OUTLINE DRAINAGE STRATEGY REPORT

Simec Uskmouth Power Station Conversion SUP

019784 - Simec Uskmouth
Power Station Conversion SUP
Outline Drainage Strategy
Report
P03
1st April 2020

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
P01	Planning	LJS	DW	DW	17/03/20
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Approval for issue

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1 INTRODUCTION

Background

1.1 RPS has been commissioned by SIMEC Atlantis Energy to produce an Outline Drainage Strategy Report for the proposed fuel conversion works to an existing coal fired power generation plant. The 363-megawatt SIMEC Uskmouth Power Station was built in 1959 and is located in South Wales, UK.

1.2 On the 7th January 2019, Schedule 3 of the Floods and Water Management Act 2010 (FWMA) was enacted in Wales. This Act requires all new developments of more than 1 dwelling or where the construction area is greater than 100m² to incorporate Sustainable Drainage Systems (SuDS) into their drainage proposals.

1.3 These SUDS proposals must be designed and built in accordance with the Welsh Government's Statutory SuDS Standards for designing, constructing, operating and maintaining surface water drainage systems. The SuDS schemes must be approved by the local SuDS Approving Body (SAB) before construction work begins.

1.4 This report has been completed by RPS to satisfy the SAB that the SuDS proposals for the proposed fuel conversion works have been designed in accordance with the six Statutory SuDS Standards and SuDS design guidance including The SuDS Manual, CIRIA Report C753.

Existing Site

1.5 Built in 1959, the existing power generation plant is located approximately 4km south of the City of Newport, South Wales, UK on the east bank of the River Usk as it reaches the Severn estuary. The site is currently drained via a combination of traditional below ground drainage networks and open ditches before discharging to the Severn Estuary approximately 0.5km to the west of the site.

1.6 Works undertaken C.2006-2009 included provisions for storage of fuel ash including a new surface water drainage system, an attenuation pond and other infrastructure improvements. RPS drawing 019784-RPS-SI-ZZ-DR-D-0300 included in Appendix A depicts the site in its existing state.

Figure 1 (Pictured left) view from south of site looking north over interceptor ditch.

Figure 2 (Pictured right) looking east into existing attenuation pond.

1.7 Forming part of the 2006-2009 works, an interceptor ditch was constructed (Figure 1 above) around the coal storage area to intercept surface water runoff. This ditch assists in removing suspended sediments before runoff passed through a lamella plate clarifier. Treated runoff is then discharged from the clarifier via hydrobrake at a reduced rate of 30l/s into the attenuation pond (Figure 2 above).

Proposed Site

1.8 The site is bisected by an existing railway running west to east. Significant aspects of the proposed fuel conversion works are located in the southern section of the site around the area previously used for coal storage. The RPS Proposed SUP Site Plan 019784-RPS-SI-ZZ-DR-A-5003 has been included in Appendix A which indicates the new and remediation works proposed. In this area, the parcel of land previously used for storage of coal will house new storage silos for storage of pelletised fuel with associated rail unloading facilities. High level conveyors will allow connection of these elements and facilitate the transfer of materials.

1.9 The Proposed SUP Site Plan also includes some relatively minor works in the north of the site which are also encompassed as part of this application.

Drainage Strategy overview

1.10 The overall drainage strategy has carefully considered the existing drainage assets in order to provide a sustainable solution which utilises existing infrastructure where feasible to reduce the use of new building materials and construction activity.

1.11 The area previously used for coal storage pictured in Figure 3 below will be remediated prior to development, leaving this an ideal opportunity to develop in line with new SuDS standards.

Figure 3 Looking east over the area previously used for coal storage

1.12 It is proposed that grassed conveyance swales will be constructed adjacent the new hardstanding areas to intercept runoff and direct flows towards the existing interceptor ditch.

1.13 As per existing arrangements, the interceptor ditch will then direct flows east to the lamella plate clarifier. Runoff will then be discharged into the attenuation pond via the existing hydrobrake limited to 30l/s.

1.14 Preliminary design of the proposed surface water drainage system serving the new hardstanding areas and silos in the southern section of the site has been undertaken using current MicroDrainage analysis software. The following sections of this report cover how the preliminary design aims to satisfy The Welsh Government six the Statutory SuDS Standards. An indicative drainage layout has been included in Appendix A.

1.15 Existing concrete roads and conveyor buildings will be left to drain as per existing arrangements to the on-site attenuation pond with localised enhancement where necessary. Any necessary amendments to the existing drainage networks will be reviewed at detailed design stage once an intrusive CCTV drainage investigation has been undertaken.

2 SURFACE WATER RUNOFF DESTINATION

S1 Surface water runoff destination

- Priority Level 1: Surface water runoff is collected for use;
- Priority Level 2: Surface water runoff is infiltrated to ground;
- Priority Level 3: Surface water runoff is discharged to a surface water body;
- Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
- Priority Level 5: Surface water runoff is discharged to a combined sewer.

