London City Airport
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City Airport Development Programme (CADP1)

Condition 69: Sustainable Drainage Systems

ATKINS

May v2. 2018

Table of Contents

Chapter Pages

Project Glossary of Abbreviations 3

1. Introduction 4

2. Approved Surface Water Drainage Strategy in UES 9
2.1. Summary of the Approved UES Surface Water Drainage Strategy 9

3. Proposed CADP1 Drainage Scheme – Technical Detail for Approval 13
3.1. Key Constraints 13
3.2. Flow Reduction – Proposed Strategy 17
3.3. Scheme Details - Airside 20
3.4. Scheme Details - Landside 22
3.5. Phasing of Delivery 25

4. Conclusion 26

Appendices 27

Appendix A. 28
A.1. Airside Drainage Drawings 28
A.2. Airside Drainage Calculations 48

Appendix B. 60
B.1. Landside Drainage Drawings 60
B.2. Landside Drainage Calculations 82

Appendix C. 184
C.1. Thames Water Meeting MoM 184
C.2. Thames Water Correspondence 187

Tables

Table 2-1 Summary of CADP1 Drainage as per the Approved UES 'Proposed Surface Water Drainage Strategy' 10
Table 3-1 Summary of CADP1 drainage, including restricted flows within Dockside Sub-Catchment 1 and ,2 demonstrating the proposed flow rates provide a net flow reduction of 44% from the current drainage regime. 16
Table 3-2 Flow rates for manholes as illustrated in considering topology of the land and assuming some flow the dockside areas will discharge directly into the adjacent dock..... 17

Figures

Figure 1-1 Extent of CADP1 delivered by CADP Construction Plan..... 8
Figure 2-1 Existing Drainage of Areas to be developed as part of CADP1 11
Figure 2-2 Proposed Drainage for the CADP1 (as per Approved UES) 12
Figure 3-1 Manholes areas drain to in DSC1 and DSC2 including those with restricted flow highlighted in red. Not to scale. (Extract from Figure 2-1) 16
Figure 3-2 Extract of A400-TPS-C-00-L00-DR-GA-864-205 Showing Airside Catchments 18

Project Glossary of Abbreviations

Project Glossary of Abbreviations	
Acronym	**Meaning**
AOD	Above Ordnance Datum
BOD	Biochemical Oxygen Demand
CADP	City Airport Development Programme
EA	Environment Agency
ETE	East Terminal Extension
KGV	King George V (dock)
SuDS	Sustainable Drainage Systems
TW	Thames Water
UES	Updated Environmental Statement
WEC	Western Energy Centre
WSY	Western Service Yard
WTE	West Terminal Extension
DSC(1)	Dockside Sub-Catchment (1)

1. Introduction

1.1.1. The City Airport Development Programme (CADP1) planning application (13/01228/FUL) was granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March/April 2016.

1.1.2. On 5th January 2017, the London Borough of Newham (LBN) approved some minor non-material design changes to the appearance of the western and southern elevations of the Western Terminal Extension (WTE). A further non-material amendment (17/02865/NONMAT) to the Planning Permission was approved on 27 September 2017 for minor amendments to the terminal buildings and associated service yard, East Pier, forecourt and decked car park. The approved minor amendments have been incorporated into the details provided to satisfy this condition.

1.1.3. Condition 69 requires that:

a) *No phase of the development shall be commenced until a Surface Water Drainage Scheme for that Phase, based on sustainable drainage principles and an assessment of the hydrological and hydrogeological context of the Development, has been submitted to and approved in writing by the Local Planning Authority.*

b) *Each approved scheme shall be consistent with the agreed Flood Risk Assessment and shall include details of runoff and surface water storage in the Phase as outlined in the Flood Risk Assessment.*

c) *Each scheme as approved above shall be implemented before the relevant Phase is used or occupied.*

Reason: to prevent the increased risk of flooding to third parties and; to the site itself; to improve water quality; to enhance biodiversity; and to ensure future maintenance of the surface water drainage system.

1.1.4. The Airport submitted a Construction Phasing Plan to LBN pursuant to Condition 4 of the CADP1 permission in February 2017. It was proposed to build out CADP1 as a single uninterrupted period of construction over 5 years split into two distinct phases. Consistent with terminology used in the Updated Environmental Statement (UES), the two phases were referred to as the 'Interim Works' and the 'Completed Works' – each delivering different parts of the CADP infrastructure. The Interim Works would be delivered first and would be immediately followed by the Completed Works. This Construction Phasing Plan was approved by LBN in March 2017 (ref. 17/00500/AOD) and the details pursuant to Condition 69 for the 'Interim Works' were also approved at the same time (ref. 17/00778/AOD).

Scope of Accelerated Construction Plan

1.1.5. Ahead of the commencement of construction of CADP1, the Airport's Delivery Partner has identified a number of programme efficiencies and improvements to the 5 year build which could reduce the duration of the construction programme by approximately one year (12 months) and deliver the full CADP1 infrastructure in an accelerated single phase. This is hereafter referred to as the *Accelerated Construction Phasing Plan*.

1.1.6. The improved *Accelerated Construction Phasing Plan* comprises a construction programme likely to be 4 years (48 months), compared to 5 years (60 months) under the previously approved *Construction Phasing Plan* (March 2017), and 5 years and 2 months (62 months) under the *2015 Accelerated Construction Programme* which was assessed in the UES.

1.1.7. The proposed drainage scheme is consistent with the approved UES, which sought to deliver an overall flow reduction of 63%. This is being achieved, however the proposed infrastructure only needs to deliver a 44% reduction in flows as the existing flow restriction devices, which were not taken into account in previous calculations, are already delivering 19% reductions.

1.1.8. Thames Water and the Environment Agency were previously consulted on the approved details under PCC69 for the Interim Works and raised no objections. They were also consulted on this application prior to formal submission and similarly raised no concerns. Refer to Appendix C.2

1.1.9. This submission seeks approval of the Surface Water Drainage Scheme pursuant to Condition 69 for all of the approved CADP1 infrastructure to be delivered by the new *Accelerated Construction Phasing Plan* (see Figure 1-1 at the end of this Introduction for the scope) as summarised below:

- Proposed airside drainage scheme for the proposed airfield as presented in Section 3.3 of this report.
- Proposed landside drainage scheme for the Western Service Yard, Forecourt and Dockside areas as presented in Section 3.4 of this report.

1.1.10. The plans submitted as part of this report for approval are at Appendix A-1 and B-1 and are listed as follows:

Originator	Drawing title	Drawing Number	Status
TPS	**Drainage Scheme Catchment Areas**	A400-TPS-C-00-L00-DR-GA-864-205	For information
TPS	**Proposed Drainage Layout Sheet 1**	A400-TPS-C-00-L00-DR-GA-864-206	For approval
TPS	**Proposed Drainage Layout Sheet 2**	A400-TPS-C-00-L00-DR-GA-864-207	For approval
TPS	**Proposed Drainage Layout Sheet 3**	A400-TPS-C-00-L00-DR-GA-864-208	For approval
TPS	**Proposed Drainage Layout Sheet 4**	A400-TPS-C-00-L00-DR-GA-864-209	For approval
TPS	**Proposed Drainage Longitudinal Sections Sheet 1**	A400-TPS-C-00-XXX-DR-SE-864-201	For information
TPS	**Proposed Drainage Longitudinal Sections Sheet 2**	A400-TPS-C-00-XXX-DR-SE-864-202	For information
TPS	**Proposed Drainage Longitudinal Sections Sheet 3**	A400-TPS-C-00-XXX-DR-SE-864-203	For information

TPS	**Proposed Drainage Longitudinal Sections Sheet 4**	A400-TPS-C-00-XXX-DR-SE-864-204	For information
TPS	**Proposed Drainage Longitudinal Sections Sheet 5**	A400-TPS-C-00-XXX-DR-SE-864-205	For information
TPS	**Proposed Drainage Longitudinal Sections Sheet 6**	A400-TPS-C-00-XXX-DR-SE-864-206	For information
TPS	**Airfield Drainage Details – Sheet 1**	A400-TPS-C-00-XXX-DR-DE-864-001	For approval
TPS	**Airfield Drainage Details – Sheet 2**	A400-TPS-C-00-XXX-DR-DE-864-002	For approval
TPS	**Airfield Drainage Details – Sheet 3**	A400-TPS-C-00-XXX-DR-DE-864-003	For approval
TPS	**Airfield Drainage Details – Sheet 4**	A400-TPS-C-00-XXX-DR-DE-864-004	For approval
TPS	**Airfield Drainage Details – Sheet 5**	A400-TPS-C-00-XXX-DR-DE-864-005	For approval
TPS	**Airfield Drainage Details – Sheet 6**	A400-TPS-C-00-XXX-DR-DE-864-006	For approval
TPS	**Drainage Scheme MicroDrainage Network**	A400-TPS-C-00-L00-DR-GA-864-210	For information
TPS	**Existing Surface Water Drainage**	A400-TPS-C-00-L00-DR-GA-864-211	For information
Atkins	**Typical Landside Attenuation Tank Detail**	-	For information
Atkins	**Typical Oil Separator Detail**	-	For information
Atkins	**Stage 3 Western Service Yard Proposed Surface Water Drainage Sheet 1 of 2**	A400-ATK-C-30-XXX-XX-DR-GA-864-101	For approval
Atkins	**Stage 3 Western Service Yard Proposed Surface Water Drainage Sheet 2 of 2**	A400-ATK-C-30-XXX-XX-DR-GA-864-102	For approval
Atkins	**Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 1 of 4**	A400-ATK-C-36-XXX-XX-DR-GA-864-101	For approval
Atkins	**Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 2 of 4**	A400-ATK-C-36-XXX-XX-DR-GA-864-102	For approval
Atkins	**Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 3 of 4**	A400-ATK-C-36-XXX-XX-DR-GA-864-103	For approval

Atkins	**Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 4 of 4**	A400-ATK-C-36-XXX-XX-DR-GA-864-104	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (1 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-101	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (2 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-102	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (3 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-103	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (4 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-104	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (5 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-105	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (6 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-106	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (7 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-107	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (8 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-108	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (9 of 12)**	A400-ATK-C-40-XXX-DR-XX-GA-864-109	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (10 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-110	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (11 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-111	For approval
Atkins	**Stage 3 Dockside Proposed Surface Water Drainage Layout (12 of 12)**	A400-ATK-C-40-XXX-XX-DR-GA-864-112	For approval

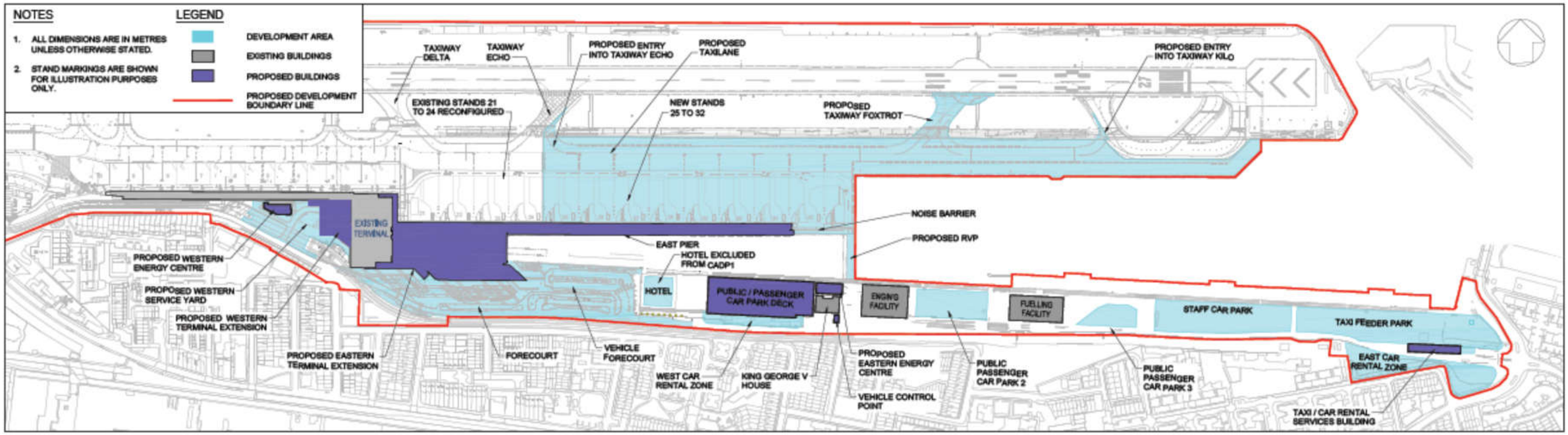

Figure 1-1 Extent of CADP1 delivered by CADP Construction Plan

2. Approved Surface Water Drainage Strategy in UES

2.1. Summary of the Approved UES Surface Water Drainage Strategy

2.1.1. The CADP1 'Proposed Surface Water Drainage Strategy' was included as an appendix to the UES and set out the drainage strategy for the full build out of CADP1.

2.1.2. The Strategy achieves an overall 63% reduction in flow rates in comparison with the existing flows from the site for CADP1 (shown at Appendix A), based on the assumption of existing unrestricted flows. This is achieved by incorporating the following SuDS infrastructure:

- A new airside attenuation tank (circa 1200m^3) and pumping station on the airfield within the grassed area to minimise flows to 300l/s from the new deck constructed above the dock (east of the Main Terminal Building).
- A new attenuation tank (circa 140m^3) and vortex flow control device in the Western Service Yard to minimise runoff to a discharge rate of 23.05l/s.
- A new attenuation tank (circa 1,215m^3) and vortex flow control device in the proposed Forecourt (mainly encompassing the existing Forecourt and Short Stay car park) to minimise runoff to a discharge rate of 13.7l/s.
- Two new attenuation tanks (circa 1,000m^3 in total) and vortex flow control device in the Dockside sub-catchment 1 (mainly encompassing the existing Long Stay car park) to minimise runoff to a discharge rate of 10.6l/s.
- New attenuation tanks (circa 2500m^3 combined storage volume) and vortex flow control device in the Dockside sub-catchment 2 (i.e. Dockside Area east of KGV house) to minimise runoff to a discharge rate of 27.7l/s.

2.1.3. The overall principle of the CADP1 'Proposed Surface Water Drainage Strategy' is to offset increased airside discharge into the public drainage network by reducing flow from the landside areas and is outlined in Table 2-1.

2.1.4. Figure 2-1 provides an illustration of where the existing catchment areas at the Airport flow to and their estimated existing runoff rates. The proposed CADP1 flows incorporated in the Approved UES 'Proposed Surface Water Drainage Strategy' are shown in Figure 2-2.

Table 2-1 Summary of CADP1 Drainage as per the Approved UES 'Proposed Surface Water Drainage Strategy'

Catchment	Existing Flow Rate (l/s)	Proposed Catchment Area (ha)	Proposed Flow Rate (l/s)	Change in Flow Rate
Airside	0	7	300	-
WTE, WSY & WEC	46.1	0.48	23.05	-50%
Forecourt (and ETE Deck & Hartmann Road)	309.7	2.75	13.7	-96%
Dockside Sub-Catchment 1 (& Hartmann Road)	220.9	2.11	10.6	-95%
Dockside Sub-Catchment 2	431.7	5.54	27.7	-94%
Total	**1008.4**	**17.88**	**375.05**	**-63%**

Notes:

- Existing flow for the existing developed areas were based on a 50mm/hr (1:2 year) storm event over the entire catchment area, as recommended in Building Regulations (Document H) and Sewers for Adoption (7th Edition). This is less than the 1:15 year and 1:20 year rainfall events recommended by Thames Water (from the meeting dated 19/09/2016 – Appendix C.1).
- Proposed flows airside based on attenuated flows for a 1 in 30 year return period and proposed flows landside are calculated based on attenuated flows for a 1 in 30 year return period (+20% for climate change).
- The calculations assume a 100% runoff from the redeveloped site areas and free outfalls. However, from subsequent surveys Dockside Sub-Catchment 2 appears to have some existing flow restriction devices in the existing drainage network.
- Catchment areas shown indicatively on Figure 2-1 and Figure 2-2 below.

2.1.5. A flood risk assessment was also included as an appendix to UES and set out the drainage strategy for the full build out of CADP1. It considered the hydrogeological and hydrological setting (context) of the development.

2.1.6. This context is still valid for the proposed development and is not repeated here for brevity.

2.1.7. The conclusions from the report stated the following:

11.5 Overall, it has been demonstrated that the development would be safe, without increasing flood risk elsewhere, and that a positive reduction in flood risk would be achieved.

2.1.8. The Approved UES 'Proposed Surface Water Drainage Strategy' evaluated a number of SuDs technique options that could be incorporated as part of the proposed drainage network and recommended the following:

- Retention – Subsurface Storage.
- Infiltration – Soakaways. Using underground features, if ground conditions are suitable. Open water features are not deemed suitable due to insufficient room and bird strike risk.
- Source control – Rainwater harvesting for Arrivals Building (East Terminal Extension Building). Existing East Development Buildings deemed too difficult to retrofit and insufficient requirement for landscaping irrigation flows.

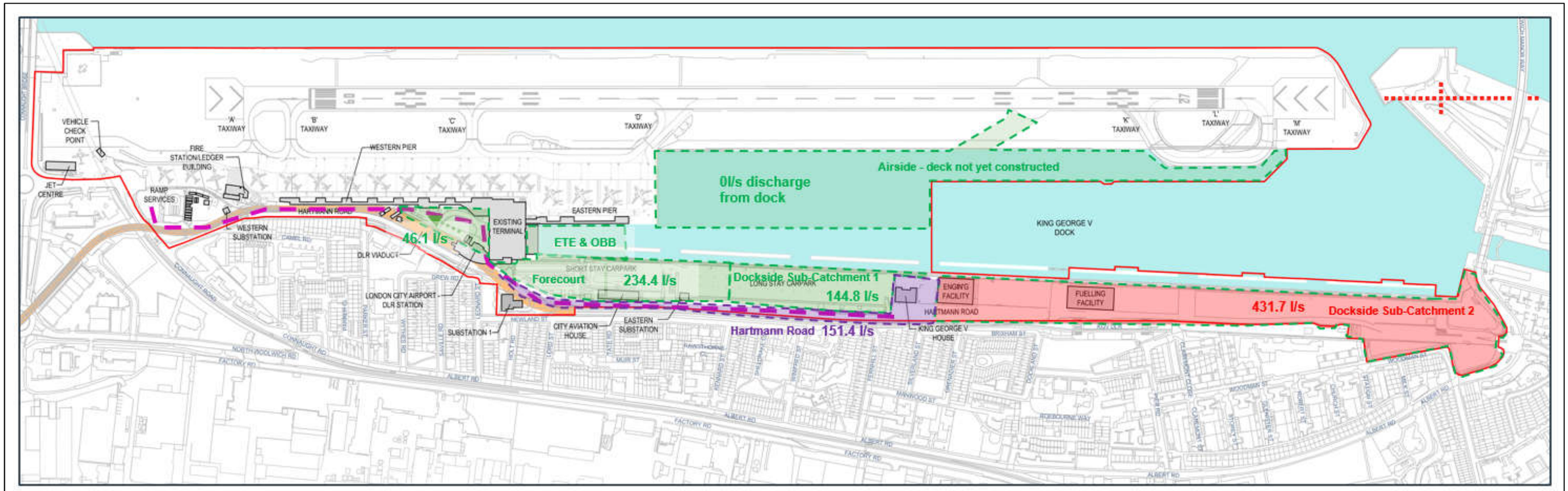

Figure 2-1 Existing Drainage of Areas to be developed as part of CADP1

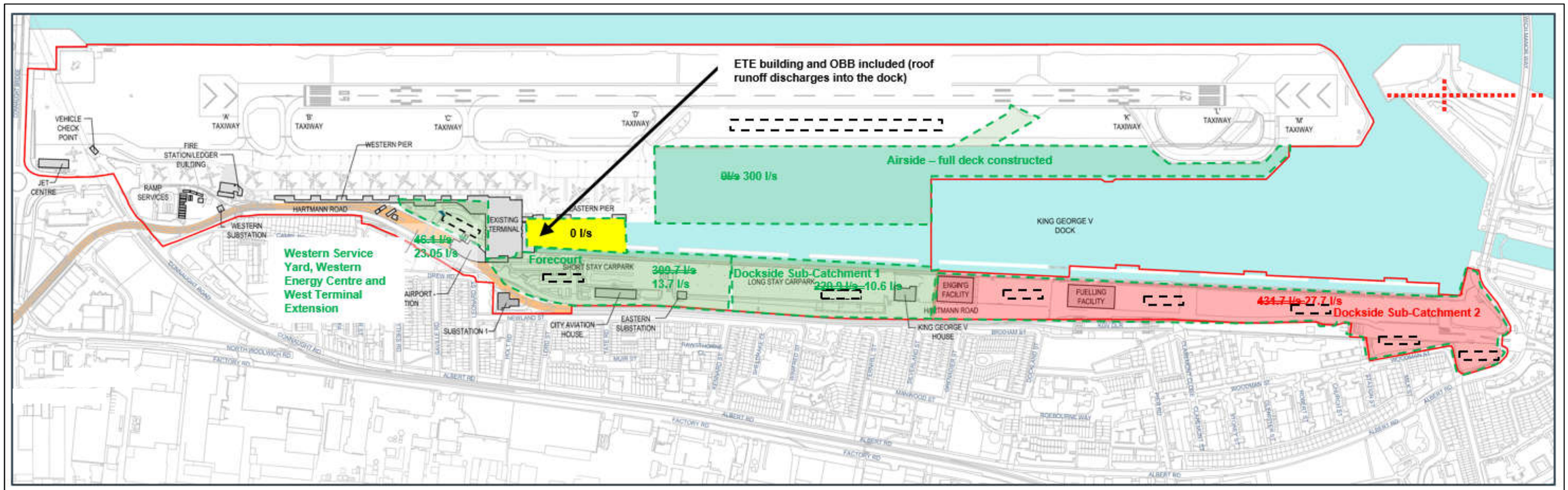

Figure 2-2 Proposed Drainage for the CADP1 (as per Approved UES)

3. Proposed CADP1 Drainage Scheme – Technical Detail for Approval

3.1. Key Constraints

3.1.1. The constraints considered in preparing the CADP1 Drainage Scheme as well as the Strategy in the UES are as explained under the following subheadings:

- Airside
- Landside

Airside

3.1.2. The airside site constraints have been identified in the Approved UES 'Proposed Surface Water Drainage Strategy' (ref: LCY-CADP-ATK-TPS-RPT-0001 – Rev 4.0 dated 12/07/13) particularly paragraphs 6.10 and 6.11 which states

6.10 The proposed Airside Area drainage system needs to consider the constraints of the environment in which it is being developed. These include the following:

- *The levels on the proposed deck need to reflect the existing infrastructure at their tie in on their western edge. This requires a slot drain positioned at a low point between the taxilane and the stands;*
- *Aircraft refuelling is performed on the aircraft stands and therefore the runoff should pass through oil separators which are not practical on the deck;*
- *The runoff collected in the slot drains needs to be piped off the deck in carrier drains. The only interface with the airfield deck and the ground is to the north; and*
- *This area of land to the north is constrained due to its location within the runway strip.*

6.11 Given the requirement to connect the drainage to the north, the following key constraints were identified:

- *The new development should be designed to prevent any increase in flooding of the existing airfield drainage system;*
- *The drainage systems in the runway strip are constrained due to airfield safeguarding. This rules out the majority of SuDS techniques;*
- *The attenuation tanks installed within the runway strip should be minimised where practical to limit the airfield safety and operational implications; and*
- *Any installations within the runway strip would need to be checked for their possible impact on the Airport's navigational aids.*

3.1.3. These constraints have been applied to the drainage design for CADP1. The construction of the full extent of the airfield deck creates additional surface runoff which would otherwise have fallen predominately into the KGV dock. This runoff will be attenuated before discharge to the drainage network but will still result in a net increase in flow from the airside site. This increase in flow will be offset by the reductions in flow into the same network from the landside development. In accordance with the Accelerated Construction Phasing Plan (May 2018) the landside attenuation will not be completed until the new car parks and forecourt on the existing land south of the Dock will be built out towards the end of the programme. Consequently, there will be a limited period during construction when there will be increased flows from the airfield into the Thames Water owned 1800mm diameter surface water sewer in the Royal Docks (Connaught Branch) until the additional attenuation is in place to deliver the agreed reductions in flow rate.

3.1.4. The temporary increase in flows during construction will be managed by the airport and its contractors through a combination of measures, potentially including control of flow rates and non-operational areas draining into KGV Dock. Detailed measures will be reviewed and agreed with Thames Water as the design and programme are finalised.

Landside

3.1.5. Some of the key constraints on the surface water drainage strategy and the landside drainage design are as follows:

- Ground Water table – in some areas of the site a high ground water table has been identified in site investigation works, which would negate the use of soakaways. This is as shallow as 2m deep in some cases, which would not allow a 1m freeboard as required in accordance with CIRIA C753 ‘This SuDS Manual’.
- Infiltration rates – ground investigation results revealed areas with low infiltration rates, suggesting ground conditions are unsuitable for infiltration in some areas based on the requirement of BRE Digest 365 ‘Soakaway Design’.
- Heavy vehicle loading – areas where heavy vehicle loading is expected would not be suitable for porous paving.
- Below ground structures – due to the potential for buried archaeology in the deeper/undisturbed ground, potential contamination and high risk of encountering existing buried underground structures (existing retained building foundations in the Dockside area), there is an environmental benefit to reducing the size of the tanks, as far as possible.

3.1.6. The proposed flows remain consistent with the UES. However, following the receipt of as-built information commissioned by AMEC ref: HA-INF-S06-DRG-66440 to …-66447, TMWDLR-HA-INF-NW-DRG-71052, TMWDLR-HA-INF-PW-DRG-85104 and survey information from MSA drawing ref: 4064-D, it is apparent that some of the existing drainage in the Dockside areas already contains attenuation in the form of flow restricting devices. As such, this means that some of the target overall reduction of 63% outlined in the Table 2-1 has already been achieved and therefore the reduction required to meet the target flow rates is 44%.

3.1.7. Table 2-1, earlier in the document, assumed no restricted flows.

3.1.8. Table 3-1 takes the restricted flows into account, illustrating the additional 44% reduction required to meet the overall target proposed flows.

Table 3-1 Summary of CADP1 drainage, including restricted flows within Dockside Sub-Catchment 1 and ,2 demonstrating the proposed flow rates provide a net flow reduction of 44% from the current drainage regime.

Catchment	Assumed Existing Flow Rate (l/s) (consistent with UES: Table 2-1)	Revised Existing Flow Rate (l/s) (with flow restrictions)	Proposed Catchment Area (ha) (consistent with UES: Table 2-1)	Proposed Flow Rate (l/s) (consistent with UES: Table 2-1)	Revised Change in Flow Rate
Airside	0	0	7	300	-
WTE, WSY & WEC	46.1	46.1	0.48	23.05	-50%
Forecourt (and ETE Deck & Hartmann Road)	309.7	309.7	2.75	13.7	-96%
Dockside Sub-Catchment 1 (& Hartmann Road)	220.9	178.6	2.11	10.6	-94%
Dockside Sub-Catchment 2	431.7	140.6	5.54	27.7	-80%
Total	**1008.4**	**675.0**	**17.88**	**375.05**	**-44%**

Notes:

- Existing flow for the existing developed areas were based on a 50mm/hr (1:2 year) storm event over the entire catchment area, as recommended in Building Regulations (Document H) and Sewers for Adoption (7th Edition). This is less than the 1:15 year and 1:20 year rainfall events recommended by Thames Water (from the meeting dated 19/09/2016 –Appendix 4.1.6.C.1C.1).
- Proposed flows airside based on attenuated flows for a 1 in 30 year return period and proposed flows landside are calculated based on attenuated flows for a 1 in 30 year return period (+20% for climate change).
- The calculations consider existing flow restriction devices in the existing drainage network as per
- Table 2-1 illustrates the change in assumed flow rates.

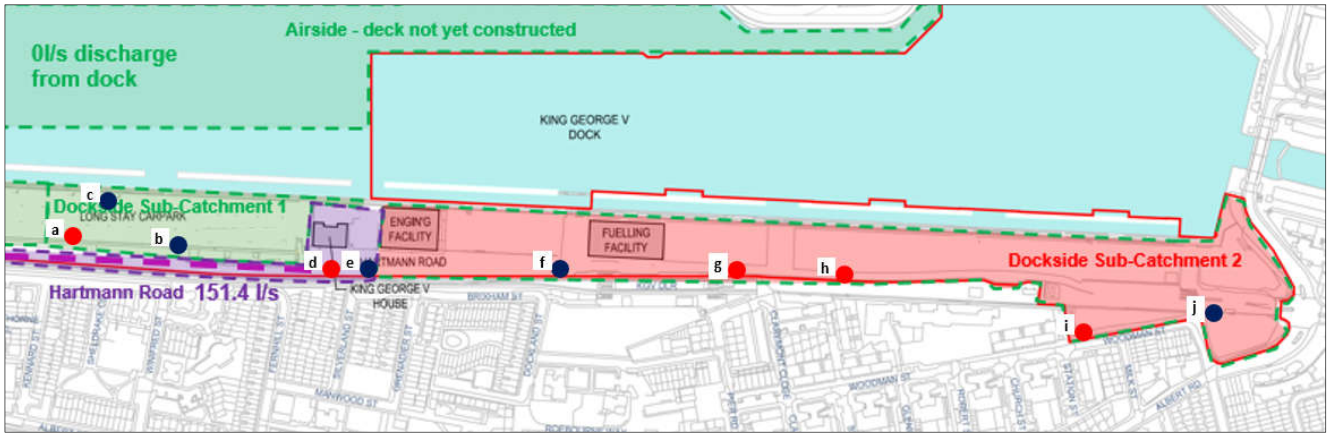

Figure 3-1 Manholes areas drain to in DSC1 and DSC2 including those with restricted flow highlighted in red. Not to scale. (Extract from Figure 2-1)

Table 3-2 Flow rates for manholes as illustrated in considering topology of the land and assuming some flow the dockside areas will discharge directly into the adjacent dock.

Ref.	Area	Name	Drainage Area (m^2)	Assumed flow rate (l/s)	Flow rate including restricted flows and drainage area instead of total area (l/s)
a	DSC1	MH_200	5788	80.4	10.0
b	DSC1	MH_197	963	13.4	13.4
c	DSC1	-	10454	145.2	145.2
d	DSC1	MH_81	3750	52.1	10.0
e	DSC1	MH_84	4126	57.3	57.3
f	DSC2	MH_93	2142	29.8	29.8
g	DSC2	MH_101	7230	100.4	10.0
h	DSC2	MH.113	5650	78.5	10.0
i	DSC2	MH_137	6519	90.6	10.0
j	DSC2	MH_140	1697	23.6	23.6

Notes:
DSC1 = Dockside Sub-Catchment 1
DSC2 = Dockside Sub-Catchment 2

3.2. Flow Reduction – Proposed Strategy

3.2.1. This scheme, consistent with the Approved UES 'Proposed Surface Water Drainage Strategy', has the base intent to reduce the existing flow rate from the proposed CADP1 to Greenfield runoff rates using SuDS techniques, wherever practical. However due to space constraints, Airport operations, possible archaeological assets and potential land contamination, the options to reduce the existing flow rate to Greenfield runoff rates are constrained, as outlined in the findings of the approved FRA and Drainage Strategy.

3.2.2. The airside CADP1 catchment areas are shown on drawing A400-TPS-C-00-L00-DR-GA-864-205 included at A.1 (extract in Figure 3-2 overleaf).

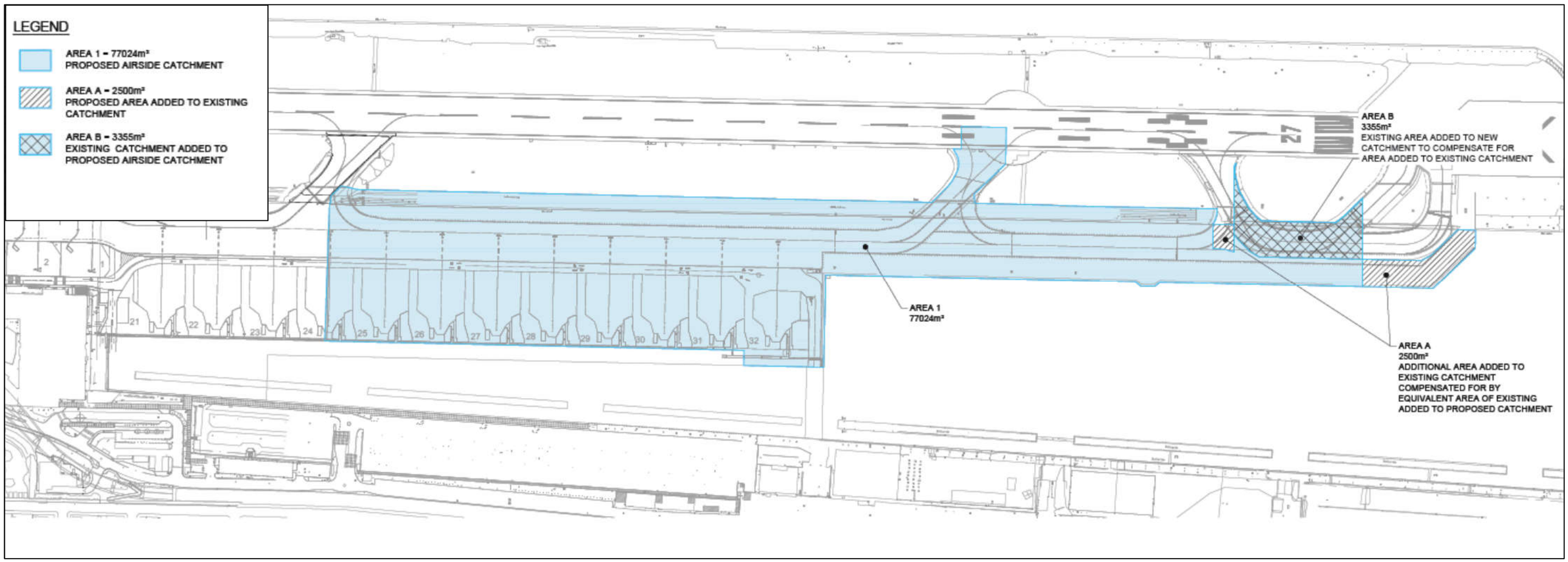

Figure 3-2 Extract of A400-TPS-C-00-L00-DR-GA-864-205 Showing Airside Catchments

3.2.3. The proposed works places additional drainage catchment around the existing pavement for the Hold 27 structure to the eastern end of the airfield. As the proposed pavement in this area is integrated with and drains across the existing pavement it is not practical to separate the existing and proposed catchments in this area. Therefore, the principle of compensatory areas has been adopted to ensure that more of the existing pavement is drained into the new system than the area of the new pavement drained into the existing system. This is shown on drawing A400-TPS-C-00-XXX-DR-GA-864-205 (Figure 3-2 or Appendix A) as Areas A and B. Area A of new pavement is the additional area added to the existing catchment, circa 2,500m^2. This is compensated by Area B of existing pavement, circa 3,355m^2 which is has been added to the new catchment.

3.2.4. The airfield drainage scheme for the above catchments is shown in more detail on the following drawings to be approved included in A.1:

- A400-TPS-C-00-L00-DR-GA-864-206: Airfield Proposed Drainage Layout Sheet 1
- A400-TPS-C-00-L00-DR-GA-864-207: Airfield Proposed Drainage Layout Sheet 2
- A400-TPS-C-00-L00-DR-GA-864-208: Airfield Proposed Drainage Layout Sheet 3
- A400-TPS-C-00-L00-DR-GA-864-209: Airfield Proposed Drainage Layout Sheet 4
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- A400-TPS-C-00-XXX-DR-DE-864-005: Airfield Drainage Details – Sheet 5
- A400-TPS-C-00-XXX-DR-DE-864-006: Airfield Drainage Details – Sheet 6

3.2.5. The deck will support the ETE and East Pier buildings and roof runoff will discharge directly into the Dock.

3.2.6. Overall, there is an increased discharge from the airside area which, unless balanced by reductions landside, would increase the flows into the Thames Water owned 1800mm diameter surface water sewer in the Royal Docks (Connaught Branch).

3.2.7. The CADP1 landside areas that will discharge into the 1800mm diameter Sewer are the Western Service Yard, West Terminal Extension, Western Energy Centre, Forecourt and Dockside sub-catchment 1. As such, these areas would include a reduction in flows to offset the airside increase.

3.2.8. Further details of the landside surface water drainage scheme to be approved are provided in Section 3.4 of this report and at Appendix B, including hydraulic calculations.

3.3. Scheme Details - Airside

New Airside Catchment

3.3.1. A drainage system will be provided for the new airside drainage catchment (Area 1 on drawing A400-TPS-C-00-XXX-DR-GA-864-205 – also shown in A.1). This system has slot drains to collect the surface water runoff from the pavement which is then transmitted within surface water drainage pipes connected via catch pits to an attenuation structure. Pipe sizes on the drainage system vary between 225mm and 900mm diameter.

3.3.2. The attenuation structure for the airfield is proposed to be a reinforced concrete box culvert structure. A box culvert structure is proposed as this is a durable structure that can withstand the loading that may be imposed on it within the runway strip. It also allows for maintenance access to the structure without significant excavation works which would be difficult within the runway strip. The proposed tank size is in accordance with the CADP1 drainage strategy and it is likely to be an internal 3m wide by 2.1m deep structure. The length is proposed to be in the order of 177m to provide a storage volume of 1,115m^3. Final dimensions and installation details of the structure may vary slightly depending on installation logistics and product choices of a contractor. The storage volume will however be maintained to ensure no flooding in a 1:30 year storm.

3.3.3. Downstream of the attenuation is an oil separator to remove oil and fuels from the surface water runoff. The separator will be a full retention class 1 in line with BS EN 858 parts 1 and 2. This specification is provided to minimise any oil or fuel residue entering the downstream system, particularly as the catchment area includes aircraft stands where refuelling is performed. The oil separator will have alarm systems linked back to the Airport operational support unit office.

3.3.4. A pumping station is provided downstream of the separator, in order to ensure emulsification of oil and fuels from the surface water runoff does not take place. The pumping station will be commissioned to provide a pumping rate of 300l/s. The pumping station will be sized to suit the cycle times on the pumps recommended by manufacturers to minimise the maintenance requirement on the pumps.

3.3.5. The pumping station will be connected to a pressurised pumping main via a valve chamber. The pumping main is sized in line with industry recommendations (Sewers of Adoption 7th Edition) to limit the velocity in the pipe to be between 0.75 and 1.8 m/s. The main is proposed to be a 630mm outside diameter SDR11 MDPE pipe. During detailed design this pipe may be specified as ductile iron to improve resistance to aircraft loads that it will be subjected to where the pipe crosses beneath the taxiway pavement.

3.3.6. The pumped main will discharge to a 600mm gravity drain to the west of the proposed development. This gravity drain will connect to the existing drainage system around taxiway Charlie to the north of Stand 4.

3.3.7. The existing drainage system at the Airport was described in the Approved UES ‘Proposed Surface Water Drainage Strategy’. A full description is not included here for brevity although the existing surface water drainage plan is included at Appendix A.1 which illustrates the existing system. Most notably the airfield drainage system including the new development discharges into Thames Water surface water manhole 8304 to the western extent of the airfield. Manhole 8304 is shown on Thames Water records tile TQ4180SE.

3.3.8. In line with the Approved UES ‘Proposed Surface Water Drainage Strategy’ the environmental strategy for the airfield drainage discharge includes:

- Potassium formate based de-icing agent used for the airfield pavements. This has better environmental characteristics than the de-icing agents used at most other UK airfields. The Airport sources the product from overseas to obtain these environmental improvements;
- Aircraft de-icing agents need to meet the requirements of international aviation standards. The Airport use mobile glycol recovery units to capture the over-spill product when it is applied to the aircraft to minimise any environmental impact;
- Aircraft washing is prohibited at the Airport; and

- The airfield drainage has been subject to monitoring of de-icing agent content, enabling it to go to the Thames Water surface water drainage network.

3.3.9. The approved drainage strategy considered the potential for a summer dock outfall for the airfield drainage system. A winter outfall was recognised as not being practical due to the de-icing products used in airfield environment. This has been considered further in this drainage scheme and it is proposed to maintain a consistent outfall to the existing piped airfield drainage network for the following reasons:

1) The MicroDrainage model for the scheme demonstrates that winter storms are critical. Therefore, a summer dock outfall would not reduce the size of attenuation required or the outfall rate in the winter period. Therefore, there is little benefit from the summer dock outfall.
2) A dual outfall system would require sensors on the drainage system to ensure that water with raised Biochemical oxygen demand (BOD) levels was not discharged to the dock. Previous experience is that these BOD sensors can be unreliable and require regular calibration. This is difficult in the operational airfield where the proposed drainage network is located.
3) The outfall would be a concentrated significant discharge into a small local area of the dock. This may affect the local water properties in the dock. Distributing the discharge over a larger area would greatly complicate the system and increase the safety risks associated with inspection and maintenance of the outfall.
4) Maintaining a single outfall to the existing airfield piped drainage network means that the risk associated with contamination of the dock water are as low as possible.

3.3.10. A MicroDrainage model of the airfield drainage scheme has been developed and the output from this is included in A.2. This should be read in conjunction with drawing A400-TPS-C-00-L00-DR-GA-864-210 included in A.1, which shows how the MicroDrainage network relates to the site.

3.3.11. This model has been created based on the system parameters described above to demonstrate the feasibility of the proposed system. Some details, particularly invert levels may be refined as the design progresses in line with the scheme parameters described herein.

3.3.12. The MicroDrainage model for the airside catchment has included a vortex control device before the pumping station. The vortex control device was added to the model to stabilise the analysis. Without this feature the MicroDrainage model had warnings about stability and unrealistic hydraulic profiles were generated. The vortex control device in this instance is only a modelling tool to overcome limitations within MicroDrainage software and will not be installed as part of the development. The control of outflow from the development will be provided by the pumping station, which will be commissioned to a discharge rate of 300l/s.

3.3.13. There are a few flood risk warnings from the MicroDrainage model, but these are purely identifying where rain water is normally flowing in pipes that are installed close to the surface, within the reinforced suspended deck, and there is therefore not a flood risk with the proposed solution.

East Pier and East Terminal Extension (ETE)

3.3.14. It is proposed that the East Pier and East Terminal Extension roofs discharge into the dock via downpipes, due to the low risk of contamination associated with roof drainage.

3.4. Scheme Details - Landside

3.4.1. The MicroDrainage calculations for the proposed landside drainage networks for CADP1 are included at Appendix B. The list of landside surface water drainage drawings for approval are as follows:

- A400-ATK-C-30-XXX-XX-DRGA-864-101: Stage 3 Western Service Yard Proposed Surface Water Drainage Sheet 1 of 2
- A400-ATK-C-30-XXX-XX-DRGA-864-102: Stage 3 Western Service Yard Proposed Surface Water Drainage Sheet 2 of 2
- A400-ATK-C-36-XXX-XX-DR-GA-864-101: Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 1
- A400-ATK-C-36-XXX-XX-DR-GA-864-102: Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 2
- A400-ATK-C-36-XXX-XX-DR-GA-864-103: Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 3
- A400-ATK-C-36-XXX-XX-DR-GA-864-104: Stage 3 Ultimate Forecourt Proposed Surface Water Drainage Sheet 4
- A400-ATK-C-40-XXX-XX-DR-GA-864-101: Stage 3 Dockside Proposed Surface Water Drainage Layout (1 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-102: Stage 3 Dockside Proposed Surface Water Drainage Layout (2 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-103: Stage 3 Dockside Proposed Surface Water Drainage Layout (3 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-104: Stage 3 Dockside Proposed Surface Water Drainage Layout (4 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-105: Stage 3 Dockside Proposed Surface Water Drainage Layout (5 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-106: Stage 3 Dockside Proposed Surface Water Drainage Layout (6 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-107: Stage 3 Dockside Proposed Surface Water Drainage Layout (7 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-108: Stage 3 Dockside Proposed Surface Water Drainage Layout (8 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-109: Stage 3 Dockside Proposed Surface Water Drainage Layout (9 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-110: Stage 3 Dockside Proposed Surface Water Drainage Layout (10 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-111: Stage 3 Dockside Proposed Surface Water Drainage Layout (11 of 12)
- A400-ATK-C-40-XXX-XX-DR-GA-864-112: Stage 3 Dockside Proposed Surface Water Drainage Layout (12 of 12)

3.4.2. Some details, particularly invert levels and sizes may be refined as the design progresses in line with the scheme parameters described herein.

Western Service Yard, West Terminal Extension and Western Energy Centre

3.4.3. Drawing A400-ATK-C-30-XXX-XX-GA-864-101 and *-102 shown in Appendix B provides details of the proposed drainage network to serve the Western Service Yard, West Terminal Extension and Western Energy Centre.

3.4.4. The Western Service Yard catchment area is constrained by the existing Terminal to the East and proposed Western Energy Centre in the north, the WTE building and diverted services corridor in the east and DLR station and assets in the south west. The service yard consists predominately of a heavy vehicle loading area with a pedestrian footway to the south.

3.4.5. Due to the heavy loading of the yard, long term durability issues and application of high shear forces by manoeuvring goods vehicles it is not deemed practicable to provide a porous paving solution and there is insufficient room for any SuDS features, except for providing a cellular attenuation tank outside of the heavily loaded area, in the pedestrian footway. This will provide storage and a vortex flow control device downstream of the storage will limit the outflow from the site and discharge to the existing Ø600 sewer that drains westwards to the Thames Water System.

3.4.6. It is proposed that the flow rate to the sewer will be limited to 23.05l/s for the proposed catchment area.

3.4.7. The level of the existing Ø600 sewer at the proposed connection point is +1.4m AOD and the catchment area can be drained by gravity.

3.4.8. A full retention class 1 separator, in line with BS EN 858 parts 1 and 2, is proposed in the WSY, to treat fuel spillages and mitigate the effects of a spillage on the water quality before discharge into the wider network.

3.4.9. The tank proposed to attenuate flows has been modelled using Micro Drainage to ensure that it is sufficient to prevent flooding for a 1 in 30 year return period flood event (+20% Climate Change). This is proposed to have a volume of circa 150m^3.

3.4.10. A vortex control device is then proposed to limit flows discharging from the WSY to 23.05l/s.

3.4.11. An assessment of the flood volume of circa 6m^3 produced for 1 in 100 year return period flood event (+20% Climate Change) shows flooding being spread across road areas and contained by kerbs. As such, this has minimal/no increased flood risk to LCY infrastructure and no risk of flooding to third parties in line with the approved UES.

Forecourt

3.4.12. Drawings A400-ATK-C-36-XXX-XX-DR-GA-864-101 to *-103 shown in Appendix B provides details of the proposed drainage network to serve the proposed Forecourt area.

3.4.13. Runoff from the existing forecourt and short-stay car park flows is collected in a series of gullies and channel drains before discharge into a 300mm diameter pipe along Hartmann Road. It is proposed to collect the run-off in a new drainage channel along the southern edge of the car park before discharging into a proposed pipe network that will discharge through an oil separator and attenuation devices before flowing into an existing 300mm diameter pipe that is positioned south of the car park.

3.4.14. A by-pass class 1 separator is proposed in a soft landscaped area within the Forecourt area.

A tank is proposed to attenuate flows and has been modelled using Micro Drainage to ensure that it is sufficient to prevent flooding for a 1 in 30 year return period flood event (+20% Climate Change). This is proposed to have a volume of 1220m^3.

3.4.15. A vortex control device is proposed to limit flows from the area to 13.7l/s.

3.4.16. An assessment of the flood volume of circa 6m^3 produced for 1 in 100 year return period flood event (+20% Climate Change) shows flooding in the south-east end of the Forecourt, along Hartmann Road, constrained by the kerb drainage and the DLR wall. As such, this has minimal/no increased flood risk to LCY infrastructure and no risk of flooding to third parties in line with the approved UES.

Dockside Sub-catchment 1 (Long Stay Car Park)

3.4.17. Drawing A400-ATK-C-40-XXX-XX-DR-GA-864-101 to *-103 shown in Appendix B provides details of the proposed drainage network to serve the Dockside Sub-catchment 1 (long stay car park) area.

3.4.18. The existing long stay car park flows in a general north-south direction with gullies collecting runoff before discharged into the existing 300mm diameter pipe that is positioned south of the car park.

3.4.19. It is proposed to collect the runoff in a new drainage channels before discharging into a proposed pipe network that will discharge through oil separators and attenuation devices before flowing into the existing 300 diameter pipe.

3.4.20. By-pass class 1 separators are proposed to serve the large car park areas in the dockside sub-catchment 1.

3.4.21. The landside tank is proposed to attenuate flows and has been modelled using Micro Drainage to ensure that it is sufficient to prevent flooding for a 1 in 30 year return period flood event (+20% Climate Change). This is proposed to have a volume of circa 900m^3. Considering the location beneath a deck an alternative attenuation structure may be proposed, i.e. culvert, oversized pipe etc, subject to structural assessment and maintenance requirements. As the design is developed and the finished ground levels are finalised the attenuation sizes may be increased to mitigate the flood risk. The attenuation will not exceed the 1000m^3 size estimated in the approved UES.

3.4.22. A vortex control device is proposed to limit flows from the area to 10.6l/s.

3.4.23. A total flood volume of circa 70m^3 produced for 1 in 100 year return period flood event (+20% Climate Change) is consistent with the amount assessed in the approved UES. However, as the design is developed and the finished levels are finalised the attenuation sizes may be increased to mitigate the flood risk.

Dockside Sub-catchment 2

3.4.24. The following drawings shown in Appendix B provide details of the proposed drainage network to serve the proposed Dockside Sub-catchment 2.

- A400-ATK-C-40-XXX-XX-DR-GA-864-104
- A400-ATK-C-40-XXX-XX-DR-GA-864-105
- A400-ATK-C-40-XXX-XX-DR-GA-864-106
- A400-ATK-C-40-XXX-XX-DR-GA-864-107
- A400-ATK-C-40-XXX-XX-DR-GA-864-108
- A400-ATK-C-40-XXX-XX-DR-GA-864-109
- A400-ATK-C-40-XXX-XX-DR-GA-864-110
- A400-ATK-C-40-XXX-XX-DR-GA-864-111
- A400-ATK-C-40-XXX-XX-DR-GA-864-112

3.4.25. The majority of the catchment area's runoff discharges into manholes along Hartmann road that eventually discharge southwards across the DLR into Thames Water sewers.

3.4.26. By-pass class 1 separators are proposed to serve the car park areas in the dockside sub-catchment 2.

3.4.27. Tanks are proposed to attenuate flows and have been modelled using Micro Drainage to ensure that it is sufficient to prevent flooding for a 1 in 30 year return period flood event (+20% Climate Change). They are currently proposed to be circa 2000m^3 in total. However, as the design is developed and the finished ground levels are finalised the attenuation sizes may be increased to mitigate the flood risk. The attenuation will not exceed the 2500m^3 size estimated in the approved UES.

3.4.28. Vortex control devices are proposed at several locations within the system with discharge limited to 27.7l/s before discharge into an existing Thames Water sewer on Woodman Street.

3.4.29. A total flood volume of circa 290m^3 produced for 1 in 100 year return period flood event (+20% Climate Change) is less than the amount assessed in the approved UES.

3.5. Phasing of Delivery

3.5.1. Drainage works for CADP1 will comprise two main components as indicated in Section 3.3 and Section 3.4 above. Those for landside attenuation works, commencing in mid Year 1; and those for airside attenuation works, commencing in late Year 1. Landside drainage works will not be continuous throughout the construction programme but will be delivered incrementally and commensurate with the approved infrastructure coming forward.

4. Conclusion

4.1.1. As required by Condition 69 of the City Airport Development Programme (CADP1) permission, this document provides the details the drainage scheme and how it has incorporated SuDS principles to ensure consistency with the Flood Risk Assessment. This document seeks the approval of the drainage strategy in accordance with the requirements on condition 69.

4.1.2. The proposed surface water drainage solution for CADP1 follows the drainage hierarchy stated in London Plan Policy 5.13 'Sustainable Drainage' and limits flows to the existing sewers as far as practicable.

4.1.3. The design solution to reduce the existing flow rates is summarised below and is to discharge Condition 69:

Airside Areas

4.1.4. Discharge minimised from the proposed airside deck by incorporating the following:

- New pumped outflow into existing system at maximum 300l/s using proposed attenuation culvert structure consistent with the UES;
- Full retention Oil Separators incorporated in line with the UES;

Landside Areas

4.1.5. The increase in the discharge airside is offset by:

- Reducing landside flows through the incorporation of attenuation tanks and flow restricting devices – see Table 2-1.
- Incorporating Oil Separators in line with the UES.

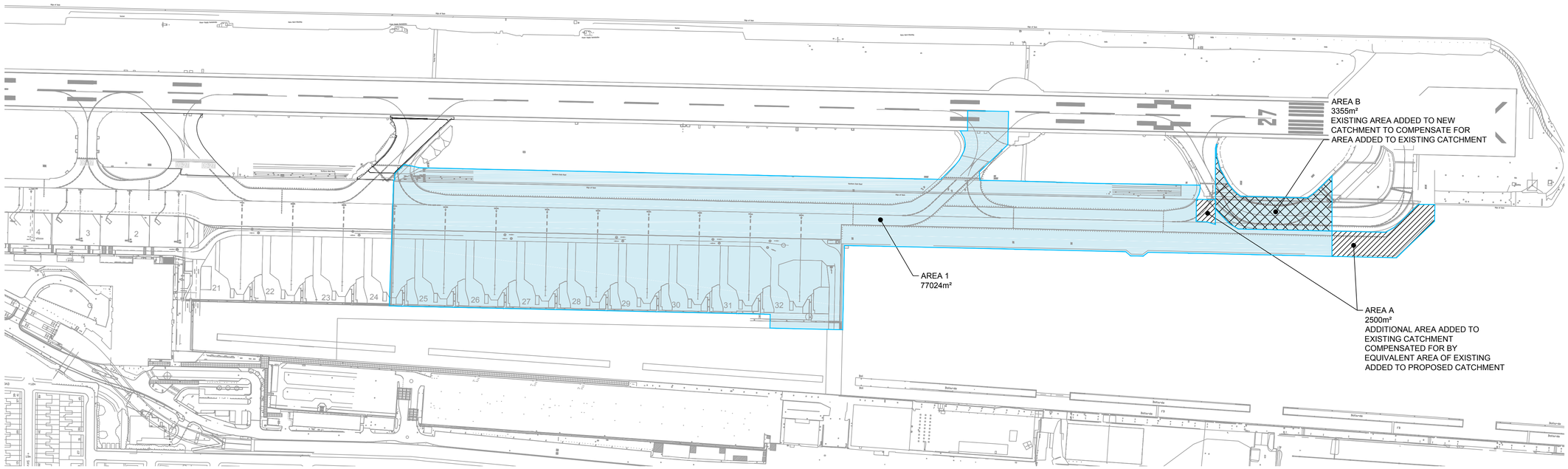
4.1.6. The proposed drainage scheme is consistent with the approved UES, which sought to deliver an overall flow reduction of 63%. The existing dockside drainage already contains some flow restriction devices, delivering a flow reduction of 19%. The proposed infrastructure delivers a 44% reduction contributing to the overall flow reduction of 63%, noted in the approved UES, and the achievement of the target flow rates.

Appendices

Appendix A.

A.1. Airside Drainage Drawings

A400-TPS-C-00-L00-DR-GA-864-205	AIRFIELD DRAINAGE SCHEME CATCHMENT AREAS
A400-TPS-C-00-L00-DR-GA-864-206	AIRFIELD PROPOSED DRAINAGE LAYOUT SHEET 1
A400-TPS-C-00-L00-DR-GA-864-207	AIRFIELD PROPOSED DRAINAGE LAYOUT SHEET 2
A400-TPS-C-00-L00-DR-GA-864-208	AIRFIELD PROPOSED DRAINAGE LAYOUT SHEET 3
A400-TPS-C-00-L00-DR-GA-864-209	AIRFIELD PROPOSED DRAINAGE LAYOUT SHEET 4
A400-TPS-C-00-L00-DR-GA-864-210	DRAINAGE SCHEME MICRODRAINAGE NETWORK
A400-TPS-C-00-L00-DR-GA-864-211	EXISTING SURFACE WATER DRAINAGE
A400-TPS-C-00-XXX-DR-SE-864-201	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 1
A400-TPS-C-00-XXX-DR-SE-864-202	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 2
A400-TPS-C-00-XXX-DR-SE-864-203	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 3
A400-TPS-C-00-XXX-DR-SE-864-204	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 4
A400-TPS-C-00-XXX-DR-SE-864-205	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 5
A400-TPS-C-00-XXX-DR-SE-864-206	AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 6
A400-TPS-C-00-XXX-DR-DE-864-001	AIRFIELD DRAINAGE DETAILS – SHEET 1 OF 6
A400-TPS-C-00-XXX-DR-DE-864-002	AIRFIELD DRAINAGE DETAILS – SHEET 2 OF 6
A400-TPS-C-00-XXX-DR-DE-864-003	AIRFIELD DRAINAGE DETAILS – SHEET 3 OF 6
A400-TPS-C-00-XXX-DR-DE-864-004	AIRFIELD DRAINAGE DETAILS – SHEET 4 OF 6
A400-TPS-C-00-XXX-DR-DE-864-005	AIRFIELD DRAINAGE DETAILS – SHEET 5 OF 6
A400-TPS-C-00-XXX-DR-DE-864-006	AIRFIELD DRAINAGE DETAILS – SHEET 6 OF 6



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NOTES

1. BASED ON MSA SURVEY DIGITAL TERRAIN MODEL.
2. SCHEME LEVEL AREAS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL. FINAL AREAS MAY VARY.

LEGEND

AREA 1 = 77024m²
PROPOSED AIRSIDE CATCHMENT

AREA A = 2500m²
PROPOSED AREA ADDED TO EXISTING CATCHMENT

AREA B = 3355m²
EXISTING CATCHMENT ADDED TO PROPOSED AIRSIDE CATCHMENT

Rev	Revised By	Date	Checked By	Date
03	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	NOTES AMENDED			
02	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	DRAWING TITLES REVISED.			
01	A.WILSON	01/11/2017	B.WYITHE	01/11/2017
	ISSUED FOR INFORMATION.			

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Drawing Title
AIRFIELD DRAINAGE SCHEME
CATCHMENT AREAS

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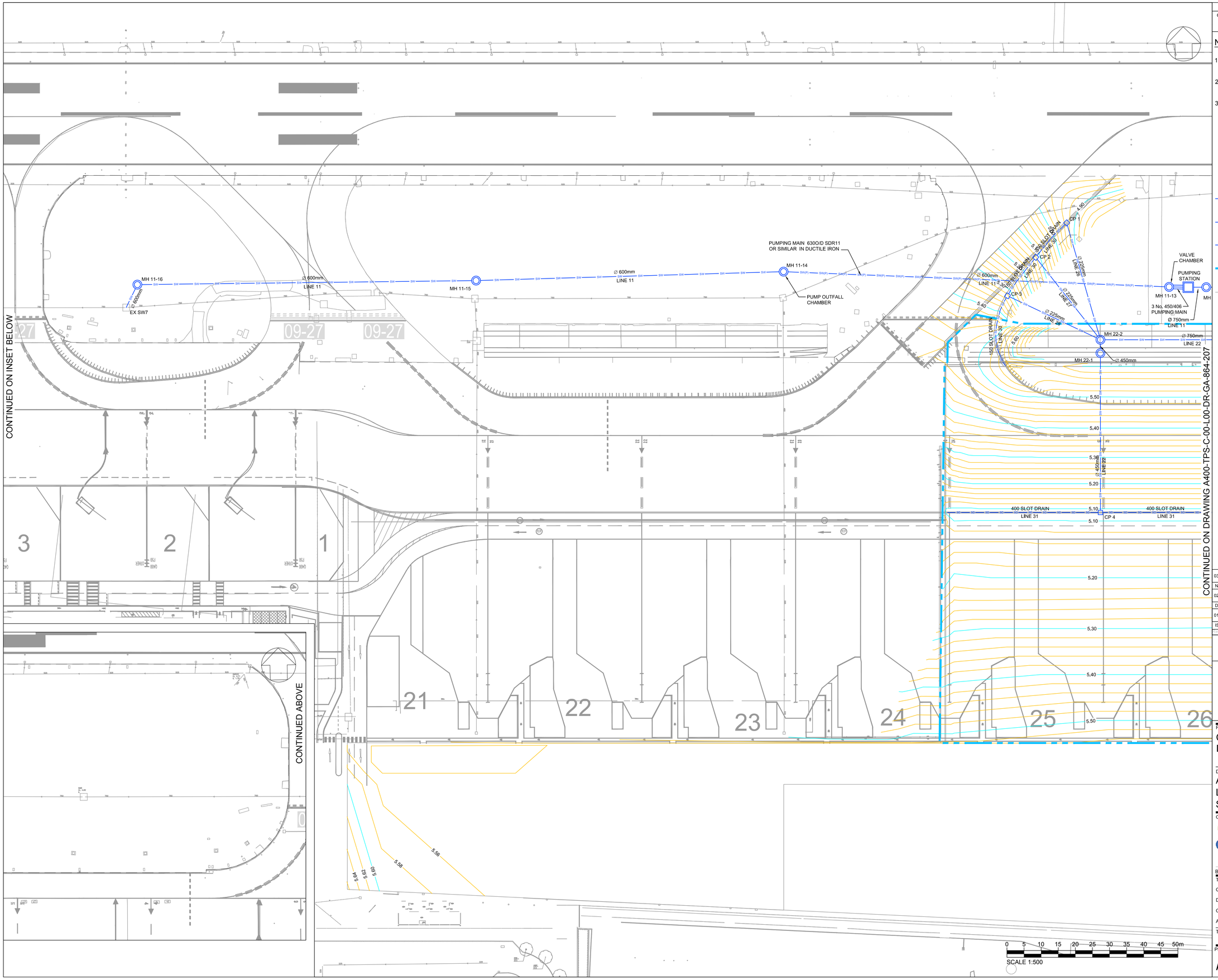
Drawn By:	A.WILSON		01/11/2017
Checked:	B.WYITHE		01/11/2017
Authorised:	S.HAWLEY		01/11/2017

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:2000

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-205									03

PLOT SCALE ACAD



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NOTES

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2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE SURVEY DATUM.
3. DIMENSIONS, AIRFIELD CONTOURS AND LEVELS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

LEGEND

- PROPOSED SURFACE WATER MAIN AND MANHOLE
- PROPOSED SURFACE WATER PUMPING MAIN
- PROPOSED SURFACE WATER SLOT DRAIN AND CATCHPIT
- PROPOSED AIRSIDE CATCHMENT AREA BOUNDARY
- EXISTING DRAINAGE PIPE TO BE DECOMMISSIONED

03	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
NOTES AMENDED				
02	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
DRAWING TITLES REVISED.				
01	A.WILSON	01/11/2017	B.WYITHE	01/11/2017
ISSUED FOR INFORMATION.				
	Drawn By	Date	Checked By	Date

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Drawing Title
AIRFIELD PROPOSED DRAINAGE LAYOUT
SHEET 1 OF 4

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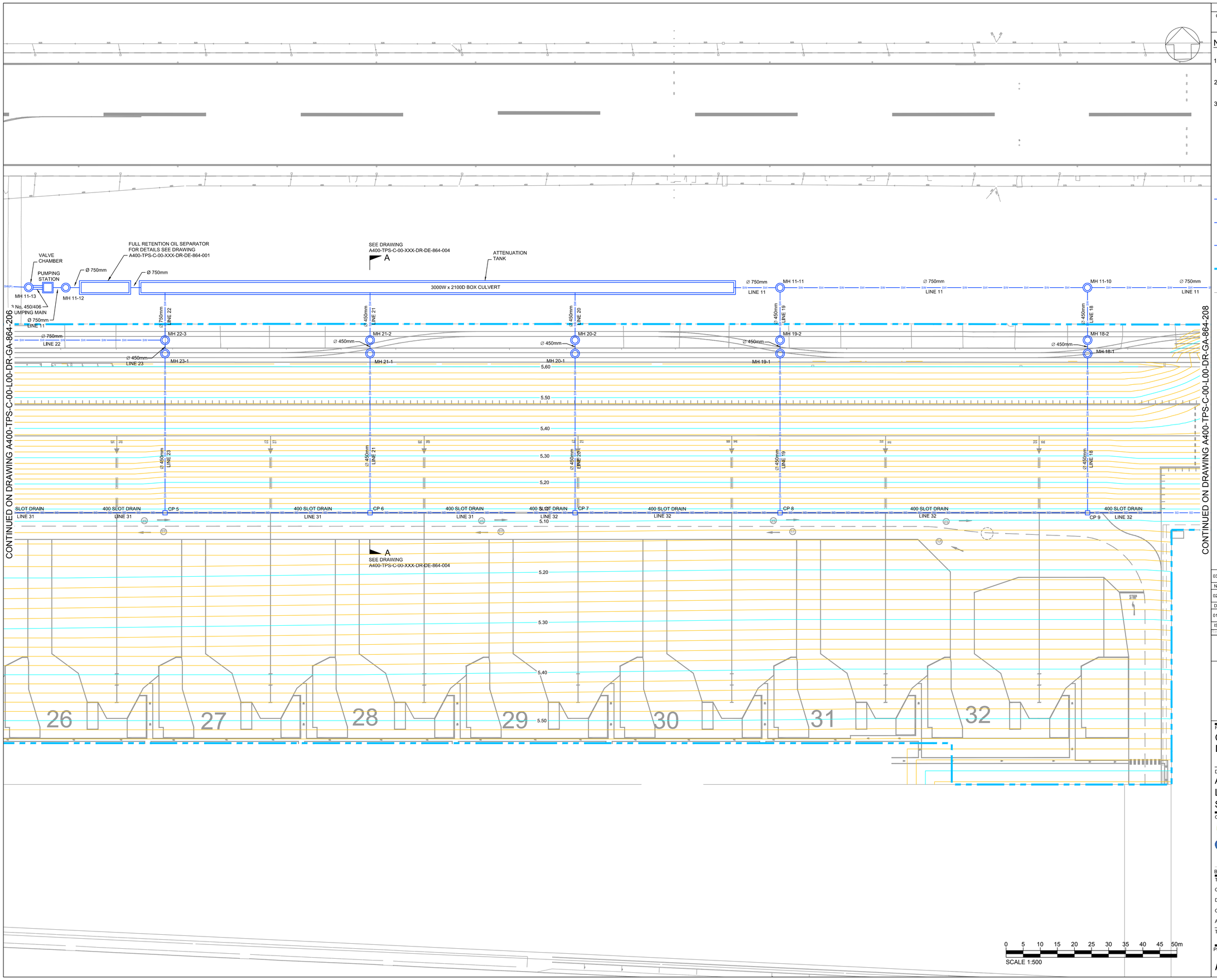
Authorised:	S.HAWLEY		01/11/2017

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	1:500

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-206									03

PLOT SCALE ACAD



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LEGEND

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- PROPOSED SURFACE WATER SLOT DRAIN AND CATCHPIT
- PROPOSED AIRSIDE CATCHMENT AREA BOUNDARY
- EXISTING DRAINAGE PIPE TO BE DECOMMISSIONED

03	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
NOTES AMENDED				
02	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
DRAWING TITLES REVISED.				
01	A.WILSON	01/11/2017	B.WYITHE	01/11/2017
ISSUED FOR INFORMATION.				
No	Revised By	Date	Checked By	Note

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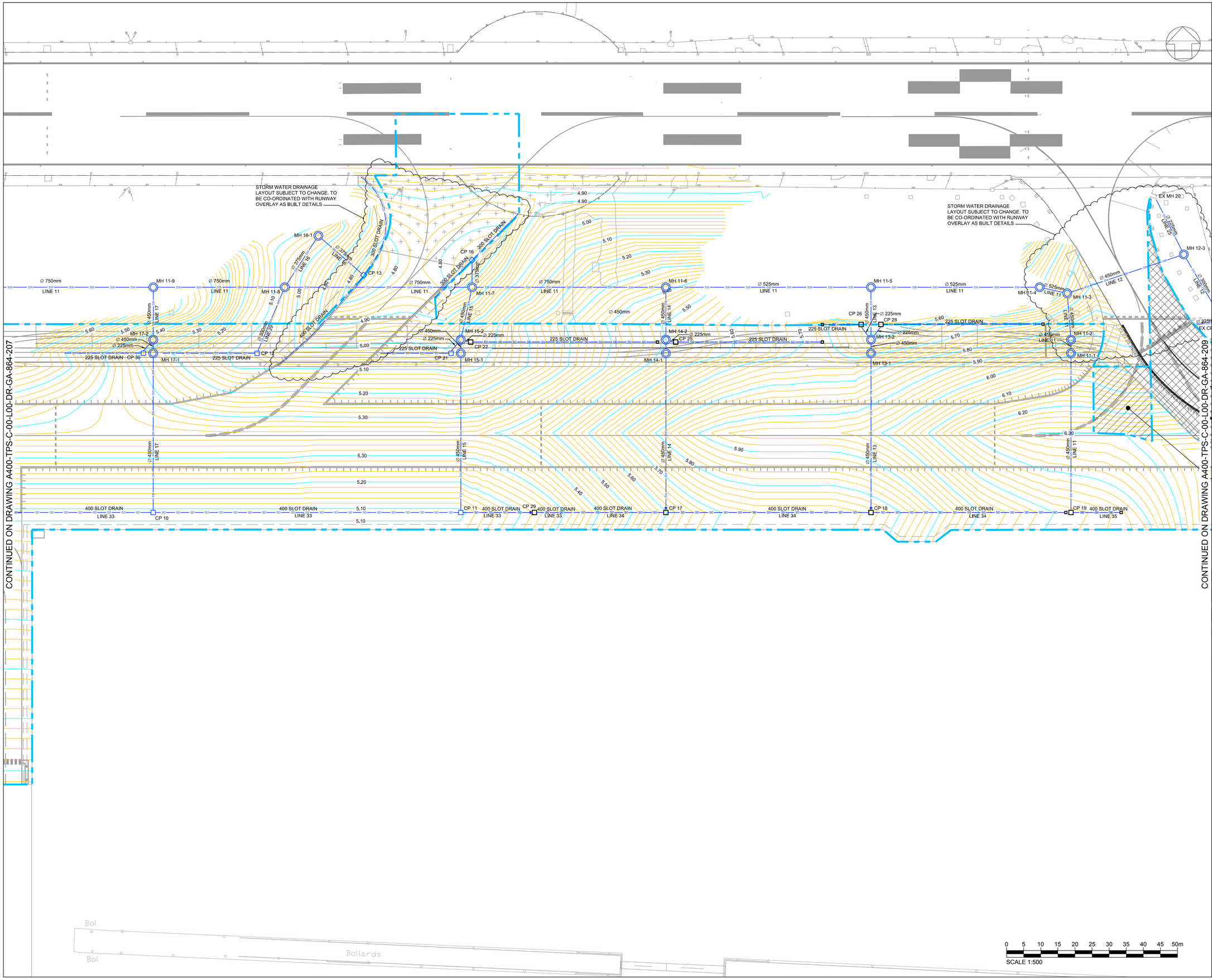
TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	A.WILSON	01/11/2017
Checked:	B.WYITHE	01/11/2017
Authorised:	S.HAWLEY	01/11/2017

TPS Project No.	Drawing Status	Scale (at A1)	(at A3)
112931	FOR APPROVAL	1:500	

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-207									03

ACAD
PLOT SCALE



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NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE SURVEY DATUM.
3. DIMENSIONS, AIRFIELD CONTOURS AND LEVELS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

LEGEND

- PROPOSED SURFACE WATER MAIN AND MANHOLE
- PROPOSED SURFACE WATER PUMPING MAIN
- PROPOSED SURFACE WATER SLOT DRAIN AND CATCHPIT
- PROPOSED AIRSIDE CATCHMENT AREA BOUNDARY
- EXISTING DRAINAGE PIPE TO BE DECOMMISSIONED
- AREA 1 = 77024m²
- AREA A = 2500m² ADDITIONAL AREA ADDED TO EXISTING CATCHMENT COMPENSATED FOR BY EQUIVALENT AREA OF EXISTING ADDED TO PROPOSED CATCHMENT
- AREA B = 3355m² EXISTING AREA ADDED TO NEW CATCHMENT TO COMPENSATE FOR AREA ADDED TO EXISTING CATCHMENT

03	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	NOTES AMENDED			
02	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	DRAWING TITLES REVISED.			
01	A.WILSON	01/11/2017	B.WYITHE	01/11/2017
	ISSUED FOR INFORMATION.			
No.	Revised By	Date	Checked By	Date

