

Proposed Surface Water Drainage Strategy Report
GTX001 | Site Infrastructure
Gartree 2

661277-0000-PEV-GTX001 | ZZ-RP-C-0503

Issue Number P03

S3 – Suitable for Review and Comment

13/08/2021



Ministry of
JUSTICE

Security Classification:
OFFICIAL

Document History

Issue	Date	Comment	Author	Chk'd
P01	27/04/2021	First issue.	PCA	MHA
P02	01/06/2021	Minor revisions following comments.	PCA	MHA
P03	13/08/2021	Minor revisions following comments.	PCA	MHA

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1.0 Introduction

This Surface Water Drainage Strategy Report has been produced to support an Outline Planning Application with all matters reserved except for access and scale for the construction of a new Category B prison of up to 82,555sqm GEA within a secure perimeter fence together with access parking, landscaping and associated engineering works on land adjacent to HMP Gartree, Gallow Field Rd, Market Harborough, Leicestershire LE16 7RP

The indicative site layout proposes a range of buildings and facilities typical of a Category B resettlement prison, including:

- Seven new houseblocks each accommodating up to 245 prisoners (1,715 prisoners in total), totalling c.53,122 sqm GEA
- Supporting development including kitchen, workshops, kennels, Entrance Resource Hub, Central Services Hub and support buildings, totalling c. 29,433 sqm GEA
- Ancillary development including car parking (c. 523 spaces), internal road layout and perimeter fencing totalling 1463 linear meters enclosing a secure perimeter area of 11.69 ha.

The house blocks will be four storeys in height, whilst the other buildings will range from one to three storeys.

Other development proposed includes kennels, polytunnels, car parking (c. 523 spaces), internal road layout and perimeter fencing. A bicycle shelter is also proposed.

The new prison will be designed and built to be highly sustainable and to exceed local and national planning policy requirements in terms of sustainability. MoJ's aspirations include targeting near zero carbon operations, 10% biodiversity net gain, and at least BREEAM 'Excellent' certification, with endeavours to achieving BREEAM 'Outstanding'.

The drainage strategy has been produced in accordance with the DEFRA Guide, Non-Statutory Technical Standards for Sustainable Drainage Systems and the requirements of the National Planning Policy Framework (NPPF).

In addition, the following planning policies on flooding/SuDS from the Harborough Local Plan (adopted in April 2019) have been addressed by the surface water drainage and SuDS proposals for this site;

- Policy CC3 – Managing Flood Risk: New development should take place in the areas of lowest risk of flooding, including the potential future risk due to climate change. Site specific Flood Risk Assessments will be required.
- Policy CC4 – Sustainable Drainage: All major development must incorporate sustainable drainage systems (SuDS).

2.0 Site Description

2.1 Existing Site

The proposed site is located adjacent to the existing HMP Gartree facility, and is around 50% longer in the east to west dimension as in the north to south dimension. The site is currently mostly grassland / farmland, with an asphalt track running through the eastern side of the site.

The site is bounded to the north by the existing HMP Gartree site, and to the west by Welland Avenue and the village of Gartree. To the south and east of the site lie open fields. An open surface water ditch runs north east to south west, roughly dividing the site in half.

A review of the topographical survey indicates the site generally falls from the western and eastern boundaries towards the central surface water ditch. The western side falls around 8m from the boundary to the top of the ditch bank, and the eastern side around 5m. This ditch itself is around 2.5m deep from the top of bank level. In addition, the ditch falls by around 7m from north to south across the site.

A Flood Risk Assessment (FRA) has been undertaken which confirms the site is in Flood Zone 1, and reference should be made to the FRA when reviewing this Surface Water Drainage Strategy report.

2.2 Proposed Site

The site is to be developed to provide a new prison, to provide facilities for up to 1715 residents. Accommodation will be provided in 7 houseblocks, with a number of additional support buildings providing all necessary facilities. While there will be a requirement for site roads, and areas of hardstanding, there will also be areas allocated to planting and green spaces. The proposed site layout plan has been used to develop the proposed surface water drainage strategy, and is shown on the drawings in the Appendix.

3.0 Surface Water Drainage Strategy

3.1 Existing Surface Water Drainage

The existing site is entirely greenfield land, and as such there is no known formal surface water drainage serving the site.

The existing surface water ditch that crosses the site is to be diverted to run around the western and southern boundaries of the proposed site, via new buried pipework.

Initial Greenfield run-off rates have been calculated for the Gartree 2 development site, and are shown in the table below.