2.1 The surface water runoff destination has been selected in accordance with the priority levels set out in the Welsh Government Statutory SuDS Standards included above.

2.2 There is no significant opportunity for water recycling in the proposed facility other than for use in staff welfare facilities. Opportunities for collecting roof water for use as grey water in welfare facilities will be identified and utilised during detailed design. Priority Level 1 will therefore be reviewed as detailed design.

2.3 Due to site being located close to the Severn Estuary at a level nearing sea level, infiltration is not considered a viable means of discharge however the site SuDS system will incorporate source control SuDS features where possible to harness residual infiltration in the underlying strata in an attempt to reduce volumetric runoff. Priority Level 2 is therefore not viable

2.4 As per existing arrangements, it is proposed to utilise the network of ditches and outfall to the Severn Estuary as the primary means of surface water disposal. Priority Level 3, discharging to a surface water body will therefore from the primary method of surface water disposal.

3 SURFACE WATER RUNOFF HYDRAULIC CONTROL

S2 Surface water runoff hydraulic control

1) Surface water should be managed to prevent, so far as possible, any discharge from the site for the majority of rainfall events of less than 5mm.
2) The surface water runoff rate for the 1 in 1 year return period event (or agreed equivalent) should be controlled to help mitigate the negative impacts of the development runoff on the morphology and associated ecology of the receiving surface water bodies.
3) The surface water runoff (rate and volume) for the 1% (1 in 100 year) return period event (or agreed equivalent) should be controlled to help mitigate negative impacts of the development on flood risk in the receiving water body.
4) The surface water runoff for events up to the 1% (1 in 100 year) return period (or agreed equivalent) should be managed to protect people and property on and adjacent to the site from flooding from the drainage system.
5) The risks (both on site and off site) associated with the surface water runoff for events greater than the 1% (1 in 100 year) return period should be considered. Where the consequences are excessive in terms of social disruption, damage or risk to life, mitigating proposals should be developed to reduce these impacts.
6) Drainage design proposals should be examined for the likelihood and consequences of any potential failure scenarios (e.g. structural failure or Sustainable Drainage Systems Standards for Wales Page 20 of 63 blockage), and the associated flood risks managed where possible.

3.1 Due to the limited opportunity for infiltration presented by the underlying strata, the ability to prevent runoff from the ‘first flush’ 5mm rainfall event is limited. However, opportunities to encourage natural process such as infiltration and evaporation will be harnessed by the inclusion of new filter strips and grassed swales and the retention of the existing interceptor ditch.

3.2 The surface water runoff will be controlled in all events including the 1 in 1 year return period via the existing lamella plate clarifier and hydrobrake prior to discharge into the attenuation pond. This will help mitigate any negative impacts to the morphology and ecology to the receiving surface water body as a result of the development. By maintaining the existing hydrobrake 30l/s runoff rate, this will also mitigate any adverse impacts of flood risk to the receiving surface water body as a result of the development.

3.3 Initial hydraulic calculations identified that the existing interceptor ditch did not have sufficient capacity to attenuate the flows from the existing and proposed impermeable areas. As a result, the eastern section of the interceptor ditch will be enlarged to provide additional surface water storage. An Indicative Drainage Layout has been included as Appendix A, RPS Drawing 019784-RPS-SI-ZZ-DR-D-0301.

3.4 Modelled outputs have been included as Appendix B. These results indicate that, following the localised enlargement of the interceptor ditch, the system has sufficient capacity to attenuate flows from the critical 1 in 100 year event including a 40% allowance for climate change with no onsite flooding.

3.5 In the event of a failure of the local drainage system or for storms in excess of those considered, site levels will be designed so that exceedance routes direct runoff towards low lying areas of the site where runoff will be stored safely until the failure rectified or until the rainfall event passes.

4 SURFACE WATER QUALITY MANAGEMENT

S3 Surface water quality management

Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

4.1 Surface water quality for site runoff for the site will be managed through a combination of new sustainable drainage features and enhancing the existing drainage assets.

4.2 A water quality risk assessment has been carried out using the SuDS hazard mitigation indices in accordance with Chapter 26, of the CIRIA C753 SuDS Manual (CIRIA, 2015). Under this method of assessment, the main silo area of the development has been conservatively considered as having high pollution hazard level.