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LAYOUT
SHEET 3 OF 4

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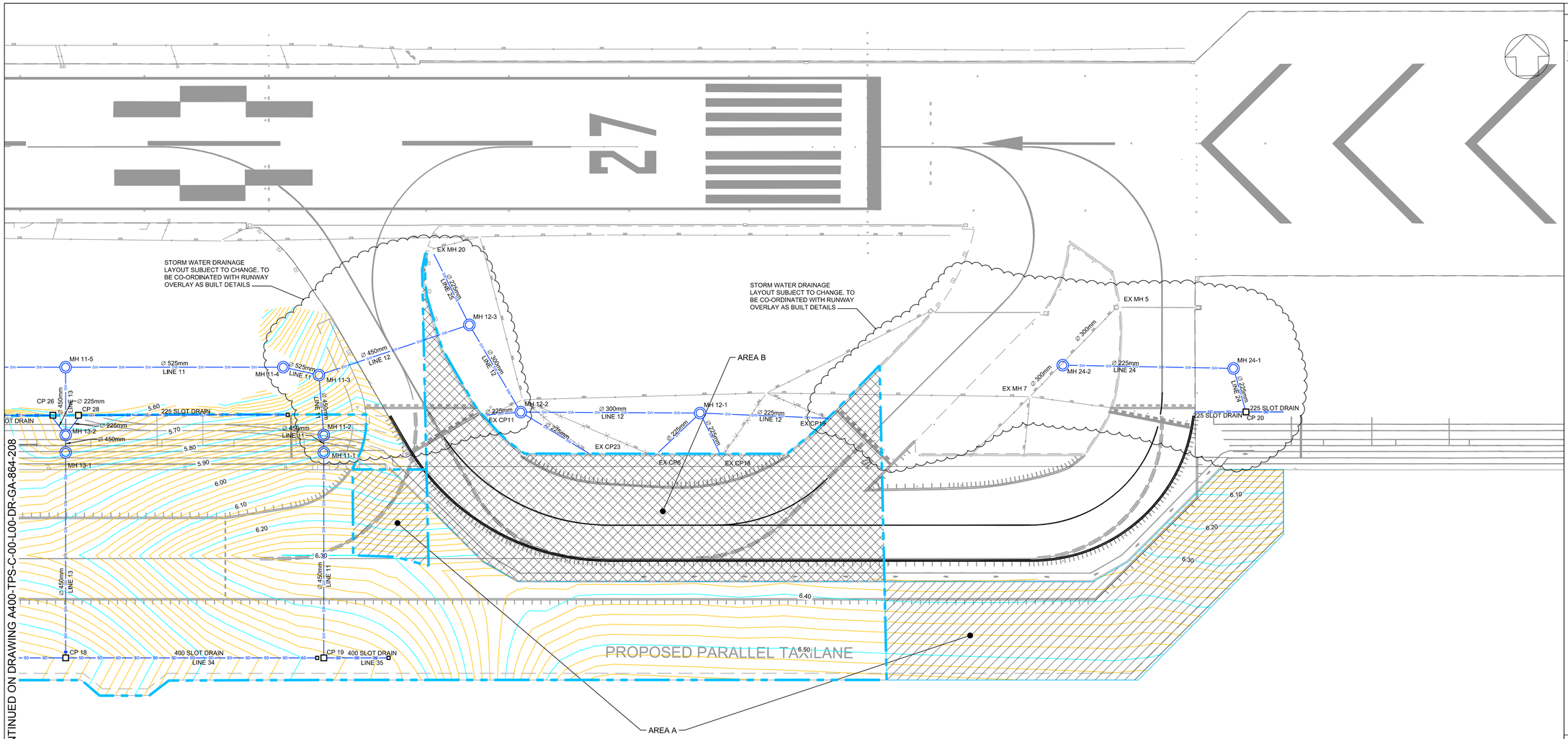
TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	A.WILSON	01/11/2017
Checked:	B.WYITHE	01/11/2017
Authorised:	S.HAWLEY	01/11/2017

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	1:500

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Snt. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-208									03

PLOT SCALE ACAD



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NOTES

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2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE SURVEY DATUM.
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LEGEND

- PROPOSED SURFACE WATER MAIN AND MANHOLE
- PROPOSED SURFACE WATER PUMPING MAIN
- PROPOSED SURFACE WATER SLOT DRAIN AND CATCHPIT
- PROPOSED AIRSIDE CATCHMENT AREA BOUNDARY
- EXISTING DRAINAGE PIPE TO BE DECOMMISSIONED
- AREA 1 = 77024m²
- AREA A = 2500m² ADDITIONAL AREA ADDED TO EXISTING CATCHMENT COMPENSATED FOR BY EQUIVALENT AREA OF EXISTING ADDED TO PROPOSED CATCHMENT
- AREA B = 3355m² EXISTING AREA ADDED TO NEW CATCHMENT TO COMPENSATE FOR AREA ADDED TO EXISTING CATCHMENT

03	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
NOTES AMENDED				
02	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
DRAWING TITLES REVISED.				
01	A.WILSON	01/11/2017	B.WYITHE	01/11/2017
ISSUED FOR INFORMATION.				
No.	Revised By	Date	Checked By	Date

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LAYOUT
SHEET 4 OF 4

Originating Office
TPS Croydon - Interchange
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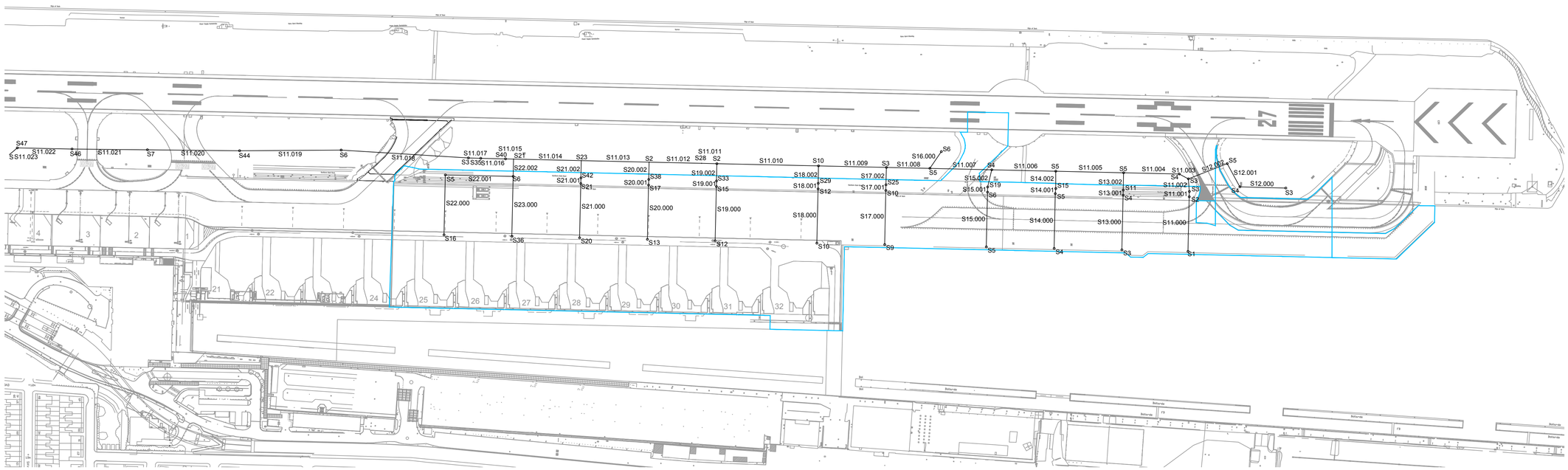
TPS Job Manager	R.KNAPTON		
QA System - Checks		Signature	Date
Drawn By:	A.WILSON		01/11/2017
Checked:	B.WYITHE		01/11/2017
Authorised:	S.HAWLEY		01/11/2017

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	1:500

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-209									03

PLOT SCALE ACAD



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Rev	Revised By	Date	Checked By	Date
02	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	TITLE AMENDED			
01	B.WYITHE	01.11.2017	R.SHANKAR	01.11.2017
	FOR INFORMATION			

FOR INFORMATION

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD DRAINAGE SCHEME
COMPLETED WORKS
MICRODRAINAGE NETWORK

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TPS Job Manager	R.KNAPTON		
QA System - Checks		Signature	Date
Drawn By:	I.CHAPMAN		01.11.2017
Checked:	B.WYITHE		01.11.2017
Authorised:	S.HAWLEY		01.11.2017

TPS Project No.	Drawing Status	Scale (at A1)	(at A3)
112931	INFORMATION	1:2000	

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-210									02

ACAD
PLOT SCALE

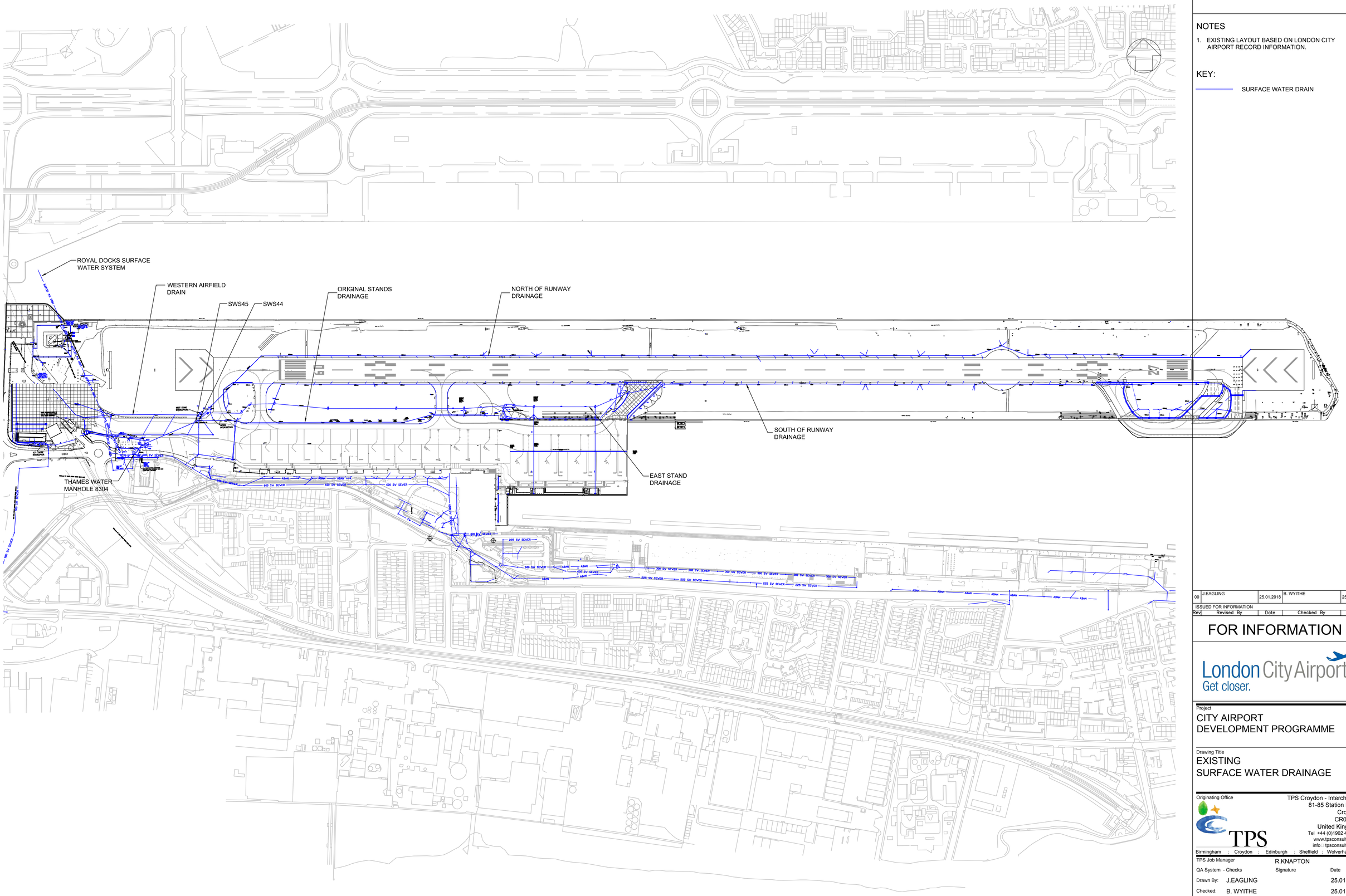
DO NOT SCALE FROM THIS DRAWING

NOTES

1. EXISTING LAYOUT BASED ON LONDON CITY AIRPORT RECORD INFORMATION.

KEY:

SURFACE WATER DRAIN



Rev	Revised By	Date	Checked By	Date
00	J.EAGLING	25.01.2018	B. WYITHE	25.01.2018

ISSUED FOR INFORMATION

FOR INFORMATION

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
EXISTING
SURFACE WATER DRAINAGE

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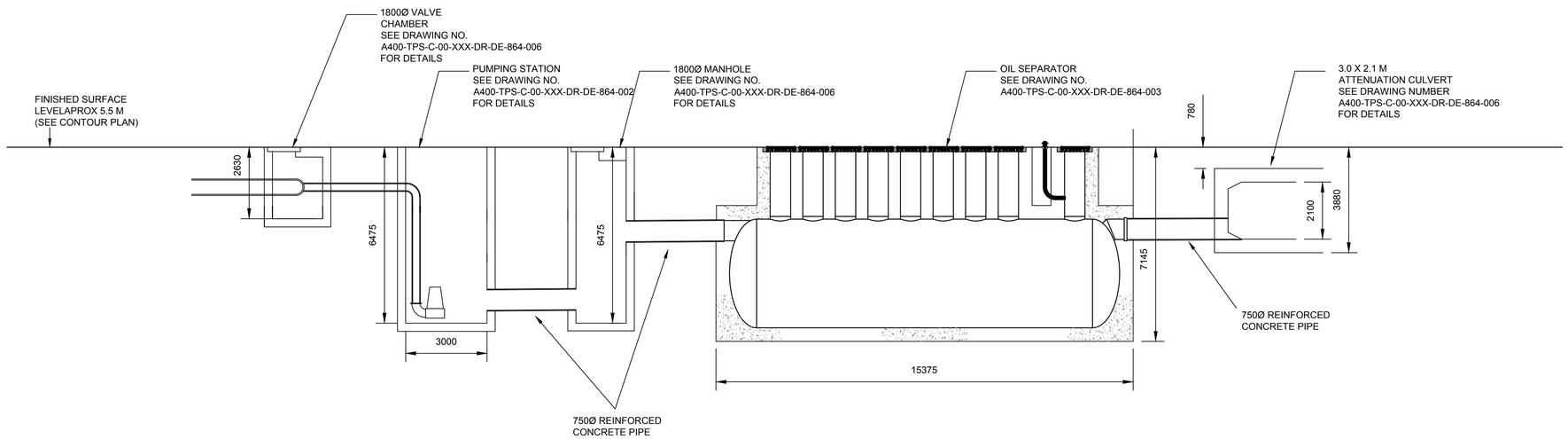
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	J.EAGLING	25.01.2018
Checked:	B. WYITHE	25.01.2018
Authorised:	S. HAWLEY	25.01.2018

TPS Project No.	Drawing Status	Scale (at A1)	(at A3)
112931	FOR INFORMATION	1:2500	

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-L00-DR-GA-864-211									00

PLOT SCALE ACAD



ATTENUATION AND PUMPING SECTION

SCALE: 1:100

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02

MAINTENANCE:
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DECOMISSIONING / DEMOLITION:
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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. FINAL DIMENSIONS AND INSTALLATION DETAILS MAY VARY SLIGHTLY DEPENDING ON INSTALLATION LOGISTICS AND PRODUCT CHOICES OF A CONTRACTOR.
3. DIMENSIONS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR APPROVAL			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 2 ADDED.			
04	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
03	R. RYAN	13/01/2017	P. MISTRY	13/01/2017
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 1

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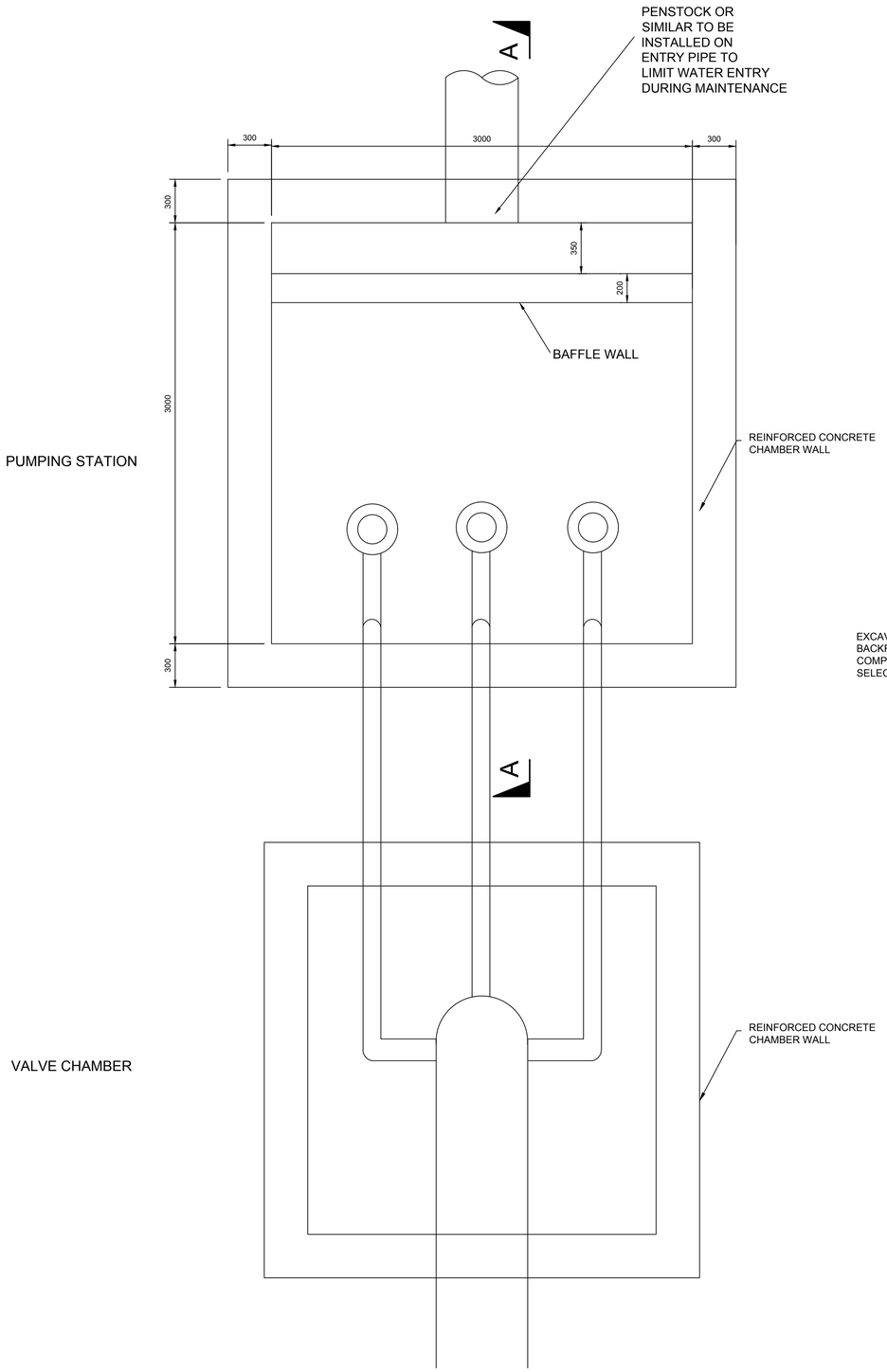
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

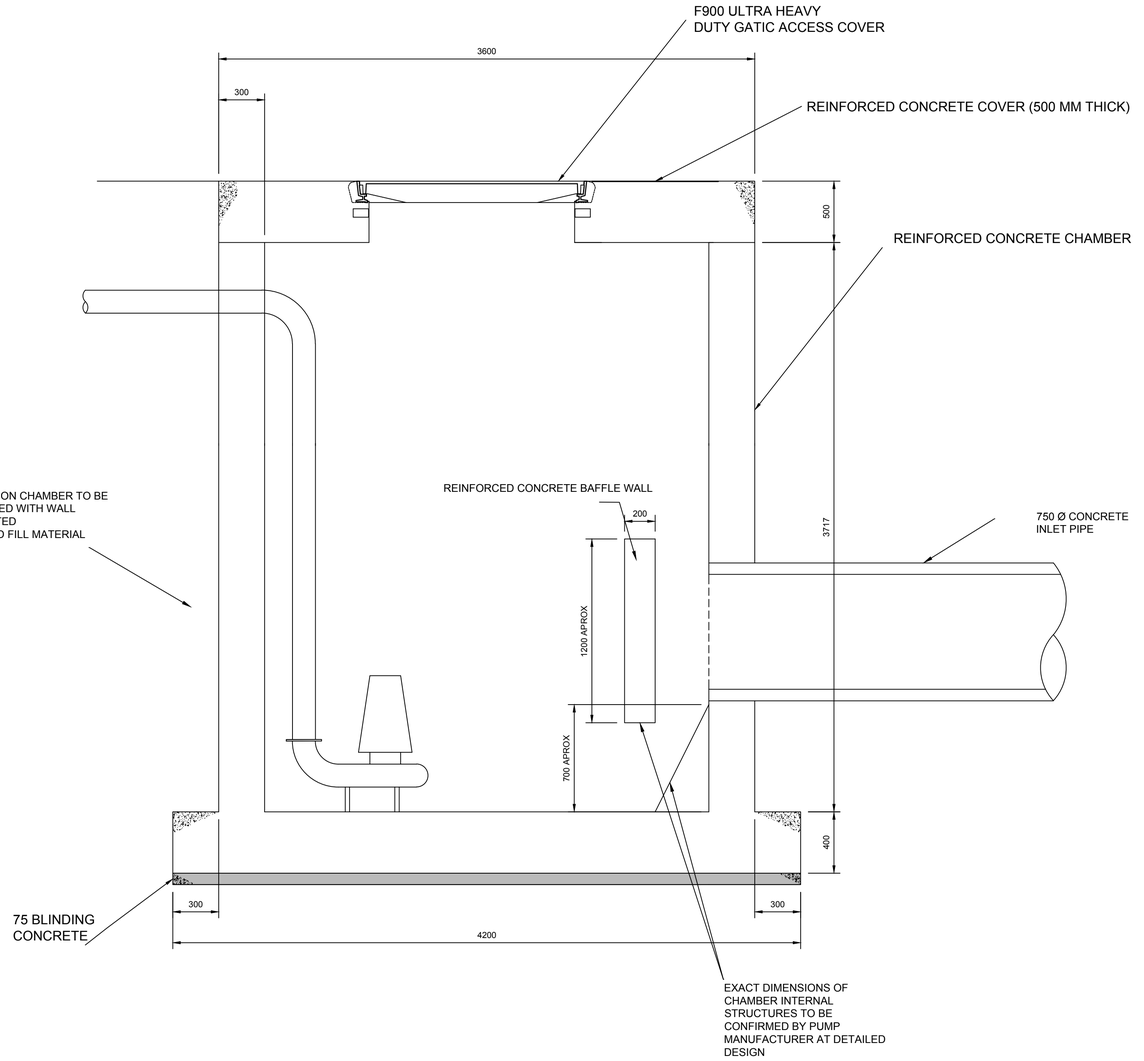
TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	L.OLARIU	06/11/2015
Checked:	W.HELLYER	06/11/2015
Authorised:	R.MOORE	06/11/2015

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	AS SHOWN

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-001									06

A
ACAD AA
AA PLOT SCALE





SECTION A-A

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02

MAINTENANCE:
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DECOMISSIONING / DEMOLITION:
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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. FOR CLARITY REINFORCEMENT DETAILS ARE NOT SHOWN.
3. PUMP TYPE(S) AND ARRANGEMENT INCLUDING OUTLET PIPE CONFIGURATION TO BE CONFIRMED AT DETAILED DESIGN BY PUMP MANUFACTURER.
4. FINAL DIMENSIONS AND INSTALLATION DETAILS MAY VARY SLIGHTLY DEPENDING ON INSTALLATION LOGISTICS AND PRODUCT CHOICES OF A CONTRACTOR.
5. DIMENSIONS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR APPROVAL			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 4 ADDED.			
04	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
03	R. RYAN	13/01/2017	P. MISTRY	13/01/2017
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 2

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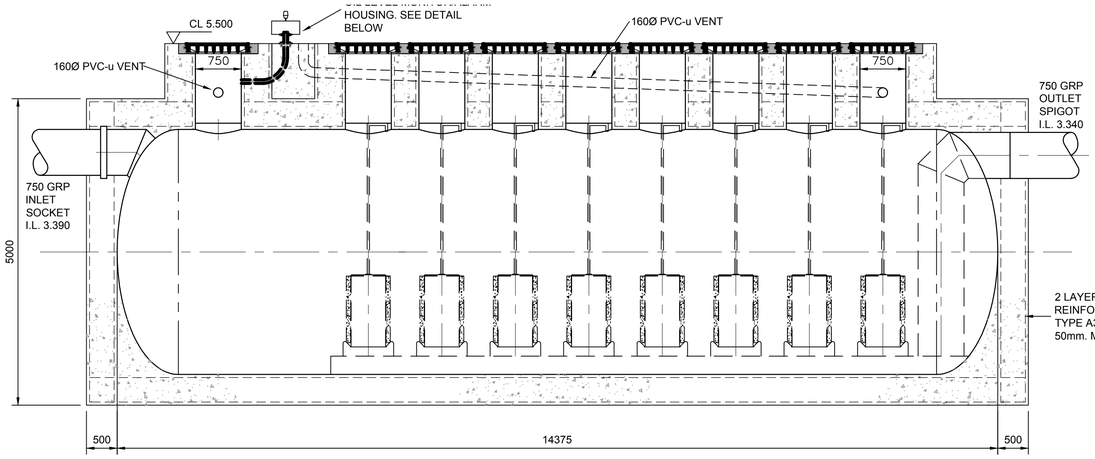
TPS Job Manager R.KNAPTON

QA System - Checks	Signature	Date
Drawn By: L.OLARIU		06/11/2015
Checked: W.HELLYER		06/11/2015
Authorised: R.MOORE		06/11/2015

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	AS SHOWN

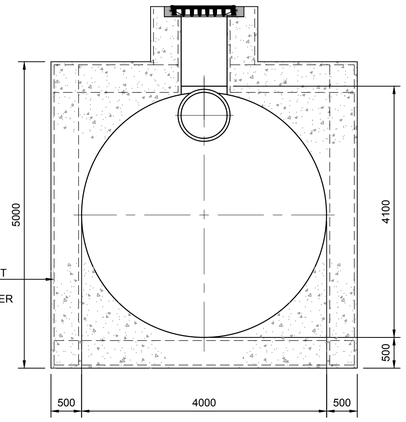
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-002									06

A ACAD AA PLOT SCALE AA



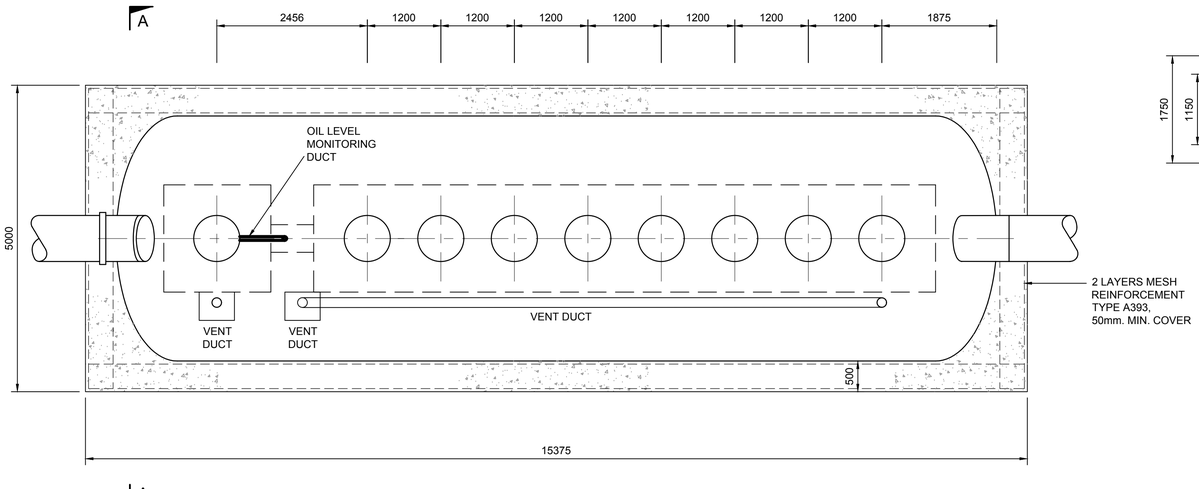
SECTION

SCALE 1:50



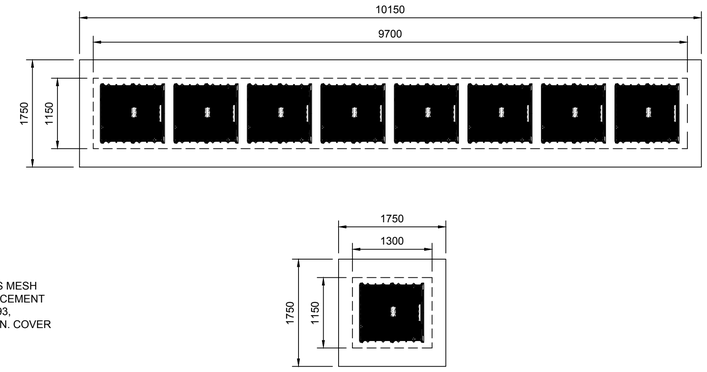
SECTION A-A

SCALE 1:50



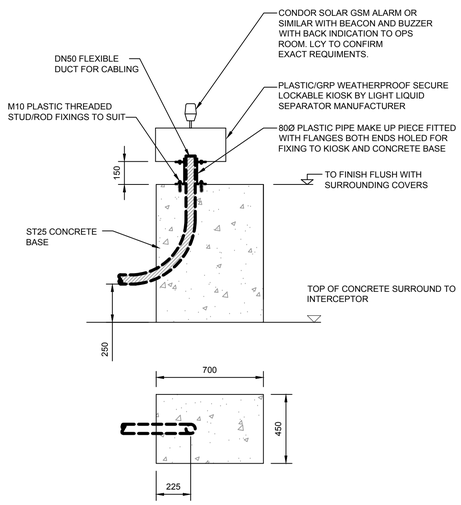
PLAN

SCALE 1:50



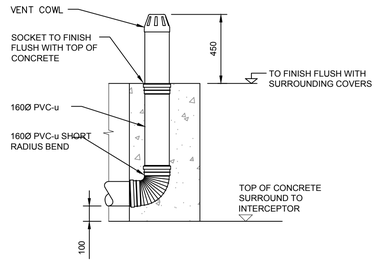
PLAN VIEW AT TOP OF TURRETS SHOWING RECESSES REQUIRED FOR COVERS

SCALE 1:50

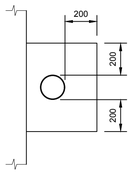


LIGHT LIQUID SEPARATOR OIL LEVEL MONITOR/ALARM CONTROL HOUSING DETAIL

SCALE :20



SECTION



PLAN

VENT DUCT DETAIL

SCALE :20

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02

MAINTENANCE:
SEE ABOVE

DECOMISSIONING / DEMOLITION:
SEE ABOVE

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NOTES:

1. ALL DIMENSIONS IN MM UNLESS OTHERWISE SHOWN.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAINAGE DRAWINGS AND THE SPECIFICATION
3. RECESSES FOR COVERS BASED ON USING DUCTILE IRON COVERS TO BS EN 124 CLASS F900 900 750 c/o AS ELKINGTON GATIC
4. CONCRETE SULPHATE CLASS DC1/0 CONCRETE STRENGTH CLASS C32/40 REINFORCEMENT TO HAVE 50mm COVER.
5. FINAL DIMENSIONS AND INSTALLATION DETAILS MAY VARY SLIGHTLY DEPENDING ON INSTALLATION LOGISTICS AND PRODUCT CHOICES OF A CONTRACTOR.
6. DIMENSIONS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR APPROVAL			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 5 ADDED.			
04	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
03	R. RYAN	13/01/2017	P. MISTRY	13/01/2017
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 3

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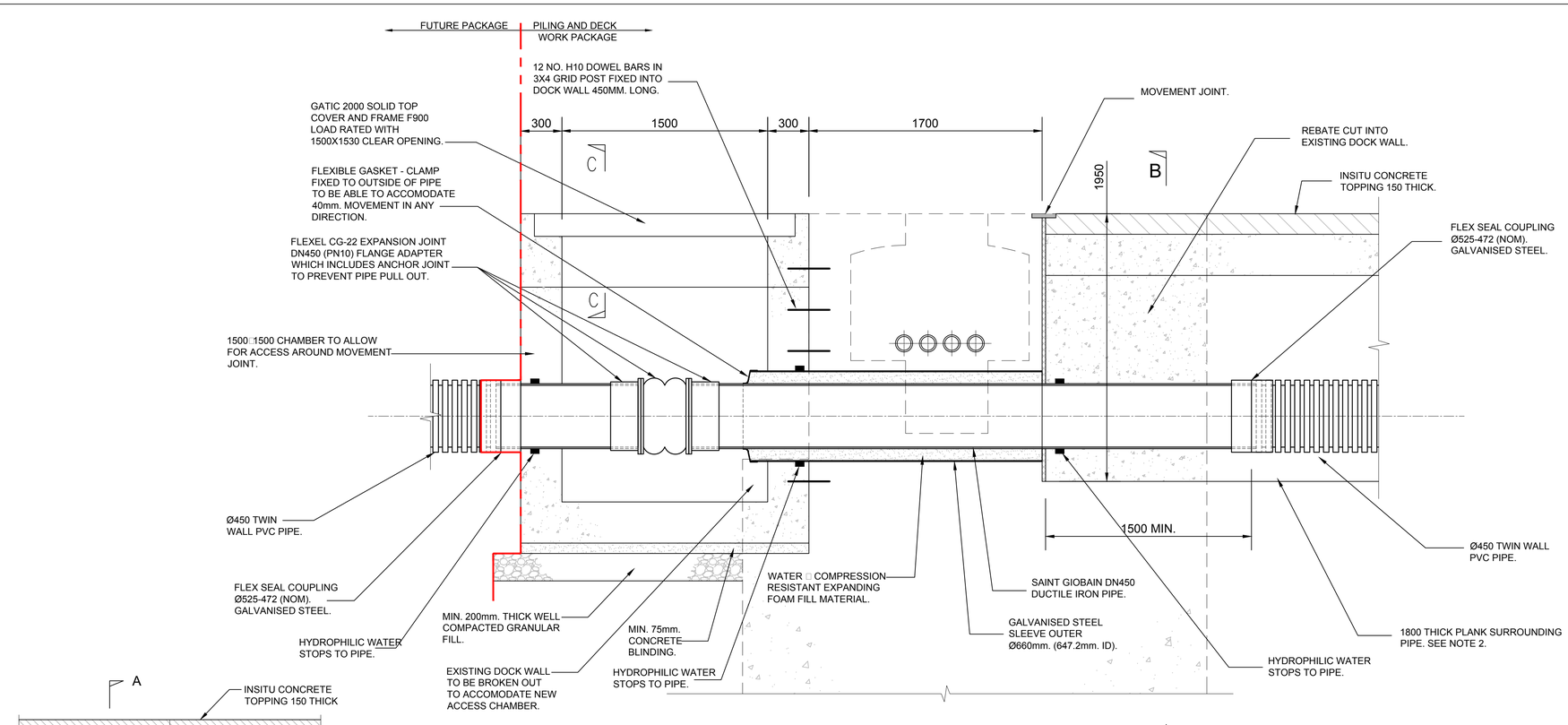
info tpsconsult.co.uk
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By: L.OLARIU		06/11/2015
Checked: W.HELLYER		06/11/2015
Authorised: R.MOORE		06/11/2015

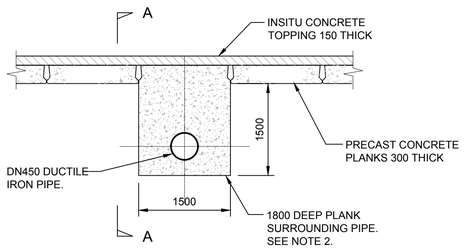
TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	AS SHOWN

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-003									06

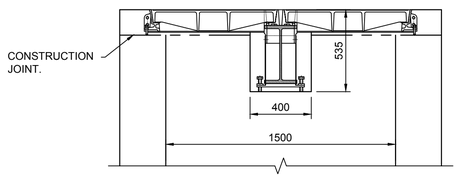
A
ACAD AA
AA PLOT SCALE



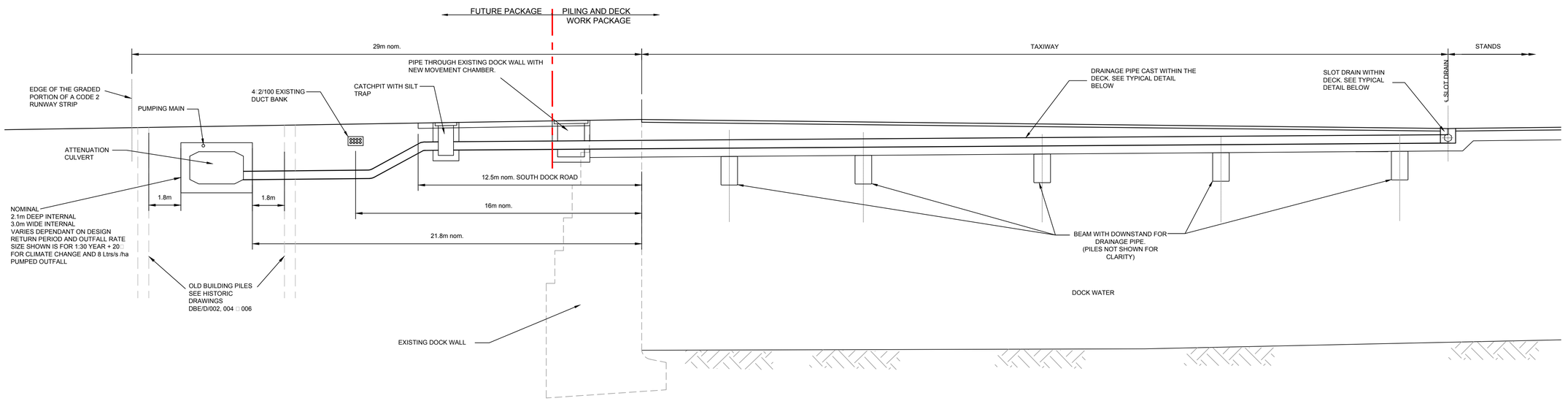
ELEVATION A-A



SECTION B-B
WHERE REBATED PLANK ABUTS EXISTING DOCK WALL
SCALE: □50



SECTION C-C
SCALE: 1:20



TYPICAL DRAINAGE SECTION LOOKING EAST
SCALE: 1:125

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02

MAINTENANCE:
SEE ABOVE

DECOMISSIONING / DEMOLITION:
SEE ABOVE

It is assumed that all works will be undertaken by a competent contractor□ working where appropriate, to an approved method statement.

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. FOR CLARITY REINFORCEMENT DETAILS ARE NOT SHOWN. .
3. MOVEMENT JOINTS SHALL ACCOMODATE 40mm LATERAL MOVEMENT IN EITHER DIRECTION AND 40mm TELESCOPIC MOVEMENT. DETAILS TO BE AGREED WITH MANUFACTURER.
4. FINAL DIMENSIONS AND INSTALLATION DETAILS MAY VARY SLIGHTLY DEPENDING ON INSTALLATION LOGISTICS AND PRODUCT CHOICES OF A CONTRACTOR.
5. DIMENSIONS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

LEGEND:

PACKAGE SCOPE BOUNDARY

Rev	Revised By	Date	Checked By	Date
07	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR APPROVAL.			
06	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 4 ADDED.			
05	A.WILSON	02/11/2017	S.HAWLEY	02/11/2017
	ATTENUATION CULVERT DESIGN NOTE REVISED.			
04	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
03	R. RYAN	14/11/2016	W.HELLYER	14/11/2016
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

London City Airport
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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 4

Originating Office
TPS Croydon - Interchange
81-85 Station Road
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CR0 2RD
United Kingdom
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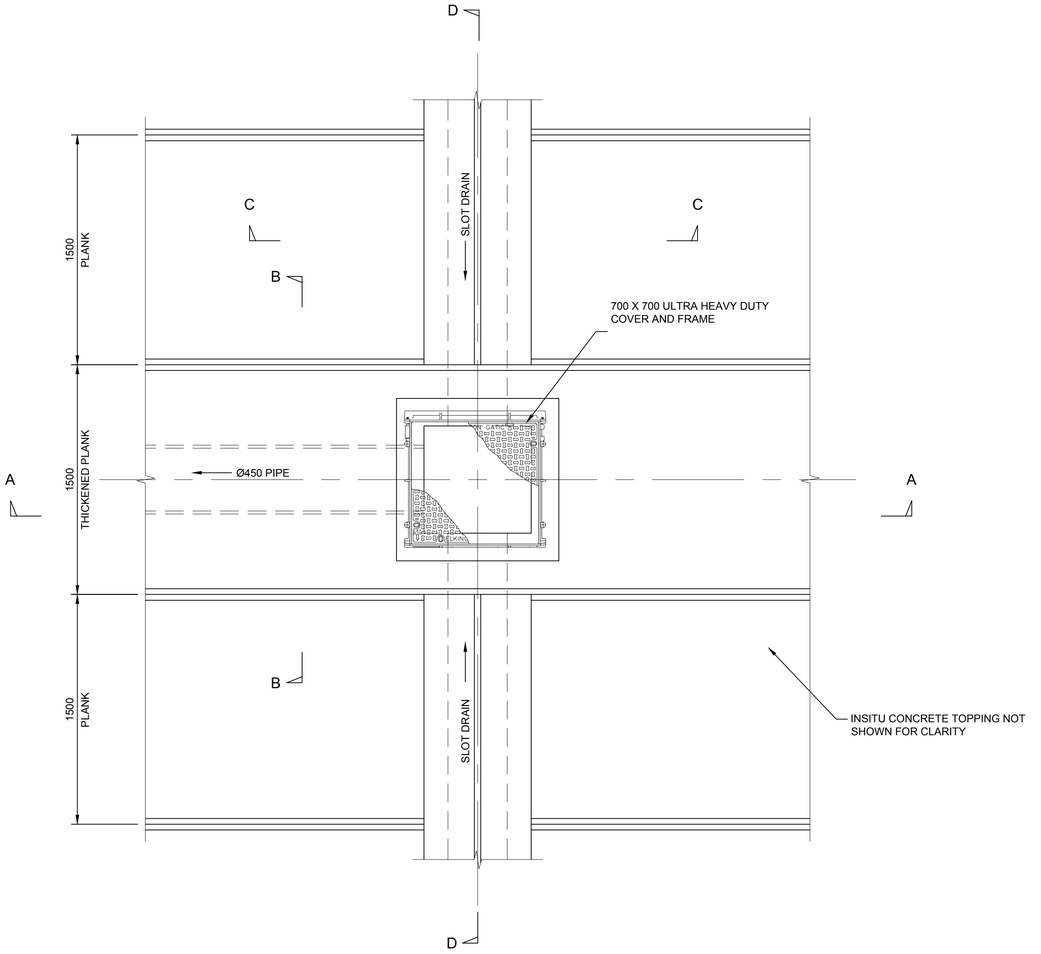
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

TPS Job Manager		R.KNAPTON	
QA System - Checks		Signature	Date
Drawn By:	L.OLARIU		06/11/2015
Checked:	W.HELLYER		06/11/2015
Authorised:	R.MOORE		06/11/2015

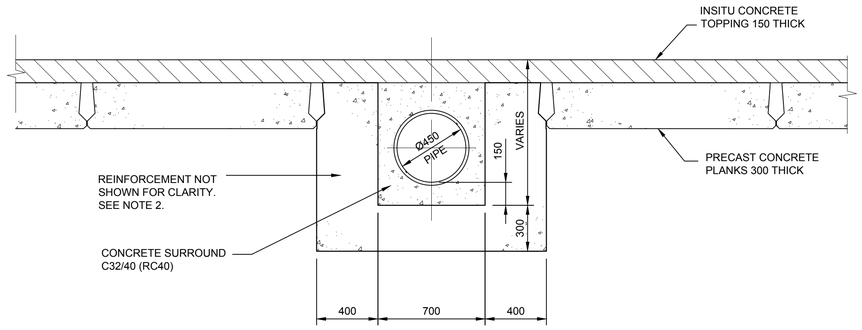
TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	AS SHOWN

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-004									07

PLOT SCALE
ACAD

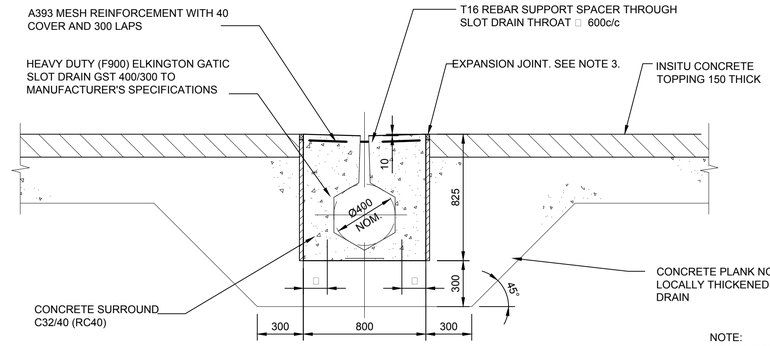


PLAN



SECTION B-B

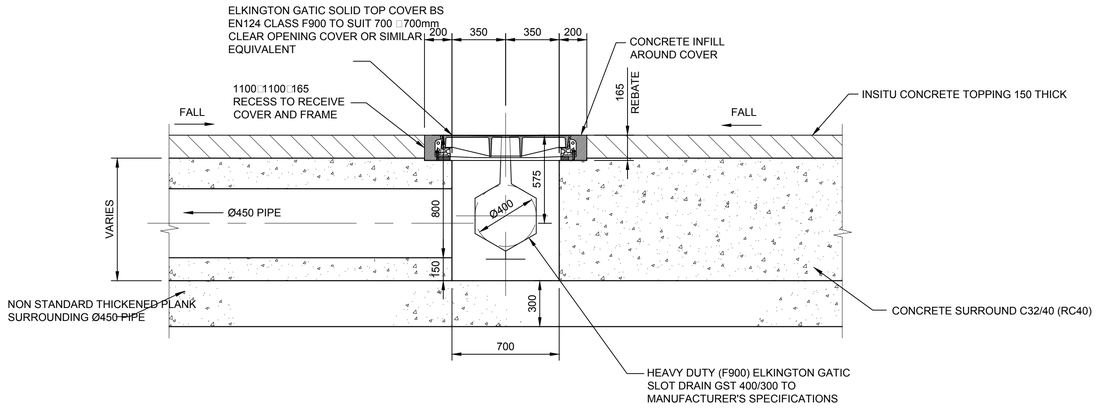
PIPE WITHIN DECK DETAIL



NOTE:
CRACK INDUCERS TO BE EVERY 3m
ALONG SLOT DRAIN LENGTH TO
COINCIDE WITH CHANNEL LENGTHS AND
DECK JOINTS WHERE PRACTICABLE.

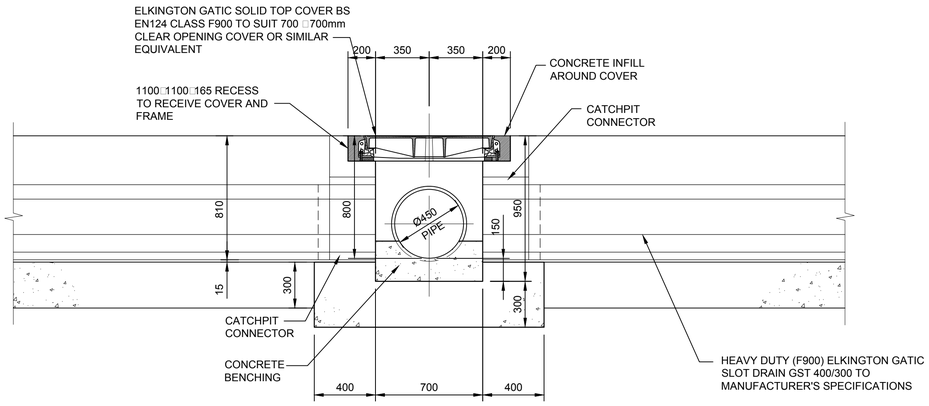
SECTION C-C

GATIC SLOT DRAIN
WITHIN DECK DETAIL



SECTION A-A

CATCHPIT DETAIL



SECTION D-D

CATCHPIT DETAIL

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER:
A400-01-U-REG-00001-02

MAINTENANCE:
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Rev	Revised By	Date	Checked By	Date
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	ISSUED FOR APPROVAL			
06	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 4 ADDED.			
05	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
04	R. RYAN	13/01/2017	P. MISTRY	13/01/2017
	NOTES 2 AND 3 ADDED.			
03	R. RYAN	14/11/2016	W.HELLYER	14/11/2016
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 5

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TPS Croydon - Interchange
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www.tpsconsult.co.uk
info tpsconsult.co.uk
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

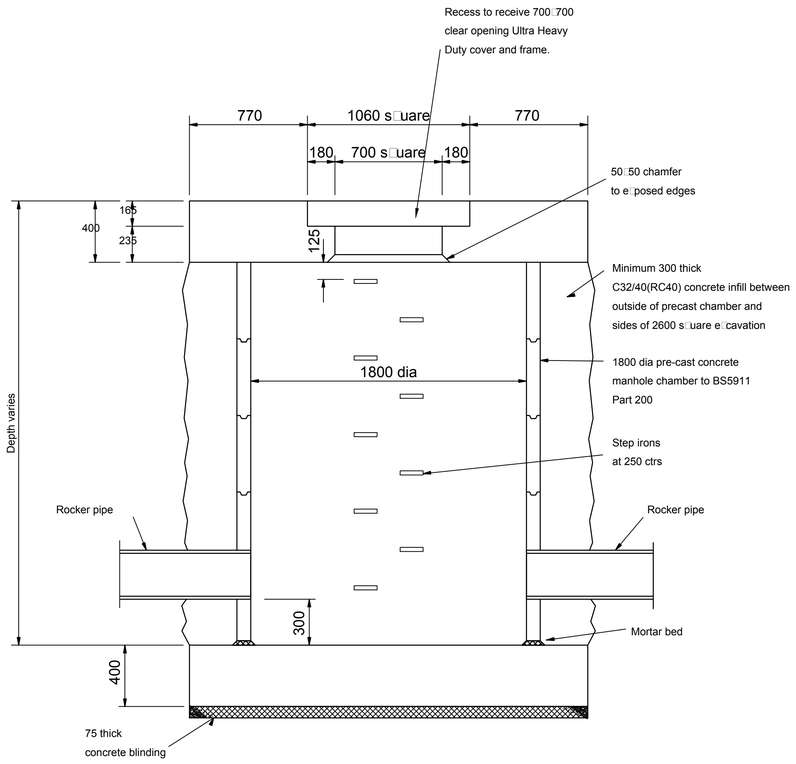
TPS Job Manager	R.KNAPTON		
QA System - Checks		Signature	Date
Drawn By:	L.OLARIU		06/11/2015
Checked:	W.HELLYER		06/11/2015
Authorised:	R.MOORE		06/11/2015

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	

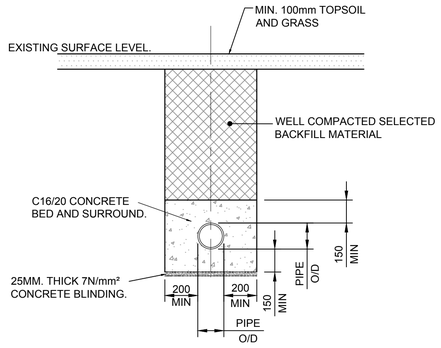
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-005									07

PLOT SCALE ACAD

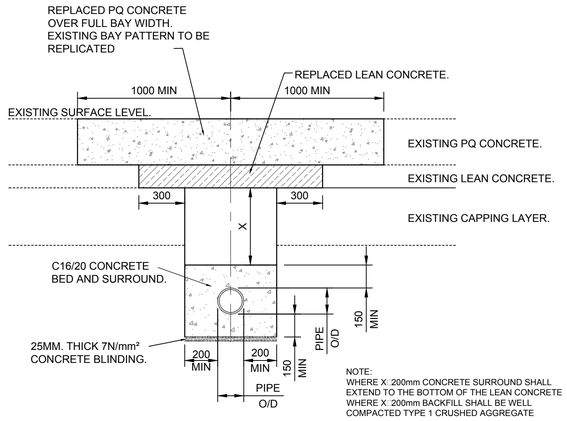
CONNECTION THROUGH DOCK WALL



DRAINAGE MANHOLE IN GRASS AREAS

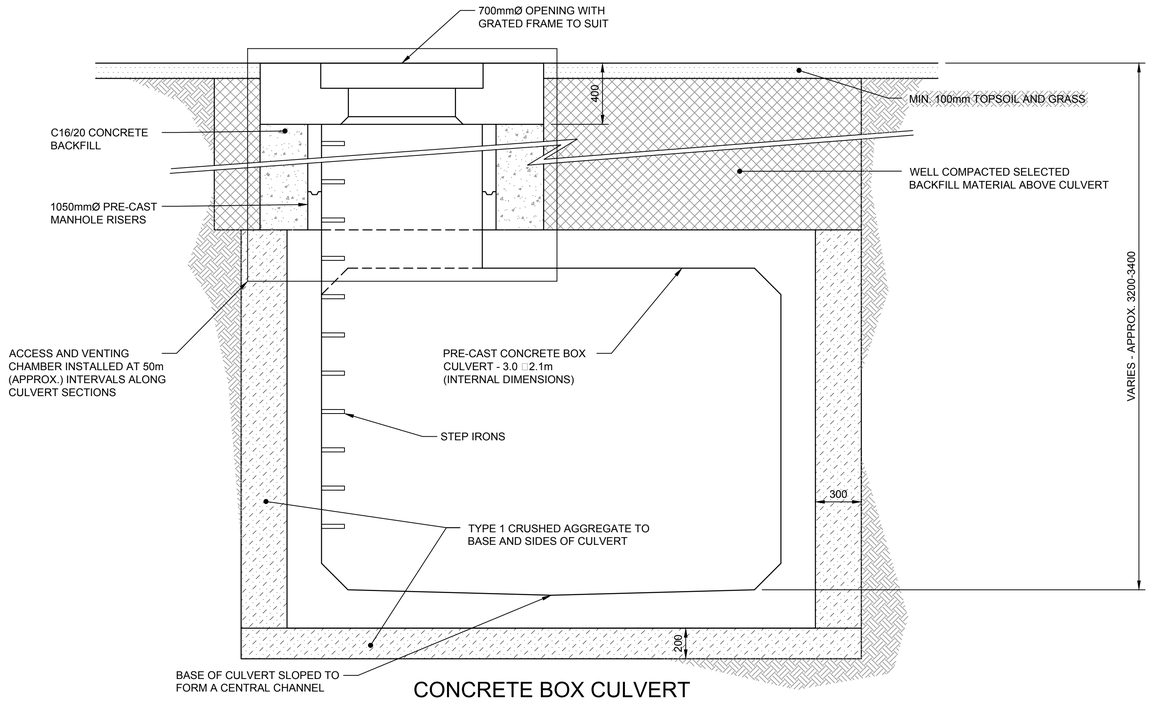


DRAIN TRENCH DETAIL EXISTING GRASS AREAS

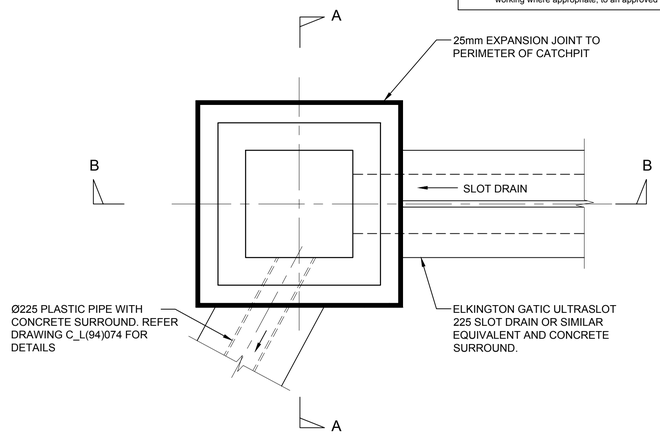


NOTE:
WHERE X□200mm CONCRETE SURROUND SHALL EXTEND TO THE BOTTOM OF THE LEAN CONCRETE
WHERE X□200mm BACKFILL SHALL BE WELL COMPACTED TYPE 1 CRUSHED AGGREGATE

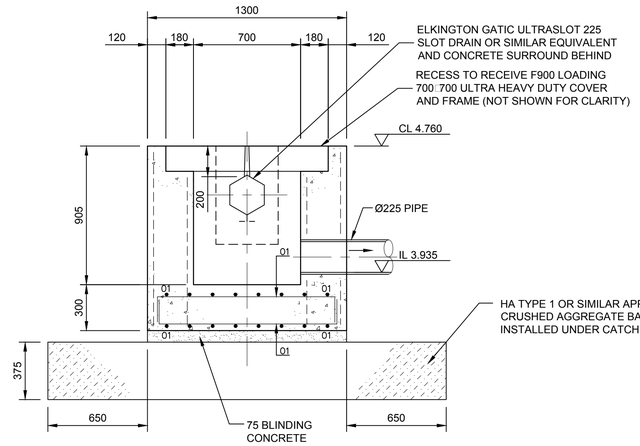
DRAIN TRENCH DETAIL EXISTING PAVEMENT AREAS



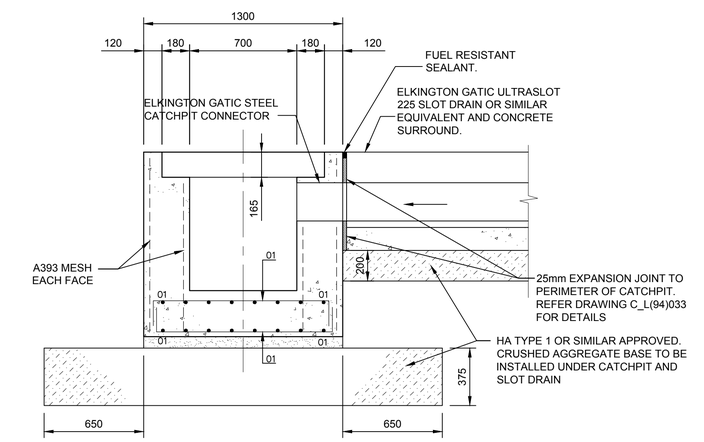
CONCRETE BOX CULVERT INSTALLATION DETAIL



SLOT DRAIN AND CATCH PIT AT TAXIWAY EDGE



SECTION A-A



SECTION B-B

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
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MAINTENANCE:
SEE ABOVE

DECOMISSIONING / DEMOLITION:
SEE ABOVE

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NOTES:-

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.
2. CONCRETE GRADES TO BE:- BLINDING LAYER C15/40 BASE AND WALLS C40/20
3. REINFORCEMENT TO BE HIGH YIELD ROUND DEFORMED BARS TO BS4449 WITH BAR BENDING TO BS4466.
4. MINIMUM COVER TO REINFORCEMENT TO BE 40mm UNLESS OTHERWISE STATED.
5. A393 REINFORCEMENT MESH TO BS4483 TO BE CUT TO SUIT, 40mm COVER, 500mm LAPS.
6. COVERS AND FRAMES SHALL BE ULTRA HEAVY DUTY.
7. FALL ACROSS COVER SLABS TO SUIT ADJACENT GROUND LEVELS.
8. FINAL DIMENSIONS AND INSTALLATION DETAILS MAY VARY SLIGHTLY DEPENDING ON INSTALLATION LOGISTICS AND PRODUCT CHOICES OF A CONTRACTOR.
9. DIMENSIONS ARE FOR INFORMATION ONLY AND NOT FOR APPROVAL.

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR APPROVAL			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	NOTE 8 ADDED.			
04	R. RYAN	25/08/2017	P. MISTRY	25/08/2017
	STAGE 3 UPDATE ISSUE			
03	R. RYAN	13/01/2017	P. MISTRY	13/01/2017
	TENDER ISSUE			
02	P.OFFER	12/07/16	W.HELLYER	12/07/16
	STAGE 3 ISSUE			
P1	L.OLARIU	06/11/2015	W.HELLYER	06/11/2015
	STAGE 3 ISSUE			

FOR APPROVAL

London City Airport
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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD
DRAINAGE DETAILS
SHEET 6

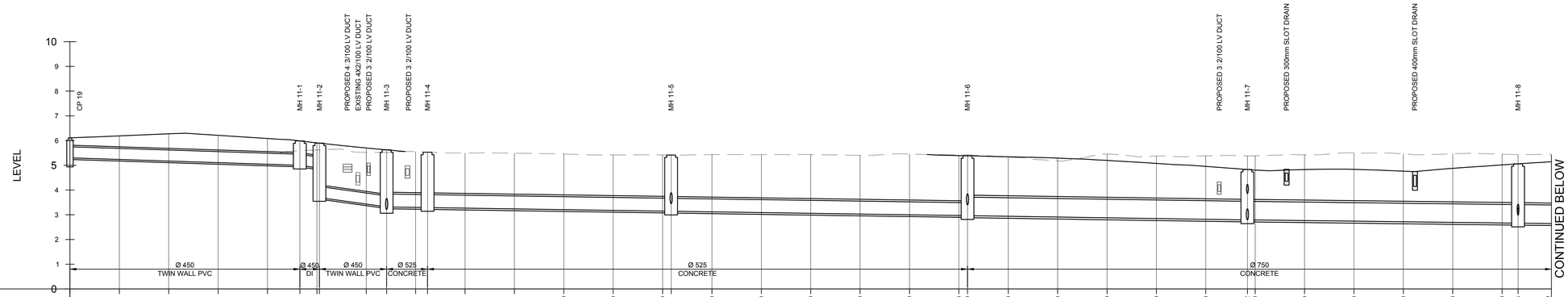
Originating Office
TPS Croydon - Interchange
81-85 Station Road
Croydon
CR0 2RD
United Kingdom
Tel +44 (0)1902 422431
www.tpsconsult.co.uk
info□tpsconsult.co.uk
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

TPS Job Manager		R.KNAPTON	
QA System - Checks		Signature	Date
Drawn By:	L.OLARIU		06/11/2015
Checked:	W.HELLYER		06/11/2015
Authorised:	R.MOORE		06/11/2015

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR APPROVAL	1:20

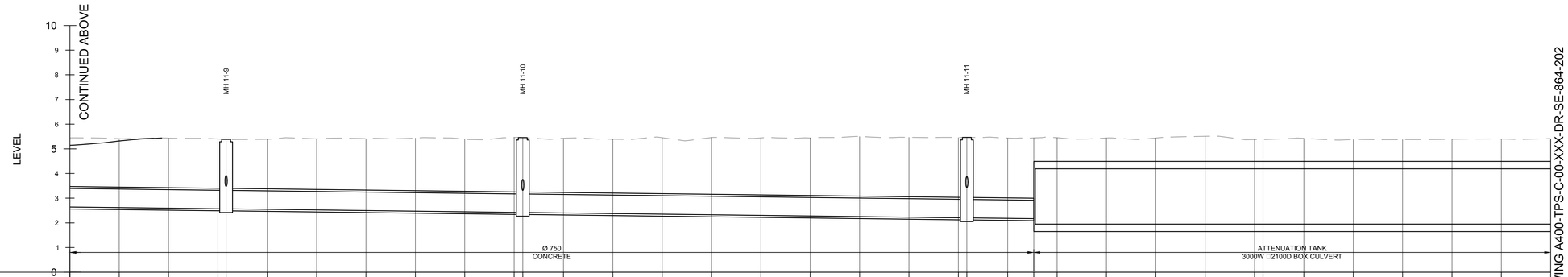
Project No.	Orig.	Disc	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-DE-864-006									06

A4 PLOT SCALE ACAD



CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.550	50.000	50.517	60.000	64.127	70.000	72.410	80.000	90.000	100.000	110.000	120.000	121.741	130.000	140.000	150.000	160.000	170.000	180.000	181.750	190.000	200.000	210.000	220.000	230.000	238.432	240.000	250.000	260.000	270.000	280.000	290.000	293.228	300.000
EXISTING GROUND LEVELS						5.591	5.620	5.624	5.527	5.513	5.553	5.529	5.496	5.487	5.458	5.418	5.419	5.416	5.435	5.431	5.434	5.404	5.455	5.421	5.424	5.328	5.183	5.451	5.376	5.382	5.381	5.386	5.424	5.504	5.464	5.467	5.448	5.433	5.444
PROPOSED GROUND LEVELS	6.110	6.190	6.273	6.213	6.085	5.988	5.908	5.897	5.700	5.626														5.392	5.384	5.344	5.290	5.198	5.076	4.956	4.832	4.809	4.828	4.837	4.763	4.878	5.016	5.060	
SERVICE INVERT LEVELS	5.300					5.000	4.878		3.316		3.291						3.143							2.962							2.792						2.660	
SERVICE PIT EASTING AND NORTHING	E: 543284.890 N: 180350.424					E: 543285.930 N: 180395.962	E: 543286.019 N: 180400.928		E: 543285.221 N: 180414.515		E: 543277.176 N: 180416.483						E: 543227.857 N: 180417.586							E: 543187.863 N: 180418.926							E: 543111.195 N: 180420.193						E: 543055.413 N: 180421.418	

LINE 11



CHAINAGE	300.000	310.000	320.000	330.000	331.668	340.000	350.000	360.000	370.000	380.000	390.000	391.757	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	481.721	490.000	495.277	500.000	510.000	520.000	530.000	540.000	541.721	550.000	560.000	570.000	580.000	590.000	600.000
EXISTING GROUND LEVELS	5.444	5.412	5.435	5.402	5.398	5.391	5.405	5.413	5.440	5.392	5.462	5.459	5.425	5.392	5.452	5.459	5.446	5.443	5.499	5.468	5.462	5.465	5.437	5.442	5.452	5.439	5.440	5.508	5.375	5.382	5.427	5.378	5.375	5.387	5.398	5.415
PROPOSED GROUND LEVELS		5.318																																		
SERVICE INVERT LEVELS				2.567							2.420										2.200			2.166													
SERVICE PIT EASTING AND NORTHING				E: 543017.987 N: 180422.277							E: 542957.909 N: 180423.640										E: 542887.867 N: 180425.622																

LINE 11

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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CONSTRUCTION:
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MAINTENANCE:
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NOTES

1. SCHEME LEVEL DRAINAGE SECTIONS SHOWN FOR ILLUSTRATION OF SCHEME. DETAILS MAY VARY AS DESIGN DEVELOPS.
2. FOR LOCATIONS REFER TO SURFACE WATER DRAINAGE LAYOUT DRAWINGS A400-TPS-C-00-L00-DR-GA-864-001 TO 004.
3. ACCESS TO SITE TO BE CO-ORDINATED WITH LONDON CITY AIRPORT OPERATIONS.

LEGEND

PROPOSED MANHOLE/CATCHPIT

EXISTING MANHOLE/CATCHPIT

PROPOSED PIPE

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR INFOMATION			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	DRAWING TITLE REVISED.			
04	R. RYAN	10/11/2017	S. GUNESS	10/11/2017
	DRAINAGE REVISED			
03	R. RYAN	08/09/2017	P. MISTRY	08/09/2017
	STAGE 3 UPDATE ISSUE			
02	R. RYAN	31/03/2017	P. MISTRY	31/03/2017
	ISSUED FOR INFORMATION			
01	R. RYAN	08/12/2016	W.HELLYER	08/12/2016
	INITIAL ISSUE			

FOR INFORMATION

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS SHEET 1 OF 6

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www.tpsconsult.co.uk
info : tpsconsult.co.uk
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

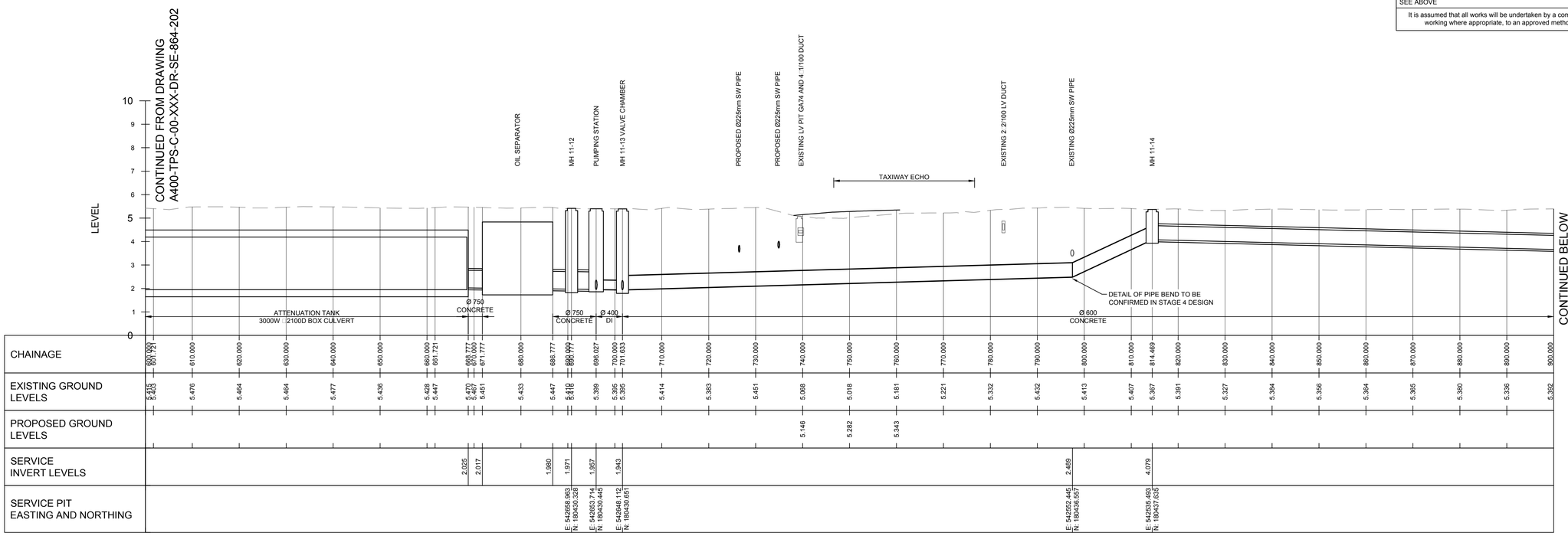
TPS Job Manager: R.KNAPTON

QA System - Checks	Signature	Date
Drawn By: R. RYAN		08/12/2016
Checked: W.HELLYER		08/12/2016
Authorised: G. PRICKETT		08/12/2016

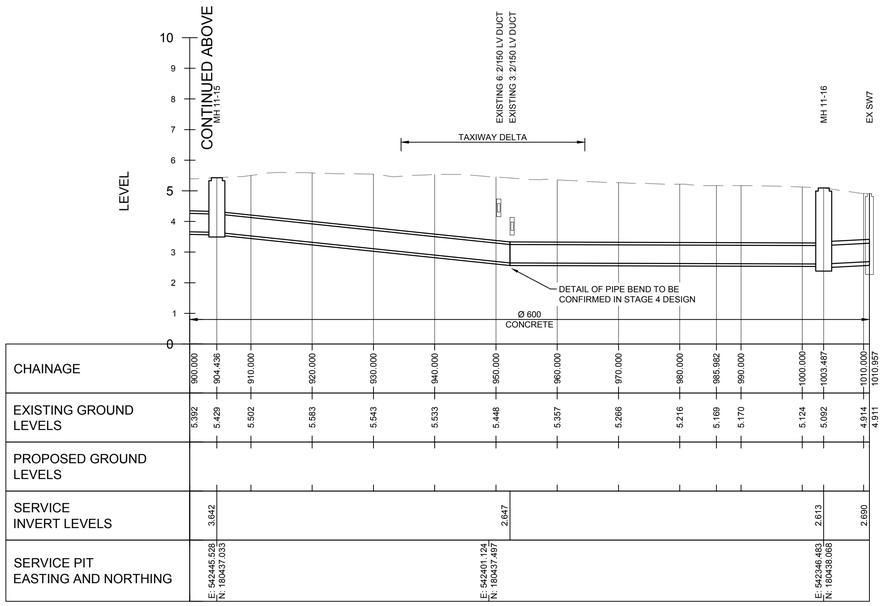
TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-201									06

PLOT SCALE ACAD



LINE 11



LINE 11

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LEGEND

PROPOSED MANHOLE/CATCHPIT

EXISTING MANHOLE/CATCHPIT

PROPOSED PIPE

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR INFOMATION			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	DRAWING TITLE REVISED.			
04	R. RYAN	10/11/2017	S. GUNESS	10/11/2017
	DRAINAGE REVISED			
03	R. RYAN	08/09/2017	P. MISTRY	08/09/2017
	STAGE 3 UPDATE ISSUE			
02	R. RYAN	31/03/2017	P. MISTRY	31/03/2017
	ISSUED FOR INFORMATION			
01	R. RYAN	08/12/2016	W.HELLYER	08/12/2016
	INITIAL ISSUE			

FOR INFORMATION

London City Airport
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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS
SHEET 2 OF 6

Originating Office
TPS Croydon - Interchange
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Croydon
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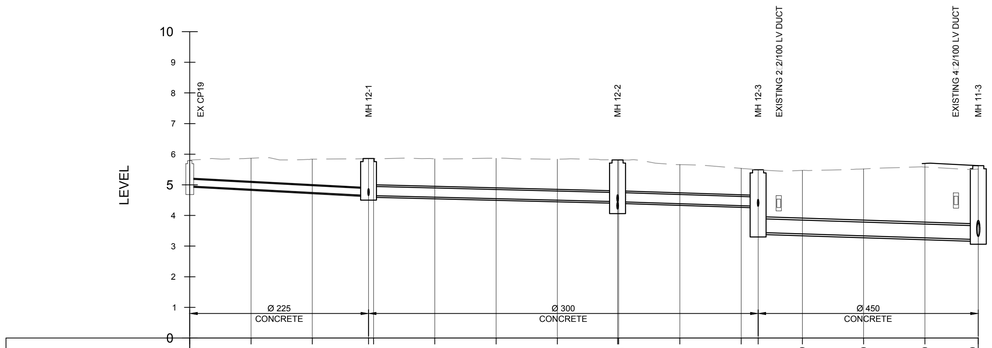
Birmingham : Croydon : Edinburgh : Sheffield : Wolverhampton

TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	R. RYAN	08/12/2016
Checked:	W.HELLYER	08/12/2016
Authorised:	G. PRICKETT	08/12/2016

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

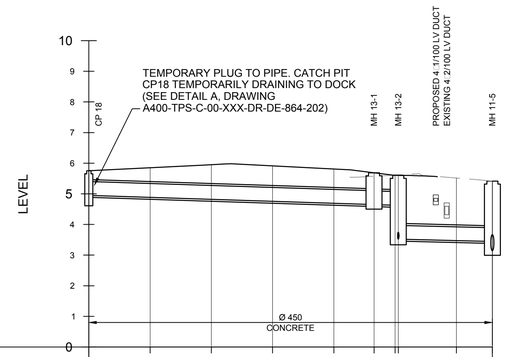
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-202									06

PLOT SCALE ACAD



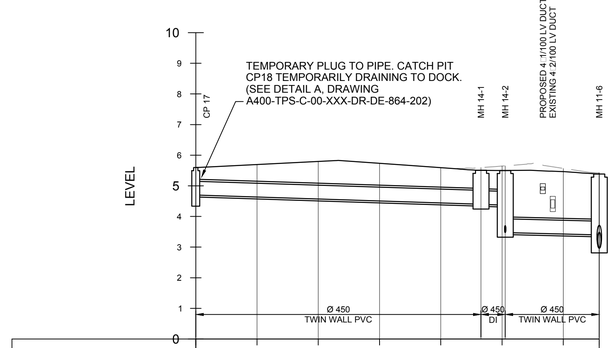
CHAINAGE	00.000	10.000	20.000	29.180 30.000	40.000	50.000	60.000	68.829 70.000	80.000	90.000	92.773	100.000	110.000	120.000	128.710
EXISTING GROUND LEVELS	5.791	5.868	5.839	5.857 5.858	5.849	5.870	5.838	5.813 5.813	5.659	5.539	5.490	5.472	5.520	5.582	5.513
PROPOSED GROUND LEVELS														5.699	5.626
SERVICE INVERT LEVELS	4.960			4.650				4.450			4.300 3.447				3.213
SERVICE PIT EASTING AND NORTHING	E: 543400.508 N: 180402.122			E: 543371.387 N: 180403.986				E: 543330.754 N: 180455.105			E: 543319.554 N: 180425.150				E: 543285.221 N: 180414.515

LINE 12



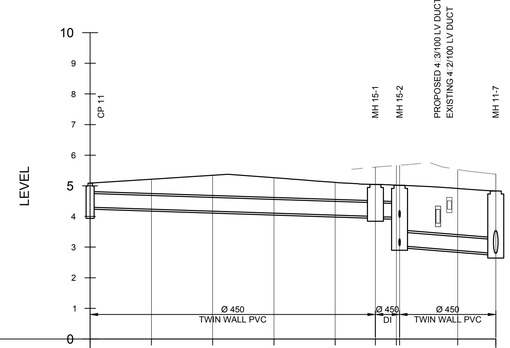
CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.555	50.000 55.516	60.000	65.870
EXISTING GROUND LEVELS						5.575	5.613 5.618	5.517	5.416
PROPOSED GROUND LEVELS	5.751	5.851	5.951	5.914	5.811	5.687	5.607 5.604		
SERVICE INVERT LEVELS	4.950					4.650	4.620 3.521		3.444
SERVICE PIT EASTING AND NORTHING	E: 543226.404 N: 180351.732					E: 543227.445 N: 180398.275	E: 543227.534 N: 180402.235		E: 543272.867 N: 180417.898

LINE 13



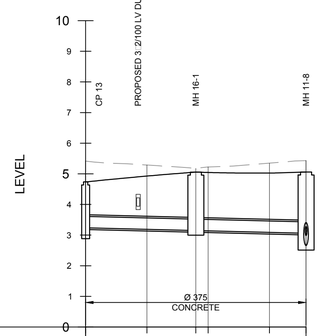
CHAINAGE	00.000	10.000	20.000	30.000	40.000	50.000	60.000	65.888
EXISTING GROUND LEVELS						5.645	5.568	5.424
PROPOSED GROUND LEVELS	5.597	5.696	5.796	5.734	5.594	5.499	5.462	5.384
SERVICE INVERT LEVELS	4.700					4.400 4.394	4.370 3.474	3.397
SERVICE PIT EASTING AND NORTHING	E: 543166.419 N: 180358.074					E: 543167.469 N: 180399.622	E: 543167.549 N: 180403.577	E: 543167.863 N: 180418.926

LINE 14



CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.566	50.000 50.515	60.000	66.215
EXISTING GROUND LEVELS						5.611	5.664 5.672	5.533	5.381
PROPOSED GROUND LEVELS	5.090	5.215	5.344	5.265	5.111	5.046	5.022 5.017	4.913	4.832
SERVICE INVERT LEVELS	4.300					4.000 3.994	3.970 3.044		2.792 3.657
SERVICE PIT EASTING AND NORTHING	E: 543166.434 N: 180354.416					E: 543107.475 N: 180400.970	E: 543107.564 N: 180404.918		E: 543111.195 N: 180420.183

LINE 15



CHAINAGE	00.000	10.000	17.995 20.000	30.000	35.980	
EXISTING GROUND LEVELS	5.417	5.287	5.178 5.223	5.349	5.433	
PROPOSED GROUND LEVELS	4.734	4.927	5.056 5.044	5.026	5.060	
SERVICE INVERT LEVELS	3.237		3.147		3.057	
SERVICE PIT EASTING AND NORTHING	E: 543079.881 N: 180424.134		E: 543066.579 N: 180436.253		E: 543058.413 N: 180421.418	

LINE 16

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

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A400-01-U-REG-00001-02

MAINTENANCE:
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DECOMISSIONING / DEMOLITION:
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3. ACCESS TO SITE TO BE CO-ORDINATED WITH LONDON CITY AIRPORT OPERATIONS.

