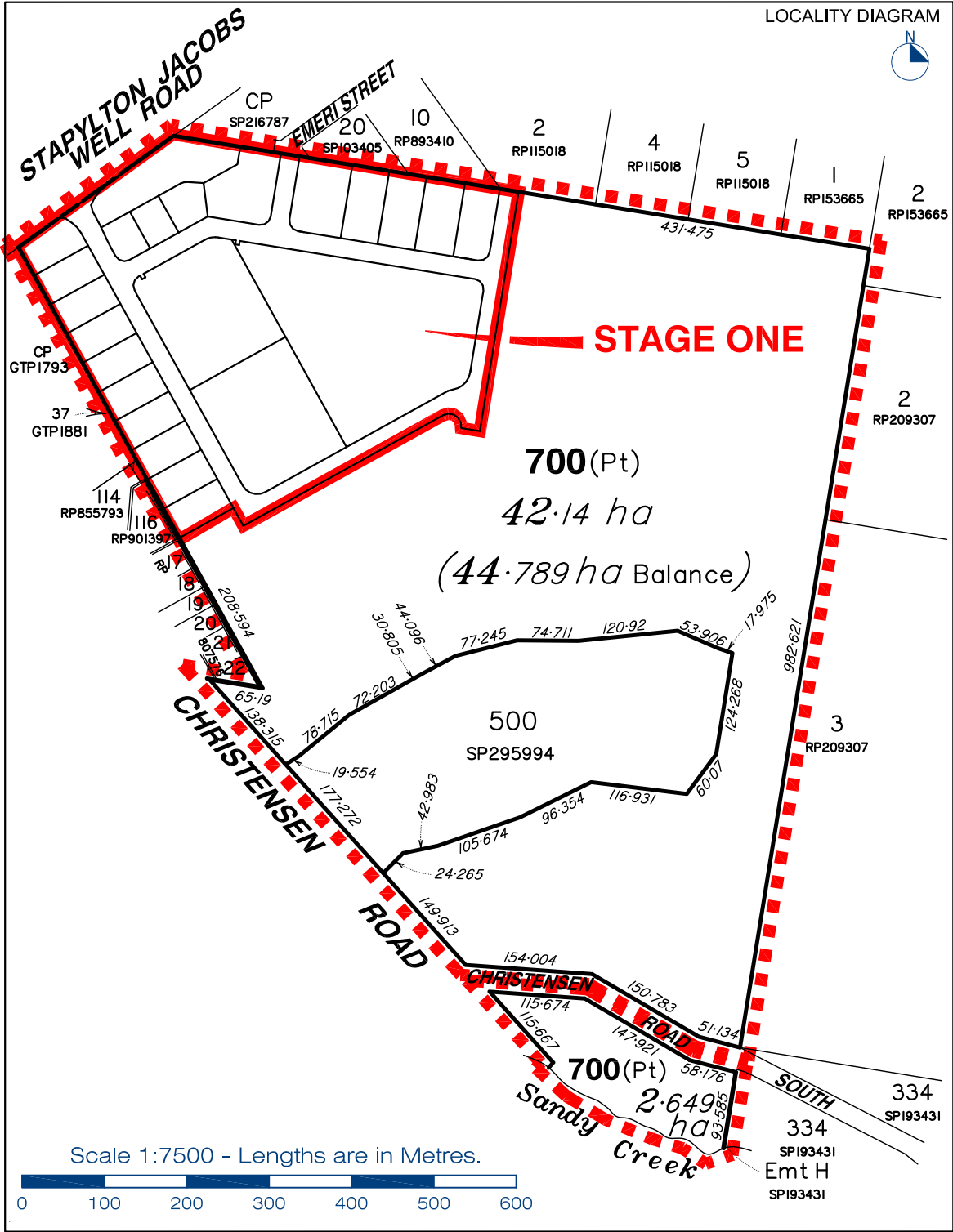
7.0 CONCLUSION

The above reporting demonstrates that proposed development can be undertaken through the construction of Civil Engineering infrastructure and services that meet the requirements of City of Gold Coast City Council's Land Development Guidelines and associated Australian Standards.

Appendix A – Stage 1 Reconfiguration of Lot Plan

DEVELOPMENT SUMMARY				
Total Site Area 64.239Ha				
LOT YIELD	STAGE AREA	LOT DENSITY	AVERAGE LOT SIZE	APPROX. AREA & LENGTH OF NEW ROAD
22 Lots	19.34 ha	1.13 Lots/ha	6742m ²	3.636 Ha 1,560m

--- Limit of Application
— Stage Boundary



Scale at A3:		1:2500			
Date:		18-12-19			
Design:		ICG			
Drawn:		SJH			
Checked:		AWG			
A	18/12/2019	ADD PMTS IN LOTS 120 & 122		SJH	AWG
	14/11/2019	ORIGINAL ISSUE		SJH	AWG
Issue	Date	Description		DRN	CHK

Project:

M38 INDUSTRIAL PARK
YATALA

Client:

FRASERS PROPERTY AUSTRALIA

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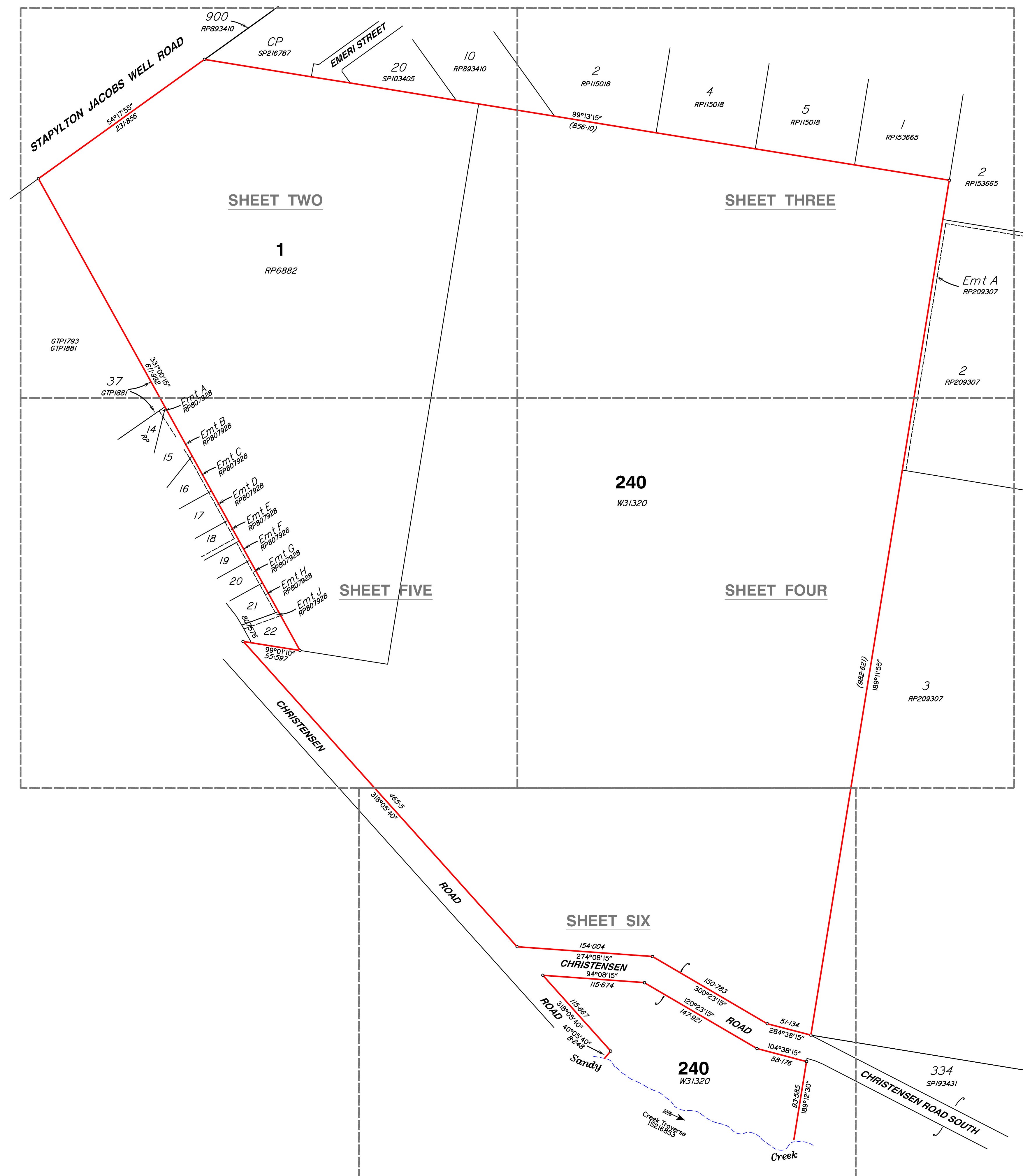
**Proposed Staged
Reconfiguration of
Land STAGE ONE**

Cancelling Lot 501 on SP295994

Drawing No:
5941 S ROL 01 A

Revision No:

Appendix B – Site Survey



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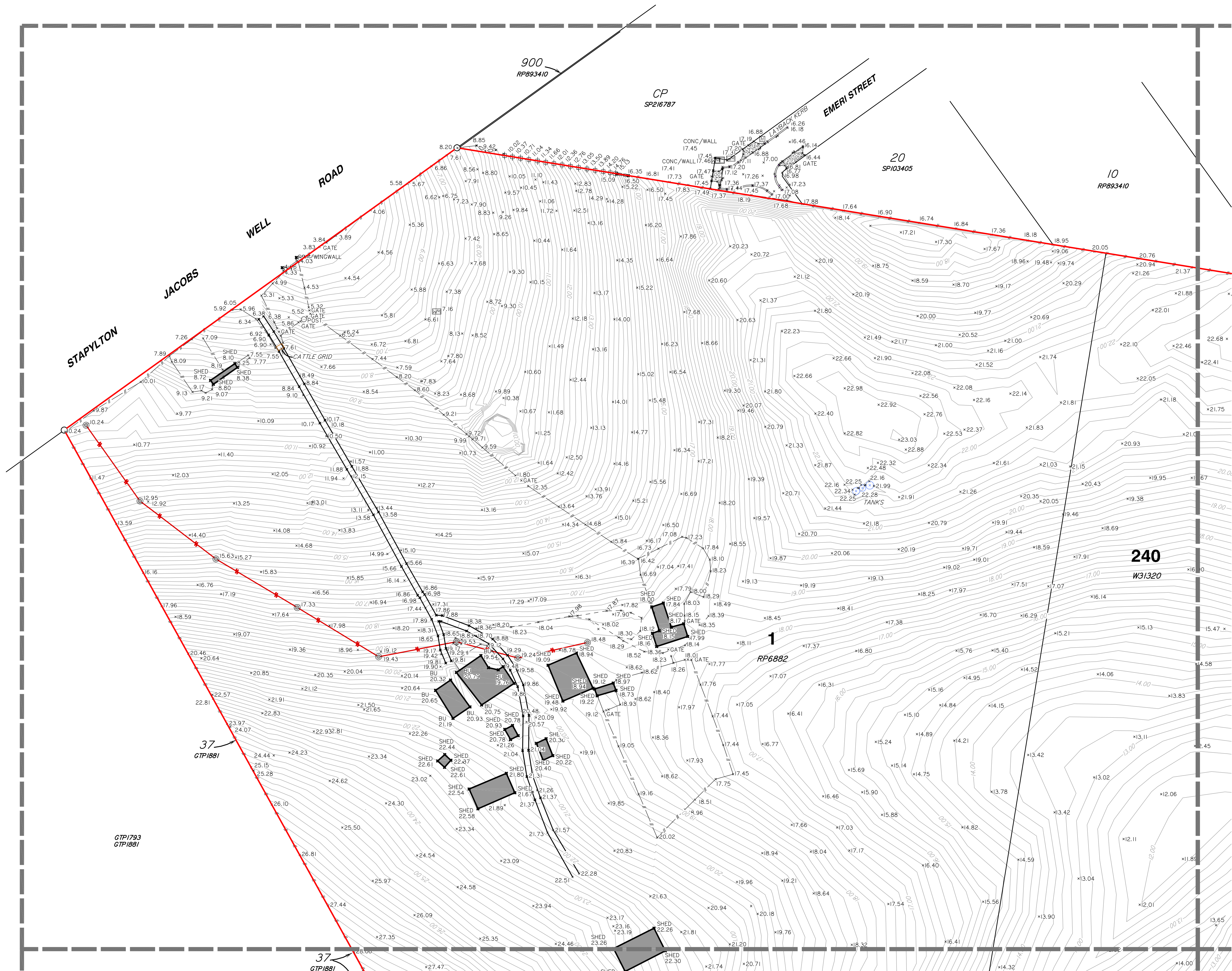
ACN 010 752 388

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Access Business Park
76 Business Street Yatala Q. 4207
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f: (07) 32875461

e: mail@gassman.com.au
or www.gassman.com.au

REFERENCE No. 5093-10
PLAN No. **5093 S CD 01**



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
- TELSTRA PIT
- MANHOLE
- STORMWATER MANHOLE
- GULLY TRAP
- WATER METER
- FIRE HYDRANT
- VALVE
- GATE
- BOLLARD
- CONCRETE
- EDGE OF BITUMEN
- FENCE
- OVERHEAD ELECTRICITY
- OPEN DRAIN
- RETAINING WALL
- EDGE OF GARDEN
- CONTOUR LEVEL

Notes

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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	IS133471	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	RL 22.169

Scale (on A1 original)	Designed
1:1000	Drawn
	Date Designed



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e: mail@gasman.com.au
w: www.gasman.com.au

REFERENCE No. **5093-10**

PLAN No. **5093 S CD 01**



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
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- CONCRETE
- EDGE OF BITUMEN
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- CONTOUR LEVEL

Notes

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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

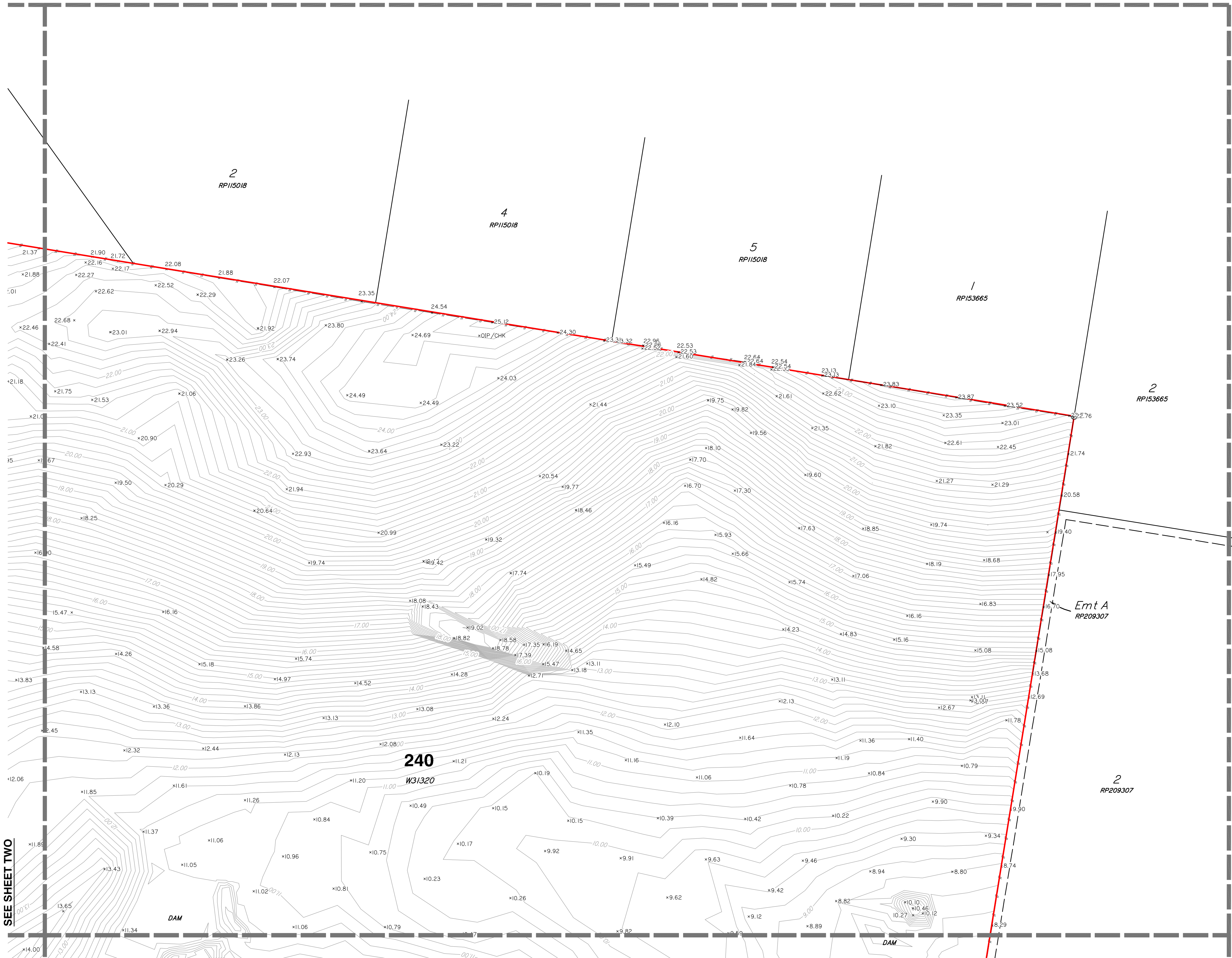
Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	15216853	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	RL 22.169
Scale (on A1 original)		Designed	
		Drawn	
		Date Designed	

gassman development perspectives planning design environment surveying

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Level 13
97 Creek Street Brisbane Q. 4000
t: (07) 32216732
f: (07) 32217308
Gold Coast and Logan Office
Access Business Park
76 Business Street Yatala Q. 4207
t: (07) 38073333
f: (07) 32975461
e: mail@gassman.com.au
w: www.gassman.com.au

REFERENCE No. **5093-10**

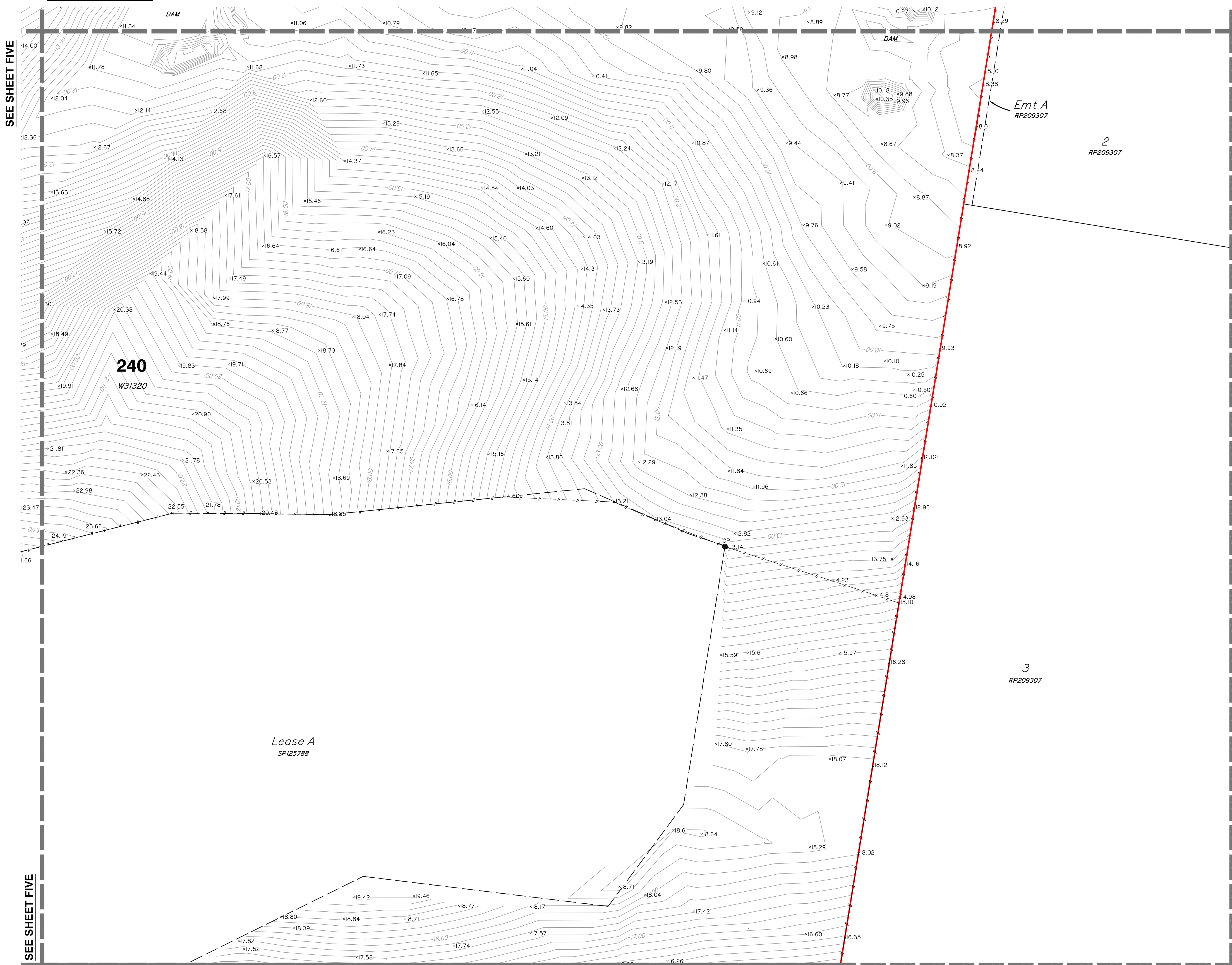
PLAN No. **5093 S CD 01**



Scale 1:1000 - Lengths are in Metres.

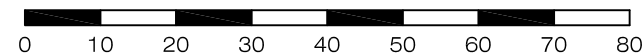


SEE SHEET THREE



SEE SHEET SIX

Scale 1:1000 - Lengths are in Metres.



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
- TELSTRA PIT
- MANHOLE
- STORMWATER MANHOLE
- GULLY TRAP
- WATER METER
- FIRE HYDRANT
- VALVE
- GATE
- BOLLARD
- CONCRETE
- EDGE OF BITUMEN
- FENCE
- OVERHEAD ELECTRICITY
- OPEN DRAIN
- RETAINING WALL
- EDGE OF GARDEN
- CONTOUR LEVEL

Notes

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Property boundaries have not been defined by this survey and have been compiled from IS216853.

Only those underground features and services as shown on this plan have been located by this survey. Prior to any construction, demolition or excavation on the site, the relevant authority should be contacted for the location of any further underground services and detailed location of all services.