Table 1: High Hazard –Pollution Mitigation

	Hazard Level	TSS	Metals	Hydro-carbons
Pollution Hazard Indices	High	0.8	0.8	0.9
Proposed SuDS mitigation I_1 Swales	-	0.5	0.6	0.6
Proposed SuDS mitigation I_2 interceptor ditch (wetland)	-	0.8	0.8	0.8
Proposed SuDS mitigation I_3 Attenuation pond	-	0.7	0.7	0.5
Total SuDS Mitigation Indices (I_1+0.5xI_2+0.5xI_3…)		**1.25**	**1.35**	**1.35**

4.3 From Table 1 above it is evident that the proposed SuDS mitigation indices far exceed the pollution hazard indices. It is important to note that this assessment does not include the additional water quality benefits provided by the existing lamella plate clarifier.

4.4 An external on site plant re-fuelling area and diesel fuel exists on the north boundary of the SIMEC site. This area will be isolated from the general hardstanding by way of a surface water channel drain surrounding the fuelling area, and then connected via a Class 1 full retention forecourt separator, prior to discharge into the surface water drainage system. Additional opportunities for isolating sections of the drainage network have also been provided as penstock valves.

4.5 The site wide water quality management will be re-evaluated at detailed design stage in conjunction with the ground remediation strategy.

5 AMENITY & BIODIVERSTIY

5.1 The proposed on site SuDS features will be designed in accordance with The SuDS Manual, CIRIA Report C753 to maximise the multiple benefits of SuDS including Amenity and Biodiversity.

S4 Amenity

The design of the surface water management system should maximise amenity benefits.

5.2 Due to the proposed nature of the site, designing for amenity is not considered of particular priority. However, the SuDS proposals will assist in providing amenity benefit to employees and site visitors.

S5 Biodiversity

The design of the surface water management system should maximise biodiversity benefits.

5.3 Considering the site's current poor ecological value, the redevelopment is recognised as an ideal opportunity to use SuDS proposals to maximise the biodiversity benefits. Through redevelopment it is envisaged that the proposed swale and interceptor ditch can be enhanced to mimic the wetland habitat observed at the nearby RSPB Reserve to provide a continuation of habitat.

6 DESIGN OF DRAINAGE FOR CONSTRUCTION, OPERATION AND MAINTENANCE

S6 Design of drainage for Construction, Operation and Maintenance

1) All elements of the surface water drainage system should be designed so that they can be constructed easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).
2) All elements of the surface water drainage system should be designed to ensure maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).
3) The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance

6.1 Under RPS' CDM Designer responsibilities, the surface water drainage system will be designed considering the health and safety both during construction and for the long term operations and maintenance of the system.

6.2 Prior to detailed design, an intrusive CCTV investigation will be undertaken to determine the location and condition of the existing site drainage assets. Detailed design will then look to retain the existing drainage assets where possible to reduce construction activity and provide an economical solution.

6.3 The detailed design of the drainage system will be undertaken concurrently with detailed level design and earthworks analysis to minimise groundworks and reduce imported fill material.

6.4 All below ground drainage infrastructure will be designed in accordance with DMRB Volume 4 Section 2 Part 5 (HA 40/01) "Determination of pipe and bedding combinations for drainage works" to ensure structural integrity under the anticipated vehicular loading. Proprietary interceptors to be installed in accordance with supplier specification.

6.5 The maintenance for all on plot drainage infrastructure will be the responsibility of the client or appointed management company. Details of the maintenance activities for the constructed drainage infrastructure will be passed to the end user as part of an Operation and Maintenance Manual post completion. Typical maintenance activities may include;

Table 2: Typical Maintenance Activities

Element	Access Method	Method of Maintenance	Frequency Required
Roof Gutters	Scaffolding / Cherry pickers to be used where required.	General cleaning of gutters. Jet cleaning where required.	Periodic inspection of gutters to ensure rainwater outlets do not become blocked. Periodic renewal of gutter coatings to prevent corrosion.
Oil / Petrol Separators	In accordance with H&S regulations and confined spaces requirements.	Refer to manufacturer's guidance.	Bi-annual inspection and emptying.
Channel Drains / Kerb Drainage	In accordance with H&S regulations.	Monitor to ensure no blockages develop. Jet cleaning where required.	Bi-annual jet cleaning of channel drains.
Silt-traps and Gullies	In accordance with H&S regulations.	Monitor to ensure no blockages develop.	Bi-annual inspection and emptying of all silt traps and gullies.
Penstock Valves/ Non-Return Flap Valves	In accordance with health and safety regulations and confined spaces requirements.	Monitored to ensure no blockages develop in accordance with the manufacturer's recommendations.	Bi-annual inspection or in accordance with the manufacturer's recommendations, whichever occurs sooner.
Surface Water Ponds and Swales	In accordance with H&S regulations	General cleaning and monitoring to ensure no blockage. Remove litter and debris. Cut grass and manage vegetation. Inspect inlets and outlets	Bi-annual inspection, cleaning and removal of silt and/or debris
Pumps	In accordance with health and safety regulations and confined spaces requirements.	Monitored via visual and audible alarms in development gatehouse to ensure no blockages develop in accordance with the manufacturer's recommendations.	Bi-annual inspection or in accordance with the manufacturer's recommendations, whichever occurs sooner.
Headwall	In accordance with health and safety regulations.	Monitored to ensure no blockages develop.	Bi-annual inspection and clearance of any debris