LEGEND

PROPOSED MANHOLE/CATCHPIT

EXISTING MANHOLE/CATCHPIT

PROPOSED PIPE

Rev				
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FOR INFORMATION

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE
LONGITUDINAL SECTIONS
SHEET 3 OF 6

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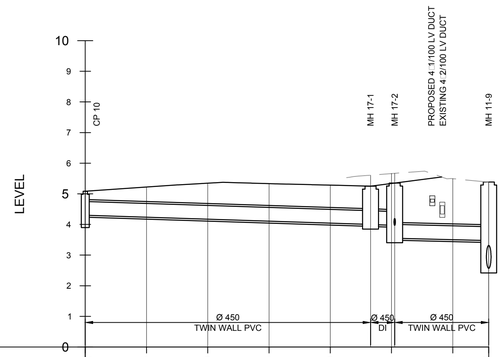
TPS Job Manager	R.KNAPTON	
QA System - Checks	Signature	Date
Drawn By:	R. RYAN	08/12/2016
Checked:	W.HELLYER	08/12/2016
Authorised:	G. PRICKETT	08/12/2016

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

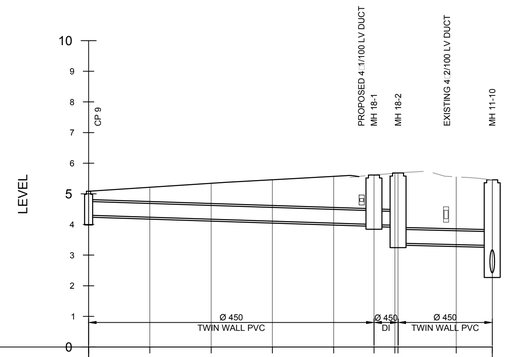
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-203									06

PLOT SCALE ACAD



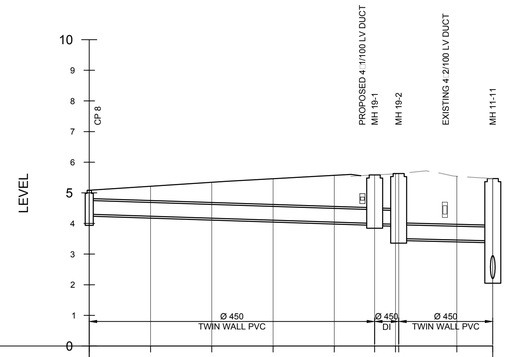
CHAINAGE	00.000	10.000	20.000	30.000	40.000	50.000	60.000	65.866	
EXISTING GROUND LEVELS						5.662	5.494	5.386	
PROPOSED GROUND LEVELS	5.085	5.221	5.347	5.333	5.284	5.339			
SERVICE INVERT LEVELS	4.300					4.000 / 3.970		3.475	
SERVICE PIT EASTING AND NORTHING	E: 542910.457 N: 180356.428					E: 543017.498 N: 180402.990 / E: 543017.586 N: 180406.929		E: 543017.987 N: 180422.277	

LINE 17



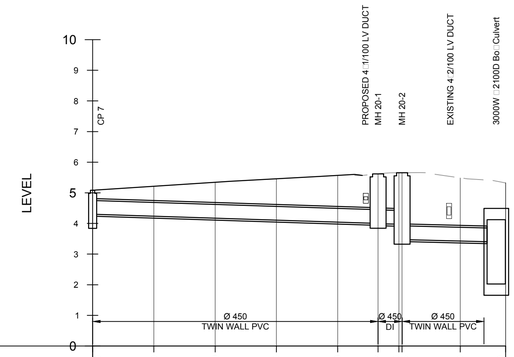
CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.581	50.000 / 50.515	60.000	65.888
EXISTING GROUND LEVELS						5.615	5.672 / 5.660	5.554	5.459
PROPOSED GROUND LEVELS	5.085	5.214	5.344	5.459	5.570				
SERVICE INVERT LEVELS	4.300					4.000 / 3.994 / 3.970		3.391	3.314
SERVICE PIT EASTING AND NORTHING	E: 542966.472 N: 180397.768					E: 542967.513 N: 180404.338 / E: 542967.601 N: 180408.270		E: 542967.908 N: 180422.840	

LINE 18



CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.891	50.000 / 50.516	60.000	65.869
EXISTING GROUND LEVELS						5.585	5.620 / 5.630	5.541	5.465
PROPOSED GROUND LEVELS	5.085	5.214	5.344	5.459	5.570				
SERVICE INVERT LEVELS	4.300					4.000 / 3.994 / 3.970	3.507		3.430
SERVICE PIT EASTING AND NORTHING	E: 542886.494 N: 180359.760					E: 542867.536 N: 180406.359 / E: 542867.623 N: 180410.283		E: 542867.967 N: 180423.502	

LINE 19



CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.597	50.000 / 50.516	60.000	67.409
EXISTING GROUND LEVELS						5.620	5.655 / 5.656	5.488	5.325
PROPOSED GROUND LEVELS	5.085	5.214	5.344	5.459	5.570				
SERVICE INVERT LEVELS	4.300					4.000 / 3.994 / 3.970	3.473	3.404	2.020
SERVICE PIT EASTING AND NORTHING	E: 542806.509 N: 180351.121					E: 542807.551 N: 180407.706 / E: 542807.638 N: 180411.624			

LINE 20

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

CONSTRUCTION:
FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02

MAINTENANCE:
SEE ABOVE

DECOMISSIONING / DEMOLITION:
SEE ABOVE

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NOTES

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3. ACCESS TO SITE TO BE CO-ORDINATED WITH LONDON CITY AIRPORT OPERATIONS.

LEGEND

PROPOSED MANHOLE/CATCHPIT

EXISTING MANHOLE/CATCHPIT

PROPOSED PIPE

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
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01	R. RYAN	08/12/2016	W.HELLYER	08/12/2016
	INITIAL ISSUE			

FOR INFORMATION

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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS
SHEET 4 OF 6

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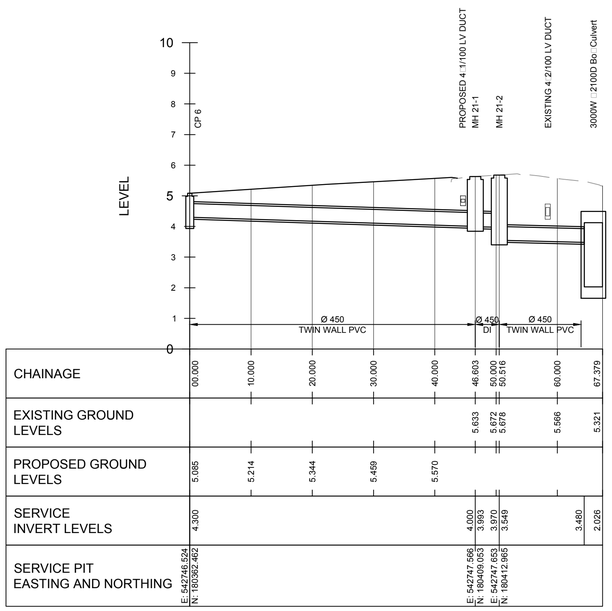
TPS Job Manager R.KNAPTON

QA System - Checks	Signature	Date
Drawn By: R. RYAN		08/12/2016
Checked: W.HELLYER		08/12/2016
Authorised: G. PRICKETT		08/12/2016

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

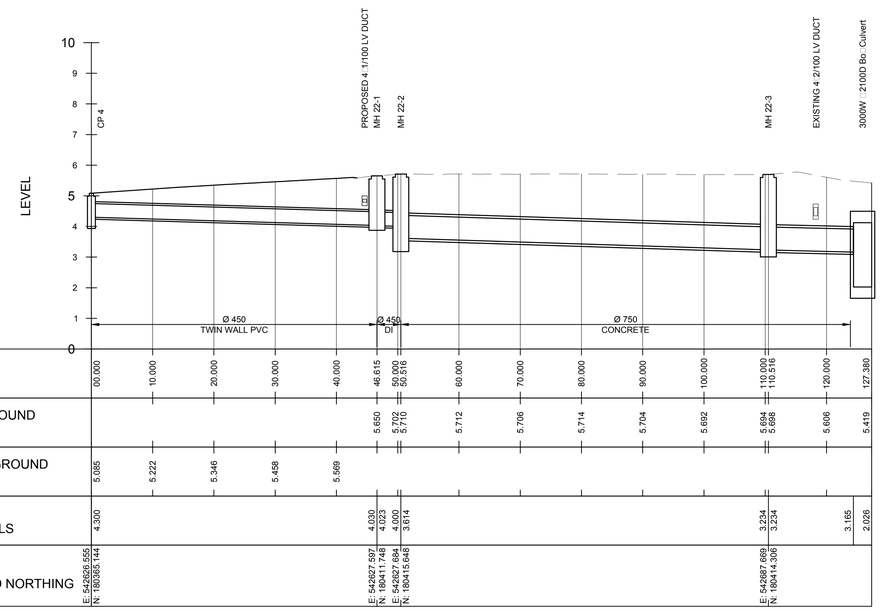
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-204									06

PLOT SCALE ACAD



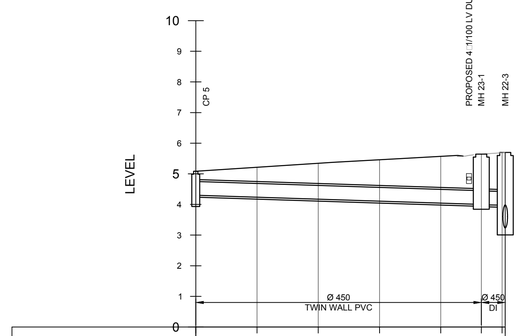
CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.603	50.000	50.516	60.000	67.379
EXISTING GROUND LEVELS						5.633	5.672	5.678	5.566	5.321
PROPOSED GROUND LEVELS	5.085	5.214	5.344	5.459	5.570					
SERVICE INVERT LEVELS	4.300					4.000	3.993	3.970	3.549	3.480 2.026
SERVICE PIT EASTING AND NORTHING	E: 542746.524 N: 180362.462					E: 542747.566 N: 180409.053		E: 542747.653 N: 180412.965		

LINE 21



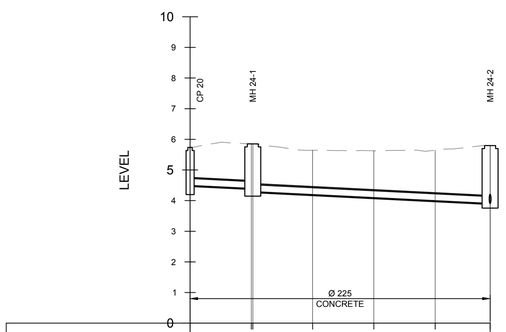
CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.615	50.000	50.516	60.000	70.000	80.000	90.000	100.000	110.000	110.516	120.000	127.380
EXISTING GROUND LEVELS						5.650	5.702	5.710	5.712	5.706	5.714	5.704	5.692	5.694	5.698	5.606	5.419
PROPOSED GROUND LEVELS	5.085	5.222	5.346	5.458	5.569												
SERVICE INVERT LEVELS	4.300					4.030	4.023	4.000	3.614					3.234	3.234	3.165	2.026
SERVICE PIT EASTING AND NORTHING	E: 542626.555 N: 180365.144					E: 542627.597 N: 180411.748		E: 542627.684 N: 180415.648						E: 542687.669 N: 180414.306			

LINE 22



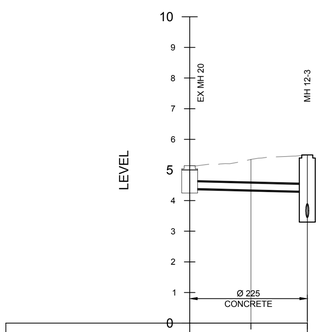
CHAINAGE	00.000	10.000	20.000	30.000	40.000	46.609	50.000	50.516
EXISTING GROUND LEVELS						5.644	5.688	5.698
PROPOSED GROUND LEVELS	5.085	5.214	5.344	5.459	5.570			
SERVICE INVERT LEVELS	4.300					4.000	3.993	3.970 3.614
SERVICE PIT EASTING AND NORTHING	E: 542686.540 N: 180363.803					E: 542687.582 N: 180410.400		E: 542687.669 N: 180414.308

LINE 23



CHAINAGE	00.000	10.000	10.242	20.000	30.000	40.000	48.978
EXISTING GROUND LEVELS	5.736	5.855	5.853	5.642	5.627	5.646	5.797
PROPOSED GROUND LEVELS							
SERVICE INVERT LEVELS	4.496	4.394	4.294				3.907
SERVICE PIT EASTING AND NORTHING	E: 543495.080 N: 180401.473	E: 543492.469 N: 180411.382					E: 543453.787 N: 180412.987

LINE 24



CHAINAGE	00.000	10.000	19.204
EXISTING GROUND LEVELS	5.139	5.341	5.490
PROPOSED GROUND LEVELS			
SERVICE INVERT LEVELS	4.396		4.450 4.300
SERVICE PIT EASTING AND NORTHING	E: 543311.316 N: 180442.477		E: 543319.554 N: 180425.130

LINE 25

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**

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PROPOSED MANHOLE/CATCHPIT

EXISTING MANHOLE/CATCHPIT

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FOR INFORMATION

London City Airport
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Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE
LONGITUDINAL SECTIONS
SHEET 5 OF 6

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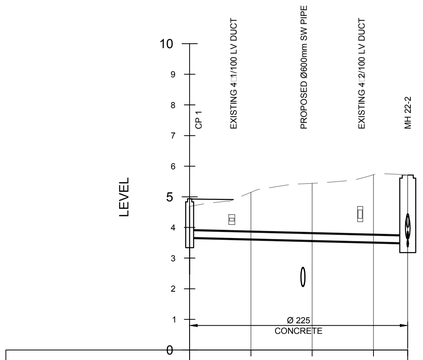
QA System - Checks		Signature	Date
Drawn By:	R. RYAN		08/12/2016
Checked:	W.HELLYER		08/12/2016
Authorised:	G. PRICKETT		08/12/2016

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

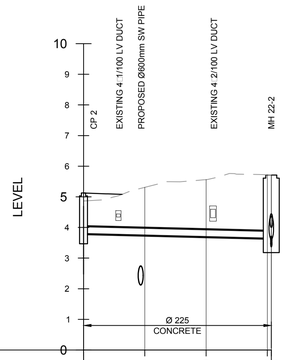
Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-205									06

PLOT SCALE ACAD



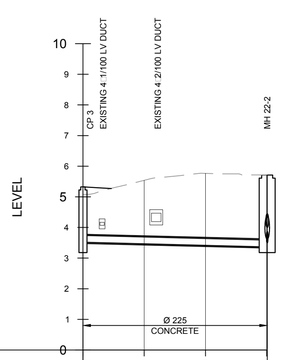
CHAINAGE	00.000	10.000	20.000	30.000	35.599
EXISTING GROUND LEVELS	4.689	5.147	5.441	5.721	5.710
PROPOSED GROUND LEVELS	4.931				
SERVICE INVERT LEVELS	3.674		1.943		3.495
SERVICE PIT EASTING AND NORTHING	E: 542618.571 N: 180450.060				E: 542627.684 N: 180415.648

LINE 26



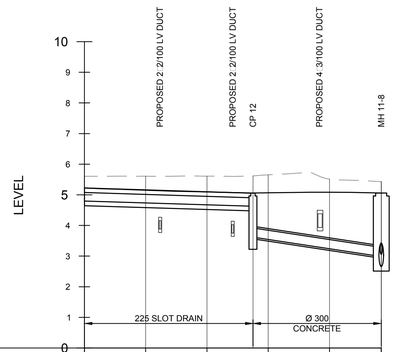
CHAINAGE	00.000	10.000	20.000	30.000	30.649
EXISTING GROUND LEVELS	4.863	5.311	5.562	5.718	5.710
PROPOSED GROUND LEVELS	5.122				
SERVICE INVERT LEVELS	3.801			**3.942**	
SERVICE PIT EASTING AND NORTHING	E: 542609.295 N: 180440.167			E: 542627.684 N: 180415.648	

LINE 27



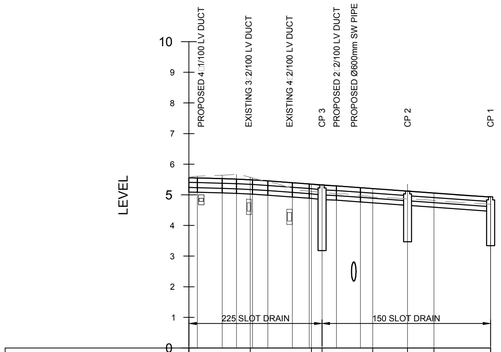
CHAINAGE	00.000	10.000	20.000	30.000
EXISTING GROUND LEVELS	5.074	5.539	5.766	5.710
PROPOSED GROUND LEVELS	5.324			
SERVICE INVERT LEVELS	3.515			**3.943**
SERVICE PIT EASTING AND NORTHING				E: 542627.684 N: 180415.648

LINE 28



CHAINAGE	00.000	10.000	20.000	30.000	40.000	48.453
EXISTING GROUND LEVELS	5.604	5.607	5.610	5.652	5.515	5.433
PROPOSED GROUND LEVELS	5.224	5.151	5.093	5.067	5.083	5.060
SERVICE INVERT LEVELS		4.056 3.845		3.741	3.803 4.034 3.897	
SERVICE PIT EASTING AND NORTHING						

LINE 29



CHAINAGE	00.000	10.000	20.000 21.731	30.000	35.689	40.000	49.247
EXISTING GROUND LEVELS	5.576	5.574	5.109 5.074	4.922	4.865	4.815	4.689
PROPOSED GROUND LEVELS	5.556	5.491	5.350 5.324	5.204	5.120	5.056	4.931
SERVICE INVERT LEVELS	5.240		4.996		4.806		4.613
SERVICE PIT EASTING AND NORTHING			E: 542600.792 N: 180429.118		E: 542609.295 N: 180440.167		E: 542618.571 N: 180450.060

LINE 30

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards and risks normally associated with the type of work detailed on this drawing. **NOTE SIGNIFICANT HAZARDS AS IDENTIFIED**
CONSTRUCTION: FOR CONSTRUCTION, OPERATION, MAINTENANCE AND DEMOLITION RISKS REFER TO COMBINED CADP RISK REGISTER: A400-01-U-REG-00001-02
MAINTENANCE: SEE ABOVE
DECOMISSIONING / DEMOLITION: SEE ABOVE
It is assumed that all works will be undertaken by a competent contractor working where appropriate, to an approved method statement.

DO NOT SCALE FROM THIS DRAWING

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NOTES

1. SCHEME LEVEL DRAINAGE SECTIONS SHOWN FOR ILLUSTRATION OF SCHEME. DETAILS MAY VARY AS DESIGN DEVELOPS.
2. FOR LOCATIONS REFER TO SURFACE WATER DRAINAGE LAYOUT DRAWINGS A400-TPS-C-00-L00-DR-GA-864-001 TO 004.
3. ACCESS TO SITE TO BE CO-ORDINATED WITH LONDON CITY AIRPORT OPERATIONS.

LEGEND

- PROPOSED MANHOLE/CATCHPIT
- EXISTING MANHOLE/CATCHPIT
- PROPOSED PIPE

Rev	Revised By	Date	Checked By	Date
06	J.EAGLING	25.01.2018	B.WYITHE	25.01.2018
	ISSUED FOR INFOMATION			
05	A.WILSON	12/12/2017	B.WYITHE	12/12/2017
	DRAWING TITLE REVISED.			
04	R. RYAN	10/11/2017	S. GUNESS	10/11/2017
	DRAINAGE REVISED			
03	R. RYAN	08/09/2017	P. MISTRY	08/09/2017
	STAGE 3 UPDATE ISSUE			
02	R. RYAN	31/03/2017	P. MISTRY	31/03/2017
	ISSUED FOR INFORMATION			
01	R. RYAN	08/12/2016	W.HELLYER	08/12/2016
	INITIAL ISSUE			

FOR INFORMATION

London City Airport
Get closer.

Project
CITY AIRPORT
DEVELOPMENT PROGRAMME

Drawing Title
AIRFIELD PROPOSED DRAINAGE LONGITUDINAL SECTIONS
SHEET 6 OF 6

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TPS Job Manager	R.KNAPTON		
QA System - Checks		Signature	Date
Drawn By:	R. RYAN		08/12/2016
Checked:	W.HELLYER		08/12/2016
Authorised:	G. PRICKETT		08/12/2016

TPS Project No.	Drawing Status	Scale (at A1) (at A3)
112931	FOR INFORMATION	1:500 (H) 1:100 (V)

Project No.	Orig.	Disc.	Zone	Level	Type	Sub Type	Series	Sht. No.	Rev.
A400-TPS-C-00-XXX-DR-SE-864-206									06

PLOT SCALE ACAD

A.2. Airside Drainage Calculations

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S11.000	48.418	0.300	161.4	0.119	5.00	0.0	0.600	o	450	Pipe/Conduit
S11.001	4.579	0.058	78.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.002	11.249	0.303	37.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S12.000	40.648	0.200	203.2	0.247	5.00	0.0	0.600	o	300	Pipe/Conduit
S12.001	23.419	0.150	156.1	0.281	0.00	0.0	0.600	o	300	Pipe/Conduit
S12.002	36.900	0.234	157.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.003	9.144	0.025	365.8	0.000	5.00	0.0	0.600	o	525	Pipe/Conduit
S11.004	49.326	0.148	333.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S13.000	48.379	0.300	161.3	0.254	5.00	0.0	0.600	o	450	Pipe/Conduit
S13.001	4.567	0.030	152.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S13.002	15.354	0.077	199.4	0.257	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.005	60.008	0.181	331.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S14.000	48.462	0.300	161.5	0.167	5.00	0.0	0.600	o	450	Pipe/Conduit
S14.001	4.574	0.030	152.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S14.002	15.348	0.077	199.3	0.126	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.006	56.682	0.170	333.4	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S11.000	5.236	0.119	0.0	1.60	254.1
S11.001	4.936	0.119	0.0	2.29	364.2
S11.002	3.694	0.119	0.0	3.35	532.0
S12.000	4.650	0.247	0.0	1.10	77.7
S12.001	4.450	0.528	0.0	1.26	88.8
S12.002	3.447	0.528	0.0	1.62	257.1
S11.003	3.316	0.647	0.0	1.17	252.3
S11.004	3.291	0.647	0.0	1.22	264.4
S13.000	4.886	0.254	0.0	1.60	254.2
S13.001	4.650	0.254	0.0	1.65	261.7
S13.002	3.521	0.511	0.0	1.44	228.4
S11.005	3.143	1.158	0.0	1.22	265.1
S14.000	4.636	0.167	0.0	1.60	254.0
S14.001	4.400	0.167	0.0	1.64	261.5
S14.002	3.474	0.293	0.0	1.44	228.4
S11.006	2.737	1.451	0.0	1.53	674.6

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Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S15.000	48.458	0.300	161.5	0.633	5.00	0.0	0.600	o	450	Pipe/Conduit
S15.001	4.544	0.030	151.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S15.002	15.700	0.079	198.7	0.193	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.007	54.797	0.132	415.1	0.155	0.00	0.0	0.600	o	750	Pipe/Conduit
S16.000	17.985	0.182	98.8	0.205	5.00	0.0	0.600	o	300	Pipe/Conduit
S11.008	38.454	0.093	413.5	0.151	0.00	0.0	0.600	o	750	Pipe/Conduit
S17.000	47.990	0.300	160.0	0.850	5.00	0.0	0.600	o	450	Pipe/Conduit
S17.001	5.000	0.030	166.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S17.002	15.352	0.077	199.4	0.038	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.009	60.075	0.147	408.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit
S18.000	48.040	0.300	160.1	0.871	5.00	0.0	0.600	o	450	Pipe/Conduit
S18.001	5.000	0.030	166.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S18.002	15.372	0.077	199.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.010	89.964	0.220	408.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S15.000	4.288	0.633	0.0	1.60	254.0
S15.001	4.000	0.633	0.0	1.65	262.4
S15.002	3.440	0.826	0.0	1.44	228.8
S11.007	2.567	2.432	0.0	1.37	604.0
S16.000	3.450	0.205	0.0	1.58	111.8
S11.008	2.435	2.788	0.0	1.37	605.2
S17.000	4.288	0.850	0.0	1.60	255.2
S17.001	4.000	0.850	0.0	1.57	250.0
S17.002	3.552	0.888	0.0	1.44	228.4
S11.009	2.342	3.676	0.0	1.38	608.8
S18.000	4.288	0.871	0.0	1.60	255.1
S18.001	4.000	0.871	0.0	1.57	250.0
S18.002	3.391	0.871	0.0	1.44	228.3
S11.010	2.195	4.547	0.0	1.38	608.6

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Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S19.000	47.957	0.300	159.9	0.888	5.00	0.0	0.600	o	450	Pipe/Conduit
S19.001	5.001	0.030	166.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S19.002	15.352	0.070	219.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.011	13.556	0.034	398.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit
S11.012	46.444	0.046	1009.7	0.000	0.00	0.0	0.600	[]	25	Pipe/Conduit
S20.000	47.999	0.300	160.0	0.623	5.00	0.0	0.600	o	450	Pipe/Conduit
S20.001	5.000	0.030	166.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S20.002	15.353	0.069	222.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.013	60.000	0.060	1000.0	0.000	0.00	0.0	0.600	[]	25	Pipe/Conduit
S21.000	48.008	0.300	160.0	0.879	5.00	0.0	0.600	o	450	Pipe/Conduit
S21.001	5.000	0.030	166.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S21.002	15.353	0.070	219.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S11.014	60.000	0.060	1000.0	0.000	0.00	0.0	0.600	[]	25	Pipe/Conduit
S22.000	53.006	0.300	176.7	0.953	5.00	0.0	0.600	o	450	Pipe/Conduit
S22.001	60.000	0.250	240.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S19.000	4.288	0.888	0.0	1.61	255.3
S19.001	4.000	0.888	0.0	1.57	250.0
S19.002	3.507	0.888	0.0	1.37	217.7
S11.011	1.975	5.435	0.0	1.40	616.4
S11.012	1.941	5.435	0.0	1.86	11538.1
S20.000	4.288	0.623	0.0	1.60	255.2
S20.001	4.000	0.623	0.0	1.57	250.0
S20.002	3.473	0.623	0.0	1.36	216.1
S11.013	1.895	6.058	0.0	1.87	11594.1
S21.000	4.288	0.879	0.0	1.60	255.2
S21.001	4.000	0.879	0.0	1.57	250.0
S21.002	3.549	0.879	0.0	1.37	217.7
S11.014	1.835	6.937	0.0	1.87	11594.1
S22.000	4.288	0.953	0.0	1.53	242.8
S22.001	4.000	0.953	0.0	1.80	796.1

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Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S23.000	53.019	0.300	176.7	0.801	5.00	0.0	0.600	o	450	Pipe/Conduit
S22.002	15.376	0.380	40.5	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit
S11.015	7.057	0.007	1008.1	0.000	0.00	0.0	0.600	[]	25	Pipe/Conduit
S11.016	22.000	0.068	323.5	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit
S11.017	10.856	0.027	402.1	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit
S11.018	112.835	-1.558	-72.4	0.000	5.00	0.0	0.600	o	515	Pipe/Conduit
S11.019	89.968	0.225	399.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S11.020	81.545	0.204	399.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S11.021	66.670	0.167	399.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S11.022	48.435	0.122	397.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S11.023	8.978	0.023	390.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S23.000	4.288	0.801	0.0	1.53	242.7
S22.002	3.614	1.754	0.0	4.41	1947.0
S11.015	1.775	8.691	0.0	1.86	11546.8
S11.016	1.768	8.691	0.0	1.55	684.9
S11.017	1.700	8.691	0.0	1.39	613.8
S11.018	1.673	8.691	0.0	0.00	0.0
S11.019	3.231	8.691	0.0	1.21	342.6
S11.020	3.006	8.691	0.0	1.21	342.6
S11.021	2.802	8.691	0.0	1.21	342.8
S11.022	2.635	8.691	0.0	1.22	343.8
S11.023	2.513	8.691	0.0	1.23	346.8

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
11.000	-	-	100	0.119	0.119	0.119
11.001	-	-	100	0.000	0.000	0.000
11.002	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.247	0.247	0.247
12.001	-	-	100	0.281	0.281	0.281
12.002	-	-	100	0.000	0.000	0.000
11.003	-	-	100	0.000	0.000	0.000
11.004	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.254	0.254	0.254
13.001	-	-	100	0.000	0.000	0.000
13.002	-	-	100	0.257	0.257	0.257
11.005	-	-	100	0.000	0.000	0.000
14.000	-	-	100	0.167	0.167	0.167
14.001	-	-	100	0.000	0.000	0.000
14.002	-	-	100	0.126	0.126	0.126
11.006	-	-	100	0.000	0.000	0.000
15.000	-	-	100	0.633	0.633	0.633
15.001	-	-	100	0.000	0.000	0.000
15.002	-	-	100	0.193	0.193	0.193
11.007	-	-	100	0.155	0.155	0.155
16.000	-	-	100	0.205	0.205	0.205
11.008	-	-	100	0.151	0.151	0.151
17.000	-	-	100	0.850	0.850	0.850
17.001	-	-	100	0.000	0.000	0.000
17.002	-	-	100	0.038	0.038	0.038
11.009	-	-	100	0.000	0.000	0.000
18.000	-	-	100	0.871	0.871	0.871
18.001	-	-	100	0.000	0.000	0.000
18.002	-	-	100	0.000	0.000	0.000
11.010	-	-	100	0.000	0.000	0.000
19.000	-	-	100	0.888	0.888	0.888
19.001	-	-	100	0.000	0.000	0.000
19.002	-	-	100	0.000	0.000	0.000
11.011	-	-	100	0.000	0.000	0.000
11.012	-	-	100	0.000	0.000	0.000
20.000	-	-	100	0.623	0.623	0.623
20.001	-	-	100	0.000	0.000	0.000
20.002	-	-	100	0.000	0.000	0.000
11.013	-	-	100	0.000	0.000	0.000
21.000	-	-	100	0.879	0.879	0.879
21.001	-	-	100	0.000	0.000	0.000
21.002	-	-	100	0.000	0.000	0.000
11.014	-	-	100	0.000	0.000	0.000
22.000	-	-	100	0.953	0.953	0.953
22.001	-	-	100	0.000	0.000	0.000
23.000	-	-	100	0.801	0.801	0.801
22.002	-	-	100	0.000	0.000	0.000
11.015	-	-	100	0.000	0.000	0.000
11.016	-	-	100	0.000	0.000	0.000
11.017	-	-	100	0.000	0.000	0.000
11.018	-	-	100	0.000	0.000	0.000

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
11.019	-	-	100	0.000	0.000	0.000
11.020	-	-	100	0.000	0.000	0.000
11.021	-	-	100	0.000	0.000	0.000
11.022	-	-	100	0.000	0.000	0.000
11.023	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				8.691	8.691	8.691

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S11.023	S	4.800	2.490	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	700
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	60
Ratio R	0.450		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S35, DS/PN: S11.017, Volume (m³): 18.3

Unit Reference	MD-CCU-0728-8000-2000-8000
Design Head (m)	2.000
Design Flow (l/s)	800.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	728
Invert Level (m)	1.700
Minimum Outlet Pipe Diameter (mm)	Site Specific Design (Contact Hydro International)
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	800.0
Flush-Flo™	1.045	644.7
Kick-Flo®	1.160	619.4
Mean Flow over Head Range	-	501.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.9	1.200	624.1	3.000	976.7	7.000	1482.3
0.200	60.2	1.400	671.2	3.500	1053.7	7.500	1533.5
0.300	127.4	1.600	716.8	4.000	1125.3	8.000	1583.1
0.400	211.1	1.800	759.6	4.500	1192.4	8.500	1631.1
0.500	303.3	2.000	800.0	5.000	1255.9	9.000	1677.7
0.600	394.9	2.200	838.4	5.500	1316.3	9.500	1722.9
0.800	536.9	2.400	875.1	6.000	1373.9		
1.000	638.1	2.600	910.2	6.500	1429.2		

Pump Manhole: S3, DS/PN: S11.018, Volume (m³): 10.7

Invert Level (m) 1.673

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	300.0000	0.900	300.0000	1.700	300.0000	2.500	300.0000
0.200	300.0000	1.000	300.0000	1.800	300.0000	2.600	300.0000
0.300	300.0000	1.100	300.0000	1.900	300.0000	2.700	300.0000
0.400	300.0000	1.200	300.0000	2.000	300.0000	2.800	300.0000
0.500	300.0000	1.300	300.0000	2.100	300.0000	2.900	300.0000
0.600	300.0000	1.400	300.0000	2.200	300.0000	3.000	300.0000
0.700	300.0000	1.500	300.0000	2.300	300.0000		
0.800	300.0000	1.600	300.0000	2.400	300.0000		

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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	0
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR Ratio R	0.450
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.400	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720
Return Period(s) (years)	3, 30
Climate Change (%)	0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S11.000	S1	15 Winter	30	+0%					5.368
S11.001	S2	15 Winter	30	+0%					5.089
S11.002	S3	15 Winter	30	+0%	30/15 Summer				4.832
S12.000	S3	15 Winter	30	+0%	30/15 Summer				5.544
S12.001	S4	15 Winter	30	+0%	3/15 Summer				5.302
S12.002	S5	15 Winter	30	+0%	30/15 Summer				4.959
S11.003	S3	15 Winter	30	+0%	30/15 Summer				4.827
S11.004	S4	15 Winter	30	+0%	30/15 Summer				4.808
S13.000	S3	15 Winter	30	+0%					5.085
S13.001	S4	15 Winter	30	+0%					4.909
S13.002	S11	15 Winter	30	+0%	30/15 Summer				4.818
S11.005	S5	15 Winter	30	+0%	30/15 Summer				4.763
S14.000	S4	15 Winter	30	+0%					4.793
S14.001	S5	15 Winter	30	+0%					4.645
S14.002	S15	60 Winter	30	+0%	30/15 Summer				4.672
S11.006	S5	60 Winter	30	+0%	30/15 Summer				4.715
S15.000	S5	15 Winter	30	+0%	30/15 Summer				4.791
S15.001	S6	60 Winter	30	+0%	30/15 Summer				4.618
S15.002	S19	60 Winter	30	+0%	30/15 Summer				4.655
S11.007	S4	60 Winter	30	+0%	30/15 Summer				4.709

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S11.000	S1	-0.318	0.000	0.18		42.4	OK	
S11.001	S2	-0.297	0.000	0.25		42.6	OK	
S11.002	S3	0.688	0.000	0.14		42.1	SURCHARGED	
S12.000	S3	0.594	0.000	1.11		80.4	SURCHARGED	
S12.001	S4	0.552	0.000	2.12		167.3	SURCHARGED	
S12.002	S5	1.062	0.000	0.64		146.0	SURCHARGED	
S11.003	S3	0.986	0.000	1.18		173.2	SURCHARGED	
S11.004	S4	0.992	0.000	0.70		163.8	SURCHARGED	
S13.000	S3	-0.251	0.000	0.39		90.5	OK	
S13.001	S4	-0.191	0.000	0.62		88.9	OK	
S13.002	S11	0.847	0.000	1.01		171.3	SURCHARGED	
S11.005	S5	1.095	0.000	1.09		262.6	SURCHARGED	
S14.000	S4	-0.293	0.000	0.26		59.4	OK	
S14.001	S5	-0.205	0.000	0.41		59.1	OK	
S14.002	S15	0.748	0.000	0.32		53.9	SURCHARGED	
S11.006	S5	1.228	0.000	0.34		197.4	SURCHARGED	
S15.000	S5	0.053	0.000	0.90		206.1	FLOOD RISK	
S15.001	S6	0.168	0.000	0.79		113.2	SURCHARGED	
S15.002	S19	0.765	0.000	0.87		147.0	SURCHARGED	
S11.007	S4	1.392	0.000	0.63		327.3	FLOOD RISK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S16.000	S6	60 Winter	30	+0%	30/15 Summer				4.634
S11.008	S5	60 Winter	30	+0%	3/15 Winter				4.645
S17.000	S9	15 Winter	30	+0%	30/15 Summer				5.038
S17.001	S10	15 Winter	30	+0%	3/15 Summer				4.620
S17.002	S25	60 Winter	30	+0%	30/15 Summer				4.534
S11.009	S3	60 Winter	30	+0%	3/15 Winter				4.587
S18.000	S10	15 Winter	30	+0%	30/15 Summer				5.062
S18.001	S12	15 Winter	30	+0%	3/15 Summer				4.627
S18.002	S29	60 Winter	30	+0%	30/15 Summer				4.476
S11.010	S10	60 Winter	30	+0%	3/15 Summer				4.554
S19.000	S12	15 Winter	30	+0%	30/15 Summer				5.081
S19.001	S15	15 Winter	30	+0%	3/15 Summer				4.634
S19.002	S33	60 Winter	30	+0%	30/15 Summer				4.350
S11.011	S2	60 Winter	30	+0%	3/15 Summer				4.305
S11.012	S28	60 Winter	30	+0%					4.041
S20.000	S13	15 Winter	30	+0%	30/15 Summer				4.779
S20.001	S17	15 Winter	30	+0%	30/15 Summer				4.531
S20.002	S38	60 Winter	30	+0%	30/15 Summer				4.296
S11.013	S2	60 Winter	30	+0%					3.995
S21.000	S20	15 Winter	30	+0%	30/15 Summer				5.071
S21.001	S21	15 Winter	30	+0%	3/15 Summer				4.630
S21.002	S42	60 Winter	30	+0%	3/15 Winter				4.320
S11.014	S23	60 Winter	30	+0%					3.935
S22.000	S16	15 Winter	30	+0%	30/15 Summer				5.024
S22.001	S5	60 Winter	30	+0%					4.369
S23.000	S36	15 Winter	30	+0%	30/15 Summer				4.871
S22.002	S6	60 Winter	30	+0%					4.345
S11.015	S21	60 Winter	30	+0%	30/30 Winter				3.984
S11.016	S40	60 Winter	30	+0%	3/15 Summer				4.246
S11.017	S35	60 Winter	30	+0%	3/15 Summer				4.366
S11.018	S3	60 Winter	30	+0%	3/15 Winter				4.027
S11.019	S6	120 Winter	30	+0%					3.779
S11.020	S44	120 Winter	30	+0%					3.577
S11.021	S7	120 Winter	30	+0%					3.392
S11.022	S46	480 Winter	30	+0%	3/15 Winter				3.235
S11.023	S47	120 Summer	3	+0%	3/60 Summer				3.113

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.000	S6	0.884	0.000	0.38		36.9	SURCHARGED	
S11.008	S5	1.460	0.000	0.73		359.8	SURCHARGED	
S17.000	S9	0.300	0.000	1.15		266.2	FLOOD RISK	
S17.001	S10	0.170	0.000	1.89		266.1	SURCHARGED	
S17.002	S25	0.532	0.000	0.89		149.8	SURCHARGED	
S11.009	S3	1.495	0.000	0.93		490.2	SURCHARGED	
S18.000	S10	0.324	0.000	1.18		271.4	FLOOD RISK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S18.001	S12	0.177	0.000	1.92		271.0	SURCHARGED	
S18.002	S29	0.635	0.000	0.89		149.9	SURCHARGED	
S11.010	S10	1.609	0.000	1.12		617.9	SURCHARGED	
S19.000	S12	0.343	0.000	1.19		275.5	FLOOD RISK	
S19.001	S15	0.184	0.000	1.95		274.9	SURCHARGED	
S19.002	S33	0.393	0.000	0.92		154.7	SURCHARGED	
S11.011	S2	1.580	0.000	2.19		744.2	SURCHARGED	
S11.012	S28	0.000	0.000	0.07		740.0	SURCHARGED*	
S20.000	S13	0.041	0.000	0.88		203.4	SURCHARGED	
S20.001	S17	0.081	0.000	1.45		205.4	SURCHARGED	
S20.002	S38	0.373	0.000	0.67		111.3	SURCHARGED	
S11.013	S2	0.000	0.000	0.05		586.3	SURCHARGED*	
S21.000	S20	0.333	0.000	1.18		273.3	FLOOD RISK	
S21.001	S21	0.180	0.000	1.93		272.8	SURCHARGED	
S21.002	S42	0.321	0.000	0.91		152.2	SURCHARGED	
S11.014	S23	0.000	0.000	0.04		521.2	SURCHARGED*	
S22.000	S16	0.286	0.000	1.39		308.8	FLOOD RISK	
S22.001	S5	-0.381	0.000	0.25		169.6	OK	
S23.000	S36	0.133	0.000	1.22		270.5	FLOOD RISK	
S22.002	S6	-0.019	0.000	0.32		312.5	OK	
S11.015	S21	0.109	0.000	0.04		590.7	SURCHARGED*	
S11.016	S40	1.728	0.000	0.90		447.2	SURCHARGED	
S11.017	S35	1.916	0.000	1.34		421.5	SURCHARGED	
S11.018	S3	1.839	0.000	2.19		300.0	SURCHARGED	
S11.019	S6	-0.052	0.000	0.95		300.0	OK	
S11.020	S44	-0.029	0.000	0.95		300.0	OK	
S11.021	S7	-0.010	0.000	0.97		300.0	OK	
S11.022	S46	0.000	0.000	1.00		299.9	SURCHARGED	
S11.023	S47	0.000	0.000	1.62		300.0	SURCHARGED	

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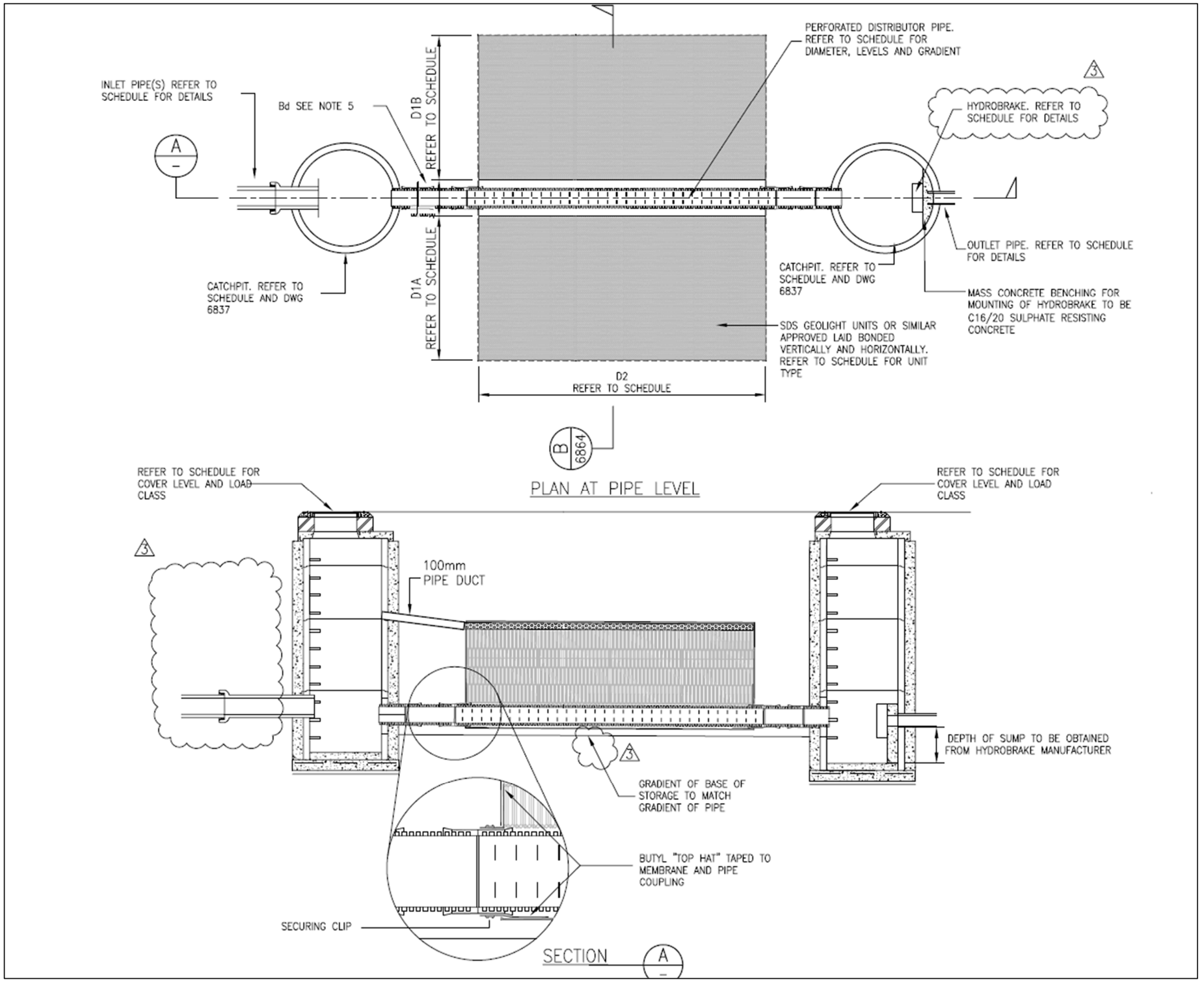
Appendix B.

B.1. Landside Drainage Drawings

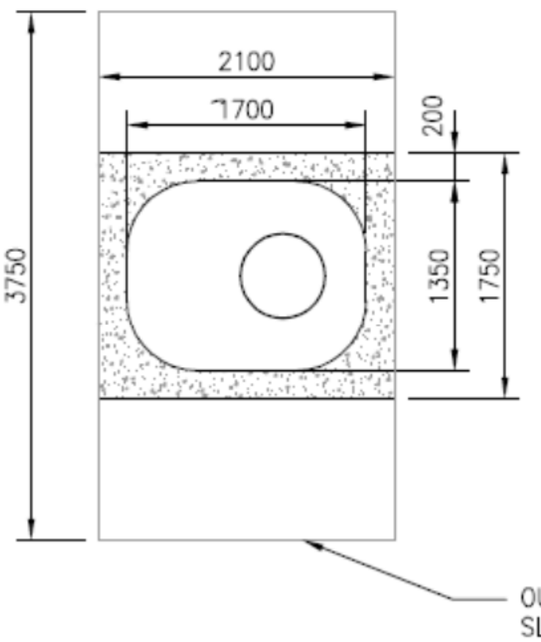
-	TYPICAL LANDSIDE ATTENUATION DETAILS
-	TYPICAL OIL SEPARATOR DETAILS
A400-ATK-C-30-XXX-DR-GA-864-101	STAGE 3 WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINAGE SHEET 1 OF 2
A400-ATK-C-30-XXX-DR-GA-864-101	STAGE 3 WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINAGE SHEET 2 OF 2
A400-ATK-C-36-XXX-XX-DR-GA-864-101	STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 1 OF 4
A400-ATK-C-36-XXX-XX-DR-GA-864-102	STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 2 OF 4
A400-ATK-C-36-XXX-XX-DR-GA-864-103	STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 3 OF 4
A400-ATK-C-36-XXX-XX-DR-GA-864-104	STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 4 OF 4
A400-ATK-C-40-XXX-XX-DR-GA-864-101	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (1 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-102	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (2 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-103	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (3 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-104	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (4 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-105	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (5 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-106	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (6 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-107	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (7 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-108	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (8 OF 12)

A400-ATK-C-40-XXX-XX-DR-GA-864-109	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (9 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-110	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (10 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-111	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (11 OF 12)
A400-ATK-C-40-XXX-XX-DR-GA-864-112	STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (12 OF 12)
A400-ATK-C-40-XXX-XX-DR-SK-864-001	EXISTING DOCKSIDE SURFACE WATER DRAINAGE FLOWS INTO EXISTING DRAINAGE NETWORK

TYPICAL LANDSIDE ATTENUATION DETAILS

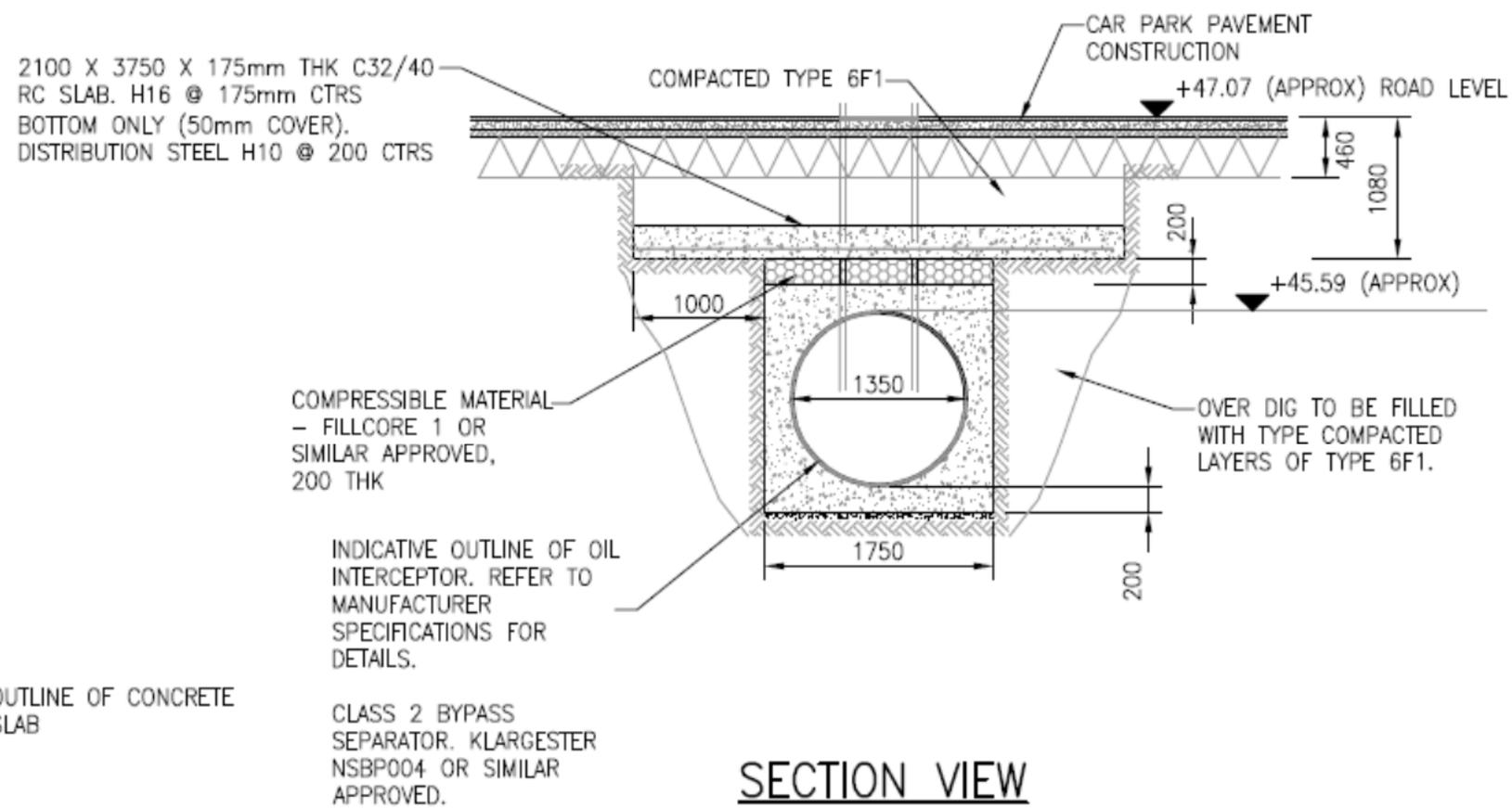


TYPICAL OIL SEPARATOR DETAILS



PLAN VIEW

SCALE 1:50



SECTION VIEW

SCALE 1:50

DO NOT SCALE

Millimetres 100 10 0

WEST PIER

WESTERN ENERGY CENTRE

REFUSE STORE

WESTERN TERMINAL EXTENSION

SW009a
SW009
SW024
SW023
SW025
SW022
SW010
SW011
SW020
SW012
SW013
SW021
SW019/1
SW019
SW014 (HYDROBRAKE) DISCHARGE 5 l/s
SW016
SW005
SW006
SW008/1
SW008
SW007
SW004
SW003
SW015
SW002
SW001

CH007
CH008
CH009
CH010
CH001
CH002
CH003
CH004
CH005
CH006
CH 015
CH 016
CH 013
CH 012
CH 011

SUMP 1
SUMP 2
SUMP 3
SUMP 4
SUMP 6
SUMP 7
SUMP 8
SUMP 9
SUMP 10

SLT 1
SLT 2

RWP
G

DRAIN PIPES FROM DRAW PIT
EXISTING GULLY OUTSIDE GREEN LINE BOUNDARY TO BE RETAINED
CONNECTION TO EXISTING 600Ø PIPE
CONNECTION FROM W.E.C BUIDLING
ATTENUATION TANK
OIL INTERCEPTOR
DRAIN PIPES FROM DRAW PITS
DRAIN PIPES FROM DRAIN PITS
STUB FOR CONNECTION TO W.S.Y CHANNEL DRAIN
REALIGNED GULLY TO SUIT ROAD WIDENING
SURFACE WATER DRAINAGE SYSTEM FOR DIVERSION WORKS REFER A400-ATK-C-00-XXX-DR-XX-864-003
CONNECTION FROM WTE BUILDING
CONNECTION FROM W.T.E BUILDING
MATWELL CONNECTION FROM W.T.E BUILDING
STUB FOR CONNECTION TO W.S.Y CHANNEL DRAIN
CONNECTION TO EXISTING MANHOLE
CONNECTION TO EXISTING DOWN PIPE
CONNECTION TO EXISTING 600Ø PIPE

NOTES:

1. THIS DRAWING IS BASED ON P□W UWSY LAYOUT A400-PAW-A-35-XXX-XX-M2-XX-900-001
2. EXISTING INFORMATION BASED ON□
   - MSA DRAINAGE SURVEY DRAWING REF 4046-D DATED 05/09/2016
   - GEOTEC SURVEY DRAWING REF 1506S004W LAYOUTS 1 TO 12 AND MANHOLE SCHEDULE LANDSIDE DATED JUNE 2015
   - TECHNICS CCTV SURVEY SD16823-01 DATED JANUARY 2017
   - STATS SEARCH UTILITIES DATED OCTOBER 2016 □ UTILITY OVERVIEW MAP REF 48558 FINAL ISSUE B DATED 08/11/2016
   - TECHNICS BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
   - 'AS-BUILT' DOCKLANDS LIGHT RAILWAY (DLR) RECORD DRAWINGS DATED 16/06/2016
   - 'AS-BUILT' UKPN RECORD DRAWINGS
   - WEST PIER WATERMAN CONSTRUCTION DRAWING DRAINAGE LAYOUTS DATED 27/08/2015.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH STAGE 3 WSY DESIGN REPORT AND PROPOSED WSY DRAWINGS SERIES:
   - A400-ATK-C-30-XXX-XX-DR-GA-500-101- PROPOSED COMMUNICATION SERVICES EXTERNAL PIT AND DUCT LAYOUT
   - A400-ATK-C-30-XXX-XX-DR-GA-823-101- PROPOSED LV □ HV SERVICES PIT AND DUCT LAYOUT
   - A400-ATK-C-30-XXX-XX-DR-GA-862-101- PROPOSED FOUL WATER DRAINAGE SYSTEM LAYOUT
   - A400-ATK-C-30-XXX-XX-DR-GA-863-101- PROPOSED FIRE MAIN AND WATER SERVICES LAYOUT
4. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO THAMES WATER NETWORK.
5. ALL MANHOLE AND COVERS TO BE D400 RATED AND PIPES TO HAVE A 150mm CONCRETE SURROUND FOR HIGHWAYS LOADING, IF LESS THAN 0.9m DEEP.
6. ATTENUATION TANK TO BE HEAVY DUTY SDS GEOLIGHT. OVERALL DIMS 7m X 11m X 2m DEEP. TYPICAL COVER FROM PROPOSED HARD LANDSCAPING LEVELS IS 0.9m. ATTENUATION TANK'S TOP SURFACE TO BE PROTECTED WITH GEOTEXTILE ROOT BARRIER.
7. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND/OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
8. PRELIMINARY MANHOLE SIZES AND PIPE BEDDING TYPES BASED ON HIGHWAYS STANDARD DETAILS (MCHW). REQUIREMENT TO BE REVIEWED AND DEVELOPED AT NEXT DESIGN STAGE.
9. OIL INTERCEPTOR TO BE 208 C1/SC BY SPEL WITH CONCRETE SURROUND DESIGN FOR VEHICLE LOADING.
10. LOCATION OF ALL EXISTING UTILITIES TO BE VERIFIED PRIOR TO CONSTRUCTION.
11. REFER TO SPECIFICATION CLAUSE 2.2.2 FOR TREATMENT OF ABANDONED SERVICES.
12. CONNECTION INTO SWS OF IRRIGATION DRAINAGE TO BE DETAILED IN NEXT PHASE WITH SPECIALIST.
13. FLAP VALVES REQUIRED AT MANHOLES FOR DRAWPIT DRAINAGE.
14. HARD CONNECTION REQUIRED BETWEEN EXISTING RWP AND BELOW GROUND DRAINAGE.
15. FOR PIPE AND MANHOLE SCHEDULE REFER DRAWING A400-ATK-C-30-XXX-XX-DR-GA-864-102.

KEY PLAN ZONE:

PRIVATE

Rev.	Date	Description	By	Chk'd	App'd
02	16/02/2018	STAGE 3 ISSUE	AM	HR	
01	20/10/2017	FIRST DRAWING ISSUE	RJM	ML	MJH

Drawing Suitability: For □□□r □□□r □□□□□ Status: S2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- Live services critical to airport operations (eg HV, AGL, Peri cables, firemain) to be protected during works.
- Contaminated soil and asbestos within buried services or in ground - see environmental reports.
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- DLR e□clusion zone re□uirements to be observed during e□cavation.
- Risk of hitting or discovering UXO - See site specific UXO reports.
- The potential hazard of no□ious gas escape from sewer manholes within the WTE building needs to be addressed in Phase 4

MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

See construction risks above

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

LEGEND:

- EXISTING SURFACE WATER DRAINAGE
- TO BE ABANDONED
- EXISTING MANHOLE
- PROPOSED BUILDING BOUNDARY
- SW — PROPOSED SURFACE WATER CARRIER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- SW SLT — PROPOSED SURFACE WATER SLOT DRAIN
- O RWP — RAINWATER DOWNPIPE
- G — GULLY
- FLOW DIRECTIOIN
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE
- PROPOSED ACCESS SHAFT

ABBREVIATION:

W.S.Y - WESTERN SERVICE YARD
W.E.C - WESTERN ENERGY CENTRE
W.T.E - WEST TERMINAL EXTENSION
DLR - DOCKLANDS LIGHT RAILWAYS.
SW008 - SURFACE WATER MANHOLE
CH012 - CHANNEL DRAIN UPSTREAM
SUMP 3 - CHANNEL DRAIN SUMP UNIT
SLT 1 - SLOT DRAIN UPSTREAM

0 4 8 12 16 20
SCALE 1:200 METRES

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Client: London City Airport Get closer.

Project Title: LONDON CITY AIRPORT CADP STAGE 3

Drawing Title: STAGE 3 WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINGAGE LAYOUT SHEET 1 OF 2

Scale	Designed	Drawn	Checked	Authorised
1:200□ A1	DH	RJM	AS	FB
Original Size A1	Date 30/08/2017	Date 30/08/2017	Date 15/09/2017	Date 15/09/2017

Drawing Number: Proj.Code Orig Dis Zone Level Proj. Tile Type Sub Series / Num Rev Status
A400-ATK-C-30-XXX-XX-DR-GA-864-101 02 S2

DO NOT SCALE

Millimetres 100 10 0

PIPE SCHEDULE

SETOUT POINTS		Conduit Type	Length (m)	Slope (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	PIPE DIAMETER (mm)	BEDDING CLASS	TYPE
FROM	TO										
CH011	Sump 5	Channel	10.61	98	5.312	5.445	5.204	0.023	100X230	Z	ACO MultiDrain M100
CH012	Sump 5	Channel	3.82	200	5.065	5.195	5.046	0.020	100X230	Z	ACO MultiDrain M100
Sump 5	SW001	Carrier	1.66	23	4.531	5.321	4.458	0.640	150	Z	Clay
SW001	SW015	Carrier	40.30	325	1.406	5.430	1.282	3.424	600	B	PCC
CH013	Sump 6	Channel	6.41	200	4.800	5.080	4.768	0.020	100X280	Z	ACO MultiDrain M100
Sump 6	SW002	Carrier	2.40	24	4.550	5.130	4.450	0.430	150	Z	Clay
SW002	SW003	Carrier	8.20	245	3.261	5.276	3.228	1.715	300	F	Clay
CH015	Sump 8	Channel	8.38	184	5.187	5.321	5.142	0.024	100X230	Z	ACO MultiDrain M100
CH016	Sump 8	Channel	4.67	235	5.072	5.203	5.052	0.021	100X230	Z	ACO MultiDrain M100
Sump 8	SW003	Carrier	5.07	56	4.587	5.323	4.497	0.586	150	Z	Clay
SW003	SW004	Carrier	22.48	234	2.280	5.498	2.184	2.918	300	B	Clay
SW004	SW006	Carrier	7.80	195	2.184	5.496	2.144	3.012	300	B	Clay
SW005	SW006	Carrier	6.39	60	2.400	5.441	2.294	2.891	150	B	Clay
SW006	SW007	Carrier	12.17	245	2.144	5.484	2.094	3.040	300	B	Clay
SW007	SW008	Carrier	8.01	211	2.094	5.270	2.056	2.876	300	B	Clay
CH007	Sump 3	Channel	29.95	150	4.817	5.052	4.617	0.020	150X235	Z	ACO MultiDrain M150
CH008	Sump 3	Channel	2.04	204	4.872	5.052	4.862	0.020	100X180	Z	ACO MultiDrain M100
Sump 3	SW008/1	Carrier	1.45	103	4.248	5.038	4.234	0.565	225	Z	Clay
SW008/1	SW008	Carrier	10.46	125	3.493	4.980	3.409	1.262	225	F	Clay
SW008	SW012	Carrier	20.52	151	2.056	5.209	1.920	2.853	300	B	Clay
SW009a	SW009	Carrier	15.69	141	2.365	4.113	2.254	1.448	300	F	Clay
CH001	CH002	Channel	3.60	200	4.170	4.300	4.152	0.020	100X230	Z	ACO MultiDrain M100
CH002	CH003	Channel	5.12	200	4.152	4.360	4.126	0.098	100X230	Z	ACO MultiDrain M100
CH003	Sump 1	Channel	3.79	200	4.126	4.355	4.107	0.119	100X230	Z	ACO MultiDrain M100
Sump 1	SW009	Carrier	6.16	14	3.700	4.293	3.250	0.443	150	Z	Clay
SW009	SW010	Carrier	29.97	245	2.254	4.502	2.132	1.948	300	F	Clay
CH004	CH005	Channel	3.60	200	4.186	4.316	4.168	0.020	100X230	Z	ACO MultiDrain M100
CH005	CH006	Channel	5.49	200	4.168	4.356	4.141	0.078	100X230	Z	ACO MultiDrain M100
CH006	Sump 2	Channel	3.69	200	4.141	4.338	4.122	0.088	100X230	Z	ACO MultiDrain M100
Sump 2	SW010	Carrier	6.68	57	3.521	4.311	3.403	0.640	150	Z	Clay
SW010	SW011	Carrier	9.04	225	2.132	4.487	2.092	2.055	300	F	Clay
SLT 2	Sump 10	Carrier	11.31	954	3.789	4.190	3.777	0.176	225X425	Z	ACO Qmax 225
Sump 10	SW011	Carrier	6.61	54	3.427	4.217	3.304	0.640	150	Z	Clay
SW011	SW012	Carrier	10.73	134	2.092	4.426	2.012	2.034	300	F	Clay
CH014	Sump 7	Channel	33.26	32	4.821	5.101	3.782	0.020	100X280	Z	ACO MultiDrain M100
Sump 7	SW012	Carrier	6.44	6	3.625	4.134	2.496	0.359	150	Z	Clay
SW012	INTERCEPTOR	Carrier	3.59	76	1.910	4.370	1.863	2.010	450	F	PCC
INTERCEPTOR	SW013	Carrier	3.10	100	1.863	4.545	1.832	2.232	450	Z	PCC
SW013	ATT TANK	Carrier	3.85	227	1.832	4.653	1.815	2.371	450	B	PCC
ATT TANK	SW014	Carrier	14.33	94	1.815	5.940	1.662	3.675	450	B	PCC
SW014	SW015	Carrier	5.33	87	1.662	5.524	1.601	3.412	450	B	PCC
SW015	SW021	Carrier	28.48	264	1.282	5.221	1.174	3.339	600	B	PCC
CH009	Sump 4	Channel	24.18	200	4.980	5.160	4.859	0.020	100X180	Z	ACO MultiDrain M100
CH010	Sump 4	Channel	8.64	99	5.372	5.494	5.285	0.012	100X230	Z	ACO MultiDrain M100
Sump 4	SW016	Carrier	1.23	38	4.611	5.401	4.579	0.640	150	Z	Clay
SW016	SW019	Carrier	24.20	101	3.518	5.414	3.279	1.746	150	F	Clay
SW019	SW019/1	Carrier	8.81	143	1.696	5.336	1.635	3.340	300	B	Clay
SLT 1	Sump 9	Carrier	14.92	93	4.828	5.378	4.668	0.200	350X550	Z	ACO Qmax 350
Sump 9	SW019/1	Carrier	2.84	37	4.227	5.017	4.150	0.640	150	Z	Clay
SW019/1	SW020	Carrier	18.92	305	1.560	5.121	1.498	3.186	375	B	PCC
SW020	SW021	Carrier	5.94	60	1.498	4.602	1.399	2.729	375	B	PCC
SW021	SW022	Carrier	39.89	376	1.174	4.400	1.068	2.626	600	B	PCC

MANHOLE SCHEDULE

SETOUT POINTS	COORDINATES		MH Type	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
	E (m)	N (m)				
SW001	542319.851	180277.695	1	1500	D400	-
SW002	542292.243	180285.285	2	1200	D400	-
SW003	542291.688	180293.470	2	1200	D400	-
SW004	542292.093	180315.949	1	1200	D400	-
SW005	542289.691	180329.682	2	1200	D400	-
SW006	542289.581	180323.289	1	1200	D400	-
SW007	542277.291	180323.366	2	1500	D400	-
SW008	542269.287	180323.621	2	1500	D400	-
SW008/1	542259.521	180327.354	2	1200	D400	-
SW009a	542204.732	180333.295	2	1200	D400	-
SW009	542218.521	180325.811	2	1500	C250	-
SW010	542245.383	180312.515	2	1200	C250	-
SW011	542253.595	180308.729	2	1500	D400	-
SW012	542263.232	180304.010	2	1500	D400	-
OIL INTERCEPTOR	542266.314	180302.165	_	"1225 DIA 2260 LENGTH"	_	-
SW013	542268.113	180304.691	1	1350	C250	-
SW014	542284.881	180297.655	2	1350	C250	HYDROBRAKE DESIGN FLOW: 5lps DESIGN HEAD:1.5m
SW015	542282.525	180292.875	2	1500	C250	-
SW016	542288.724	180331.420	1	1200	D400	-
SW019	542287.878	180307.239	2	1200	D400	-
SW019/1	542279.076	180307.629	2	1350	C250	-
SW020	542260.211	180309.089	2	1350	D400	-
SW021	542256.481	180304.463	2	1500	D400	-

CHANNEL SCHEDULE

SETOUT POINTS	COORDINATES		MH Type	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
	E (m)	N (m)				
CH001	542224.579	180315.775	-	100X230	-	-
CH002	542221.175	180314.593	-	100X230	-	-
CH003	542216.588	180316.872	-	100X230	-	-
CH004	542232.945	180311.467	-	100X230	-	-
CH005	542234.054	180308.041	-	100X230	-	-
CH006	542238.921	180305.491	-	100X230	-	-
CH007	542229.667	180330.171	-	150X235	-	-
CH008	542261.620	180328.703	-	100X180	-	-
CH009	542264.533	180333.187	-	100X180	-	-
CH010	542297.341	180332.407	-	100X230	-	-
CH011	542327.772	180269.430	-	100X230	-	-
CH012	542316.250	180278.076	-	100X230	-	-
CH013	542296.810	180279.776	-	100X280	-	-
CH014	542290.106	180283.263	-	100X280	-	-
CH015	542286.735	180301.805	-	100X230	-	-
CH016	542286.452	180288.756	-	100X230	-	-
SLT 1	542279.611	180325.382	-	350X550	-	-
SLT 2	542260.341	180297.345	-	225X425	-	-
Sump 1	542215.434	180320.478	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 2	542242.464	180306.510	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 3	542259.587	180328.798	-	500x185x735	-	ACO M150D SUMP UNIT
Sump 4	542288.708	180332.647	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 5	542319.496	180276.069	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 6	542291.318	180283.074	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 7	542260.400	180298.228	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 8	542286.619	180293.423	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 9	542279.168	180310.468	-	_	-	ACO Qmax 350
Sump 10	542250.484	180302.900	-	_	-	ACO Qmax 225

ATTENUATION TANK SCHEDULE

STRUCTURE TYPE	AREA / Sq.m	DEPTH (m)
CELLULAR STORAGE	77	2.0

NOTES:

1. THIS DRAWING IS BASED ON P□W UWSY LAYOUT A400-PAW-A-35-XXX-XX-M2-XX-900-001
2. EXISTING INFORMATION BASED ON□
   - MSA DRAINAGE SURVEY DRAWING REF 4046-D DATED 05/09/2016
   - GEOTEC SURVEY DRAWING REF 1506S004W LAYOUTS 1 TO 12 AND MANHOLE SCHEDULE LANDSIDE DATED JUNE 2015
   - TECHNICS CCTV SURVEY SD16823-01 DATED JANUARY 2017
   - STATS SEARCH UTILITIES DATED OCTOBER 2016 □ UTILITY OVERVIEW MAP REF 48558 FINAL ISSUE B DATED 08/11/2016
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11. CONNECTION INTO SWS OF IRRIGATION DRAINAGE TO BE DETAILED IN NEXT PHASE WITH SPECIALIST.
12. FLAP VALVES REQUIRED AT MANHOLES FOR DRAWPIT DRAINAGE.
13. HARD CONNECTION REQUIRED BETWEEN EXISTING RWP AND BELOW GROUND DRAINAGE.