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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	IS216853	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	
	RL 22.169		

Scale (on A1 original)	Designed
1:1000	Drawn
	Date Designed



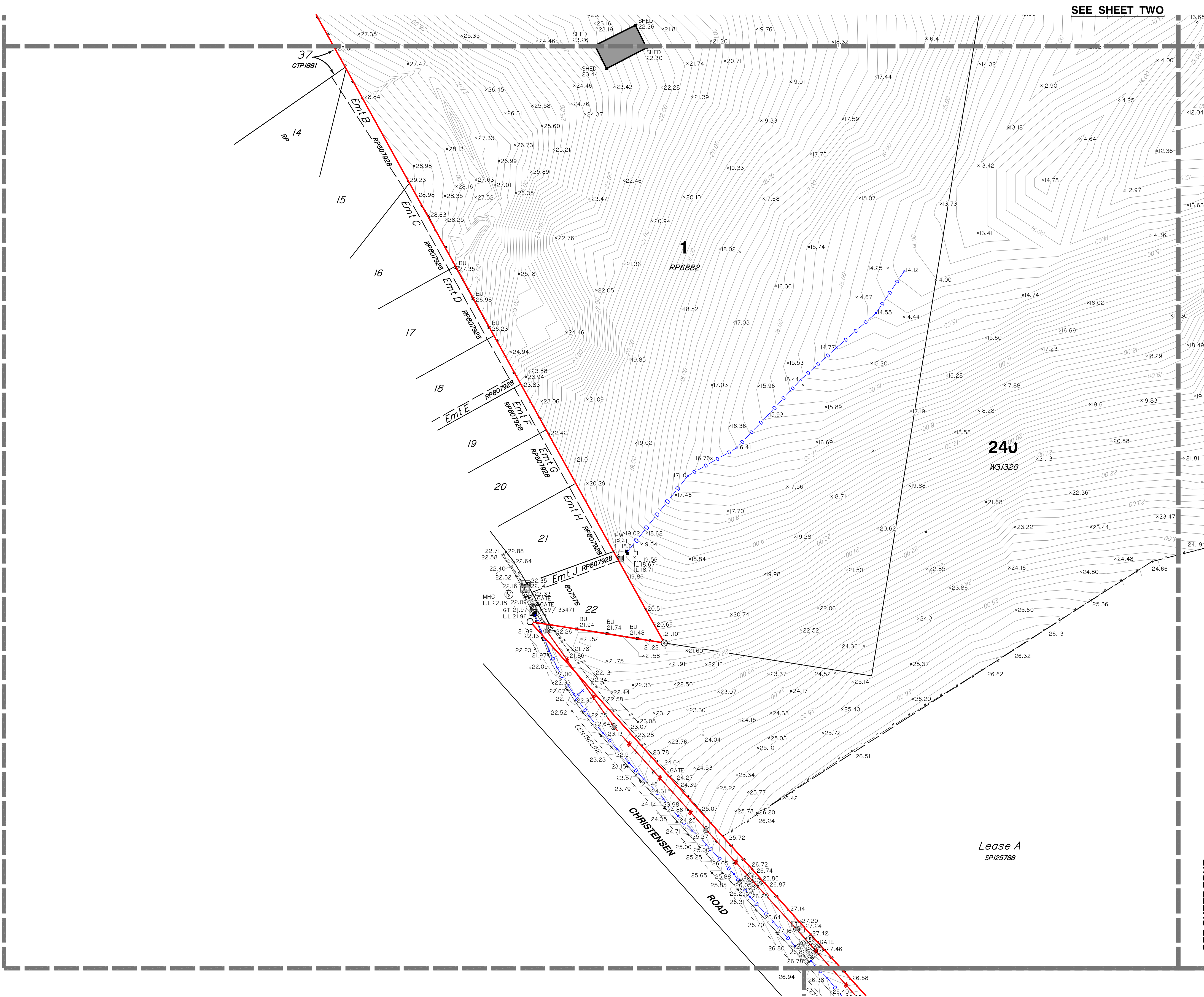
gassman
development
perspectives

planning
design
environment
surveying

ACN 010 752 388
Brisbane Office
Level 13
97 Creek Street Brisbane Q. 4000
t: (07) 32216732
f: (07) 32217308
Gold Coast and Logan Office
Access Business Park
76 Business Street Yatala Q. 4207
t: (07) 38073333
f: (07) 32975461
e: mail@gassman.com.au
w: www.gassman.com.au

REFERENCE No. **5093-10**

PLAN No. **5093 S CD 01**



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
- TELSTRA PIT
- MANHOLE
- STORMWATER MANHOLE
- GULLY TRAP
- WATER METER
- FIRE HYDRANT
- VALVE
- GATE
- BOLLARD
- CONCRETE
- EDGE OF BITUMEN
- FENCE
- OVERHEAD ELECTRICITY
- OPEN DRAIN
- RETAINING WALL
- EDGE OF GARDEN
- CONTOUR LEVEL

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Property boundaries have not been defined by this survey and have been compiled from IS216853.

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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	IS216853	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	RL 22.169

Scale (on A1 original)	Designed
1:1000	Date Designed



ACN 010 752 388
Brisbane Office
Level 13
97 Creek Street Brisbane Q. 4000
t: (07) 32216732
f: (07) 32217308
Gold Coast and Logan Office
Access Business Park
76 Business Street Yatala Q. 4207
t: (07) 38073333
f: (07) 32975461
e: mail@gassman.com.au
w: www.gassman.com.au

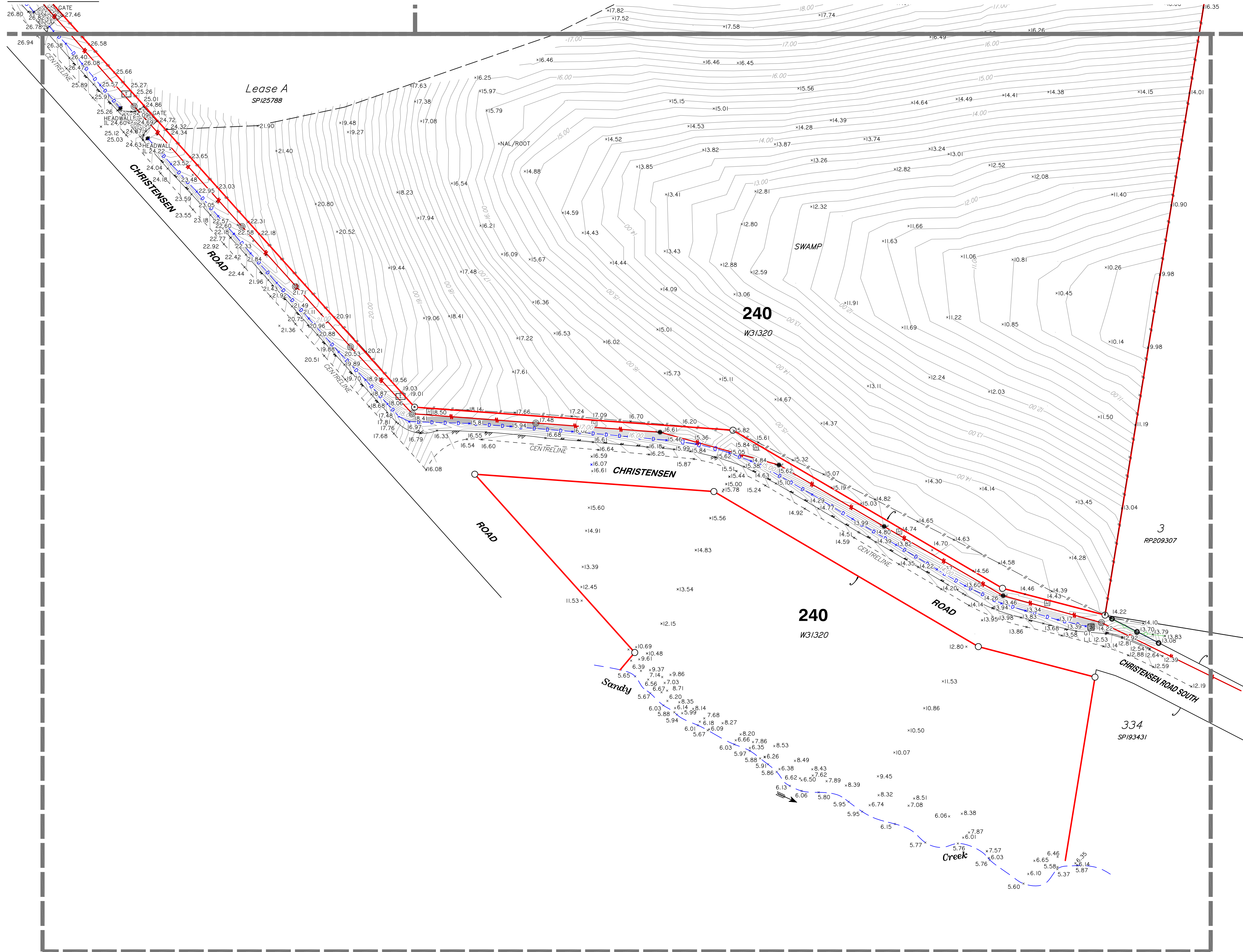
REFERENCE No. **5093-10**

PLAN No. **5093 S CD 01**



SEE SHEET FIVE

SEE SHEET FOUR



LEGEND

- PERMANENT MARK
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- ELECTRICITY PILLAR
- ELECTRICITY POLE
- ELECTRICITY POLE WITH LIGHT
- TELSTRA PIT
- MANHOLE
- STORMWATER MANHOLE
- GULLY TRAP
- WATER METER
- FIRE HYDRANT
- VALVE
- GATE
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- OPEN DRAIN
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Client

HESTER

Project

CONTOUR AND DETAIL PLAN

Over Lot 1 on RP6882 and Lot 240 on WD31320

Parish of **ALBERT**

County of **Ward**

Local Govt **GOLD COAST CITY COUNCIL**

Level Datum	A.H.D.	Date Surveyed	Jan 2011
Meridian	IS216853	Surveyor	A. Macdonald
Contour Interval	0.2	Drawn	S. Holt
F.B.	No	Date Drafted	02-02-2011
Origin	PSM 133471	Checked	
	RL 22.169		

Scale (on A1 original)	Designed
1:1000	Date Designed



ACN 010 752 388
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Level 13
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t: (07) 38073333
f: (07) 32975461
e: mail@gassman.com.au
w: www.gassman.com.au

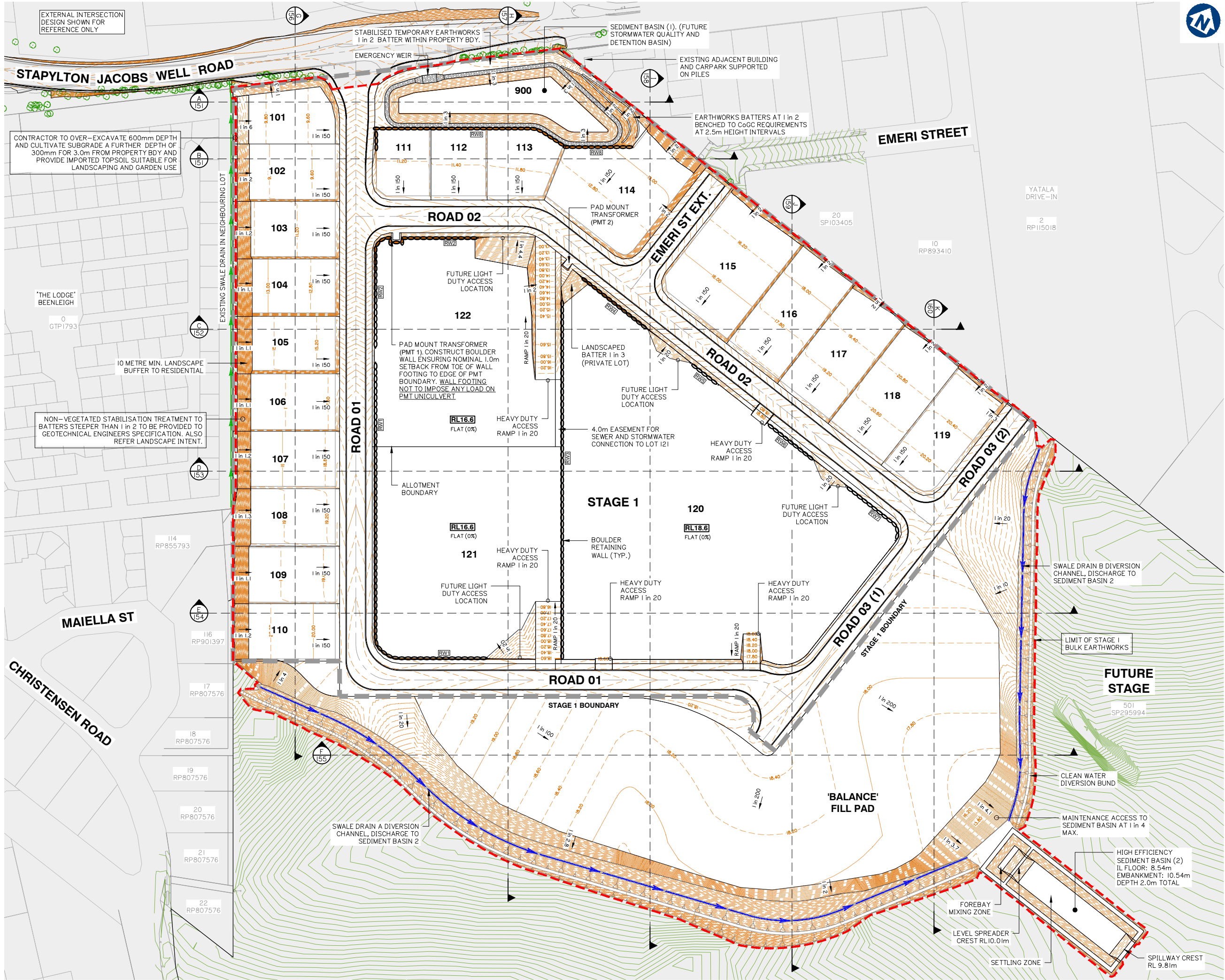
REFERENCE No. **5093-10**

PLAN No. **5093 S CD 01**

Scale 1:1000 - Lengths are in Metres.



Appendix C – Bulk Earthworks Strategy



Client:



FRASERS PROPERTY
(AUSTRALIA) PTY. LTD.

Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO
BE PRINTED IN COLOUR

RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
RL: -

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

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ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH GENERAL NOTES

DRAWING TITLE
FINISHED EARTHWORKS
CROSS SECTIONS SHEET
1 OF 11

Issue	Date	Original Issue Description	JRG	MG
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

SCALE IN METRES



1:1250 (FULL SIZE A1)
1:2500 (HALE SIZE A3)

Scale at A1: 1:1250

Designed: IG

Drafted: JRG

Approved: MG

RPEQ: 16939

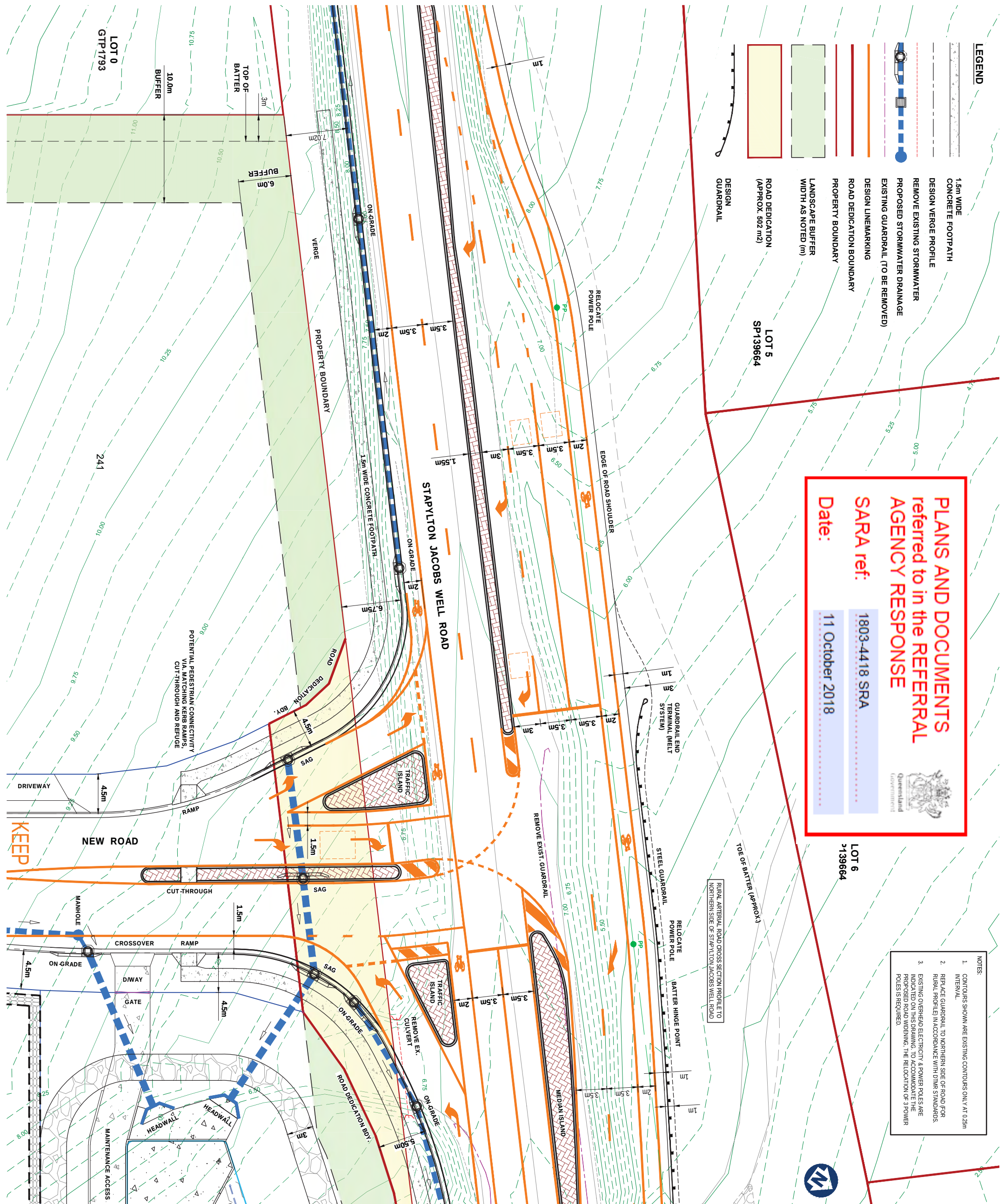
Signed:

Date: 20-12-2019

Drawing No:
5941 ENG BE1 150

Rev. No:
A

Appendix D – External Intersection Layout Plan



PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE

 Queensland
Government

SARA ref: 1803-4418 SRA

Date: 11 October 2018

1. CONTOURS SHOWN ARE EXISTING CONTOURS ONLY AT 0.25m INTERVAL.
2. REPLACE GUARDRAIL TO NORTHERN SIDE OF ROAD FOR RURAL PROFILE IN ACCORDANCE WITH OTHER STANDARDS.
3. EXISTING OVERHEAD ELECTRICITY & POWER POLES ARE INDICATED ON THIS DRAWING. TO ACCOMMODATE THE PROPOSED ROAD WIDENING, THE RELOCATION OF 3 POWER POLES IS REQUIRED.

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development
landscape perspectives



est. 1985

planning | environment | landscape | engineering | survey

T: 3607 3333 | F: 3607 5467 | www.gassman.com.au

Good Coast & Copan | 176 Burnmore Street, Victoria Q.D. | PO Box 392, Deeraght 4207

Client: KS8 Pty. Ltd

Site Address:

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

RPD:
Lot / Plan: 1 on RP6882

240 on W31320
4 on FP6843

Parish: Albert
County: Ward
Local Authority: City of Gold Coast
Level Datum: Council
Meridian: AHD
Contour Interval: IS216853
PSM: -
RL: -

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DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTES

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DRAWING TITLE

FUNCTIONAL ROAD
LAYOUT PLAN AND
STORMWATER DRAINAGE
LAYOUT PLAN
SHEET 1 OF 2

[illegible]

SCALE IN METRES



1:200 @ AT

Scale at A1:
1:200

Designed: IG

Dated: _____ IG

MG

Signed: _____

Date: 24-07-18

Drawing No: Rev. No:

5738 ENG BE1 SK-004

- NOTES:
1. CONTOURS SHOWN ARE EXISTING CONTOURS ONLY AT 0.25m INTERVAL.
 2. REPLACE GUARDRAIL TO NORTHERN SIDE OF ROAD FOR RURAL PROFILE IN ACCORDANCE WITH TM 9 STANDARDS.
 3. EXISTING OVERHEAD ELECTRICITY & POWER POLES ARE INDICATED ON THIS DRAWING. TO ACCOMMODATE THE PROPOSED ROAD WIDENING, THE RELOCATION OF 3 POWER POLES IS REQUIRED.