APPENDIX A – RPS DRAWINGS

Notes

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
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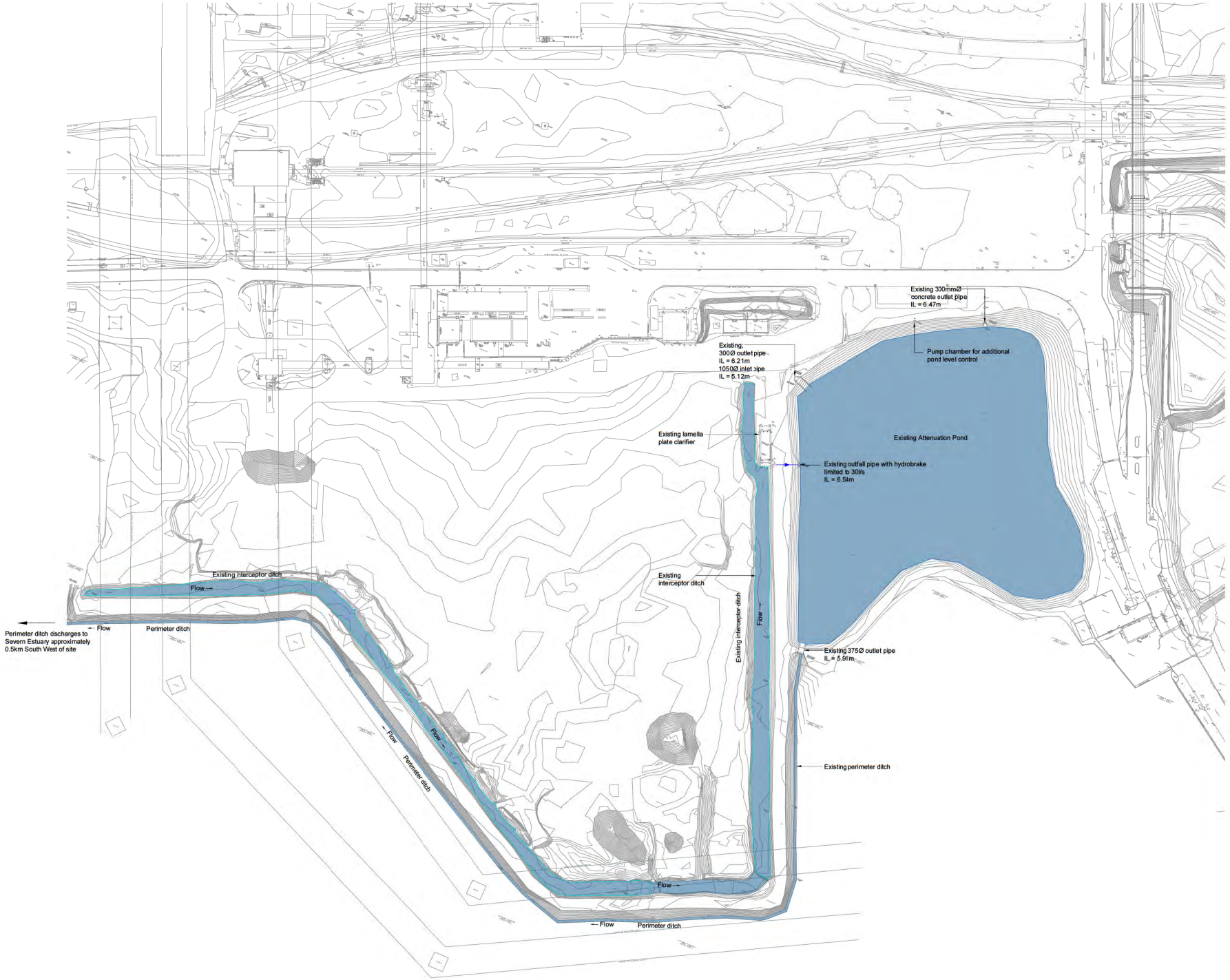

Rev	Description	By	Ckd	Date
P02	Amended in accordance with client comment.	MB	LJS	26.03.20
P01	First Issue.	CW	LJS	16.03.20

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Client: SIMEC ATLANTIS ENERGY

Project: Simec Uskmouth Power Station Conversion SUP

Title: Existing Drainage

RPS Project Number	Scale @ A1	Date Created
NK019784	1:750	16.03.2020
Task Team Manager	**Information Author**	**Task Information Manager**
GB	CW	LJS