ABBREVIATION

MH - MANHOLE
US - UPSTREAM
DS - DOWNSTREAM
IL - INVERT LEVEL
CL - COVER LEVEL
ATT - ATTENUATION TANK
M100 - ACO MULTIDRAIN M100
M150 - ACO MULTIDRAIN M150
Qma□ - ACO Qma□ (Q-Slot edge)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

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- DLR e□clusion zone re□uirements to be observed during e□cavation.
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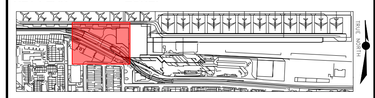
MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

See construction risks above

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

KEY PLAN ZONE:



PRIVATE

Rev.	Date	Description	By	Chk'd	App'd
01	16/02/2018	STAGE 3 ISSUE	AM	HR	

Drawing Suitability: F□□□r □□□r□ □□□□ — Status: S2

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Client: London City Airport — Get closer.

Project Title: LONDON CITY AIRPORT CADP STAGE 3

Drawing Title: STAGE 3 WESTERN SERVICE YARD PROPOSED SURFACE WATER DRAINAGE LAYOUT SHEET 2 OF 2

Scale	Designed	Drawn	Checked	Authorised
1:200□ A1	AM	RPN	HR	-
Original Size	**Date**	**Date**	**Date**	**Date**
A1	15/02/2018	15/02/2018	16/02/2018	-

Drawing Number

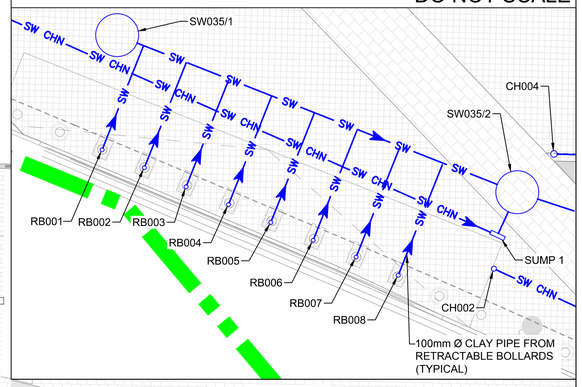
Proj.Code	Orig	Dis	Zone	Level	Proj. Tile	Type	Sub	Series / Num	Rev	Status
A400	ATK	C	30	XXX	XX	DR	GA	864-102	01	S2

DO NOT SCALE

MAIN TERMINAL BUILDING

EAST TERMINAL EXTENSION

SUBSTATION 1



DETAIL-1
SCALE 1:100

RWP CONNECTION FROM ETE BUILDING

MATWELL DRAINAGE

CH001
SW035/1
SW035/2
CH004
SUMP 1
CH002
SUMP 3
CH005
CH006
SUMP 4
CH007
CH008
SW035
SW035/3
SUMP 2
CH003
100mm Ø CLAY PIPE FROM RETRACTABLE BOLLARDS (TYPICAL)
SW029
CH014
CH009
SW001
SW036/1
SUMP 8
SW036/2
SW036
CH017
SUMP 9
CH015
SW002

FOR CONTINUATION SEE: A400-ATK-C-36-XXX-XX-DR-GA-864-102

LEGEND:

- EXISTING SURFACE WATER PIPE TO BE ABANDONED
- EXISTING SURFACE WATER PIPE
- EXISTING 150mm Ø SURFACE WATER PIPE
- EXISTING 225mm Ø SURFACE WATER PIPE
- EXISTING 300mm Ø SURFACE WATER PIPE
- EXISTING 600mm Ø SURFACE WATER PIPE
- PROPOSED SURFACE WATER CHANNEL DRAIN
- PROPOSED SURFACE WATER CARRIER PIPE
- PROPOSED CONNECTION FROM ETE TO SURFACE WATER DRAINAGE
- PROPOSED FLOW DIRECTION
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE
- PROPOSED SITE BOUNDARY

ABBREVIATION

MTB - MAIN TERMINAL BUILDING
ETE - EAST TERMINAL EXTENSION
SW013 - SURFACE WATER MANHOLE
CH059 - CHANNEL DRAIN UPSTREAM
SUMP 5 - CHANNEL DRAIN SUMP UNIT
RB003 - RETRACTABLE BOLLARD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- Live services critical to airport operations (eg HV, AGL, Peri cables, firemain) to be protected during works.
- Contaminated soil and asbestos within buried services or in ground - see environmental reports.
- Risk of collisions with pedestrians and vehicles in live airport environment and public access road
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- Risk of hitting or discovering UXO - See site specific UXO reports.

MAINTENANCE/CLEANING

- Risk of collisions with pedestrians and vehicles in live airport environment and public access road
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DECOMMISSIONING/DEMOLITION

- See construction risks above.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

0 2 4 6 8 10 METRES
SCALE 1:100

0 4 8 12 16 20 METRES
SCALE 1:200

NOTES:

1. THIS DRAWING IS BASED ON P□W FORECOURT LAYOUT A400-PAW-A-36-XXX-XX-M3-200-001.
2. REFER TO THE FOLLOWING DRAWINGS FOR EXISTING SURVEY INFORMATION:
   - A400-ATK-C-36-XXX-XX-DR-XX-800-321 - EXISTING COMBINED SERVICES LAYOUT - BASED ON MSA RECORDS
   - A400-ATK-C-36-XXX-XX-DR-XX-800-324 - EXISTING COMBINED SERVICES LAYOUT - BASED ON 2015 □ 2017 BURIED SERVICES SURVEY.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH STAGE 3 FORECOURT DESIGN REPORT AND PROPOSED FORECOURT DRAWINGS SERIES:
   - A400-ATK-C-36-XXX-XX-DR-GA-500-101 TO 103 - PROPOSED COMMUNICATION SERVICES EXTERNAL PIT AND DUCT LAYOUT
   - A400-ATK-C-36-XXX-XX-DR-GA-823-101 TO 103 - PROPOSED LV □ HV SERVICES PIT AND DUCT LAYOUT
   - A400-ATK-C-36-XXX-XX-DR-GA-831-101 TO 103 - PROPOSED GAS MAIN LAYOUT
   - A400-ATK-C-36-XXX-XX-DR-GA-842-101 TO 103 - PROPOSED EXTERNAL LOW TEMPERATURE HOT WATER SERVICES LAYOUT
   - A400-ATK-C-36-XXX-XX-DR-GA-862-101 TO 103 - PROPOSED FOUL WATER DRAINAGE SYSTEM LAYOUT
   - A400-ATK-C-36-XXX-XX-DR-GA-863-101 TO 103 - PROPOSED FIRE MAIN AND WATER SERVICES LAYOUT
4. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO THAMES WATER NETWORK.
5. ALL MANHOLE AND COVERS TO BE D400 RATED AND PIPES TO HAVE A 150mm CONCRETE SURROUND FOR HIGHWAYS LOADING, IF LESS THAN 1.2m DEEP.
6. ATTENUATION TANK TO BE HEAVY DUTY SDS GEOLIGHT. OVERALL DIMS 74m X 11m X 1.5m DEEP. TYPICAL COVER FROM PROPOSED HARD LANDSCAPING LEVELS IS 0.9m. ATTENUATION TANK'S TOP SURFACE TO BE PROTECTED WITH GEOTEXTILE ROOT BARRIER.
7. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND/OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
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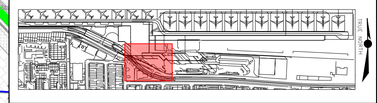
9. OIL INTERCEPTOR TO BE 210 C1/SC AND 330 C1/SC BY SPEL WITH CONCRETE SURROUND DESIGN FOR VEHICLE LOADING.
10. LOCATION OF ALL EXISTING UTILITIES TO BE VERIFIED PRIOR TO CONSTRUCTION.
11. FOR PIPE AND MANHOLE SCHEDULE REFER DRAWING A400-ATK-C-36-XXX-XX-DR-GA-864-104.
12. REFER TO SPECIFICATION CLAUSE 2.2.2 FOR TREATMENT OF ABANDONED SERVICES.
13. CONNECTION INTO SWS OF IRRIGATION DRAINAGE TO BE DETAILED IN NEXT PHASE WITH SPECIALIST .

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	27/02/18	STAGE 3 ISSUE	AM	HR	
01	20/10/17	FIRST DRAWING ISSUE	RJM	ML	MJH

Drawing Suitability: SUITABLE FOR INFORMATION
Status: S2

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www.atkinsglobal.com

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Client: London City Airport Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) ULTIMATE FORECOURT

Drawing Title: STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 1 OF 4

Scale	Designed	Drawn	Checked	Authorised
AS SHOWN	AIZ	RJM	ML	MJH
Original Size: A1	Date: 20/10/2017	Date: 20/10/2017	Date: 20/10/2017	Date: 20/10/2017

Drawing Number: Proj.Code Orig Dis Zone Level Proj. Tile Type Sub Series / Num — A400-ATK-C-36-XXX-XX-DR-GA-864-101 — Rev 02 Status S2

DO NOT SCALE

Millimetres 0 10 100

EAST TERMINAL EXTENSION

ATTENUATION TANK

RWP CONNECTION FROM ETE BUILDING

RWP CONNECTION FROM ETE BUILDING

MATWELL DRAINAGE

RAIN WATER HARVESTING

SW030 SW031 SW032 SW033 SW033/1 SW034 SW035 SW036 SW037 SW038 SW038/1 SW039 SW040 SW041 SW042 SW043 SW003 SW004 SW005 SW007 SW008 SW008/1 SW009 SW016 SW025 SW026 SW033/2

CH010 CH011 CH012 CH013 CH016 CH018 CH019 CH020 CH021 CH022 CH023 CH024 CH025 CH026 CH027 CH028 CH030 CH031 CH032

SUMP 5 SUMP 6 SUMP 7 SUMP 10 SUMP 11 SUMP 12 SUMP 13

750mm DIA ACCESS SHAFT
900mm DIA ACCESS SHAFT
750mm DIA ACCESS SHAFT
500mm DIA ACCESS SHAFT
OIL INTERCEPTOR 1
OIL INTERCEPTOR 2

EXTERNAL OUTFALL CONNECTION TO EXISTING DRAINAGE SYSTEM, NEW MANHOLE ON EXISTING SURFACE WATER DRAINAGE RUN

FOR CONTINUATION SEE: A400-ATK-C-36-XXX-XX-DR-GA-864-101

FOR CONTINUATION SEE: A400-ATK-C-36-XXX-XX-DR-GA-864-103

NOTES:

1. THIS DRAWING IS BASED ON P□W FORECOURT LAYOUT A400-PAW-A-36-XXX-XX-M3-200-001.
2. REFER TO THE FOLLOWING DRAWINGS FOR EXISTING SURVEY INFORMATION:
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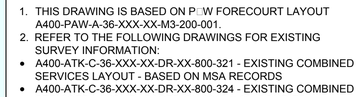
13. CONNECTION INTO SWS OF IRRIGATION DRAINAGE TO BE DETAILED IN NEXT PHASE WITH SPECIALIST .

KEY PLAN ZONE:



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Rev.	Date	Description	By	Chk'd	App'd
02	27/02/18	STAGE 3 ISSUE	AM	HR	
01	20/10/17	FIRST DRAWING ISSUE	RJM	ML	MJH

Drawing Suitability: SUITABLE FOR INFORMATION — Status: S2

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Euston Tower
286 Euston Road
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NW1 3AT
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www.atkinsglobal.com

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) ULTIMATE FORECOURT

Drawing Title: STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 2 OF 4

Scale	Designed	Drawn	Checked	Authorised
1:200	AIZ	RJM	ML	MJH
Original Size	**Date**	**Date**	**Date**	**Date**
A1	20/10/2017	20/10/2017	20/10/2017	20/10/2017

Drawing Number: A400-ATK-C-36-XXX-XX-DR-GA-864-102 — Proj. Code / Orig / Dis / Zone / Level / Proj. Tile / Type / Sub / Series / Num: 02 S2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- Live services critical to airport operations (eg HV, AGL, Peri cables, firemain) to be protected during works.
- Contaminated soil and asbestos within buried services or in ground - see environmental reports.
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DECOMMISSIONING/DEMOLITION

- See construction risks above.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

LEGEND:

- EXISTING SURFACE WATER PIPE TO BE ABANDONED
- EXISTING SURFACE WATER PIPE
- EXISTING 150mm Ø SURFACE WATER PIPE
- EXISTING 225mm Ø SURFACE WATER PIPE
- EXISTING 300mm Ø SURFACE WATER PIPE
- EXISTING 600mm Ø SURFACE WATER PIPE
- PROPOSED SURFACE WATER CHANNEL DRAIN
- PROPOSED SURFACE WATER CARRIER PIPE
- PROPOSED CONNECTION FROM ETE TO SURFACE WATER DRAINAGE
- PROPOSED FLOW DIRECTION
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE
- PROPOSED ACCESS SHAFT
- PROPOSED SITE BOUNDARY

ABBREVIATION

MTB - MAIN TERMINAL BUILDING
ETE - EAST TERMINAL EXTENSION
SW013 - SURFACE WATER MANHOLE
CH059 - CHANNEL DRAIN UPSTREAM
SUMP 5 - CHANNEL DRAIN SUMP UNIT

0 4 8 12 16 20
SCALE 1:200 METRES

DO NOT SCALE

Millimetres 0 10 100

SEE: A400-ATK-C-36-XXX-XX-DR-GA-864-102 FOR CONTINUATION

CH033 CH034 SUMP 14 CH029 SW019 SW018 SW017 SW017/1 SW017/2 CH035 SUMP 15 CH036 CH037 SUMP 16 CH038 SW022 100mm Ø CLAY PIPE FROM RETRACTABLE BOLLARDS (TYPICAL) REFER DETAIL-2 SW021 SW020 SW020/1 SW020/2 CH039 SUMP 17 SUMP 18 CH040 CH041 SW024/1 CH042 SUMP 19 SW024 SW023 SW023/1 CH043 CH044 CH045 SUMP 20 CH046 SUMP 21 CH047 SW014 SW014/1 SW014/2 CH051 SUMP 23 CH050 CH049 SUMP 22 CH048 SW010 SW013 SW012 SW011 300 SW SEWER

NOTES:
1. THIS DRAWING IS BASED ON P□W FORECOURT LAYOUT A400-PAW-A-36-XXX-XX-M3-200-001.
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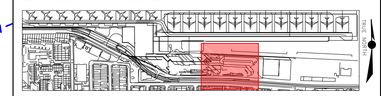
14. REFER TO ARCHITECTURAL DRAWINGS FOR FURTHER INFORMATION OR RAINWATER PIPES CONCEALED IN CANOPY STRUCTURE.

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	27/02/18	STAGE 3 ISSUE	AM	HR	
01	20/10/17	FIRST DRAWING ISSUE	RJM	ML	MJH

Drawing Suitability: SUITABLE FOR INFORMATION — Status: S2

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Euston Tower
286 Euston Road
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NW1 3AT
Tel: +44 (0) 207 121 2000
www.atkinsglobal.com

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) ULTIMATE FORECOURT

Drawing Title: STAGE 3 ULTIMATE FORECOURT PROPOSED SURFACE WATER DRAINAGE SHEET 3 OF 4

Scale	Designed	Drawn	Checked	Authorised
1:200	AIZ	RJM	ML	MJH
Original Size: A1	Date: 20/10/2017	Date: 20/10/2017	Date: 20/10/2017	Date: 20/10/2017

Drawing Number: Proj Code Orig Dis Zone Level Proj Tile Type Sub Series / Num Rev Status
A400-ATK-C-36-XXX-XX-DR-GA-864-103 02 S2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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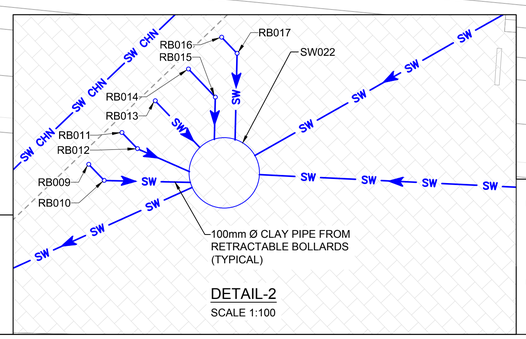
- EXISTING 600mm Ø SURFACE WATER PIPE
- PROPOSED SURFACE WATER CHANNEL DRAIN
- PROPOSED SURFACE WATER CARRIER PIPE
- PROPOSED FLOW DIRECTION
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE
- PROPOSED SITE BOUNDARY
- RAIN WATER DOWN PIPE WITH RODDING EYE

ABBREVIATION

MTB - MAIN TERMINAL BUILDING
ETE - EAST TERMINAL EXTENSION
SW013 - SURFACE WATER MANHOLE
CH059 - CHANNEL DRAIN UPSTREAM
SUMP 5 - CHANNEL DRAIN SUMP UNIT
RB015 - RETRACTABLE BOLLARD



DETAIL-2
SCALE 1:100

SCALE 1:100 METRES (0 2 4 6 8 10)

SCALE 1:200 METRES (0 4 8 12 16 20)

Millimetres 100 10 0

PIPE SCHEDULE

SETOUT POINTS FROM	SETOUT POINTS TO	Conduit Type	Length (m)	Slope (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	PIPE DIAMETER (mm)	BEDDING CLASS	TYPE
SW001	SW002	Carrier	41.71	158	4.004	4.804	3.740	0.575	225	Z	Clay
SW002	SW003	Carrier	27.07	193	3.040	4.540	2.900	1.200	300	F	Clay
SW003	SW004	Carrier	57.26	245	2.900	4.400	2.666	1.200	300	F	Clay
SW004	SW005	Carrier	54.30	365	2.441	4.360	2.292	1.394	525	F	PCC
SW005	SW009	Carrier	11.94	442	2.292	4.358	2.265	1.541	525	B	PCC
CH019	Sump 10	Channel	31.70	254	4.604	4.840	4.479	0.026	100x230	Z	ACO MultiDrain M100
CH018	Sump 10	Channel	35.55	188	4.656	4.886	4.467	0.020	100x230	Z	ACO MultiDrain M100
Sump 10	SW007	Carrier	5.82	33	4.000	4.831	3.825	0.681	150	Z	Clay
CH020	Sump 11	Channel	33.39	187	4.265	4.495	4.086	0.020	100x230	Z	ACO MultiDrain M100
CH021	Sump 11	Channel	27.48	233	4.270	4.483	4.152	0.003	100x230	Z	ACO MultiDrain M100
Sump 11	SW007	Carrier	3.96	26	3.693	4.483	3.543	0.640	150	Z	Clay
SW007	SW008	Carrier	31.44	103	3.468	4.580	3.162	0.887	225	Z	Clay
SW008/1	SW008	Carrier	6.45	52	3.456	4.863	3.332	1.182	225	F	Clay
SW008	SW009	Carrier	30.17	119	3.162	4.587	2.909	1.200	225	F	Clay
CH022	Sump 12	Channel	16.15	199	4.355	4.485	4.274	0.020	100x130	Z	ACO MultiDrain M100
Sump 12	SW009	Carrier	18.53	59	3.706	4.496	3.389	0.640	150	Z	Clay
SW009	SW026	Carrier	17.26	401	2.265	4.604	2.222	1.814	525	B	PCC
SW025	SW026	Carrier	18.24	150	3.700	5.351	3.578	1.426	225	F	Clay
CH047	Sump 21	Channel	34.45	176	4.443	4.679	4.247	0.026	100x230	Z	ACO MultiDrain M100
Sump 21	SW023	Carrier	2.59	88	3.926	4.725	3.896	0.649	150	Z	Clay
SW023/1	SW023	Carrier	24.00	209	3.200	4.763	3.085	1.338	225	F	Clay
SW023	SW024	Carrier	24.00	160	3.085	4.772	2.935	1.462	225	F	Clay
CH046	Sump 20	Channel	22.76	169	4.494	4.724	4.359	0.020	100x230	Z	ACO MultiDrain M100
CH043	CH044	Channel	6.56	46	4.640	4.770	4.497	0.020	100x130	Z	ACO MultiDrain M100
CH044	CH045	Channel	2.34	98	4.497	4.758	4.473	0.151	100x130	Z	ACO MultiDrain M100
CH045	Sump 20	Channel	10.46	374	4.473	4.775	4.445	0.191	100x130	Z	ACO MultiDrain M100
Sump 20	SW024	Carrier	2.47	44	3.936	4.727	3.880	0.641	150	Z	Clay
SW024	SW024/1	Carrier	25.93	245	2.860	4.778	2.754	1.618	300	F	Clay
CH042	Sump 19	Channel	8.84	200	4.669	4.799	4.625	0.020	100x130	Z	ACO MultiDrain M100
Sump 19	SW024/1	Carrier	1.70	37	3.995	4.785	3.949	0.640	150	Z	Clay
SW024/1	SW026	Carrier	25.64	245	2.754	4.815	2.649	1.761	300	B	Clay
SW010	SW011	Carrier	19.01	200	3.100	4.600	3.005	1.200	300	F	Clay
SW011	SW012	Carrier	65.53	324	2.930	4.330	2.728	1.025	375	F	PCC
SW012	SW013	Carrier	47.39	402	2.653	4.360	2.535	1.257	450	F	PCC
SW013	SW016	Carrier	15.08	397	2.535	4.440	2.497	1.455	450	F	PCC
CH048	Sump 22	Channel	18.40	100	4.279	4.509	4.095	0.020	100x230	Z	ACO MultiDrain M100
CH049	Sump 22	Channel	18.48	201	4.309	4.539	4.217	0.020	100x230	Z	ACO MultiDrain M100
Sump 22	SW014/1	Carrier	3.99	93	3.746	4.536	3.703	0.790	150	Z	Clay
SW014/2	SW014/1	Carrier	17.73	365	2.930	4.580	2.881	1.200	450	F	PCC
SW014/1	SW014	Carrier	37.70	366	2.881	4.609	2.778	1.278	450	F	PCC
CH050	Sump 23	Channel	17.42	98	4.302	4.539	4.124	0.027	100x230	Z	ACO MultiDrain M100
CH051	Sump 23	Channel	21.60	57	4.352	4.582	3.976	0.020	100x230	Z	ACO MultiDrain M100
Sump 23	SW014	Carrier	4.20	91	3.740	4.530	3.694	0.790	225	Z	Clay
SW014	SW016	Carrier	43.40	154	2.778	4.612	2.497	1.384	450	B	PCC
SW016	SW026	Carrier	14.81	449	2.422	4.784	2.389	1.837	525	B	PCC
CH038	Sump 16	Channel	17.27	200	4.881	5.116	4.795	0.020	150x235	Z	ACO MultiDrain M150
CH037	Sump 16	Channel	14.32	199	4.964	5.199	4.892	0.072	150x235	Z	ACO MultiDrain M150
Sump 16	SW017/1	Carrier	2.08	80	4.386	5.176	4.360	0.565	225	Z	Clay
SW017/2	SW017/1	Carrier	24.00	130	3.950	5.159	3.765	0.984	225	F	Clay
SW017/1	SW017	Carrier	24.00	364	3.690	5.218	3.624	1.228	300	F	Clay
SW017	SW018	Carrier	24.00	364	3.624	5.242	3.558	1.318	300	F	Clay
CH035	Sump 15	Channel	12.42	106	4.979	5.209	4.862	0.020	100x230	Z	ACO MultiDrain M100
CH036	Sump 15	Channel	31.35	309	4.971	5.200	4.870	0.019	100x230	Z	ACO MultiDrain M100
Sump 15	SW018	Carrier	1.95	21	4.412	5.203	4.319	0.566	225	Z	Clay
SW018	SW019	Carrier	13.58	65	3.558	5.239	3.348	1.381	300	F	Clay
CH030	CH031	Channel	8.61	200	5.328	5.563	5.285	0.020	150x235	Z	ACO MultiDrain M150
CH031	CH032	Channel	1.42	200	5.285	5.586	5.278	0.086	150x235	Z	ACO MultiDrain M150
CH032	CH033	Channel	12.71	200	5.233	5.566	5.169	0.073	200x290	Z	ACO MultiDrain M200
CH033	CH034	Channel	1.84	200	5.169	5.591	5.160	0.162	200x290	Z	ACO MultiDrain M200
CH034	Sump 14	Channel	7.64	200	5.104	5.559	5.066	0.195	200x290	Z	ACO MultiDrain M200
Sump 14	SW019	Carrier	20.72	505	4.266	5.564	4.225	0.998	300	F	Clay
SW019	SW022	Carrier	25.52	170	3.273	5.244	3.123	1.596	375	F	PCC
CH041	Sump 18	Channel	39.59	200	4.600	4.830	4.402	0.020	100x230	Z	ACO MultiDrain M100
Sump 18	SW020	Carrier	4.38	55	4.125	4.915	4.045	0.640	150	Z	Clay
SW020/2	SW020/1	Carrier	16.89	214	3.410	4.910	3.331	1.200	300	F	Clay
SW020/1	SW020	Carrier	24.00	214	3.331	4.967	3.219	1.336	300	F	Clay
SW020	SW021	Carrier	23.92	154	3.219	4.994	3.064	1.475	300	F	Clay
CH040	Sump 17	Channel	23.08	130	4.682	4.912	4.504	0.020	100x230	Z	ACO MultiDrain M100
CH039	Sump 17	Channel	12.52	42	4.800	4.930	4.504	0.020	100x130	Z	ACO MultiDrain M100
Sump 17	SW021	Carrier	4.19	47	4.504	4.915	4.415	0.261	150	Z	Clay
SW021	SW022	Carrier	34.74	76	3.064	4.992	2.607	1.628	300	F	Clay
SW022	SW026	Carrier	19.00	127	2.457	5.142	2.307	2.235	450	B	PCC
CH029	Sump 13	Channel	40.04	80	5.189	5.474	4.689	0.500	150x285	Z	ACO MultiDrain M150
CH023	CH024	Channel	5.05	1000	4.555	4.840	4.550	0.020	150x285	Z	ACO MultiDrain M150
CH024	CH025	Channel	5.66	1000	4.550	4.845	4.544	0.030	150x285	Z	ACO MultiDrain M150
CH025	CH026	Channel	5.28	1000	4.544	4.863	4.539	0.054	150x285	Z	ACO MultiDrain M150
CH026	CH027	Channel	4.98	1000	4.539	4.893	4.534	0.089	150x285	Z	ACO MultiDrain M150
CH027	CH028	Channel	5.07	1000	4.534	4.927	4.529	0.128	150x285	Z	ACO MultiDrain M150
CH028	Sump 13	Channel	7.22	1000	4.529	4.971	4.522	0.177	150x285	Z	ACO MultiDrain M150
Sump 13	SW026	Carrier	1.50	26	4.205	5.032	4.148	0.602	225	Z	Clay
SW033/2	SW026	Carrier	7.80	177	3.700	5.010	3.656	1.160	150	Z	Clay
SW026	SW033	Carrier	4.04	202	2.222	5.059	2.202	2.087	750	B	PCC
SW032	RW Harvesting	Carrier	4.78	37	3.745	5.442	3.616	1.322	375	F	PCC
SW029	SW030	Carrier	27.90	349	3.669	5.471	3.589	1.352	450	F	PCC
SW030	SW031	Carrier	61.25	171	3.589	5.450	3.231	1.411	450	F	PCC
SW031	RW Harvesting	Carrier	25.34	243	3.231	5.347	3.127	1.666	450	B	PCC
RW Harvesting	SW033/1	Carrier	7.36	323	3.127	5.378	3.104	1.801	450	B	PCC
SW033/1	SW033	Carrier	13.15	323	3.104	5.308	3.063	1.754	450	B	PCC
SW033	Petrol Interceptor	Carrier	3.34	167	2.202	5.090	2.182	2.138	750	B	PCC
Petrol Interceptor	Att Tank	Carrier	2.73	273	2.183	5.115	2.173	2.182	750	B	PCC
SW035/1	SW035/2	Carrier	14.04	54	3.060	5.111	2.800	1.901	150	B	Clay
CH001	Sump 1	Channel	22.82	200	4.843	5.023	4.729	0.020	100x180	Z	ACO MultiDrain M100
Sump 1	SW035/2	Carrier	1.55	31	3.979	5.047	3.929	0.918	150	Z	Clay
SW035/2	SW035/3	Carrier	10.68	63	2.800	5.097	2.630	2.147	150	B	Clay
CH002	Sump 2	Channel	10.26	200	4.885	5.015	4.834	0.020	100x130	Z	ACO MultiDrain M100
CH003	Sump 2	Channel	5.59	200	4.977	5.107	4.949	0.020	100x130	Z	ACO MultiDrain M100
Sump 2	SW035/3	Carrier	3.79	84	4.034	5.081	3.989	0.897	150	Z	Clay
CH004	Sump 3	Channel	9.07	201	4.968	5.148	4.923	0.020	100x180	Z	ACO MultiDrain M100
CH005	Sump 3	Channel	7.98	100	5.149	5.279	5.069	0.020	100x130	Z	ACO MultiDrain M100
Sump 3	SW035/3	Carrier	4.35	31	4.123	5.193	3.982	0.920	150	Z	Clay
SW035/3	SW035	Carrier	37.15	206	2.480	5.139	2.300	2.359	300	B	Clay
CH006	Sump 4	Channel	28.33	200	5.041	5.271	4.899	0.020	100x230	Z	ACO MultiDrain M100
CH007	Sump 4	Channel	8.70	200	5.283	5.413	5.239	0.020	100x130	Z	ACO MultiDrain M100
Sump 4	SW035	Carrier	1.50	47	4.099	5.400	4.067	1.151	150	F	Clay

PIPE SCHEDULE

SETOUT POINTS FROM	SETOUT POINTS TO	Conduit Type	Length (m)	Slope (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	PIPE DIAMETER (mm)	BEDDING CLASS	TYPE
SW035	SW036	Carrier	36.41	240	2.300	5.459	2.148	2.859	300	B	Clay
CH014	Sump 8	Channel	21.09	200	4.887	5.117	4.782	0.020	100x230	Z	ACO MultiDrain M100
CH015	Sump 8	Channel	20.11	200	4.683	4.813	4.582	0.020	100x130	Z	ACO MultiDrain M100
Sump 8	SW036/1	Carrier	3.24	48	3.982	4.998	3.914	0.866	150	Z	Clay
SW036/1	SW036/2	Carrier	17.85	74	3.634	5.049	3.392	1.190	225	F	Clay
SW036/2	SW036	Carrier	13.26	40	3.392	4.927	3.060	1.310	225	F	Clay
CH016	Sump 9	Channel	26.09	200	4.602	4.887	4.472	0.025	100x280	Z	ACO MultiDrain M100
CH017	Sump 9	Channel	12.83	190	4.417	4.812	4.349	0.285	100x130	Z	ACO MultiDrain M100
Sump 9	SW036	Carrier	6.62	53	4.027	4.848	3.902	0.671	150	Z	Clay
SW036	SW040	Carrier	18.29	398	2.078	4.995	2.032	2.467	450	B	PCC
CH011	Sump 6	Channel	29.29	201	4.990	5.270	4.844	0.065	150x235	Z	ACO MultiDrain M150
CH012	Sump 6	Channel	20.03	200	4.980	5.215	4.880	0.100	150x235	Z	ACO MultiDrain M150
Sump 6	SW038	Carrier	1.15	14	4.436	5.226	4.354	0.565	225	Z	Clay
SW038	SW038/1	Carrier	42.38	245	3.758	5.258	3.585	1.200	300	F	Clay
CH013	Sump 7	Channel	23.75	200	4.967	5.197	4.848	0.020	100x230	Z	ACO MultiDrain M100
Sump 7	SW038/1	Carrier	1.17	39	4.848	5.800	4.818	0.802	150	Z	Clay
SW038/1	SW039	Carrier	22.05	210	3.585	5.245	3.480	1.360	300	F	Clay
CH008	CH009	Channel	20.89	167	5.295	5.414	5.170	0.009	100x130	Z	ACO MultiDrain M100
CH009	Sump 5	Channel	18.64	114	5.170	5.320	5.006	0.040	100x130	Z	ACO MultiDrain M100
CH010	Sump 5	Channel	19.91	152	5.087	5.267	4.956	0.020	100x180	Z	ACO MultiDrain M100
Sump 5	SW039	Carrier	1.51	60	4.534	5.326	4.509	0.567	225	Z	Clay
SW039	SW040	Carrier	4.43	221	3.405	5.299	3.385	1.519	375	F	PCC
SW040	Oil Interceptor	Carrier	3.32	400	2.032	5.215	2.024	2.733	450	B	PCC
Oil Interceptor	SW041	Carrier	17.92	398	2.024	5.211	1.979	2.737	450	B	PCC
SW041	SW042	Carrier	9.96	369	1.979	5.426	1.952	2.997	450	B	PCC
SW042	SW043	Carrier	20.39	400	1.952	4.948	1.901	2.546	450	B	PCC

MANHOLE SCHEDULE

SETOUT POINT	COORDINATES E (m)	COORDINATES N (m)	MH Type	MH SIZE (mm)	MH COVER LOAD	NOTE
SW001	542379.668	180213.804	2	1200	D400	-
SW002	542416.399	180194.050	2	1200	D400	-
SW003	542442.773	180187.961	2	1500	D400	-
SW004	542499.955	180184.926	2	1500	D400	-
SW005	542554.235	180183.301	2	1500	D400	-
SW007	542492.733	180194.411	2	1500	D400	-
SW008/1	542525.196	180200.204	2	1200	D400	-
SW008	542526.762	180193.858	2	1500	D400	-
SW009	542554.295	180195.241	2	1500	D400	-
SW025	542555.094	180230.617	2	1200	D400	-
SW023/1	542652.399	180203.402	2	1200	D400	-
SW023	542628.457	180205.113	2	1200	D400	-
SW024	542604.517	180206.824	2	1200	D400	-
SW024/1	542578.655	180208.673	2	1200	D400	-
SW010	542682.274	180197.846	2	1200	D400	-
SW011	542679.597	180179.026	2	1500	D400	-
SW012	542614.191	180183.003	2	1500	D400	-
SW013	542566.889	180185.887	2	1500	D400	-
SW014/2	542659.214	180194.162	2	1500	D400	-
SW014/1	542641.544	180195.581	2	1200	D400	-
SW014	542603.947	180198.396	2	1500	D400	-
SW016	542560.565	180199.571	2	1500	D400	-
SW017/2	542678.182	180226.945	2	1200	D400	-
SW017/1	542654.240	180228.608	2	1200	D400	-
SW017	542630.298	180230.271	2	1200	D400	-
SW018	542606.355	180231.934	2	1200	D400	-
SW019	542592.808	180232.874	2	1200	D400	-
SW020/2	542669.985	180214.343	2	1200	D400	-
SW020/1	542653.129	180215.450	2	1200	D400	-
SW020	542629.185	180217.024	2	1200	D400	-
SW021	542605.313	180218.593	2	1200	D400	-
SW022	542570.618	180220.279	2	2100	D400	-
SW026	542553.295	180212.468	2	2100	D400	-
SW032	542542.719	180230.619	2	1500	D400	-
SW029	542428.099	180227.687	2	1500	D400	-
SW030	542455.940	180225.856	2	1500	D400	-
SW031	542517.176	180224.782	2	1500	D400	-
RW Harvesting	542542.496	180225.879	2	1500	D400	-
SW033/1	542549.859	180225.744	2	1500	D400	-
SW033	542549.254	180212.611	2	1500	D400	-
Oil Interceptor 1	542545.920	180212.833	2	"1875 DIA 5070 LENGTH"	D400	-
SW035/1	542341.463	180241.728	2	1200	D400	-
SW035/2	542354.528	180236.602	2	1200	D400	-
SW035/3	542364.671	180233.257	2	1200	D400	-
SW035	542401.810	180234.300	2	1200	D400	-
SW036/1	542398.089	180214.832	2	1200	D400	-
SW036/2	542413.667	180206.123	2	1200	D400	-
SW036	542426.816	180207.833	2	1200	D400	-
SW038	542508.396	180218.168	2	1200	D400	-
SW038/1	542466.025	180219.168	2	1200	D400	-
SW039	542443.972	180219.069	2	1200	D400	-
SW040	542443.776	180214.669	2	1200	D400	-
Oil Interceptor 2	542447.086	180214.486	2	"1225 DIA 2920 LENGTH"	D400	-
SW041	542464.936	180212.888	2	2100	D400	Hydrobrake Head: 1.99m Design flow: 12 l/s
SW042	542463.136	180203.279	2	1500	D400	-
SW033/2	542547.064	180207.784	2	1200	D400	-
SW043	542443.814	180196.764	2	1500	D400	-
CH001	542333.011	180244.432	-	100X180	-	-
CH002	542353.764	180234.108	-	100x130	-	-
CH003	542368.170	180227.478	-	100x130	-	-
CH004	542355.726	180237.851	-	100x180	-	-
CH005	542372.765	180237.407	-	100x130	-	-
CH006	542373.522	180236.428	-	100x230	-	-
CH007	542410.545	180235.602	-	100x130	-	-
CH008	542410.662	180235.435	-	100x130	-	-
CH009	542425.214	180220.452	-	100x130	-	-
CH010	542463.764	180220.286	-	100x180	-	-
CH011	542537.643	180218.688	-	150x235	-	-
CH012	542488.333	180219.733	-	100x180	-	-
CH013	542489.805	180217.777	-	100x230	-	-
CH014	542378.418	180222.845	-	100x230	-	-
CH015	542413.760	180201.668	-	100x130	-	-

MANHOLE SCHEDULE

SETOUT POINT	COORDINATES E (m)	COORDINATES N (m)	MH Type	MH SIZE (mm)	MH COVER LOAD	NOTE
CH016	542456.977	180200.587	-	100X280	-	-
CH017	542413.996	180201.620	-	100x130	-	-
CH018	542457.244	180200.582	-	100X230	-	-
CH019	542524.467	180199.150	-	100X230	-	-
CH020	542459.352	180190.992	-	100X230	-	-
CH021	542520.205	180190.009	-	100X230	-	-
CH022	542520.457	180190.055	-	100x130	-	-
CH023	542524.775	180199.132	-	150X285	-	-
CH024	542529.821	180198.834	-	150X285	-	-
CH025	542535.444	180199.489	-	150X285	-	-
CH026	542540.468	180201.127	-	150X285	-	-
CH027	542544.945	180203.311	-	150X285	-	-
CH028	542548.985	180206.369	-	150X285	-	-
CH029	542583.172	180238.994	-	100X280	-	-
CH030	542544.441	180247.484	-	150X235	-	-
CH031	542553.048	180247.292	-	150X235	-	-
CH032	542554.027	180246.269	-	200X290	-	-
CH033	542566.736	180245.985	-	200X290	-	-
CH034	542568.009	180244.655	-	200X290	-	-
CH035	542593.848	180230.911	-	100X230	-	-
CH036	542637.497	180227.657	-	100X230	-	-
CH037	542639.826	180227.585	-	100x130	-	-
CH038	542671.331	180225.254	-	150X235	-	-
CH039	542592.395	180215.456	-	100x130	-	-
CH040	542627.880	180212.708	-	100X230	-	-
CH041	542669.618	180209.874	-	100X230	-	-
CH042	542569.617	180207.604	-	100x130	-	-
CH043	542585.477	180206.502	-	100x130	-	-
CH044	542592.018	180206.047	-	100x130	-	-
CH045	542595.939	180204.772	-	100x130	-	-
CH046	542627.114	180202.606	-	100X230	-	-
CH047	542662.718	180200.132	-	100X230	-	-
CH048	542659.594	180189.984	-	100X230	-	-
CH049	542622.835	180192.879	-	100X230	-	-
CH050	542621.046	180193.067	-	100X230	-	-
CH051	542585.608	180195.466	-	100X230	-	-
Sump 1	542353.883	180235.196	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 2	542363.088	180229.817	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 3	542364.788	180237.606	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 4	542401.844	180235.796	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 5	542443.853	180220.507	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 6	542508.360	180219.312	-	500x185x735	-	ACO M150D SUMP UNIT
Sump 7	542466.056	180218.002	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 8	542396.508	180212.005	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 9	542426.816	180201.214	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 10	542492.790	180200.230	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 11	542492.733	180190.453	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 12	542536.604	180189.715	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 13	542554.249	180211.313	-	500x135x635	-	ACO M150D SUMP UNIT
Sump 14	542575.647	180244.484	-	500x235x790	-	ACO M200D SUMP UNIT
Sump 15	542606.232	180229.988	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 16	542654.109	180226.528	-	500x185x735	-	ACO M150D SUMP UNIT
Sump 17	542604.868	180214.428	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 18	542630.132	180212.748	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 19	542578.440	180206.991	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 20	542604.427	180204.357	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 21	542628.348	180202.526	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 22	542641.267	180191.599	-	500x135x635	-	ACO M100D SUMP UNIT
Sump 23	542603.664	180194.211	-	500x135x635	-	ACO M100D SUMP UNIT

ABBREVIATION

CADP - CITY AIRPORT DEVELOPMENT PROGRAMME
ETE - EAST TERMINAL EXTENSION
MH - MANHOLE
US - UPSTREAM
DS - DOWNSTREAM
IL - INVERT LEVEL
CL - COVER LEVEL
DLR - DOCKLANDS LIGHT RAILWAYS
MTB - MAIN TERMINAL BUILDING
M100 - ACO MULTIDRAIN M100
M150 - ACO MULTIDRAIN M150
M200 - ACO MULTIDRAIN M200

RETRACTABLE BOLLARDS SETTING OUT POINTS

SETOUT POINT	COORDINATES E (m)	COORDINATES N (m)
RB001	542340.974	180237.985
RB002	542342.356	180237.985
RB003	542343.717	180236.780
RB004	542345.100	180236.199
RB005	542346.483	180235.617
RB006	542347.865	180235.034
RB007	542349.266	180234.486
RB008	542350.644	180233.893
RB009	542566.197	180220.561
RB010	542566.702	180220.033
RB011	542567.281	180221.598
RB012	542567.786	180221.070
RB013	542568.365	180222.635
RB014	542569.449	180223.671
RB015	542570.326	180222.754
RB016	542570.533	180224.708
RB017	542571.038	180224.180

ATTENUATION TANK SCHEDULE

STRUCTURE TYPE	AREA / Sq.m	DEPTH (m)
CELLULAR STORAGE	814	1.5

DO NOT SCALE

NOTES:

1. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
2. ALL MANHOLE AND COVERS TO BE D400 RATED AND PIPES TO HAVE A 150mm CONCRETE SURROUND FOR HIGHWAYS LOADING, IF LESS THAN 1.2m DEEP.
3. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
4. PRELIMINARY MANHOLE SIZES AND PIPES BEDDING TYPES BASED ON HIGHWAY STANDARD DETAILS (MCHW), REQUIREMENTS TO BE REVIEWED AND DEVELOPED AT NEXT DESIGN STAGE.
5. READ SCHEDULES IN CONJUNCTION WITH A400-ATK-C-36-XXX-XX-DR-GA-864-101 TO 103 PROPOSED SURFACE WATER DRAINAGE SYSTEM LAYOUT.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- Live services critical to airport operations (eg HV, AGL, Peri cables, firemain) to be protected during works.
- Contaminated soil and asbestos within buried services or in ground - see environmental reports.
- Risk of collisions with pedestrians and vehicles in live airport environment and public access road
- Airport operations related height restrictions to be observed when operating tall plant such as cranes.
- DLR exclusion zone requirements to be observed during excavation.
- Risk of hitting or discovering UXO - See site specific UXO reports.
- The potential hazard of noxious gas escape from sewer manholes within the WTE building needs to be addressed in Phase 4

MAINTENANCE/CLEANING

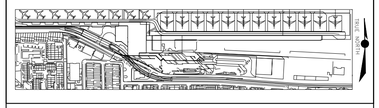
- Risk of collisions with pedestrians and vehicles in live airport environment and public access road
- Airport operations related height restrictions to be observed when operating tall plant such as cranes.

DECOMMISSIONING/DEMOLITION

- See construction risks above.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
01	27/02/18	STAGE 3 ISS

ABBREVIATION

SW023 - SURFACE WATER MANHOLE
CH034 - SETTING OUT POINT / SUMP UNIT
EMH-197 - EXISTING MANHOLE
DATCT - DIGITAL AIR TRAFFIC CONTROL TOWER

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.
10. REFER A429-ATK-C-12-XXX-DR-GA-800-003 FOR DETAILS FROM DATCT-SW001 TO DATCT-SW002
11. PIPE CONNECTING DATCT SW002 AND SW020 TO SUPERSEDE CONNECTION BETWEEN DATCT SW002 TO DSC-SW012 IN DRAWING A429-ATK-C-12-XXX-DR-GA-800-003

LEGEND:

- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

Millimetres 0 10 100

HOTEL
DATCT
SW023
SW028
SW020
SW029
SW005
SW004
SW001
CH002
CH003
CH006
CH035 (HIGH POINT)
CH036
CH037
CH034
EMH-197
DATCT-SW002
SEE NOTE 10
SEE NOTE 11
EXISTING SEWER TO BE DIVERTED TO SUIT HOTEL AND MSCP. CCTV SURVEY REQUIRED TO TRACE EXTENTS OF SURFACE WATER RUN IN ORDER FOR DIVERSION WORKS TO BE DETERMINATED
HARTMANN ROAD
FOR CONTINUATION SEE A400-ATK-C-36-XXX-XX-DR-GA-864-103
FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-102

0 4 8 12 16 20
SCALE 1:200 METRES

KEY PLAN **ZONE:**

PRIVATE
NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
03	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
02	26/01/18	FOR INFORMATION	SK	DK	PH
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** Status: **S2**

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (1 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-101 Rev 03 Status S2

Millimetres 0 10 100

ATTENUATION TANK SCHEDULE

TANK NUMBER	STRUCTURE TYPE	AREA in Sq.m	DIMENSION (m)	DEPTH (m)
ATT.01	CELLULAR STORAGE	675	62.5x10.8	1.2

ABBREVIATION

SW024 - PROPOSED SURFACE WATER MANHOLE
CH038 - PROPOSED SETTING OUT POINT/SUMP UNIT
ATT - ATTENUATION TANK

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
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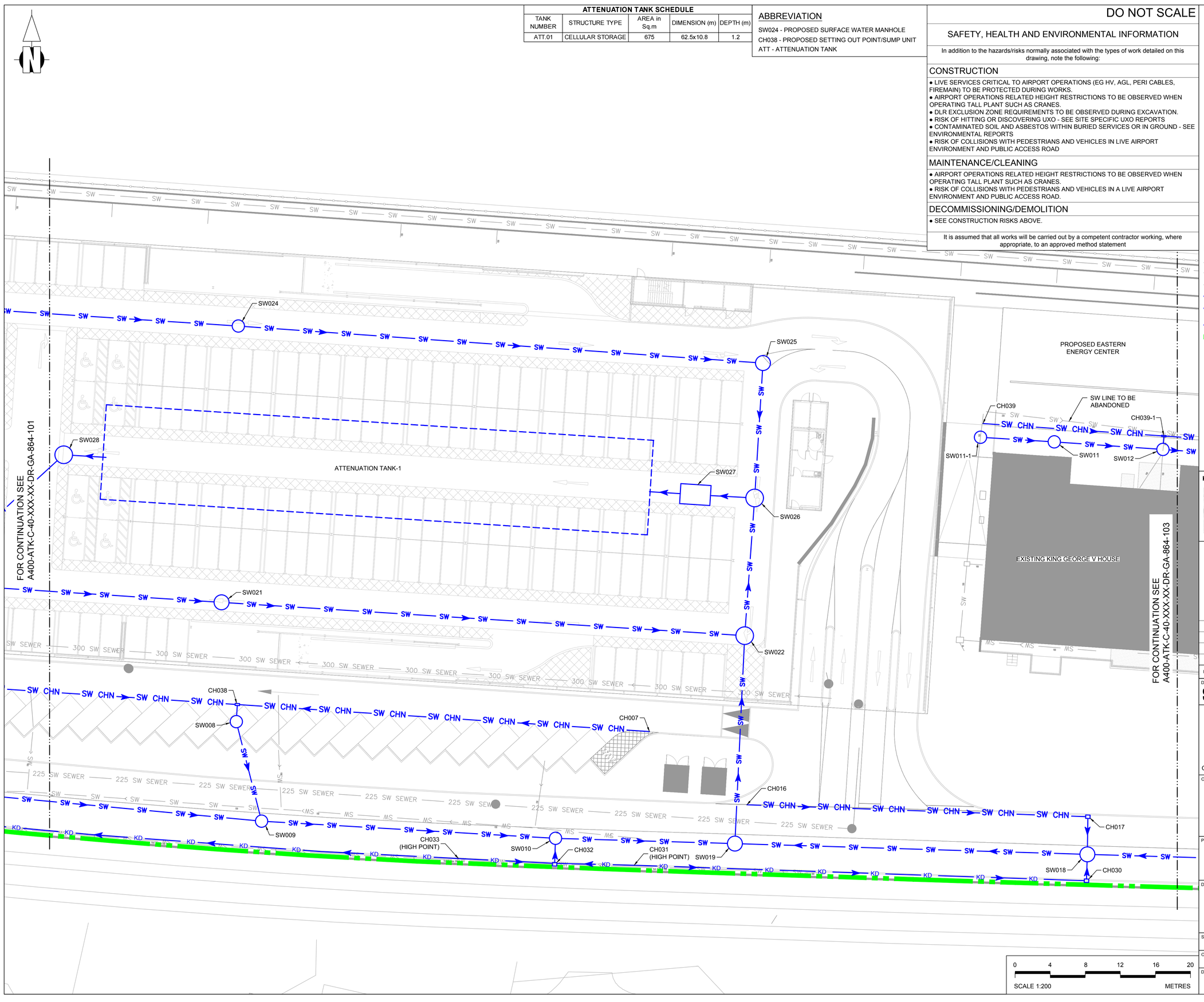
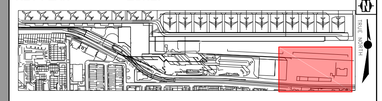
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE



KEY PLAN **ZONE:**



PRIVATE
NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
03	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
02	26/01/18	FOR INFORMATION	SK	DK	PH
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** Status: **S2**

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (2 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size	Date	Date	Date	Date
A1	08/12/2017	08/12/2017	08/12/2017	08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-102 03 S2

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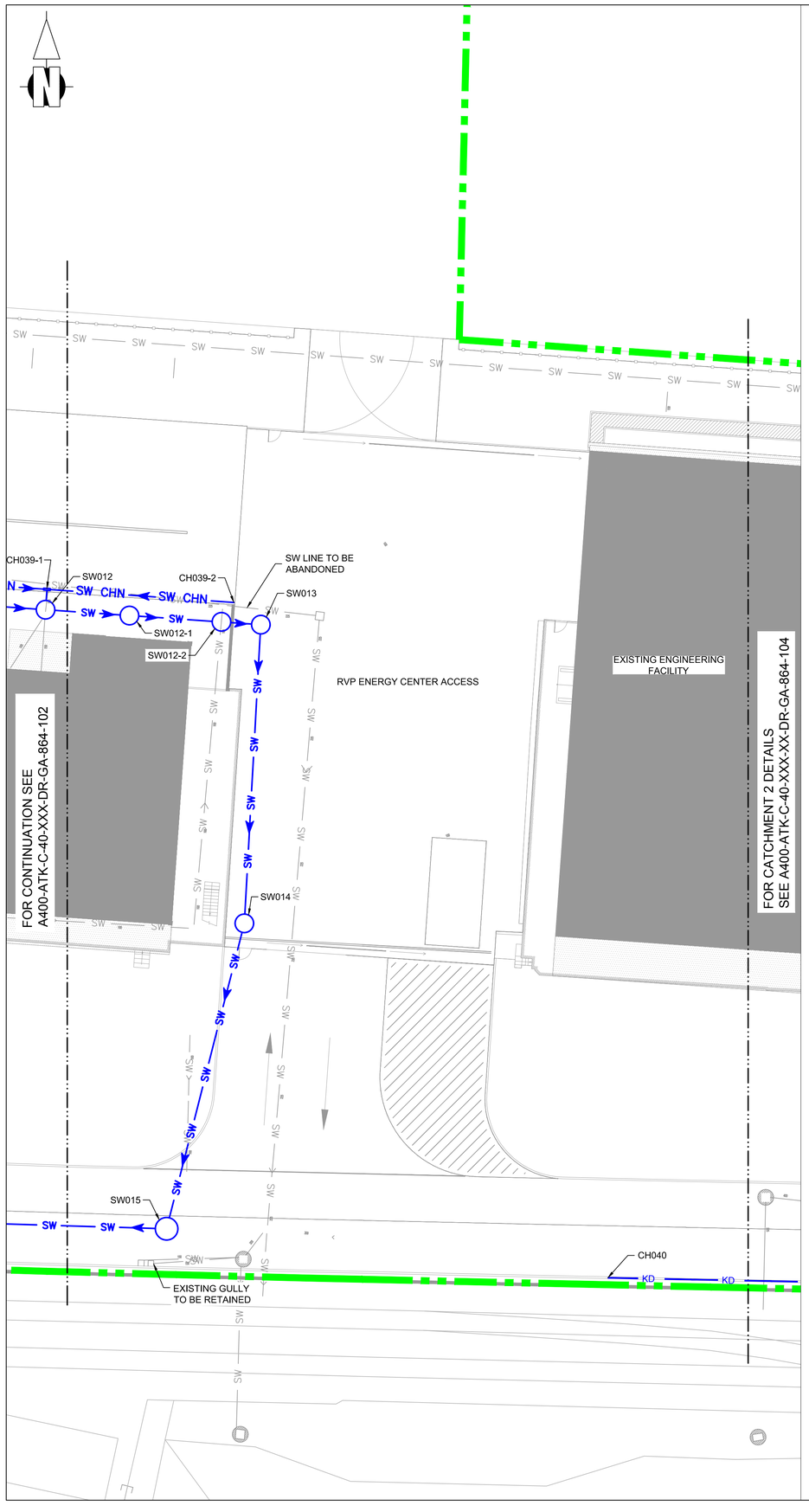
SCALE 1:200 METRES



PIPE SCHEDULE

SETOUT POINTS FROM	SETOUT POINTS TO	CONDUIT TYPE	LENGTH (m)	SLOPE (1:X)	USIL (m)	USCL (m)	DSIL (m)	US COVER DEPTH (m)	CONDUIT SIZE(mm)	BEDDING CLASS	TYPE
SW001	SW004	CARRIER	32.326	245	2.689	4.175	2.557	1.186	300	A	PCC
CH002	CH003	CHANNEL DRAIN	17.220	1076	4.009	4.319	3.993	-	200x340	-	ACO M200D
CH003	SW004	CARRIER	4.173	100	3.599	4.303	3.557	0.554	150	A	CLAY
SW004	SW005	CARRIER	29.626	245	2.557	4.198	2.436	1.341	300	B	PCC
SW005	SW009	CARRIER	45.086	245	2.436	4.204	2.252	1.468	300	B	PCC
CH006	CH038	CHANNEL DRAIN	68.393	1103	4.214	4.524	4.152	-	200x340	-	ACO M200D
CH007	CH038	CHANNEL DRAIN	47.661	350	4.288	4.598	4.152	-	200x340	-	ACO M200D
CH038	SW008	CARRIER	1.962	166	3.760	3.910	3.748	0.712	225	A	CLAY
SW008	SW009	CARRIER	13.597	60	3.037	4.462	2.811	1.125	300	B	PCC
SW009	SW010	CARRIER	33.566	404	2.102	4.244	2.019	1.692	450	F	PCC
SW010	SW019	CARRIER	20.457	400	2.019	4.244	1.968	1.775	450	F	PCC
CH039	CH039-1	CHANNEL DRAIN	24.189	69	5.474	5.604	5.126	-	100x130	-	ACO M100D
CH039-2	CH039-1	CHANNEL DRAIN	14.139	140	5.225	5.355	5.124	-	100x130	-	ACO M100D
CH039-1	SW012	CARRIER	1.539	225	4.621	5.256	4.609	0.485	150	A	CLAY
SW011-1	SW011	CARRIER	8.423	110	4.029	5.398	3.952	1.144	225	B	CLAY
SW011	SW012	CARRIER	12.421	110	3.952	5.326	3.839	1.149	225	B	CLAY
SW012	SW012-1	CARRIER	6.348	247	3.839	5.296	3.801	1.232	225	F	CLAY
SW012-1	SW012-2	CARRIER	9.931	247	3.813	5.294	3.744	1.258	225	F	CLAY
SW012-2	SW013	CARRIER	2.979	247	3.744	5.304	3.711	1.294	225	F	CLAY
SW013	SW014	CARRIER	23.278	35	3.684	5.130	3.108	1.102	225	B	CLAY
SW014	SW015	CARRIER	23.081	149	2.790	4.290	2.635	1.125	375	B	PCC
SW015	SW018	CARRIER	17.754	169	2.560	4.210	2.455	1.200	450	F	PCC
CH016	CH017	CHANNEL DRAIN	38.896	447	4.045	4.355	3.958	-	200x340	-	ACO M200D
CH017	SW018	CARRIER	4.293	171	3.558	4.268	3.533	0.485	225	A	CLAY
SW018	SW019	CARRIER	40.194	390	2.380	4.190	2.277	1.285	525	F	PCC
SW019	SW022	CARRIER	23.733	126	1.685	4.253	1.496	1.818	750	F	PCC
SW020	SW021	CARRIER	57.649	310	3.800	5.524	3.614	1.425	375	B	PCC
SW021	SW022	CARRIER	59.763	310	3.614	5.552	3.421	1.611	375	B	PCC
SW022	SW026	CARRIER	15.736	550	1.496	5.544	1.467	3.354	750	B	PCC
SW023	SW024	CARRIER	57.538	170	4.105	5.519	3.767	1.270	225	B	CLAY
SW024	SW025	CARRIER	59.961	239	3.692	5.545	3.441	1.608	300	B	PCC
SW025	SW026	CARRIER	15.412	249	3.216	5.451	3.154	2.009	375	B	PCC
SW026	SW027	CARRIER	5.098	464	1.450	5.494	1.439	3.400	750	B	PCC
SW027	ATT U/S	CARRIER	3.517	350	1.439	5.433	1.428	3.159	750	B	PCC
ATT D/S	SW028	CARRIER	4.832	499	1.300	5.524	1.291	3.411	750	B	PCC
SW028	SW029	CARRIER	28.002	491	1.291	5.487	1.234	3.784	525	B	PCC
SW029	EMH-197	CARRIER	22.710	247	1.234	5.560	1.142	4.066	300	A	PCC
DATCT-SW002	SW020	CARRIER	16.231	85	3.990	4.444	3.800	0.721	375	A	PCC
CH030	SW018	CARRIER	3.007	168	3.268	4.261	3.250	0.843	150	A	CLAY
CH031	CH030	KERB DRAIN	52.655	863	3.840	4.344	3.779	-	150x480	-	ACO-HB480
CH031	CH032	KERB DRAIN	9.920	342	3.840	4.344	3.811	-	150x480	-	ACO-HB480
CH032	SW010	CARRIER	2.848	154	3.299	4.292	3.280	0.843	150	A	CLAY
CH033	CH032	KERB DRAIN	10.115	3372	3.814	4.318	3.811	-	150x480	-	ACO-HB480
CH033	CH034	KERB DRAIN	69.610	444	3.814	4.318	3.733	-	150x480	-	ACO-HB480
CH035	CH034	KERB DRAIN	33.479	180	3.923	4.427	3.737	-	150x480	-	ACO-HB480
CH034	SW005	CARRIER	3.383	174	3.226	4.213	3.207	0.837	150	A	CLAY
CH035	CH036	KERB DRAIN	19.971	143	3.923	4.427	3.783	-	150x480	-	ACO-HB480
CH037	CH036	KERB DRAIN	39.768	172	4.014	4.517	3.783	-	150x480	-	ACO-HB480
CH036	SW001	CARRIER	2.384	150	3.247	4.265	2.384	0.868	150	A	CLAY

MANHOLE SCHEDULE

SETOUT POINTS	COORDINATES E(m)	COORDINATES N(m)	MH TYPE	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
SW001	542738.567	180166.607	2	1200	D400	-
SW004	542770.795	180164.099	2	1200	D400	-
SW005	542800.290	180161.319	2	1200	D400	-
SW008	542842.296	180168.474	2	1200	D400	-
SW009	542845.181	180157.130	2	1500	D400	-
SW010	542845.181	180157.130	2	1500	D400	-
SW011-1	542927.132	180200.897	2	1200	D400	-
SW011	542935.539	542935.539	2	1200	D400	-
SW012	542948.930	180199.509	2	1200	D400	-
SW012-1	542954.262	180199.069	2	1200	D400	-
SW013	542964.169	180198.381	2	1200	D400	-
SW014	542962.930	180175.851	2	1500	D400	-
SW015	542957.059	180152.815	2	1500	D400	-
SW018	542939.314	180153.343	2	1500	D400	-
SW019	542899.138	180154.570	2	1800	D400	-
SW020	542783.082	180185.795	2	1500	D400	-
SW021	542840.611	180182.074	2	1500	D400	-
SW022	542900.253	180178.277	1	1800	D400	-
SW023	542785.110	180217.325	2	1200	D400	-
SW024	542842.526	180213.580	2	1200	D400	-
SW025	542902.338	180209.355	2	1500	D400	-
SW026	542901.389	180193.972	1	1800	D400	-
SW027	542896.299	180194.261	1	"2700 DIA, 3450 LENGTH"	-	FUEL INTERCEPTOR. MODEL 460C1/SC
SW028	542822.622	180198.905	1	1800	D400	HYDROBRAKE DESIGN FLOW: 10.6lps HEAD: 2.070m
SW029	542801.893	180179.945	1	1500	D400	-
CH002	542753.934	180169.799	-	-	D400	-
CH003	542771.085	180168.262	-	500x235x790	D400	ACO M200D SUMP UNIT
CH006	542773.597	180174.979	-	-	D400	-
CH007	542889.398	180167.347	-	-	D400	-
CH016	542900.504	180158.999	-	-	D400	-
CH017	542939.377	180157.636	-	500x235x790	D400	ACO M200D SUMP UNIT
CH030	542939.217	180150.338	-	500x390x1025	D400	ACO KERB SUMP UNIT
CH031	542887.648	180152.099	-	-	D400	HIGH POINT
CH032	542878.590	180152.324	-	500x390x1025	D400	ACO KERB SUMP UNIT
CH033	542867.628	180152.867	-	-	D400	HIGH POINT
CH034	542799.970	180157.951	-	500x390x1025	D400	ACO KERB SUMP UNIT
CH035	542758.115	180162.034	-	-	D400	HIGH POINT
CH036	542738.262	180164.046	-	500x390x1025	D400	ACO KERB SUMP UNIT
CH037	542698.448	180168.095	-	-	D400	HIGH POINT
CH038	542842.420	180170.431	-	500x235x790	D400	ACO M200D SUMP UNIT
CH039	542923.907	180202.729	-	-	D400	-
CH039-2	542962.141	180200.060	-	-	D400	-
CH039-1	542948.037	180201.045	-	500x135x635	D400	ACO M100D SUMP UNIT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

0 4 8 12 16 20

SCALE 1:200 METRES

DO NOT SCALE

ABBREVIATION

SW012 - PROPOSED SURFACE WATER MANHOLE
CH030 - PROPOSED SETTING OUT POINT/SUMP UNIT
ATT - ATTENUATION TANK
US - UPSTREAM
DS - DOWNSTREAM
IL - INVERT LEVEL
CL - COVER LEVEL

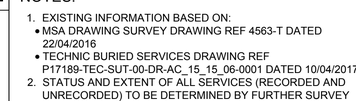
NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
03	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
02	26/01/18	FOR INFORMATION	SK	DK	PH
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: SUITABLE FOR INFORMATION
Status: S2

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (3 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-103 03 S2
(Proj Code Orig Dis Zone Level Proj Tile Type Sub Series / Num Rev Status)

ABBREVIATION

SW055 - SURFACE WATER MANHOLE
CH072 - SETTING OUT POINT / SUMP UNIT

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- EXISTING 300mm Ø SW SEWER PIPE
- EXISTING 225mm Ø SW SEWER PIPE
- EXISTING SURFACE WATER PIPE
- PROPOSED SURFACE WATER PIPE
- PROPOSED SURFACE WATER CHANNEL DRAIN
- PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

FOR CATCHMENT 1 DETAILS REFER A400-ATK-C-40-XXX-XX-DR-GA-864-103

FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-105

EXISTING ENGINEERING FACILITY
CAR PARK 2
ATTENUATION TANK 02
HARTMANN ROAD

SW055 SW056 SW043 SW047 SW050 SW054 SW063 SW071 SW075 SW080 SW081 SW082
CH042 CH044 CH041 CH046 CH045 CH051 CH049 CH052 CH053 CH057 CH060 CH062 CH059 CH058 CH064 CH061 CH067 CH072 CH074 CH073 CH077

0 4 8 12 16 20
SCALE 1:200 METRES

KEY PLAN **ZONE:**

PRIVATE
NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** Status: **S2**

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Client: London City Airport – Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (4 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size	Date	Date	Date	Date
A1	08/12/2017	08/12/2017	08/12/2017	08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-104 Rev 02 Status S2

Millimetres 0 10 100

ABBREVIATION

SW055 - SURFACE WATER MANHOLE
CH072 - SETTING OUT POINT / SUMP UNIT

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

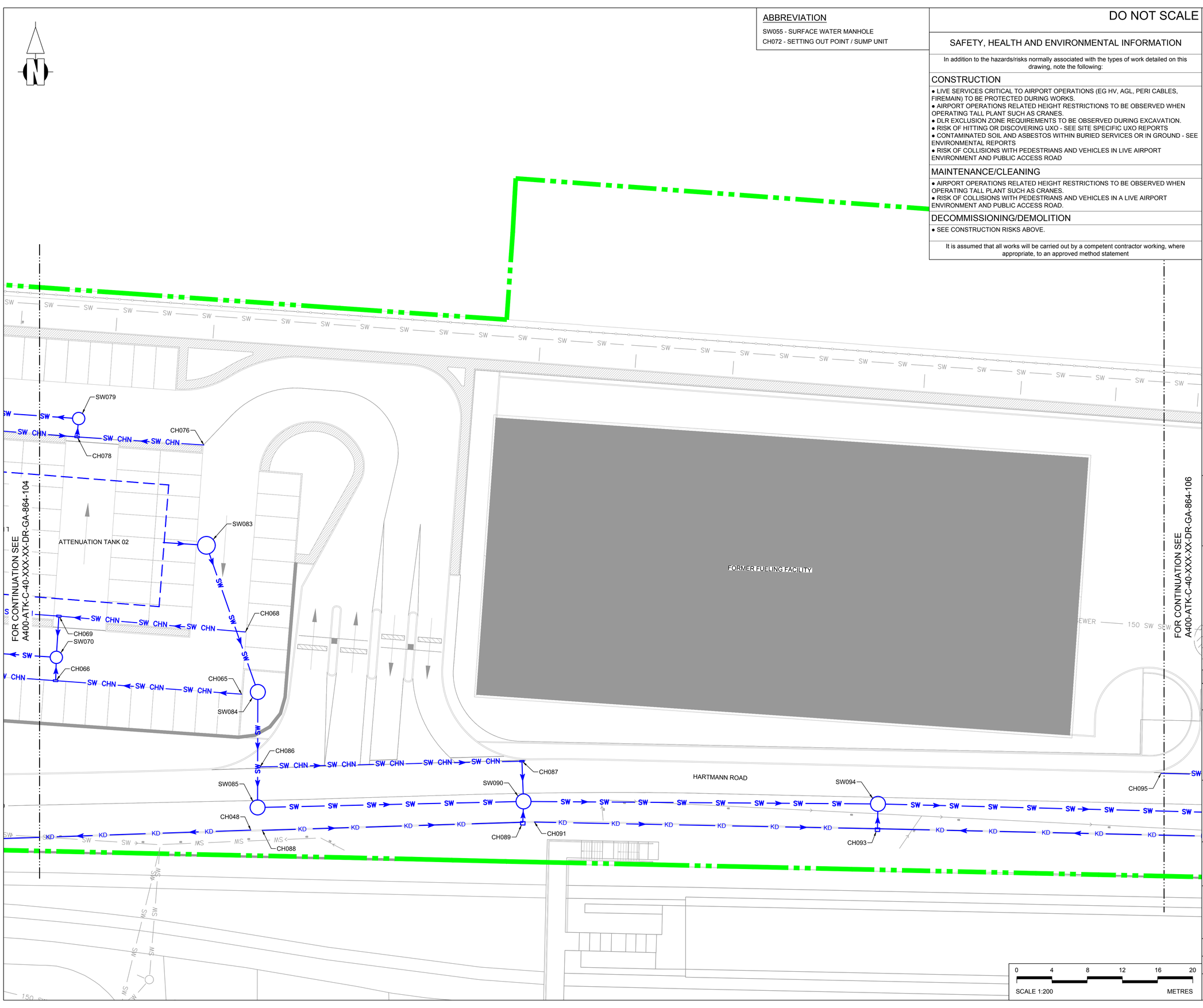
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

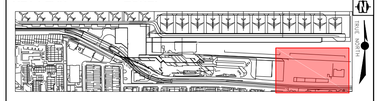
1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE



KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** Status: **S2**

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (5 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size	Date	Date	Date	Date
A1	08/12/2017	08/12/2017	08/12/2017	08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-105 Rev 02 Status S2

Proj Code: A400 Orig: ATK Dis: C Zone: 40 Level: XXX Proj Tile: XX Type: DR Sub: GA Series / Num: 864-105

Millimetres 0 10 100

ABBREVIATION

SW055 - SURFACE WATER MANHOLE
CH072 - SETTING OUT POINT / SUMP UNIT
ATT - ATTENUATION TANK

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

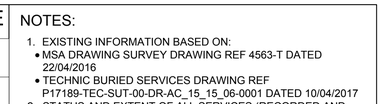
NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PRELIMINARY MANHOLE SIZES AND PIPES BEDDING TYPES BASED ON HIGHWAY STANDARD DETAILS (MCHW). REQUIREMENTS TO BE REVIEWED AND DEVELOPED AT NEXT DESIGN STAGE.
6. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
7. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
8. ALL CHANNEL DRAINS TO BE CLASS D400.
9. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
10. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.
11. MODIFICATIONS TO EEC COULD HAVE AN IMPACT ON THE UTILITY SHOWN ON DRAWING.

LEGEND:

- 150 SW SEWER — EXISTING 100mm Ø SW SEWER PIPE
- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** — Status: **S2**

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (6 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-106 — Rev: 02 — Status: S2

0 4 8 12 16 20
SCALE 1:200 METRES

FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-105

FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-107

HARTMANN ROAD

ATTENUATION TANK 03

ABBREVIATION

SW158 - SURFACE WATER MANHOLE
CH155 - SETTING OUT POINT / SUMP UNIT

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
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3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
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7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- 150 SW SEWER — EXISTING 150mm Ø SW SEWER PIPE
- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

Millimetres 0 10 100

FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-106

FOR CONTINUATION SEE A400-ATK-C-40-XXX-XX-DR-GA-864-108

MOTORCYCLES

HARTMANN ROAD

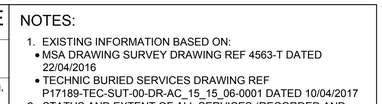
SW158 SW162 SW149 SW153 SW136 SW137 SW140

CH108 CH131 CH132 CH133 CH135 CH146 CH147 CH148 CH150 CH152 CH155 CH156 CH157 CH159 CH161 CH134 CH138 CH139

150 SW SEWER 300 SW SEWER

0 4 8 12 16 20
SCALE 1:200 METRES

KEY PLAN **ZONE:**



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** Status: **S2**

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Client: London City Airport Get closer.