LOT 6
SP139664

LOT 7
SP139664

LEGEND

- 1.5m WIDE CONCRETE FOOTPATH
- DESIGN VERGE PROFILE
- REMOVE EXISTING STORMWATER
- PROPOSED STORMWATER DRAINAGE
- EXISTING GUARDRAIL (TO BE REMOVED)
- DESIGN LINEMARKING
- ROAD DEDICATION BOUNDARY
- PROPERTY BOUNDARY
- LANDSCAPE BUFFER WIDTH AS NOTED (m)
- ROAD DEDICATION (APPROX. 502 m2)
- DESIGN GUARDRAIL

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

SARA ref: 1803-4418 SRA

Date: 11 October 2018

60 STAPYLTON JACOBS WELL ROAD, STAPYLTON

RPD:

Lot / Plan:

1 on RP6882
240 on W31320
4 on RP6843

Parish:

Albert

County:

Ward

Local Authority:

City of Gold Coast

Level Datum:

AHD

Meridian:

IS216853

Contour Interval:

PSM:

RL:

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DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTES

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DRAWING TITLE
FUNCTIONAL ROAD LAYOUT PLAN AND STORMWATER DRAINAGE LAYOUT PLAN
SHEET 2 OF 2

AMENDMENTS AS PER OTHER REQUEST			
Rev	Date	Original Issue	Rev
B	24-07-18		16
A	16-07-18		15
Issue	Date	Rev	14

SCALE IN METRES

0 2 4 6 8 10m

1:200 @ A1

Scale at A1: 1:200

Designed:

Drafted:

Approved:

RPEC:

Signed:

Date:

Drawing No: 24-07-18

Rev. No: B

5738 ENG BE1 SK-005

Queensland
Government

1803-4418 SRA

11 October 2018

FILLED AS PART OF INTERSECTION
EARTHWORKS TO AVOID LOCALISED
PONDING (TYPICAL FOR ALL SECTIONS)



KS8 Pty. Ltd

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

Lot / Plan: 1 on RP6882
240 on W3132C
4 on RP6843

Local Authority: City of Gold Coast

Level Datum: AHD

Contour Interval

RL:

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DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTES

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TYPICAL CROSS SECTIONS
OF STAPYLTON JACOBS
WELL ROAD

[illegible]

SCALE IN METRES



Scale at A1: 1:100

Designed:

Drafted:

Approved: _____ MG

RPEQ:	16939
-------	-------

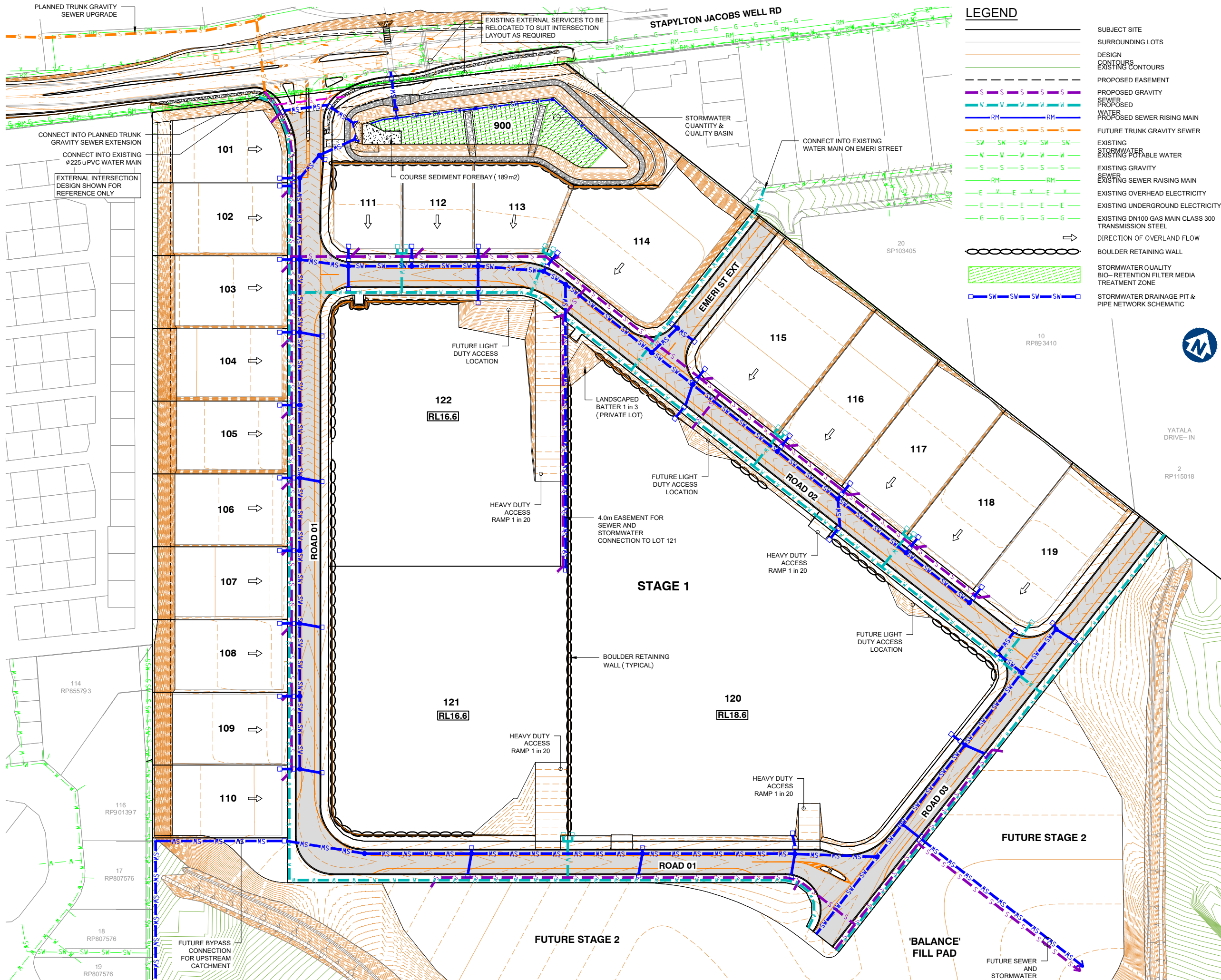
Signed: _____

Date: 24-07-18

Drawing No: Rev. No:

0700 LIND BL 1 CR-000

Appendix E – Civil Servicing Strategy Plan



LEGEND

- SUBJECT SITE
- SURROUNDING LOTS
- DESIGN CONTOURS
- EXISTING CONTOURS
- PROPOSED EASEMENT
- PROPOSED GRAVITY SEWER
- PROPOSED STORMWATER DRAIN
- PROPOSED SEWER RISING MAIN
- FUTURE TRUNK GRAVITY SEWER
- EXISTING STORMWATER
- EXISTING POTABLE WATER
- EXISTING GRAVITY SEWER
- EXISTING SEWER RAISING MAIN
- EXISTING OVERHEAD ELECTRICITY
- EXISTING UNDERGROUND ELECTRICITY
- EXISTING DN100 GAS MAIN CLASS 300 TRANSMISSION STEEL
- DIRECTION OF OVERLAND FLOW
- BOULDER RETAINING WALL
- STORMWATER QUALITY BIO-RETENTION FILTER MEDIA TREATMENT ZONE
- STORMWATER DRAINAGE PIT & PIPE NETWORK SCHEMATIC

Client:



Project:

M38 INDUSTRIAL
PARK YATALA

Site Address:

60 STAPYLTON JACOBS WELL
ROAD, STAPYLTON QLD 4207

THIS DRAWING IS INTENDED TO
BE PRINTED IN COLOUR

RPD:

Lot: 501
Plan: SP295994
Local Authority: CITY OF GOLD COAST
COUNCIL
Level Datum: AHD
Meridian: -
Contour Interval: -
PSM: -
RL: -

ISSUED FOR APPROVAL
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DRAWING TITLE

STAGE 1 - ENGINEERING
SERVICING STRATEGY
PLAN

Issue	Date	Original Issue Description	JRG	MG
A	20-12-2019	ORIGINAL ISSUE	JRG	MG

SCALE IN METRES

0 20 40 60 80 100
1:1000 (FULL SIZE A1)
1:2000 (HALE SIZE A3)

Scale at A1: 1:1000

Designed:	IG
Drafted:	JRG
Approved:	MG
RPEQ:	16939
Signed:	
Date:	20-12-2019

Drawing No: 5941 ENG SP 001
Rev. No: A

STAGE 1 - ENGINEERING SERVICING STRATEGY PLAN

Appendix F – Dial Before You Dig Search Results

30/01/2018

Company: Gassman Development Perspectives
Mr Mitchell Gassman
PO Box 392
Beenleigh
QLD 4207

mitchell@gassman.com.au

Dear Mr Mitchell Gassman

Sequence Number: 68110313
Worksite Address: Stapylton Jacobs Well Road
stapylton
QLD 4207

RE: REQUEST FOR APA GROUP (APA) UNDERGROUND DIAL BEFORE YOU DIG

Dear Sir/Madam

In response to the above enquiry we wish to confirm that APA **operates underground plant** (Mains and / or Services) at or in the vicinity of the above address.

Please check that the following map represents the area you requested - if the area is not correct please contact our Dial Before You Dig Officer - (08) 8115 4500. If works are proposed adjacent to any underground plant operated by APA please ensure compliance with the attached "DUTY OF CARE"

Please find enclosed the following information in support of the above: -

1. A location map of the **suburb** the service is in and an A4 location map showing the **status** of APA underground plant (Mains and / or Services) adjacent to the subject site
2. DUTY OF CARE statement which forms **an integral part** of any information supplied by APA

For **GAS EMERGENCIES 24 HOURS - 1800 GAS LEAK (1800 427 532)**

Please note that as work on APA underground plant is ongoing any information supplied on their status can only be considered current for **30 days from the date of this response**. Expired locations, i.e., over 30 days from the date of this response, require a new Dial Before You Dig request to validate location information.

Should you have any questions with **regards to the attached information** please contact our Dial Before You Dig officer - (08) 8115 4500.

For any excavation works, including vacuum excavations, an "Authority to Work" Permit may be required and a Site Watch may need to be scheduled.

A minimum of 5 business days' notice is required to process permit applications. Permit applications can be made by: -

Post: Permit Applications QLD, PO Box 885 Hamilton Central QLD 4007 or

Email: permitsqld@apa.com.au or Phone: (07) 3215 6700 though an application will most likely be required

Charges may apply for Site Watch requests. Your sequence number may be requested when making your booking, please have this available when you request either a mains location or site watch.

For other enquiries please contact your gas retailer

To find out who your retailer is call 1800 657 567

Warning: if there are high or transmission pressure gas mains present in the vicinity of your area of interest, an APA employee must be in attendance during any excavation within 3 metres of high or transmission pressure mains, and an "Authority to Work" permit must be issued prior to work commencing.

Please contact us for a permit to work request if you believe your work is within this zone, by completing the "Authority to Work" request form attached and sending to APA. 5 days' notice is required prior to the commencement of any excavation to assess and allocate resources. Contact phone numbers are shown at the end of the notice of location.

Please Note: For some DBYD enquiries, you might receive 2 responses from the APA Group. Please read both responses carefully as they will relate to different assets. It is your responsibility to action all requirements set out in APA Group responses.

Please take some time to review the entire response document and check the information supplied and please let us have any feedback by sending an email to DBYDNetworksAPA@apa.com.au or contacting us direct on (08) 8115 4500.

Yours faithfully

Dial Before You Dig Officer
APA Group

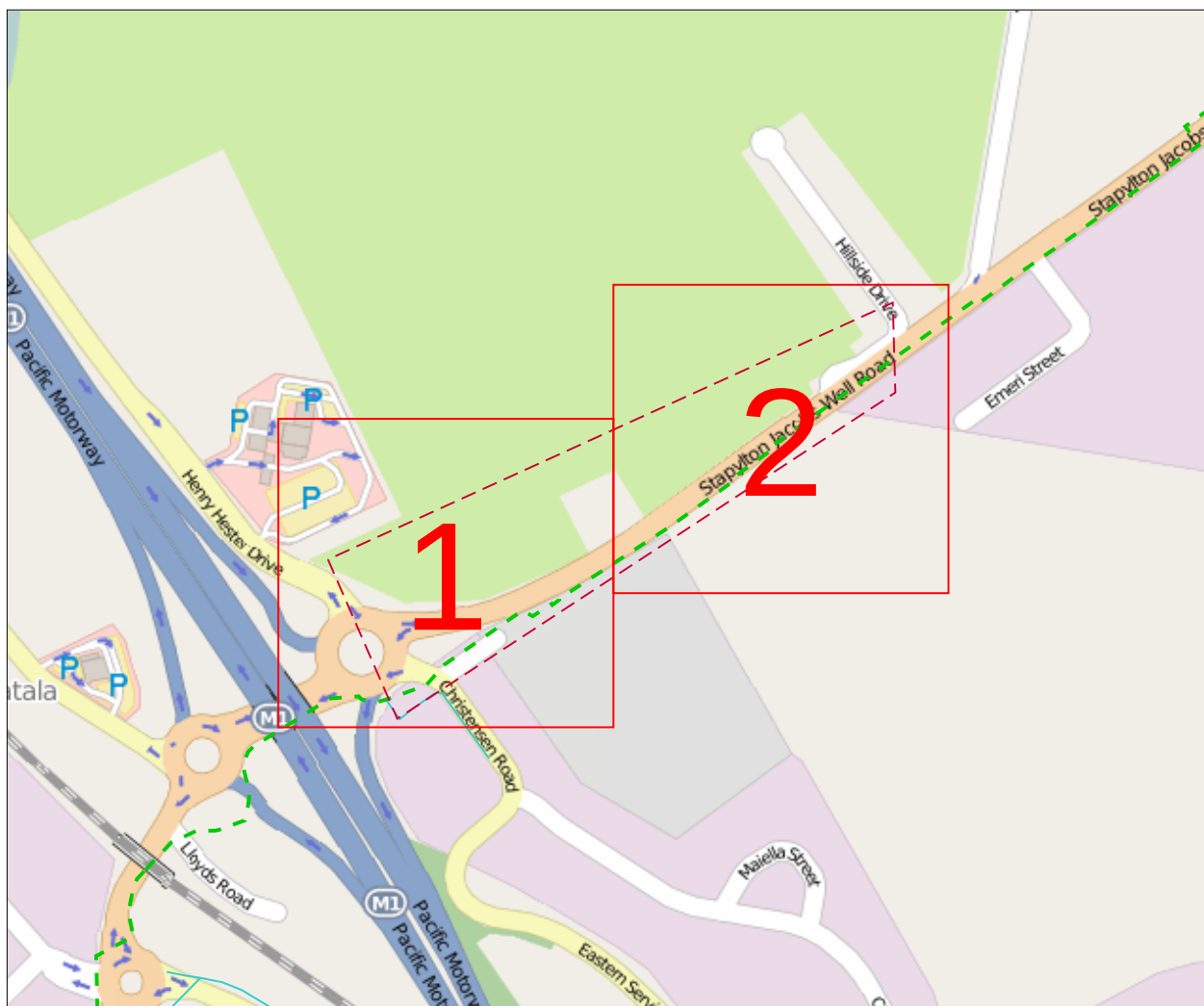
Email DBYDNetworksAPA@apa.com.au
Ph. (08) 8115 4500

30/01/2018

SCALE: DO NOT SCALE

REF NO: 68110313

As work on APA underground plant is ongoing any drawing with an issue date of more than 30 days previous can no longer be considered valid. All persons planning civil works on any site are advised to contact APA to confirm location. All underground gas pipelines are the property of APA & are not to be accessed by unauthorised persons. All care is taken with preparation of the drawings & no responsibility is accepted for errors or omissions



Enquiry: 68110313

Papersize: A4 Scale: 1: 6000

0 0.07km



Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by



This maps is created in colour and shall be printed in colour

Legend

Distribution Main - Class 900 Transmission - Class 600 Transmission - Class 300 Transmission - High Pressure Steel - High Pressure PE Trunk - High Pressure/ Class 500 - Medium Pressure PE/ Nylon - Medium Pressure (Allgas) - Low Pressure - LPG - TLP - Proposed/ Under Construction - Idle Gas Pipe - Abandoned Gas Pipe - Sleeve	Gas Assets and Fittings - Gate Station - Regulator Station - Block/ Emergency Valve - Isolation Valve - Test Point - Syphon - Anode - Pipeline Marker - Trace Wire Point - Reducer - Pipe Connector/ Tee - Pipe Connector - End Cap	Pipe Materials - CI Cast Iron - CU Copper - GAL Wrought Galvanised Iron - PGAL Poly Coated Wrought Galvanised Iron - ST Steel - NY/ NY11 Nylon - PE Polyethylene - MDPE Medium Density Polyethylene - HDPE High Density Polyethylene - DN Nominal Diameter - OD Outside Diameter
---	---	--

Examples: 40PE in DN80 CI 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
63PE INS 63mm Polyethylene inserted in another pipe

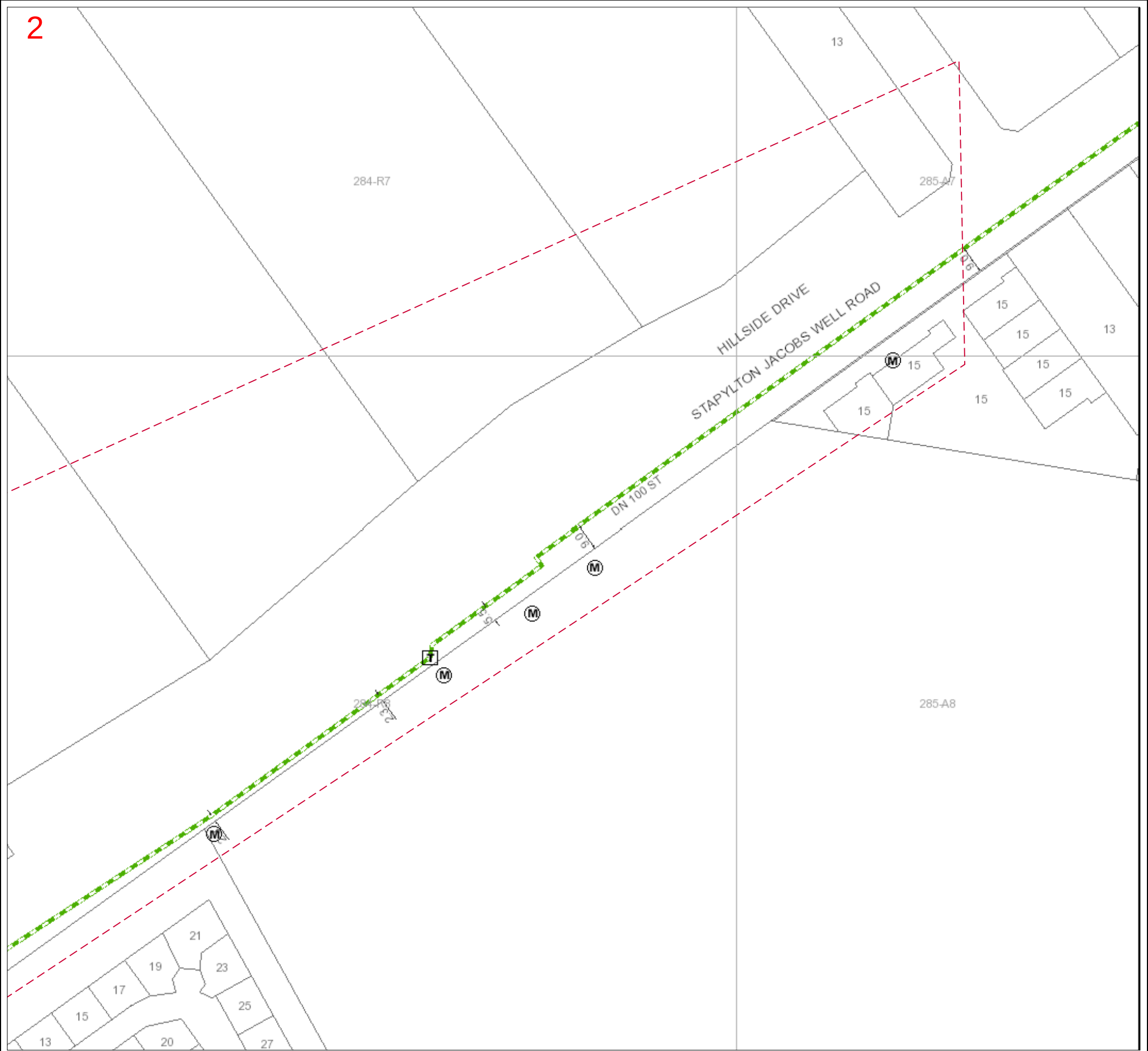
Line/ Polygon Request

APA Group does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. APA Group is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.



Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by
apa

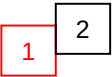


68110313 Map Sheet: 2

Papersize: A3 Scale: 1: 1000



Map Key:



This maps is created in colour and shall be printed in colour

Legend

Distribution Main	Gas Assets and Fittings	Pipe Materials
- Class 900 Transmission - Class 600 Transmission - Class 300 Transmission - High Pressure Steel - High Pressure PE Trunk - High Pressure/ Class 500 - Medium Pressure PE/ Nylon - Medium Pressure (Allgas) - Low Pressure - LPG - TLP - Proposed/ Under Construction - Idle Gas Pipe - Abandoned Gas Pipe - Sleeve	- Gate Station - Regulator Station - Block/ Emergency Valve - Isolation Valve - Test Point - Syphon - Anode - Pipeline Marker - Trace Wire Point - Reducer - Pipe Connector/ Tee - Pipe Connector - End Cap	- CI Cast Iron - CU Copper - GAL Wrought Galvanised Iron - PGAL Poly Coated Wrought Galvanised Iron - ST Steel - NY/ NY11 Nylon - PE Polyethylene - MDPE Medium Density Polyethylene - HDPE High Density Polyethylene - DN Nominal Diameter - OD Outside Diameter
Examples: 40PE in DN80 CI 63PE INS	40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve 63mm Polyethylene inserted in another pipe	
Line/ Polygon Request		

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

Working Around Gas Assets: Duty of Care and Responsibilities

It is illegal to interfere or tamper with gas infrastructure.

Offenders who interfere or tamper with gas infrastructure may be prosecuted under relevant legislation and there are very serious penalties for such offences

"Gas infrastructure" or "infrastructure" in this document refers to any infrastructure or property owned or operated by APA Group including, but not limited to natural gas mains, services and regulator/meter stations or regulator pits.

1. Planning Your Work

- a. The constructor must:
 - i. Request plans of APA Group infrastructure for a particular location at a reasonable time before construction begins (at least 5 business days);
 - ii. Design for minimal impact and ensure protection of APA Group infrastructure, this includes networks managed by APA on behalf of Australian Gas Networks and Allgas; and
 - iii. Contact APA Group if their infrastructure is in any way affected by planned construction activities.

2. Before You Start Work

- a. Please Note: You will be responsible to pay for the repair of **any damage by you to gas assets**.
- b. You must obtain **Dial Before You Dig (DBYD)** documentation before any on-site construction or excavation commences. This document is to be read in conjunction with the Dial Before You Dig plans and other relevant documentation.
APA Group will provide free site plans if an APA Group infrastructure location request is made to APA on **(08) 8115 4500**
- c. If DBYD documents indicate you will be working within 3m of a high pressure or transmission gas pipeline, you must complete and submit the **Authority to Work Request** provided with your DBYD documentation **five (5) business days** prior to commencing the work. Requests **under** five (5) business days will incur extra charges.
- d. APA Group shall assess your Authority to Work Request and will inform you if a Site Watch is required. A Site Watch involves the presence of an APA representative at site to advise on locating and working around the asset. Where on-site location advice is provided, the constructor is responsible for all hand digging (potholing) to visually locate and expose APA Group infrastructure. Vacuum excavations may only be used if permission is granted by APA and if it is used on high pressure mains Site Watch will be required. **Site Watch services are charged at an hourly rate.**
- e. The principal contractor for the site must provide APA Group with a written construction methodology for all works impacting or encroaching on APA infrastructure. All construction methodology documents will be reviewed by APA Group prior to the commencement of site works. Construction methodology documents must be submitted as part of an Authority to Work Request (send to permitsqld@apa.com.au).
- f. Site Plans
 - i. Plans and/or details provided by APA Group through DBYD or otherwise are current for one (1) month from the date of dispatch and should be disposed of by shredding or any other secure disposal method after use.
 - ii. APA Group retains copyright in all plans and details provided in connection with any request.
 - iii. APA Group plans or other details are provided for the use of the applicant, its servants, employees, contractors and agents, and must not be used for any unauthorised purpose.
 - iv. APA Group plans are pipe indication diagrams only and indicate the presence of plant in the general vicinity of the geographical area shown. Exact ground cover and alignments cannot be given with any certainty as such levels can change over time.
 - v. APA Group, its servants, employees, or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and/or details so supplied to the applicant/constructor, its servants, employees, contractors and/or agents, and the applicant/constructor agrees to indemnify APA Group against any claim or demand for any such loss or damage.
 - vi. The constructor is responsible for all infrastructure damage occasioned to APA Group infrastructure.
 - vii. APA Group reserves all rights to recover compensation for loss or damage caused by interference or damage, including consequential loss and damages to its property and gas infrastructure.
 - viii. All care is taken in the preparation of location drawings and plans, but NO responsibility is accepted by APA Group for errors or omissions.