Table I – Greenfield Run-off Calculations

Return Period (Years)	Greenfield Discharge Rate (l/s)
QBar	89
1	73
30	173
100	227

3.2 SuDS Introduction

The SuDS hierarchy requires that surface water run-off is controlled and preferably re-used wherever possible. In the event that it cannot be re-used it should be disposed of to a receptor in the order described in the Building Regulations Approved Document Part H and CIRIA C753 The SuDS Manual 2015:

- Via infiltration,
- To watercourse, and finally,
- To sewers.

3.3 SuDS Strategy

Surface water run-off should preferably be discharged via infiltration. Further ground investigation works are proposed, in order to determine the suitability of this option and all further options outlined as part of the surface water drainage strategy.

It is anticipated that surface water flows will be discharged via new connections to the diverted/culverted surface water ditch. In conjunction with this approach, attenuation is likely to be required. This can take many forms, including below ground cellular storage tanks, and also surface level ponds and detention tanks. Please refer to the proposals plan in the appendix for further details.

CIRIA C753 requires that surface water run-off is treated to improve the quality of the discharge water so that it does not negatively impact on the quality of the receiving watercourse or groundwater. Flows from roofs generally require a single stage of treatment, whereas flows from roads, car parks and yard areas generally require two stages of treatment.

The table below discusses types of SuDS (taken from C753), and whether they might be utilised at this site, to provide a contribution to either attenuation and/or treatment of the surface water flows. The final choice of SuDS treatment train elements will be confirmed at the detailed design stage.

3.4 SuDS Strategy Site Assessment

SuDS Component	Site Suitability	Comments
Green roofs	✓	Potential to be used to provide at source treatment and control, subject to financial viability, M&E plant requirements, and building form.
Soakaways	✓	May be suitable, depending on ground conditions.

Rainwater harvesting systems	✓	Potential to be utilised for W.C. flushing etc. to reduce the use of potable water for the development, subject to client approval and acceptance.
Filter strips	✓	Potential to be used to convey surface water flows from footpaths and road adjacent soft landscaping.
Filter trenches	✓	Potential to be used to convey surface water flows from footpaths and road adjacent soft landscaping.
Infiltration trenches	✓	Potentially suitable, depending on ground conditions and space availability.
Swales	✓	Potentially suitable to convey surface water flows from footpaths and roads adjacent soft landscaping.
Bioretention	✓	Potential to be used to convey surface water flows from footpaths and road adjacent soft landscaping.
Pervious pavements	✓	Potential to be used for collection, attenuation and discharge of the surface water flows from the car park areas.
Geocellular systems	✓	Suitable to be used for attenuation and discharge of surface water run-off.
Infiltration basins	✓	Potentially suitable depending on ground.
Attenuation basins	✓	As Infiltration Basins above.
Ponds	✓	As Infiltration Basins above.
Stormwater wetlands	✓	As Infiltration Basins above.
Proprietary Devices	✓	Not preferred due to ongoing maintenance requirements but can provide suitable treatment if required.
Rain gardens	✓	Could be utilised to prevent run-off from small events from leaving the site.

3.5 Surface Water Drainage Strategy

An outline surface water drainage and SuDS strategy drawing has been developed for this site, and is included in the Appendix to this report. The approach to surface water drainage is outlined in the following report sections. The site is split into three sections, generally separated to suit the proposed level design across the site.

3.5.1 Western Section Surface Water Drainage

The Western Section Network drains surface water runoff from the car parks to the west of the site. The new surface water drainage discharges into a collector drain, which in turn discharges to new surface level detention ponds, located to the east of the car park. The detention ponds will be designed to provide a permanent depth of water, delivering ecological benefits.

The ponds will be interconnected, and will drain via new pipework to the south and then east, to finally discharge into the retained section of the existing site surface water ditch.

Appropriate levels of treatment will be provided, and oil/petrol interceptors included as required, Attenuation storage will be provided in the form of geocellular crates, although the option of permeable paving with tanked storage beneath is also to be investigated in the subsequent design stages.

3.5.2 Central Section Surface Water Drainage

The central section of the site includes all support buildings (with the exception of CASU), and one houseblock. The proposed surface water drainage network collects runoff from roof and road areas, and runs in a generally westerly direction. Oil/petrol interceptors are provided, in addition to geocellular attenuation storage beneath a yard area, before the Central network outfalls to the collector drain that also serves the car parks as outlined above.

3.5.3 Eastern Section Surface Water Drainage

Surface water runoff from the Eastern Section of the site, containing six houseblocks and the CASU buildings, will drain via a new below ground network running generally in a southerly direction, before discharging into the retained section of the existing site surface water ditch, Attenuation will be provided, in the form of below ground attenuation crates, currently to be located beneath the football pitch, and individual MUGA pitches.



Appropriate levels of treatment will be provided, and oil/petrol interceptors included as required.