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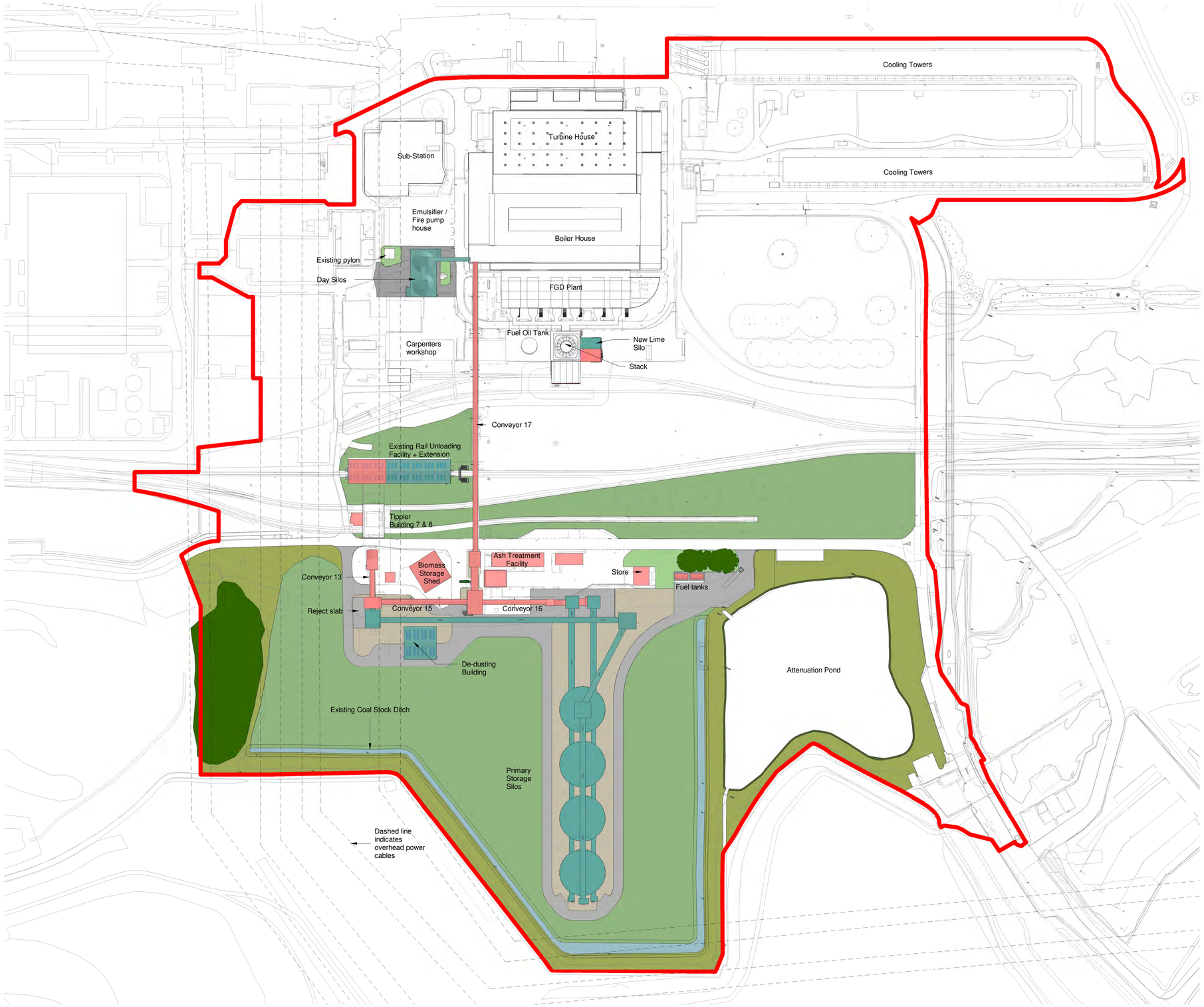

Legend

- Landscaped Area
- Existing Shrubbed Area
- Existing Native Trees and Shrubs
- Concrete
- Aggregate Crushed Stone
- Ditch / Reen
- Denotes Existing structure to be re-clad
- Denotes new works to powerstation

North

Rev	Description	By	Ckd	Date
P07	Drawing revised and updated to show lorry unloading building removed including the towers and conveyor system feeds, weighbridges removed to suit, access road revised to existing layout at junction	PBR	TFH	03/02/20
P06	Drawing revised and updated to reflect new topographical survey	PBR	TFH	12/09/19
P05	Site boundry revised	PBR	TFH	01/08/19
P04	Drawing revised to curerent details	PBR	TFH	03/07/19
P03	Drawing sent to team prior to design change	PBR	TFH	14/06/19
P02	Drawing revised and updatedto show day silo adjacent maint power station, new lime silo adjacent existing and primary storage facility to show 4 large silos	PBR	NB	07/06/19
P01	Initial Issue	PBR	TFH	21.05.19