3. Working in the Vicinity of a Gas Pipeline

a. Excavation near Gas Mains and Services

PLEASE NOTE: Unless otherwise approved, mechanical excavation is not permitted above, or within 600mm of either side of APA Group infrastructure.

- i. **Location of Gas Mains and Services:** Examining the DBYD documentation and other plans is not sufficient as reference points may change from the time of installation and recording on documentation. You MUST use appropriately qualified plant locators to accurately locate and prove the position of all assets and then validate these positions prior to commencing work. For all work to be done within 3.0 metres of APA Group infrastructure, the constructor is required to hand dig (pothole) and expose the plant, hence proving its exact location before work can commence. Vacuum excavation can cause failure of some types of gas mains and therefore APA Group must be contacted prior to any vacuum excavation.
Please note that new APA Group gas mains generally have a plastic warning tape or lightweight plastic board buried above the pipe but this is not the case for older mains or when pipe is laid by means of boring or located in conduit.
 - ii. **IMPORTANT NOTE: Not all gas services (i.e. pipe from gas main to a gas meter in an individual property) are captured on APA Plans. Gas services shown on plans are indicative only and do not pinpoint the exact location of APA's asset. A gas service may also cross a road to reach a property. To confirm the presence of a gas service, please contact the APA DBYD number below for further information.**
 - iii. **Installation of Utilities Parallel to Gas Mains and Services:** If construction work is being undertaken parallel to APA Group gas mains, then hand digging (potholing) at least every 4 m is required to establish the location of all gas mains. Nominal locations must be confirmed before work can commence. A minimum clearance of 600mm must be maintained from gas mains unless otherwise approved by APA. If an excavation exceeds the depth of the gas mains and it is likely that the covers or bedding material around the pipes will move, approval must be sought from APA Group's Capital Works team.
 - iv. **Installation of Utilities Across Gas Mains and Services:** A minimum clearance of 300mm above and below and APA Group gas mains must be maintained unless otherwise approved by APA. If the width or depth of the excavation is such that the gas mains will be exposed or unsupported, then APA Group must be contacted to determine whether the gas mains should be taken out of service, or whether they need to be protected or supported. Protective cover strips when removed must be replaced under APA Group supervision.
 - v. **Exposed Gas mains and Services:** Exposure of APA infrastructure shall be limited to potholing for location purposes. Any other exposure of pipe is not permitted unless expressly approved by APA Group. Exposed gas pipes must be protected by the constructor against the effects of heat by shielding or covering with a suitable material. Heating of exposed plastic pipes is dangerous. If depth of cover is compromised in any way due to works, please contact APA immediately.
 - vi. **Heavy machinery Operation over Gas Mains and Services:** Where heavy "Crawler" or "Vibration" type machinery is operated over the top of gas mains, a minimum cover of 750mm to the gas mains must be maintained using load bearing protection whilst the machinery is in operation.
 - vii. **Directional Drilling Near Gas Mains and Services:** When drilling parallel to gas mains, trial holes must be carefully hand dug at least every 4m to prove the actual location of the conduits/pipes before using drilling machinery. Where it is required to drill across the line of gas mains, the actual location of the gas mains must first be proven by the constructor by hand digging. A trench must be excavated one metre from the side of the gas mains where the auger will approach to ensure a minimum clearance of 600mm for gas mains can be maintained unless otherwise approved by APA.
 - viii. **Explosives:** Clearances must be obtained from APA Group's Networks Engineering Manager for use of explosives in the vicinity of gas mains. Please contact the APA Group.
- b. **Damage Reporting:** All damage to conduits and pipes and any other gas infrastructure and property must be reported to APA Group no matter how insignificant the damage appears to be. Even very minor damage to protective coverings can lead to eventual failure through corrosion. All work in the vicinity of damaged infrastructure should cease and the area should be vacated until a clearance to continue work has been obtained from an APA Group officer. Please contact the Emergency number below to report damage.
- c. **Solutions and Assistance:** If it is determined that APA Group infrastructure is likely to be impacted or encroached upon by planned construction, APA Group must be contacted to arrange for possible engineering solutions. If APA Group relocation or protection works are part of the agreed solution, then payment to APA Group for the cost of this work will be the responsibility of the principal contractor. APA Group will provide an estimated quotation for work on receipt of the order number before work will proceed.
- d. **Reinstatement:** APA assets affected by third party works as highlighted above are to be reinstated as per APA requirements, potentially including but not limited to; warning tape/marker board, soft bedding/backfill materials, trench dimensions, depth of cover, trace wire for PE mains, compaction requirements, concrete protection, and surface re-instatement.

4. Contacting APA

GAS EMERGENCIES 24 HRS 1800 GAS LEAK (1800 427 532)	GAS PLANT RELOCATIONS APA CAPITAL WORKS PH: 07 3215 6709 FAX: 07 3215 6699 capitalworksqldnetworks@apa.com.au	APA GROUP GAS ASSET LOCATIONS TEAM (PERMITS OFFICE) PH: 07 3215 6700 FAX: 07 3215 6699 permitsqld@apa.com.au	DIAL BEFORE YOU DIG SUPPORT PH: (08) 8115 4500
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HIGH PRESSURE GAS DISTRIBUTION MAINS "AUTHORITY TO WORK" REQUEST

N.B. THIS IS NOT A PERMIT TO WORK

SITE ADDRESS:

SUBURB: UBD MAP REF:

DBYD Sequence Number: Date of DBYD Enquiry:

(Note: Only valid enquiries will be accepted and the currency of DBYD requests will affect your permit period. APA Group's DBYD requests are valid for 30 days only. Enquiries may need to be renewed and a new application may be required)

COMMENTS:

BROAD DESCRIPTION OF WORK (please provide any approvals from APA Group related to these works)

WORK TO BE CARRIED OUT:

- | | | |
|----------|---|--------------------------|
| Class 1. | Location | |
| | Works crossing a high pressure gas mains | ☐ |
| Class 2. | Location | |
| | Works within 3 metres of a high pressure gas mains | ☐ |
| Class 3. | Location | |
| | Works involving large excavations that would cause ground movement, vibrations or blasting beyond 3m of a high pressure gas mains | ☐ |
| Class 4. | Location | |
| | Works within 1m of gas service or connection to industrial gas meter | ☐ |

DETAILS OF WORK INVOLVED (Tick Applicable)

- | | | | |
|-----------------------------------|--------------------------|---------------------------|--------------------------|
| Excavation | ☐ | Change to surface level | ☐ |
| Service crossing (Gas CONNECTION) | ☐ | Boring | ☐ |
| Proving (Dial Before You Dig) | ☐ | Blasting | ☐ |
| Earthworks | ☐ | Road Construction/Change? | ☐ |
| Vacuum Excavation | ☐ | Other (give details) | ☐ |

Relevant drawings, Block Plans etc, attached Yes ☐ No ☐

PROPOSED DATES AND TIMES

From:

To:

Excavation / / 20... am/pm / / 20... am/pm

Backfill / / 20... am/pm / / 20... am/pm

Insurance Cover – Current Level None ☐ \$5M ☐ \$10M ☐ \$20M ☐ Other ☐ _

NOTES

1. This Authority to Work applies only to work in the vicinity of the Gas Mains. It does not authorise work near or on the Gas Mains itself.
2. A minimum of 5 business days must be allowed between receipt by APA Group of this Request and a response. However, more time for notification may be necessary.
3. For Class 1 and Class 2 classifications, this application must be accompanied by a detailed sequence of events, outlining all aspects of work involved and work is not permitted until an Authority to Work is issued.
4. For class 1 and 2 Dial Before You Dig, APA Group will arrange for an inspector to be on site as necessary during the work. An inspector must be present at all times for works involving excavation within 1m of the Gas Mains. APA Group will advise the requirement for an inspector for other works within 3m of the Gas Mains.
5. The applicant is responsible for any damage resulting from the work and all consequential damages and losses arising from such damage and therefore must insure against every liability of the contractor in respect of or arising out of any loss of life, loss of or damage to property of person (both real and personal), arising out of or in any way connected to this permit.

Such insurance must be arranged for an indemnity of not less than \$20 Million unless otherwise agreed.

Permit Requested By:(print name).....Signature:Date .../.../....

Company:..... Postal Address:.....

Phone No:..... Fax number..... Email.....

Requestors PO Number..... Site Contact Details: Name.....

Site Contact Number.....

Principal Contractors Details(if required).....

Principal Contractors Contact details:.....

Please be advised;
Under the Work Health and Safety Act 2011, each work place has an obligation to comply to Workplace Health and Safety Regulations and Codes of Practice.

APA Group brings to your attention Work Health and Safety Regulations 2011, Chapter 4: Hazardous Work. Failure to comply to the above regulation may result in APA Group reporting the non-compliance to Workplace Health and Safety.

Office use only

Received: Date .../.../....

Site Watch required? **Yes/No** (please circle)

Pipeline Officer:

(print name).....Signature:Date: .../.../....

Further information can be requested via:

Post: **Permit Applications QLD**

PO Box 885 Hamilton Central QLD 4007

Phone: (07) 3215 6700 though an application will most likely be required

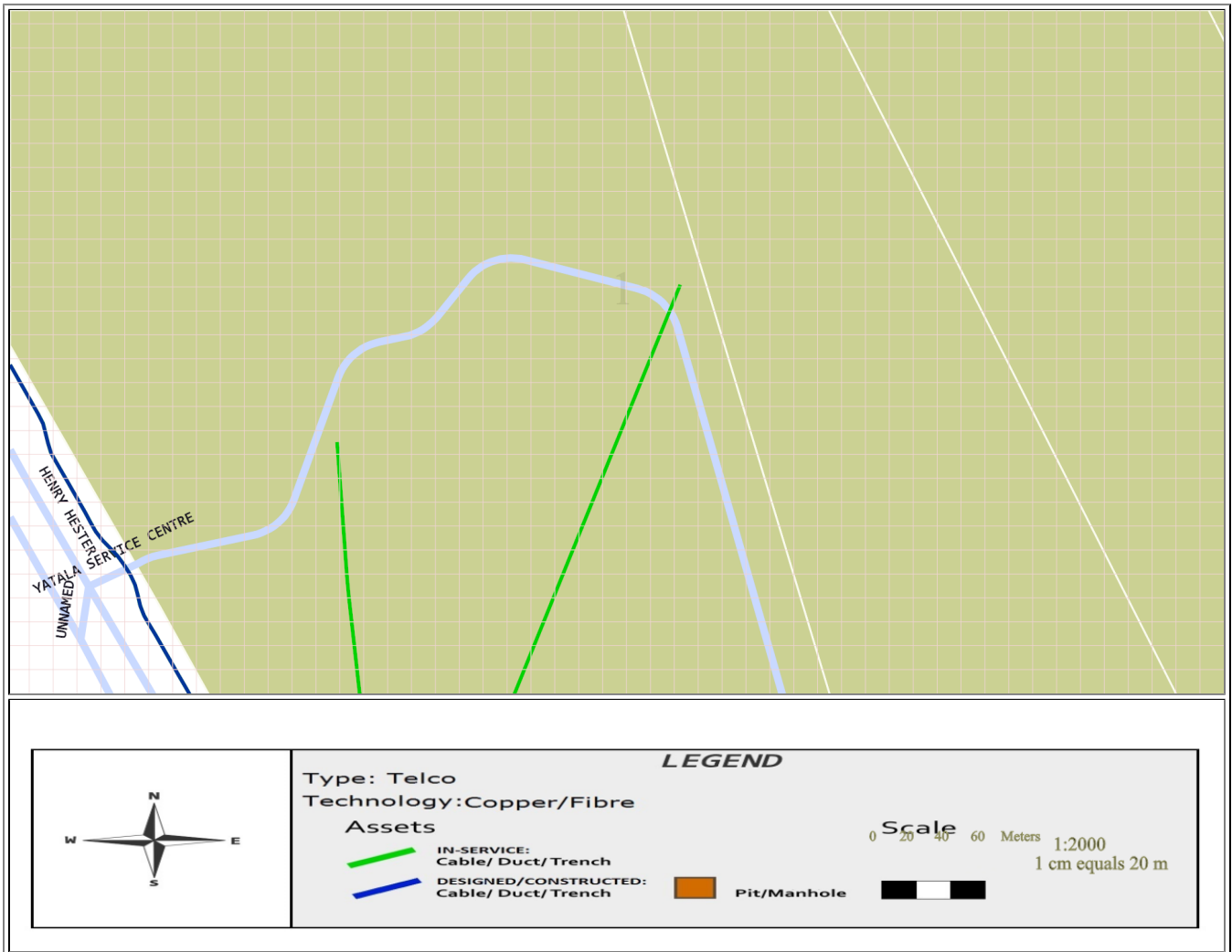
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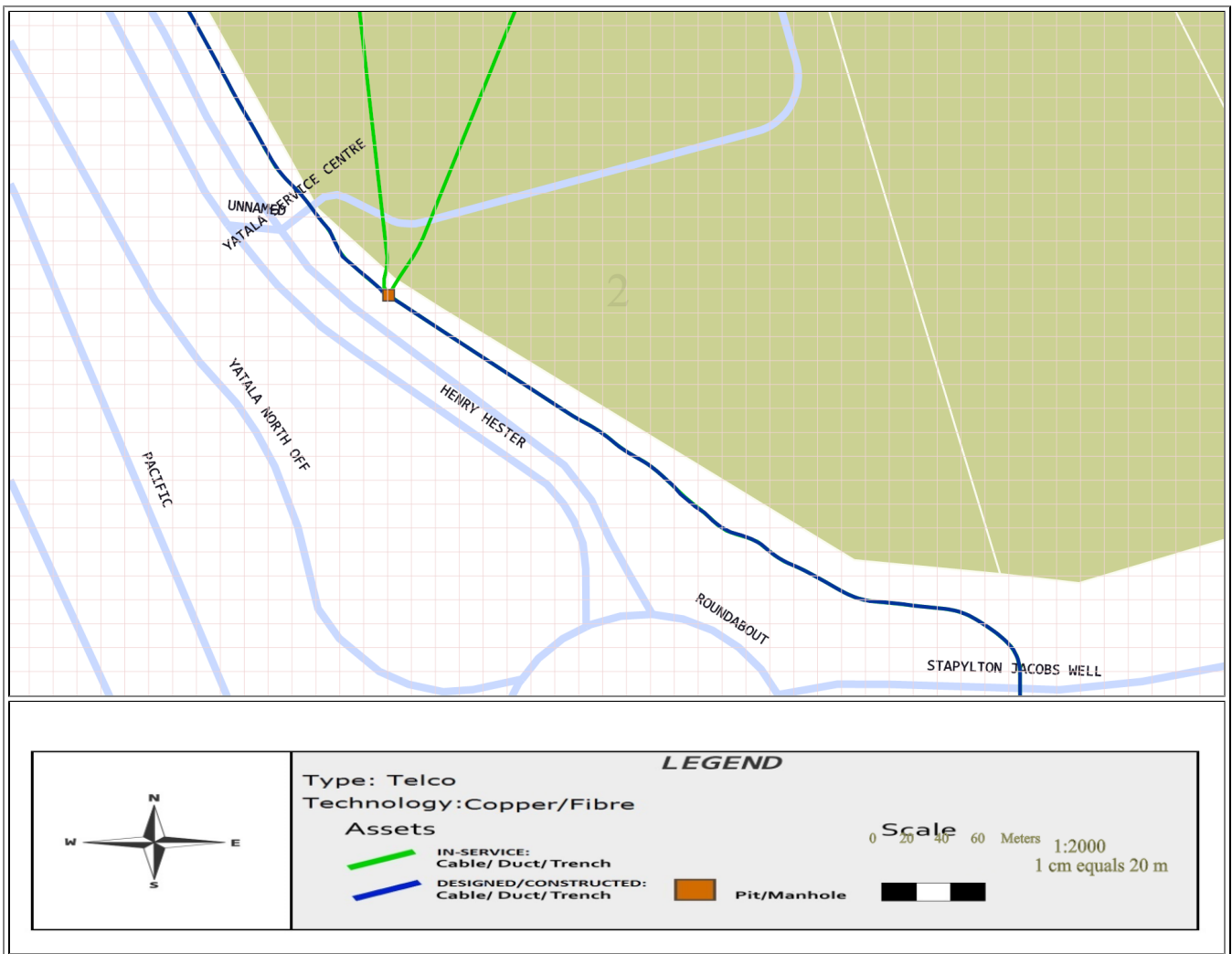
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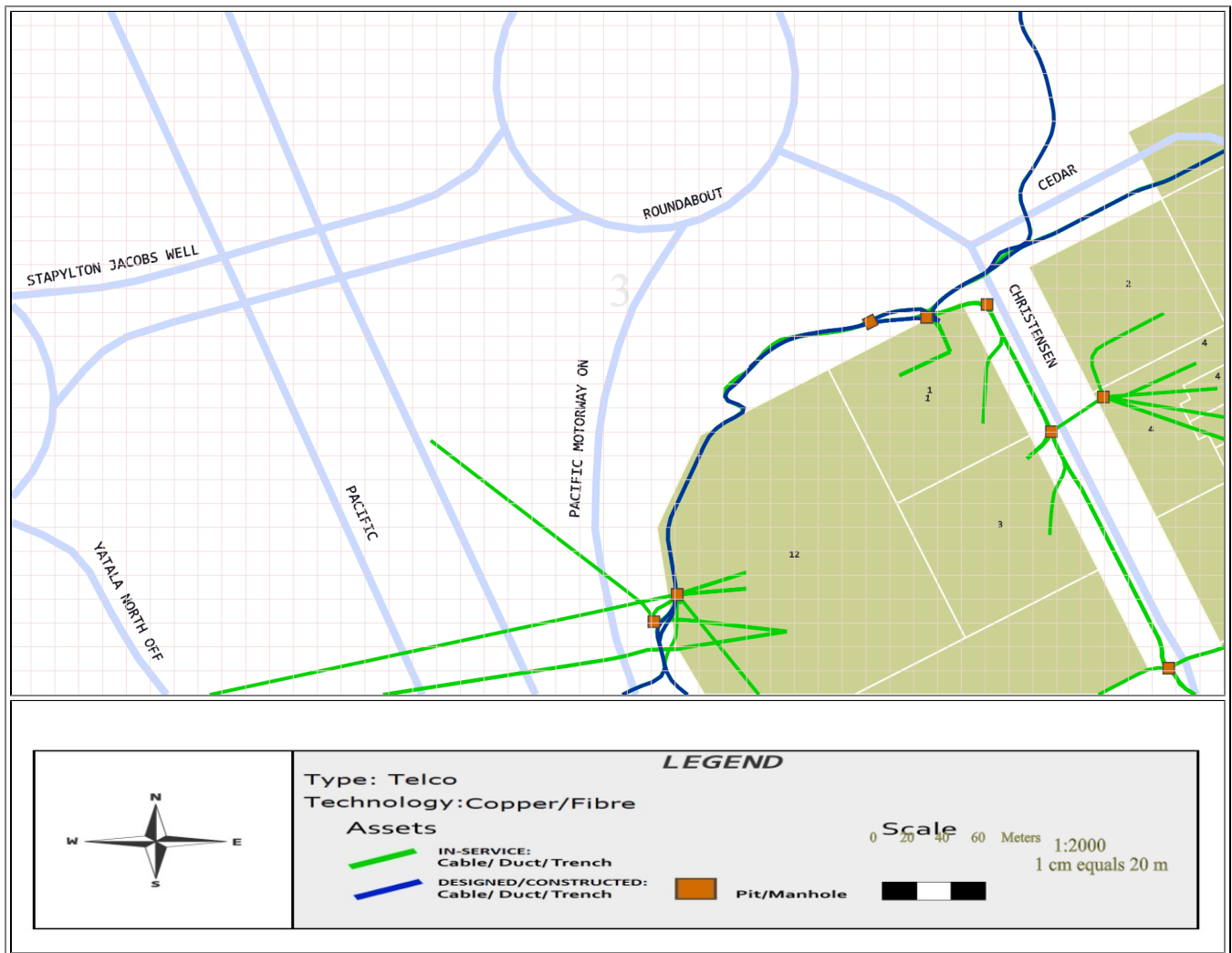
Issue Date:	30/01/2018	 DIAL BEFORE YOU DIG www.1100.com.au
Location:	Stapylton Jacobs Well Road, stapylton, QLD-4207	