4.0 Conclusions












An outline surface water drainage strategy drawing has been prepared for this site, which includes the principles of SuDS into the surface water drainage design. Further details will be developed in subsequent project stages.

Appendix A

661277-0000-PEV-GTX0011-ZZ-DR-C-0511_Proposed Surface Water Drainage Strategy

	This symbol identifies a Residual Risk that is recorded on the Design Risk Register and is relevant to this drawing. This drawing must be read in conjunction with the following project CDM documents: 661277-0000-PEV-GTX0011-XX-HS-C-002_Design Risk Assessment
	This symbol identifies a Derogation that is recorded on the Derogation Schedule and is relevant to this drawing. This drawing must be read in conjunction with the following project Derogation documents: N/A


The above symbols can only be read when this drawing is in colour print

KEY:	
	- PROPOSED SURFACE WATER SEWER.
	- PROPOSED CHANNEL DRAINS.
	- PROPOSED SITE BOUNDARY (TBC).
	- INDICATIVE MoJ PROPERTY LINE.
	- SW INSPECTION CHAMBER.
	- SW ACCESS CHAMBER (MANHOLE).
	- UNDERGROUND GEO-CELLULAR ATTENUATION TANK (DETAILS TBC).
	- PETROL INTERCEPTOR (TBC).
	- PONDS/STORAGE ATTENUATION TANKS (DETAILS TBC).
	- EXISTING DITCH TO BE DIVERTED AND BACKFILLED (DETAILS TBC).
	- DITCH DIVERSION PIPE (TBC).

P04	2021.05.24	RED BOUNDARY UPDATED.CSH GYM EXTENDED.
P03	2021.04.26	SITE LAYOUT UPDATED. ISSUED FOR OPA.
P02	2021.02.18	SUITABILITY STATUS REVISION.
P01	2021.02.12	FIRST ISSUE.
Rev	Date	Description

This document references the following linked files		
File Reference	Status	Revision
N/A	N/A	N/A

Project Status
RIBA Stage 2

Client

Ministry of Justice
Ministry of Justice, 102 Petty France, London, SW1H 9AJ


Project
New Prisons Programme

Project Description / Site
New Prisons Programme
Gartree 2

Project Address
Site Adjacent to HMP Gartree

Building Type
Site Infrastructure

Drawing Title
Proposed Surface Water Drainage Strategy

Originator Logo 	Drawn By JAS	Date 12.02.21
	Checked By PCA	Date 12.02.21
	Approved By PCA	Date 12.02.21