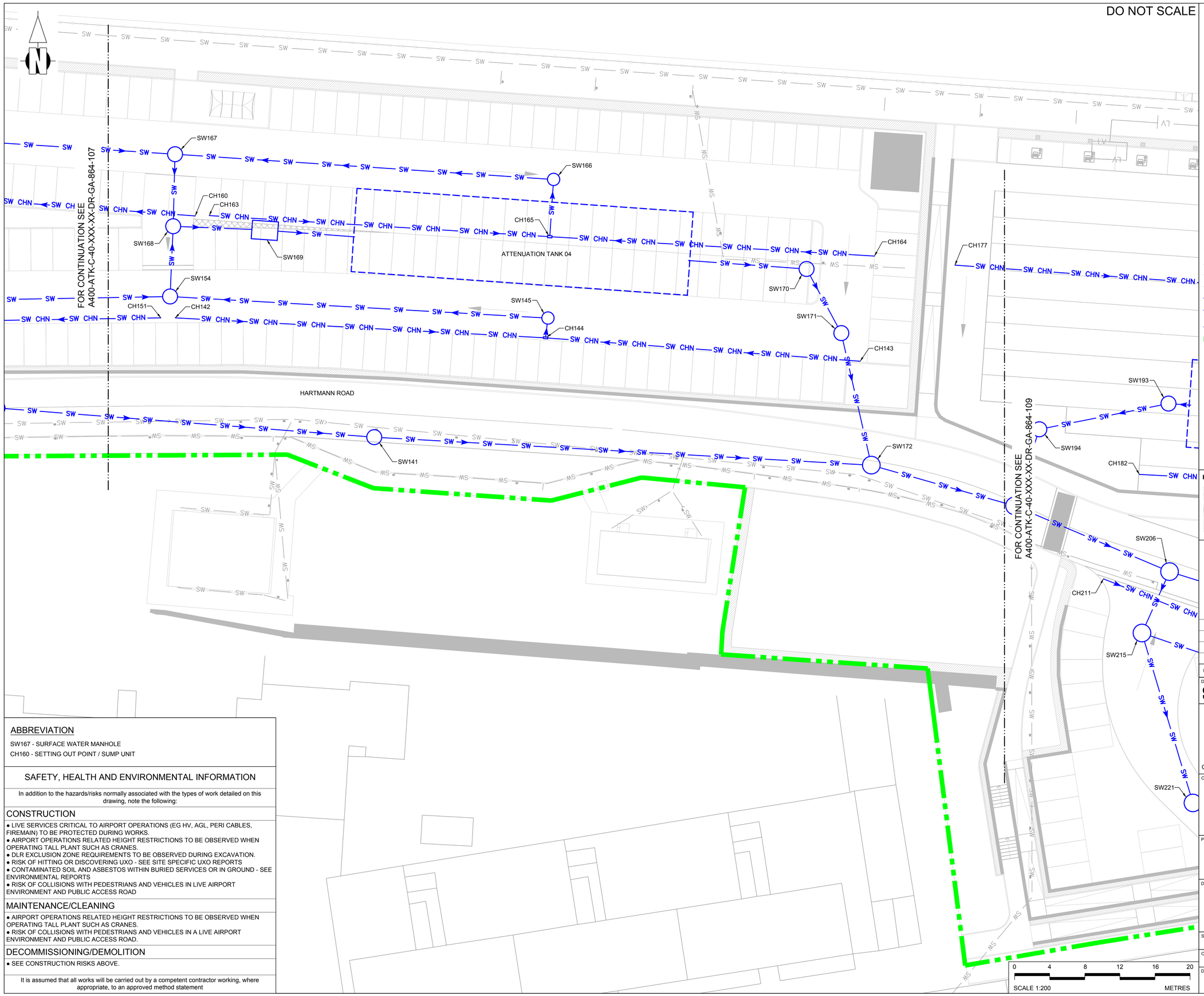
Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (7 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size	**Date**	**Date**	**Date**	**Date**
A1	08/12/2017	08/12/2017	08/12/2017	08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-107 Rev 02 Status S2

DO NOT SCALE



ABBREVIATION

SW167 - SURFACE WATER MANHOLE

CH160 - SETTING OUT POINT / SUMP UNIT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
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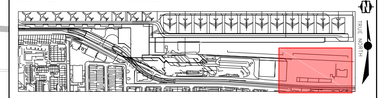
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

LEGEND:

- 300 SW SEWER — EXISTING 300mm Ø SW SEWER PIPE
- 225 SW SEWER — EXISTING 225mm Ø SW SEWER PIPE
- SW — EXISTING SURFACE WATER PIPE
- SW — PROPOSED SURFACE WATER PIPE
- SW CHN — PROPOSED SURFACE WATER CHANNEL DRAIN
- KD — PROPOSED KERB DRAIN
- PROPOSED SITE BOUNDARY
- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

KEY PLAN ZONE:



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NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
02	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** — Status: **S2**

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www.atkinsglobal.com

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (8 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-108 — Rev: 02 — Status: S2

0 4 8 12 16 20

SCALE 1:200 METRES

DO NOT SCALE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

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- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

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DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

ABBREVIATION

SW195 - SURFACE WATER MANHOLE
CH203 - SETTING OUT POINT / SUMP UNIT
EX MH - EXISTING MANHOLE

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
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- FLOW DIRECTION
- PROPOSED FUEL INTERCEPTOR
- PROPOSED ATTENUATION TANK
- PROPOSED ACO DRAIN SUMP UNIT
- PROPOSED MANHOLE

FOR CONTINUATION SEE A400-ATK-C-40-XXX-DR-GA-864-108

FOR CONTINUATION SEE A400-ATK-C-40-XXX-DR-GA-864-110

HARTMAN ROAD

CAR HIRE BUILDING

ON HOLD

ATTENUATION TANK 04

ATTENUATION TANK 05

KEEP CLEAR

EX MH-97

SCALE 1:200 — 0 4 8 12 16 20 METRES

KEY PLAN ZONE:

PRIVATE

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
03	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
02	30/01/18	FOR INFORMATION	SK	DK	PH
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: **SUITABLE FOR INFORMATION** — Status: **S2**

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www.atkinsglobal.com

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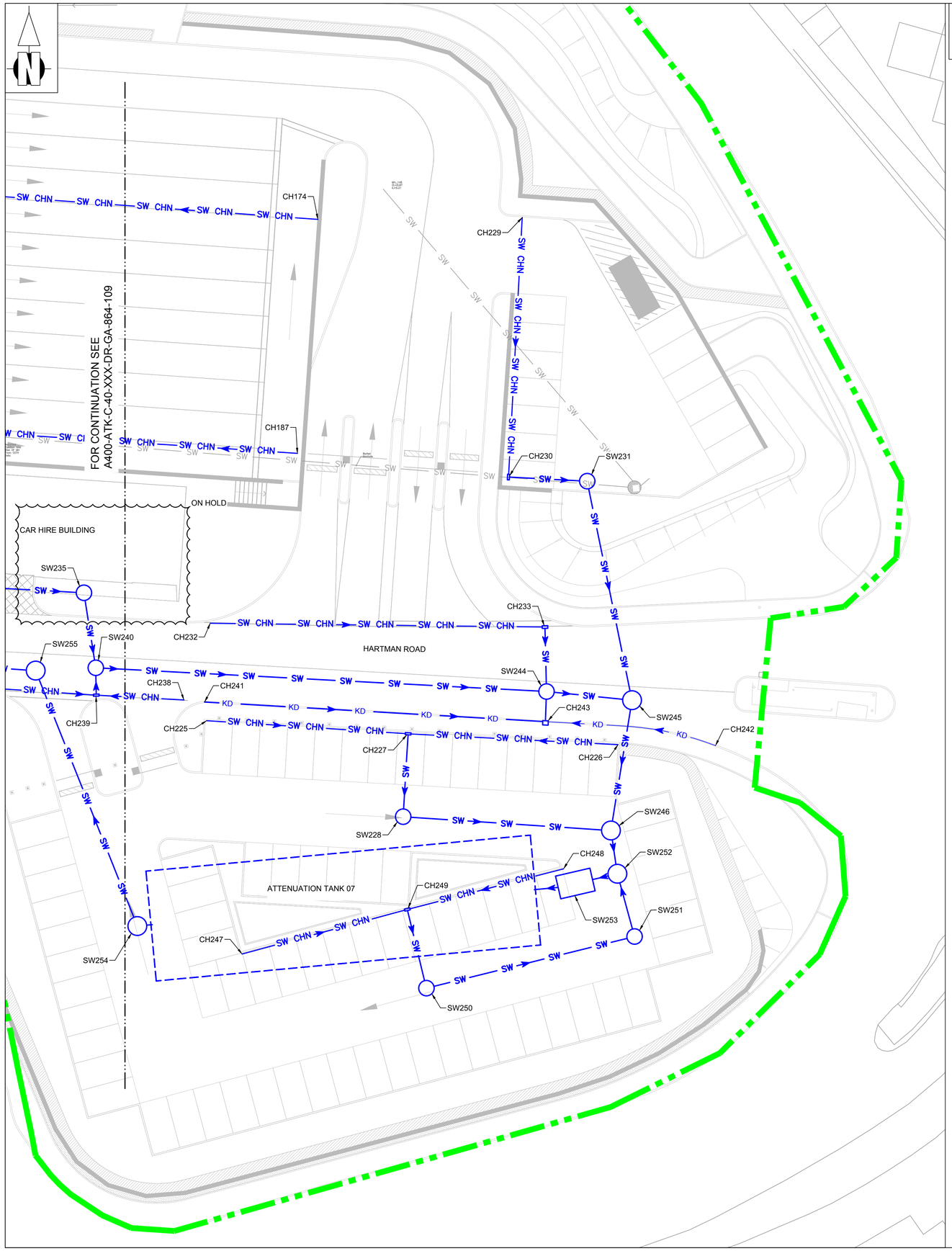
Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (9 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number: A400-ATK-C-40-XXX-XX-DR-GA-864-109 — Rev: 03 — Status: S2



ABBREVIATION

SW055 - SURFACE WATER MANHOLE

CH072 - SETTING OUT POINT / SUMP UNIT

DO NOT SCALE

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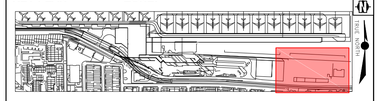
KEY PLAN ZONE:



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Rev.	Date	Description	By	Chk'd	App'd
03	02/03/18	STAGE 3 ISSUE	SK	DK	SJP
02	30/01/18	FOR INFORMATION	SK	DK	PH
01	08/12/17	FOR INFORMATION	SK	DK	PH

Drawing Suitability: SUITABLE FOR INFORMATION

Status: S2

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (10 OF 12)

Scale	Designed	Drawn	Checked	Authorised
1:200 A1	SK	AG	DK	SJP
Original Size: A1	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017	Date: 08/12/2017

Drawing Number

Proj.Code	Orig	Dis	Zone	Level	Proj. Tile	Type	Sub	Series / Num	Rev	Status
A400-ATK-C-40-XXX-XX-DR-GA-864-110									03	S2

Millimetres 100 0 10

PIPE SCHEDULE

SETOUT POINTS FROM	SETOUT POINTS TO	CONDUIT TYPE	LENGTH (mm)	SLOPE (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	CONDUIT SIZE(mm)	BEDDING CLASS	TYPE
CH040	CH042	KERB DRAIN	20.859	802	3.931	4.186	3.905	-	150X405	-	ACO HB405
CH041	CH042	KERB DRAIN	19.172	383	4.005	4.160	3.955	-	150X305	-	ACO HB305
CH042	SW043	CARRIER	2.724	101	3.603	4.318	3.576	0.49	225	A	CLAY
SW043	SW047	CARRIER	41.205	171	2.814	4.222	2.573	1.183	225	A	CLAY
CH044	CH046	KERB DRAIN	21.048	526	4.002	4.157	3.962	-	150X305	-	ACO HB305
CH045	CH046	KERB DRAIN	19.657	728	3.989	4.144	3.962	-	150X305	-	ACO HB305
CH046	SW047	CARRIER	2.466	103	3.402	4.117	3.378	0.49	225	A	CLAY
SW047	SW054	CARRIER	45.714	171	2.573	4.177	2.306	1.379	225	B	CLAY
CH048	CH049	KERB DRAIN	30.007	250	3.980	4.135	3.860	-	150X305	-	ACO HB305
CH049	SW050	CARRIER	2.41	100	3.353	4.220	3.329	0.717	150	A	CLAY
SW050	SW054	CARRIER	22.232	100	2.895	4.250	2.673	1.205	150	B	CLAY
CH051	CH053	KERB DRAIN	25.386	259	3.990	4.145	3.892	-	150X305	-	ACO HB305
CH052	CH053	KERB DRAIN	21.118	728	4.060	4.215	4.031	-	150X305	-	ACO HB305
CH053	SW054	CARRIER	2.551	102	3.471	4.186	3.446	0.49	225	A	CLAY
SW054	SW071	CARRIER	19.963	219	2.156	4.228	2.065	1.697	375	B	PCC
SW055	SW056	CARRIER	33.534	96	4.120	5.682	3.770	1.412	150	B	CLAY
SW056	SW063	CARRIER	26.42	100	3.770	5.103	3.506	1.183	150	B	CLAY
CH057	CH059	CHANNEL	19.27	201	4.902	5.067	4.806	-	150x185	-	ACO M150D
CH058	CH059	CHANNEL	31.716	200	4.900	5.065	4.741	-	150x185	-	ACO M150D
CH059	SW063	CARRIER	2.78	126	4.364	5.100	4.342	0.511	225	A	CLAY
CH060	CH062	CHANNEL	18.962	107	5.016	5.181	4.839	-	150x185	-	ACO M150D
CH061	CH062	CHANNEL	32.622	115	4.995	5.160	4.712	-	150x185	-	ACO M150D
CH062	SW063	CARRIER	4.516	137	4.461	5.171	4.428	0.485	225	A	CLAY
SW063	SW071	CARRIER	30.458	100	3.356	5.111	3.051	1.455	300	B	PCC
CH064	CH066	CHANNEL	26.275	101	4.900	5.065	4.641	-	150x185	-	ACO M150D
CH065	CH066	CHANNEL	21.198	104	4.995	5.160	4.792	-	150x185	-	ACO M150D
CH066	SW070	CARRIER	2.652	133	4.343	5.084	4.323	0.516	225	A	CLAY
CH067	CH069	CHANNEL	25.239	143	4.997	5.162	4.821	-	150x185	-	ACO M150D
CH068	CH069	CHANNEL	21.276	182	4.964	5.129	4.847	-	150x185	-	ACO M150D
CH069	SW070	CARRIER	4.7	100	4.446	5.156	4.399	0.485	225	A	CLAY
SW070	SW071	CARRIER	28.864	135	3.890	5.090	3.676	0.975	225	S	CLAY
SW071	SW081	CARRIER	13.632	545	1.840	5.100	1.815	2.66	600	F	PCC
CH072	CH074	CHANNEL	15.83	189	5.286	5.451	5.202	-	150x185	-	ACO M150D
CH073	CH074	CHANNEL	29.495	201	5.271	5.436	5.124	-	150x185	-	ACO M150D
CH074	SW075	CARRIER	2.177	128	4.737	5.450	4.720	0.488	225	A	CLAY
SW075	SW080	CARRIER	27.643	107	4.200	5.475	3.942	1.05	225	B	CLAY
CH076	CH078	CHANNEL	14.448	201	5.261	5.426	5.189	-	150x185	-	ACO M150D
CH077	CH078	CHANNEL	26.359	183	5.275	5.440	5.131	-	150x185	-	ACO M150D
CH078	SW079	CARRIER	2.088	131	4.718	5.499	4.702	0.556	225	A	CLAY
SW079	SW080	CARRIER	29.791	100	4.200	5.456	3.901	1.031	225	B	CLAY
SW080	SW081	CARRIER	13.722	80	3.872	5.464	3.701	1.292	300	B	PCC
SW081	SW082	CARRIER	5.869	534	1.815	5.284	1.804	2.869	600	F	PCC
SW082	ATT U/S 02	CARRIER	4.250	552	1.804	5.276	1.796	2.872	600	F	PCC
ATT D/S 02	SW083	CARRIER	4.914	552	1.741	5.279	1.733	2.929	600	F	PCC
SW083	SW084	CARRIER	17.671	570	1.733	5.272	1.702	2.939	600	F	PCC
SW084	SW085	CARRIER	13.124	571	1.702	5.189	1.679	2.887	600	F	PCC
SW085	SW090	CARRIER	30.235	571	1.679	4.328	1.626	2.049	600	F	PCC
CH086	CH087	CHANNEL	29.763	198	4.179	4.344	4.029	-	150x185	-	ACO M150D
CH087	SW090	CARRIER	4.574	153	3.616	4.421	3.586	0.58	225	A	CLAY
CH088	CH089	KERB DRAIN	29.639	302	4.009	4.264	3.911	-	150X405	-	ACO HB405
CH089	SW090	CARRIER	2.083	99	3.278	4.273	3.257	0.845	150	A	CLAY
SW090	SW094	CARRIER	40.287	567	1.626	4.300	1.555	2.074	600	F	PCC
CH091	CH093	KERB DRAIN	39.004	534	4.012	4.267	3.939	-	150X405	-	ACO HB405
CH092	CH093	KERB DRAIN	47.954	480	4.025	4.280	3.925	-	150X405	-	ACO HB405
CH093	SW094	CARRIER	2.511	100	3.480	4.195	3.455	0.49	225	A	CLAY
SW094	SW097	CARRIER	48.07	572	1.555	4.259	1.471	2.104	600	F	PCC
CH095	CH096	CHANNEL	15.89	201	4.188	4.403	4.109	-	150x235	-	ACO M150D
CH096	SW097	CARRIER	4.315	50	3.949	4.659	3.863	0.485	225	A	CLAY
SW097	SW101	CARRIER	28.654	585	1.471	4.417	1.422	2.346	600	F	PCC
CH098	CH100	KERB DRAIN	27.346	536	4.017	4.272	3.966	-	150X405	-	ACO HB405
CH099	CH100	KERB DRAIN	26.131	533	4.028	4.283	3.979	-	150X405	-	ACO HB405
CH100	SW101	CARRIER	2.483	99	3.524	4.239	3.499	0.49	225	A	CLAY
SW101	SW102	CARRIER	26.06	579	1.422	4.294	1.377	2.272	600	F	PCC
SW102	SW106	CARRIER	29.595	580	1.377	4.336	1.326	2.359	600	F	PCC
CH103	CH105	KERB DRAIN	28.086	380	4.031	4.286	3.957	-	150X405	-	ACO HB405
CH104	CH105	KERB DRAIN	26.214	452	3.951	4.206	3.893	-	150X405	-	ACO HB405
CH105	SW106	CARRIER	2.64	102	3.502	4.217	3.476	0.49	225	A	CLAY
SW106	SW130	CARRIER	26.074	593	1.326	4.291	1.282	2.365	600	F	PCC
CH107	CH109	CHANNEL	22.228	193	4.885	5.050	4.770	-	150x185	-	ACO M150D
CH108	CH109	CHANNEL	27.895	115	4.987	5.152	4.744	-	150x185	-	ACO M150D
CH109	SW110	CARRIER	2.216	139	4.338	5.050	4.322	0.487	225	A	CLAY
SW110	SW117	CARRIER	46.454	110	3.900	5.075	3.478	0.95	225	S	CLAY
SW111	SW112	CARRIER	21.968	65	3.830	5.345	3.492	0.99	525	B	PCC
SW112	SW116	CARRIER	30.194	165	3.492	4.854	3.309	0.837	525	A	PCC
CH113	CH115	CHANNEL	14.955	199	4.885	5.050	4.810	-	150x185	-	ACO M150D
CH114	CH115	CHANNEL	43.934	200	4.883	5.048	4.663	-	150x185	-	ACO M150D
CH115	SW116	CARRIER	2.311	136	4.341	5.051	4.324	0.485	225	A	CLAY
SW116	SW117	CARRIER	20.826	200	3.309	5.088	3.205	1.254	525	F	PCC
SW117	SW127	CARRIER	10.158	199	3.178	5.090	3.127	1.387	525	F	PCC
CH118	CH120	CHANNEL	15.432	200	5.087	5.252	5.010	-	150x185	-	ACO M150D
CH119	CH120	CHANNEL	24.164	200	5.052	5.217	4.931	-	150x185	-	ACO M150D
CH120	SW121	CARRIER	7.141	135	4.592	5.282	4.539	0.465	225	A	CLAY
SW121	SW126	CARRIER	38.598	100	4.155	5.335	3.769	0.955	225	S	CLAY
CH122	CH124	CHANNEL	21.311	143	5.129	5.294	4.980	-	150x185	-	ACO M150D
CH123	CH124	CHANNEL	36.983	200	5.088	5.253	4.903	-	150x185	-	ACO M150D
CH124	SW125	CARRIER	6.932	136	4.623	5.380	4.572	0.532	225	A	CLAY
SW125	SW126	CARRIER	15.329	100	4.100	5.387	3.947	0.987	300	S	PCC
SW126	SW127	CARRIER	9.582	150	3.694	5.372	3.630	1.378	300	B	PCC
SW127	SW128	CARRIER	8.05	196	3.127	5.343	3.086	1.691	525	F	PCC
SW128	ATT U/S 03	CARRIER	9.060	352	3.021	5.347	2.985	1.884	600	F	PCC
ATT D/S 03	SW129	CARRIER	4.052	352	2.884	5.323	2.873	2.07	600	F	PCC
SW129	SW130	CARRIER	26.423	110	2.675	5.221	2.435	1.946	600	F	PCC
SW130	SW136	CARRIER	23.062	577	1.207	4.271	1.167	2.389	675	F	PCC
CH131	CH132	CHANNEL	13.898	201	4.170	4.385	4.101	-	150x235	-	ACO M150D
CH132	SW136	CARRIER	4.64	50	3.676	4.445	3.583	0.544	225	A	CLAY
CH133	CH135	KERB DRAIN	21.656	349	3.951	4.206	3.889	-	150X405	-	ACO HB405
CH134	CH135	KERB DRAIN	49.762	392	3.955	4.210	3.828	-	150X405	-	ACO HB405

PIPE SCHEDULE

SETOUT POINTS FROM	SETOUT POINTS TO	CONDUIT TYPE	LENGTH (mm)	SLOPE (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	CONDUIT SIZE(mm)	BEDDING CLASS	TYPE
CH135	SW136	CARRIER	2.498	100	3.495	4.210	3.470	0.49	225	A	CLAY
SW136	SW137	CARRIER	49.658	584	1.167	4.272	1.082	2.43	675	F	PCC
SW137	SW140	CARRIER	50.626	582	1.082	4.288	0.995	2.531	675	F	PCC
CH138	CH139	KERB DRAIN	49.583	365	3.955	4.210	3.819	-	150X405	-	ACO HB405
CH139	SW140	CARRIER	3.081	128	3.493	4.208	3.469	0.49	225	A	CLAY
SW140	SW141	CARRIER	43.071	507	0.995	4.273	0.910	2.603	675	F	PCC
SW141	SW172	CARRIER	56.754	668	0.910	4.165	0.825	2.58	675	F	PCC
CH142	CH144	CHANNEL	42.267	200	4.860	5.025	4.649	-	150x185	-	ACO M150D
CH143	CH144	CHANNEL	35.967	175	5.052	5.217	4.846	-	150x185	-	ACO M150D
CH144	SW145	CARRIER	2.269	134	4.331	5.050	4.314	0.494	225	A	CLAY
SW145	SW154	CARRIER	43.147	160	3.902	5.072	3.632	0.945	225	S	CLAY
CH146	CH148	CHANNEL	31.127	200	5.031	5.196	4.875	-	150x185	-	ACO M150D
CH147	CH148	CHANNEL	13.599	200	4.899	5.064	4.831	-	150x185	-	ACO M150D
CH148	SW149	CARRIER	2.362	103	4.395	5.061	4.372	0.441	225	A	CLAY
SW149	SW153	CARRIER	46.795	130	3.877	5.060	3.517	0.958	225	S	CLAY
CH150	CH152	CHANNEL	31.946	200	4.898	5.063	4.738	-	150x185	-	ACO M150D
CH151	CH152	CHANNEL	39.422	200	4.861	5.026	4.664	-	150x185	-	ACO M150D
CH152	SW153	CARRIER	2.346	138	4.336	5.050	4.319	0.489	225	A	CLAY
SW153	SW154	CARRIER	40.502	117	3.442	5.069	3.097	1.327	300	B	PCC
SW154	SW168	CARRIER	8.009	211	2.947	5.063	2.909	1.666	450	B	PCC
CH155	CH157	CHANNEL	21.802	200	5.074	5.239	4.965	-	150x185	-	ACO M150D
CH156	CH157	CHANNEL	23.311	199	5.086	5.251	4.969	-	150x185	-	ACO M150D
CH157	SW158	CARRIER	6.674	136	4.546	5.289	4.497	0.518	225	A	CLAY
SW158	SW162	CARRIER	40.816	163	4.197	5.337	3.946	0.915	225	S	CLAY
CH159	CH161	CHANNEL	16.035	200	5.088	5.253	5.008	-	150x185	-	ACO M150D
CH160	CH161	CHANNEL	40.537	200	5.038	5.203	4.835	-	150x185	-	ACO M150D
CH161	SW162	CARRIER	6.46	101	4.640	5.312	4.576	0.447	225	A	CLAY
SW162	SW167	CARRIER	37.794	151	3.871	5.343	3.620	1.172	300	B	PCC
CH163	CH165	CHANNEL	38.891	201	4.893	5.203	4.699	-	200x340	-	ACO M200D
CH164	CH165	CHANNEL	37.077	200	5.155	5.369	4.970	-	200x240	-	ACO M200D
CH165	SW166	CARRIER	6.533	50	4.494	5.204	4.363	0.485	225	A	CLAY
SW166	SW167	CARRIER	43.253	170	4.074	5.296	3.820	0.922	300	S	PCC
SW167	SW168	CARRIER	8.212	293	3.470	5.309	3.442	1.389	450	B	PCC
SW168	SW169	CARRIER	8.979	134	2.909	5.187	2.842	1.828	450	B	PCC
SW169	ATT U/S 04	CARRIER	8.781	289	2.842	5.175	2.811	1.87	450	B	PCC
ATT D/S 04	SW170	CARRIER	13.497	290	2.669	5.231	2.623	2.157	450	B	PCC
SW170	SW171	CARRIER	8.313	287	2.623	5.429	2.594	2.356	450	B	PCC
SW171	SW172	CARRIER	15.423	200	2.512	5.258	2.435	2.296	450	B	PCC
SW172	SW195	CARRIER	16.971	771	0.750	4.246	0.728	2.746	750	F	PCC
CH173	CH175	CHANNEL	35.553	200	4.966	5.276	4.788	-	200x340	-	ACO M200D
CH174	CH175	CHANNEL	40.798	123	5.300	5.610	4.967	-	200x340	-	ACO M200D
CH175	SW176	CARRIER	3.191	40	4.586	5.277	4.506	0.391	300	A	PCC
SW176	SW181	CARRIER	38.902	155	4.064	5.242	3.813	0.878	300	A	PCC
CH177	CH179	CHANNEL	35.562	115	5.206	5.516	4.896	-	200x340	-	ACO M200D
CH178	CH179	CHANNEL	41.456	200	4.966	5.276	4.759	-	200x340	-	ACO M200D
CH179	SW180	CARRIER	3.341	28	4.670	5.363	4.550	0.393	300	A	PCC
SW180	SW181	CARRIER	39.309	120	4.137	5.330	3.809	0.893	300	A	PCC
SW181	SW191	CARRIER	10.38	150	3.734	5.246	3.665	1.137	375	B	PCC
CH182	CH184	CHANNEL	26.606	140	4.956	5.166	4.766	-	200x240	-	ACO M200D
CH183	CH184	CHANNEL	28.027	115	4.863	5.073	4.620	-	200x240	-	ACO M200D
CH184	SW185	CARRIER	1.224	102	4.450	5.150	4.438	0.475	225	A	CLAY
SW185	SW190	CARRIER	25.915	145	3.953	5.150	3.774	0.972	225	S	CLAY
CH186	CH188	CHANNEL	35.881	201	4.862	5.072	4.683	-	200x240	-	ACO M200D
CH187	CH188	CHANNEL	40.277	163	5.087	5.297	4.840	-	200x240	-	ACO M200D
CH188	SW189	CARRIER	1.397	100	4.376	5.050	4.362	0.374	300	A	PCC
SW189	SW190	CARRIER	38.906	105	3.875	5.050	3.503	0.875	300	A	PCC
SW190	SW191	CARRIER	9.156	100	3.353	5.100	3.261	1.297	450	B	PCC
SW191	SW192	CARRIER	5.577	136	3.186	5.149	3.145	1.438	525	F	PCC
SW192	ATT U/S 05	CARRIER	1.419	301	3.145	5.159	3.140	1.489	525	F	PCC
ATT D/S 05	SW193	CARRIER	2.543	301	3.007	5.238	2.999	1.527	525	F	PCC
SW193	SW194	CARRIER	15.013	406	2.999	5.243	2.962	1.719	525	F	PCC
SW194	SW195	CARRIER	9.16	92	2.500	5.305	2.400	2.205	600	F	PCC
SW195	SW206	CARRIER	19.191	768	0.678	4.258	0.653	2.83	750	F	PCC
SW196	SW197	CARRIER	8.248	102	3.087	4.411	3.006	1.174	150	B	CLAY
SW197	SW198	CARRIER	8.322	102	3.006	4.399	2.924	1.243	150	B	CLAY
SW198	SW202	CARRIER	26.028	100	2.924	4.414	2.664	1.34	150	B	CLAY
CH199	CH201	CHANNEL	24.821	1773	3.876	4.231	3.862	-	150x480	-	ACO HB480
CH200	CH201	CHANNEL	23.575	445	3.949	4.204	3.896	-	150X405	-	ACO HB405
CH201	SW202	CARRIER	1.977	76	3.377	4.217	3.351	0.615	225	A	CLAY
SW202	SW205	CARRIER	22.839	100	2.589	4.250	2.361	1.436	225	B	CLAY
CH203	CH204	CHANNEL	24.139	575	4.130	4.295	4.088	-	150x185	-	ACO M150D
CH204	SW205	CARRIER	5.366	55	3.546	4.253	3.448	0.557	150	A	CLAY
SW205	SW206	CARRIER	13.449	44	2.641	4.250	2.336	1.459	150	B	CLAY
SW206	SW215	CARRIER	7.663	766	0.653	4.274	0.643	2.871	750	F	PCC
CH207	CH208	CHANNEL	13.676	180	4.034	4.244	3.958	-	200x240	-	ACO M200D
CH208	CH209	CHANNEL	18.677	158	3.958	4.236	3.840	-	200x240	-	ACO M200D
CH209	CH210	CHANNEL	12.131	169	3.740	4.211	3.668	-	200x340	-	ACO M200D
CH210	CH213	CHANNEL	10.565	199	3.668	4.200	3.615	-	200x340	-	ACO M200D
CH211	CH212	CHANNEL	14.227	156	4.090	4.255	3.999	-	150x185	-	ACO M150D
CH212	CH213	CHANNEL	9.847	126	3.854	4.235	3.776	-	200x340	-	ACO M200D
CH213	SW214	CARRIER	3.651	28	3.496	4.206	3.366	0.485	225	A	CLAY
SW214	SW215	CARRIER	17.359	100	2.987	4.250	2.813	0.963	300	S	PCC
SW215	SW221	CARRIER	20.209	777	0.643	4.263	0.617	2.87	750	F	PCC
CH216	CH218	CHANNEL	25.003	147	4.253	4.418	4.083	-	150x185	-	ACO M150D
CH217	CH218	CHANNEL	15.135	199	4.159	4.324	4.083	-	150x185	-	ACO M150D
CH218	SW219	CARRIER	4.022	101	3.663	4.358	3.623	0.545	150	A	CLAY
SW219	SW220	CARRIER	30.546	85	3.623	4.400	3.263	0.627	150	A	CLAY
SW220	SW221	CARRIER	12.905	244	3.113	4.494	3.060	1.081	300	B	PCC
SW221	SW222	CARRIER	5.989	749	0.617	4.390	0.609	3.023	750	B	PCC
SW222	ATT U/S 06	CARRIER	38.239	750	0.607	4.370	0.602	3.013	750	B	PCC
ATT D/S 06	SW223	CARRIER	3.483	750	0.601	4.283	0.556	2.931	750	B	PCC
SW223	SW224	CARRIER	25.184	741	0.556	4.278	0.522	2.972	750	F	PCC
SW224	SW256	CARRIER	24.867	410	0.521	4.385	0.460	3.414	450	S	PCC
CH225	CH227	CHANNEL	18.307	193	4.082	4.247	3.987	-	150x185	-	ACO M150D
CH226	CH227	CHANNEL	19.057	201	4.074	4.239	3.979	-	150x185	-	ACO M150D

ON HOLD

PIPE SCHEDULE

DO NOT SCALE

SETOUT POINTS FROM	SETOUT POINTS TO	CONDUIT TYPE	LENGTH (mm)	SLOPE (1:X)	USIL (m)	USCL (m)	DSIL (m)	US DEPTH (m)	CONDUIT SIZE(mm)	BEDDING CLASS	TYPE
CH226	CH227	CHANNEL	19.057	201	4.074	4.239	3.979	-	150x185	-	ACO M150D
CH227	SW228	CARRIER	7.532	100	3.534	4.244	3.459	0.56	150	A	CLAY
SW228	SW246	CARRIER	18.876	82	3.100	4.299	2.871	0.974	225	S	CLAY
CH229	SW230	CHANNEL	23.548	107	4.973	5.165	4.753	-	150x185	-	ACO M150D
CH230	SW231	CARRIER	7.143	101	4.424	5.284	4.353	0.710	150	A	CLAY
SW231	SW245	CARRIER	20.264	36	3.474	5.220	2.911	1.596	150	B	CLAY
CH232	CH233	CHANNEL	30.356	196	4.101	4.311	3.946	-	200x240	-	ACO M200D
CH233	SW244	CARRIER	5.846	130	3.543	4.349	3.498	0.581	225	A	CLAY
SW234	SW235	CARRIER	16.768	101	3.000	4.369	2.834	1.219	150	B	CLAY
SW235	SW240	CARRIER	6.878	100	2.834	4.454	2.765	1.470	150	B	CLAY
CH236	CH237	CHANNEL	28.722	193	4.075	4.240	3.926	-	150x185	-	ACO M150D
CH237	CH239	CHANNEL	9.686	179	3.781	4.236	3.727	-	200x340	-	ACO M200D
CH238	CH239	CHANNEL	7.958	199	4.070	4.235	4.030	-	150x185	-	ACO M150D
CH239	SW240	CARRIER	2.483	118	3.478	4.235	3.457	0.532	225	A	CLAY
SW240	SW244	CARRIER	40.925	130	2.690	4.264	2.375	1.349	225	B	CLAY
CH241	CH243	KERB DRAIN	32.042	5340	3.980	4.235	3.974	-	150X405	-	ACO HB405
CH242	CH243	KERB DRAIN	15.684	1743	3.983	4.238	3.974	-	150X405	-	ACO HB405
CH243	SW244	CARRIER	2.597	100	3.361	4.353	3.335	0.842	150	A	CLAY
SW244	SW245	CARRIER	7.791	244	2.300	4.261	2.268	1.661	300	B	PCC
SW245	SW246	CARRIER	11.966	239	2.118	4.260	2.068	1.692	450	B	PCC
SW246	SW252	CARRIER	3.966	198	1.993	4.300	1.973	1.782	525	F	PCC
CH247	CH249	CHANNEL	15.51	140	4.234	4.399	4.123	-	150x185	-	ACO M150D
CH248	CH249	CHANNEL	14.64	201	4.157	4.323	4.084	-	150x185	-	ACO M150D
CH249	SW250	CARRIER	7.339	101	3.650	4.360	3.577	0.485	225	A	CLAY
SW250	SW251	CARRIER	19.444	84	3.192	4.412	2.961	0.995	225	S	CLAY
SW251	SW252	CARRIER	5.894	100	2.961	4.371	2.902	1.185	225	B	CLAY
SW252	SW253	CARRIER	5.512	251	1.973	4.324	1.951	1.826	525	F	PCC
SW253	ATT U/S 07	CARRIER	2.171	299	1.951	4.376	1.944	1.900	525	F	PCC
ATT D/S 07	SW254	CARRIER	1.358	300	1.827	4.391	1.823	1.922	525	F	PCC
SW254	SW255	CARRIER	24.919	209	1.823	4.394	1.704	2.046	525	B	PCC
SW255	SW256	CARRIER	7.783	251	1.704	4.258	1.673	2.029	525	B	PCC
SW256	EX MH-97	CARRIER	4.573	305	0.460	4.258	0.445	3.423	375	S	PCC

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8.

Millimetres 100 10 0

MANHOLE SCHEDULE

SETOUT POINTS	COORDINATES E(m)	COORDINATES N(m)	MH TYPE	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
CH040	542990.365	180149.12	-	-	D400	
CH041	543030.385	180148.23	-	-	D400	
CH042	543011.219	180148.575	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW043	543011.364	180151.746	2	1200	D400	
CH044	543031.375	180148.208	-	-	D400	
CH045	543072.069	180147.296	-	-	D400	
CH046	543052.418	180147.629	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW047	543052.552	180150.565	2	1200	D400	
CH048	543150.589	180147.911	-	-	D400	
CH049	543120.6	180146.776	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW050	543120.486	180149.677	2	1200	D400	
CH051	543072.783	180147.28	-	-	D400	
CH052	543119.302	180146.851	-	-	D400	
CH053	543098.164	180146.605	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW054	543098.255	180149.582	2	1200	D400	
SW055	543045.535	180207.333	2	1200	D400	
SW056	543042.975	180173.897	2	1200	D400	
CH057	543049.848	180170.417	-	-	D400	
CH058	543100.712	180166.895	-	-	D400	
CH059	543069.072	180169.088	-	500x185x735	D400	ACO M150D SUMP UNIT
CH060	543050.664	180177.381	-	-	D400	
CH061	543102.131	180173.95	-	-	D400	
CH062	543069.599	180176.364	-	500x185x735	D400	ACO M150D SUMP UNIT
SW063	543069.316	180171.857	2	1200	D400	
CH064	543102.203	180166.838	-	-	D400	
CH065	543149.548	180163.361	-	-	D400	
CH066	543128.406	180164.895	-	500x185x735	D400	ACO M150D SUMP UNIT
CH067	543103.601	180174.044	-	-	D400	
CH068	543149.974	180170.43	-	-	D400	
CH069	543128.775	180172.237	-	500x185x735	D400	ACO M150D SUMP UNIT
SW070	543128.48	180167.546	2	1200	D400	
SW071	543099.682	180169.495	2	1500	D400	
CH072	543057.735	180198.131	-	-	D400	
CH073	543102.919	180194.55	-	-	D400	
CH074	543073.515	180196.862	-	500x185x735	D400	ACO M150D SUMP UNIT
SW075	543073.749	180199.026	2	1200	D400	
CH076	543145.253	180191.686	-	-	D400	
CH077	543104.555	180194.652	-	-	D400	
CH078	543130.835	180192.607	-	500x185x735	D400	ACO M150D SUMP UNIT
SW079	543131.018	180194.687	2	1200	D400	
SW080	543101.302	180196.8	2	1200	D400	
SW081	543100.588	180183.097	2	1800	D400	
SW082	543108.043	180182.674	2	"1875 DIA, 3200 LENGTH"	-	FUEL INTERCEPTOR MODEL 318C1/SC BY SPEL
SW083	543145.536	180180.283	2	1800	D400	
SW084	543151.384	180163.607	2	1500	D400	
SW085	543151.355	180150.484	2	1500	D400	
CH086	543151.647	180155.101	-	-	D400	
CH087	543181.403	180155.743	-	500x185x735	D400	ACO M150D SUMP UNIT
CH088	543151.888	180147.889	-	-	D400	
CH089	543181.503	180148.69	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW090	543181.583	180151.172	2	1500	D400	
CH091	543182.827	180148.83	-	-	D400	
CH092	543269.756	180146.991	-	-	D400	
CH093	543221.816	180147.961	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW094	543221.868	180150.89	2	1500	D400	
CH095	543254.039	180154.368	-	-	D400	
CH096	543269.925	180153.993	-	500x185x735	D400	ACO M150D SUMP UNIT
SW097	543269.923	180149.677	2	1500	D400	
CH098	543271.052	180146.962	-	-	D400	
CH099	543324.484	180145.226	-	-	D400	
CH100	543298.374	180146.176	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW101	543298.572	180149.097	2	1500	D400	
SW102	543324.614	180148.143	2	1500	D400	
CH103	543325.967	180145.136	-	-	D400	
CH104	543379.971	180139.743	-	-	D400	
CH105	543353.954	180142.69	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW106	543354.108	180145.703	2	1500	D400	
CH107	543340.98	180158.01	-	-	D400	
CH108	543390.99	180154.636	-	-	D400	
CH109	543363.153	180156.444	-	500x185x735	D400	ACO M150D SUMP UNIT
SW110	543363.418	180158.644	2	1200	D400	
SW111	543267.585	180187.604	2	1200	D400	
SW112	543266.199	180165.68	2	1500	D400	
CH113	543281.087	180162.062	-	-	D400	
CH114	543339.835	180157.992	-	-	D400	
CH115	543296.011	180161.113	-	500x185x735	D400	ACO M150D SUMP UNIT
SW116	543296.307	180163.405	2	1500	D400	
SW117	543317.09	180162.065	2	1500	D400	
CH118	543341.049	180172.981	-	-	D400	
CH119	543380.558	180170.362	-	-	D400	
CH120	543356.45	180171.999	-	500x185x735	D400	ACO M150D SUMP UNIT
SW121	543356.856	180179.128	2	1200	D400	
CH122	543281.349	180176.801	-	-	D400	
CH123	543339.521	180173.091	-	-	D400	
CH124	543302.632	180175.71	-	500x185x735	D400	ACO M150D SUMP UNIT
SW125	543303.044	180182.63	2	-	D400	
SW126	543318.349	180181.764	2	1200	D400	
SW127	543317.64	180172.208	2	1500	D400	
SW128	543327.273	180171.644	2	"1875 DIA, 3200 LENGTH"	-	FUEL INTERCEPTOR MODEL 318C1/SC BY SPEL
SW129	543374.03	180168.336	2	1800	D400	
SW130	543379.996	180142.595	2	1500	D400	
CH131	543389.233	180146.352	-	-	D400	
CH132	543403.061	180144.966	-	500x185x735	D400	ACO M150D SUMP UNIT
CH133	543381.334	180139.606	-	-	D400	
CH134	543452.605	180134.736	-	-	D400	
CH135	543402.926	180137.387	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW136	543402.946	180140.327	2	1500	D400	

MANHOLE SCHEDULE

SETOUT POINTS	COORDINATES E(m)	COORDINATES N(m)	MH TYPE	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
SW137	543452.556	180138.139	2	1500	D400	
CH138	543453.882	180134.709	-	-	D400	
CH139	543503.504	180134.729		500x390x1025	D400	ACO KERB SUMP UNIT
SW140	543503.183	180138.232	2	1500	D400	
SW141	543546.125	180134.905	2	1500	D400	
CH142	543523.443	180148.505	-	-	D400	
CH143	543601.517	180143.562	-	-	D400	
CH144	543565.649	180146.224	-	500x185x735	D400	ACO M150D SUMP UNIT
SW145	543565.928	180148.475	2	1200	D400	
CH146	543404.432	180151.674	-	-	D400	
CH147	543449.045	180148.505	-	-	D400	
CH148	543435.484	180149.519	-	500x185x735	D400	ACO M150D SUMP UNIT
SW149	543435.589	180151.879	2	1200	D400	
CH150	543450.439	180148.505	-	-	D400	
CH151	543521.796	180148.505	-	-	D400	
CH152	543482.379	180147.872	-	500x185x735	D400	ACO M150D SUMP UNIT
SW153	543482.355	180150.218	2	1200	D400	
SW154	543522.851	180150.93	2	1500	D400	
CH155	543422.806	180167.541	-	-	D400	
CH156	543467.798	180164.238	-	-	D400	
CH157	543444.545	180165.889	-	500x185x735	D400	ACO M150D SUMP UNIT
SW158	543444.99	180172.549	2	1200	D400	
CH159	543469.311	180164.376	-	-	D400	
CH160	543525.723	180160.111	-	-	D400	
CH161	543485.299	180163.138	-	500x185x735	D400	ACO M150D SUMP UNIT
SW162	543485.698	180169.585	2	1200	D400	
CH163	543527.317	180160.156	2	-	D400	
CH164	543603.145	180155.542	-	-	D400	
CH165	543566.134	180157.749	-	500x235x790	D400	ACO M200D SUMP UNIT
SW166	543566.571	180164.267	2	1200	D400	
SW167	543523.413	180167.141	2	1500	D400	
SW168	543523.207	180158.932	2	1500	D400	
SW169	543533.659	543533.659	2	"1875 DIA, 3200 LENGTH"	-	FUEL INTERCEPTOR MODEL 318C1/SC BY SPEL
SW170	543595.406	180154.068	2	1500	D400	
SW171	543599.369	180146.76	2	1500	D400	
SW172	543602.789	180131.72	2	1800	D400	
CH173	543690.362	180149.02	2	-	D400	
CH174	543766.524	180143.666	2	-	D400	
CH175	543725.833	180146.611	-	500x235x790	D400	ACO M200D SUMP UNIT
SW176	543725.477	180143.44	2	1200	D400	
CH177	543612.326	180154.508	2	-	D400	
CH178	543689.157	180149.154	2	-	D400	
CH179	543647.797	180151.965	-	500x235x790	D400	ACO M200D SUMP UNIT
SW180	543647.441	180148.643	2	1200	D400	
SW181	543686.647	180145.803	2	1500	D400	
CH182	543633.349	180130.668	-	-	D400	
CH183	543687.895	180127.595	-	-	D400	
CH184	543659.918	180129.26	-	500x235x790	D400	ACO M200D SUMP UNIT
SW185	543659.716	180128.052	2	1200	D400	
CH186	543688.682	180127.591	-	-	D400	
CH187	543764.666	180122.456	-	-	D400	
CH188	543724.479	180125.135	-	500x235x790	D400	ACO M200D SUMP UNIT
SW189	543724.393	180123.741	2	1200	D400	
SW190	543685.572	180126.298	2	1500	D400	
SW191	543686.138	180135.436	2	1500	D400	
SW192	543679.199	180135.85	2	"1875 DIA, 3200 LENGTH"	-	FUEL INTERCEPTOR MODEL 318C1/SC BY SPEL
SW193	543636.662	180138.73	2	1500	D400	
SW194	543621.937	180135.801	2	1500	D400	
SW195	543619.116	180127.086	2	1800	D400	
SW196	543713.589	180112.154	2	1200	D400	ON HOLD
SW197	543705.36	180112.713	2	1200	D400	ON HOLD
SW198	543697.052	180113.192	2	1200	D400	ON HOLD
CH199	543695.297	180103.306	-	-	D400	
CH200	543648.155	180113.296	-	-	D400	
CH201	543670.736	180106.48	-	500x390x1025	D400	ACO KERB SUMP UNIT
SW202	543671.408	180108.736	2	1200	D400	
CH203	543675.343	180119.094	-	-	D400	
CH204	543651.258	180120.711	-	500x185x735	D400	ACO M150D SUMP UNIT
SW205	543649.626	180115.599	2	1200	D400	
SW206	543636.782	180119.589	2	1800	D400	
CH207	543705.909	180101.807	-	-	D400	
CH208	543692.24	180102.236	-	-	D400	
CH209	543673.692	180104.434	2	-	D400	
CH210	543661.899	180107.275	2	-	D400	
CH211	543629.252	180118.768	-	-	D400	
CH212	543642.461	180113.484	2	-	D400	
CH213	543651.761	180110.248	-	500x235x790	D400	ACO M200D SUMP UNIT
SW214	543650.076	180107.009	2	1200	D400	
SW215	543633.642	180112.598	2	1800	D400	
CH216	543652.076	180088.151	-	-	D400	
CH217	543691.699	180094.557	-	-	D400	
CH218	543676.751	180092.185	-	500x185x735	D400	ACO M150D SUMP UNIT
SW219	543677.505	180088.247	2	1200	D400	
SW220	543647.397	180083.074	2	1200	D400	
SW221	543639.453	180093.243	1	1800	D400	
SW222	543644.261	180093.841	1	"2700 DIA, 4400 LENGTH"	-	FUEL INTERCEPTOR MODEL 460C1/SC BY SPEL
SW223	543683.357	180098.58	2	1800	D400	
SW224	543708.506	180099.897	1	1800	D400	
CH225	543756.437	180098.231	-	-	D400	
CH226	543793.736	180096.05	-	-	D400	
CH227	543774.705	180097.041	-	500x185x735	D400	ACO M150D SUMP UNIT
SW228	543774.251	180089.523	2	1200	D400	
CH229	543785.043	180143.826	-	-	D400	-
CH230	543783.803	180120.31	-	500x185x735	D400	ACO M150D SUMP UNIT
SW231	543790.935	180119.934	2	1200	D400	
CH232	543756.759	180107.063	-	-	D400	
CH233	543787.113	180106.717	-	500x235x790	D400	ACO M200D SUMP UNIT
SW234	543728.568	180110.735	2	1200	D400	ON HOLD

MANHOLE SCHEDULE

SETOUT POINTS	COORDINATES E(m)	COORDINATES N(m)	MH TYPE	MH SIZE (mm)	MH COVER LOAD CLASS	NOTE
SW235	543745.311	180109.818	2	1200	D400	ON HOLD
CH236	543708.094	180102.903	-	-	D400	
CH237	543736.764	180101.185	-		D400	
CH238	543754.375	180100.111	-		D400	
CH239	543746.429	180100.541	-		D400	
SW240	543746.379	180103.023	2	1200	D400	
CH241	543756.248	180099.923	-		D400	
CH242	543802.574	180099.971	-		D400	
CH243	543787.155	180098.029	-		D400	
SW244	543787.248	180100.872	2	1200	D400	
SW245	543794.999	180100.081	2	1200	D400	
SW246	543793.086	180088.27	2	1200	D400	
CH247	543759.653	180077.082	-	-	D400	
CH248	543788.797	180084.804	-	-	D400	
CH249	543774.63	180081.11	-	500x185x735	D400	ACO M150D SUMP UNIT
SW250	543776.36	180073.978	2	1200	D400	
SW251	543795.231	180078.662	2	1200	D400	
SW252	543793.677	180084.348	2	1500	D400	
SW253	543789.864	180083.47	2	"1875 DIA, 3200 LENGTH"	-	FUEL INTERCEPTOR. MODEL 318C1/SC BY SPEL
SW254	543750.151	180079.613	2	1500	D400	
SW255	543740.929	180102.762	2	1500	D400	
SW256	543733.156	180103.172	1	1500	D400	

ATTENUATION TANK SCHEDULE

TANK NUMBER	STRUCTURE TYPE	AREA in Sq.m	DIMENSION (m)	DEPTH (m)
ATT 02	CELLULAR STORAGE	380	27x14.07	0.8
ATT 03	CELLULAR STORAGE	360	32.5x10.76	0.8
ATT 04	CELLULAR STORAGE	380	40x9.5	0.8
ATT 05	CELLULAR STORAGE	375	37.5x10	0.8
ATT 06	CELLULAR STORAGE	325	32.5x10	1.2
ATT 07	CELLULAR STORAGE	350	35x10	0.8

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

- LIVE SERVICES CRITICAL TO AIRPORT OPERATIONS (EG HV, AGL, PERI CABLES, FIREMAIN) TO BE PROTECTED DURING WORKS.
- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- DLR EXCLUSION ZONE REQUIREMENTS TO BE OBSERVED DURING EXCAVATION.
- RISK OF HITTING OR DISCOVERING UXO - SEE SITE SPECIFIC UXO REPORTS
- CONTAMINATED SOIL AND ASBESTOS WITHIN BURIED SERVICES OR IN GROUND - SEE ENVIRONMENTAL REPORTS
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD

MAINTENANCE/CLEANING

- AIRPORT OPERATIONS RELATED HEIGHT RESTRICTIONS TO BE OBSERVED WHEN OPERATING TALL PLANT SUCH AS CRANES.
- RISK OF COLLISIONS WITH PEDESTRIANS AND VEHICLES IN A LIVE AIRPORT ENVIRONMENT AND PUBLIC ACCESS ROAD.

DECOMMISSIONING/DEMOLITION

- SEE CONSTRUCTION RISKS ABOVE.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

DO NOT SCALE

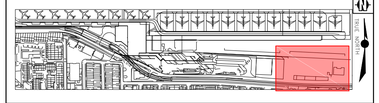
NOTES:

1. EXISTING INFORMATION BASED ON:
   - MSA DRAWING SURVEY DRAWING REF 4563-T DATED 22/04/2016
   - TECHNIC BURIED SERVICES DRAWING REF P17189-TEC-SUT-00-DR-AC_15_15_06-0001 DATED 10/04/2017
2. STATUS AND EXTENT OF ALL SERVICES (RECORDED AND UNRECORDED) TO BE DETERMINED BY FURTHER SURVEY AND CONSULTATION WITH RELEVANT UTILITY OWNER.
3. ALL MANHOLE COVERS AND GRATING TO BE D400 RATED.
4. ALL RETAINED EXISTING PITS AND MANHOLES TO BE ADJUSTED AND /OR REINFORCED TO SUIT LEVELS AND LOADING WHERE REQUIRED.
5. PIPES TO BE ENCLOSED WITH 150 THICK CONCRETE SURROUND AT LOCATIONS WHERE COVER IN HARDSTAND AREAS ARE LESS THAN 900 AND AT LOCATION WHERE COVER IS LESS THAN 1200 ALONG HARTMANN ROAD.
6. CONSULTATION WITH THAMES WATER REQUIRED TO AGREE DISCHARGE RATES AND CONNECTION INTO EXISTING THAMES WATER NETWORK.
7. ALL CHANNEL DRAINS TO BE CLASS D400.
8. MODIFICATIONS TO SERVICES SHOWN ARE SUBJECT TO REVIEW AND APPROVAL BY UTILITY OWNERS.
9. WHERE MODIFICATION TO EXISTING SURFACE LEVELS ARE MADE THE CONTRACTOR IS TO PROVIDE ADEQUATE SURFACE WATER DRAINAGE.

ABBREVIATION

SW158 - SURFACE WATER MANHOLE
CH155 - SETTING OUT POINT / SUMP UNIT
ATT - ATTENUATION TANK
US - UPSTREAM
DS - DOWNSTREAM
IL - INVERT LEVEL
CL - COVER LEVEL

KEY PLAN ZONE:



PRIVATE

NOT FOR CONSTRUCTION

Rev.	Date	Description	By	Chk'd	App'd
01	02/03/18	STAGE 3 ISSUE	SK	DK	SJP

Drawing Suitability: SUITABLE FOR INFORMATION — Status: S2

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Client: London City Airport — Get closer.

Project Title: CITY AIRPORT DEVELOPMENT PROGRAMME (CADP) - DOCKSIDE

Drawing Title: STAGE 3 DOCKSIDE PROPOSED SURFACE WATER DRAINAGE LAYOUT (12 OF 12)

Scale	Designed	Drawn	Checked	Authorised
NTS	SK	AG	DK	SJP
Original Size: A1	Date: 02/03/2018	Date: 02/03/2018	Date: 02/03/2018	Date: 02/03/2018

Drawing Number: Proj.Code Orig Dis Zone Level Proj. Tile Type Sub Series / Num Rev Status
A400-ATK-C-40-XXX-XX-DR-GA-864-112 01 S2

B.2. Landside Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	30	Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.840	Min Vel for Auto Design only (m/s)	1.00
Ratio R	0.435	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	500
Maximum Rainfall (mm/hr)	250	Minimum Backdrop Height (m)	0.200		
Maximum Time of Concentration (mins)	30	Maximum Backdrop Height (m)	1.500		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.277	4-8	0.171

Total Area Contributing (ha) = 0.448

Total Pipe Volume (m^3) = 55.590

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)	HYD SECT	DIA (mm)	Auto Design
1.000	10.610	0.108	98.3	0.007	5.00	0.0	0.600	M10	-29	
2.000	3.816	0.019	200.0	0.000	5.00	0.0	0.600	M10	-29	
1.001	1.664	0.268	6.2	0.007	0.00	0.0	0.600	o	150	
1.002	40.295	0.124	325.0	0.057	0.00	0.0	0.600	o	600	
3.000	6.406	0.032	200.2	0.005	5.00	0.0	0.600	M13	-32	
3.001	2.396	0.100	23.9	0.001	0.00	0.0	0.600	o	150	
3.002	8.204	0.033	245.0	0.010	0.00	0.0	0.600	o	300	
4.000	8.383	0.045	184.4	0.000	5.00	0.0	0.600	M10	-29	
5.000	4.670	0.020	235.4	0.002	5.00	0.0	0.600	M10	-29	
4.001	5.069	0.125	40.6	0.005	0.00	0.0	0.600	o	150	
3.003	22.483	0.096	234.2	0.005	0.00	0.0	0.600	o	300	
3.004	7.801	0.040	195.0	0.001	0.00	0.0	0.600	o	300	
6.000	6.394	0.106	60.3	0.002	5.00	0.0	0.600	o	150	
3.005	12.166	0.050	245.0	0.000	0.00	0.0	0.600	o	300	
3.006	8.008	0.038	210.7	0.005	0.00	0.0	0.600	o	300	

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	133.51	5.18	5.312	0.007	0.0	0.0	0.6	0.98	9.8	3.3
2.000	134.42	5.09	5.065	0.000	0.0	0.0	0.0	0.69	6.9	0.2
1.001	133.44	5.19	4.725	0.015	0.0	0.0	1.2	4.07	72.0	7.2
1.002	128.49	5.69	1.406	0.072	0.0	0.0	5.6	1.35	380.4	33.5
3.000	133.95	5.14	4.800	0.005	0.0	0.0	0.4	0.78	19.4	2.3
3.001	133.74	5.16	4.550	0.006	0.0	0.0	0.5	2.07	36.6	2.8
3.002	132.34	5.29	3.261	0.016	0.0	0.0	1.3	1.00	70.7	7.8
4.000	133.35	5.20	5.187	0.000	0.0	0.0	0.0	0.71	7.1	0.0
5.000	134.10	5.12	5.072	0.002	0.0	0.0	0.2	0.63	6.3	1.0
4.001	132.80	5.25	4.825	0.008	0.0	0.0	0.6	1.58	28.0	3.6
3.003	128.73	5.66	2.280	0.029	0.0	0.0	2.2	1.02	72.3	13.4
3.004	127.64	5.78	2.184	0.030	0.0	0.0	2.3	1.12	79.3	13.9
6.000	134.53	5.08	2.400	0.002	0.0	0.0	0.1	1.30	22.9	0.8
3.005	125.78	5.98	2.144	0.032	0.0	0.0	2.4	1.00	70.7	14.4
3.006	124.68	6.10	2.094	0.036	0.0	0.0	2.7	1.08	76.3	16.4

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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)	HYD SECT	DIA (mm)	Auto Design
7.000	29.951	0.200	149.8	0.049	5.00	0.0	0.600	M51	-34	
8.000	2.036	0.010	203.6	0.001	5.00	0.0	0.600	M11	-30	
7.001	1.445	0.116	12.5	0.000	0.00	0.0	0.600	o	225	
7.002	10.455	0.084	124.5	0.000	0.00	0.0	0.600	o	225	
3.007	20.524	0.136	150.9	0.003	0.00	0.0	0.600	o	300	
9.000	15.689	0.111	141.3	0.006	5.00	0.0	0.600	o	300	
10.000	3.604	0.018	200.0	0.003	5.00	0.0	0.600	M10	-29	
10.001	5.122	0.026	200.0	0.001	0.00	0.0	0.600	M10	-29	
10.002	3.786	0.019	200.0	0.003	0.00	0.0	0.600	M10	-29	
10.003	6.162	0.450	13.7	0.001	0.00	0.0	0.600	o	150	
9.001	29.972	0.122	245.0	0.019	0.00	0.0	0.600	o	300	
11.000	3.601	0.018	200.0	0.002	5.00	0.0	0.600	M10	-29	
11.001	5.494	0.027	200.0	0.002	0.00	0.0	0.600	M10	-29	
11.002	3.687	0.018	200.0	0.003	0.00	0.0	0.600	M10	-29	
11.003	6.677	0.297	22.5	0.002	0.00	0.0	0.600	o	150	
9.002	9.043	0.040	225.0	0.008	0.00	0.0	0.600	o	300	
12.000	11.314	0.012	954.4	0.004	5.00	0.0	0.600	Q22	-2	
12.001	6.607	0.100	66.1	0.000	0.00	0.0	0.600	o	150	
9.003	10.730	0.080	134.3	0.005	0.00	0.0	0.600	o	300	
13.000	33.263	1.039	32.0	0.007	5.00	0.0	0.600	M13	-32	
13.001	6.438	1.129	5.7	0.000	0.00	0.0	0.600	o	150	
3.008	3.592	0.047	76.4	0.016	0.00	0.0	0.600	o	450	
3.009	3.101	0.031	100.0	0.000	0.00	0.0	0.600	o	450	
3.010	3.852	0.017	226.6	0.000	0.00	0.0	0.600	o	450	
3.011	14.333	0.153	93.7	0.000	0.00	0.0	0.600	o	450	
3.012	5.329	0.061	87.4	0.000	0.00	0.0	0.600	o	450	

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)
7.000	130.67	5.46	4.817	0.049	0.0	0.0	3.9	1.09	32.6	23.5
8.000	134.91	5.05	4.872	0.001	0.0	0.0	0.1	0.73	10.9	0.3
7.001	130.61	5.47	4.350	0.050	0.0	0.0	4.0	3.72	148.0	23.8
7.002	129.16	5.62	3.493	0.050	0.0	0.0	4.0	1.17	46.5	23.8
3.007	122.37	6.37	2.056	0.090	0.0	0.0	6.7	1.28	90.3	40.2
9.000	133.32	5.20	2.365	0.006	0.0	0.0	0.4	1.32	93.3	2.7
10.000	134.47	5.09	4.170	0.003	0.0	0.0	0.2	0.69	6.9	1.4
10.001	133.17	5.21	4.152	0.004	0.0	0.0	0.3	0.69	6.9	1.7
10.002	132.23	5.30	4.126	0.006	0.0	0.0	0.5	0.69	6.9	3.1
10.003	131.85	5.34	3.700	0.008	0.0	0.0	0.6	2.74	48.4	3.7
9.001	127.04	5.84	2.254	0.033	0.0	0.0	2.5	1.00	70.7	15.1
11.000	134.48	5.09	4.186	0.002	0.0	0.0	0.2	0.69	6.9	1.0
11.001	133.08	5.22	4.168	0.004	0.0	0.0	0.3	0.69	6.9	1.8
11.002	132.17	5.31	4.141	0.007	0.0	0.0	0.5	0.69	6.9	3.3
11.003	131.64	5.36	3.700	0.009	0.0	0.0	0.7	2.13	37.7	4.4
9.002	125.72	5.99	2.132	0.050	0.0	0.0	3.8	1.04	73.8	22.7
12.000	130.75	5.45	3.789	0.004	0.0	0.0	0.3	0.42	16.7	1.9
12.001	129.87	5.54	3.200	0.004	0.0	0.0	0.3	1.24	21.9	1.9
9.003	124.55	6.12	2.092	0.059	0.0	0.0	4.4	1.35	95.8	26.5
13.000	132.44	5.28	4.821	0.007	0.0	0.0	0.6	1.96	48.9	3.4
13.001	132.19	5.31	3.625	0.007	0.0	0.0	0.6	4.25	75.1	3.4
3.008	122.15	6.40	1.910	0.172	0.0	0.0	12.7	2.33	370.2	76.3
3.009	121.94	6.42	1.863	0.172	0.0	0.0	12.7	2.03	323.3	76.3
3.010	121.54	6.47	1.832	0.172	0.0	0.0	12.7	1.35	214.1	76.3
3.011	120.61	6.58	1.815	0.172	0.0	0.0	12.7	2.10	334.2	76.3
3.012	120.28	6.62	1.662	0.172	0.0	0.0	12.7	2.18	346.1	76.3

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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)	HYD SECT	DIA (mm)	Auto Design
1.003	28.475	0.108	263.7	0.006	0.00	0.0	0.600	o	600	
14.000	24.181	0.121	199.8	0.016	5.00	0.0	0.600	M11	-30	
15.000	8.637	0.087	99.4	0.007	5.00	0.0	0.600	M10	-29	
14.001	1.227	0.223	5.5	0.000	0.00	0.0	0.600	o	150	
14.002	24.196	0.239	101.2	0.000	0.00	0.0	0.600	o	150	
14.003	8.811	0.062	143.3	0.134	0.00	0.0	0.600	o	300	
16.000	14.920	0.160	93.0	0.020	5.00	0.0	0.600	Q35	-3	
16.001	2.840	0.077	36.9	0.002	0.00	0.0	0.600	o	150	
14.004	18.921	0.062	305.2	0.003	0.00	0.0	0.600	o	375	
14.005	5.942	0.099	60.0	0.006	0.00	0.0	0.600	o	375	
1.004	39.885	0.106	376.3	0.010	0.00	0.0	0.600	o	600	

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)
1.003	117.77	6.94	1.282	0.250	0.0	0.0	17.8	1.49	422.7	107.0
14.000	129.79	5.55	4.980	0.016	0.0	0.0	1.3	0.73	11.0	7.5
15.000	133.85	5.15	5.372	0.007	0.0	0.0	0.6	0.98	9.8	3.4
14.001	129.74	5.55	4.800	0.023	0.0	0.0	1.8	4.33	76.4	10.8
14.002	125.96	5.96	3.618	0.023	0.0	0.0	1.8	1.00	17.6	10.8
14.003	124.96	6.07	1.696	0.157	0.0	0.0	11.9	1.31	92.7	71.5
16.000	133.94	5.14	4.828	0.020	0.0	0.0	1.6	1.80	172.4	9.7
16.001	133.64	5.17	4.227	0.022	0.0	0.0	1.8	1.66	29.4	10.7
14.004	122.32	6.38	1.560	0.183	0.0	0.0	13.5	1.03	114.0	81.3
14.005	121.97	6.42	1.498	0.188	0.0	0.0	13.9	2.34	258.7	83.6
1.004	113.85	7.47	1.174	0.448	0.0	0.0	30.9	1.25	353.3	185.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
11	5.445	0.133	Junction	0	1.000	5.312	-29				
12	5.195	0.130	Junction	0	2.000	5.065	-29				
Sump 5	5.321	0.596	Open Manhole	1200	1.001	4.725	150	1.000	5.204	-29	439
								2.000	5.046	-29	281
SW001	5.430	4.024	Open Manhole	1500	1.002	1.406	600	1.001	4.457	150	2601
13	5.080	0.280	Junction	0	3.000	4.800	-32				
Sump 6	5.130	0.580	Open Manhole	1200	3.001	4.550	150	3.000	4.768	-32	328
SW002	5.276	2.015	Open Manhole	1200	3.002	3.261	300	3.001	4.450	150	1039
15	5.321	0.134	Junction	0	4.000	5.187	-29				
16	5.203	0.131	Junction	0	5.000	5.072	-29				
Sump 8	5.323	0.498	Open Manhole	1200	4.001	4.825	150	4.000	5.142	-29	277
								5.000	5.052	-29	187
SW003	5.498	3.218	Open Manhole	1200	3.003	2.280	300	3.002	3.228	300	948
								4.001	4.700	150	2270
SW004	5.496	3.312	Open Manhole	1200	3.004	2.184	300	3.003	2.184	300	
SW005	5.441	3.041	Open Manhole	1200	6.000	2.400	150				
SW006	5.484	3.340	Open Manhole	1200	3.005	2.144	300	3.004	2.144	300	
								6.000	2.294	150	
SW007	5.270	3.176	Open Manhole	1500	3.006	2.094	300	3.005	2.094	300	
7	5.052	0.235	Junction	0	7.000	4.817	-34				
8	5.052	0.180	Junction	0	8.000	4.872	-30				
Sump 3	5.038	0.688	Open Manhole	1200	7.001	4.350	225	7.000	4.617	-34	257
								8.000	4.862	-30	447
SW008/1	4.980	1.487	Open Manhole	1200	7.002	3.493	225	7.001	4.234	225	741
SW008	5.209	3.153	Open Manhole	1500	3.007	2.056	300	3.006	2.056	300	
								7.002	3.409	225	1278
SW009a	4.113	1.748	Open Manhole	1200	9.000	2.365	300				
1	4.300	0.130	Junction		10.000	4.170	-29				
2	4.360	0.208	Junction		10.001	4.152	-29	10.000	4.152	-29	
3	4.355	0.229	Junction	0	10.002	4.126	-29	10.001	4.126	-29	
Sump 1	4.293	0.593	Open Manhole	1200	10.003	3.700	150	10.002	4.107	-29	367
SW009	4.502	2.248	Open Manhole	1500	9.001	2.254	300	9.000	2.254	300	
								10.003	3.250	150	846
4	4.316	0.130	Junction		11.000	4.186	-29				
5	4.356	0.188	Junction		11.001	4.168	-29	11.000	4.168	-29	
6	4.338	0.198	Junction	0	11.002	4.141	-29	11.001	4.141	-29	
Sump 2	4.311	0.611	Open Manhole	1200	11.003	3.700	150	11.002	4.122	-29	382
SW010	4.487	2.355	Open Manhole	1200	9.002	2.132	300	9.001	2.132	300	
								11.003	3.403	150	1121
SLT 2	4.190	0.401	Junction	0	12.000	3.789	-2				
Sump 10	4.217	1.017	Open Manhole	1200	12.001	3.200	150	12.000	3.777	-2	652
SW011	4.426	2.334	Open Manhole	1500	9.003	2.092	300	9.002	2.092	300	
								12.001	3.100	150	858
14	5.101	0.280	Junction	0	13.000	4.821	-32				
Sump 7	4.134	0.509	Open Manhole	1200	13.001	3.625	150	13.000	3.782	-32	267
SW012	4.370	2.460	Open Manhole	1500	3.008	1.910	450	3.007	1.920	300	
								9.003	2.012	300	
								13.001	2.496	150	286
INTERCEPTOR	4.545	2.682	Open Manhole	1350	3.009	1.863	450	3.008	1.863	450	
SW013	4.653	2.821	Open Manhole	1350	3.010	1.832	450	3.009	1.832	450	
ATT TANK	5.940	4.125	Open Manhole	1350	3.011	1.815	450	3.010	1.815	450	
SW014	5.524	3.862	Open Manhole	1350	3.012	1.662	450	3.011	1.662	450	
SW015	5.221	3.939	Open Manhole	1500	1.003	1.282	600	1.002	1.282	600	
								3.012	1.601	450	169
9	5.160	0.180	Junction	0	14.000	4.980	-30				
10	5.494	0.122	Junction	0	15.000	5.372	-29				
Sump 4	5.401	0.601	Open Manhole	1200	14.001	4.800	150	14.000	4.859	-30	69
								15.000	5.285	-29	445
SW016	5.414	1.796	Open Manhole	1200	14.002	3.618	150	14.001	4.577	150	959
SW019	5.336	3.640	Open Manhole	1200	14.003	1.696	300	14.002	3.379	150	1533
SLT 1	5.378	0.550	Junction	0	16.000	4.828	-3				
Sump 9	5.017	0.790	Open Manhole	1200	16.001	4.227	150	16.000	4.668	-3	641
SW019/1	5.121	3.561	Open Manhole	1350	14.004	1.560	375	14.003	1.635	300	
								16.001	4.150	150	2365