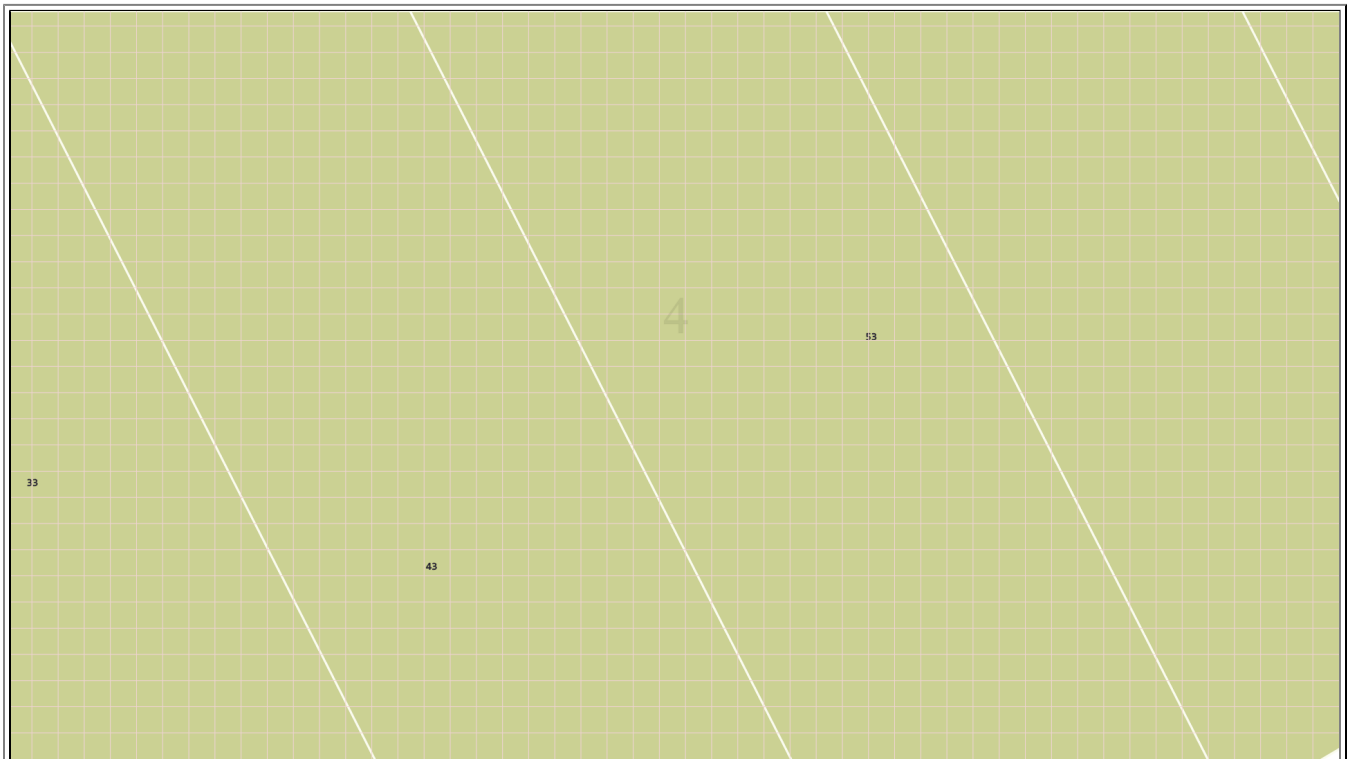
1	4	7
2	5	8
3	6	9

		LEGEND Type: Telco Technology: Copper/Fibre Assets  IN-SERVICE: Cable/ Duct/ Trench  DESIGNED/CONSTRUCTED: Cable/ Duct/ Trench  Pit/Manhole 		Scale 0 20 40 60 Meters 1:2000 1 cm equals 20 m
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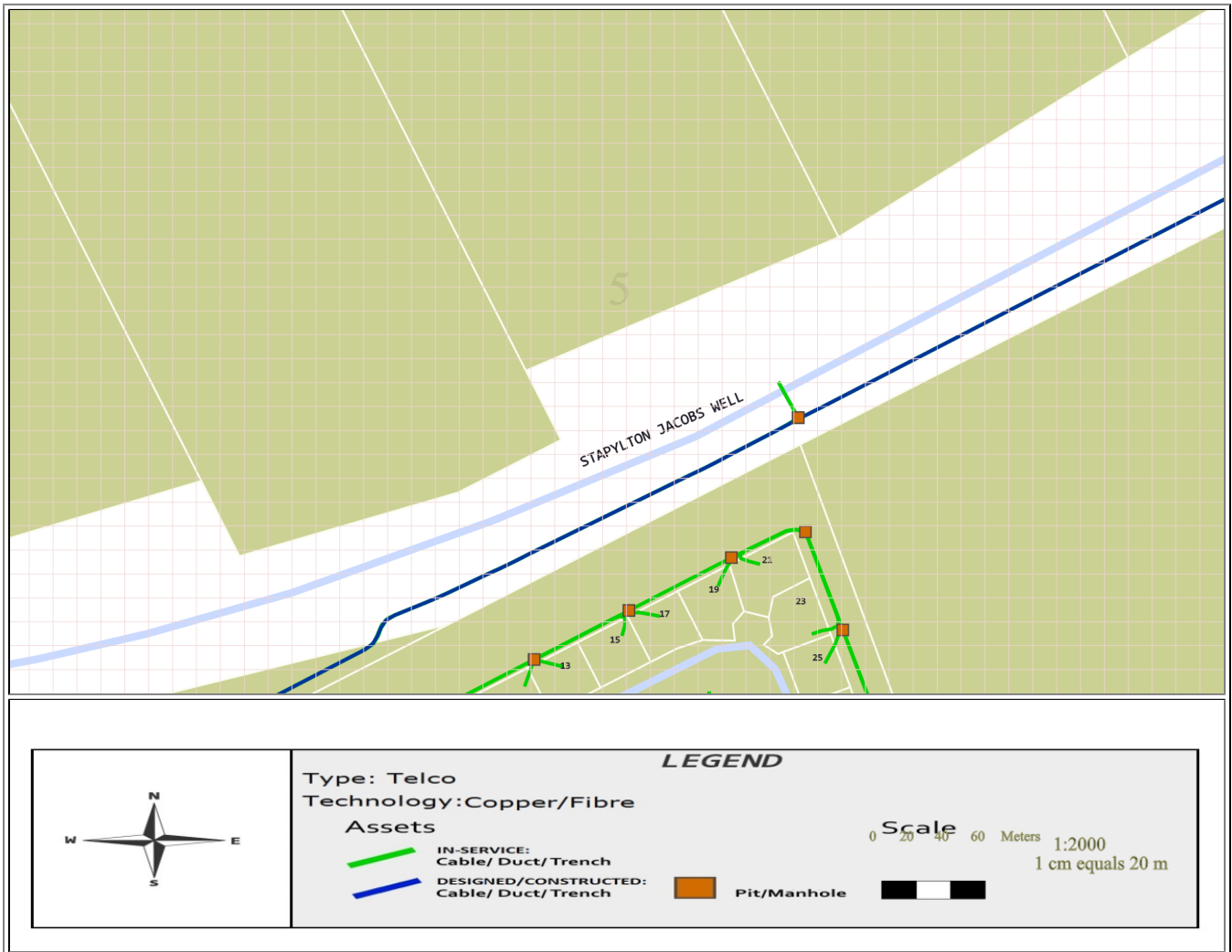


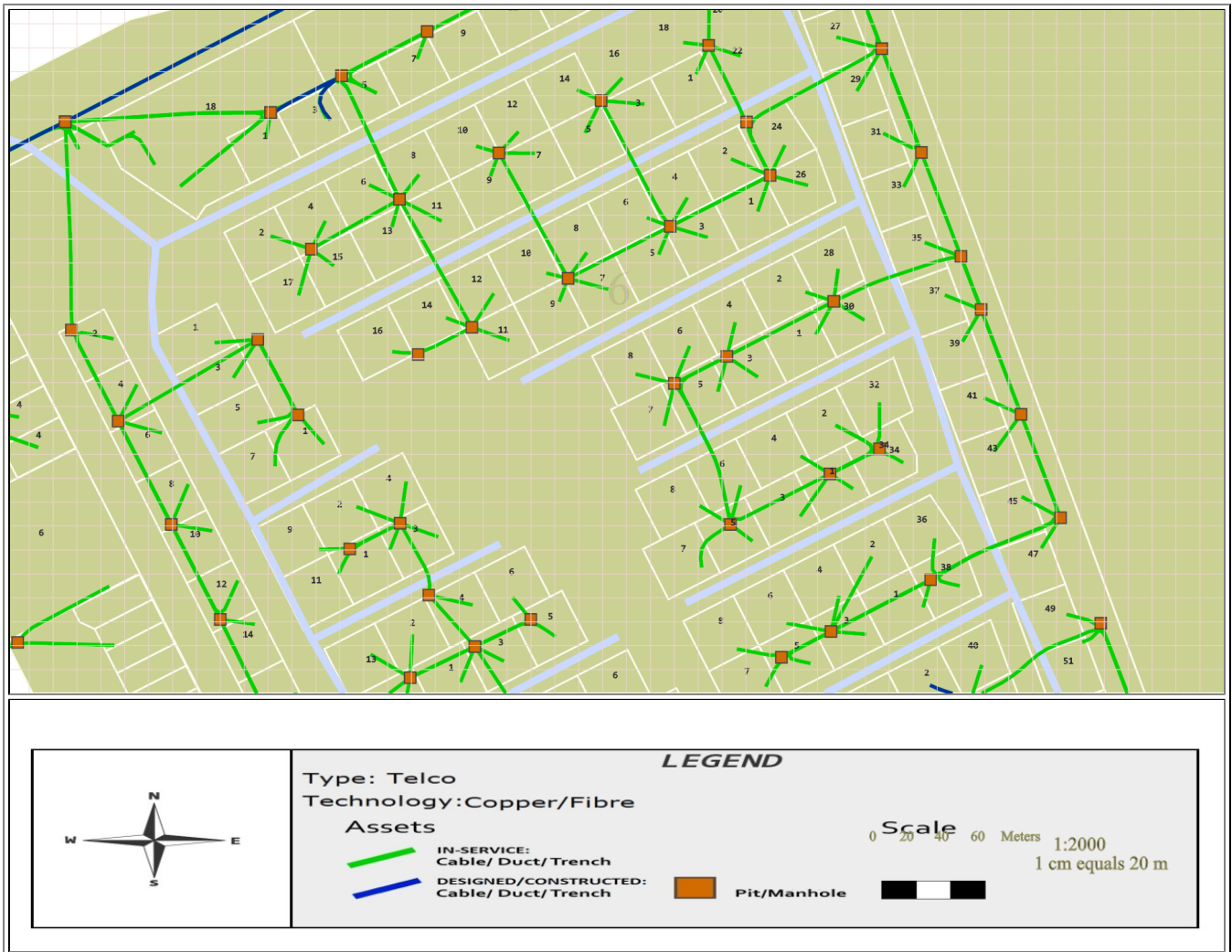


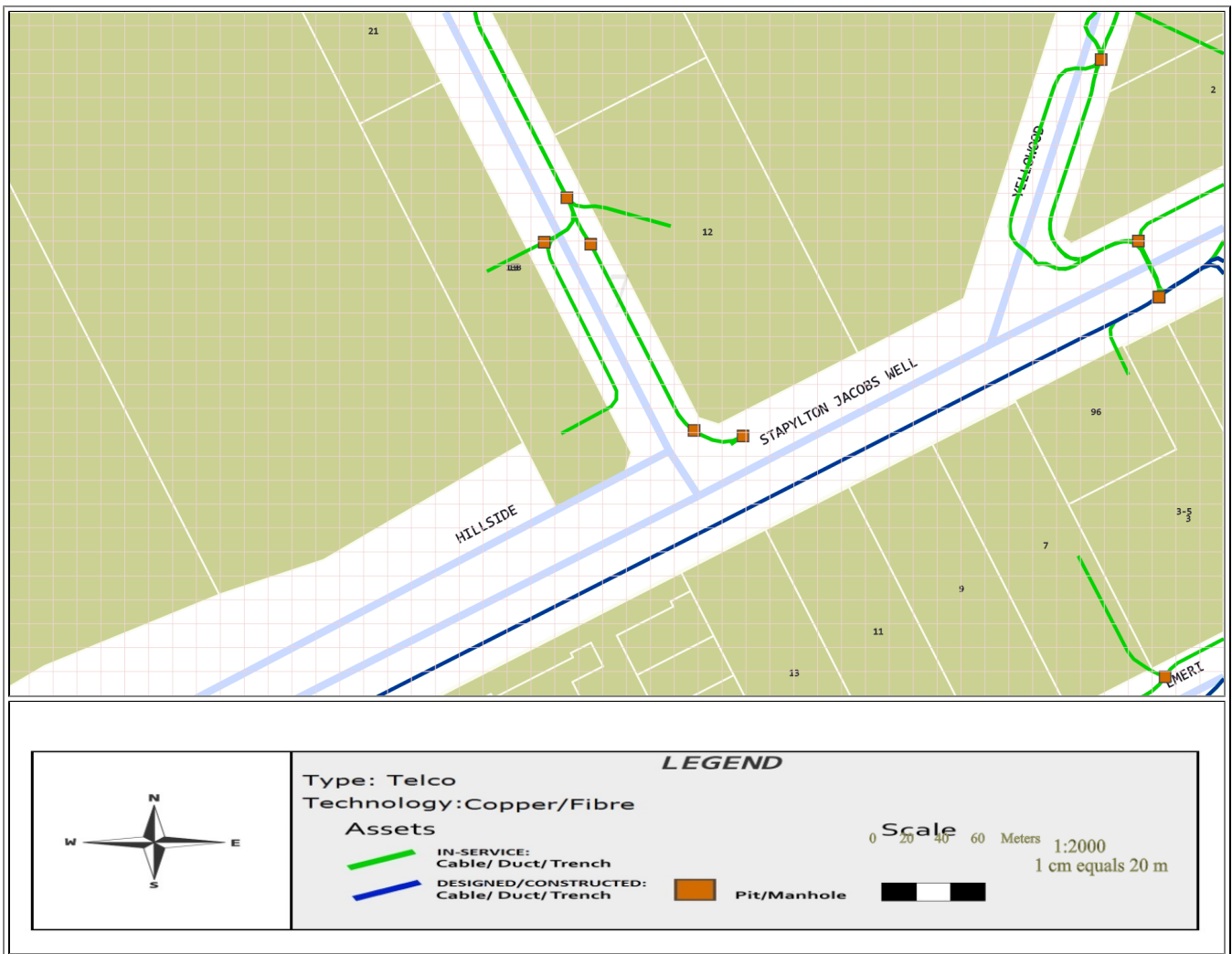


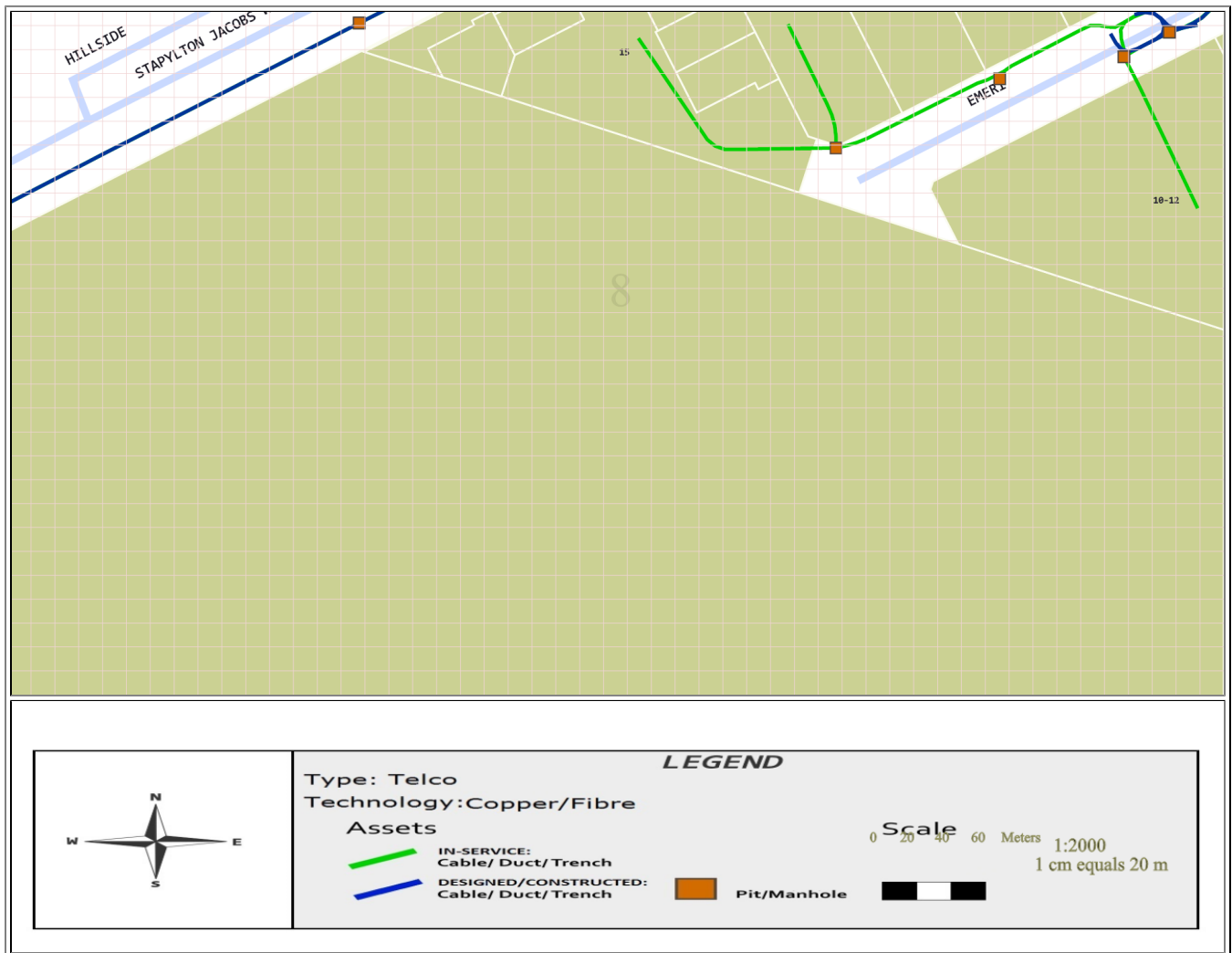


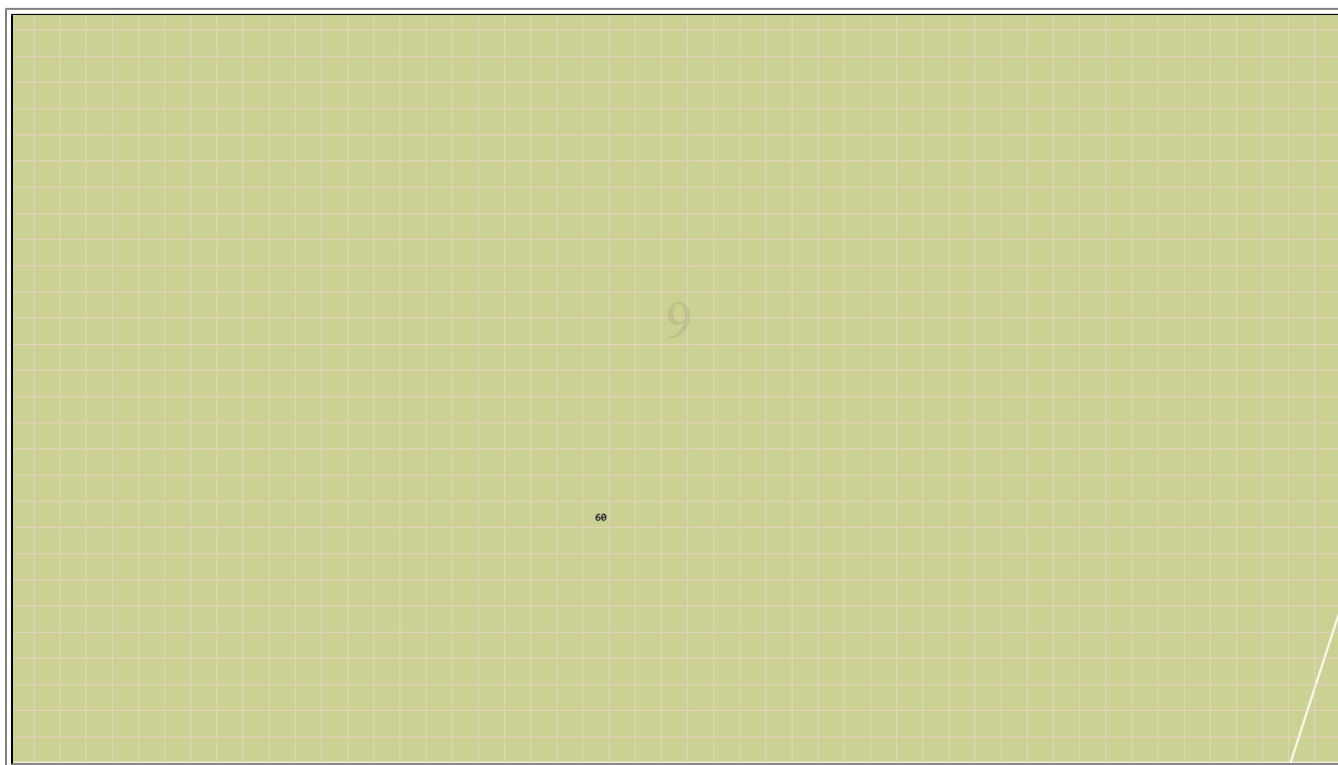
	LEGEND	
	Type: Telco Technology: Copper/Fibre	
	Assets  IN-SERVICE: Cable/ Duct/ Trench  DESIGNED/CONSTRUCTED: Cable/ Duct/ Trench  Pit/Manhole	
Scale 0 20 40 60 Meters 1:2000 1 cm equals 20 m		











Emergency Contacts

You must immediately report any damage to **nbn**[™] network that you are/become aware of. Notification may be by telephone - 1800 626 329.