Drawing Number
661277-0000-PEV-GTX0011-ZR-DR-C-0511

Delref
D0100

Sheet No.
01 of 01

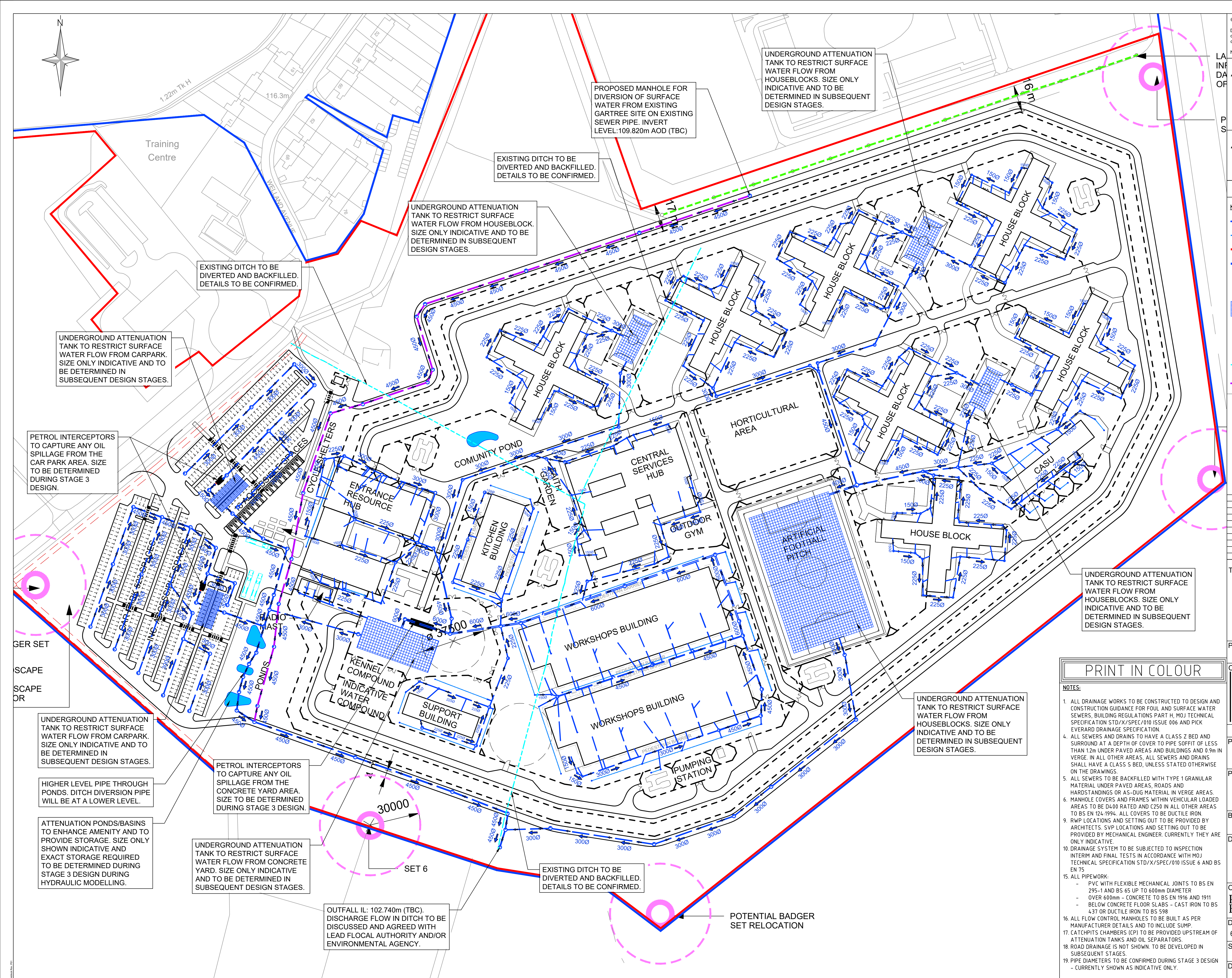
Scale
1: 1000

Orig. Sheet Size
@ A1

Rev.
P04

Data Security Classification
OFFICIAL

Suitability
S3



PRINT IN COLOUR

NOTES:

- ALL DRAINAGE WORKS TO BE CONSTRUCTED TO DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS, BUILDING REGULATIONS PART H, MOJ TECHNICAL SPECIFICATION STD/X/SPEC/010 ISSUE 006 AND PICK EVERARD DRAINAGE SPECIFICATION.
- ALL SEWERS AND DRAINS TO HAVE A CLASS 2 BED AND SURROUND AT A DEPTH OF COVER TO PIPE SOFFIT OF LESS THAN 1.2m UNDER PAVED AREAS AND BUILDINGS AND 0.9m IN VERGE. IN ALL OTHER AREAS, ALL SEWERS AND DRAINS SHALL HAVE A CLASS S BED, UNLESS STATED OTHERWISE ON THE DRAWINGS.
- ALL SEWERS TO BE BACKFILLED WITH TYPE 1 GRANULAR MATERIAL UNDER PAVED AREAS, ROADS AND HARDSTANDINGS OR AS-DUG MATERIAL IN VERGE AREAS. MANHOLE COVERS AND FRAMES WITHIN VEHICULAR LOADED AREAS TO BE D400 RATED AND C250 IN ALL OTHER AREAS TO BS EN 124-1994. ALL COVERS TO BE DUCTILE IRON.
- RWP LOCATIONS AND SETTING OUT TO BE PROVIDED BY ARCHITECTS. SVP LOCATIONS AND SETTING OUT TO BE PROVIDED BY MECHANICAL ENGINEER. CURRENTLY THEY ARE ONLY INDICATIVE.
- DRAINAGE SYSTEM TO BE SUBJECTED TO INSPECTION INTERIM AND FINAL TESTS IN ACCORDANCE WITH MOJ TECHNICAL SPECIFICATION STD/X/SPEC/010 ISSUE 6 AND BS EN 75
- ALL PIPEWORK:
 - PVC WITH FLEXIBLE MECHANICAL JOINTS TO BS EN 295-1 AND BS 65 UP TO 600mm DIAMETER
 - OVER 600mm - CONCRETE TO BS EN 1916 AND 1911
 - BELOW CONCRETE FLOOR SLABS - CAST IRON TO BS 637 OR DUCTILE IRON TO BS 598
- ALL FLOW CONTROL MANHOLES TO BE BUILT AS PER MANUFACTURER DETAILS AND TO INCLUDE SUMP.
- CATCHPITS CHAMBERS (CP) TO BE PROVIDED UPSTREAM OF ATTENUATION TANKS AND OIL SEPARATORS.
- ROAD DRAINAGE IS NOT SHOWN. TO BE DEVELOPED IN SUBSEQUENT STAGES.
- PIPE DIAMETERS TO BE CONFIRMED DURING STAGE 3 DESIGN - CURRENTLY SHOWN AS INDICATIVE ONLY.