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Project: SUP Fuel Conversion project

Title: Proposed SUP Site Plan

Status	Scale @ A1	Date Created
Preliminary	As indicated	20/05/19

Task Team Manager	Information Author	Task Information Manager
TFH	PBR	NB

Document Number
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RPS Project Number	Suitability	Revision
NK019784	S0	P07

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1 Site Plan.
1 : 1250

0m 20m 40m 60m 80m 100m

VISUAL SCALE 1:1000 @ A1

Notes

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Key:

- ***mm@1:60 — FW Drain (I/D & Gradient)
- ***mm@1:300 — SW Drain (I/D & Gradient)
- Liner Drainage
- S1 — SW Manhole
- Area of existing drainage enhancement
- Containment area
- Headwall
- Attenuation Pond/Ditch
- Grassed Conveyance Swale

Localised enhancements to existing drainage assets TBC at detailed design sage.

Slot Drain

Interceptor

SW1

PN 3.092
300mm3
@ 1:295

Existing pumping station for pond level control

Existing lamella plate clarifier for sediment / pollution control

Existing hydrobrake and outfall pipe limited to 3l/s

Existing Attenuation Pond

S1.1
CL 7.450mAOD
IL 7.100mAOD
Bed width 0.9m

Crossfall

Swale

S1.3
CL 7.450mAOD
IL 7.018mAOD
Bed width 2.4m

S2.1
CL 7.450mAOD
IL 7.1mAOD
Bed width 1.3m

S1.1
CL 7.450mAOD
IL 6.933mAOD
Bed width 2.6m

S2.2
CL 7.450mAOD
IL 7.021mAOD
Bed width 1.7m

Localised widening of interceptor ditch

Existing interceptor ditch

Flow

Perimeter ditch discharges to Severn Estuary approximately 0.5km South West of site

Perimeter ditch

B

B

A

A

S1.1
CL 7.450mAOD
IL 6.859mAOD
Bed width 3m

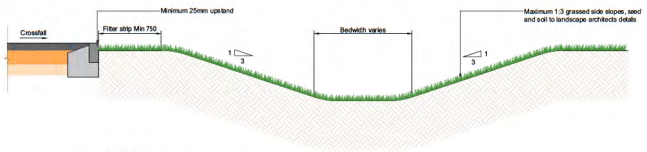
S2.3
CL 7.450mAOD
IL 6.947mAOD
Bed width 2.3m

Existing interceptor ditch extent

Area of interceptor ditch to be enlarged for surface water attenuation

Existing vegetation to be retained and enhanced where necessary TBC with landscape architect at detailed design stage

Section B-B
Typical section through remediated existing interceptor ditch
Scale 1:25



Section A-A
Typical section through proposed conveyance swale
Scale 1:25

Rev	Description	By	Ckd	Date
P02	Amended in accordance with client comment.	MB	LJS	26.03.20
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Client: SIMEC ATLANTIS ENERGY

Project: Simec Uskmouth Power Station Conversion SUP

Title: Indicative Drainage Layout

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APPENDIX B – RPS CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 332964 183552 ST 32964 83552
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	0.150
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	2.707	4-8	0.382	8-12	0.284	12-16	0.737	16-20	0.116	20-24	0.116	24-28	0.101

Total Area Contributing (ha) = 4.443

Total Pipe Volume (m³) = 456.428

Network Design Table for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	65.429	0.082	797.9	0.291	10.00	0.0		0.045	3 \=/	900	1:3 Swale	
1.001	67.609	0.085	795.4	0.555	0.00	0.0		0.045	3 \=/	2400	1:3 Swale	
1.002	59.144	0.074	799.2	0.198	0.00	0.0		0.045	3 \=/	2600	1:3 Swale	
1.003	10.000#	0.013	769.2	0.184	0.00	0.0		0.045	3 \=/	3000	1:3 Swale	
2.000	63.517	0.079	804.0	0.329	5.00	0.0		0.045	3 \=/	1300	1:3 Swale	
2.001	59.175	0.074	799.7	0.184	0.00	0.0		0.045	3 \=/	1700	1:3 Swale	
2.002	10.000#	0.013	769.2	0.203	0.00	0.0		0.045	3 \=/	2300	1:3 Swale	
3.000	5.000#	0.017	300.0	0.275	5.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	10.000#	0.260	38.5	2.224	0.00	0.0	0.600		o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	32.62	16.05	7.100	0.291	0.0	0.0	0.0	0.18	36.5	34.3
1.001	27.26	21.70	7.018	0.846	0.0	0.0	0.0	0.20	85.4	83.3
1.002	24.01	26.61	6.933	1.044	0.0	0.0	0.0	0.20	91.8	90.5
1.003	23.56	27.42	6.859	1.228	0.0	0.0	0.0	0.21	107.0	104.5
2.000	40.98	10.66	7.100	0.329	0.0	0.0	0.0	0.19	49.1	48.7
2.001	32.97	15.76	7.021	0.513	0.0	0.0	0.0	0.19	62.3	61.1
2.002	32.01	16.59	6.947	0.716	0.0	0.0	0.0	0.20	83.5	82.8
3.000	50.00	5.09	6.900	0.275	0.0	0.0	0.0	0.90	63.8	49.7
1.004	50.00	5.06	6.800	0.000	30.0	0.0	0.0	2.93	323.6	30.0