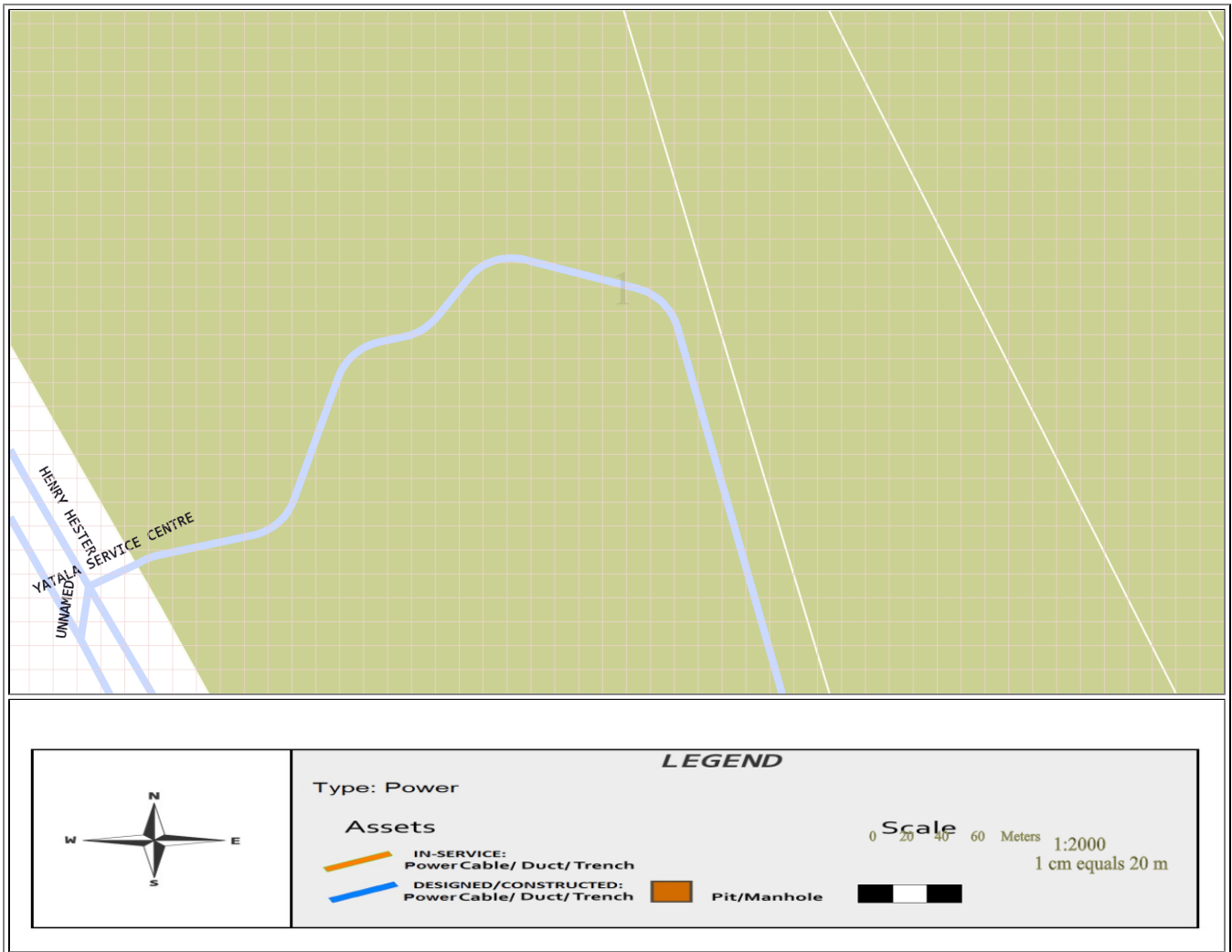


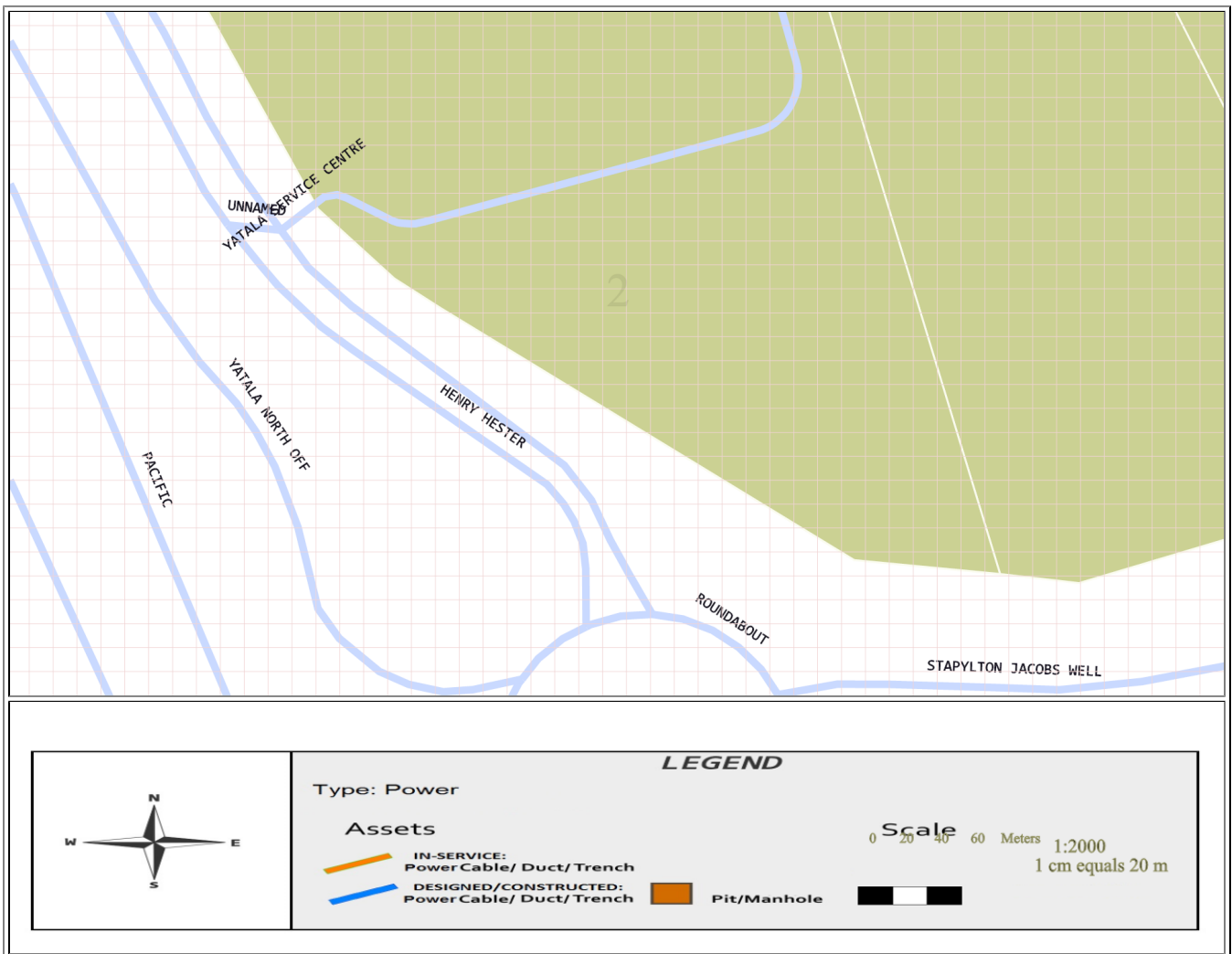
Indicative Plans

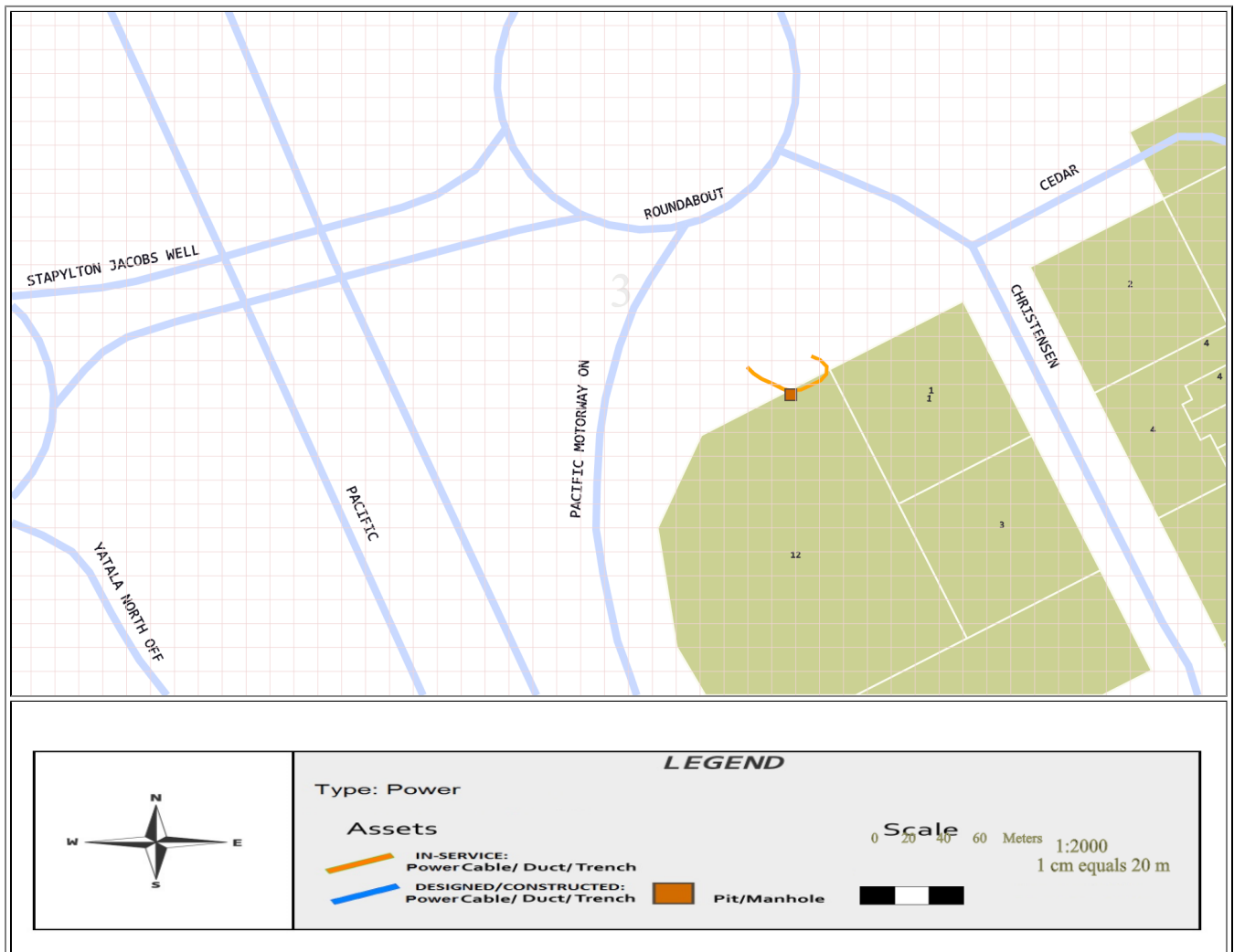
Issue Date:	30/01/2018	 DIAL BEFORE YOU DIG www.1100.com.au
Location:	Stapylton Jacobs Well Road, stapylton, QLD-4207	

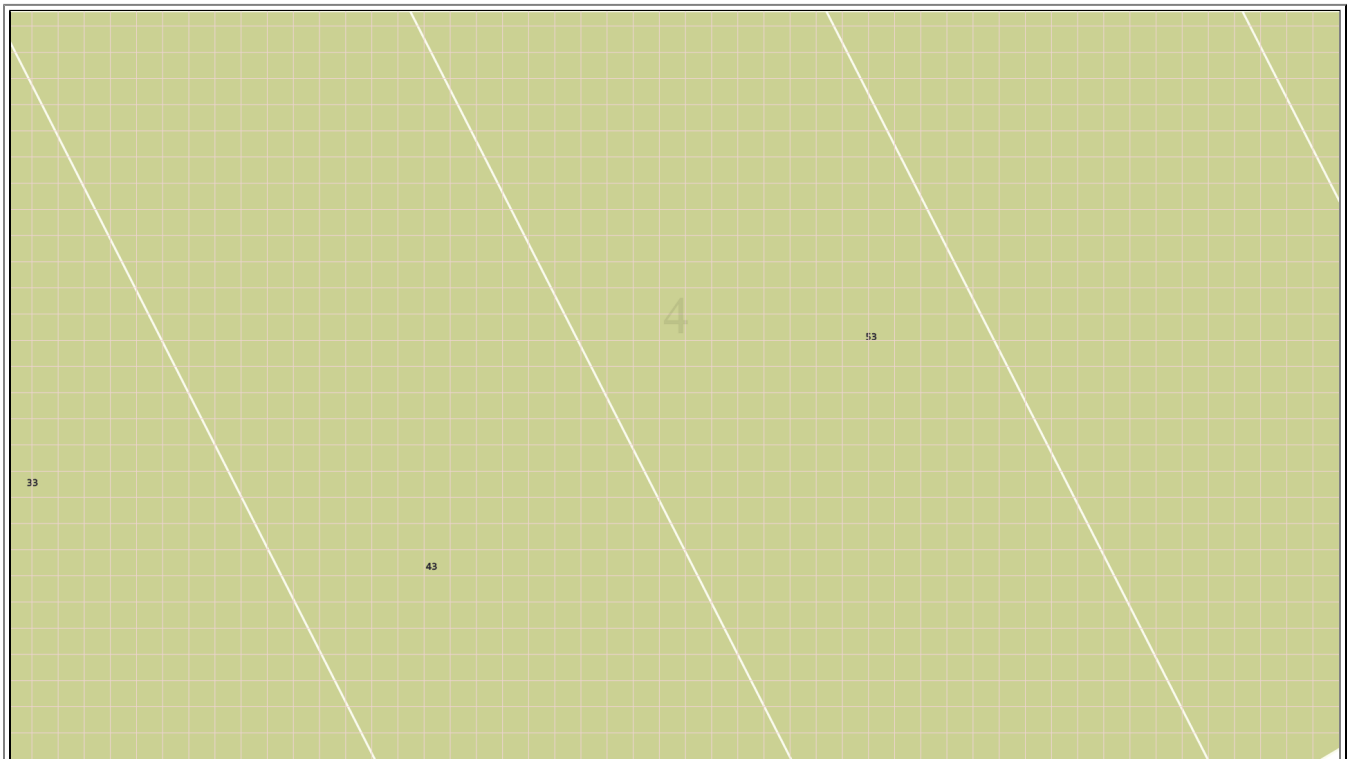
1	4	7
2	5	8
3	6	9

		
LEGEND		
Type: Power		
Assets		
 IN-SERVICE: Power Cable/ Duct/ Trench	 DESIGNED/CONSTRUCTED: Power Cable/ Duct/ Trench	 Pit/Manhole
		