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW020	4.602	3.104	Open Manhole	1350	14.005	1.498	375	14.004	1.498	375	
SW021	4.400	3.226	Open Manhole	1500	1.004	1.174	600	1.003	1.174	600	
								14.005	1.399	375	
SW022	4.200	3.132	Open Manhole	1500		OUTFALL		1.004	1.068	600	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	M10	-29	11	5.445	5.312	0.023	Junction	
2.000	M10	-29	12	5.195	5.065	0.020	Junction	
1.001	o	150	Sump 5	5.321	4.725	0.446	Open Manhole	1200
1.002	o	600	SW001	5.430	1.406	3.424	Open Manhole	1500
3.000	M13	-32	13	5.080	4.800	0.020	Junction	
3.001	o	150	Sump 6	5.130	4.550	0.430	Open Manhole	1200
3.002	o	300	SW002	5.276	3.261	1.715	Open Manhole	1200
4.000	M10	-29	15	5.321	5.187	0.024	Junction	
5.000	M10	-29	16	5.203	5.072	0.021	Junction	
4.001	o	150	Sump 8	5.323	4.825	0.348	Open Manhole	1200
3.003	o	300	SW003	5.498	2.280	2.918	Open Manhole	1200
3.004	o	300	SW004	5.496	2.184	3.012	Open Manhole	1200
6.000	o	150	SW005	5.441	2.400	2.891	Open Manhole	1200
3.005	o	300	SW006	5.484	2.144	3.040	Open Manhole	1200
3.006	o	300	SW007	5.270	2.094	2.876	Open Manhole	1500
7.000	M51	-34	7	5.052	4.817	0.020	Junction	
8.000	M11	-30	8	5.052	4.872	0.020	Junction	
7.001	o	225	Sump 3	5.038	4.350	0.463	Open Manhole	1200
7.002	o	225	SW008/1	4.980	3.493	1.262	Open Manhole	1200
3.007	o	300	SW008	5.209	2.056	2.853	Open Manhole	1500
9.000	o	300	SW009a	4.113	2.365	1.448	Open Manhole	1200
10.000	M10	-29	1	4.300	4.170	0.020	Junction	
10.001	M10	-29	2	4.360	4.152	0.098	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	10.610	98.3	Sump 5	5.321	5.204	0.007	Open Manhole	1200
2.000	3.816	200.0	Sump 5	5.321	5.046	0.165	Open Manhole	1200
1.001	1.664	6.2	SW001	5.430	4.457	0.824	Open Manhole	1500
1.002	40.295	325.0	SW015	5.221	1.282	3.339	Open Manhole	1500
3.000	6.406	200.2	Sump 6	5.130	4.768	0.102	Open Manhole	1200
3.001	2.396	23.9	SW002	5.276	4.450	0.677	Open Manhole	1200
3.002	8.204	245.0	SW003	5.498	3.228	1.971	Open Manhole	1200
4.000	8.383	184.4	Sump 8	5.323	5.142	0.071	Open Manhole	1200
5.000	4.670	235.4	Sump 8	5.323	5.052	0.161	Open Manhole	1200
4.001	5.069	40.6	SW003	5.498	4.700	0.648	Open Manhole	1200
3.003	22.483	234.2	SW004	5.496	2.184	3.012	Open Manhole	1200
3.004	7.801	195.0	SW006	5.484	2.144	3.040	Open Manhole	1200
6.000	6.394	60.3	SW006	5.484	2.294	3.040	Open Manhole	1200
3.005	12.166	245.0	SW007	5.270	2.094	2.876	Open Manhole	1500
3.006	8.008	210.7	SW008	5.209	2.056	2.853	Open Manhole	1500
7.000	29.951	149.8	Sump 3	5.038	4.617	0.206	Open Manhole	1200
8.000	2.036	203.6	Sump 3	5.038	4.862	0.016	Open Manhole	1200
7.001	1.445	12.5	SW008/1	4.980	4.234	0.521	Open Manhole	1200
7.002	10.455	124.5	SW008	5.209	3.409	1.575	Open Manhole	1500
3.007	20.524	150.9	SW012	4.370	1.920	2.150	Open Manhole	1500
9.000	15.689	141.3	SW009	4.502	2.254	1.948	Open Manhole	1500
10.000	3.604	200.0	2	4.360	4.152	0.098	Junction	
10.001	5.122	200.0	3	4.355	4.126	0.119	Junction	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
10.002	M10	-29	3	4.355	4.126	0.119	Junction	
10.003	o	150	Sump 1	4.293	3.700	0.443	Open Manhole	1200
9.001	o	300	SW009	4.502	2.254	1.948	Open Manhole	1500
11.000	M10	-29	4	4.316	4.186	0.020	Junction	
11.001	M10	-29	5	4.356	4.168	0.078	Junction	
11.002	M10	-29	6	4.338	4.141	0.088	Junction	
11.003	o	150	Sump 2	4.311	3.700	0.461	Open Manhole	1200
9.002	o	300	SW010	4.487	2.132	2.055	Open Manhole	1200
12.000	Q22	-2	SLT 2	4.190	3.789	0.176	Junction	
12.001	o	150	Sump 10	4.217	3.200	0.867	Open Manhole	1200
9.003	o	300	SW011	4.426	2.092	2.034	Open Manhole	1500
13.000	M13	-32	14	5.101	4.821	0.020	Junction	
13.001	o	150	Sump 7	4.134	3.625	0.359	Open Manhole	1200
3.008	o	450	SW012	4.370	1.910	2.010	Open Manhole	1500
3.009	o	450	INTERCEPTOR	4.545	1.863	2.232	Open Manhole	1350
3.010	o	450	SW013	4.653	1.832	2.371	Open Manhole	1350
3.011	o	450	ATT TANK	5.940	1.815	3.675	Open Manhole	1350
3.012	o	450	SW014	5.524	1.662	3.412	Open Manhole	1350
1.003	o	600	SW015	5.221	1.282	3.339	Open Manhole	1500
14.000	M11	-30	9	5.160	4.980	0.020	Junction	
15.000	M10	-29	10	5.494	5.372	0.012	Junction	
14.001	o	150	Sump 4	5.401	4.800	0.451	Open Manhole	1200
14.002	o	150	SW016	5.414	3.618	1.646	Open Manhole	1200
14.003	o	300	SW019	5.336	1.696	3.340	Open Manhole	1200
16.000	Q35	-3	SLT 1	5.378	4.828	0.200	Junction	
16.001	o	150	Sump 9	5.017	4.227	0.640	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
10.002	3.786	200.0	Sump 1	4.293	4.107	0.076	Open Manhole	1200
10.003	6.162	13.7	SW009	4.502	3.250	1.102	Open Manhole	1500
9.001	29.972	245.0	SW010	4.487	2.132	2.055	Open Manhole	1200
11.000	3.601	200.0	5	4.356	4.168	0.078	Junction	
11.001	5.494	200.0	6	4.338	4.141	0.088	Junction	
11.002	3.687	200.0	Sump 2	4.311	4.122	0.078	Open Manhole	1200
11.003	6.677	22.5	SW010	4.487	3.403	0.934	Open Manhole	1200
9.002	9.043	225.0	SW011	4.426	2.092	2.034	Open Manhole	1500
12.000	11.314	954.4	Sump 10	4.217	3.777	0.215	Open Manhole	1200
12.001	6.607	66.1	SW011	4.426	3.100	1.176	Open Manhole	1500
9.003	10.730	134.3	SW012	4.370	2.012	2.058	Open Manhole	1500
13.000	33.263	32.0	Sump 7	4.134	3.782	0.092	Open Manhole	1200
13.001	6.438	5.7	SW012	4.370	2.496	1.725	Open Manhole	1500
3.008	3.592	76.4	INTERCEPTOR	4.545	1.863	2.232	Open Manhole	1350
3.009	3.101	100.0	SW013	4.653	1.832	2.371	Open Manhole	1350
3.010	3.852	226.6	ATT TANK	5.940	1.815	3.675	Open Manhole	1350
3.011	14.333	93.7	SW014	5.524	1.662	3.412	Open Manhole	1350
3.012	5.329	87.4	SW015	5.221	1.601	3.170	Open Manhole	1500
1.003	28.475	263.7	SW021	4.400	1.174	2.626	Open Manhole	1500
14.000	24.181	199.8	Sump 4	5.401	4.859	0.382	Open Manhole	1200
15.000	8.637	99.4	Sump 4	5.401	5.285	0.006	Open Manhole	1200
14.001	1.227	5.5	SW016	5.414	4.577	0.687	Open Manhole	1200
14.002	24.196	101.2	SW019	5.336	3.379	1.807	Open Manhole	1200
14.003	8.811	143.3	SW019/1	5.121	1.635	3.187	Open Manhole	1350
16.000	14.920	93.0	Sump 9	5.017	4.668	0.000	Open Manhole	1200
16.001	2.840	36.9	SW019/1	5.121	4.150	0.821	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
14.004	o	375	SW019/1	5.121	1.560	3.186	Open Manhole	1350
14.005	o	375	SW020	4.602	1.498	2.729	Open Manhole	1350
1.004	o	600	SW021	4.400	1.174	2.626	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
14.004	18.921	305.2	SW020	4.602	1.498	2.729	Open Manhole	1350
14.005	5.942	60.0	SW021	4.400	1.399	2.626	Open Manhole	1500
1.004	39.885	376.3	SW022	4.200	1.068	2.532	Open Manhole	1500

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.007	0.007	0.007
2.000	User	-	40	0.001	0.000	0.000
1.001	User	-	100	0.007	0.007	0.007
	User	-	100	0.000	0.000	0.007
1.002	User	-	100	0.057	0.057	0.057
3.000	User	-	40	0.012	0.005	0.005
3.001	User	-	40	0.002	0.001	0.001
3.002	User	-	40	0.001	0.000	0.000
	User	-	40	0.025	0.010	0.010
4.000	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.002	0.002	0.002
4.001	User	-	100	0.005	0.005	0.005
	User	-	100	0.001	0.001	0.005
3.003	User	-	40	0.012	0.005	0.005
3.004	User	-	40	0.003	0.001	0.001
6.000	User	-	40	0.004	0.002	0.002
3.005	-	-	100	0.000	0.000	0.000
3.006	User	-	100	0.005	0.005	0.005
7.000	User	-	100	0.049	0.049	0.049
8.000	User	-	40	0.002	0.001	0.001
7.001	-	-	100	0.000	0.000	0.000
7.002	User	-	40	0.001	0.000	0.000
3.007	User	-	100	0.003	0.003	0.003
9.000	User	-	100	0.006	0.006	0.006
10.000	User	-	100	0.003	0.003	0.003
10.001	User	-	100	0.001	0.001	0.001
10.002	User	-	100	0.003	0.003	0.003
10.003	User	-	100	0.001	0.001	0.001
9.001	User	-	100	0.019	0.019	0.019
11.000	User	-	100	0.002	0.002	0.002
11.001	User	-	100	0.002	0.002	0.002
11.002	User	-	100	0.003	0.003	0.003
11.003	User	-	100	0.001	0.001	0.001
	User	-	100	0.001	0.001	0.002
9.002	User	-	40	0.019	0.008	0.008
12.000	User	-	100	0.004	0.004	0.004
12.001	-	-	100	0.000	0.000	0.000
9.003	User	-	40	0.012	0.005	0.005
13.000	User	-	40	0.018	0.007	0.007
13.001	-	-	100	0.000	0.000	0.000
3.008	User	-	100	0.016	0.016	0.016
3.009	-	-	100	0.000	0.000	0.000
3.010	-	-	100	0.000	0.000	0.000
3.011	-	-	100	0.000	0.000	0.000
3.012	-	-	100	0.000	0.000	0.000
1.003	User	-	40	0.016	0.006	0.006
14.000	User	-	100	0.016	0.016	0.016
15.000	User	-	100	0.007	0.007	0.007
14.001	-	-	100	0.000	0.000	0.000
14.002	User	-	40	0.001	0.000	0.000
14.003	-	-	100	0.134	0.134	0.134
16.000	User	-	100	0.020	0.020	0.020
16.001	User	-	100	0.002	0.002	0.002
14.004	User	-	40	0.008	0.003	0.003
14.005	User	-	100	0.006	0.006	0.006
1.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.006	0.006	0.010
				Total	Total	Total
				0.531	0.448	0.448

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	SW022	4.200	1.068	0.000	1500	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000	Cv (Summer)	0.750
Return Period (years)	1	Ratio R	0.435	Cv (Winter)	0.840
Region	England and Wales	Profile Type	Summer	Storm Duration (mins)	15

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Online Controls for Storm

Hydro-Brake Optimum® Manhole: SW014, DS/PN: 3.012, Volume (m³): 7.6

Unit Reference	MD-SHE-0098-5000-1500-5000	Diameter (mm)	98
Design Head (m)	1.500	Invert Level (m)	1.662
Design Flow (l/s)	5.0	Minimum Outlet Pipe Diameter (mm)	150
Flush-Flo™	Calculated	Suggested Manhole Diameter (mm)	1200
Objective	Minimise upstream storage		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	0.600	4.8	1.600	5.1	2.600	6.5	5.000	8.8	7.500	10.7
0.200	4.4	0.800	4.3	1.800	5.4	3.000	6.9	5.500	9.2	8.000	11.0
0.300	4.8	1.000	4.1	2.000	5.7	3.500	7.4	6.000	9.6	8.500	11.3
0.400	4.9	1.200	4.5	2.200	6.0	4.000	7.9	6.500	10.0	9.000	11.6
0.500	4.9	1.400	4.8	2.400	6.2	4.500	8.4	7.000	10.3	9.500	11.9

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Storage Structures for Storm

Cellular Storage Manhole: ATT TANK, DS/PN: 3.011

Invert Level (m) 1.815 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	77.0	0.0	1.000	77.0	0.0	2.000	77.0	0.0	2.001	0.0	0.0

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	30	Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.840	Min Vel for Auto Design only (m/s)	1.00
Ratio R	0.435	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	500
Maximum Rainfall (mm/hr)	250	Minimum Backdrop Height (m)	0.200		
Maximum Time of Concentration (mins)	30	Maximum Backdrop Height (m)	10.000		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.402	4-8	1.552	8-12	0.185

Total Area Contributing (ha) = 2.139

Total Pipe Volume (m³) = 196.425

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	41.706	0.264	158.0	0.038	5.00	0.0	0.600	o	225	
1.001	27.068	0.140	193.3	0.054	0.00	0.0	0.600	o	300	
1.002	57.262	0.234	244.7	0.047	0.00	0.0	0.600	o	300	
1.003	54.304	0.149	364.5	0.066	0.00	0.0	0.600	o	525	
1.004	11.940	0.027	442.2	0.047	0.00	0.0	0.600	o	525	
2.000	31.695	0.125	253.6	0.015	5.00	0.0	0.600	M12	-31	
3.000	35.548	0.189	187.9	0.016	5.00	0.0	0.600	M12	-31	
2.001	5.819	0.175	33.3	0.000	0.00	0.0	0.600	o	150	
4.000	33.385	0.179	186.5	0.024	5.00	0.0	0.600	M12	-31	
5.000	27.476	0.118	232.8	0.009	5.00	0.0	0.600	M12	-31	
4.001	3.958	0.150	26.4	0.000	0.00	0.0	0.600	o	150	
2.002	34.033	0.306	111.2	0.020	0.00	0.0	0.600	o	225	
6.000	6.536	0.124	52.7	0.000	5.00	0.0	0.600	o	225	
2.003	27.568	0.253	109.0	0.014	0.00	0.0	0.600	o	225	

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	128.64	5.67	4.004	0.038	0.0	0.0	3.0	1.04	41.3	17.8
1.001	124.96	6.07	3.040	0.092	0.0	0.0	7.0	1.13	79.7	41.9
1.002	117.14	7.02	2.900	0.140	0.0	0.0	9.9	1.00	70.7	59.5
1.003	111.59	7.80	2.441	0.205	0.0	0.0	13.9	1.17	252.7	83.4
1.004	110.33	7.99	2.292	0.253	0.0	0.0	16.9	1.06	229.2	101.5
2.000	127.55	5.79	4.604	0.015	0.0	0.0	1.2	0.67	13.5	6.9
3.000	127.82	5.76	4.656	0.016	0.0	0.0	1.2	0.78	15.7	7.4
2.001	127.04	5.84	4.000	0.031	0.0	0.0	2.4	1.75	31.0	14.2
4.000	128.28	5.71	4.265	0.024	0.0	0.0	1.9	0.79	15.7	11.3
5.000	128.81	5.65	4.270	0.009	0.0	0.0	0.7	0.70	14.0	4.0
4.001	127.96	5.74	3.693	0.033	0.0	0.0	2.5	1.97	34.8	15.3
2.002	122.98	6.30	3.468	0.083	0.0	0.0	6.2	1.24	49.3	37.3
6.000	134.76	5.06	3.456	0.000	0.0	0.0	0.0	1.81	71.8	0.0
2.003	119.94	6.67	3.162	0.097	0.0	0.0	7.1	1.25	49.8	42.4

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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)	HYD SECT	DIA (mm)	Auto Design
7.000	16.151	0.081	199.4	0.005	5.00	0.0	0.600	M10	-29	
7.001	18.534	0.317	58.5	0.007	0.00	0.0	0.600	o	150	
1.005	17.256	0.043	401.3	0.023	0.00	0.0	0.600	o	525	
8.000	23.567	0.122	193.2	0.000	5.00	0.0	0.600	o	225	
9.000	34.453	0.196	175.5	0.024	5.00	0.0	0.600	M12	-31	
9.001	2.589	0.030	87.6	0.000	0.00	0.0	0.600	o	150	
10.000	24.003	0.115	208.7	0.000	5.00	0.0	0.600	o	225	
9.002	24.001	0.150	160.0	0.051	0.00	0.0	0.600	o	225	
11.000	22.755	0.135	168.6	0.014	5.00	0.0	0.600	M12	-31	
12.000	6.557	0.143	45.9	0.008	5.00	0.0	0.600	M10	-29	
12.001	4.123	0.024	173.4	0.000	0.00	0.0	0.600	M10	-29	
12.002	8.498	0.028	303.5	0.000	0.00	0.0	0.600	M10	-29	
11.001	2.469	0.056	44.1	0.000	0.00	0.0	0.600	o	150	
9.003	25.928	0.106	244.9	0.017	0.00	0.0	0.600	o	300	
13.000	8.844	0.044	200.0	0.014	5.00	0.0	0.600	M10	-29	
13.001	1.696	0.046	36.9	0.000	0.00	0.0	0.600	o	150	
9.004	25.642	0.105	245.2	0.000	0.00	0.0	0.600	o	300	
14.000	19.009	0.095	200.1	0.110	5.00	0.0	0.600	o	300	
14.001	65.527	0.202	324.4	0.116	0.00	0.0	0.600	o	375	
14.002	47.390	0.118	401.6	0.072	0.00	0.0	0.600	o	450	
14.003	15.075	0.038	396.7	0.030	0.00	0.0	0.600	o	450	
15.000	18.398	0.184	100.1	0.029	5.00	0.0	0.600	M12	-31	
16.000	18.476	0.092	200.8	0.021	5.00	0.0	0.600	M12	-31	

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)
7.000	131.35	5.39	4.355	0.005	0.0	0.0	0.4	0.69	6.9	2.6
7.001	129.06	5.63	3.706	0.013	0.0	0.0	1.0	1.32	23.3	6.0
1.005	108.65	8.25	2.265	0.386	0.0	0.0	25.4	1.11	240.7	152.7
8.000	131.08	5.42	3.700	0.000	0.0	0.0	0.0	0.94	37.3	0.0
9.000	128.27	5.71	4.443	0.024	0.0	0.0	1.9	0.81	16.2	11.2
9.001	127.90	5.75	3.926	0.024	0.0	0.0	1.9	1.07	19.0	11.2
10.000	130.83	5.44	3.200	0.000	0.0	0.0	0.0	0.90	35.8	0.0
9.002	124.38	6.14	3.085	0.075	0.0	0.0	5.6	1.03	41.0	33.8
11.000	130.69	5.46	4.494	0.014	0.0	0.0	1.1	0.83	16.6	6.5
12.000	134.60	5.08	4.640	0.008	0.0	0.0	0.7	1.45	14.5	4.1
12.001	133.62	5.17	4.497	0.008	0.0	0.0	0.7	0.74	7.4	4.1
12.002	131.03	5.42	4.473	0.008	0.0	0.0	0.7	0.55	5.5	4.1
11.001	130.42	5.49	3.936	0.022	0.0	0.0	1.7	1.52	26.9	10.5
9.003	120.73	6.57	2.860	0.113	0.0	0.0	8.3	1.00	70.7	49.7
13.000	133.14	5.21	4.669	0.014	0.0	0.0	1.1	0.69	6.9	6.7
13.001	132.97	5.23	3.995	0.014	0.0	0.0	1.1	1.66	29.4	6.7
9.004	117.35	7.00	2.754	0.127	0.0	0.0	9.0	1.00	70.7	54.3
14.000	132.42	5.29	3.100	0.110	0.0	0.0	8.8	1.11	78.3	52.9
14.001	122.31	6.38	2.930	0.226	0.0	0.0	16.7	1.00	110.5	100.4
14.002	116.11	7.16	2.653	0.298	0.0	0.0	21.0	1.01	160.4	126.0
14.003	114.30	7.41	2.535	0.328	0.0	0.0	22.8	1.01	161.4	136.6
15.000	132.43	5.28	4.279	0.029	0.0	0.0	2.3	1.08	21.6	14.0
16.000	131.20	5.41	4.309	0.021	0.0	0.0	1.7	0.76	15.1	9.9

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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)	HYD SECT	DIA (mm)	Auto Design
15.001	3.992	0.043	92.8	0.000	0.00	0.0	0.600	o	150	
17.000	17.727	0.049	365.2	0.000	5.00	0.0	0.600	o	450	
15.002	37.702	0.103	366.0	0.000	0.00	0.0	0.600	o	450	
18.000	17.420	0.178	97.9	0.020	5.00	0.0	0.600	M12	-31	
19.000	18.100	0.376	48.1	0.042	5.00	0.0	0.600	M12	-31	
18.001	4.195	0.046	91.2	0.000	0.00	0.0	0.600	o	225	
15.003	43.398	0.281	154.4	0.000	0.00	0.0	0.600	o	450	
14.004	14.805	0.033	448.6	0.009	0.00	0.0	0.600	o	525	
20.000	17.269	0.086	200.0	0.044	5.00	0.0	0.600	M51	-34	
21.000	14.322	0.072	198.9	0.000	5.00	0.0	0.600	M51	-34	
20.001	2.084	0.026	79.5	0.000	0.00	0.0	0.600	o	225	
22.000	24.000	0.185	130.1	0.000	5.00	0.0	0.600	o	225	
20.002	24.000	0.066	363.6	0.074	0.00	0.0	0.600	o	300	
20.003	24.001	0.066	363.6	0.000	0.00	0.0	0.600	o	300	
23.000	12.419	0.117	105.8	0.024	5.00	0.0	0.600	M12	-31	
24.000	31.352	0.101	309.0	0.018	5.00	0.0	0.600	M12	-31	
23.001	1.950	0.093	21.0	0.000	0.00	0.0	0.600	o	225	
20.004	13.580	0.210	64.7	0.000	0.00	0.0	0.600	o	300	
25.000	8.609	0.043	200.0	0.050	5.00	0.0	0.600	M51	-34	
25.001	1.416	0.007	200.0	0.000	0.00	0.0	0.600	M51	-34	
25.002	12.712	0.064	200.0	0.000	0.00	0.0	0.600	M21	-37	
25.003	1.841	0.009	200.0	0.000	0.00	0.0	0.600	M21	-37	

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)
15.001	130.57	5.47	3.746	0.050	0.0	0.0	3.9	1.04	18.4«	23.7
17.000	132.48	5.28	2.930	0.000	0.0	0.0	0.0	1.06	168.3	0.0
15.002	125.01	6.07	2.881	0.050	0.0	0.0	3.9	1.06	168.1	23.7
18.000	132.62	5.27	4.302	0.020	0.0	0.0	1.6	1.09	21.8	9.9
19.000	133.37	5.19	4.352	0.042	0.0	0.0	3.4	1.56	31.2	20.4
18.001	132.10	5.32	3.740	0.062	0.0	0.0	5.0	1.37	54.5	30.0
15.003	121.22	6.51	2.778	0.112	0.0	0.0	8.3	1.63	259.8	49.5
14.004	112.65	7.64	2.422	0.450	0.0	0.0	30.7	1.05	227.5	184.4
20.000	132.20	5.31	4.881	0.044	0.0	0.0	3.5	0.94	28.1	21.0
21.000	132.74	5.25	4.964	0.000	0.0	0.0	0.0	0.94	28.2	0.0
20.001	131.96	5.33	4.386	0.044	0.0	0.0	3.5	1.47	58.4	21.0
22.000	131.77	5.35	3.950	0.000	0.0	0.0	0.0	1.14	45.5	0.0
20.002	127.06	5.84	3.690	0.118	0.0	0.0	9.1	0.82	57.9	54.7
20.003	122.74	6.33	3.624	0.118	0.0	0.0	9.1	0.82	57.9	54.7
23.000	133.32	5.20	4.979	0.024	0.0	0.0	2.0	1.05	21.0	11.8
24.000	126.87	5.86	4.971	0.018	0.0	0.0	1.4	0.61	12.2	8.3
23.001	126.76	5.87	4.412	0.042	0.0	0.0	3.3	2.87	114.1	19.6
20.004	121.77	6.44	3.558	0.161	0.0	0.0	11.9	1.96	138.4	71.2
25.000	133.79	5.15	5.328	0.050	0.0	0.0	4.1	0.94	28.1	24.5
25.001	133.52	5.18	5.285	0.050	0.0	0.0	4.1	0.94	28.1	24.5
25.002	131.58	5.37	5.233	0.050	0.0	0.0	4.1	1.11	53.3	24.5
25.003	131.30	5.40	5.169	0.050	0.0	0.0	4.1	1.11	53.3	24.5

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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)	HYD SECT	DIA (mm)	Auto Design
25.004	7.640	0.038	200.0	0.000	0.00	0.0	0.600	M21	-37	
25.005	20.719	0.041	505.3	0.000	0.00	0.0	0.600	o	300	
20.005	25.515	0.150	170.1	0.058	0.00	0.0	0.600	o	375	
26.000	39.591	0.198	200.0	0.026	5.00	0.0	0.600	M12	-31	
26.001	4.379	0.080	55.0	0.000	0.00	0.0	0.600	o	150	
27.000	16.892	0.079	213.8	0.000	5.00	0.0	0.600	o	300	
27.001	23.996	0.112	213.8	0.000	0.00	0.0	0.600	o	300	
26.002	23.924	0.155	154.3	0.115	0.00	0.0	0.600	o	300	
28.000	23.076	0.178	129.7	0.016	5.00	0.0	0.600	M12	-31	
29.000	12.515	0.296	42.2	0.000	5.00	0.0	0.600	M10	-29	
28.001	4.189	0.089	47.1	0.013	0.00	0.0	0.600	o	150	
26.003	34.736	0.457	76.0	0.001	0.00	0.0	0.600	o	300	
30.000	1.001	0.061	16.4	0.000	5.00	0.0	0.600	o	100	
30.001	3.518	0.061	57.7	0.000	0.00	0.0	0.600	o	100	
31.000	3.588	0.122	29.4	0.000	5.00	0.0	0.600	o	100	
32.000	1.023	0.061	16.8	0.000	5.00	0.0	0.600	o	100	
32.001	2.260	0.061	37.1	0.000	0.00	0.0	0.600	o	100	
33.000	1.034	0.061	17.0	0.000	5.00	0.0	0.600	o	100	
33.001	2.599	0.061	42.6	0.000	0.00	0.0	0.600	o	100	
34.000	1.705	0.061	28.0	0.000	5.00	0.0	0.600	o	100	
34.001	2.779	0.061	45.6	0.000	0.00	0.0	0.600	o	100	
20.006	19.003	0.150	126.7	0.011	0.00	0.0	0.600	o	450	
35.000	40.035	0.500	80.0	0.056	5.00	0.0	0.600	M52	-35	

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)
25.004	130.17	5.51	5.104	0.050	0.0	0.0	4.1	1.11	53.3	24.5
25.005	125.50	6.01	4.266	0.050	0.0	0.0	4.1	0.69	49.0	24.5
20.005	119.27	6.75	3.273	0.269	0.0	0.0	19.5	1.39	153.1	116.9
26.000	126.77	5.87	4.600	0.026	0.0	0.0	2.0	0.76	15.2	11.8
26.001	126.28	5.92	4.125	0.026	0.0	0.0	2.0	1.36	24.0	11.8
27.000	132.65	5.26	3.410	0.000	0.0	0.0	0.0	1.07	75.7	0.0
27.001	128.96	5.64	3.331	0.000	0.0	0.0	0.0	1.07	75.7	0.0
26.002	123.49	6.24	3.219	0.141	0.0	0.0	10.5	1.26	89.3	63.3
28.000	131.20	5.41	4.682	0.016	0.0	0.0	1.3	0.95	18.9	7.8
29.000	133.94	5.14	4.800	0.000	0.0	0.0	0.0	1.51	15.1	0.0
28.001	130.73	5.45	4.504	0.029	0.0	0.0	2.3	1.47	26.0	13.8
26.003	120.80	6.56	3.064	0.171	0.0	0.0	12.5	1.81	127.6	75.0
30.000	135.31	5.01	3.466	0.000	0.0	0.0	0.0	1.92	15.0	0.0
30.001	134.70	5.07	3.405	0.000	0.0	0.0	0.0	1.02	8.0	0.0
31.000	134.96	5.04	3.483	0.000	0.0	0.0	0.0	1.43	11.2	0.0
32.000	135.31	5.01	3.500	0.000	0.0	0.0	0.0	1.90	14.9	0.0
32.001	134.99	5.04	3.439	0.000	0.0	0.0	0.0	1.27	10.0	0.0
33.000	135.31	5.01	3.518	0.000	0.0	0.0	0.0	1.89	14.8	0.0
33.001	134.92	5.05	3.457	0.000	0.0	0.0	0.0	1.18	9.3	0.0
34.000	135.20	5.02	3.535	0.000	0.0	0.0	0.0	1.47	11.5	0.0
34.001	134.77	5.06	3.474	0.000	0.0	0.0	0.0	1.15	9.0	0.0
20.006	117.90	6.92	2.457	0.451	0.0	0.0	32.2	1.80	287.1	193.4
35.000	130.92	5.43	5.189	0.056	0.0	0.0	4.5	1.54	56.8	26.9

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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)	HYD SECT	DIA (mm)	Auto Design
36.000	5.054	0.005	1000.0	0.015	5.00	0.0	0.600	M52	-35	
36.001	5.662	0.006	1000.0	0.000	0.00	0.0	0.600	M52	-35	
36.002	5.284	0.005	1000.0	0.000	0.00	0.0	0.600	M52	-35	
36.003	4.982	0.005	1000.0	0.000	0.00	0.0	0.600	M52	-35	
36.004	5.067	0.005	1000.0	0.000	0.00	0.0	0.600	M52	-35	
36.005	7.221	0.007	1000.0	0.005	0.00	0.0	0.600	M52	-35	
35.001	1.498	0.057	26.3	0.000	0.00	0.0	0.600	o	225	
37.000	7.795	0.044	177.2	0.000	5.00	0.0	0.600	o	150	
1.006	4.044	0.020	202.2	0.019	0.00	0.0	0.600	o	750	
38.000	4.821	0.129	37.3	0.071	5.00	0.0	0.600	o	375	
39.000	27.901	0.080	348.8	0.118	5.00	0.0	0.600	o	450	
39.001	61.245	0.358	171.1	0.014	0.00	0.0	0.600	o	450	
39.002	25.344	0.104	243.2	0.000	0.00	0.0	0.600	o	450	
38.001	7.364	0.023	323.2	0.000	0.00	0.0	0.600	o	450	
38.002	13.147	0.041	323.2	0.010	0.00	0.0	0.600	o	450	
1.007	3.341	0.020	167.1	0.000	0.00	0.0	0.600	o	750	
1.008	2.733	0.010	273.3	0.000	0.00	0.0	0.600	o	750	
1.009	78.251	0.060	1304.2	0.000	0.00	0.0	0.600	o	750	
40.000	14.035	0.260	54.0	0.000	5.00	0.0	0.600	o	150	
41.000	22.824	0.114	200.2	0.021	5.00	0.0	0.600	M11	-30	
41.001	1.547	0.050	30.9	0.000	0.00	0.0	0.600	o	150	
40.001	10.680	0.170	62.8	0.000	0.00	0.0	0.600	o	150	
42.000	10.264	0.051	200.0	0.003	5.00	0.0	0.600	M10	-29	
43.000	5.594	0.028	200.0	0.007	5.00	0.0	0.600	M10	-29	
42.001	3.787	0.045	84.2	0.000	0.00	0.0	0.600	o	150	

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)
36.000	133.32	5.20	4.555	0.015	0.0	0.0	1.2	0.43	15.8	7.1
36.001	131.07	5.42	4.550	0.015	0.0	0.0	1.2	0.43	15.8	7.1
36.002	129.06	5.63	4.544	0.015	0.0	0.0	1.2	0.43	15.8	7.1
36.003	127.22	5.82	4.539	0.015	0.0	0.0	1.2	0.43	15.8	7.1
36.004	125.42	6.02	4.534	0.015	0.0	0.0	1.2	0.43	15.8	7.1
36.005	122.95	6.30	4.529	0.020	0.0	0.0	1.5	0.43	15.8	8.8
35.001	122.87	6.31	4.205	0.076	0.0	0.0	5.7	2.56	101.9	34.1
37.000	133.58	5.17	3.700	0.000	0.0	0.0	0.0	0.75	13.3	0.0
1.006	108.42	8.28	2.222	1.509	0.0	0.0	99.2	1.96	867.8	595.5
38.000	135.12	5.03	3.745	0.071	0.0	0.0	5.8	2.97	328.5	34.9
39.000	130.97	5.43	3.669	0.118	0.0	0.0	9.4	1.08	172.2	56.3
39.001	124.81	6.09	3.589	0.132	0.0	0.0	10.0	1.55	246.7	59.9
39.002	122.01	6.41	3.231	0.132	0.0	0.0	10.0	1.30	206.6	59.9
38.001	121.11	6.52	3.127	0.203	0.0	0.0	14.9	1.13	179.0	89.4
38.002	119.53	6.72	3.104	0.212	0.0	0.0	15.4	1.13	179.0	92.5
1.007	108.26	8.31	2.202	1.721	0.0	0.0	113.1	2.16	955.3	678.3
1.008	108.08	8.33	2.183	1.721	0.0	0.0	113.1	1.69	745.7	678.3
1.009	98.18	10.04	2.173	1.721	0.0	0.0	113.1	0.77	338.4«	678.3
40.000	133.60	5.17	3.060	0.000	0.0	0.0	0.0	1.37	24.2	0.0
41.000	130.09	5.52	4.843	0.021	0.0	0.0	1.7	0.73	11.0	9.9
41.001	129.95	5.53	3.979	0.021	0.0	0.0	1.7	1.82	32.1	9.9
40.001	128.60	5.67	2.800	0.021	0.0	0.0	1.7	1.27	22.5	9.9
42.000	132.79	5.25	4.885	0.003	0.0	0.0	0.3	0.69	6.9	1.6
43.000	133.97	5.14	4.977	0.007	0.0	0.0	0.6	0.69	6.9	3.4
42.001	132.20	5.31	4.034	0.010	0.0	0.0	0.8	1.10	19.4	4.9

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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)	HYD SECT	DIA (mm)	Auto Design
44.000	9.065	0.045	201.4	0.019	5.00	0.0	0.600	M11	-30	
45.000	7.979	0.080	100.0	0.013	5.00	0.0	0.600	M10	-29	
44.001	4.351	0.141	30.9	0.000	0.00	0.0	0.600	o	150	
40.002	37.154	0.180	206.4	0.000	0.00	0.0	0.600	o	300	
46.000	28.329	0.142	199.5	0.029	5.00	0.0	0.600	M12	-31	
47.000	8.703	0.044	200.0	0.010	5.00	0.0	0.600	M10	-29	
46.001	1.496	0.032	46.8	0.000	0.00	0.0	0.600	o	150	
40.003	36.412	0.152	240.0	0.010	0.00	0.0	0.600	o	300	
48.000	21.089	0.105	200.0	0.010	5.00	0.0	0.600	M12	-31	
49.000	20.112	0.101	200.0	0.010	5.00	0.0	0.600	M10	-29	
48.001	3.239	0.068	47.6	0.000	0.00	0.0	0.600	o	150	
48.002	17.847	0.242	73.6	0.000	0.00	0.0	0.600	o	225	
48.003	13.260	0.332	39.9	0.000	0.00	0.0	0.600	o	225	
50.000	30.168	0.130	231.3	0.028	5.00	0.0	0.600	M13	-32	
51.000	12.826	0.067	190.1	0.006	5.00	0.0	0.600	M10	-29	
50.001	6.619	0.125	53.0	0.000	0.00	0.0	0.600	o	150	
40.004	18.286	0.046	397.5	0.017	0.00	0.0	0.600	o	450	
52.000	29.290	0.146	200.6	0.049	5.00	0.0	0.600	M51	-34	
53.000	20.032	0.100	200.3	0.020	5.00	0.0	0.600	M51	-34	
52.001	1.145	0.082	14.0	0.000	0.00	0.0	0.600	o	225	
52.002	42.384	0.173	245.0	0.020	0.00	0.0	0.600	o	300	

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)
44.000	133.23	5.21	4.968	0.019	0.0	0.0	1.5	0.73	10.9	9.0
45.000	133.96	5.14	5.149	0.013	0.0	0.0	1.1	0.98	9.8	6.5
44.001	132.82	5.25	4.123	0.032	0.0	0.0	2.6	1.82	32.1	15.4
40.002	123.47	6.24	2.480	0.063	0.0	0.0	4.7	1.09	77.1	28.3
46.000	129.10	5.62	5.041	0.029	0.0	0.0	2.3	0.76	15.2	13.9
47.000	133.18	5.21	5.283	0.010	0.0	0.0	0.8	0.69	6.9	4.8
46.001	128.94	5.64	4.099	0.039	0.0	0.0	3.1	1.48	26.1	18.5
40.003	118.54	6.84	2.300	0.113	0.0	0.0	8.1	1.01	71.4	48.7
48.000	130.64	5.46	4.887	0.010	0.0	0.0	0.8	0.76	15.2	4.6
49.000	130.39	5.49	4.683	0.010	0.0	0.0	0.8	0.69	6.9	4.9
48.001	130.03	5.53	3.982	0.020	0.0	0.0	1.6	1.46	25.8	9.5
48.002	128.16	5.72	3.634	0.020	0.0	0.0	1.6	1.53	60.7	9.5
48.003	127.17	5.83	3.392	0.020	0.0	0.0	1.6	2.08	82.6	9.5
50.000	128.37	5.70	4.602	0.028	0.0	0.0	2.2	0.72	18.0	13.2
51.000	132.24	5.30	4.417	0.006	0.0	0.0	0.5	0.70	7.0	2.9
50.001	127.62	5.78	4.027	0.034	0.0	0.0	2.7	1.39	24.5	16.0
40.004	116.25	7.14	2.078	0.185	0.0	0.0	13.0	1.01	161.2	78.2
52.000	130.07	5.52	4.990	0.049	0.0	0.0	3.8	0.94	28.1	23.1
53.000	131.70	5.36	4.980	0.020	0.0	0.0	1.6	0.94	28.1	9.8
52.001	130.02	5.53	4.436	0.069	0.0	0.0	5.5	3.52	140.0	32.7
52.002	123.54	6.23	3.758	0.089	0.0	0.0	6.7	1.00	70.7	40.2

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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)	HYD SECT	DIA (mm)	Auto Design
54.000	23.750	0.119	199.6	0.030	5.00	0.0	0.600	M12	-31	
54.001	1.167	0.030	39.4	0.000	0.00	0.0	0.600	o	150	
52.003	22.053	0.105	210.0	0.027	0.00	0.0	0.600	o	300	
55.000	20.887	0.125	167.2	0.006	5.00	0.0	0.600	M10	-29	
55.001	18.639	0.164	113.7	0.009	0.00	0.0	0.600	M10	-29	
56.000	19.913	0.131	151.8	0.019	5.00	0.0	0.600	M11	-30	
55.002	1.443	0.025	57.7	0.000	0.00	0.0	0.600	o	225	
52.004	4.428	0.020	221.4	0.003	0.00	0.0	0.600	o	375	
40.005	3.315	0.008	400.0	0.024	0.00	0.0	0.600	o	450	
40.006	17.921	0.045	398.2	0.000	0.00	0.0	0.600	o	450	
1.010	9.964	0.027	369.0	0.019	0.00	0.0	0.600	o	450	
1.011	20.391	0.051	400.0	0.006	0.00	0.0	0.600	o	450	

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)
54.000	130.07	5.52	4.967	0.030	0.0	0.0	2.4	0.76	15.2	14.3
54.001	129.95	5.53	4.848	0.030	0.0	0.0	2.4	1.61	28.4	14.3
52.003	120.69	6.57	3.585	0.147	0.0	0.0	10.8	1.08	76.4	64.5
55.000	130.64	5.46	5.295	0.006	0.0	0.0	0.5	0.75	7.5	3.0
55.001	127.39	5.80	5.170	0.015	0.0	0.0	1.2	0.91	9.1	7.1
56.000	131.33	5.39	5.087	0.019	0.0	0.0	1.5	0.84	12.6	8.9
55.002	127.26	5.82	4.534	0.034	0.0	0.0	2.6	1.72	68.6	15.8
52.004	120.19	6.63	3.405	0.184	0.0	0.0	13.4	1.21	134.0	80.4
40.005	115.84	7.20	2.032	0.392	0.0	0.0	27.6	1.01	160.7«	165.5
40.006	113.71	7.49	2.024	0.392	0.0	0.0	27.6	1.01	161.0«	165.5
1.010	97.36	10.19	1.979	2.133	0.0	0.0	126.0	1.05	167.4«	755.9
1.011	95.67	10.53	1.952	2.139	0.0	0.0	126.0	1.01	160.7«	755.9

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW001	4.804	0.800	Open Manhole	1200	1.000	4.004	225				
SW002	4.540	1.500	Open Manhole	1200	1.001	3.040	300	1.000	3.740	225	625
SW003	4.400	1.500	Open Manhole	1500	1.002	2.900	300	1.001	2.900	300	
SW004	4.360	1.919	Open Manhole	1500	1.003	2.441	525	1.002	2.666	300	
SW005	4.358	2.066	Open Manhole	1500	1.004	2.292	525	1.003	2.292	525	
19	4.840	0.236	Junction	0	2.000	4.604	-31				
18	4.886	0.230	Junction	0	3.000	4.656	-31				
Sump 10	4.831	0.831	Open Manhole	600	2.001	4.000	150	2.000	4.479	-31	539
								3.000	4.467	-31	527
20	4.495	0.230	Junction	0	4.000	4.265	-31				
21	4.483	0.213	Junction	0	5.000	4.270	-31				
Sump 11	4.483	0.790	Open Manhole	600	4.001	3.693	150	4.000	4.086	-31	453
								5.000	4.152	-31	519
SW007	4.580	1.112	Open Manhole	1500	2.002	3.468	225	2.001	3.825	150	282
								4.001	3.543	150	
SW008/1	4.866	1.410	Open Manhole	1200	6.000	3.456	225				
SW008	4.593	1.431	Open Manhole	1500	2.003	3.162	225	2.002	3.162	225	
								6.000	3.332	225	170
22	4.485	0.130	Junction	0	7.000	4.355	-29				
Sump 12	4.496	0.790	Open Manhole	600	7.001	3.706	150	7.000	4.274	-29	528
SW009	4.604	2.339	Open Manhole	1500	1.005	2.265	525	1.004	2.265	525	
								2.003	2.909	225	344
								7.001	3.389	150	749
SW025	5.433	1.733	Open Manhole	1200	8.000	3.700	225				
47	4.679	0.236	Junction	0	9.000	4.443	-31				
Sump 21	4.725	0.799	Open Manhole	600	9.001	3.926	150	9.000	4.247	-31	381
SW023/1	4.763	1.563	Open Manhole	1200	10.000	3.200	225				
SW023	4.772	1.687	Open Manhole	1200	9.002	3.085	225	9.001	3.896	150	736
								10.000	3.085	225	
46	4.724	0.230	Junction	0	11.000	4.494	-31				
43	4.770	0.130	Junction		12.000	4.640	-29				
44	4.758	0.261	Junction		12.001	4.497	-29	12.000	4.497	-29	
45	4.730	0.257	Junction	0	12.002	4.473	-29	12.001	4.473	-29	
Sump 20	4.727	0.791	Open Manhole	600	11.001	3.936	150	11.000	4.359	-31	483
								12.002	4.445	-29	469
SW024	4.778	1.918	Open Manhole	1200	9.003	2.860	300	9.002	2.935	225	
								11.001	3.880	150	870
42	4.799	0.130	Junction	0	13.000	4.669	-29				
Sump 19	4.785	0.790	Open Manhole	600	13.001	3.995	150	13.000	4.625	-29	590
SW024/1	4.815	2.061	Open Manhole	1200	9.004	2.754	300	9.003	2.754	300	
								13.001	3.949	150	1045
SW010	4.600	1.500	Open Manhole	1200	14.000	3.100	300				
SW011	4.330	1.400	Open Manhole	1500	14.001	2.930	375	14.000	3.005	300	
SW012	4.360	1.707	Open Manhole	1500	14.002	2.653	450	14.001	2.728	375	
SW013	4.440	1.905	Open Manhole	1500	14.003	2.535	450	14.002	2.535	450	
48	4.509	0.230	Junction	0	15.000	4.279	-31				
49	4.539	0.230	Junction	0	16.000	4.309	-31				
Sump 22	4.536	0.790	Open Manhole	600	15.001	3.746	150	15.000	4.095	-31	409
								16.000	4.217	-31	531
SW014/2	4.580	1.650	Open Manhole	1200	17.000	2.930	450				
SW014/1	4.609	1.728	Open Manhole	1200	15.002	2.881	450	15.001	3.703	150	522
								17.000	2.881	450	
50	4.539	0.237	Junction	0	18.000	4.302	-31				
51	4.557	0.205	Junction	0	19.000	4.352	-31				
Sump 23	4.530	0.790	Open Manhole	600	18.001	3.740	225	18.000	4.124	-31	369
								19.000	3.976	-31	221
SW014	4.612	1.834	Open Manhole	1500	15.003	2.778	450	15.002	2.778	450	
								18.001	3.694	225	691
SW016	4.784	2.362	Open Manhole	1500	14.004	2.422	525	14.003	2.497	450	
								15.003	2.497	450	
38	5.116	0.235	Junction	0	20.000	4.881	-34				
37	5.199	0.235	Junction	0	21.000	4.964	-34				
Sump 16	5.176	0.790	Open Manhole	600	20.001	4.386	225	20.000	4.795	-34	399
								21.000	4.892	-34	496

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW017/2	5.159	1.209	Open Manhole	1200	22.000	3.950	225				
SW017/1	5.218	1.528	Open Manhole	1200	20.002	3.690	300	20.001	4.360	225	595
								22.000	3.765	225	
SW017	5.242	1.618	Open Manhole	1200	20.003	3.624	300	20.002	3.624	300	
35	5.209	0.230	Junction	0	23.000	4.979	-31				
36	5.200	0.229	Junction	0	24.000	4.971	-31				
Sump 15	5.203	0.791	Open Manhole	600	23.001	4.412	225	23.000	4.862	-31	435
								24.000	4.870	-31	443
SW018	5.239	1.681	Open Manhole	1200	20.004	3.558	300	20.003	3.558	300	
								23.001	4.319	225	686
30	5.563	0.235	Junction		25.000	5.328	-34				
31	5.586	0.301	Junction		25.001	5.285	-34	25.000	5.285	-34	
32	5.566	0.333	Junction		25.002	5.233	-37	25.001	5.278	-34	
33	5.591	0.422	Junction		25.003	5.169	-37	25.002	5.169	-37	
34	5.559	0.455	Junction	0	25.004	5.104	-37	25.003	5.160	-37	56
Sump 14	5.564	1.298	Open Manhole	600	25.005	4.266	300	25.004	5.066	-37	760
SW019	5.244	1.971	Open Manhole	1200	20.005	3.273	375	20.004	3.348	300	
								25.005	4.225	300	877
41	4.830	0.230	Junction	0	26.000	4.600	-31				
Sump 18	4.915	0.790	Open Manhole	600	26.001	4.125	150	26.000	4.402	-31	337
SW020/2	4.910	1.500	Open Manhole	1200	27.000	3.410	300				
SW020/1	4.967	1.636	Open Manhole	1200	27.001	3.331	300	27.000	3.331	300	
SW020	4.994	1.775	Open Manhole	1200	26.002	3.219	300	26.001	4.045	150	676
								27.001	3.219	300	
40	4.912	0.230	Junction	0	28.000	4.682	-31				
39	4.930	0.130	Junction	0	29.000	4.800	-29				
Sump 17	4.915	0.411	Open Manhole	600	28.001	4.504	150	28.000	4.504	-31	
								29.000	4.504	-29	
SW021	4.992	1.928	Open Manhole	1200	26.003	3.064	300	26.002	3.064	300	
								28.001	4.415	150	1201
53	5.150	1.684	Junction		30.000	3.466	100				
54	5.141	1.736	Junction	0	30.001	3.405	100	30.000	3.405	100	
55	5.167	1.684	Junction	0	31.000	3.483	100				
56	5.184	1.684	Junction		32.000	3.500	100				
57	5.173	1.734	Junction	0	32.001	3.439	100	32.000	3.439	100	
58	5.202	1.684	Junction		33.000	3.518	100				
59	5.187	1.730	Junction	0	33.001	3.457	100	33.000	3.457	100	
60	5.219	1.684	Junction		34.000	3.535	100				
61	5.190	1.716	Junction	0	34.001	3.474	100	34.000	3.474	100	
SW022	5.142	2.685	Open Manhole	2100	20.006	2.457	450	20.005	3.123	375	591
								26.003	2.607	300	
								30.001	3.344	100	537
								31.000	3.361	100	554
								32.001	3.378	100	571
								33.001	3.396	100	589
								34.001	3.413	100	606
29	5.474	0.285	Junction	0	35.000	5.189	-35				
23	4.840	0.285	Junction		36.000	4.555	-35				
24	4.845	0.295	Junction		36.001	4.550	-35	36.000	4.550	-35	
25	4.863	0.319	Junction		36.002	4.544	-35	36.001	4.544	-35	
26	4.893	0.354	Junction		36.003	4.539	-35	36.002	4.539	-35	
27	4.927	0.393	Junction		36.004	4.534	-35	36.003	4.534	-35	
28	4.971	0.442	Junction	0	36.005	4.529	-35	36.004	4.529	-35	
Sump 13	5.032	0.827	Open Manhole	900	35.001	4.205	225	35.000	4.689	-35	524
								36.005	4.522	-35	357
SW033/2	5.010	1.310	Open Manhole	1200	37.000	3.700	150				
SW026	5.059	2.837	Open Manhole	2100	1.006	2.222	750	1.005	2.222	525	
								8.000	3.578	225	831
								9.004	2.649	300	
								14.004	2.389	525	
								20.006	2.307	450	
								35.001	4.148	225	1401
								37.000	3.656	150	834
SW032	5.434	1.689	Open Manhole	1500	38.000	3.745	375				

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW029	5.471	1.802	Open Manhole	1500	39.000	3.669	450				
SW030	5.450	1.861	Open Manhole	1500	39.001	3.589	450	39.000	3.589	450	
SW031	5.347	2.116	Open Manhole	1500	39.002	3.231	450	39.001	3.231	450	
RW Harvesting	5.378	2.251	Open Manhole	1500	38.001	3.127	450	38.000	3.616	375	414
								39.002	3.127	450	
SW033/1	5.308	2.204	Open Manhole	1500	38.002	3.104	450	38.001	3.104	450	
SW033	5.090	2.888	Open Manhole	1500	1.007	2.202	750	1.006	2.202	750	
								38.002	3.063	450	561
Petrol Interceptor	5.115	2.933	Open Manhole	1500	1.008	2.183	750	1.007	2.182	750	
Att Tank	5.800	3.627	Open Manhole	2100	1.009	2.173	750	1.008	2.173	750	
SW035/1	5.111	2.051	Open Manhole	1200	40.000	3.060	150				
1	5.023	0.180	Junction	0	41.000	4.843	-30				
Sump 1	5.047	1.068	Open Manhole	1200	41.001	3.979	150	41.000	4.729	-30	760
SW035/2	5.097	2.297	Open Manhole	1200	40.001	2.800	150	40.000	2.800	150	
								41.001	3.929	150	1129
2	5.015	0.130	Junction	0	42.000	4.885	-29				
3	5.107	0.130	Junction	0	43.000	4.977	-29				
Sump 2	5.081	1.047	Open Manhole	1200	42.001	4.034	150	42.000	4.834	-29	760
								43.000	4.949	-29	875
4	5.148	0.180	Junction	0	44.000	4.968	-30				
5	5.279	0.130	Junction	0	45.000	5.149	-29				
Sump 3	5.193	1.070	Open Manhole	1200	44.001	4.123	150	44.000	4.923	-30	810
								45.000	5.069	-29	906
SW035/3	5.139	2.659	Open Manhole	1200	40.002	2.480	300	40.001	2.630	150	
								42.001	3.989	150	1359
								44.001	3.982	150	1352
6	5.271	0.230	Junction	0	46.000	5.041	-31				
7	5.413	0.130	Junction	0	47.000	5.283	-29				
Sump 4	5.400	1.301	Open Manhole	1200	46.001	4.099	150	46.000	4.899	-31	860
								47.000	5.239	-29	1100
SW035	5.459	3.159	Open Manhole	1200	40.003	2.300	300	40.002	2.300	300	
								46.001	4.067	150	1617
14	5.117	0.230	Junction	0	48.000	4.887	-31				
15	4.813	0.130	Junction	0	49.000	4.683	-29				
Sump 8	4.998	1.016	Open Manhole	1200	48.001	3.982	150	48.000	4.782	-31	860
								49.000	4.582	-29	560
SW036/1	5.049	1.415	Open Manhole	1200	48.002	3.634	225	48.001	3.914	150	205
SW036/2	4.927	1.535	Open Manhole	1200	48.003	3.392	225	48.002	3.392	225	
16	4.886	0.284	Junction	0	50.000	4.602	-32				
17	4.812	0.395	Junction	0	51.000	4.417	-29				
Sump 9	4.848	0.821	Open Manhole	600	50.001	4.027	150	50.000	4.472	-32	555
								51.000	4.349	-29	282
SW036	4.995	2.917	Open Manhole	1200	40.004	2.078	450	40.003	2.148	300	
								48.003	3.060	225	757
								50.001	3.902	150	1524
11	5.270	0.280	Junction	0	52.000	4.990	-34				
12	5.215	0.235	Junction	0	53.000	4.980	-34				
Sump 6	5.226	0.790	Open Manhole	600	52.001	4.436	225	52.000	4.844	-34	398
								53.000	4.880	-34	434
SW038	5.258	1.500	Open Manhole	1200	52.002	3.758	300	52.001	4.354	225	521
13	5.197	0.230	Junction	0	54.000	4.967	-31				
Sump 7	5.800	0.952	Open Manhole	600	54.001	4.848	150	54.000	4.848	-31	
SW038/1	5.245	1.660	Open Manhole	1200	52.003	3.585	300	52.002	3.585	300	
								54.001	4.818	150	1083
8	5.414	0.119	Junction		55.000	5.295	-29				
9	5.320	0.150	Junction	0	55.001	5.170	-29	55.000	5.170	-29	
10	5.267	0.180	Junction	0	56.000	5.087	-30				
Sump 5	5.324	0.790	Open Manhole	600	55.002	4.534	225	55.001	5.006	-29	357
								56.000	4.956	-30	357
SW039	5.299	1.894	Open Manhole	1200	52.004	3.405	375	52.003	3.480	300	
								55.002	4.509	225	954
SW040	5.215	3.183	Open Manhole	1200	40.005	2.032	450	40.004	2.032	450	
								52.004	3.385	375	1278
Oil Interceptor	5.211	3.187	Open Manhole	1200	40.006	2.024	450	40.005	2.024	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW041	5.426	3.447	Open Manhole	2100	1.010	1.979	450	1.009	2.113	750	434
								40.006	1.979	450	
SW042	4.948	2.996	Open Manhole	1500	1.011	1.952	450	1.010	1.952	450	
SW043	4.600	2.699	Open Manhole	1500		OUTFALL		1.011	1.901	450	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW001	4.804	4.004	0.575	Open Manhole	1200
1.001	o	300	SW002	4.540	3.040	1.200	Open Manhole	1200
1.002	o	300	SW003	4.400	2.900	1.200	Open Manhole	1500
1.003	o	525	SW004	4.360	2.441	1.394	Open Manhole	1500
1.004	o	525	SW005	4.358	2.292	1.541	Open Manhole	1500
2.000	M12	-31	19	4.840	4.604	0.026	Junction	
3.000	M12	-31	18	4.886	4.656	0.020	Junction	
2.001	o	150	Sump 10	4.831	4.000	0.681	Open Manhole	600
4.000	M12	-31	20	4.495	4.265	0.020	Junction	
5.000	M12	-31	21	4.483	4.270	0.003	Junction	
4.001	o	150	Sump 11	4.483	3.693	0.640	Open Manhole	600
2.002	o	225	SW007	4.580	3.468	0.887	Open Manhole	1500
6.000	o	225	SW008/1	4.866	3.456	1.185	Open Manhole	1200
2.003	o	225	SW008	4.593	3.162	1.206	Open Manhole	1500
7.000	M10	-29	22	4.485	4.355	0.020	Junction	
7.001	o	150	Sump 12	4.496	3.706	0.640	Open Manhole	600
1.005	o	525	SW009	4.604	2.265	1.814	Open Manhole	1500
8.000	o	225	SW025	5.433	3.700	1.508	Open Manhole	1200
9.000	M12	-31	47	4.679	4.443	0.026	Junction	
9.001	o	150	Sump 21	4.725	3.926	0.649	Open Manhole	600
10.000	o	225	SW023/1	4.763	3.200	1.338	Open Manhole	1200
9.002	o	225	SW023	4.772	3.085	1.462	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	41.706	158.0	SW002	4.540	3.740	0.575	Open Manhole	1200
1.001	27.068	193.3	SW003	4.400	2.900	1.200	Open Manhole	1500
1.002	57.262	244.7	SW004	4.360	2.666	1.394	Open Manhole	1500
1.003	54.304	364.5	SW005	4.358	2.292	1.541	Open Manhole	1500
1.004	11.940	442.2	SW009	4.604	2.265	1.814	Open Manhole	1500
2.000	31.695	253.6	Sump 10	4.831	4.479	0.142	Open Manhole	600
3.000	35.548	187.9	Sump 10	4.831	4.467	0.155	Open Manhole	600
2.001	5.819	33.3	SW007	4.580	3.825	0.605	Open Manhole	1500
4.000	33.385	186.5	Sump 11	4.483	4.086	0.187	Open Manhole	600
5.000	27.476	232.8	Sump 11	4.483	4.152	0.121	Open Manhole	600
4.001	3.958	26.4	SW007	4.580	3.543	0.887	Open Manhole	1500
2.002	34.033	111.2	SW008	4.593	3.162	1.206	Open Manhole	1500
6.000	6.536	52.7	SW008	4.593	3.332	1.036	Open Manhole	1500
2.003	27.568	109.0	SW009	4.604	2.909	1.470	Open Manhole	1500
7.000	16.151	199.4	Sump 12	4.496	4.274	0.112	Open Manhole	600
7.001	18.534	58.5	SW009	4.604	3.389	1.065	Open Manhole	1500
1.005	17.256	401.3	SW026	5.059	2.222	2.312	Open Manhole	2100
8.000	23.567	193.2	SW026	5.059	3.578	1.256	Open Manhole	2100
9.000	34.453	175.5	Sump 21	4.725	4.247	0.268	Open Manhole	600
9.001	2.589	87.6	SW023	4.772	3.896	0.726	Open Manhole	1200
10.000	24.003	208.7	SW023	4.772	3.085	1.462	Open Manhole	1200
9.002	24.001	160.0	SW024	4.778	2.935	1.618	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	M12	-31	46	4.724	4.494	0.020	Junction	
12.000	M10	-29	43	4.770	4.640	0.020	Junction	
12.001	M10	-29	44	4.758	4.497	0.151	Junction	
12.002	M10	-29	45	4.730	4.473	0.147	Junction	
11.001	o	150	Sump 20	4.727	3.936	0.641	Open Manhole	600
9.003	o	300	SW024	4.778	2.860	1.618	Open Manhole	1200
13.000	M10	-29	42	4.799	4.669	0.020	Junction	
13.001	o	150	Sump 19	4.785	3.995	0.640	Open Manhole	600
9.004	o	300	SW024/1	4.815	2.754	1.761	Open Manhole	1200
14.000	o	300	SW010	4.600	3.100	1.200	Open Manhole	1200
14.001	o	375	SW011	4.330	2.930	1.025	Open Manhole	1500
14.002	o	450	SW012	4.360	2.653	1.257	Open Manhole	1500
14.003	o	450	SW013	4.440	2.535	1.455	Open Manhole	1500
15.000	M12	-31	48	4.509	4.279	0.020	Junction	
16.000	M12	-31	49	4.539	4.309	0.020	Junction	
15.001	o	150	Sump 22	4.536	3.746	0.640	Open Manhole	600
17.000	o	450	SW014/2	4.580	2.930	1.200	Open Manhole	1200
15.002	o	450	SW014/1	4.609	2.881	1.278	Open Manhole	1200
18.000	M12	-31	50	4.539	4.302	0.027	Junction	
19.000	M12	-31	51	4.557	4.352	-0.005	Junction	
18.001	o	225	Sump 23	4.530	3.740	0.565	Open Manhole	600
15.003	o	450	SW014	4.612	2.778	1.384	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	22.755	168.6	Sump 20	4.727	4.359	0.158	Open Manhole	600
12.000	6.557	45.9	44	4.758	4.497	0.151	Junction	
12.001	4.123	173.4	45	4.730	4.473	0.147	Junction	
12.002	8.498	303.5	Sump 20	4.727	4.445	0.172	Open Manhole	600
11.001	2.469	44.1	SW024	4.778	3.880	0.748	Open Manhole	1200
9.003	25.928	244.9	SW024/1	4.815	2.754	1.760	Open Manhole	1200
13.000	8.844	200.0	Sump 19	4.785	4.625	0.051	Open Manhole	600
13.001	1.696	36.9	SW024/1	4.815	3.949	0.716	Open Manhole	1200
9.004	25.642	245.2	SW026	5.059	2.649	2.110	Open Manhole	2100
14.000	19.009	200.1	SW011	4.330	3.005	1.025	Open Manhole	1500
14.001	65.527	324.4	SW012	4.360	2.728	1.257	Open Manhole	1500
14.002	47.390	401.6	SW013	4.440	2.535	1.455	Open Manhole	1500
14.003	15.075	396.7	SW016	4.784	2.497	1.837	Open Manhole	1500
15.000	18.398	100.1	Sump 22	4.536	4.095	0.231	Open Manhole	600
16.000	18.476	200.8	Sump 22	4.536	4.217	0.109	Open Manhole	600
15.001	3.992	92.8	SW014/1	4.609	3.703	0.756	Open Manhole	1200
17.000	17.727	365.2	SW014/1	4.609	2.881	1.278	Open Manhole	1200
15.002	37.702	366.0	SW014	4.612	2.778	1.384	Open Manhole	1500
18.000	17.420	97.9	Sump 23	4.530	4.124	0.196	Open Manhole	600
19.000	18.100	48.1	Sump 23	4.530	3.976	0.344	Open Manhole	600
18.001	4.195	91.2	SW014	4.612	3.694	0.693	Open Manhole	1500
15.003	43.398	154.4	SW016	4.784	2.497	1.837	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
14.004	o	525	SW016	4.784	2.422	1.837	Open Manhole	1500
20.000	M51	-34	38	5.116	4.881	0.020	Junction	
21.000	M51	-34	37	5.199	4.964	0.020	Junction	
20.001	o	225	Sump 16	5.176	4.386	0.565	Open Manhole	600
22.000	o	225	SW017/2	5.159	3.950	0.984	Open Manhole	1200
20.002	o	300	SW017/1	5.218	3.690	1.228	Open Manhole	1200
20.003	o	300	SW017	5.242	3.624	1.318	Open Manhole	1200
23.000	M12	-31	35	5.209	4.979	0.020	Junction	
24.000	M12	-31	36	5.200	4.971	0.019	Junction	
23.001	o	225	Sump 15	5.203	4.412	0.566	Open Manhole	600
20.004	o	300	SW018	5.239	3.558	1.381	Open Manhole	1200
25.000	M51	-34	30	5.563	5.328	0.020	Junction	
25.001	M51	-34	31	5.586	5.285	0.086	Junction	
25.002	M21	-37	32	5.566	5.233	0.073	Junction	
25.003	M21	-37	33	5.591	5.169	0.162	Junction	
25.004	M21	-37	34	5.559	5.104	0.195	Junction	
25.005	o	300	Sump 14	5.564	4.266	0.998	Open Manhole	600
20.005	o	375	SW019	5.244	3.273	1.596	Open Manhole	1200
26.000	M12	-31	41	4.830	4.600	0.020	Junction	
26.001	o	150	Sump 18	4.915	4.125	0.640	Open Manhole	600
27.000	o	300	SW020/2	4.910	3.410	1.200	Open Manhole	1200
27.001	o	300	SW020/1	4.967	3.331	1.336	Open Manhole	1200
26.002	o	300	SW020	4.994	3.219	1.475	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
14.004	14.805	448.6	SW026	5.059	2.389	2.145	Open Manhole	2100
20.000	17.269	200.0	Sump 16	5.176	4.795	0.167	Open Manhole	600
21.000	14.322	198.9	Sump 16	5.176	4.892	0.069	Open Manhole	600
20.001	2.084	79.5	SW017/1	5.218	4.360	0.633	Open Manhole	1200
22.000	24.000	130.1	SW017/1	5.218	3.765	1.227	Open Manhole	1200
20.002	24.000	363.6	SW017	5.242	3.624	1.318	Open Manhole	1200
20.003	24.001	363.6	SW018	5.239	3.558	1.381	Open Manhole	1200
23.000	12.419	105.8	Sump 15	5.203	4.862	0.131	Open Manhole	600
24.000	31.352	309.0	Sump 15	5.203	4.870	0.123	Open Manhole	600
23.001	1.950	21.0	SW018	5.239	4.319	0.695	Open Manhole	1200
20.004	13.580	64.7	SW019	5.244	3.348	1.596	Open Manhole	1200
25.000	8.609	200.0	31	5.586	5.285	0.086	Junction	
25.001	1.416	200.0	32	5.566	5.278	0.073	Junction	
25.002	12.712	200.0	33	5.591	5.169	0.162	Junction	
25.003	1.841	200.0	34	5.559	5.160	0.139	Junction	
25.004	7.640	200.0	Sump 14	5.564	5.066	0.238	Open Manhole	600
25.005	20.719	505.3	SW019	5.244	4.225	0.719	Open Manhole	1200
20.005	25.515	170.1	SW022	5.142	3.123	1.644	Open Manhole	2100
26.000	39.591	200.0	Sump 18	4.915	4.402	0.303	Open Manhole	600
26.001	4.379	55.0	SW020	4.994	4.045	0.798	Open Manhole	1200
27.000	16.892	213.8	SW020/1	4.967	3.331	1.336	Open Manhole	1200
27.001	23.996	213.8	SW020	4.994	3.219	1.475	Open Manhole	1200
26.002	23.924	154.3	SW021	4.992	3.064	1.628	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
28.000	M12	-31	40	4.912	4.682	0.020	Junction	
29.000	M10	-29	39	4.930	4.800	0.020	Junction	
28.001	o	150	Sump 17	4.915	4.504	0.261	Open Manhole	600
26.003	o	300	SW021	4.992	3.064	1.628	Open Manhole	1200
30.000	o	100	53	5.150	3.466	1.584	Junction	
30.001	o	100	54	5.141	3.405	1.636	Junction	
31.000	o	100	55	5.167	3.483	1.584	Junction	
32.000	o	100	56	5.184	3.500	1.584	Junction	
32.001	o	100	57	5.173	3.439	1.634	Junction	
33.000	o	100	58	5.202	3.518	1.584	Junction	
33.001	o	100	59	5.187	3.457	1.630	Junction	
34.000	o	100	60	5.219	3.535	1.584	Junction	
34.001	o	100	61	5.190	3.474	1.616	Junction	
20.006	o	450	SW022	5.142	2.457	2.235	Open Manhole	2100
35.000	M52	-35	29	5.474	5.189	0.020	Junction	
36.000	M52	-35	23	4.840	4.555	0.020	Junction	
36.001	M52	-35	24	4.845	4.550	0.030	Junction	
36.002	M52	-35	25	4.863	4.544	0.054	Junction	
36.003	M52	-35	26	4.893	4.539	0.089	Junction	
36.004	M52	-35	27	4.927	4.534	0.128	Junction	
36.005	M52	-35	28	4.971	4.529	0.177	Junction	
35.001	o	225	Sump 13	5.032	4.205	0.602	Open Manhole	900
37.000	o	150	SW033/2	5.010	3.700	1.160	Open Manhole	1200
1.006	o	750	SW026	5.059	2.222	2.087	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
28.000	23.076	129.7	Sump 17	4.915	4.504	0.201	Open Manhole	600
29.000	12.515	42.2	Sump 17	4.915	4.504	0.301	Open Manhole	600
28.001	4.189	47.1	SW021	4.992	4.415	0.427	Open Manhole	1200
26.003	34.736	76.0	SW022	5.142	2.607	2.235	Open Manhole	2100
30.000	1.001	16.4	54	5.141	3.405	1.636	Junction	
30.001	3.518	57.7	SW022	5.142	3.344	1.698	Open Manhole	2100
31.000	3.588	29.4	SW022	5.142	3.361	1.681	Open Manhole	2100
32.000	1.023	16.8	57	5.173	3.439	1.634	Junction	
32.001	2.260	37.1	SW022	5.142	3.378	1.664	Open Manhole	2100
33.000	1.034	17.0	59	5.187	3.457	1.630	Junction	
33.001	2.599	42.6	SW022	5.142	3.396	1.646	Open Manhole	2100
34.000	1.705	28.0	61	5.190	3.474	1.616	Junction	
34.001	2.779	45.6	SW022	5.142	3.413	1.629	Open Manhole	2100
20.006	19.003	126.7	SW026	5.059	2.307	2.302	Open Manhole	2100
35.000	40.035	80.0	Sump 13	5.032	4.689	0.079	Open Manhole	900
36.000	5.054	1000.0	24	4.845	4.550	0.030	Junction	
36.001	5.662	1000.0	25	4.863	4.544	0.054	Junction	
36.002	5.284	1000.0	26	4.893	4.539	0.089	Junction	
36.003	4.982	1000.0	27	4.927	4.534	0.128	Junction	
36.004	5.067	1000.0	28	4.971	4.529	0.177	Junction	
36.005	7.221	1000.0	Sump 13	5.032	4.522	0.245	Open Manhole	900
35.001	1.498	26.3	SW026	5.059	4.148	0.686	Open Manhole	2100
37.000	7.795	177.2	SW026	5.059	3.656	1.253	Open Manhole	2100
1.006	4.044	202.2	SW033	5.090	2.202	2.138	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
38.000	o	375	SW032	5.434	3.745	1.314	Open Manhole	1500
39.000	o	450	SW029	5.471	3.669	1.352	Open Manhole	1500
39.001	o	450	SW030	5.450	3.589	1.411	Open Manhole	1500
39.002	o	450	SW031	5.347	3.231	1.666	Open Manhole	1500
38.001	o	450	RW Harvesting	5.378	3.127	1.801	Open Manhole	1500
38.002	o	450	SW033/1	5.308	3.104	1.754	Open Manhole	1500
1.007	o	750	SW033	5.090	2.202	2.138	Open Manhole	1500
1.008	o	750	Petrol Interceptor	5.115	2.183	2.182	Open Manhole	1500
1.009	o	750	Att Tank	5.800	2.173	2.877	Open Manhole	2100
40.000	o	150	SW035/1	5.111	3.060	1.901	Open Manhole	1200
41.000	M11	-30	1	5.023	4.843	0.020	Junction	
41.001	o	150	Sump 1	5.047	3.979	0.918	Open Manhole	1200
40.001	o	150	SW035/2	5.097	2.800	2.147	Open Manhole	1200
42.000	M10	-29	2	5.015	4.885	0.020	Junction	
43.000	M10	-29	3	5.107	4.977	0.020	Junction	
42.001	o	150	Sump 2	5.081	4.034	0.897	Open Manhole	1200
44.000	M11	-30	4	5.148	4.968	0.020	Junction	
45.000	M10	-29	5	5.279	5.149	0.020	Junction	
44.001	o	150	Sump 3	5.193	4.123	0.920	Open Manhole	1200
40.002	o	300	SW035/3	5.139	2.480	2.359	Open Manhole	1200
46.000	M12	-31	6	5.271	5.041	0.020	Junction	
47.000	M10	-29	7	5.413	5.283	0.020	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
38.000	4.821	37.3	RW Harvesting	5.378	3.616	1.387	Open Manhole	1500
39.000	27.901	348.8	SW030	5.450	3.589	1.411	Open Manhole	1500
39.001	61.245	171.1	SW031	5.347	3.231	1.666	Open Manhole	1500
39.002	25.344	243.2	RW Harvesting	5.378	3.127	1.801	Open Manhole	1500
38.001	7.364	323.2	SW033/1	5.308	3.104	1.754	Open Manhole	1500
38.002	13.147	323.2	SW033	5.090	3.063	1.576	Open Manhole	1500
1.007	3.341	167.1	Petrol Interceptor	5.115	2.182	2.183	Open Manhole	1500
1.008	2.733	273.3	Att Tank	5.800	2.173	2.877	Open Manhole	2100
1.009	78.251	1304.2	SW041	5.426	2.113	2.563	Open Manhole	2100
40.000	14.035	54.0	SW035/2	5.097	2.800	2.147	Open Manhole	1200
41.000	22.824	200.2	Sump 1	5.047	4.729	0.158	Open Manhole	1200
41.001	1.547	30.9	SW035/2	5.097	3.929	1.018	Open Manhole	1200
40.001	10.680	62.8	SW035/3	5.139	2.630	2.359	Open Manhole	1200
42.000	10.264	200.0	Sump 2	5.081	4.834	0.137	Open Manhole	1200
43.000	5.594	200.0	Sump 2	5.081	4.949	0.022	Open Manhole	1200
42.001	3.787	84.2	SW035/3	5.139	3.989	1.000	Open Manhole	1200
44.000	9.065	201.4	Sump 3	5.193	4.923	0.110	Open Manhole	1200
45.000	7.979	100.0	Sump 3	5.193	5.069	0.013	Open Manhole	1200
44.001	4.351	30.9	SW035/3	5.139	3.982	1.007	Open Manhole	1200
40.002	37.154	206.4	SW035	5.459	2.300	2.859	Open Manhole	1200
46.000	28.329	199.5	Sump 4	5.400	4.899	0.291	Open Manhole	1200
47.000	8.703	200.0	Sump 4	5.400	5.239	0.050	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
46.001	o	150	Sump 4	5.400	4.099	1.151	Open Manhole	1200
40.003	o	300	SW035	5.459	2.300	2.859	Open Manhole	1200
48.000	M12	-31	14	5.117	4.887	0.020	Junction	
49.000	M10	-29	15	4.813	4.683	0.020	Junction	
48.001	o	150	Sump 8	4.998	3.982	0.866	Open Manhole	1200
48.002	o	225	SW036/1	5.049	3.634	1.190	Open Manhole	1200
48.003	o	225	SW036/2	4.927	3.392	1.310	Open Manhole	1200
50.000	M13	-32	16	4.886	4.602	0.024	Junction	
51.000	M10	-29	17	4.812	4.417	0.285	Junction	
50.001	o	150	Sump 9	4.848	4.027	0.671	Open Manhole	600
40.004	o	450	SW036	4.995	2.078	2.467	Open Manhole	1200
52.000	M51	-34	11	5.270	4.990	0.065	Junction	
53.000	M51	-34	12	5.215	4.980	0.020	Junction	
52.001	o	225	Sump 6	5.226	4.436	0.565	Open Manhole	600
52.002	o	300	SW038	5.258	3.758	1.200	Open Manhole	1200
54.000	M12	-31	13	5.197	4.967	0.020	Junction	
54.001	o	150	Sump 7	5.800	4.848	0.802	Open Manhole	600
52.003	o	300	SW038/1	5.245	3.585	1.360	Open Manhole	1200
55.000	M10	-29	8	5.414	5.295	0.009	Junction	
55.001	M10	-29	9	5.320	5.170	0.040	Junction	
56.000	M11	-30	10	5.267	5.087	0.020	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
46.001	1.496	46.8	SW035	5.459	4.067	1.242	Open Manhole	1200
40.003	36.412	240.0	SW036	4.995	2.148	2.547	Open Manhole	1200
48.000	21.089	200.0	Sump 8	4.998	4.782	0.007	Open Manhole	1200
49.000	20.112	200.0	Sump 8	4.998	4.582	0.306	Open Manhole	1200
48.001	3.239	47.6	SW036/1	5.049	3.914	0.985	Open Manhole	1200
48.002	17.847	73.6	SW036/2	4.927	3.392	1.310	Open Manhole	1200
48.003	13.260	39.9	SW036	4.995	3.060	1.710	Open Manhole	1200
50.000	30.168	231.3	Sump 9	4.848	4.472	0.116	Open Manhole	600
51.000	12.826	190.1	Sump 9	4.848	4.349	0.389	Open Manhole	600
50.001	6.619	53.0	SW036	4.995	3.902	0.943	Open Manhole	1200
40.004	18.286	397.5	SW040	5.215	2.032	2.733	Open Manhole	1200
52.000	29.290	200.6	Sump 6	5.226	4.844	0.167	Open Manhole	600
53.000	20.032	200.3	Sump 6	5.226	4.880	0.131	Open Manhole	600
52.001	1.145	14.0	SW038	5.258	4.354	0.679	Open Manhole	1200
52.002	42.384	245.0	SW038/1	5.245	3.585	1.360	Open Manhole	1200
54.000	23.750	199.6	Sump 7	5.800	4.848	0.742	Open Manhole	600
54.001	1.167	39.4	SW038/1	5.245	4.818	0.277	Open Manhole	1200
52.003	22.053	210.0	SW039	5.299	3.480	1.519	Open Manhole	1200
55.000	20.887	167.2	9	5.320	5.170	0.040	Junction	
55.001	18.639	113.7	Sump 5	5.324	5.006	0.208	Open Manhole	600
56.000	19.913	151.8	Sump 5	5.324	4.956	0.209	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
55.002	o	225	Sump 5	5.324	4.534	0.565	Open Manhole	600
52.004	o	375	SW039	5.299	3.405	1.519	Open Manhole	1200
40.005	o	450	SW040	5.215	2.032	2.733	Open Manhole	1200
40.006	o	450	Oil Interceptor	5.211	2.024	2.737	Open Manhole	1200
1.010	o	450	SW041	5.426	1.979	2.997	Open Manhole	2100
1.011	o	450	SW042	4.948	1.952	2.546	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
55.002	1.443	57.7	SW039	5.299	4.509	0.565	Open Manhole	1200
52.004	4.428	221.4	SW040	5.215	3.385	1.455	Open Manhole	1200
40.005	3.315	400.0	Oil Interceptor	5.211	2.024	2.737	Open Manhole	1200
40.006	17.921	398.2	SW041	5.426	1.979	2.997	Open Manhole	2100
1.010	9.964	369.0	SW042	4.948	1.952	2.546	Open Manhole	1500
1.011	20.391	400.0	SW043	4.600	1.901	2.249	Open Manhole	1500