Storage Structures for Storm

Tank or Pond Manhole: Stock Ditch, DS/PN: 1.004

Invert Level (m) 6.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	4278.0	0.600	5541.0

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 332964 183552 ST 32964 83552
Data Type	Point
Cv (Summer)	0.606
Cv (Winter)	0.801

Margin for Flood Risk Warning (mm)	50.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1.1	720 Winter	100	+40%				
1.001	S1.2	720 Winter	100	+40%				
1.002	S1.3	720 Winter	100	+40%				
1.003	S1.4	720 Winter	100	+40%				
2.000	S2.1	720 Winter	100	+40%				
2.001	S2.2	720 Winter	100	+40%				
2.002	S2.3	720 Winter	100	+40%				
3.000	SW1	720 Winter	100	+40%	100/60 Summer			
1.004	Stock Ditch	720 Winter	100	+40%	100/60 Winter			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.1	7.361	-0.089	0.000	0.08		15.1	OK	
1.001	S1.2	7.360	-0.090	0.000	0.07		41.7	OK	
1.002	S1.3	7.360	-0.090	0.000	0.05		45.2	OK	
1.003	S1.4	7.360	-0.090	0.000	0.04		47.2	OK	
2.000	S2.1	7.360	-0.090	0.000	0.07		17.1	OK	
2.001	S2.2	7.361	-0.089	0.000	0.05		23.9	OK	
2.002	S2.3	7.361	-0.089	0.000	0.04		29.7	OK	
3.000	SW1	7.361	0.161	0.000	0.31		14.3	SURCHARGED	
1.004	Stock Ditch	7.360	0.185	0.000	0.15		29.9	FLOOD RISK*	

Notes

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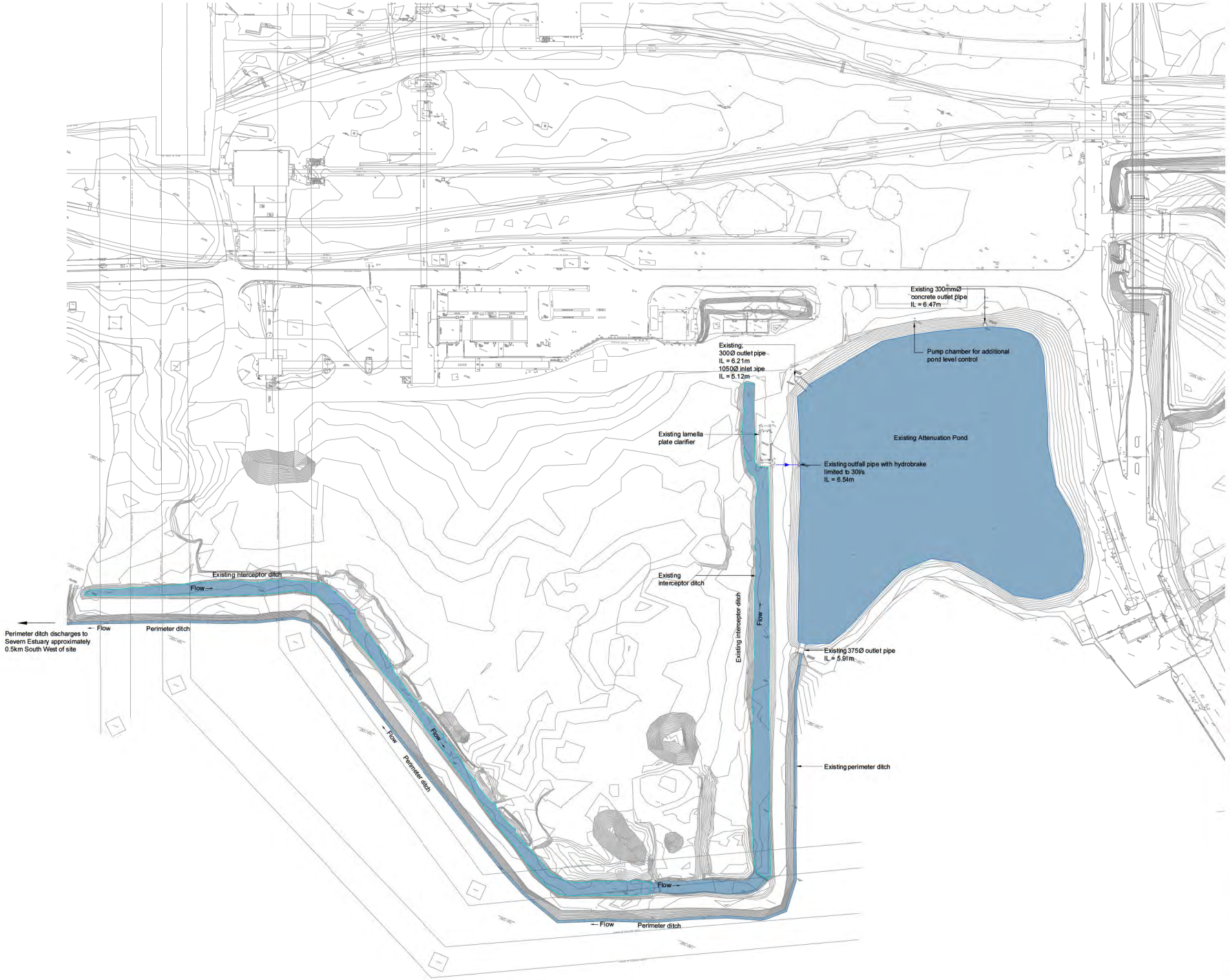