		Scale 0 20 40 60 Meters 1:2000 1 cm equals 20 m

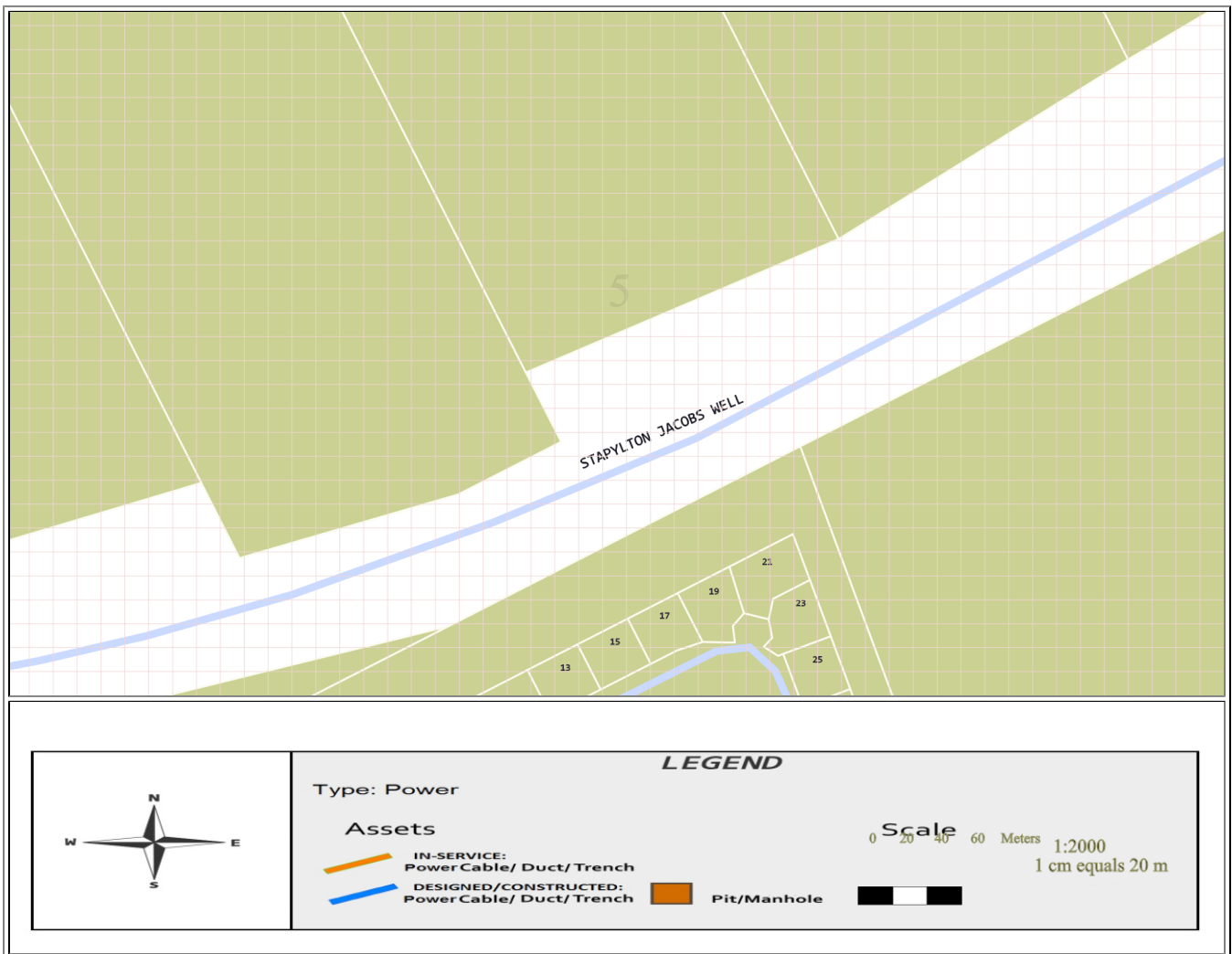




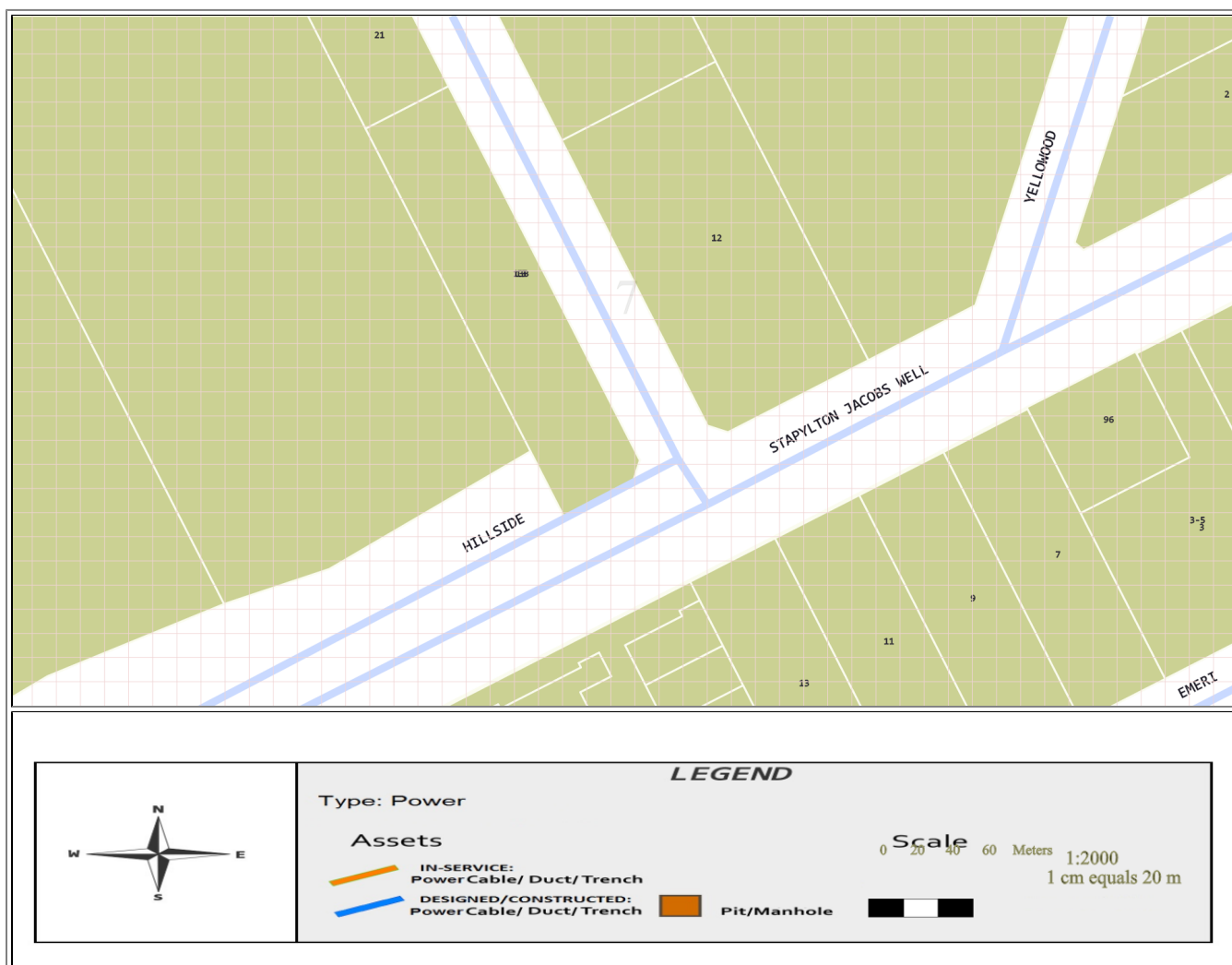


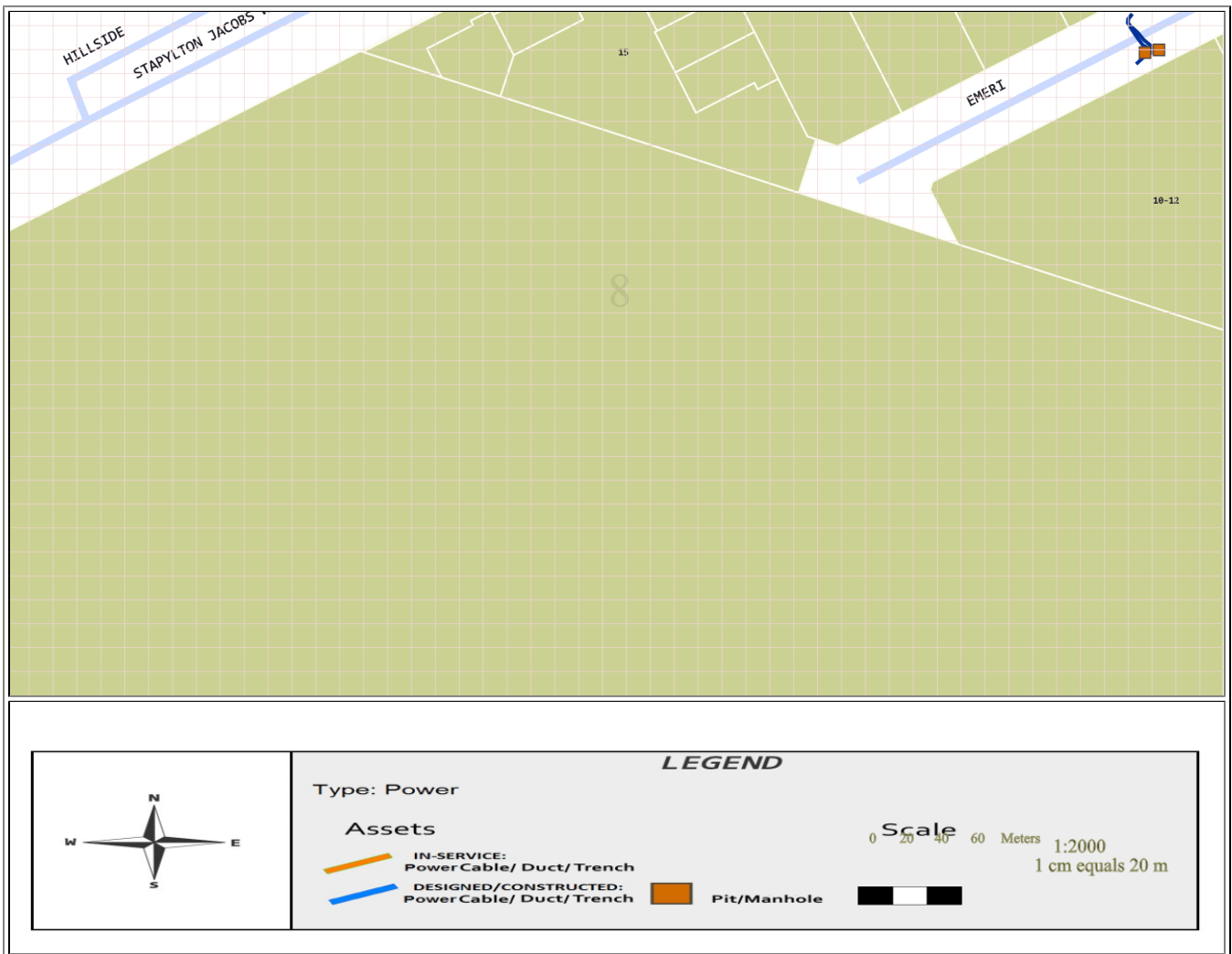


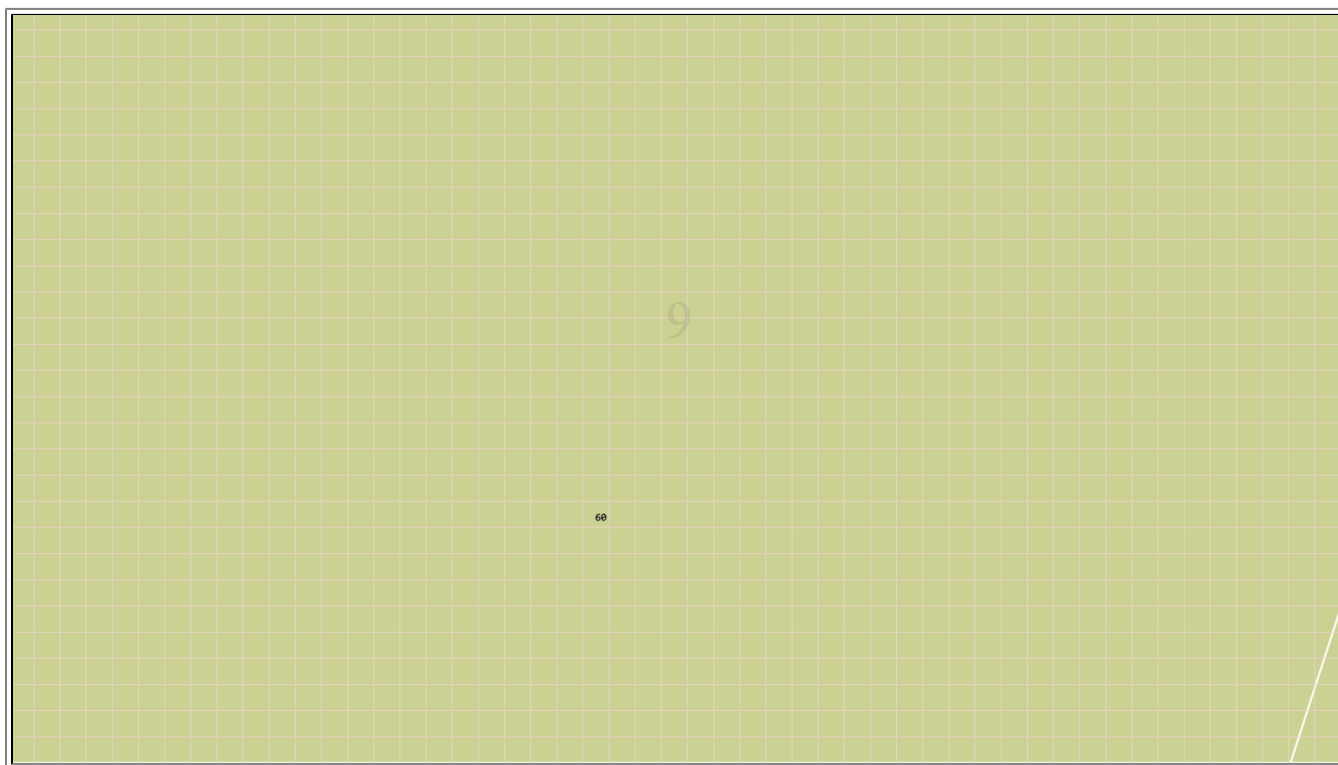
	LEGEND Type: Power Assets IN-SERVICE: Power Cable/ Duct/ Trench DESIGNED/CONSTRUCTED: Power Cable/ Duct/ Trench Pit/Manhole Scale 0 20 40 60 Meters 1:2000 1 cm equals 20 m
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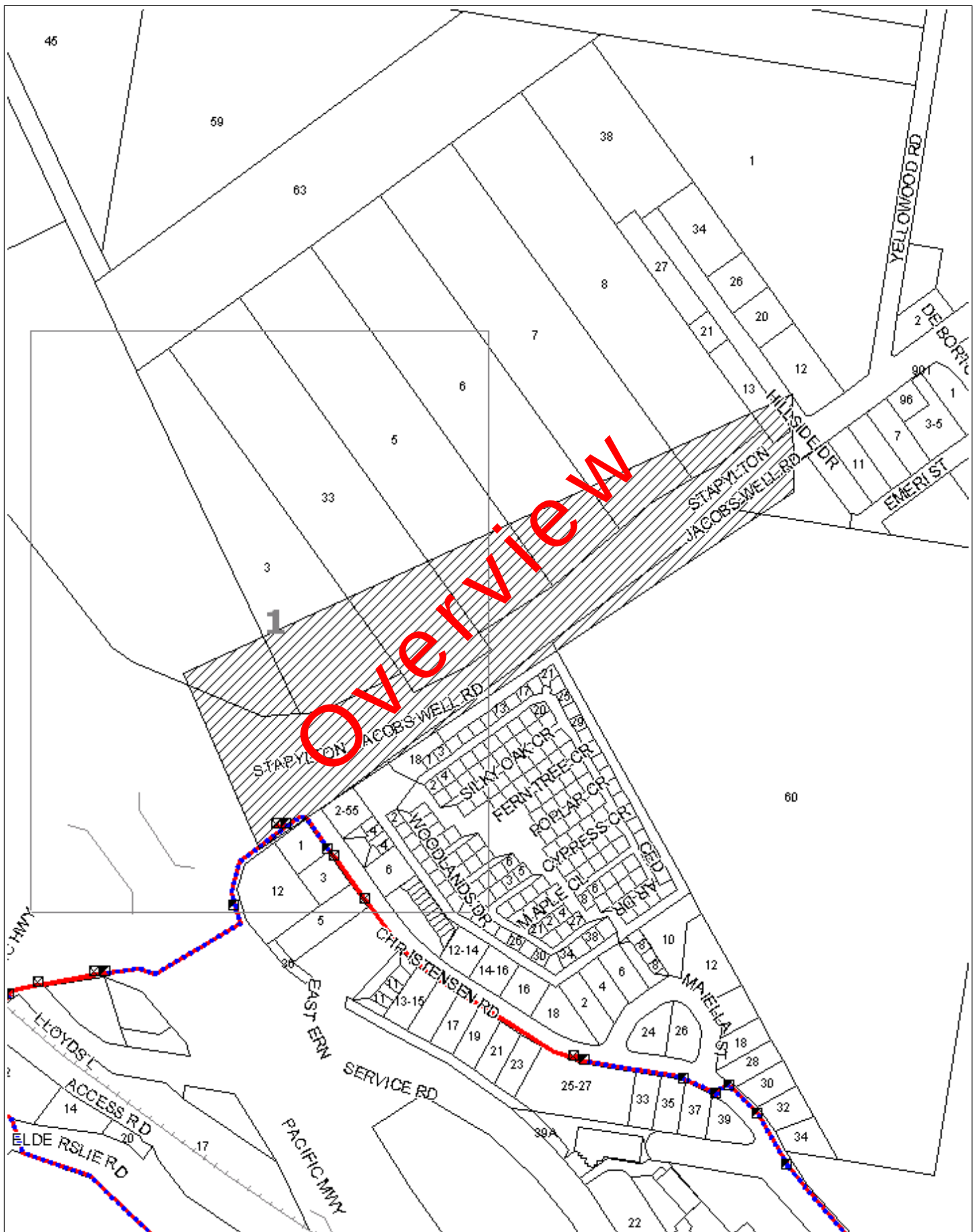






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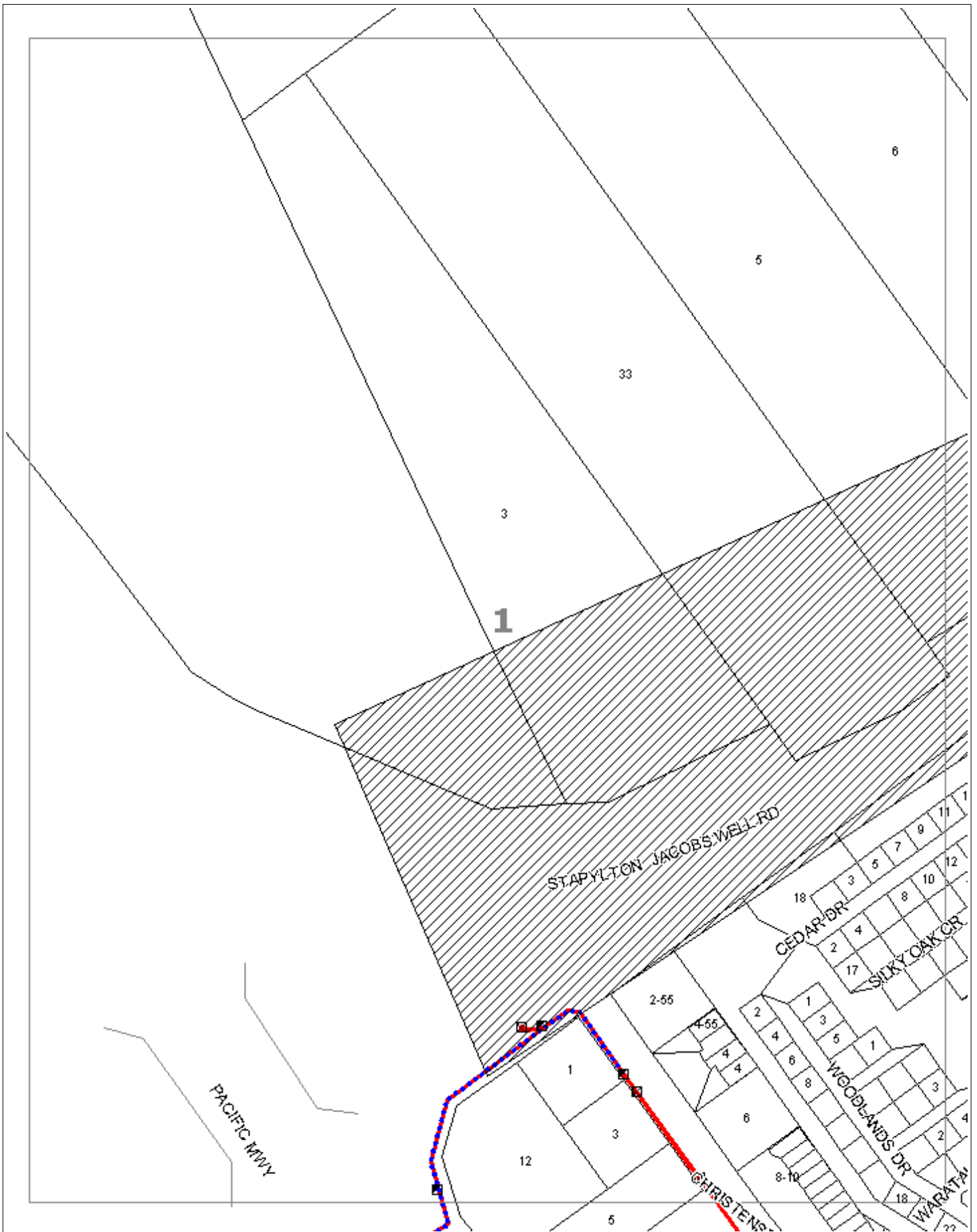
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Date Generated: 30/01/2018



For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208





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Sequence Number: 68110312

Date Generated: 30/01/2018



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Optus Limited ACN 052 833 208



All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX EnerGISE DBYD map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please call 13 19 62



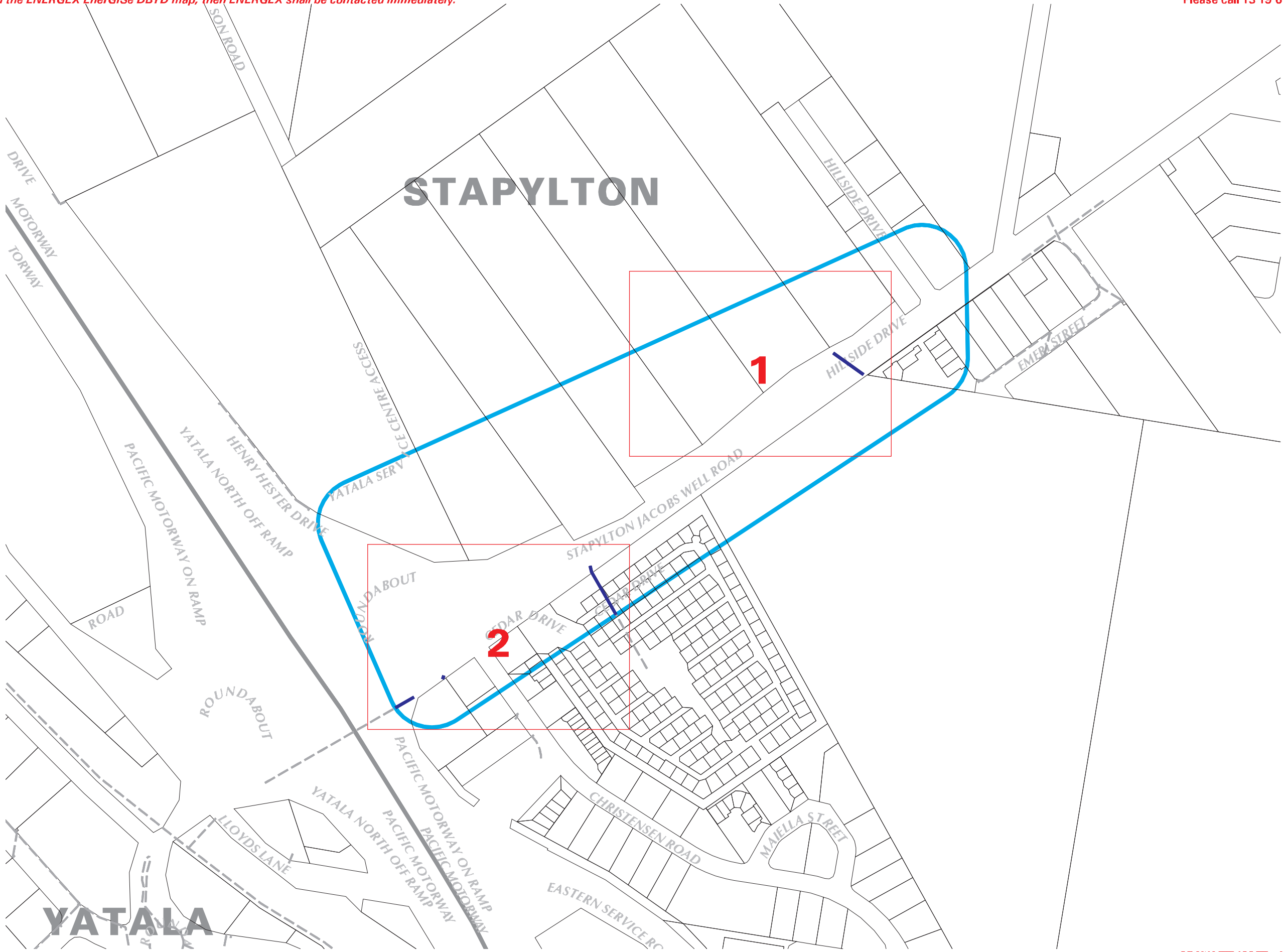
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Requested By: DBYD

NOT TO SCALE
0 150m

Enquiry No: 68110310
KEY MAP

Enquiry Area

STAPYLTON



YATALA

This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

UNCONTROLLED COPY

LOCALITY DIAGRAM



All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX EnerGISE DBYD map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please call 13 19 62



Date: 30 Jan 18 Time: 16.41.51
Requested By: DBYD

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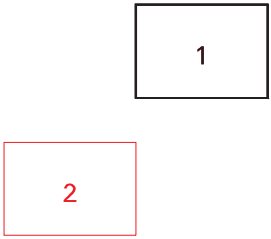
Enquiry No: 68110310

STRIP No: 1

- | | | | |
|--|---------------------|--|------------------------------|
| | Ground Transformer | | Cable Voltage Less Than 33kV |
| | Cubicle Transformer | | Cable Voltage 33kV or Higher |
| | Ring Main Unit | | |
| | Metering Unit | | Direct-Lay Cable |
| | Link Pillar | | Conduit |
| | Service Pillar | | Multi-Section Duct |
| | Junction Pillar | | Trench |
| | Pit | | Cable Tray |
| | Cable Joint | | Tunnel |
| | Cable Termination | | |
| | Cable Marker | | |
| | Street Light Pole | | |
| | Earth | | |
| | Works Order Polygon | | |



INDEX TO SHEETS



LOCALITY DIAGRAM



This output provides details of the ENERGEX electrical network. As variations may exist no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

UNCONTROLLED COPY

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX EnerGISE DBYD map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please call 13 19 62



Date: 30 Jan 18 Time: 16.42.06
Requested By: DBYD

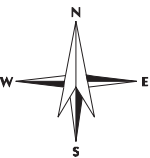
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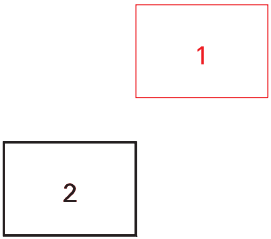
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STRIP No: 2

- | | | | |
|--|---------------------|--|------------------------------|
| | Ground Transformer | | Cable Voltage Less Than 33kV |
| | Cubicle Transformer | | Cable Voltage 33kV or Higher |
| | Ring Main Unit | | |
| | Metering Unit | | Direct-Lay Cable |
| | Link Pillar | | Conduit |
| | Service Pillar | | Multi-Section Duct |
| | Junction Pillar | | Trench |
| | Pit | | Cable Tray |
| | Cable Joint | | Tunnel |
| | Cable Termination | | |
| | Cable Marker | | |
| | Street Light Pole | | |
| | Earth | | |
| | Works Order Polygon | | |



INDEX TO SHEETS



LOCALITY DIAGRAM



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UNCONTROLLED COPY



ATTACHMENT 9

AMENDED LANDSCAPE INTENT PLAN

M38 INDUSTRIAL PARK

Landscape Intent plan Stage 1

Frasers Property (Australia) Pty. Ltd.

Lot S01 on SP295994

Stapylton-Jacobs Well Road,
Stapylton

December 2019
Revision - A

Prepared By -
Gassman Development Perspectives

GDP Ref: 5941





Landscape master plan

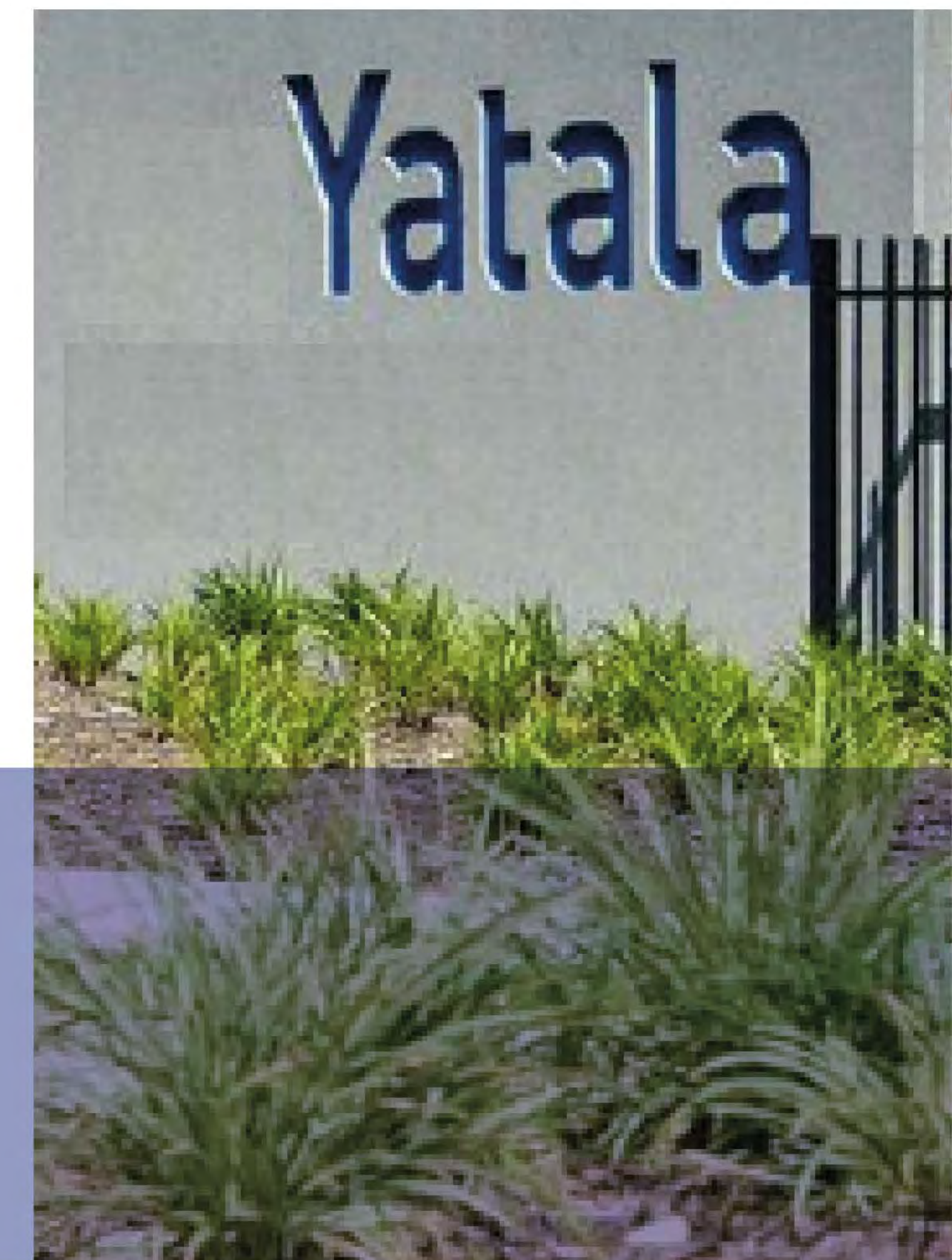
CONTENT

M38 INDUSTRIAL PARK

Cover Page.....01

Content Page.....02

01	SITE LOCALITY PLAN.....03
02	LANDSCAPE PLANS.....04-05
03	TYPICAL SECTIONS.....06-07
04	DESIGN PALETTE.....08
05	PLANTING PALETTE.....09-11



01 SITE LOCALITY PLAN



02 LANDSCAPE PLANS



LANDSCAPE DETAIL PLAN

LEGEND



01 DENSE AND AESTHETICALLY PLEASING 6000MM BUFFER PLANTING PALETTE TO DEVELOPMENT FRONTAGE



02 ACOUSTIC FENCE AND RICH 3000MM MINIMUM PLANTED BUFFER BETWEEN THE DEVELOPMENT AND ADJACENT PROPERTIES

03 1:3 BATTER TO BE TREATED WITH COMPOST BLANKET CONTAINING SOIL AMELIORATION ADDITIVES AND A NATIVE GROUND COVER AND GRASS SEED MIX. AS DETERMINED NECESSARY ON SITE A SUPPLEMENTARY STABILISATION TECHNIQUE OF AN OPEN WEAVE ORGANIC BLANKET IS TO BE USED IN CONJUNCTION WITH THE COMPOST BLANKET

04 NON-VEGETATED STABILISATION TREATMENT TO BATTERS STEEPER THAN 1 IN 2 TO BE PROVIDED AS PER GEOTECHNICAL ENGINEERS SPECIFICATION