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.038	0.038	0.038
1.001	User	-	100	0.054	0.054	0.054
1.002	User	-	100	0.047	0.047	0.047
1.003	User	-	100	0.066	0.066	0.066
1.004	User	-	100	0.047	0.047	0.047
2.000	User	-	40	0.037	0.015	0.015
3.000	User	-	40	0.040	0.016	0.016
2.001	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.024	0.024	0.024
5.000	User	-	100	0.009	0.009	0.009
4.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.018	0.018	0.018
	User	-	100	0.001	0.001	0.020
6.000	-	-	100	0.000	0.000	0.000
2.003	User	-	100	0.013	0.013	0.013
	User	-	100	0.001	0.001	0.014
7.000	User	-	100	0.005	0.005	0.005
7.001	User	-	100	0.007	0.007	0.007
1.005	User	-	100	0.019	0.019	0.019
	User	-	100	0.005	0.005	0.023
8.000	-	-	100	0.000	0.000	0.000
9.000	User	-	100	0.024	0.024	0.024
9.001	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.000	0.000	0.000
9.002	User	-	100	0.051	0.051	0.051
11.000	User	-	100	0.014	0.014	0.014
12.000	User	-	100	0.008	0.008	0.008
12.001	-	-	100	0.000	0.000	0.000
12.002	-	-	100	0.000	0.000	0.000
11.001	-	-	100	0.000	0.000	0.000
9.003	User	-	100	0.017	0.017	0.017
13.000	User	-	100	0.014	0.014	0.014
13.001	-	-	100	0.000	0.000	0.000
9.004	-	-	100	0.000	0.000	0.000
14.000	User	-	100	0.110	0.110	0.110
14.001	User	-	100	0.116	0.116	0.116
14.002	User	-	100	0.072	0.072	0.072
14.003	User	-	100	0.030	0.030	0.030
15.000	User	-	100	0.029	0.029	0.029
16.000	User	-	100	0.021	0.021	0.021
15.001	-	-	100	0.000	0.000	0.000
17.000	-	-	100	0.000	0.000	0.000
15.002	-	-	100	0.000	0.000	0.000
18.000	User	-	100	0.020	0.020	0.020
19.000	User	-	100	0.042	0.042	0.042
18.001	-	-	100	0.000	0.000	0.000
15.003	-	-	100	0.000	0.000	0.000
14.004	User	-	100	0.009	0.009	0.009
20.000	User	-	100	0.044	0.044	0.044
21.000	-	-	100	0.000	0.000	0.000
20.001	-	-	100	0.000	0.000	0.000
22.000	-	-	100	0.000	0.000	0.000
20.002	User	-	100	0.074	0.074	0.074
20.003	-	-	100	0.000	0.000	0.000
23.000	User	-	100	0.024	0.024	0.024
24.000	User	-	100	0.018	0.018	0.018
23.001	-	-	100	0.000	0.000	0.000
20.004	-	-	100	0.000	0.000	0.000
25.000	User	-	100	0.050	0.050	0.050
25.001	-	-	100	0.000	0.000	0.000
25.002	-	-	100	0.000	0.000	0.000
25.003	-	-	100	0.000	0.000	0.000
25.004	-	-	100	0.000	0.000	0.000
25.005	-	-	100	0.000	0.000	0.000
20.005	User	-	100	0.058	0.058	0.058
26.000	User	-	100	0.026	0.026	0.026
26.001	-	-	100	0.000	0.000	0.000
27.000	-	-	100	0.000	0.000	0.000
27.001	-	-	100	0.000	0.000	0.000
26.002	User	-	100	0.115	0.115	0.115
28.000	User	-	100	0.016	0.016	0.016
29.000	-	-	100	0.000	0.000	0.000
28.001	User	-	100	0.013	0.013	0.013
26.003	User	-	100	0.001	0.001	0.001
30.000	-	-	100	0.000	0.000	0.000
30.001	-	-	100	0.000	0.000	0.000
31.000	-	-	100	0.000	0.000	0.000
32.000	-	-	100	0.000	0.000	0.000
32.001	-	-	100	0.000	0.000	0.000
33.000	-	-	100	0.000	0.000	0.000
33.001	-	-	100	0.000	0.000	0.000
34.000	-	-	100	0.000	0.000	0.000
34.001	-	-	100	0.000	0.000	0.000
20.006	User	-	100	0.011	0.011	0.011
35.000	User	-	100	0.015	0.015	0.015

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.041	0.041	0.056
36.000	User	-	40	0.037	0.015	0.015
36.001	-	-	100	0.000	0.000	0.000
36.002	-	-	100	0.000	0.000	0.000
36.003	-	-	100	0.000	0.000	0.000
36.004	-	-	100	0.000	0.000	0.000
36.005	User	-	100	0.005	0.005	0.005
35.001	-	-	100	0.000	0.000	0.000
37.000	-	-	100	0.000	0.000	0.000
1.006	User	-	100	0.019	0.019	0.019
38.000	-	-	100	0.071	0.071	0.071
39.000	-	-	100	0.118	0.118	0.118
39.001	User	-	100	0.014	0.014	0.014
39.002	-	-	100	0.000	0.000	0.000
38.001	-	-	100	0.000	0.000	0.000
38.002	User	-	100	0.010	0.010	0.010
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
40.000	-	-	100	0.000	0.000	0.000
41.000	User	-	100	0.021	0.021	0.021
41.001	-	-	100	0.000	0.000	0.000
40.001	-	-	100	0.000	0.000	0.000
42.000	User	-	100	0.003	0.003	0.003
43.000	User	-	100	0.007	0.007	0.007
42.001	-	-	100	0.000	0.000	0.000
44.000	User	-	100	0.019	0.019	0.019
45.000	User	-	100	0.013	0.013	0.013
44.001	-	-	100	0.000	0.000	0.000
40.002	-	-	100	0.000	0.000	0.000
46.000	User	-	100	0.029	0.029	0.029
47.000	User	-	100	0.010	0.010	0.010
46.001	-	-	100	0.000	0.000	0.000
40.003	User	-	40	0.026	0.010	0.010
48.000	User	-	40	0.024	0.010	0.010
49.000	User	-	40	0.026	0.010	0.010
48.001	-	-	100	0.000	0.000	0.000
48.002	-	-	100	0.000	0.000	0.000
48.003	-	-	100	0.000	0.000	0.000
50.000	User	-	100	0.028	0.028	0.028
51.000	User	-	100	0.006	0.006	0.006
50.001	-	-	100	0.000	0.000	0.000
40.004	User	-	40	0.044	0.017	0.017
52.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.014	0.014	0.049
53.000	User	-	100	0.020	0.020	0.020
52.001	-	-	100	0.000	0.000	0.000
52.002	User	-	100	0.020	0.020	0.020
54.000	User	-	100	0.030	0.030	0.030
54.001	-	-	100	0.000	0.000	0.000
52.003	User	-	100	0.027	0.027	0.027
55.000	User	-	100	0.006	0.006	0.006
55.001	User	-	100	0.009	0.009	0.009
56.000	User	-	100	0.019	0.019	0.019
55.002	-	-	100	0.000	0.000	0.000
52.004	User	-	100	0.003	0.003	0.003
40.005	User	-	100	0.011	0.011	0.011
	User	-	100	0.013	0.013	0.024
40.006	-	-	100	0.000	0.000	0.000
1.010	User	-	40	0.012	0.005	0.005
	User	-	100	0.015	0.015	0.019
1.011	User	-	100	0.006	0.006	0.006
				Total	Total	Total
				2.286	2.139	2.139

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011	SW043	4.600	1.901	2.200	1500	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000	Cv (Summer)	0.750
Return Period (years)	1	Ratio R	0.435	Cv (Winter)	0.840
Region England and Wales	Profile Type	Summer	Storm Duration (mins)		15

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Online Controls for Storm

Hydro-Brake Optimum® Manhole: SW041, DS/PN: 1.010, Volume (m³): 48.2

Unit Reference	MD-SHE-0143-1210-2000-1210	Diameter (mm)	143
Design Head (m)	2.000	Invert Level (m)	1.979
Design Flow (l/s)	12.1	Minimum Outlet Pipe Diameter (mm)	225
Flush-Flo™	Calculated	Suggested Manhole Diameter (mm)	1500
Objective	Minimise upstream storage		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	12.0	Kick-Flo®	1.207	9.4
Flush-Flo™	0.582	12.0	Mean Flow over Head Range	-	10.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	0.600	12.0	1.600	10.8	2.600	13.6	5.000	18.5	7.500	22.5
0.200	10.0	0.800	11.7	1.800	11.4	3.000	14.5	5.500	19.4	8.000	23.2
0.300	11.1	1.000	11.1	2.000	12.0	3.500	15.6	6.000	20.2	8.500	23.9
0.400	11.7	1.200	9.5	2.200	12.5	4.000	16.6	6.500	21.0	9.000	24.6
0.500	11.9	1.400	10.1	2.400	13.1	4.500	17.6	7.000	21.8	9.500	25.2

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Storage Structures for Storm

Cellular Storage Manhole: Att Tank, DS/PN: 1.009

Invert Level (m) 2.173 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	814.0	0.0	0.800	814.0	0.0	1.501	10.0	0.0
0.400	814.0	0.0	1.500	814.0	0.0			

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.600	Minimum Backdrop Height (m)	0.200
Ratio R	0.437	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	100	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	32.326	0.132	245.0	0.118	5.00	0.0	0.600	o	300	
2.000	17.220	0.016	1076.3	0.012	5.00	0.0	0.600	M22	-38	
2.001	4.173	0.042	100.0	0.000	0.00	0.0	0.600	o	150	
1.001	29.626	0.121	245.0	0.000	0.00	0.0	0.600	o	300	
1.002	45.086	0.184	245.0	0.035	0.00	0.0	0.600	o	300	
3.000	68.393	0.062	1103.1	0.000	5.00	0.0	0.600	M22	-38	
4.000	47.661	0.136	350.4	0.000	5.00	0.0	0.600	M22	-38	
3.001	2.083	0.013	160.2	0.145	0.00	0.0	0.600	o	225	
3.002	11.608	0.226	51.3	0.000	0.00	0.0	0.600	o	300	
1.003	33.566	0.083	404.4	0.040	0.00	0.0	0.600	o	450	
1.004	20.457	0.051	400.0	0.000	0.00	0.0	0.600	o	450	

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	72.37	5.54	2.689	0.118	0.0	0.0	0.0	1.00	70.7	23.1
2.000	72.06	5.59	4.009	0.012	0.0	0.0	0.0	0.49	28.2	2.3
2.001	71.65	5.66	3.599	0.012	0.0	0.0	0.0	1.00	17.8	2.3
1.001	68.90	6.15	2.557	0.130	0.0	0.0	0.0	1.00	70.7	24.2
1.002	65.15	6.91	2.436	0.165	0.0	0.0	0.0	1.00	70.7	29.1
3.000	63.03	7.38	4.214	0.000	0.0	0.0	0.0	0.48	27.8	0.0
4.000	70.15	5.92	4.288	0.000	0.0	0.0	0.0	0.86	49.9	0.0
3.001	62.88	7.41	3.760	0.145	0.0	0.0	0.0	1.03	41.0	24.6
3.002	62.50	7.50	3.037	0.145	0.0	0.0	0.0	2.20	155.5	24.6
1.003	60.27	8.06	2.102	0.350	0.0	0.0	0.0	1.00	159.8	57.1
1.004	59.00	8.39	2.019	0.350	0.0	0.0	0.0	1.01	160.7	57.1

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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)	HYD SECT	DIA (mm)	Auto Design
5.000	8.556	0.077	111.2	0.026	5.00	0.0	0.600	o	225	
5.001	11.082	0.113	98.1	0.021	0.00	0.0	0.600	o	225	
6.000	21.072	0.348	60.5	0.012	5.00	0.0	0.600	M10	-29	
7.000	14.437	0.101	142.9	0.000	5.00	0.0	0.600	M10	-29	
6.001	1.197	0.012	100.0	0.000	0.00	0.0	0.600	o	150	
5.002	6.437	0.038	170.0	0.041	0.00	0.0	0.600	o	225	
5.003	6.684	0.069	97.0	0.017	0.00	0.0	3.801	o	225	
5.004	4.106	0.033	124.4	0.023	0.00	0.0	0.600	o	225	
5.005	23.047	0.576	40.0	0.067	0.00	0.0	0.600	o	225	
5.006	23.081	0.155	149.0	0.053	0.00	0.0	0.600	o	375	
5.007	17.754	0.105	169.1	0.123	0.00	0.0	0.600	o	450	
8.000	38.896	0.087	447.1	0.009	5.00	0.0	0.600	M22	-38	
8.001	4.293	0.025	171.0	0.013	0.00	0.0	0.600	o	225	
5.008	40.194	0.103	390.2	0.000	0.00	0.0	0.600	o	525	
1.005	23.733	0.189	125.6	0.056	0.00	0.0	0.600	o	750	
9.000	57.649	0.186	309.9	0.419	5.00	0.0	0.600	o	375	
9.001	59.763	0.193	309.7	0.072	0.00	0.0	0.600	o	375	
1.006	15.736	0.029	542.6	0.113	0.00	0.0	0.600	o	750	

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)
5.000	74.99	5.12	4.029	0.026	0.0	0.0	0.0	1.24	49.3	5.2
5.001	74.10	5.25	3.952	0.047	0.0	0.0	0.0	1.32	52.5	9.4
6.000	73.95	5.28	5.474	0.012	0.0	0.0	0.0	1.26	12.6	2.4
7.000	73.84	5.30	5.225	0.000	0.0	0.0	0.0	0.81	8.1	0.0
6.001	73.72	5.32	4.621	0.012	0.0	0.0	0.0	1.00	17.8	2.4
5.002	73.06	5.42	3.839	0.100	0.0	0.0	0.0	1.00	39.8	19.8
5.003	72.39	5.53	3.813	0.117	0.0	0.0	0.0	1.00	39.6	23.0
5.004	72.04	5.59	3.744	0.140	0.0	0.0	0.0	1.17	46.6	27.3
5.005	70.97	5.78	3.684	0.207	0.0	0.0	0.0	2.07	82.5	39.8
5.006	69.53	6.04	2.790	0.261	0.0	0.0	0.0	1.48	163.7	49.1
5.007	68.52	6.23	2.560	0.383	0.0	0.0	0.0	1.56	248.2	71.2
8.000	70.55	5.85	4.045	0.009	0.0	0.0	0.0	0.76	44.1	1.8
8.001	70.15	5.93	3.558	0.022	0.0	0.0	0.0	1.00	39.6	4.2
5.008	65.55	6.82	2.380	0.406	0.0	0.0	0.0	1.13	244.1	72.0
1.005	58.43	8.55	1.685	0.811	0.0	0.0	0.0	2.50	1102.8	128.4
9.000	70.07	5.94	3.800	0.419	0.0	0.0	0.0	1.02	113.1	79.5
9.001	65.13	6.91	3.614	0.491	0.0	0.0	0.0	1.02	113.1	86.7
1.006	57.66	8.77	1.496	1.415	0.0	0.0	0.0	1.19	527.6	221.0

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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)	HYD SECT	DIA (mm)	Auto Design
10.000	57.538	0.338	170.2	0.109	5.00	0.0	0.600	o	225	
10.001	59.961	0.251	238.9	0.186	0.00	0.0	0.600	o	300	
10.002	15.412	0.062	248.6	0.168	0.00	0.0	0.600	o	375	
1.007	5.098	0.011	463.5	0.000	0.00	0.0	0.600	o	750	
1.008	73.824	0.148	498.8	0.000	0.00	0.0	0.600	o	750	
1.009	28.002	0.057	491.3	0.000	0.00	0.0	0.600	o	525	
1.010	22.710	0.092	246.8	0.000	0.00	0.0	0.600	o	300	

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)
10.000	69.96	5.96	4.105	0.109	0.0	0.0	0.0	1.00	39.7	20.6
10.001	64.96	6.95	3.692	0.295	0.0	0.0	0.0	1.01	71.6	51.9
10.002	63.94	7.17	3.216	0.463	0.0	0.0	0.0	1.14	126.4	80.1
1.007	57.44	8.84	1.450	1.878	0.0	0.0	0.0	1.29	571.3	292.1
1.008	54.27	9.82	1.439	1.878	0.0	0.0	0.0	1.25	550.5	292.1
1.009	52.91	10.29	1.291	1.878	0.0	0.0	0.0	1.00	217.3«	292.1
1.010	51.85	10.67	1.234	1.878	0.0	0.0	0.0	1.00	70.4«	292.1

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	4.175	1.486	Open Manhole	1200	1.000	2.689	300				
2	4.319	0.310	Junction	0	2.000	4.009	-38				
3	4.303	0.704	Open Manhole	600	2.001	3.599	150	2.000	3.993	-38	554
4	4.198	1.641	Open Manhole	1200	1.001	2.557	300	1.000	2.557	300	
								2.001	3.557	150	850
5	4.204	1.768	Open Manhole	1200	1.002	2.436	300	1.001	2.436	300	
6	4.524	0.310	Junction	0	3.000	4.214	-38				
7	4.598	0.310	Junction	0	4.000	4.288	-38				
38	4.462	0.702	Open Manhole	600	3.001	3.760	225	3.000	4.152	-38	477
								4.000	4.152	-38	477
8	4.499	1.462	Open Manhole	1200	3.002	3.037	300	3.001	3.747	225	635
9	4.244	2.142	Open Manhole	1500	1.003	2.102	450	1.002	2.252	300	
								3.002	2.811	300	559
10	4.244	2.225	Open Manhole	1500	1.004	2.019	450	1.003	2.019	450	
11-1	5.398	1.369	Open Manhole	1200	5.000	4.029	225				
11	5.326	1.374	Open Manhole	1200	5.001	3.952	225	5.000	3.952	225	
39	5.604	0.130	Junction	0	6.000	5.474	-29				
40	5.355	0.130	Junction	0	7.000	5.225	-29				
41	5.300	0.679	Open Manhole	600	6.001	4.621	150	6.000	5.126	-29	465
								7.000	5.124	-29	463
12	5.296	1.457	Open Manhole	1200	5.002	3.839	225	5.001	3.839	225	
								6.001	4.609	150	695
12-1	5.294	1.493	Open Manhole	1200	5.003	3.813	225	5.002	3.801	225	
12-2	5.304	1.560	Open Manhole	1200	5.004	3.744	225	5.003	3.744	225	
13	5.130	1.446	Open Manhole	1200	5.005	3.684	225	5.004	3.711	225	27
14	4.290	1.500	Open Manhole	1500	5.006	2.790	375	5.005	3.108	225	168
15	4.210	1.650	Open Manhole	1500	5.007	2.560	450	5.006	2.635	375	
16	4.355	0.310	Junction	0	8.000	4.045	-38				
17	4.268	0.710	Open Manhole	600	8.001	3.558	225	8.000	3.958	-38	485
18	4.190	1.810	Open Manhole	1500	5.008	2.380	525	5.007	2.455	450	
								8.001	3.533	225	853
19	4.253	2.568	Open Manhole	1800	1.005	1.685	750	1.004	1.968	450	
								5.008	2.277	525	367
20	5.524	1.724	Open Manhole	1500	9.000	3.800	375				
21	5.552	1.938	Open Manhole	1500	9.001	3.614	375	9.000	3.614	375	
22	5.544	4.048	Open Manhole	1800	1.006	1.496	750	1.005	1.496	750	
								9.001	3.421	375	1550
23	5.519	1.414	Open Manhole	1200	10.000	4.105	225				
24	5.545	1.853	Open Manhole	1200	10.001	3.692	300	10.000	3.767	225	
25	5.451	2.235	Open Manhole	1500	10.002	3.216	375	10.001	3.441	300	150
26	5.494	4.044	Open Manhole	1800	1.007	1.450	750	1.006	1.467	750	17
								10.002	3.154	375	1329
27	5.433	3.994	Open Manhole	1800	1.008	1.439	750	1.007	1.439	750	
28	5.487	4.196	Open Manhole	1800	1.009	1.291	525	1.008	1.291	750	
29	5.560	4.326	Open Manhole	1500	1.010	1.234	300	1.009	1.234	525	
EMH-197	4.190	3.048	Open Manhole	0		OUTFALL		1.010	1.142	300	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	1	4.175	2.689	1.186	Open Manhole	1200
2.000	M22	-38	2	4.319	4.009	0.000	Junction	
2.001	o	150	3	4.303	3.599	0.554	Open Manhole	600
1.001	o	300	4	4.198	2.557	1.341	Open Manhole	1200
1.002	o	300	5	4.204	2.436	1.468	Open Manhole	1200
3.000	M22	-38	6	4.524	4.214	0.000	Junction	
4.000	M22	-38	7	4.598	4.288	0.000	Junction	
3.001	o	225	38	4.462	3.760	0.477	Open Manhole	600
3.002	o	300	8	4.499	3.037	1.162	Open Manhole	1200
1.003	o	450	9	4.244	2.102	1.692	Open Manhole	1500
1.004	o	450	10	4.244	2.019	1.775	Open Manhole	1500
5.000	o	225	11-1	5.398	4.029	1.144	Open Manhole	1200
5.001	o	225	11	5.326	3.952	1.149	Open Manhole	1200
6.000	M10	-29	39	5.604	5.474	0.020	Junction	
7.000	M10	-29	40	5.355	5.225	0.020	Junction	
6.001	o	150	41	5.300	4.621	0.529	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	32.326	245.0	4	4.198	2.557	1.341	Open Manhole	1200
2.000	17.220	1076.3	3	4.303	3.993	0.000	Open Manhole	600
2.001	4.173	100.0	4	4.198	3.557	0.491	Open Manhole	1200
1.001	29.626	245.0	5	4.204	2.436	1.468	Open Manhole	1200
1.002	45.086	245.0	9	4.244	2.252	1.692	Open Manhole	1500
3.000	68.393	1103.1	38	4.462	4.152	0.000	Open Manhole	600
4.000	47.661	350.4	38	4.462	4.152	0.000	Open Manhole	600
3.001	2.083	160.2	8	4.499	3.747	0.527	Open Manhole	1200
3.002	11.608	51.3	9	4.244	2.811	1.133	Open Manhole	1500
1.003	33.566	404.4	10	4.244	2.019	1.775	Open Manhole	1500
1.004	20.457	400.0	19	4.253	1.968	1.835	Open Manhole	1800
5.000	8.556	111.2	11	5.326	3.952	1.149	Open Manhole	1200
5.001	11.082	98.1	12	5.296	3.839	1.232	Open Manhole	1200
6.000	21.072	60.5	41	5.300	5.126	0.064	Open Manhole	600
7.000	14.437	142.9	41	5.300	5.124	0.066	Open Manhole	600
6.001	1.197	100.0	12	5.296	4.609	0.537	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.002	o	225	12	5.296	3.839	1.232	Open Manhole	1200
5.003	o	225	12-1	5.294	3.813	1.256	Open Manhole	1200
5.004	o	225	12-2	5.304	3.744	1.335	Open Manhole	1200
5.005	o	225	13	5.130	3.684	1.221	Open Manhole	1200
5.006	o	375	14	4.290	2.790	1.125	Open Manhole	1500
5.007	o	450	15	4.210	2.560	1.200	Open Manhole	1500
8.000	M22	-38	16	4.355	4.045	0.000	Junction	
8.001	o	225	17	4.268	3.558	0.485	Open Manhole	600
5.008	o	525	18	4.190	2.380	1.285	Open Manhole	1500
1.005	o	750	19	4.253	1.685	1.818	Open Manhole	1800
9.000	o	375	20	5.524	3.800	1.349	Open Manhole	1500
9.001	o	375	21	5.552	3.614	1.563	Open Manhole	1500
1.006	o	750	22	5.544	1.496	3.298	Open Manhole	1800
10.000	o	225	23	5.519	4.105	1.189	Open Manhole	1200
10.001	o	300	24	5.545	3.692	1.553	Open Manhole	1200
10.002	o	375	25	5.451	3.216	1.860	Open Manhole	1500
1.007	o	750	26	5.494	1.450	3.294	Open Manhole	1800
1.008	o	750	27	5.433	1.439	3.244	Open Manhole	1800
1.009	o	525	28	5.487	1.291	3.671	Open Manhole	1800
1.010	o	300	29	5.560	1.234	4.026	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.002	6.437	170.0	12-1	5.294	3.801	1.268	Open Manhole	1200
5.003	6.684	97.0	12-2	5.304	3.744	1.335	Open Manhole	1200
5.004	4.106	124.4	13	5.130	3.711	1.194	Open Manhole	1200
5.005	23.047	40.0	14	4.290	3.108	0.957	Open Manhole	1500
5.006	23.081	149.0	15	4.210	2.635	1.200	Open Manhole	1500
5.007	17.754	169.1	18	4.190	2.455	1.285	Open Manhole	1500
8.000	38.896	447.1	17	4.268	3.958	0.000	Open Manhole	600
8.001	4.293	171.0	18	4.190	3.533	0.432	Open Manhole	1500
5.008	40.194	390.2	19	4.253	2.277	1.451	Open Manhole	1800
1.005	23.733	125.6	22	5.544	1.496	3.298	Open Manhole	1800
9.000	57.649	309.9	21	5.552	3.614	1.563	Open Manhole	1500
9.001	59.763	309.7	22	5.544	3.421	1.748	Open Manhole	1800
1.006	15.736	542.6	26	5.494	1.467	3.277	Open Manhole	1800
10.000	57.538	170.2	24	5.545	3.767	1.553	Open Manhole	1200
10.001	59.961	238.9	25	5.451	3.441	1.710	Open Manhole	1500
10.002	15.412	248.6	26	5.494	3.154	1.965	Open Manhole	1800
1.007	5.098	463.5	27	5.433	1.439	3.244	Open Manhole	1800
1.008	73.824	498.8	28	5.487	1.291	3.446	Open Manhole	1800
1.009	28.002	491.3	29	5.560	1.234	3.801	Open Manhole	1500
1.010	22.710	246.8	EMH-197	4.190	1.142	2.748	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	90	0.029	0.026	0.026
	User	-	90	0.060	0.054	0.081
	User	-	90	0.042	0.037	0.118
2.000	User	-	90	0.013	0.012	0.012
2.001	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	90	0.039	0.035	0.035
3.000	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.000	0.000	0.000
3.001	User	-	90	0.161	0.145	0.145
3.002	-	-	100	0.000	0.000	0.000
1.003	User	-	90	0.044	0.040	0.040
1.004	-	-	100	0.000	0.000	0.000
5.000	User	-	90	0.028	0.026	0.026
5.001	User	-	90	0.024	0.021	0.021
6.000	User	-	90	0.013	0.012	0.012
7.000	-	-	100	0.000	0.000	0.000
6.001	-	-	100	0.000	0.000	0.000
5.002	User	-	90	0.045	0.041	0.041
5.003	User	-	90	0.019	0.017	0.017
5.004	User	-	90	0.025	0.023	0.023
5.005	User	-	90	0.048	0.043	0.043
	User	-	90	0.027	0.024	0.067
5.006	User	-	90	0.059	0.053	0.053
5.007	User	-	90	0.045	0.040	0.040
	User	-	90	0.042	0.038	0.078
	User	-	90	0.050	0.045	0.123
8.000	User	-	90	0.011	0.009	0.009
8.001	User	-	90	0.014	0.013	0.013
5.008	-	-	100	0.000	0.000	0.000
1.005	User	-	90	0.052	0.047	0.047
	User	-	90	0.010	0.009	0.056
9.000	User	-	90	0.080	0.072	0.072
	User	-	90	0.385	0.347	0.419
9.001	User	-	90	0.080	0.072	0.072
1.006	User	-	90	0.068	0.062	0.062
	User	-	90	0.057	0.051	0.113
10.000	User	-	90	0.121	0.109	0.109
10.001	User	-	90	0.142	0.128	0.128
	User	-	90	0.065	0.058	0.186
10.002	User	-	90	0.153	0.138	0.138
	User	-	90	0.033	0.030	0.168
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.087	1.878	1.878

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Online Controls for Storm

Hydro-Brake Optimum® Manhole: 28, DS/PN: 1.009, Volume (m³): 42.5

Unit Reference	MD-SHE-0134-1060-2070-1060
Design Head (m)	2.070
Design Flow (l/s)	10.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	134
Invert Level (m)	1.291
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.070	10.6	Kick-Flo®	1.194	8.2
Flush-Flo™	0.582	10.4	Mean Flow over Head Range	-	9.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	0.800	10.2	2.000	10.4	4.000	14.5	7.000	18.9
0.200	8.7	1.000	9.6	2.200	10.9	4.500	15.3	7.500	19.6
0.300	9.6	1.200	8.2	2.400	11.4	5.000	16.1	8.000	20.2
0.400	10.1	1.400	8.8	2.600	11.8	5.500	16.9	8.500	20.8
0.500	10.3	1.600	9.4	3.000	12.6	6.000	17.6	9.000	21.4
0.600	10.4	1.800	9.9	3.500	13.6	6.500	18.3	9.500	21.9

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Storage Structures for Storm

Cellular Storage Manhole: 28, DS/PN: 1.009

Invert Level (m) 1.291 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	675.0	0.0	1.200	675.0	0.0	1.201	0.0	0.0

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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	0.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.600
Region	England and Wales	Ratio R	0.437
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	1	15 Winter	2	+20%					2.820	-0.169	0.000	0.38
2.000	2	15 Winter	2	+20%					4.071	-0.248	0.000	0.13
2.001	3	15 Winter	2	+20%					3.646	-0.103	0.000	0.21
1.001	4	15 Winter	2	+20%					2.698	-0.159	0.000	0.44
1.002	5	15 Winter	2	+20%					2.588	-0.148	0.000	0.49
3.000	6	120 Winter	2	+20%					4.214	-0.310	0.000	0.00
4.000	7	120 Winter	2	+20%					4.288	-0.310	0.000	0.00
3.001	38	15 Winter	2	+20%					3.934	-0.051	0.000	0.94
3.002	8	15 Winter	2	+20%					3.136	-0.201	0.000	0.23
1.003	9	15 Winter	2	+20%					2.383	-0.169	0.000	0.46
1.004	10	15 Winter	2	+20%					2.340	-0.129	0.000	0.48
5.000	11-1	15 Winter	2	+20%					4.087	-0.167	0.000	0.15
5.001	11	15 Winter	2	+20%					4.025	-0.152	0.000	0.22
6.000	39	15 Winter	2	+20%					5.515	-0.069	0.000	0.22
7.000	40	120 Winter	2	+20%					5.225	-0.110	0.000	0.00
6.001	41	15 Winter	2	+20%					4.673	-0.098	0.000	0.25
5.002	12	15 Winter	2	+20%					3.978	-0.086	0.000	0.69
5.003	12-1	15 Winter	2	+20%					3.954	-0.084	0.000	0.71
5.004	12-2	15 Winter	2	+20%					3.917	-0.052	0.000	0.95
5.005	13	15 Winter	2	+20%					3.803	-0.106	0.000	0.54
5.006	14	15 Winter	2	+20%					2.939	-0.226	0.000	0.33
5.007	15	15 Winter	2	+20%					2.767	-0.243	0.000	0.43
8.000	16	15 Winter	2	+20%					4.090	-0.265	0.000	0.05
8.001	17	15 Winter	2	+20%					3.619	-0.164	0.000	0.17
5.008	18	15 Winter	2	+20%					2.590	-0.315	0.000	0.34
1.005	19	15 Summer	2	+20%					2.306	-0.129	0.000	0.20
9.000	20	15 Winter	2	+20%					4.073	-0.102	0.000	0.83
9.001	21	15 Winter	2	+20%					3.900	-0.089	0.000	0.93
1.006	22	15 Summer	2	+20%					2.246	0.000	0.000	0.87
10.000	23	15 Winter	2	+20%					4.236	-0.094	0.000	0.61
10.001	24	15 Winter	2	+20%					3.905	-0.087	0.000	0.82
10.002	25	15 Winter	2	+20%					3.516	-0.075	0.000	0.99
1.007	26	30 Summer	2	+20%					2.200	0.000	0.000	1.16

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1		26.4	OK	
2.000	2		2.7	FLOOD RISK*	
2.001	3		2.7	OK	
1.001	4		28.4	OK	
1.002	5		33.9	OK	
3.000	6		0.0	OK	
4.000	7		0.0	OK	
3.001	38		28.1	OK	
3.002	8		28.0	OK	
1.003	9		64.4	OK	
1.004	10		62.7	OK	
5.000	11-1		5.9	OK	
5.001	11		9.9	OK	
6.000	39		2.7	FLOOD RISK*	
7.000	40		0.0	OK	
6.001	41		2.7	OK	
5.002	12		20.7	OK	
5.003	12-1		24.1	OK	
5.004	12-2		28.3	OK	
5.005	13		41.1	OK	
5.006	14		51.1	OK	
5.007	15		74.0	OK	
8.000	16		2.2	FLOOD RISK*	
8.001	17		4.6	OK	
5.008	18		78.8	OK	
1.005	19		125.8	OK	
9.000	20		92.3	OK	
9.001	21		102.7	OK	
1.006	22		232.0	OK	
10.000	23		23.9	OK	
10.001	24		57.7	OK	
10.002	25		88.4	OK	
1.007	26		278.3	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.008	27	15 Winter	2	+20%					1.885	-0.304	0.000	0.63
1.009	28	240 Winter	2	+20%					1.804	-0.012	0.000	0.06
1.010	29	240 Winter	2	+20%					1.312	-0.222	0.000	0.15

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	27		331.2	OK	
1.009	28		10.3	OK	
1.010	29		10.3	OK	

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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	0.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 20.600	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.437	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 Winter	30	+20%					2.885	-0.104	0.000
2.000	2	15 Winter	30	+20%					4.102	-0.217	0.000
2.001	3	15 Winter	30	+20%					3.665	-0.084	0.000
1.001	4	15 Winter	30	+20%					2.831	-0.026	0.000
1.002	5	15 Winter	30	+20%	30/15 Winter				2.765	0.029	0.000
3.000	6	120 Winter	30	+20%					4.214	-0.310	0.000
4.000	7	120 Winter	30	+20%					4.288	-0.310	0.000
3.001	38	15 Summer	30	+20%	30/15 Summer				4.187	0.202	0.000
3.002	8	15 Summer	30	+20%					3.198	-0.139	0.000
1.003	9	15 Winter	30	+20%	30/15 Summer				2.654	0.102	0.000
1.004	10	15 Winter	30	+20%	30/15 Summer				2.596	0.127	0.000
5.000	11-1	15 Winter	30	+20%	30/15 Summer				4.451	0.197	0.000
5.001	11	15 Winter	30	+20%	30/15 Summer				4.438	0.261	0.000
6.000	39	15 Winter	30	+20%					5.535	-0.049	0.000
7.000	40	120 Winter	30	+20%					5.225	-0.110	0.000
6.001	41	15 Winter	30	+20%					4.695	-0.076	0.000
5.002	12	15 Winter	30	+20%	30/15 Summer				4.400	0.336	0.000
5.003	12-1	15 Winter	30	+20%	30/15 Summer				4.323	0.285	0.000
5.004	12-2	15 Winter	30	+20%	30/15 Summer				4.199	0.230	0.000
5.005	13	15 Winter	30	+20%	30/15 Summer				4.049	0.140	0.000
5.006	14	15 Winter	30	+20%					3.023	-0.142	0.000
5.007	15	15 Winter	30	+20%					2.904	-0.106	0.000
8.000	16	15 Winter	30	+20%					4.108	-0.247	0.000
8.001	17	15 Winter	30	+20%					3.651	-0.132	0.000
5.008	18	15 Winter	30	+20%					2.711	-0.194	0.000
1.005	19	15 Winter	30	+20%	30/15 Summer				2.552	0.117	0.000
9.000	20	15 Winter	30	+20%	30/15 Summer				4.859	0.684	0.000
9.001	21	15 Winter	30	+20%	30/15 Summer				4.400	0.411	0.000
1.006	22	15 Winter	30	+20%	30/15 Summer				2.509	0.263	0.000
10.000	23	15 Winter	30	+20%	30/15 Summer				4.959	0.629	0.000
10.001	24	15 Winter	30	+20%	30/15 Summer				4.528	0.536	0.000
10.002	25	15 Winter	30	+20%	30/15 Summer				3.762	0.171	0.000
1.007	26	15 Winter	30	+20%	30/15 Summer				2.444	0.244	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.73		50.3	OK	
2.000	2	0.25		5.1	FLOOD RISK*	
2.001	3	0.40		5.1	OK	
1.001	4	0.81		51.8	OK	
1.002	5	0.82		56.6	SURCHARGED	
3.000	6	0.00		0.0	OK	
4.000	7	0.00		0.0	OK	
3.001	38	2.22		66.2	FLOOD RISK	
3.002	8	0.55		65.9	OK	
1.003	9	0.87		120.8	SURCHARGED	
1.004	10	0.90		117.7	SURCHARGED	
5.000	11-1	0.29		11.4	SURCHARGED	
5.001	11	0.45		20.2	SURCHARGED	
6.000	39	0.41		5.2	FLOOD RISK*	
7.000	40	0.00		0.0	OK	
6.001	41	0.48		5.2	OK	
5.002	12	1.33		39.8	SURCHARGED	
5.003	12-1	1.40		47.4	SURCHARGED	
5.004	12-2	1.89		56.5	SURCHARGED	
5.005	13	1.10		83.3	SURCHARGED	
5.006	14	0.68		105.2	OK	
5.007	15	0.92		157.9	OK	
8.000	16	0.09		4.1	FLOOD RISK*	
8.001	17	0.35		9.8	OK	
5.008	18	0.70		164.3	OK	
1.005	19	0.45		287.0	SURCHARGED	
9.000	20	1.52		168.6	SURCHARGED	
9.001	21	1.77		196.7	SURCHARGED	
1.006	22	1.91		507.4	SURCHARGED	
10.000	23	1.14		44.8	SURCHARGED	
10.001	24	1.62		114.3	SURCHARGED	
10.002	25	1.98		177.7	SURCHARGED	
1.007	26	2.81		672.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.008	27	480 Winter	30	+20%	30/15 Summer				2.343	0.154	0.000	0.15
1.009	28	480 Winter	30	+20%	30/15 Winter				2.342	0.526	0.000	0.06
1.010	29	960 Winter	30	+20%					1.312	-0.222	0.000	0.15

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	27		79.4	SURCHARGED	
1.009	28		10.3	SURCHARGED	
1.010	29		10.3	OK	

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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	0.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.600
Region	England and Wales	Ratio R	0.437
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	480 Winter	100	+20%	100/15 Summer	100/240 Winter			4.183	1.194
2.000	2	360 Winter	100	+20%					4.194	-0.125
2.001	3	480 Winter	100	+20%	100/180 Winter				4.194	0.445
1.001	4	600 Winter	100	+20%	100/15 Summer	100/240 Winter			4.199	1.342
1.002	5	480 Winter	100	+20%	100/15 Summer	100/240 Winter			4.205	1.469
3.000	6	15 Winter	100	+20%					4.290	-0.234
4.000	7	15 Winter	100	+20%					4.288	-0.310
3.001	38	15 Winter	100	+20%	100/15 Summer				4.292	0.307
3.002	8	480 Winter	100	+20%	100/180 Winter				4.237	0.900
1.003	9	600 Winter	100	+20%	100/15 Summer				4.240	1.688
1.004	10	600 Winter	100	+20%	100/15 Summer	100/240 Winter			4.245	1.776
5.000	11-1	15 Winter	100	+20%	100/15 Summer				4.965	0.711
5.001	11	15 Winter	100	+20%	100/15 Summer				4.950	0.773
6.000	39	15 Winter	100	+20%					5.546	-0.038
7.000	40	120 Winter	100	+20%					5.225	-0.110
6.001	41	15 Winter	100	+20%	100/15 Summer				4.888	0.117
5.002	12	15 Winter	100	+20%	100/15 Summer				4.884	0.820
5.003	12-1	15 Winter	100	+20%	100/15 Summer				4.763	0.725
5.004	12-2	15 Winter	100	+20%	100/15 Summer				4.570	0.601
5.005	13	15 Winter	100	+20%	100/15 Summer				4.347	0.438
5.006	14	480 Winter	100	+20%	100/15 Winter				4.223	1.058
5.007	15	480 Winter	100	+20%	100/15 Summer	100/240 Winter			4.223	1.213
8.000	16	480 Winter	100	+20%					4.223	-0.132
8.001	17	480 Winter	100	+20%	100/180 Winter				4.223	0.440
5.008	18	480 Winter	100	+20%	100/15 Winter	100/240 Winter			4.223	1.318
1.005	19	240 Winter	100	+20%	100/15 Summer	100/240 Winter			4.255	1.820
9.000	20	15 Winter	100	+20%	100/15 Summer	100/15 Winter			5.524	1.349
9.001	21	15 Winter	100	+20%	100/15 Summer				4.799	0.810
1.006	22	360 Winter	100	+20%	100/15 Summer				4.294	2.048
10.000	23	15 Winter	100	+20%	100/15 Summer	100/15 Summer			5.520	1.190
10.001	24	15 Winter	100	+20%	100/15 Summer				5.135	1.143
10.002	25	240 Winter	100	+20%	100/15 Summer				4.314	0.723
1.007	26	480 Winter	100	+20%	100/15 Summer				4.315	2.115

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	7.756	0.21		14.7	FLOOD	6
2.000	2	0.000	0.09		1.8	FLOOD RISK*	
2.001	3	0.000	0.56		7.2	FLOOD RISK	
1.001	4	0.074	0.22		14.2	FLOOD	5
1.002	5	1.134	0.14		9.6	FLOOD	5
3.000	6	0.000	0.01		0.3	FLOOD RISK*	
4.000	7	0.000	0.00		0.0	OK	
3.001	38	0.000	2.69		80.5	FLOOD RISK	
3.002	8	0.000	0.16		19.5	FLOOD RISK	
1.003	9	0.000	0.14		20.1	FLOOD RISK	
1.004	10	0.589	0.13		16.6	FLOOD	5
5.000	11-1	0.000	0.36		14.1	SURCHARGED	
5.001	11	0.000	0.57		25.1	SURCHARGED	
6.000	39	0.000	0.54		6.7	FLOOD RISK*	
7.000	40	0.000	0.00		0.0	OK	
6.001	41	0.000	0.61		6.6	SURCHARGED	
5.002	12	0.000	1.63		48.8	SURCHARGED	
5.003	12-1	0.000	1.70		57.6	SURCHARGED	
5.004	12-2	0.000	2.29		68.6	SURCHARGED	
5.005	13	0.000	1.32		99.7	SURCHARGED	
5.006	14	0.000	0.10		15.1	FLOOD RISK	
5.007	15	12.533	0.13		22.2	FLOOD	5
8.000	16	0.000	0.02		1.1	FLOOD RISK*	
8.001	17	0.000	0.45		12.6	FLOOD RISK	
5.008	18	33.598	0.13		30.9	FLOOD	5
1.005	19	2.890	0.13		79.5	FLOOD	5
9.000	20	0.392	1.95		216.3	FLOOD	1
9.001	21	0.000	2.28		252.2	SURCHARGED	
1.006	22	0.000	0.38		100.6	SURCHARGED	
10.000	23	1.445	1.53		59.9	FLOOD	2
10.001	24	0.000	2.04		144.1	SURCHARGED	
10.002	25	0.000	0.52		46.8	SURCHARGED	
1.007	26	0.000	0.45		107.0	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.008	27	480 Winter	100	+20%	100/15 Summer				4.328	2.139	0.000
1.009	28	480 Winter	100	+20%	100/15 Summer				4.335	2.519	0.000
1.010	29	240 Winter	100	+20%					1.321	-0.213	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	27	0.20		106.7	SURCHARGED	
1.009	28	0.07		12.5	SURCHARGED	
1.010	29	0.18		12.4	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.600	Minimum Backdrop Height (m)	0.000
Ratio R	0.437	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	150	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
40.000	20.859	0.026	802.3	0.032	5.00	0.0	0.600	K40	-22	
41.000	19.172	0.050	383.4	0.017	5.00	0.0	0.600	K30	-21	
40.001	2.724	0.027	100.9	0.032	0.00	0.0	0.600	o	225	
40.002	41.205	0.241	171.0	0.000	0.00	0.0	0.600	o	225	
42.000	21.048	0.040	526.2	0.021	5.00	0.0	0.600	K30	-21	
43.000	19.657	0.027	728.0	0.017	5.00	0.0	0.600	K30	-21	
42.001	2.466	0.024	102.8	0.031	0.00	0.0	0.600	o	225	
40.003	45.714	0.267	171.2	0.000	0.00	0.0	0.600	o	225	
44.000	30.007	0.120	250.0	0.032	5.00	0.0	0.600	K30	-21	
44.001	2.410	0.024	100.4	0.010	0.00	0.0	0.600	o	150	

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)
40.000	70.22	5.91	3.931	0.032	0.0	0.0	0.0	0.38	9.1	6.1
41.000	71.94	5.61	4.005	0.017	0.0	0.0	0.0	0.52	7.3	3.3
40.001	70.02	5.95	3.603	0.081	0.0	0.0	0.0	1.30	51.8	15.4
40.002	66.44	6.64	2.814	0.081	0.0	0.0	0.0	1.00	39.6	15.4
42.000	70.92	5.79	4.002	0.021	0.0	0.0	0.0	0.45	6.2	4.0
43.000	70.46	5.87	3.989	0.017	0.0	0.0	0.0	0.38	5.3	3.3
42.001	70.28	5.90	3.402	0.069	0.0	0.0	0.0	1.29	51.3	13.0
40.003	62.92	7.40	2.573	0.150	0.0	0.0	0.0	1.00	39.6	25.5
44.000	71.03	5.77	3.980	0.032	0.0	0.0	0.0	0.65	9.1	6.1
44.001	70.80	5.81	3.353	0.042	0.0	0.0	0.0	1.00	17.7	8.1

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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)	HYD SECT	DIA (mm)	Auto Design
44.002	22.232	0.222	100.1	0.000	0.00	0.0	0.600	o	150	
45.000	25.386	0.098	259.0	0.030	5.00	0.0	0.600	K30	-21	
46.000	21.118	0.029	728.2	0.023	5.00	0.0	0.600	K30	-21	
45.001	2.551	0.025	102.0	0.015	0.00	0.0	0.600	o	225	
40.004	19.963	0.091	219.4	0.000	0.00	0.0	0.600	o	375	
47.000	33.534	0.350	95.8	0.061	5.00	0.0	0.600	o	150	
47.001	26.420	0.264	100.1	0.000	0.00	0.0	0.600	o	150	
48.000	19.270	0.096	200.7	0.028	5.00	0.0	0.600	M50	-33	
49.000	31.716	0.159	199.5	0.020	5.00	0.0	0.600	M50	-33	
48.001	2.780	0.022	126.4	0.019	0.00	0.0	0.600	o	225	
50.000	18.962	0.177	107.1	0.026	5.00	0.0	0.600	M50	-33	
51.000	32.622	0.283	115.3	0.029	5.00	0.0	0.600	M50	-33	
50.001	4.516	0.033	136.8	0.039	0.00	0.0	0.600	o	225	
47.002	30.458	0.305	99.9	0.199	0.00	0.0	0.600	o	300	
52.000	26.275	0.259	101.4	0.016	5.00	0.0	0.600	M50	-33	

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)
44.002	68.78	6.18	2.895	0.042	0.0	0.0	0.0	1.00	17.7	8.1
45.000	71.64	5.66	3.990	0.030	0.0	0.0	0.0	0.64	8.9	5.9
46.000	70.10	5.93	4.060	0.023	0.0	0.0	0.0	0.38	5.3	4.5
45.001	69.92	5.97	3.471	0.069	0.0	0.0	0.0	1.29	51.5	13.1
40.004	61.77	7.67	2.156	0.261	0.0	0.0	0.0	1.22	134.7	43.7
47.000	72.33	5.54	4.120	0.061	0.0	0.0	0.0	1.03	18.1	11.9
47.001	69.83	5.98	3.770	0.061	0.0	0.0	0.0	1.00	17.7	11.9
48.000	73.45	5.36	4.902	0.028	0.0	0.0	0.0	0.89	19.6	5.5
49.000	72.06	5.59	4.900	0.020	0.0	0.0	0.0	0.90	19.7	3.9
48.001	71.83	5.63	4.364	0.067	0.0	0.0	0.0	1.16	46.2	13.0
50.000	74.08	5.26	5.016	0.026	0.0	0.0	0.0	1.23	27.0	5.2
51.000	72.84	5.46	4.995	0.029	0.0	0.0	0.0	1.18	26.0	5.7
50.001	72.43	5.53	4.461	0.094	0.0	0.0	0.0	1.12	44.4	18.5
47.002	68.11	6.31	3.356	0.421	0.0	0.0	0.0	1.57	111.2	77.7
52.000	73.52	5.35	4.900	0.016	0.0	0.0	0.0	1.26	27.7	3.3

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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)	HYD SECT	DIA (mm)	Auto Design
53.000	21.198	0.203	104.4	0.021	5.00	0.0	0.600	M50	-33	
52.001	2.652	0.020	132.6	0.017	0.00	0.0	0.600	o	225	
54.000	25.239	0.176	143.4	0.039	5.00	0.0	0.600	M50	-33	
55.000	21.276	0.117	181.8	0.030	5.00	0.0	0.600	M50	-33	
54.001	4.700	0.047	100.0	0.033	0.00	0.0	0.600	o	225	
52.002	28.864	0.214	134.9	0.000	0.00	0.0	0.600	o	225	
40.005	13.632	0.025	545.3	0.000	0.00	0.0	0.600	o	600	
56.000	15.830	0.084	188.5	0.026	5.00	0.0	0.600	M50	-33	
57.000	29.495	0.147	200.6	0.031	5.00	0.0	0.600	M50	-33	
56.001	2.177	0.017	128.1	0.026	0.00	0.0	0.600	o	225	
56.002	27.643	0.258	107.1	0.000	0.00	0.0	0.600	o	225	
58.000	14.448	0.072	200.7	0.027	5.00	0.0	0.600	M50	-33	
59.000	26.359	0.144	183.0	0.027	5.00	0.0	0.600	M50	-33	
58.001	2.088	0.016	130.5	0.027	0.00	0.0	0.600	o	225	
58.002	29.791	0.299	99.6	0.000	0.00	0.0	0.600	o	225	

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)
53.000	73.91	5.28	4.995	0.021	0.0	0.0	0.0	1.24	27.3	4.3
52.001	73.28	5.39	4.343	0.055	0.0	0.0	0.0	1.13	45.1	10.9
54.000	73.22	5.40	4.997	0.039	0.0	0.0	0.0	1.06	23.3	7.7
55.000	73.34	5.38	4.964	0.030	0.0	0.0	0.0	0.94	20.6	6.0
54.001	72.85	5.46	4.446	0.102	0.0	0.0	0.0	1.31	52.0	20.1
52.002	70.37	5.89	3.890	0.157	0.0	0.0	0.0	1.12	44.7	29.9
40.005	60.89	7.89	1.840	0.839	0.0	0.0	0.0	1.04	292.9	138.4
56.000	73.90	5.29	5.286	0.026	0.0	0.0	0.0	0.92	20.3	5.2
57.000	72.29	5.55	5.271	0.031	0.0	0.0	0.0	0.89	19.6	6.0
56.001	72.11	5.58	4.737	0.083	0.0	0.0	0.0	1.15	45.9	16.3
56.002	70.03	5.95	4.200	0.083	0.0	0.0	0.0	1.26	50.2	16.3
58.000	74.01	5.27	5.261	0.027	0.0	0.0	0.0	0.89	19.6	5.4
59.000	72.78	5.47	5.275	0.027	0.0	0.0	0.0	0.94	20.6	5.3
58.001	72.60	5.50	4.718	0.081	0.0	0.0	0.0	1.14	45.4	15.9
58.002	70.40	5.88	4.200	0.081	0.0	0.0	0.0	1.31	52.1	15.9

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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)	HYD SECT	DIA (mm)	Auto Design
56.003	13.722	0.171	80.2	0.000	0.00	0.0	0.600	o	300	
40.006	5.869	0.011	533.5	0.000	0.00	0.0	0.600	o	600	
40.007	39.168	0.071	551.7	0.000	0.00	0.0	0.600	o	600	
40.008	17.671	0.031	570.0	0.000	0.00	0.0	0.600	o	600	
40.009	13.124	0.023	570.6	0.000	0.00	0.0	0.600	o	600	
40.010	30.235	0.053	570.5	0.000	0.00	0.0	0.600	o	600	
60.000	29.763	0.150	198.4	0.000	5.00	0.0	0.600	M50	-33	
60.001	4.574	0.030	152.5	0.096	0.00	0.0	0.600	o	225	
61.000	29.639	0.098	302.4	0.017	5.00	0.0	0.600	K40	-22	
61.001	2.083	0.021	99.2	0.013	0.00	0.0	0.600	o	150	
40.011	40.287	0.071	567.4	0.009	0.00	0.0	0.600	o	600	
62.000	39.004	0.073	534.3	0.027	5.00	0.0	0.600	K40	-22	
63.000	47.954	0.100	479.5	0.040	5.00	0.0	0.600	K40	-22	
62.001	2.511	0.025	100.4	0.027	0.00	0.0	0.600	o	225	
40.012	48.070	0.084	572.3	0.000	0.00	0.0	0.600	o	600	
64.000	15.890	0.079	201.1	0.024	5.00	0.0	0.600	M51	-34	
64.001	4.315	0.086	50.2	0.002	0.00	0.0	0.600	o	225	

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)
56.003	69.32	6.08	3.872	0.164	0.0	0.0	0.0	1.76	124.2	30.8
40.006	60.53	7.99	1.815	1.003	0.0	0.0	0.0	1.05	296.1	164.5
40.007	58.19	8.62	1.804	1.003	0.0	0.0	0.0	1.03	291.1	164.5
40.008	57.18	8.91	1.733	1.003	0.0	0.0	0.0	1.01	286.4	164.5
40.009	56.46	9.13	1.702	1.003	0.0	0.0	0.0	1.01	286.2	164.5
40.010	54.87	9.63	1.679	1.003	0.0	0.0	0.0	1.01	286.2	164.5
60.000	72.28	5.55	4.179	0.000	0.0	0.0	0.0	0.90	19.7	0.0
60.001	71.86	5.62	3.616	0.096	0.0	0.0	0.0	1.06	42.0	18.8
61.000	70.92	5.79	4.009	0.017	0.0	0.0	0.0	0.63	15.1	3.3
61.001	70.73	5.82	3.278	0.030	0.0	0.0	0.0	1.01	17.8	5.8
40.011	52.92	10.29	1.626	1.139	0.0	0.0	0.0	1.02	287.0	164.5
62.000	67.70	6.39	4.012	0.027	0.0	0.0	0.0	0.47	11.3	5.0
63.000	66.56	6.61	4.025	0.040	0.0	0.0	0.0	0.50	11.9	7.1
62.001	66.41	6.64	3.480	0.094	0.0	0.0	0.0	1.30	51.9	16.8
40.012	50.77	11.08	1.555	1.233	0.0	0.0	0.0	1.01	285.8	169.5
64.000	73.92	5.28	4.188	0.024	0.0	0.0	0.0	0.94	28.1	4.8
64.001	73.68	5.32	3.949	0.027	0.0	0.0	0.0	1.85	73.6	5.3

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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)	HYD SECT	DIA (mm)	Auto Design
40.013	28.654	0.049	584.8	0.008	0.00	0.0	0.600	o	600	
65.000	27.346	0.051	536.2	0.027	5.00	0.0	0.600	K40	-22	
66.000	26.131	0.049	533.3	0.019	5.00	0.0	0.600	K40	-22	
65.001	2.483	0.025	99.3	0.014	0.00	0.0	0.600	o	225	
40.014	26.060	0.045	579.1	0.000	0.00	0.0	0.600	o	600	
40.015	29.595	0.051	580.3	0.000	0.00	0.0	0.600	o	600	
67.000	28.086	0.074	379.5	0.019	5.00	0.0	0.600	K40	-22	
68.000	26.214	0.058	452.0	0.020	5.00	0.0	0.600	K40	-22	
67.001	2.640	0.026	101.5	0.018	0.00	0.0	0.600	o	225	
40.016	26.074	0.044	592.6	0.000	0.00	0.0	0.600	o	600	
69.000	22.228	0.115	193.3	0.023	5.00	0.0	0.600	M50	-33	
70.000	27.895	0.243	114.8	0.028	5.00	0.0	0.600	M50	-33	
69.001	2.216	0.016	138.5	0.052	0.00	0.0	0.600	o	225	
69.002	46.454	0.422	110.1	0.000	0.00	0.0	0.600	o	225	
71.000	21.968	0.338	65.0	0.329	5.00	0.0	0.600	o	525	
71.001	30.194	0.183	165.0	0.000	0.00	0.0	0.600	o	525	

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)
40.013	49.57	11.56	1.471	1.267	0.0	0.0	0.0	1.00	282.7	170.0
65.000	69.88	5.97	4.017	0.027	0.0	0.0	0.0	0.47	11.2	5.2
66.000	70.14	5.93	4.028	0.019	0.0	0.0	0.0	0.47	11.3	3.5
65.001	69.71	6.00	3.524	0.060	0.0	0.0	0.0	1.31	52.2	11.4
40.014	48.54	11.99	1.422	1.327	0.0	0.0	0.0	1.00	284.1	174.4
40.015	47.42	12.48	1.377	1.327	0.0	0.0	0.0	1.00	283.8	174.4
67.000	70.64	5.84	4.031	0.019	0.0	0.0	0.0	0.56	13.4	3.6
68.000	70.54	5.85	3.951	0.020	0.0	0.0	0.0	0.51	12.3	3.8
67.001	70.35	5.89	3.502	0.057	0.0	0.0	0.0	1.30	51.6	10.9
40.016	46.48	12.92	1.326	1.384	0.0	0.0	0.0	0.99	280.8	174.4
69.000	73.16	5.41	4.885	0.023	0.0	0.0	0.0	0.91	20.0	4.5
70.000	73.25	5.39	4.987	0.028	0.0	0.0	0.0	1.18	26.0	5.7
69.001	72.95	5.44	4.338	0.104	0.0	0.0	0.0	1.11	44.1	20.5
69.002	69.40	6.06	3.900	0.104	0.0	0.0	0.0	1.25	49.5	20.5
71.000	74.88	5.13	3.830	0.329	0.0	0.0	0.0	2.78	602.2	66.7
71.001	73.08	5.42	3.492	0.329	0.0	0.0	0.0	1.74	376.9	66.7

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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)	HYD SECT	DIA (mm)	Auto Design
72.000	14.955	0.075	199.4	0.039	5.00	0.0	0.600	M50	-33	
73.000	43.934	0.220	199.7	0.037	5.00	0.0	0.600	M50	-33	
72.001	2.311	0.017	135.9	0.057	0.00	0.0	0.600	o	225	
71.002	20.826	0.104	200.3	0.000	0.00	0.0	0.600	o	525	
69.003	10.158	0.051	199.2	0.000	0.00	0.0	0.600	o	525	
74.000	15.432	0.077	200.4	0.029	5.00	0.0	0.600	M50	-33	
75.000	24.164	0.121	199.7	0.050	5.00	0.0	0.600	M50	-33	
74.001	7.141	0.053	134.7	0.016	0.00	0.0	0.600	o	225	
74.002	38.598	0.386	100.0	0.000	0.00	0.0	0.600	o	225	
76.000	21.311	0.149	143.0	0.046	5.00	0.0	0.600	M50	-33	
77.000	36.983	0.185	199.9	0.047	5.00	0.0	0.600	M50	-33	
76.001	6.932	0.051	135.9	0.038	0.00	0.0	0.600	o	225	
76.002	15.329	0.153	100.2	0.000	0.00	0.0	0.600	o	300	
74.003	9.582	0.064	149.7	0.000	0.00	0.0	0.600	o	300	
69.004	8.050	0.041	196.3	0.000	0.00	0.0	0.600	o	525	

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)
72.000	73.95	5.28	4.885	0.039	0.0	0.0	0.0	0.90	19.7	7.8
73.000	70.74	5.82	4.883	0.037	0.0	0.0	0.0	0.89	19.7	7.0
72.001	70.55	5.85	4.341	0.132	0.0	0.0	0.0	1.12	44.5	25.3
71.002	69.34	6.07	3.309	0.461	0.0	0.0	0.0	1.58	341.9	86.7
69.003	68.77	6.18	3.178	0.565	0.0	0.0	0.0	1.58	342.8	105.2
74.000	73.89	5.29	5.087	0.029	0.0	0.0	0.0	0.89	19.6	5.7
75.000	72.90	5.45	5.052	0.050	0.0	0.0	0.0	0.89	19.7	9.8
74.001	72.26	5.56	4.592	0.094	0.0	0.0	0.0	1.12	44.7	18.4
74.002	69.47	6.05	4.155	0.094	0.0	0.0	0.0	1.31	52.0	18.4
76.000	73.60	5.34	5.129	0.046	0.0	0.0	0.0	1.06	23.3	9.2
77.000	71.48	5.69	5.088	0.047	0.0	0.0	0.0	0.89	19.7	9.1
76.001	70.89	5.79	4.623	0.132	0.0	0.0	0.0	1.12	44.5	25.3
76.002	69.98	5.96	4.100	0.132	0.0	0.0	0.0	1.57	111.0	25.3
74.003	68.81	6.17	3.694	0.226	0.0	0.0	0.0	1.28	90.7	42.1
69.004	68.33	6.26	3.127	0.791	0.0	0.0	0.0	1.59	345.3	146.3

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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)	HYD SECT	DIA (mm)	Auto Design
69.005	48.474	0.138	351.3	0.000	0.00	0.0	0.600	o	600	
69.006	26.423	0.240	110.1	0.000	0.00	0.0	0.600	o	600	
40.017	23.062	0.040	576.6	0.000	0.00	0.0	0.600	o	675	
78.000	13.898	0.069	201.4	0.057	5.00	0.0	0.600	M51	-34	
78.001	4.640	0.093	49.9	0.000	0.00	0.0	0.600	o	225	
79.000	21.656	0.062	349.3	0.013	5.00	0.0	0.600	K40	-22	
80.000	49.762	0.127	391.8	0.039	5.00	0.0	0.600	K40	-22	
79.001	2.498	0.025	99.9	0.011	0.00	0.0	0.600	o	225	
40.018	49.658	0.085	584.2	0.000	0.00	0.0	0.600	o	675	
40.019	50.626	0.087	581.9	0.000	0.00	0.0	0.600	o	675	
81.000	49.583	0.136	364.6	0.031	5.00	0.0	0.600	K40	-22	
81.001	3.081	0.024	128.4	0.031	0.00	0.0	0.600	o	225	
40.020	43.071	0.085	506.7	0.000	0.00	0.0	0.600	o	675	
40.021	56.754	0.085	667.7	0.043	0.00	0.0	0.600	o	675	
82.000	42.267	0.211	200.3	0.036	5.00	0.0	0.600	M50	-33	
83.000	35.967	0.206	174.6	0.048	5.00	0.0	0.600	M50	-33	
82.001	2.269	0.017	133.5	0.048	0.00	0.0	0.600	o	225	

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)
69.005	65.24	6.89	3.011	0.791	0.0	0.0	0.0	1.29	365.7	146.3
69.006	64.36	7.08	2.675	0.791	0.0	0.0	0.0	2.32	656.1	146.3
40.017	45.75	13.27	1.207	2.175	0.0	0.0	0.0	1.08	388.0	269.4
78.000	74.14	5.25	4.170	0.057	0.0	0.0	0.0	0.93	28.0	11.5
78.001	73.88	5.29	3.676	0.057	0.0	0.0	0.0	1.86	73.8	11.5
79.000	71.89	5.62	3.951	0.013	0.0	0.0	0.0	0.58	14.0	2.6
80.000	67.08	6.51	3.955	0.039	0.0	0.0	0.0	0.55	13.2	7.1
79.001	66.92	6.54	3.495	0.064	0.0	0.0	0.0	1.31	52.0	11.6
40.018	44.24	14.04	1.167	2.296	0.0	0.0	0.0	1.08	385.4	275.1
40.019	42.83	14.82	1.082	2.296	0.0	0.0	0.0	1.08	386.2	275.1
81.000	67.38	6.45	3.955	0.031	0.0	0.0	0.0	0.57	13.7	5.7
81.001	67.15	6.49	3.493	0.062	0.0	0.0	0.0	1.15	45.8	11.2
40.020	41.77	15.44	0.995	2.357	0.0	0.0	0.0	1.16	414.2	275.1
40.021	40.29	16.38	0.910	2.400	0.0	0.0	0.0	1.01	360.3	275.1
82.000	70.91	5.79	4.860	0.036	0.0	0.0	0.0	0.89	19.7	7.0
83.000	71.85	5.63	5.052	0.048	0.0	0.0	0.0	0.96	21.1	9.4
82.001	70.72	5.82	4.331	0.133	0.0	0.0	0.0	1.13	44.9	25.5

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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)	HYD SECT	DIA (mm)	Auto Design
82.002	43.147	0.270	159.8	0.000	0.00	0.0	0.600	o	225	
84.000	31.127	0.156	199.5	0.055	5.00	0.0	0.600	M50	-33	
85.000	13.599	0.068	200.0	0.000	5.00	0.0	0.600	M50	-33	
84.001	2.362	0.023	102.7	0.059	0.00	0.0	0.600	o	225	
84.002	46.795	0.360	130.0	0.000	0.00	0.0	0.600	o	225	
86.000	31.946	0.160	199.7	0.037	5.00	0.0	0.600	M50	-33	
87.000	39.422	0.197	200.1	0.060	5.00	0.0	0.600	M50	-33	
86.001	2.346	0.017	138.0	0.032	0.00	0.0	0.600	o	225	
84.003	40.502	0.345	117.4	0.000	0.00	0.0	0.600	o	300	
82.003	8.009	0.038	210.8	0.000	0.00	0.0	0.600	o	450	
88.000	21.802	0.109	200.0	0.040	5.00	0.0	0.600	M50	-33	
89.000	23.311	0.117	199.2	0.034	5.00	0.0	0.600	M50	-33	
88.001	6.674	0.049	136.2	0.034	0.00	0.0	0.600	o	225	
88.002	40.816	0.251	162.6	0.000	0.00	0.0	0.600	o	225	
90.000	16.035	0.080	200.4	0.031	5.00	0.0	0.600	M50	-33	

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)
82.002	67.02	6.52	3.902	0.133	0.0	0.0	0.0	1.03	41.0	25.5
84.000	72.12	5.58	5.031	0.055	0.0	0.0	0.0	0.90	19.7	10.8
85.000	74.11	5.25	4.899	0.000	0.0	0.0	0.0	0.89	19.7	0.0
84.001	71.94	5.61	4.395	0.114	0.0	0.0	0.0	1.29	51.3	22.2
84.002	68.18	6.29	3.877	0.114	0.0	0.0	0.0	1.15	45.5	22.2
86.000	72.03	5.60	4.898	0.037	0.0	0.0	0.0	0.89	19.7	7.2
87.000	71.22	5.74	4.861	0.060	0.0	0.0	0.0	0.89	19.7	11.7
86.001	71.02	5.77	4.336	0.129	0.0	0.0	0.0	1.11	44.2	24.9
84.003	65.86	6.76	3.442	0.243	0.0	0.0	0.0	1.45	102.5	43.4
82.003	65.41	6.85	2.947	0.376	0.0	0.0	0.0	1.40	222.1	66.7
88.000	73.16	5.41	5.074	0.040	0.0	0.0	0.0	0.89	19.7	7.9
89.000	73.00	5.43	5.086	0.034	0.0	0.0	0.0	0.90	19.7	6.7
88.001	72.40	5.53	4.546	0.108	0.0	0.0	0.0	1.12	44.5	21.1
88.002	68.67	6.20	4.197	0.108	0.0	0.0	0.0	1.02	40.7	21.1
90.000	73.82	5.30	5.088	0.031	0.0	0.0	0.0	0.89	19.6	6.3

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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)	HYD SECT	DIA (mm)	Auto Design
91.000	40.537	0.203	199.7	0.046	5.00	0.0	0.600	M50	-33	
90.001	6.460	0.064	100.9	0.039	0.00	0.0	0.600	o	225	
88.003	37.794	0.251	150.6	0.000	0.00	0.0	0.600	o	300	
92.000	38.891	0.194	200.5	0.047	5.00	0.0	0.600	M22	-38	
93.000	37.077	0.185	200.4	0.060	5.00	0.0	0.600	M20	-36	
92.001	6.533	0.131	49.9	0.058	0.00	0.0	0.600	o	225	
92.002	43.253	0.254	170.3	0.000	0.00	0.0	0.600	o	300	
88.004	8.212	0.028	293.3	0.000	0.00	0.0	0.600	o	450	
82.004	8.979	0.067	134.0	0.000	0.00	0.0	0.600	o	450	
82.005	63.389	0.219	289.4	0.000	0.00	0.0	0.600	o	450	
82.006	8.313	0.029	286.7	0.000	0.00	0.0	0.600	o	450	
82.007	15.423	0.077	200.0	0.000	0.00	0.0	0.600	o	450	
40.022	16.971	0.022	771.4	0.037	0.00	0.0	0.600	o	750	
94.000	35.553	0.178	199.7	0.063	5.00	0.0	0.600	M22	-38	
95.000	40.798	0.333	122.5	0.063	5.00	0.0	0.600	M22	-38	
94.001	3.191	0.080	39.9	0.044	0.00	0.0	0.600	o	300	
94.002	38.902	0.251	155.0	0.000	0.00	0.0	0.600	o	300	