Rev	Description	By	Ckd	Date
P02	Amended in accordance with client comment.	MB	LJS	26.03.20
P01	First Issue.	CW	LJS	16.03.20

RPS MAKING COMPLEX EASY

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Client: SIMEC ATLANTIS ENERGY

Project: Simec Uskmouth Power Station Conversion SUP

Title: Existing Drainage

RPS Project Number	Scale @ A1	Date Created
NK019784	1:750	16.03.2020
Task Team Manager	**Information Author**	**Task Information Manager**
GB	CW	LJS

Status: S2 (Suitable for Information)

Document Number: 019784-RPS-SI-ZZ-DR-D-0300

Revision: P02

Project Code - Originator - Zone - Level - Type - Role - Drawing Number

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Key:

- ***mm@1:60 — FW Drain (I/D & Gradient)
- ***mm@1:300 — SW Drain (I/D & Gradient)
- Liner Drainage
- S1 — SW Manhole
- Area of existing drainage enhancement
- Containment area
- Headwall
- Attenuation Pond/Ditch
- Grassed Conveyance Swale

Localised enhancements to existing drainage assets TBC at detailed design sage.

Slot Drain

Interceptor

SW1

PN 3.092
300mm3
@ 1:295

Existing pumping station for pond level control

Existing lamella plate clarifier for sediment / pollution control

Existing hydrobrake and outfall pipe limited to 3l/s

Existing Attenuation Pond

S1.1
CL 7.450mAOD
IL 7.100mAOD
Bed width 0.9m

Crossfall

Swale

S1.3
CL 7.450mAOD
IL 7.018mAOD
Bed width 2.4m

S2.1
CL 7.450mAOD
IL 7.1mAOD
Bed width 1.3m

S1.1
CL 7.450mAOD
IL 6.933mAOD
Bed width 2.6m

S2.2
CL 7.450mAOD
IL 7.021mAOD
Bed width 1.7m

Localised widening of interceptor ditch

Existing interceptor ditch

Flow

Perimeter ditch discharges to Severn Estuary approximately 0.5km South West of site

Perimeter ditch

B

B

A

A

S1.1
CL 7.450mAOD
IL 6.859mAOD
Bed width 3m

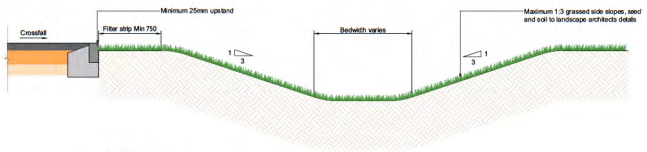
S2.3
CL 7.450mAOD
IL 6.947mAOD
Bed width 2.3m

Existing interceptor ditch extent

Area of interceptor ditch to be enlarged for surface water attenuation

Existing vegetation to be retained and enhanced where necessary TBC with landscape architect at detailed design stage

Section B-B
Typical section through remediated existing interceptor ditch
Scale 1:25



Section A-A
Typical section through proposed conveyance swale
Scale 1:25

Rev	Description	By	Ckd	Date
P02	Amended in accordance with client comment.	MB	LJS	26.03.20
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Project: Simec Uskmouth Power Station Conversion SUP

Title: Indicative Drainage Layout

RPS Project Number	Scale @ A0	Date Created
NK019784	1:500	16.03.2020
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