05 CLUSTERS OF BRACHYCHITON ACERIFOLIUS TO ESTATE ENTRANCE TO FRAME THE DEVELOPMENT

06 BUCKINGHAMIA CELSISSIMA STREET TREE

07 XANTHOSTEMON CHRYSANTHUS STREET TREE

08 ELAEOCARPUS EUMUNDII STREET TREE

09 BIO-RETENTION BASIN PLANTED WITH WATER SENSITIVE SPECIES TO SUPPORT LOCAL WILDLIFE

10 INDICATIVE DRIVEWAY LOCATIONS

11 ROAD GARDEN TREATMENTS TO SOFTEN THE BUILT FORM AND IMPROVE THE VISUAL AMENITIES

PROPOSED INDUSTRIAL ALLOTMENTS

ENTRY STATEMENT FOR INDUSTRIAL DEVELOPMENT

2400MM HIGH ACOUSTIC FENCE

BOUNDER RETAINING WALL (TO ENGINEERS SPECIFICATIONS)

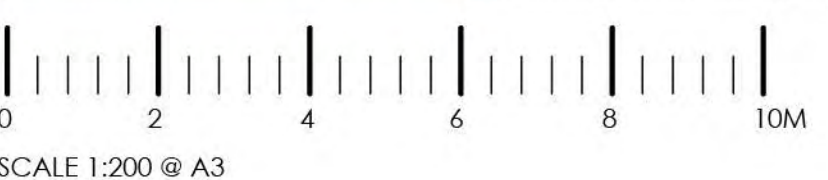
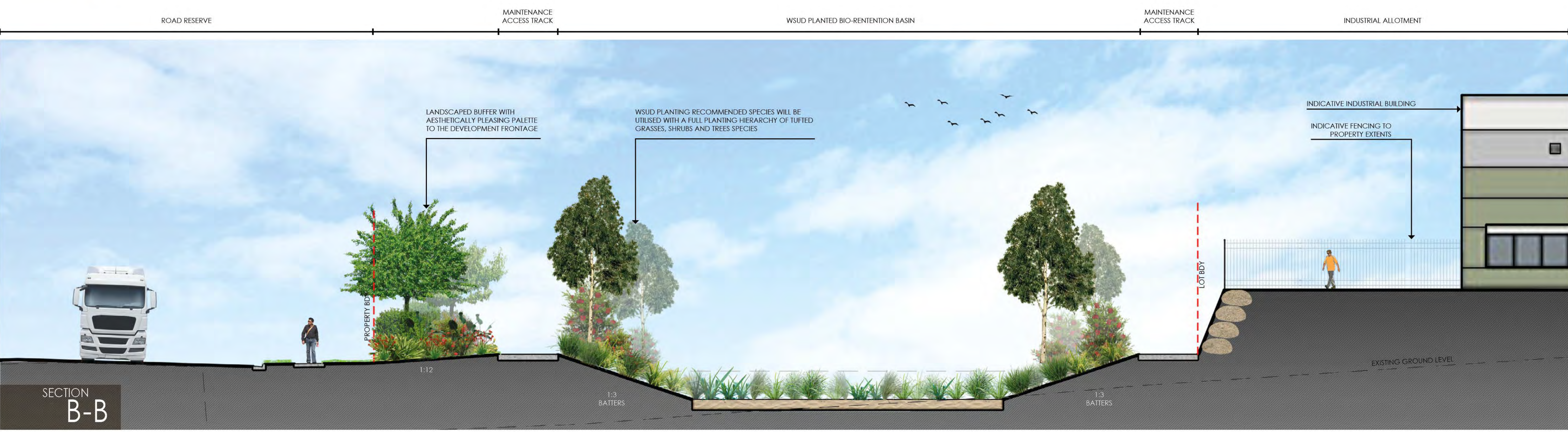
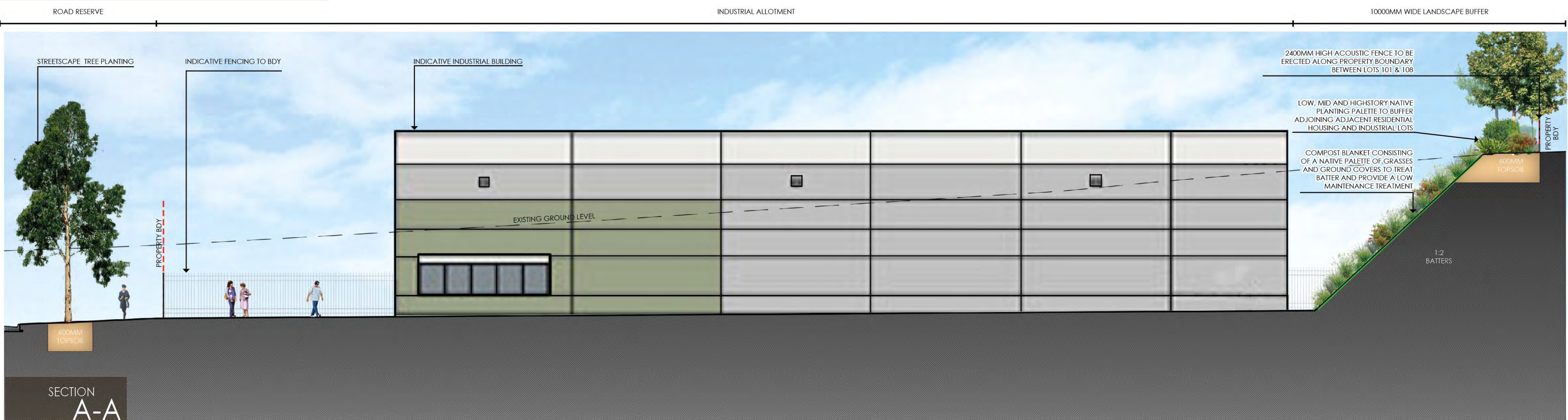
FUTURE STAGE OF THE M38 INDUSTRIAL PARK DEVELOPMENT SUBJECT TO FUTURE DESIGN

FULL EXTENT OF THE EARTHWORKS ASSOCIATED WITH STAGE ONE OF THE DEVELOPMENT ARE TO BE STABILISED TO MINIMISE EROSION AND PRESERVE FUTURE STAGES OF THE DEVELOPMENT IN ACCORDANCE WITH CIVIL SPECIFICATIONS



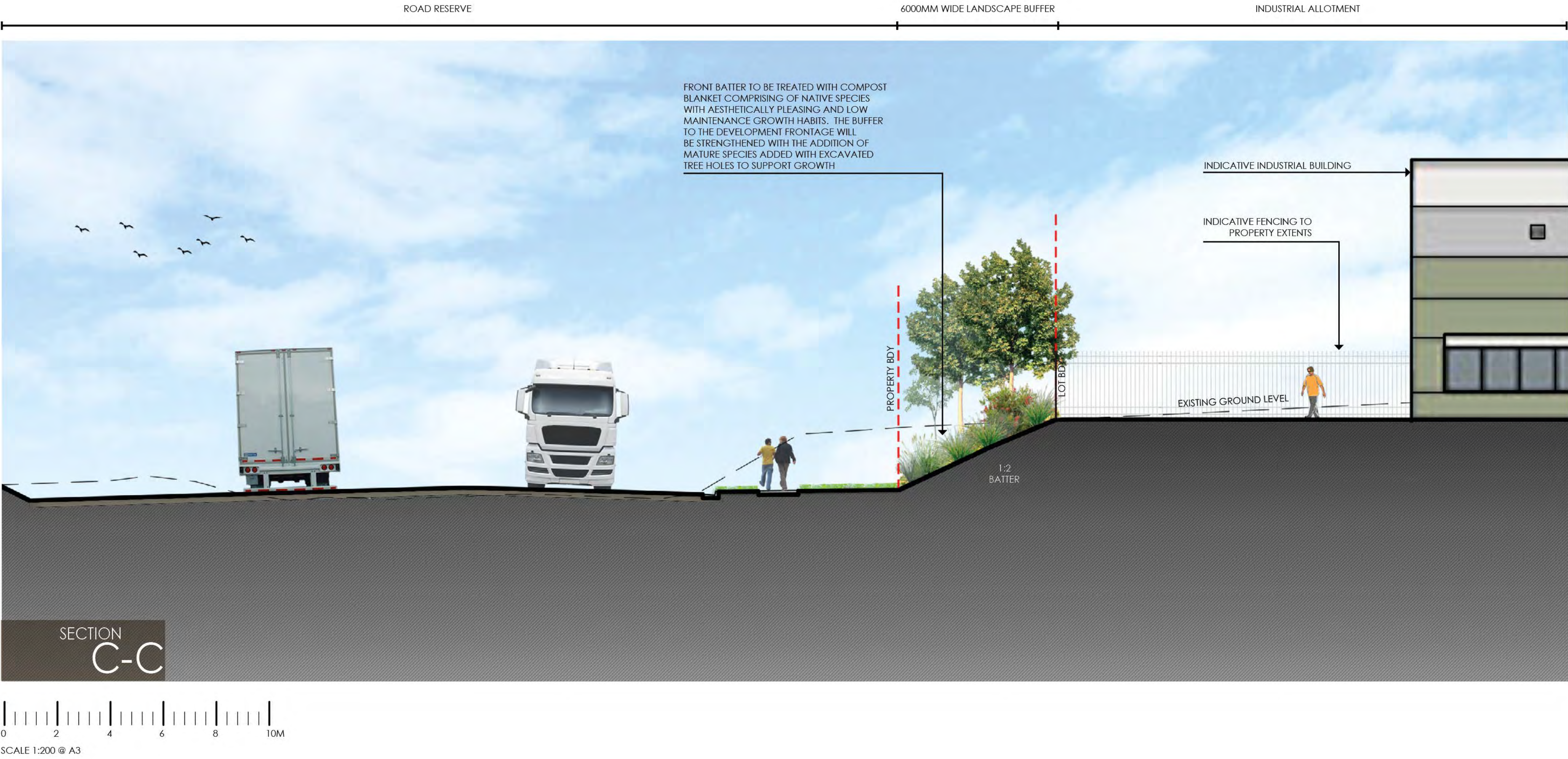
03

TYPICAL SECTIONS



03

TYPICAL
SECTIONS



M38 INDUSTRIAL PARK DESIGN PALETTE

04

The landscape design intent for the industrial estate is underpinned by a number of overriding design Principles that will promote legibility, create site scale and setting and respond to the environmental values of the site.

Design details, finishes and materials will be complimentary to provide visual consistency throughout the estate. The softscape palette has been selected in response to the location of the site. Accompanied by an appropriate species list, the result will be a variety of landscape forms that meet both the needs of the estate and the local fauna.

The planting hierarchy throughout the development will reflect Crime Prevention through Environmental Design principles. By utilising plants with low heights and trees with thin trunks, this will allow for passive surveillance as well as recognition of traffic and pedestrian movements. By increasing the planting areas and providing a shared network, the overall aesthetics of the estate will be greatly enhanced. Water Sensitive Urban Design principles will be applied to the industrial estate where space allows. The principles will be incorporated into open space areas, allowing for water filtering and harvesting and other landscape purposes.

The scale and nature of the landscaping materials shall be appropriate to the size of the structures and the available space. Planting has been selected for ease of maintenance as well as the suitability and tolerance to the varying conditions of the site.

The planting scheme used is predominately native which softens the built form, improves natural ecosystems and minimised water usage. The design will respect the environmental aspects of responsible design, planning, and construction, which will respond to issues of bio diversity, natural processes and impacts on local waterways.



COHESIVE STREETSCAPE DESIGN
AND PLANT PALETTE



DISTINCTIVE ENTRY STATEMENT TO
DEVELOPMENT ENTRANCE



DENSE PLANTING BUFFERS TO
ESTATE FRONTAGE



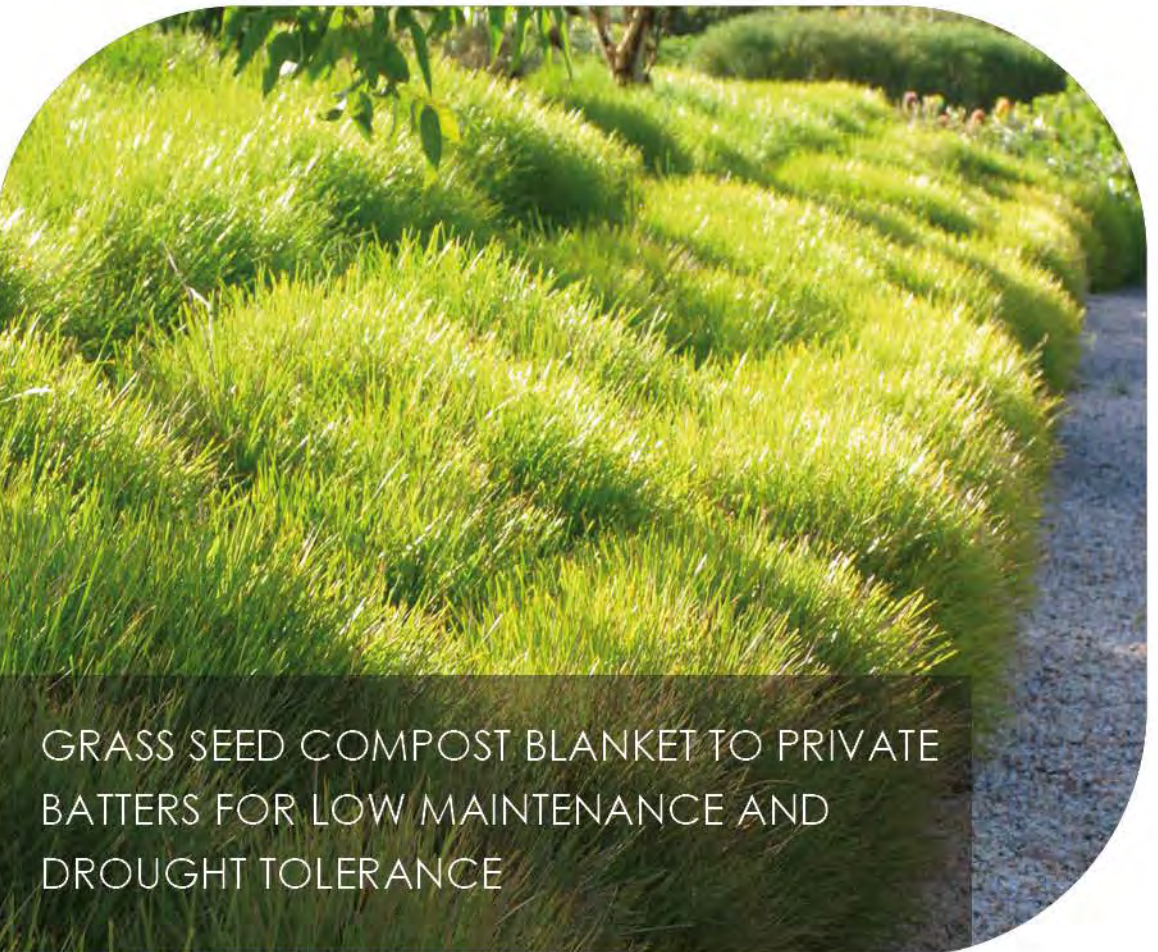
2M HIGH ACOUSTIC FENCING TO REAR OF
INDUSTRIAL LOTS TO PROVIDE PRIVACY TO
ADJACENT RESIDENTIAL HOUSING



AUSTRALIAN NATIVE PLANTING
PALETTE



WATER SENSITIVE URBAN DESIGN
PLANTING PALETTE TO
BIO-RETENTION BASIN



GRASS SEED COMPOST BLANKET TO PRIVATE
BATTERS FOR LOW MAINTENANCE AND
DROUGHT TOLERANCE



TIMBER PRIVACY FENCING TO REAR
OF INDUSTRIAL LOTS TO PROVIDE
PRIVACY TO ADJACENT INDUSTRY

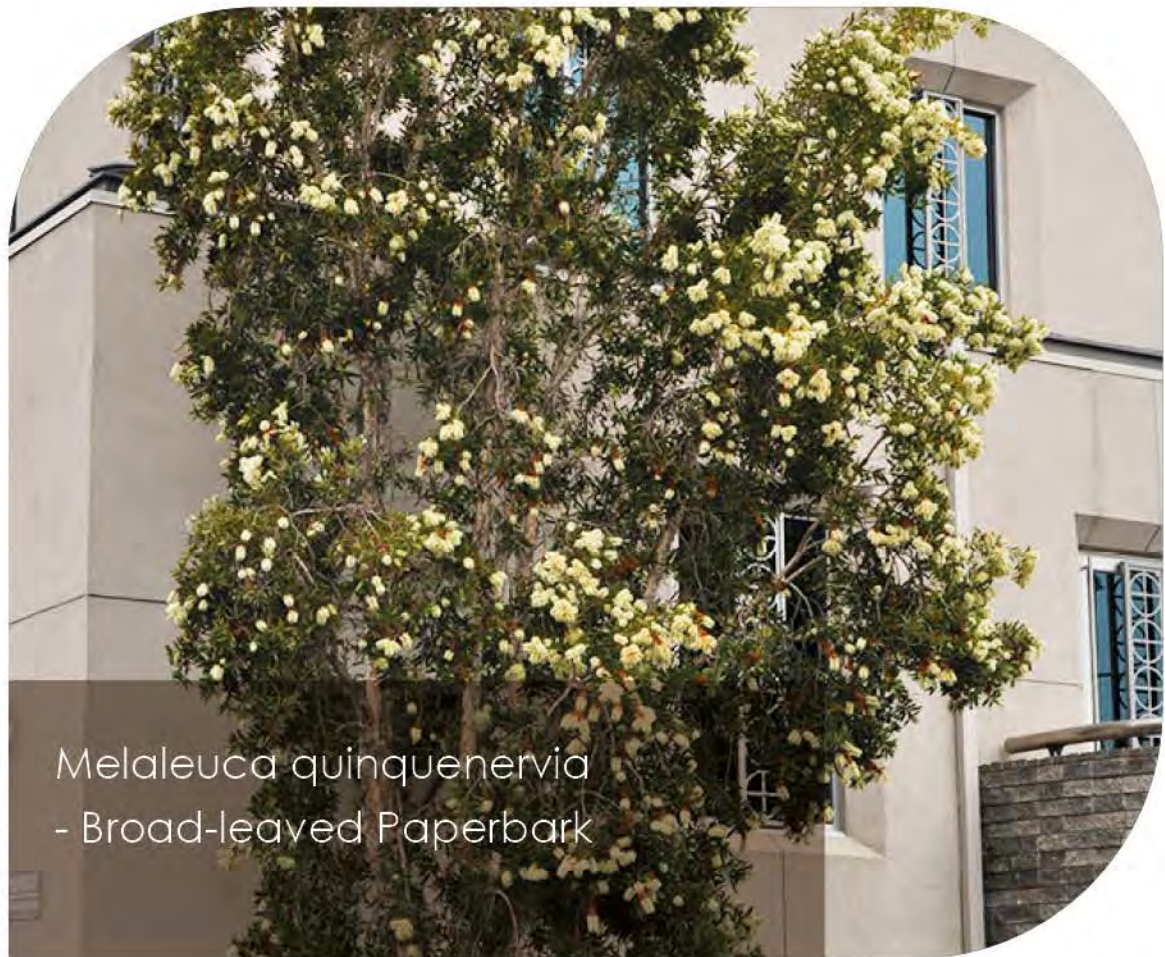
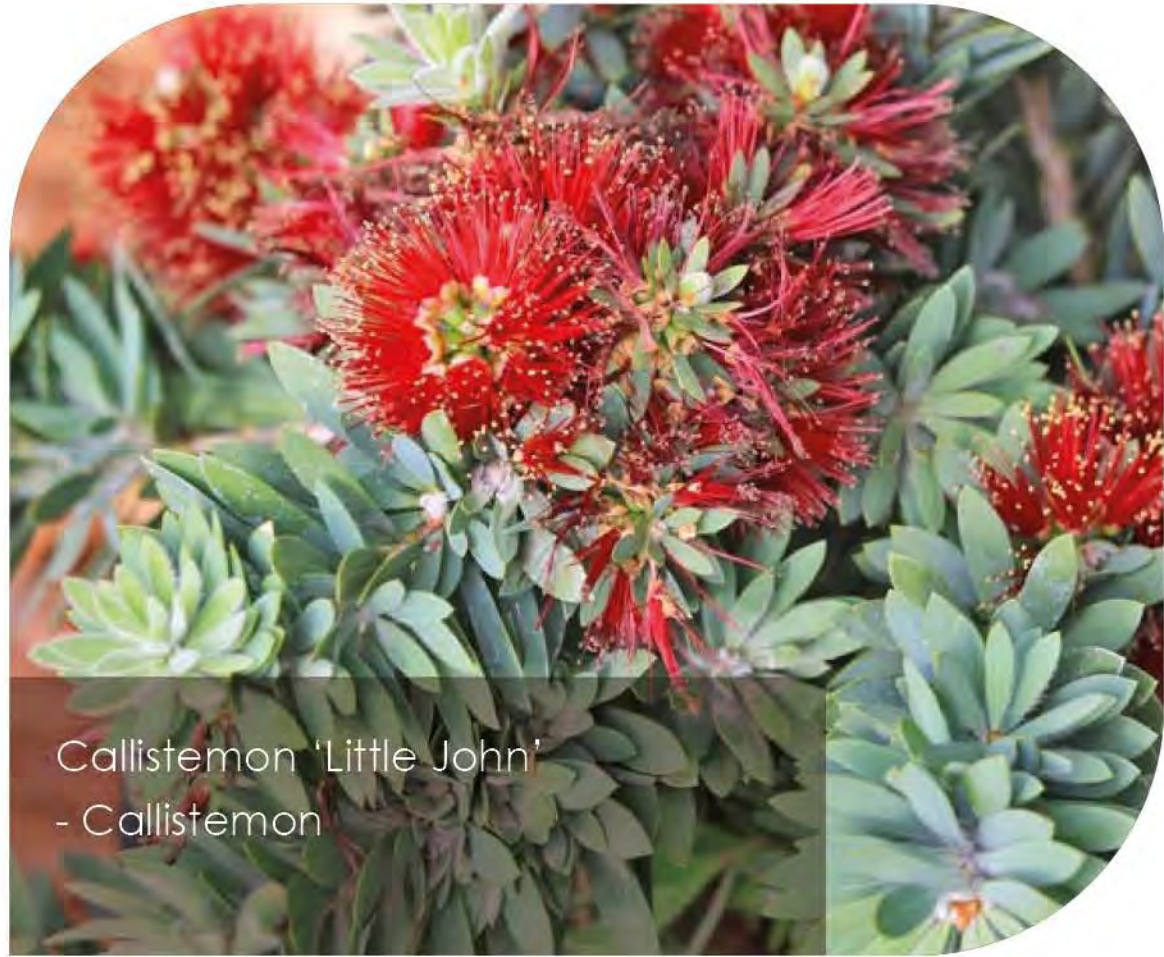
M38 INDUSTRIAL PARK

PLANTING
PALETTE 05



M38 INDUSTRIAL PARK

PLANTING
PALETTE 06



* BIO SPECIES

M38 INDUSTRIAL PARK

PLANTING
PALETTE

07



* BIO SPECIES