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)
91.000	71.10	5.76	5.038	0.046	0.0	0.0	0.0	0.89	19.7	8.8
90.001	70.64	5.84	4.640	0.116	0.0	0.0	0.0	1.30	51.7	22.1
88.003	66.18	6.69	3.871	0.223	0.0	0.0	0.0	1.28	90.4	40.0
92.000	72.19	5.57	4.893	0.047	0.0	0.0	0.0	1.14	66.2	9.2
93.000	72.12	5.58	5.155	0.060	0.0	0.0	0.0	1.06	40.5	11.7
92.001	71.77	5.64	4.494	0.165	0.0	0.0	0.0	1.86	73.8	32.0
92.002	68.46	6.24	4.074	0.165	0.0	0.0	0.0	1.20	85.0	32.0
88.004	65.62	6.81	3.470	0.388	0.0	0.0	0.0	1.18	188.0	68.9
82.004	65.01	6.94	2.909	0.764	0.0	0.0	0.0	1.75	279.0	134.5
82.005	61.16	7.83	2.842	0.764	0.0	0.0	0.0	1.19	189.2	134.5
82.006	60.71	7.94	2.623	0.764	0.0	0.0	0.0	1.20	190.2	134.5
82.007	60.02	8.12	2.512	0.764	0.0	0.0	0.0	1.43	228.1	134.5
40.022	39.86	16.67	0.750	3.201	0.0	0.0	0.0	1.00	441.6	345.6
94.000	72.49	5.52	4.966	0.063	0.0	0.0	0.0	1.14	66.3	12.3
95.000	72.81	5.46	5.300	0.063	0.0	0.0	0.0	1.46	84.8	12.5
94.001	72.36	5.54	4.586	0.170	0.0	0.0	0.0	2.50	176.5	33.3
94.002	69.44	6.05	4.064	0.170	0.0	0.0	0.0	1.26	89.1	33.3

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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)	HYD SECT	DIA (mm)	Auto Design
96.000	35.562	0.310	114.7	0.122	5.00	0.0	0.600	M22	-38	
97.000	41.456	0.207	200.3	0.056	5.00	0.0	0.600	M22	-38	
96.001	3.341	0.120	27.9	0.048	0.00	0.0	0.600	o	300	
96.002	39.309	0.328	119.8	0.000	0.00	0.0	0.600	o	300	
94.003	10.380	0.069	150.4	0.000	0.00	0.0	0.600	o	375	
98.000	26.606	0.190	140.0	0.000	5.00	0.0	0.600	M20	-36	
99.000	28.027	0.243	115.3	0.046	5.00	0.0	0.600	M20	-36	
98.001	1.224	0.012	102.0	0.055	0.00	0.0	0.600	o	225	
98.002	25.915	0.179	144.8	0.000	0.00	0.0	0.600	o	225	
100.000	35.881	0.179	200.5	0.053	5.00	0.0	0.600	M20	-36	
101.000	40.277	0.247	163.1	0.055	5.00	0.0	0.600	M20	-36	
100.001	1.397	0.014	99.8	0.067	0.00	0.0	0.600	o	300	
100.002	38.906	0.372	104.6	0.000	0.00	0.0	0.600	o	300	
98.003	9.156	0.092	99.5	0.000	0.00	0.0	0.600	o	450	
94.004	5.577	0.041	136.0	0.000	0.00	0.0	0.600	o	525	
94.005	44.009	0.146	301.4	0.000	0.00	0.0	0.600	o	525	

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)
96.000	73.25	5.39	5.206	0.122	0.0	0.0	0.0	1.51	87.7	24.1
97.000	71.97	5.61	4.966	0.056	0.0	0.0	0.0	1.14	66.2	10.9
96.001	71.86	5.62	4.670	0.226	0.0	0.0	0.0	2.99	211.2	44.0
96.002	69.30	6.08	4.137	0.226	0.0	0.0	0.0	1.44	101.4	44.0
94.003	68.67	6.20	3.734	0.396	0.0	0.0	0.0	1.47	162.9	73.6
98.000	73.52	5.35	4.956	0.000	0.0	0.0	0.0	1.28	48.5	0.0
99.000	73.62	5.33	4.863	0.046	0.0	0.0	0.0	1.41	53.5	9.2
98.001	73.43	5.36	4.450	0.101	0.0	0.0	0.0	1.29	51.5	20.1
98.002	71.07	5.76	3.953	0.101	0.0	0.0	0.0	1.08	43.1	20.1
100.000	72.23	5.56	4.862	0.053	0.0	0.0	0.0	1.06	40.5	10.3
101.000	72.19	5.57	5.087	0.055	0.0	0.0	0.0	1.18	44.9	10.7
100.001	72.10	5.58	4.376	0.174	0.0	0.0	0.0	1.57	111.3	34.0
100.002	69.71	6.00	3.875	0.174	0.0	0.0	0.0	1.54	108.7	34.0
98.003	69.30	6.08	3.353	0.275	0.0	0.0	0.0	2.04	324.1	51.7
94.004	68.42	6.25	3.186	0.671	0.0	0.0	0.0	1.92	415.4	124.4
94.005	65.57	6.82	3.145	0.671	0.0	0.0	0.0	1.28	278.1	124.4

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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)	HYD SECT	DIA (mm)	Auto Design
94.006	15.013	0.037	405.8	0.000	0.00	0.0	0.600	o	525	
94.007	9.160	0.100	91.6	0.000	0.00	0.0	0.600	o	600	
40.023	19.191	0.025	767.6	0.011	0.00	0.0	0.600	o	750	
102.000	8.248	0.081	101.8	0.000	5.00	0.0	0.600	o	150	
102.001	8.322	0.082	101.5	0.000	0.00	0.0	0.600	o	150	
102.002	26.028	0.260	100.1	0.000	0.00	0.0	0.600	o	150	
103.000	24.821	0.014	1772.9	0.026	5.00	0.0	0.600	K8s	-24	
104.000	23.575	0.053	444.8	0.019	5.00	0.0	0.600	K40	-22	
103.001	1.977	0.026	76.0	0.000	0.00	0.0	0.600	o	225	
102.003	22.839	0.228	100.2	0.041	0.00	0.0	0.600	o	225	
105.000	24.139	0.042	574.7	0.011	5.00	0.0	0.600	M50	-33	
105.001	5.366	0.098	54.8	0.006	0.00	0.0	0.600	o	150	
102.004	13.449	0.305	44.1	0.000	0.00	0.0	0.600	o	150	
40.024	7.663	0.010	766.3	0.000	0.00	0.0	0.600	o	750	
106.000	13.676	0.076	179.9	0.019	5.00	0.0	0.600	M20	-36	
106.001	18.677	0.118	158.3	0.017	0.00	0.0	0.600	M20	-36	
106.002	12.131	0.072	168.5	0.017	0.00	0.0	0.600	M22	-38	
106.003	10.565	0.053	199.3	0.030	0.00	0.0	0.600	M22	-38	

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)
94.006	64.52	7.04	2.999	0.671	0.0	0.0	0.0	1.11	239.4	124.4
94.007	64.24	7.10	2.500	0.671	0.0	0.0	0.0	2.55	719.6	124.4
40.023	39.40	16.99	0.678	3.884	0.0	0.0	0.0	1.00	442.7	414.4
102.000	74.84	5.14	3.087	0.000	0.0	0.0	0.0	1.00	17.6	0.0
102.001	73.96	5.28	3.006	0.000	0.0	0.0	0.0	1.00	17.6	0.0
102.002	71.37	5.71	2.924	0.000	0.0	0.0	0.0	1.00	17.7	0.0
103.000	66.66	6.59	3.876	0.026	0.0	0.0	0.0	0.26	8.8	4.8
104.000	71.06	5.76	3.949	0.019	0.0	0.0	0.0	0.52	12.4	3.7
103.001	66.55	6.61	3.377	0.046	0.0	0.0	0.0	1.50	59.7	8.2
102.003	65.15	6.91	2.589	0.086	0.0	0.0	0.0	1.31	51.9	15.2
105.000	71.02	5.77	4.130	0.011	0.0	0.0	0.0	0.52	11.5	2.2
105.001	70.65	5.84	3.546	0.017	0.0	0.0	0.0	1.36	24.1	3.3
102.004	64.47	7.05	2.641	0.104	0.0	0.0	0.0	1.52	26.8	18.1
40.024	39.21	17.11	0.653	3.987	0.0	0.0	0.0	1.00	443.1	423.5
106.000	74.43	5.20	4.034	0.019	0.0	0.0	0.0	1.12	42.7	3.9
106.001	72.82	5.46	3.958	0.037	0.0	0.0	0.0	1.20	45.6	7.3
106.002	71.86	5.62	3.740	0.054	0.0	0.0	0.0	1.25	72.2	10.5
106.003	70.97	5.78	3.668	0.084	0.0	0.0	0.0	1.14	66.3	16.1

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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)	HYD SECT	DIA (mm)	Auto Design
107.000	14.227	0.091	156.3	0.037	5.00	0.0	0.600	M50	-33	
107.001	9.847	0.078	126.2	0.056	0.00	0.0	0.600	M22	-38	
106.004	3.651	0.130	28.1	0.000	0.00	0.0	0.600	o	225	
106.005	17.359	0.174	99.8	0.000	0.00	0.0	0.600	o	300	
40.025	20.209	0.026	777.3	0.000	0.00	0.0	0.600	o	750	
108.000	25.003	0.170	147.1	0.015	5.00	0.0	0.600	M50	-33	
109.000	15.135	0.076	199.1	0.009	5.00	0.0	0.600	M50	-33	
108.001	4.022	0.040	100.6	0.000	0.00	0.0	0.600	o	150	
108.002	30.546	0.360	84.9	0.000	0.00	0.0	0.600	o	150	
108.003	12.905	0.053	243.5	0.000	0.00	0.0	0.600	o	300	
40.026	5.989	0.008	748.6	0.000	0.00	0.0	0.600	o	750	
40.027	38.239	0.051	749.8	0.000	0.00	0.0	0.600	o	750	
40.028	25.184	0.034	740.7	0.000	0.00	0.0	0.600	o	750	
40.029	24.867	0.061	410.0	0.000	0.00	0.0	0.600	o	450	
110.000	18.307	0.095	192.7	0.031	5.00	0.0	0.600	M50	-33	
111.000	19.057	0.095	200.6	0.031	5.00	0.0	0.600	M50	-33	
110.001	7.532	0.075	100.4	0.000	0.00	0.0	0.600	o	150	
110.002	18.876	0.229	82.4	0.000	0.00	0.0	0.600	o	225	

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)
107.000	74.23	5.23	4.090	0.037	0.0	0.0	0.0	1.01	22.3	7.5
107.001	73.52	5.35	3.854	0.093	0.0	0.0	0.0	1.44	83.5	18.5
106.004	70.83	5.80	3.496	0.177	0.0	0.0	0.0	2.48	98.5	34.0
106.005	69.81	5.99	2.987	0.177	0.0	0.0	0.0	1.57	111.3	34.0
40.025	38.74	17.45	0.643	4.164	0.0	0.0	0.0	1.00	439.9	436.9
108.000	73.21	5.40	4.253	0.015	0.0	0.0	0.0	1.04	23.0	2.9
109.000	73.93	5.28	4.159	0.009	0.0	0.0	0.0	0.90	19.7	1.7
108.001	72.80	5.47	3.663	0.023	0.0	0.0	0.0	1.00	17.7	4.6
108.002	70.11	5.93	3.623	0.023	0.0	0.0	0.0	1.09	19.3	4.6
108.003	68.95	6.15	3.113	0.023	0.0	0.0	0.0	1.00	70.9	4.6
40.026	38.60	17.55	0.617	4.188	0.0	0.0	0.0	1.01	448.4	437.8
40.027	37.76	18.18	0.607	4.188	0.0	0.0	0.0	1.01	448.0	437.8
40.028	37.23	18.59	0.556	4.188	0.0	0.0	0.0	1.02	450.8	437.8
40.029	36.71	19.00	0.521	4.188	0.0	0.0	0.0	1.00	158.7«	437.8
110.000	73.60	5.33	4.082	0.031	0.0	0.0	0.0	0.91	20.0	6.1
111.000	73.47	5.36	4.074	0.031	0.0	0.0	0.0	0.89	19.6	6.2
110.001	72.71	5.48	3.534	0.062	0.0	0.0	0.0	1.00	17.7	12.2
110.002	71.42	5.70	3.100	0.062	0.0	0.0	0.0	1.44	57.3	12.2

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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)	HYD SECT	DIA (mm)	Auto Design
112.000	23.548	0.220	107.0	0.025	5.00	0.0	0.600	M50	-33	
112.001	7.143	0.071	101.0	0.027	0.00	0.0	0.600	o	150	
112.002	20.264	0.563	36.0	0.000	0.00	0.0	0.600	o	150	
113.000	30.356	0.155	195.8	0.084	5.00	0.0	0.600	M20	-36	
113.001	5.846	0.045	129.9	0.008	0.00	0.0	0.600	o	225	
114.000	16.768	0.166	101.0	0.013	5.00	0.0	0.600	o	150	
114.001	6.878	0.069	100.0	0.022	0.00	0.0	0.600	o	150	
115.000	28.722	0.149	192.8	0.030	5.00	0.0	0.600	M50	-33	
115.001	9.686	0.054	179.4	0.057	0.00	0.0	0.600	M22	-38	
116.000	7.958	0.040	199.0	0.025	5.00	0.0	0.600	M50	-33	
115.002	2.483	0.021	118.2	0.006	0.00	0.0	0.600	o	225	
114.002	40.925	0.315	129.9	0.000	0.00	0.0	0.600	o	225	
117.000	32.042	0.006	5340.3	0.015	5.00	0.0	0.600	K40	-22	
118.000	15.684	0.009	1742.7	0.010	5.00	0.0	0.600	K40	-22	
117.001	2.597	0.026	99.9	0.022	0.00	0.0	0.600	o	150	
113.002	7.791	0.032	243.5	0.000	0.00	0.0	0.600	o	300	

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)
112.000	73.69	5.32	4.973	0.025	0.0	0.0	0.0	1.23	27.0	4.9
112.001	72.96	5.44	4.424	0.052	0.0	0.0	0.0	1.00	17.7	10.2
112.002	71.77	5.64	3.474	0.052	0.0	0.0	0.0	1.68	29.7	10.2
113.000	72.78	5.47	4.101	0.084	0.0	0.0	0.0	1.08	40.9	16.5
113.001	72.27	5.55	3.543	0.092	0.0	0.0	0.0	1.15	45.5	18.1
114.000	73.95	5.28	3.000	0.013	0.0	0.0	0.0	1.00	17.7	2.5
114.001	73.24	5.39	2.834	0.034	0.0	0.0	0.0	1.00	17.8	6.8
115.000	72.44	5.53	4.075	0.030	0.0	0.0	0.0	0.91	20.0	5.9
115.001	71.66	5.66	3.781	0.088	0.0	0.0	0.0	1.21	70.0	17.0
116.000	74.78	5.15	4.070	0.025	0.0	0.0	0.0	0.90	19.7	5.0
115.002	71.46	5.69	3.478	0.118	0.0	0.0	0.0	1.20	47.8	22.9
114.002	68.19	6.29	2.690	0.153	0.0	0.0	0.0	1.15	45.5	28.2
117.000	57.68	8.77	3.980	0.015	0.0	0.0	0.0	0.14	3.4	2.3
118.000	69.60	6.02	3.983	0.010	0.0	0.0	0.0	0.26	6.1	2.0
117.001	57.53	8.81	3.361	0.047	0.0	0.0	0.0	1.01	17.8	7.4
113.002	57.09	8.94	2.300	0.292	0.0	0.0	0.0	1.00	70.9	45.2

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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)	HYD SECT	DIA (mm)	Auto Design
112.003	11.966	0.050	239.3	0.000	0.00	0.0	0.600	o	450	
110.003	3.966	0.020	198.3	0.000	0.00	0.0	0.600	o	525	
119.000	15.510	0.111	139.7	0.055	5.00	0.0	0.600	M50	-33	
120.000	14.640	0.073	200.5	0.046	5.00	0.0	0.600	M50	-33	
119.001	7.339	0.073	100.5	0.000	0.00	0.0	0.600	o	225	
119.002	19.444	0.231	84.2	0.000	0.00	0.0	0.600	o	225	
119.003	5.894	0.059	99.9	0.000	0.00	0.0	0.600	o	225	
110.004	5.512	0.022	250.5	0.000	0.00	0.0	0.600	o	525	
110.005	38.314	0.128	299.3	0.000	0.00	0.0	0.600	o	525	
110.006	24.919	0.119	209.4	0.000	0.00	0.0	0.600	o	525	
110.007	7.783	0.031	251.1	0.000	0.00	0.0	0.600	o	525	
40.030	4.573	0.015	304.9	0.000	0.00	0.0	0.600	o	375	

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)
112.003	56.58	9.09	2.118	0.344	0.0	0.0	0.0	1.31	208.3	52.7
110.003	56.44	9.13	1.993	0.406	0.0	0.0	0.0	1.59	343.6	62.0
119.000	74.19	5.24	4.234	0.055	0.0	0.0	0.0	1.07	23.6	11.1
120.000	73.98	5.27	4.157	0.046	0.0	0.0	0.0	0.89	19.6	9.2
119.001	73.40	5.37	3.650	0.101	0.0	0.0	0.0	1.30	51.8	20.1
119.002	72.04	5.59	3.192	0.101	0.0	0.0	0.0	1.43	56.7	20.1
119.003	71.60	5.67	2.961	0.101	0.0	0.0	0.0	1.31	52.0	20.1
110.004	56.23	9.20	1.973	0.507	0.0	0.0	0.0	1.41	305.3	77.2
110.005	54.67	9.69	1.951	0.507	0.0	0.0	0.0	1.29	279.1	77.2
110.006	53.86	9.96	1.823	0.507	0.0	0.0	0.0	1.54	334.2	77.2
110.007	53.59	10.05	1.704	0.507	0.0	0.0	0.0	1.41	305.0	77.2
40.030	36.62	19.08	0.460	4.695	0.0	0.0	0.0	1.03	114.0«	465.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
40	4.186	0.255	Junction	0	40.000	3.931	-22				
41	4.160	0.155	Junction	0	41.000	4.005	-21				
42	4.318	0.715	Open Manhole	600	40.001	3.603	225	40.000	3.905	-22	332
								41.000	3.955	-21	282
43	4.222	1.408	Open Manhole	1200	40.002	2.814	225	40.001	3.576	225	762
44	4.157	0.155	Junction	0	42.000	4.002	-21				
45	4.144	0.155	Junction	0	43.000	3.989	-21				
46	4.117	0.715	Open Manhole	600	42.001	3.402	225	42.000	3.962	-21	490
								43.000	3.962	-21	490
47	4.177	1.604	Open Manhole	1200	40.003	2.573	225	40.002	2.573	225	
								42.001	3.378	225	805
48	4.135	0.155	Junction	0	44.000	3.980	-21				
49	4.220	0.867	Open Manhole	600	44.001	3.353	150	44.000	3.860	-21	512
50	4.250	1.355	Open Manhole	1200	44.002	2.895	150	44.001	3.329	150	434
51	4.145	0.155	Junction	0	45.000	3.990	-21				
52	4.215	0.155	Junction	0	46.000	4.060	-21				
53	4.186	0.715	Open Manhole	600	45.001	3.471	225	45.000	3.892	-21	351
								46.000	4.031	-21	490
54	4.228	2.072	Open Manhole	1500	40.004	2.156	375	40.003	2.306	225	
								44.002	2.673	150	292
								45.001	3.446	225	1140
55	5.682	1.562	Open Manhole	1200	47.000	4.120	150				
56	5.103	1.333	Open Manhole	1200	47.001	3.770	150	47.000	3.770	150	
57	5.067	0.165	Junction	0	48.000	4.902	-33				
58	5.065	0.165	Junction	0	49.000	4.900	-33				
59	5.100	0.736	Open Manhole	600	48.001	4.364	225	48.000	4.806	-33	382
								49.000	4.741	-33	317
60	5.181	0.165	Junction	0	50.000	5.016	-33				
61	5.160	0.165	Junction	0	51.000	4.995	-33				
62	5.171	0.710	Open Manhole	600	50.001	4.461	225	50.000	4.839	-33	318
								51.000	4.712	-33	191
63	5.111	1.755	Open Manhole	1200	47.002	3.356	300	47.001	3.506	150	
								48.001	4.342	225	911
								50.001	4.428	225	997
64	5.065	0.165	Junction	0	52.000	4.900	-33				
65	5.160	0.165	Junction	0	53.000	4.995	-33				
66	5.084	0.741	Open Manhole	600	52.001	4.343	225	52.000	4.641	-33	238
								53.000	4.792	-33	389
67	5.162	0.165	Junction	0	54.000	4.997	-33				
68	5.129	0.165	Junction	0	55.000	4.964	-33				
69	5.156	0.710	Open Manhole	600	54.001	4.446	225	54.000	4.821	-33	315
								55.000	4.847	-33	341
70	5.090	1.200	Open Manhole	1500	52.002	3.890	225	52.001	4.323	225	433
								54.001	4.399	225	509
71	5.100	3.260	Open Manhole	1500	40.005	1.840	600	40.004	2.065	375	
								47.002	3.051	300	911

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								52.002	3.676	225	1461
72	5.451	0.165	Junction	0	56.000	5.286	-33				
73	5.436	0.165	Junction	0	57.000	5.271	-33				
74	5.450	0.713	Open Manhole	600	56.001	4.737	225	56.000	5.202	-33	405
								57.000	5.124	-33	327
75	5.475	1.275	Open Manhole	1200	56.002	4.200	225	56.001	4.720	225	520
76	5.426	0.165	Junction	0	58.000	5.261	-33				
77	5.440	0.165	Junction	0	59.000	5.275	-33				
78	5.499	0.781	Open Manhole	600	58.001	4.718	225	58.000	5.189	-33	411
								59.000	5.131	-33	353
79	5.456	1.256	Open Manhole	1200	58.002	4.200	225	58.001	4.702	225	502
80	5.464	1.592	Open Manhole	1200	56.003	3.872	300	56.002	3.942	225	
								58.002	3.901	225	
81	5.284	3.469	Open Manhole	1800	40.006	1.815	600	40.005	1.815	600	
								56.003	3.701	300	1586
82	5.276	3.472	Open Manhole	1500	40.007	1.804	600	40.006	1.804	600	
83	5.272	3.539	Open Manhole	1800	40.008	1.733	600	40.007	1.733	600	
84	5.189	3.487	Open Manhole	1500	40.009	1.702	600	40.008	1.702	600	
85	4.328	2.649	Open Manhole	1500	40.010	1.679	600	40.009	1.679	600	
86	4.344	0.165	Junction	0	60.000	4.179	-33				
87	4.421	0.805	Open Manhole	600	60.001	3.616	225	60.000	4.029	-33	353
88	4.264	0.255	Junction	0	61.000	4.009	-22				
89	4.273	0.995	Open Manhole	600	61.001	3.278	150	61.000	3.911	-22	738
90	4.300	2.674	Open Manhole	1500	40.011	1.626	600	40.010	1.626	600	
								60.001	3.586	225	1585
								61.001	3.257	150	1181
91	4.267	0.255	Junction	0	62.000	4.012	-22				
92	4.280	0.255	Junction	0	63.000	4.025	-22				
93	4.195	0.715	Open Manhole	600	62.001	3.480	225	62.000	3.939	-22	489
								63.000	3.925	-22	475
94	4.259	2.704	Open Manhole	1500	40.012	1.555	600	40.011	1.555	600	
								62.001	3.455	225	1525
95	4.403	0.215	Junction	0	64.000	4.188	-34				
96	4.659	0.710	Open Manhole	600	64.001	3.949	225	64.000	4.109	-34	150
97	4.417	2.946	Open Manhole	1500	40.013	1.471	600	40.012	1.471	600	
								64.001	3.863	225	2017
98	4.272	0.255	Junction	0	65.000	4.017	-22				
99	4.283	0.255	Junction	0	66.000	4.028	-22				
100	4.239	0.715	Open Manhole	600	65.001	3.524	225	65.000	3.966	-22	472
								66.000	3.979	-22	485
101	4.294	2.872	Open Manhole	1500	40.014	1.422	600	40.013	1.422	600	
								65.001	3.499	225	1702
102	4.336	2.959	Open Manhole	1500	40.015	1.377	600	40.014	1.377	600	
103	4.286	0.255	Junction	0	67.000	4.031	-22				
104	4.206	0.255	Junction	0	68.000	3.951	-22				
105	4.217	0.715	Open Manhole	600	67.001	3.502	225	67.000	3.957	-22	485

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								68.000	3.893	-22	421
106	4.291	2.965	Open Manhole	1500	40.016	1.326	600	40.015	1.326	600	
								67.001	3.476	225	1775
107	5.050	0.165	Junction	0	69.000	4.885	-33				
108	5.152	0.165	Junction	0	70.000	4.987	-33				
109	5.050	0.712	Open Manhole	600	69.001	4.338	225	69.000	4.770	-33	372
								70.000	4.744	-33	346
110	5.075	1.175	Open Manhole	1200	69.002	3.900	225	69.001	4.322	225	422
111	5.345	1.515	Open Manhole	1500	71.000	3.830	525				
112	4.854	1.362	Open Manhole	1500	71.001	3.492	525	71.000	3.492	525	
113	5.050	0.165	Junction	0	72.000	4.885	-33				
114	5.048	0.165	Junction	0	73.000	4.883	-33				
115	5.051	0.710	Open Manhole	600	72.001	4.341	225	72.000	4.810	-33	409
								73.000	4.663	-33	262
116	5.088	1.779	Open Manhole	1500	71.002	3.309	525	71.001	3.309	525	
								72.001	4.324	225	715
117	5.090	1.912	Open Manhole	1500	69.003	3.178	525	69.002	3.478	225	
								71.002	3.205	525	27
118	5.252	0.165	Junction	0	74.000	5.087	-33				
119	5.217	0.165	Junction	0	75.000	5.052	-33				
120	5.282	0.690	Open Manhole	600	74.001	4.592	225	74.000	5.010	-33	358
								75.000	4.931	-33	279
121	5.335	1.180	Open Manhole	1200	74.002	4.155	225	74.001	4.539	225	384
122	5.294	0.165	Junction	0	76.000	5.129	-33				
123	5.253	0.165	Junction	0	77.000	5.088	-33				
124	5.380	0.757	Open Manhole	600	76.001	4.623	225	76.000	4.980	-33	297
								77.000	4.903	-33	220
125	5.387	1.287	Open Manhole	1200	76.002	4.100	300	76.001	4.572	225	397
126	5.372	1.678	Open Manhole	1200	74.003	3.694	300	74.002	3.769	225	
								76.002	3.947	300	253
127	5.343	2.216	Open Manhole	1500	69.004	3.127	525	69.003	3.127	525	
								74.003	3.630	300	278
128	5.346	2.335	Open Manhole	1500	69.005	3.011	600	69.004	3.086	525	
129	5.221	2.546	Open Manhole	1800	69.006	2.675	600	69.005	2.873	600	198
130	4.271	3.064	Open Manhole	1500	40.017	1.207	675	40.016	1.282	600	
								69.006	2.435	600	1153
131	4.385	0.215	Junction	0	78.000	4.170	-34				
132	4.445	0.769	Open Manhole	600	78.001	3.676	225	78.000	4.101	-34	415
133	4.206	0.255	Junction	0	79.000	3.951	-22				
134	4.210	0.255	Junction	0	80.000	3.955	-22				
135	4.210	0.715	Open Manhole	600	79.001	3.495	225	79.000	3.889	-22	424
								80.000	3.828	-22	363
136	4.272	3.105	Open Manhole	1500	40.018	1.167	675	40.017	1.167	675	
								78.001	3.583	225	1966
								79.001	3.470	225	1853
137	4.288	3.206	Open Manhole	1500	40.019	1.082	675	40.018	1.082	675	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
138	4.210	0.255	Junction	0	81.000	3.955	-22				
139	4.208	0.715	Open Manhole	600	81.001	3.493	225	81.000	3.819	-22	356
140	4.273	3.278	Open Manhole	1500	40.020	0.995	675	40.019	0.995	675	
								81.001	3.469	225	2024
141	4.165	3.255	Open Manhole	1500	40.021	0.910	675	40.020	0.910	675	
142	5.025	0.165	Junction	0	82.000	4.860	-33				
143	5.217	0.165	Junction	0	83.000	5.052	-33				
144	5.050	0.719	Open Manhole	600	82.001	4.331	225	82.000	4.649	-33	258
								83.000	4.846	-33	455
145	5.072	1.170	Open Manhole	1200	82.002	3.902	225	82.001	4.314	225	412
146	5.196	0.165	Junction	0	84.000	5.031	-33				
147	5.064	0.165	Junction	0	85.000	4.899	-33				
148	5.061	0.666	Open Manhole	600	84.001	4.395	225	84.000	4.875	-33	420
								85.000	4.831	-33	376
149	5.060	1.183	Open Manhole	1200	84.002	3.877	225	84.001	4.372	225	495
150	5.063	0.165	Junction	0	86.000	4.898	-33				
151	5.026	0.165	Junction	0	87.000	4.861	-33				
152	5.050	0.714	Open Manhole	600	86.001	4.336	225	86.000	4.738	-33	342
								87.000	4.664	-33	268
153	5.069	1.627	Open Manhole	1200	84.003	3.442	300	84.002	3.517	225	
								86.001	4.319	225	802
154	5.063	2.116	Open Manhole	1500	82.003	2.947	450	82.002	3.632	225	460
								84.003	3.097	300	
155	5.239	0.165	Junction	0	88.000	5.074	-33				
156	5.251	0.165	Junction	0	89.000	5.086	-33				
157	5.289	0.743	Open Manhole	600	88.001	4.546	225	88.000	4.965	-33	359
								89.000	4.969	-33	363
158	5.337	1.140	Open Manhole	1200	88.002	4.197	225	88.001	4.497	225	300
159	5.253	0.165	Junction	0	90.000	5.088	-33				
160	5.203	0.165	Junction	0	91.000	5.038	-33				
161	5.312	0.672	Open Manhole	600	90.001	4.640	225	90.000	5.008	-33	308
								91.000	4.835	-33	135
162	5.343	1.472	Open Manhole	1200	88.003	3.871	300	88.002	3.946	225	
								90.001	4.576	225	630
163	5.203	0.310	Junction	0	92.000	4.893	-38				
164	5.369	0.214	Junction	0	93.000	5.155	-36				
165	5.204	0.710	Open Manhole	600	92.001	4.494	225	92.000	4.699	-38	290
								93.000	4.970	-36	461
166	5.296	1.222	Open Manhole	1200	92.002	4.074	300	92.001	4.363	225	214
167	5.309	1.839	Open Manhole	1500	88.004	3.470	450	88.003	3.620	300	
								92.002	3.820	300	200
168	5.187	2.278	Open Manhole	1500	82.004	2.909	450	82.003	2.909	450	
								88.004	3.442	450	533
169	5.175	2.333	Open Manhole	1500	82.005	2.842	450	82.004	2.842	450	
170	5.429	2.806	Open Manhole	1500	82.006	2.623	450	82.005	2.623	450	
171	5.258	2.746	Open Manhole	1500	82.007	2.512	450	82.006	2.594	450	82

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
172	4.246	3.496	Open Manhole	1800	40.022	0.750	750	40.021	0.825	675	
								82.007	2.435	450	1385
173	5.276	0.310	Junction	0	94.000	4.966	-38				
174	5.610	0.310	Junction	0	95.000	5.300	-38				
175	5.277	0.691	Open Manhole	600	94.001	4.586	300	94.000	4.788	-38	212
								95.000	4.967	-38	391
176	5.242	1.178	Open Manhole	1200	94.002	4.064	300	94.001	4.506	300	442
177	5.516	0.310	Junction	0	96.000	5.206	-38				
178	5.276	0.310	Junction	0	97.000	4.966	-38				
179	5.363	0.693	Open Manhole	600	96.001	4.670	300	96.000	4.896	-38	236
								97.000	4.759	-38	99
180	5.330	1.193	Open Manhole	1200	96.002	4.137	300	96.001	4.550	300	413
181	5.246	1.512	Open Manhole	1500	94.003	3.734	375	94.002	3.813	300	4
								96.002	3.809	300	
182	5.166	0.210	Junction	0	98.000	4.956	-36				
183	5.073	0.210	Junction	0	99.000	4.863	-36				
184	5.150	0.700	Open Manhole	600	98.001	4.450	225	98.000	4.766	-36	301
								99.000	4.620	-36	155
185	5.150	1.197	Open Manhole	1200	98.002	3.953	225	98.001	4.438	225	485
186	5.072	0.210	Junction	0	100.000	4.862	-36				
187	5.297	0.210	Junction	0	101.000	5.087	-36				
188	5.050	0.674	Open Manhole	600	100.001	4.376	300	100.000	4.683	-36	217
								101.000	4.840	-36	374
189	5.050	1.175	Open Manhole	1200	100.002	3.875	300	100.001	4.362	300	487
190	5.100	1.747	Open Manhole	1500	98.003	3.353	450	98.002	3.774	225	196
								100.002	3.503	300	
191	5.149	1.963	Open Manhole	1500	94.004	3.186	525	94.003	3.665	375	329
								98.003	3.261	450	
192	5.159	2.014	Open Manhole	1500	94.005	3.145	525	94.004	3.145	525	
193	5.243	2.244	Open Manhole	1500	94.006	2.999	525	94.005	2.999	525	
194	5.305	2.805	Open Manhole	1500	94.007	2.500	600	94.006	2.962	525	387
195	4.258	3.580	Open Manhole	1800	40.023	0.678	750	40.022	0.728	750	50
								94.007	2.400	600	1572
196	4.411	1.324	Open Manhole	1200	102.000	3.087	150				
197	4.399	1.393	Open Manhole	1200	102.001	3.006	150	102.000	3.006	150	
198	4.414	1.490	Open Manhole	1200	102.002	2.924	150	102.001	2.924	150	
199	4.231	0.355	Junction	0	103.000	3.876	-24				
200	4.204	0.255	Junction	0	104.000	3.949	-22				
201	4.217	0.840	Open Manhole	600	103.001	3.377	225	103.000	3.862	-24	615
								104.000	3.896	-22	549
202	4.250	1.661	Open Manhole	1200	102.003	2.589	225	102.002	2.664	150	
								103.001	3.351	225	762
203	4.295	0.165	Junction	0	105.000	4.130	-33				
204	4.253	0.707	Open Manhole	600	105.001	3.546	150	105.000	4.088	-33	557
205	4.250	1.889	Open Manhole	1200	102.004	2.641	150	102.003	2.361	225	
								105.001	3.448	150	807

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
206	4.274	3.621	Open Manhole	1800	40.024	0.653	750	40.023	0.653	750	
								102.004	2.336	150	1083
207	4.244	0.210	Junction		106.000	4.034	-36				
208	4.236	0.278	Junction		106.001	3.958	-36	106.000	3.958	-36	
209	4.211	0.471	Junction		106.002	3.740	-38	106.001	3.840	-36	
210	4.200	0.532	Junction	0	106.003	3.668	-38	106.002	3.668	-38	
211	4.255	0.165	Junction		107.000	4.090	-33				
212	4.235	0.381	Junction	0	107.001	3.854	-38	107.000	3.999	-33	
213	4.206	0.710	Open Manhole	600	106.004	3.496	225	106.003	3.615	-38	204
								107.001	3.776	-38	365
214	4.250	1.263	Open Manhole	1200	106.005	2.987	300	106.004	3.366	225	304
215	4.263	3.620	Open Manhole	1800	40.025	0.643	750	40.024	0.643	750	
								106.005	2.813	300	1720
216	4.418	0.165	Junction	0	108.000	4.253	-33				
217	4.324	0.165	Junction	0	109.000	4.159	-33				
218	4.358	0.695	Open Manhole	600	108.001	3.663	150	108.000	4.083	-33	435
								109.000	4.083	-33	435
219	4.400	0.777	Open Manhole	1200	108.002	3.623	150	108.001	3.623	150	
220	4.494	1.381	Open Manhole	1200	108.003	3.113	300	108.002	3.263	150	
221	4.390	3.773	Open Manhole	1800	40.026	0.617	750	40.025	0.617	750	
								108.003	3.060	300	1993
222	4.370	3.763	Open Manhole	1800	40.027	0.607	750	40.026	0.609	750	2
223	4.278	3.722	Open Manhole	1800	40.028	0.556	750	40.027	0.556	750	
224	4.385	3.864	Open Manhole	1800	40.029	0.521	450	40.028	0.522	750	301
225	4.247	0.165	Junction	0	110.000	4.082	-33				
226	4.239	0.165	Junction	0	111.000	4.074	-33				
227	4.244	0.710	Open Manhole	600	110.001	3.534	150	110.000	3.987	-33	468
								111.000	3.979	-33	460
228	4.299	1.199	Open Manhole	1200	110.002	3.100	225	110.001	3.459	150	284
229	5.165	0.192	Junction	0	112.000	4.973	-33				
230	5.284	0.860	Open Manhole	600	112.001	4.424	150	112.000	4.753	-33	344
231	5.220	1.746	Open Manhole	1200	112.002	3.474	150	112.001	4.353	150	879
232	4.311	0.210	Junction	0	113.000	4.101	-36				
233	4.349	0.806	Open Manhole	600	113.001	3.543	225	113.000	3.946	-36	388
234	4.369	1.369	Open Manhole	1200	114.000	3.000	150				
235	4.454	1.620	Open Manhole	1200	114.001	2.834	150	114.000	2.834	150	
236	4.240	0.165	Junction		115.000	4.075	-33				
237	4.236	0.455	Junction	0	115.001	3.781	-38	115.000	3.926	-33	
238	4.235	0.165	Junction	0	116.000	4.070	-33				
239	4.235	0.757	Open Manhole	600	115.002	3.478	225	115.001	3.727	-38	334
								116.000	4.030	-33	492
240	4.264	1.574	Open Manhole	1200	114.002	2.690	225	114.001	2.765	150	
								115.002	3.457	225	767
241	4.235	0.255	Junction	0	117.000	3.980	-22				
242	4.238	0.255	Junction	0	118.000	3.983	-22				
243	4.353	0.992	Open Manhole	600	117.001	3.361	150	117.000	3.974	-22	718

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								118.000	3.974	-22	718
244	4.261	1.961	Open Manhole	1200	113.002	2.300	300	113.001	3.498	225	1123
								114.002	2.375	225	
								117.001	3.335	150	885
245	4.260	2.142	Open Manhole	1500	112.003	2.118	450	112.002	2.911	150	493
								113.002	2.268	300	
246	4.300	2.307	Open Manhole	1500	110.003	1.993	525	110.002	2.871	225	578
								112.003	2.068	450	
247	4.399	0.165	Junction	0	119.000	4.234	-33				
248	4.323	0.166	Junction	0	120.000	4.157	-33				
249	4.360	0.710	Open Manhole	600	119.001	3.650	225	119.000	4.123	-33	413
								120.000	4.084	-33	374
250	4.412	1.220	Open Manhole	1200	119.002	3.192	225	119.001	3.577	225	385
251	4.371	1.410	Open Manhole	1200	119.003	2.961	225	119.002	2.961	225	
252	4.324	2.351	Open Manhole	1500	110.004	1.973	525	110.003	1.973	525	
								119.003	2.902	225	629
253	4.376	2.425	Open Manhole	1500	110.005	1.951	525	110.004	1.951	525	
254	4.394	2.571	Open Manhole	1500	110.006	1.823	525	110.005	1.823	525	
255	4.258	2.554	Open Manhole	1500	110.007	1.704	525	110.006	1.704	525	
256	4.258	3.798	Open Manhole	1500	40.030	0.460	375	40.029	0.460	450	
								110.007	1.673	525	1363
97	4.240	3.795	Open Manhole	0		OUTFALL		40.030	0.445	375	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
40.000	K40	-22	40	4.186	3.931	0.000	Junction	
41.000	K30	-21	41	4.160	4.005	0.000	Junction	
40.001	o	225	42	4.318	3.603	0.490	Open Manhole	600
40.002	o	225	43	4.222	2.814	1.183	Open Manhole	1200
42.000	K30	-21	44	4.157	4.002	0.000	Junction	
43.000	K30	-21	45	4.144	3.989	0.000	Junction	
42.001	o	225	46	4.117	3.402	0.490	Open Manhole	600
40.003	o	225	47	4.177	2.573	1.379	Open Manhole	1200
44.000	K30	-21	48	4.135	3.980	0.000	Junction	
44.001	o	150	49	4.220	3.353	0.717	Open Manhole	600
44.002	o	150	50	4.250	2.895	1.205	Open Manhole	1200
45.000	K30	-21	51	4.145	3.990	0.000	Junction	
46.000	K30	-21	52	4.215	4.060	0.000	Junction	
45.001	o	225	53	4.186	3.471	0.490	Open Manhole	600
40.004	o	375	54	4.228	2.156	1.697	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
40.000	20.859	802.3	42	4.318	3.905	0.158	Open Manhole	600
41.000	19.172	383.4	42	4.318	3.955	0.208	Open Manhole	600
40.001	2.724	100.9	43	4.222	3.576	0.421	Open Manhole	1200
40.002	41.205	171.0	47	4.177	2.573	1.379	Open Manhole	1200
42.000	21.048	526.2	46	4.117	3.962	0.000	Open Manhole	600
43.000	19.657	728.0	46	4.117	3.962	0.000	Open Manhole	600
42.001	2.466	102.8	47	4.177	3.378	0.574	Open Manhole	1200
40.003	45.714	171.2	54	4.228	2.306	1.697	Open Manhole	1500
44.000	30.007	250.0	49	4.220	3.860	0.205	Open Manhole	600
44.001	2.410	100.4	50	4.250	3.329	0.771	Open Manhole	1200
44.002	22.232	100.1	54	4.228	2.673	1.405	Open Manhole	1500
45.000	25.386	259.0	53	4.186	3.892	0.139	Open Manhole	600
46.000	21.118	728.2	53	4.186	4.031	0.000	Open Manhole	600
45.001	2.551	102.0	54	4.228	3.446	0.557	Open Manhole	1500
40.004	19.963	219.4	71	5.100	2.065	2.660	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
47.000	o	150	55	5.682	4.120	1.412	Open Manhole	1200
47.001	o	150	56	5.103	3.770	1.183	Open Manhole	1200
48.000	M50	-33	57	5.067	4.902	0.000	Junction	
49.000	M50	-33	58	5.065	4.900	0.000	Junction	
48.001	o	225	59	5.100	4.364	0.511	Open Manhole	600
50.000	M50	-33	60	5.181	5.016	0.000	Junction	
51.000	M50	-33	61	5.160	4.995	0.000	Junction	
50.001	o	225	62	5.171	4.461	0.485	Open Manhole	600
47.002	o	300	63	5.111	3.356	1.455	Open Manhole	1200
52.000	M50	-33	64	5.065	4.900	0.000	Junction	
53.000	M50	-33	65	5.160	4.995	0.000	Junction	
52.001	o	225	66	5.084	4.343	0.516	Open Manhole	600
54.000	M50	-33	67	5.162	4.997	0.000	Junction	
55.000	M50	-33	68	5.129	4.964	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
47.000	33.534	95.8	56	5.103	3.770	1.183	Open Manhole	1200
47.001	26.420	100.1	63	5.111	3.506	1.455	Open Manhole	1200
48.000	19.270	200.7	59	5.100	4.806	0.129	Open Manhole	600
49.000	31.716	199.5	59	5.100	4.741	0.194	Open Manhole	600
48.001	2.780	126.4	63	5.111	4.342	0.544	Open Manhole	1200
50.000	18.962	107.1	62	5.171	4.839	0.167	Open Manhole	600
51.000	32.622	115.3	62	5.171	4.712	0.294	Open Manhole	600
50.001	4.516	136.8	63	5.111	4.428	0.458	Open Manhole	1200
47.002	30.458	99.9	71	5.100	3.051	1.749	Open Manhole	1500
52.000	26.275	101.4	66	5.084	4.641	0.278	Open Manhole	600
53.000	21.198	104.4	66	5.084	4.792	0.127	Open Manhole	600
52.001	2.652	132.6	70	5.090	4.323	0.542	Open Manhole	1500
54.000	25.239	143.4	69	5.156	4.821	0.170	Open Manhole	600
55.000	21.276	181.8	69	5.156	4.847	0.144	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
54.001	o	225	69	5.156	4.446	0.485	Open Manhole	600
52.002	o	225	70	5.090	3.890	0.975	Open Manhole	1500
40.005	o	600	71	5.100	1.840	2.660	Open Manhole	1500
56.000	M50	-33	72	5.451	5.286	0.000	Junction	
57.000	M50	-33	73	5.436	5.271	0.000	Junction	
56.001	o	225	74	5.450	4.737	0.488	Open Manhole	600
56.002	o	225	75	5.475	4.200	1.050	Open Manhole	1200
58.000	M50	-33	76	5.426	5.261	0.000	Junction	
59.000	M50	-33	77	5.440	5.275	0.000	Junction	
58.001	o	225	78	5.499	4.718	0.556	Open Manhole	600
58.002	o	225	79	5.456	4.200	1.031	Open Manhole	1200
56.003	o	300	80	5.464	3.872	1.292	Open Manhole	1200
40.006	o	600	81	5.284	1.815	2.869	Open Manhole	1800
40.007	o	600	82	5.276	1.804	2.872	Open Manhole	1500
40.008	o	600	83	5.272	1.733	2.939	Open Manhole	1800
40.009	o	600	84	5.189	1.702	2.887	Open Manhole	1500
40.010	o	600	85	4.328	1.679	2.049	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
54.001	4.700	100.0	70	5.090	4.399	0.466	Open Manhole	1500
52.002	28.864	134.9	71	5.100	3.676	1.199	Open Manhole	1500
40.005	13.632	545.3	81	5.284	1.815	2.869	Open Manhole	1800
56.000	15.830	188.5	74	5.450	5.202	0.083	Open Manhole	600
57.000	29.495	200.6	74	5.450	5.124	0.161	Open Manhole	600
56.001	2.177	128.1	75	5.475	4.720	0.530	Open Manhole	1200
56.002	27.643	107.1	80	5.464	3.942	1.297	Open Manhole	1200
58.000	14.448	200.7	78	5.499	5.189	0.145	Open Manhole	600
59.000	26.359	183.0	78	5.499	5.131	0.203	Open Manhole	600
58.001	2.088	130.5	79	5.456	4.702	0.529	Open Manhole	1200
58.002	29.791	99.6	80	5.464	3.901	1.338	Open Manhole	1200
56.003	13.722	80.2	81	5.284	3.701	1.283	Open Manhole	1800
40.006	5.869	533.5	82	5.276	1.804	2.872	Open Manhole	1500
40.007	39.168	551.7	83	5.272	1.733	2.939	Open Manhole	1800
40.008	17.671	570.0	84	5.189	1.702	2.887	Open Manhole	1500
40.009	13.124	570.6	85	4.328	1.679	2.049	Open Manhole	1500
40.010	30.235	570.5	90	4.300	1.626	2.074	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
60.000	M50	-33	86	4.344	4.179	0.000	Junction	
60.001	o	225	87	4.421	3.616	0.580	Open Manhole	600
61.000	K40	-22	88	4.264	4.009	0.000	Junction	
61.001	o	150	89	4.273	3.278	0.845	Open Manhole	600
40.011	o	600	90	4.300	1.626	2.074	Open Manhole	1500
62.000	K40	-22	91	4.267	4.012	0.000	Junction	
63.000	K40	-22	92	4.280	4.025	0.000	Junction	
62.001	o	225	93	4.195	3.480	0.490	Open Manhole	600
40.012	o	600	94	4.259	1.555	2.104	Open Manhole	1500
64.000	M51	-34	95	4.403	4.188	0.000	Junction	
64.001	o	225	96	4.659	3.949	0.485	Open Manhole	600
40.013	o	600	97	4.417	1.471	2.346	Open Manhole	1500
65.000	K40	-22	98	4.272	4.017	0.000	Junction	
66.000	K40	-22	99	4.283	4.028	0.000	Junction	
65.001	o	225	100	4.239	3.524	0.490	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
60.000	29.763	198.4	87	4.421	4.029	0.227	Open Manhole	600
60.001	4.574	152.5	90	4.300	3.586	0.489	Open Manhole	1500
61.000	29.639	302.4	89	4.273	3.911	0.107	Open Manhole	600
61.001	2.083	99.2	90	4.300	3.257	0.893	Open Manhole	1500
40.011	40.287	567.4	94	4.259	1.555	2.104	Open Manhole	1500
62.000	39.004	534.3	93	4.195	3.939	0.001	Open Manhole	600
63.000	47.954	479.5	93	4.195	3.925	0.015	Open Manhole	600
62.001	2.511	100.4	94	4.259	3.455	0.579	Open Manhole	1500
40.012	48.070	572.3	97	4.417	1.471	2.346	Open Manhole	1500
64.000	15.890	201.1	96	4.659	4.109	0.335	Open Manhole	600
64.001	4.315	50.2	97	4.417	3.863	0.329	Open Manhole	1500
40.013	28.654	584.8	101	4.294	1.422	2.272	Open Manhole	1500
65.000	27.346	536.2	100	4.239	3.966	0.018	Open Manhole	600
66.000	26.131	533.3	100	4.239	3.979	0.005	Open Manhole	600
65.001	2.483	99.3	101	4.294	3.499	0.570	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
40.014	o	600	101	4.294	1.422	2.272	Open Manhole	1500
40.015	o	600	102	4.336	1.377	2.359	Open Manhole	1500
67.000	K40	-22	103	4.286	4.031	0.000	Junction	
68.000	K40	-22	104	4.206	3.951	0.000	Junction	
67.001	o	225	105	4.217	3.502	0.490	Open Manhole	600
40.016	o	600	106	4.291	1.326	2.365	Open Manhole	1500
69.000	M50	-33	107	5.050	4.885	0.000	Junction	
70.000	M50	-33	108	5.152	4.987	0.000	Junction	
69.001	o	225	109	5.050	4.338	0.487	Open Manhole	600
69.002	o	225	110	5.075	3.900	0.950	Open Manhole	1200
71.000	o	525	111	5.345	3.830	0.990	Open Manhole	1500
71.001	o	525	112	4.854	3.492	0.837	Open Manhole	1500
72.000	M50	-33	113	5.050	4.885	0.000	Junction	
73.000	M50	-33	114	5.048	4.883	0.000	Junction	
72.001	o	225	115	5.051	4.341	0.485	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
40.014	26.060	579.1	102	4.336	1.377	2.359	Open Manhole	1500
40.015	29.595	580.3	106	4.291	1.326	2.365	Open Manhole	1500
67.000	28.086	379.5	105	4.217	3.957	0.005	Open Manhole	600
68.000	26.214	452.0	105	4.217	3.893	0.069	Open Manhole	600
67.001	2.640	101.5	106	4.291	3.476	0.590	Open Manhole	1500
40.016	26.074	592.6	130	4.271	1.282	2.389	Open Manhole	1500
69.000	22.228	193.3	109	5.050	4.770	0.115	Open Manhole	600
70.000	27.895	114.8	109	5.050	4.744	0.141	Open Manhole	600
69.001	2.216	138.5	110	5.075	4.322	0.528	Open Manhole	1200
69.002	46.454	110.1	117	5.090	3.478	1.387	Open Manhole	1500
71.000	21.968	65.0	112	4.854	3.492	0.837	Open Manhole	1500
71.001	30.194	165.0	116	5.088	3.309	1.254	Open Manhole	1500
72.000	14.955	199.4	115	5.051	4.810	0.076	Open Manhole	600
73.000	43.934	199.7	115	5.051	4.663	0.223	Open Manhole	600
72.001	2.311	135.9	116	5.088	4.324	0.539	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
71.002	o	525	116	5.088	3.309	1.254	Open Manhole	1500
69.003	o	525	117	5.090	3.178	1.387	Open Manhole	1500
74.000	M50	-33	118	5.252	5.087	0.000	Junction	
75.000	M50	-33	119	5.217	5.052	0.000	Junction	
74.001	o	225	120	5.282	4.592	0.465	Open Manhole	600
74.002	o	225	121	5.335	4.155	0.955	Open Manhole	1200
76.000	M50	-33	122	5.294	5.129	0.000	Junction	
77.000	M50	-33	123	5.253	5.088	0.000	Junction	
76.001	o	225	124	5.380	4.623	0.532	Open Manhole	600
76.002	o	300	125	5.387	4.100	0.987	Open Manhole	1200
74.003	o	300	126	5.372	3.694	1.378	Open Manhole	1200
69.004	o	525	127	5.343	3.127	1.691	Open Manhole	1500
69.005	o	600	128	5.346	3.011	1.735	Open Manhole	1500
69.006	o	600	129	5.221	2.675	1.946	Open Manhole	1800
40.017	o	675	130	4.271	1.207	2.389	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
71.002	20.826	200.3	117	5.090	3.205	1.360	Open Manhole	1500
69.003	10.158	199.2	127	5.343	3.127	1.691	Open Manhole	1500
74.000	15.432	200.4	120	5.282	5.010	0.107	Open Manhole	600
75.000	24.164	199.7	120	5.282	4.931	0.186	Open Manhole	600
74.001	7.141	134.7	121	5.335	4.539	0.571	Open Manhole	1200
74.002	38.598	100.0	126	5.372	3.769	1.378	Open Manhole	1200
76.000	21.311	143.0	124	5.380	4.980	0.235	Open Manhole	600
77.000	36.983	199.9	124	5.380	4.903	0.312	Open Manhole	600
76.001	6.932	135.9	125	5.387	4.572	0.590	Open Manhole	1200
76.002	15.329	100.2	126	5.372	3.947	1.125	Open Manhole	1200
74.003	9.582	149.7	127	5.343	3.630	1.413	Open Manhole	1500
69.004	8.050	196.3	128	5.346	3.086	1.735	Open Manhole	1500
69.005	48.474	351.3	129	5.221	2.873	1.748	Open Manhole	1800
69.006	26.423	110.1	130	4.271	2.435	1.236	Open Manhole	1500
40.017	23.062	576.6	136	4.272	1.167	2.430	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
78.000	M51	-34	131	4.385	4.170	0.000	Junction	
78.001	o	225	132	4.445	3.676	0.544	Open Manhole	600
79.000	K40	-22	133	4.206	3.951	0.000	Junction	
80.000	K40	-22	134	4.210	3.955	0.000	Junction	
79.001	o	225	135	4.210	3.495	0.490	Open Manhole	600
40.018	o	675	136	4.272	1.167	2.430	Open Manhole	1500
40.019	o	675	137	4.288	1.082	2.531	Open Manhole	1500
81.000	K40	-22	138	4.210	3.955	0.000	Junction	
81.001	o	225	139	4.208	3.493	0.490	Open Manhole	600
40.020	o	675	140	4.273	0.995	2.603	Open Manhole	1500
40.021	o	675	141	4.165	0.910	2.580	Open Manhole	1500
82.000	M50	-33	142	5.025	4.860	0.000	Junction	
83.000	M50	-33	143	5.217	5.052	0.000	Junction	
82.001	o	225	144	5.050	4.331	0.494	Open Manhole	600
82.002	o	225	145	5.072	3.902	0.945	Open Manhole	1200
84.000	M50	-33	146	5.196	5.031	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
78.000	13.898	201.4	132	4.445	4.101	0.129	Open Manhole	600
78.001	4.640	49.9	136	4.272	3.583	0.464	Open Manhole	1500
79.000	21.656	349.3	135	4.210	3.889	0.066	Open Manhole	600
80.000	49.762	391.8	135	4.210	3.828	0.127	Open Manhole	600
79.001	2.498	99.9	136	4.272	3.470	0.577	Open Manhole	1500
40.018	49.658	584.2	137	4.288	1.082	2.531	Open Manhole	1500
40.019	50.626	581.9	140	4.273	0.995	2.603	Open Manhole	1500
81.000	49.583	364.6	139	4.208	3.819	0.134	Open Manhole	600
81.001	3.081	128.4	140	4.273	3.469	0.579	Open Manhole	1500
40.020	43.071	506.7	141	4.165	0.910	2.580	Open Manhole	1500
40.021	56.754	667.7	172	4.246	0.825	2.746	Open Manhole	1800
82.000	42.267	200.3	144	5.050	4.649	0.236	Open Manhole	600
83.000	35.967	174.6	144	5.050	4.846	0.039	Open Manhole	600
82.001	2.269	133.5	145	5.072	4.314	0.533	Open Manhole	1200
82.002	43.147	159.8	154	5.063	3.632	1.206	Open Manhole	1500
84.000	31.127	199.5	148	5.061	4.875	0.021	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
85.000	M50	-33	147	5.064	4.899	0.000	Junction	
84.001	o	225	148	5.061	4.395	0.441	Open Manhole	600
84.002	o	225	149	5.060	3.877	0.958	Open Manhole	1200
86.000	M50	-33	150	5.063	4.898	0.000	Junction	
87.000	M50	-33	151	5.026	4.861	0.000	Junction	
86.001	o	225	152	5.050	4.336	0.489	Open Manhole	600
84.003	o	300	153	5.069	3.442	1.327	Open Manhole	1200
82.003	o	450	154	5.063	2.947	1.666	Open Manhole	1500
88.000	M50	-33	155	5.239	5.074	0.000	Junction	
89.000	M50	-33	156	5.251	5.086	0.000	Junction	
88.001	o	225	157	5.289	4.546	0.518	Open Manhole	600
88.002	o	225	158	5.337	4.197	0.915	Open Manhole	1200
90.000	M50	-33	159	5.253	5.088	0.000	Junction	
91.000	M50	-33	160	5.203	5.038	0.000	Junction	
90.001	o	225	161	5.312	4.640	0.447	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
85.000	13.599	200.0	148	5.061	4.831	0.065	Open Manhole	600
84.001	2.362	102.7	149	5.060	4.372	0.463	Open Manhole	1200
84.002	46.795	130.0	153	5.069	3.517	1.327	Open Manhole	1200
86.000	31.946	199.7	152	5.050	4.738	0.147	Open Manhole	600
87.000	39.422	200.1	152	5.050	4.664	0.221	Open Manhole	600
86.001	2.346	138.0	153	5.069	4.319	0.525	Open Manhole	1200
84.003	40.502	117.4	154	5.063	3.097	1.666	Open Manhole	1500
82.003	8.009	210.8	168	5.187	2.909	1.828	Open Manhole	1500
88.000	21.802	200.0	157	5.289	4.965	0.159	Open Manhole	600
89.000	23.311	199.2	157	5.289	4.969	0.155	Open Manhole	600
88.001	6.674	136.2	158	5.337	4.497	0.615	Open Manhole	1200
88.002	40.816	162.6	162	5.343	3.946	1.172	Open Manhole	1200
90.000	16.035	200.4	161	5.312	5.008	0.139	Open Manhole	600
91.000	40.537	199.7	161	5.312	4.835	0.312	Open Manhole	600
90.001	6.460	100.9	162	5.343	4.576	0.542	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
88.003	o	300	162	5.343	3.871	1.172	Open Manhole	1200
92.000	M22	-38	163	5.203	4.893	0.000	Junction	
93.000	M20	-36	164	5.369	5.155	0.004	Junction	
92.001	o	225	165	5.204	4.494	0.485	Open Manhole	600
92.002	o	300	166	5.296	4.074	0.922	Open Manhole	1200
88.004	o	450	167	5.309	3.470	1.389	Open Manhole	1500
82.004	o	450	168	5.187	2.909	1.828	Open Manhole	1500
82.005	o	450	169	5.175	2.842	1.883	Open Manhole	1500
82.006	o	450	170	5.429	2.623	2.356	Open Manhole	1500
82.007	o	450	171	5.258	2.512	2.296	Open Manhole	1500
40.022	o	750	172	4.246	0.750	2.746	Open Manhole	1800
94.000	M22	-38	173	5.276	4.966	0.000	Junction	
95.000	M22	-38	174	5.610	5.300	0.000	Junction	
94.001	o	300	175	5.277	4.586	0.391	Open Manhole	600
94.002	o	300	176	5.242	4.064	0.878	Open Manhole	1200
96.000	M22	-38	177	5.516	5.206	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
88.003	37.794	150.6	167	5.309	3.620	1.389	Open Manhole	1500
92.000	38.891	200.5	165	5.204	4.699	0.195	Open Manhole	600
93.000	37.077	200.4	165	5.204	4.970	0.024	Open Manhole	600
92.001	6.533	49.9	166	5.296	4.363	0.708	Open Manhole	1200
92.002	43.253	170.3	167	5.309	3.820	1.189	Open Manhole	1500
88.004	8.212	293.3	168	5.187	3.442	1.295	Open Manhole	1500
82.004	8.979	134.0	169	5.175	2.842	1.883	Open Manhole	1500
82.005	63.389	289.4	170	5.429	2.623	2.356	Open Manhole	1500
82.006	8.313	286.7	171	5.258	2.594	2.214	Open Manhole	1500
82.007	15.423	200.0	172	4.246	2.435	1.361	Open Manhole	1800
40.022	16.971	771.4	195	4.258	0.728	2.780	Open Manhole	1800
94.000	35.553	199.7	175	5.277	4.788	0.179	Open Manhole	600
95.000	40.798	122.5	175	5.277	4.967	0.000	Open Manhole	600
94.001	3.191	39.9	176	5.242	4.506	0.436	Open Manhole	1200
94.002	38.902	155.0	181	5.246	3.813	1.133	Open Manhole	1500
96.000	35.562	114.7	179	5.363	4.896	0.157	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
97.000	M22	-38	178	5.276	4.966	0.000	Junction	
96.001	o	300	179	5.363	4.670	0.393	Open Manhole	600
96.002	o	300	180	5.330	4.137	0.893	Open Manhole	1200
94.003	o	375	181	5.246	3.734	1.137	Open Manhole	1500
98.000	M20	-36	182	5.166	4.956	0.000	Junction	
99.000	M20	-36	183	5.073	4.863	0.000	Junction	
98.001	o	225	184	5.150	4.450	0.475	Open Manhole	600
98.002	o	225	185	5.150	3.953	0.972	Open Manhole	1200
100.000	M20	-36	186	5.072	4.862	0.000	Junction	
101.000	M20	-36	187	5.297	5.087	0.000	Junction	
100.001	o	300	188	5.050	4.376	0.374	Open Manhole	600
100.002	o	300	189	5.050	3.875	0.875	Open Manhole	1200
98.003	o	450	190	5.100	3.353	1.297	Open Manhole	1500
94.004	o	525	191	5.149	3.186	1.438	Open Manhole	1500
94.005	o	525	192	5.159	3.145	1.489	Open Manhole	1500
94.006	o	525	193	5.243	2.999	1.719	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
97.000	41.456	200.3	179	5.363	4.759	0.294	Open Manhole	600
96.001	3.341	27.9	180	5.330	4.550	0.480	Open Manhole	1200
96.002	39.309	119.8	181	5.246	3.809	1.137	Open Manhole	1500
94.003	10.380	150.4	191	5.149	3.665	1.109	Open Manhole	1500
98.000	26.606	140.0	184	5.150	4.766	0.174	Open Manhole	600
99.000	28.027	115.3	184	5.150	4.620	0.320	Open Manhole	600
98.001	1.224	102.0	185	5.150	4.438	0.487	Open Manhole	1200
98.002	25.915	144.8	190	5.100	3.774	1.101	Open Manhole	1500
100.000	35.881	200.5	188	5.050	4.683	0.157	Open Manhole	600
101.000	40.277	163.1	188	5.050	4.840	0.000	Open Manhole	600
100.001	1.397	99.8	189	5.050	4.362	0.388	Open Manhole	1200
100.002	38.906	104.6	190	5.100	3.503	1.297	Open Manhole	1500
98.003	9.156	99.5	191	5.149	3.261	1.438	Open Manhole	1500
94.004	5.577	136.0	192	5.159	3.145	1.489	Open Manhole	1500
94.005	44.009	301.4	193	5.243	2.999	1.719	Open Manhole	1500
94.006	15.013	405.8	194	5.305	2.962	1.818	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
94.007	o	600	194	5.305	2.500	2.205	Open Manhole	1500
40.023	o	750	195	4.258	0.678	2.830	Open Manhole	1800
102.000	o	150	196	4.411	3.087	1.174	Open Manhole	1200
102.001	o	150	197	4.399	3.006	1.243	Open Manhole	1200
102.002	o	150	198	4.414	2.924	1.340	Open Manhole	1200
103.000	K8s	-24	199	4.231	3.876	0.000	Junction	
104.000	K40	-22	200	4.204	3.949	0.000	Junction	
103.001	o	225	201	4.217	3.377	0.615	Open Manhole	600
102.003	o	225	202	4.250	2.589	1.436	Open Manhole	1200
105.000	M50	-33	203	4.295	4.130	0.000	Junction	
105.001	o	150	204	4.253	3.546	0.557	Open Manhole	600
102.004	o	150	205	4.250	2.641	1.459	Open Manhole	1200
40.024	o	750	206	4.274	0.653	2.871	Open Manhole	1800
106.000	M20	-36	207	4.244	4.034	0.000	Junction	
106.001	M20	-36	208	4.236	3.958	0.068	Junction	
106.002	M22	-38	209	4.211	3.740	0.161	Junction	
106.003	M22	-38	210	4.200	3.668	0.222	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
94.007	9.160	91.6	195	4.258	2.400	1.258	Open Manhole	1800
40.023	19.191	767.6	206	4.274	0.653	2.871	Open Manhole	1800
102.000	8.248	101.8	197	4.399	3.006	1.243	Open Manhole	1200
102.001	8.322	101.5	198	4.414	2.924	1.340	Open Manhole	1200
102.002	26.028	100.1	202	4.250	2.664	1.436	Open Manhole	1200
103.000	24.821	1772.9	201	4.217	3.862	0.000	Open Manhole	600
104.000	23.575	444.8	201	4.217	3.896	0.066	Open Manhole	600
103.001	1.977	76.0	202	4.250	3.351	0.674	Open Manhole	1200
102.003	22.839	100.2	205	4.250	2.361	1.664	Open Manhole	1200
105.000	24.139	574.7	204	4.253	4.088	0.000	Open Manhole	600
105.001	5.366	54.8	205	4.250	3.448	0.652	Open Manhole	1200
102.004	13.449	44.1	206	4.274	2.336	1.788	Open Manhole	1800
40.024	7.663	766.3	215	4.263	0.643	2.870	Open Manhole	1800
106.000	13.676	179.9	208	4.236	3.958	0.068	Junction	
106.001	18.677	158.3	209	4.211	3.840	0.161	Junction	
106.002	12.131	168.5	210	4.200	3.668	0.222	Junction	
106.003	10.565	199.3	213	4.206	3.615	0.281	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
107.000	M50	-33	211	4.255	4.090	0.000	Junction	
107.001	M22	-38	212	4.235	3.854	0.071	Junction	
106.004	o	225	213	4.206	3.496	0.485	Open Manhole	600
106.005	o	300	214	4.250	2.987	0.963	Open Manhole	1200
40.025	o	750	215	4.263	0.643	2.870	Open Manhole	1800
108.000	M50	-33	216	4.418	4.253	0.000	Junction	
109.000	M50	-33	217	4.324	4.159	0.000	Junction	
108.001	o	150	218	4.358	3.663	0.545	Open Manhole	600
108.002	o	150	219	4.400	3.623	0.627	Open Manhole	1200
108.003	o	300	220	4.494	3.113	1.081	Open Manhole	1200
40.026	o	750	221	4.390	0.617	3.023	Open Manhole	1800
40.027	o	750	222	4.370	0.607	3.013	Open Manhole	1800
40.028	o	750	223	4.278	0.556	2.972	Open Manhole	1800
40.029	o	450	224	4.385	0.521	3.414	Open Manhole	1800
110.000	M50	-33	225	4.247	4.082	0.000	Junction	
111.000	M50	-33	226	4.239	4.074	0.000	Junction	
110.001	o	150	227	4.244	3.534	0.560	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
107.000	14.227	156.3	212	4.235	3.999	0.071	Junction	
107.001	9.847	126.2	213	4.206	3.776	0.120	Open Manhole	600
106.004	3.651	28.1	214	4.250	3.366	0.659	Open Manhole	1200
106.005	17.359	99.8	215	4.263	2.813	1.150	Open Manhole	1800
40.025	20.209	777.3	221	4.390	0.617	3.023	Open Manhole	1800
108.000	25.003	147.1	218	4.358	4.083	0.110	Open Manhole	600
109.000	15.135	199.1	218	4.358	4.083	0.110	Open Manhole	600
108.001	4.022	100.6	219	4.400	3.623	0.627	Open Manhole	1200
108.002	30.546	84.9	220	4.494	3.263	1.081	Open Manhole	1200
108.003	12.905	243.5	221	4.390	3.060	1.030	Open Manhole	1800
40.026	5.989	748.6	222	4.370	0.609	3.011	Open Manhole	1800
40.027	38.239	749.8	223	4.278	0.556	2.972	Open Manhole	1800
40.028	25.184	740.7	224	4.385	0.522	3.113	Open Manhole	1800
40.029	24.867	410.0	256	4.258	0.460	3.347	Open Manhole	1500
110.000	18.307	192.7	227	4.244	3.987	0.092	Open Manhole	600
111.000	19.057	200.6	227	4.244	3.979	0.100	Open Manhole	600
110.001	7.532	100.4	228	4.299	3.459	0.690	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
110.002	o	225	228	4.299	3.100	0.974	Open Manhole	1200
112.000	M50	-33	229	5.165	4.973	0.027	Junction	
112.001	o	150	230	5.284	4.424	0.710	Open Manhole	600
112.002	o	150	231	5.220	3.474	1.596	Open Manhole	1200
113.000	M20	-36	232	4.311	4.101	0.000	Junction	
113.001	o	225	233	4.349	3.543	0.581	Open Manhole	600
114.000	o	150	234	4.369	3.000	1.219	Open Manhole	1200
114.001	o	150	235	4.454	2.834	1.470	Open Manhole	1200
115.000	M50	-33	236	4.240	4.075	0.000	Junction	
115.001	M22	-38	237	4.236	3.781	0.145	Junction	
116.000	M50	-33	238	4.235	4.070	0.000	Junction	
115.002	o	225	239	4.235	3.478	0.532	Open Manhole	600
114.002	o	225	240	4.264	2.690	1.349	Open Manhole	1200
117.000	K40	-22	241	4.235	3.980	0.000	Junction	
118.000	K40	-22	242	4.238	3.983	0.000	Junction	
117.001	o	150	243	4.353	3.361	0.842	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
110.002	18.876	82.4	246	4.300	2.871	1.204	Open Manhole	1500
112.000	23.548	107.0	230	5.284	4.753	0.366	Open Manhole	600
112.001	7.143	101.0	231	5.220	4.353	0.717	Open Manhole	1200
112.002	20.264	36.0	245	4.260	2.911	1.199	Open Manhole	1500
113.000	30.356	195.8	233	4.349	3.946	0.193	Open Manhole	600
113.001	5.846	129.9	244	4.261	3.498	0.538	Open Manhole	1200
114.000	16.768	101.0	235	4.454	2.834	1.470	Open Manhole	1200
114.001	6.878	100.0	240	4.264	2.765	1.349	Open Manhole	1200
115.000	28.722	192.8	237	4.236	3.926	0.145	Junction	
115.001	9.686	179.4	239	4.235	3.727	0.198	Open Manhole	600
116.000	7.958	199.0	239	4.235	4.030	0.040	Open Manhole	600
115.002	2.483	118.2	240	4.264	3.457	0.582	Open Manhole	1200
114.002	40.925	129.9	244	4.261	2.375	1.661	Open Manhole	1200
117.000	32.042	5340.3	243	4.353	3.974	0.124	Open Manhole	600
118.000	15.684	1742.7	243	4.353	3.974	0.124	Open Manhole	600
117.001	2.597	99.9	244	4.261	3.335	0.776	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
113.002	o	300	244	4.261	2.300	1.661	Open Manhole	1200
112.003	o	450	245	4.260	2.118	1.692	Open Manhole	1500
110.003	o	525	246	4.300	1.993	1.782	Open Manhole	1500
119.000	M50	-33	247	4.399	4.234	0.000	Junction	
120.000	M50	-33	248	4.323	4.157	0.001	Junction	
119.001	o	225	249	4.360	3.650	0.485	Open Manhole	600
119.002	o	225	250	4.412	3.192	0.995	Open Manhole	1200
119.003	o	225	251	4.371	2.961	1.185	Open Manhole	1200
110.004	o	525	252	4.324	1.973	1.826	Open Manhole	1500
110.005	o	525	253	4.376	1.951	1.900	Open Manhole	1500
110.006	o	525	254	4.394	1.823	2.046	Open Manhole	1500
110.007	o	525	255	4.258	1.704	2.029	Open Manhole	1500
40.030	o	375	256	4.258	0.460	3.423	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
113.002	7.791	243.5	245	4.260	2.268	1.692	Open Manhole	1500
112.003	11.966	239.3	246	4.300	2.068	1.782	Open Manhole	1500
110.003	3.966	198.3	252	4.324	1.973	1.826	Open Manhole	1500
119.000	15.510	139.7	249	4.360	4.123	0.072	Open Manhole	600
120.000	14.640	200.5	249	4.360	4.084	0.111	Open Manhole	600
119.001	7.339	100.5	250	4.412	3.577	0.610	Open Manhole	1200
119.002	19.444	84.2	251	4.371	2.961	1.185	Open Manhole	1200
119.003	5.894	99.9	252	4.324	2.902	1.197	Open Manhole	1500
110.004	5.512	250.5	253	4.376	1.951	1.900	Open Manhole	1500
110.005	38.314	299.3	254	4.394	1.823	2.046	Open Manhole	1500
110.006	24.919	209.4	255	4.258	1.704	2.029	Open Manhole	1500
110.007	7.783	251.1	256	4.258	1.673	2.060	Open Manhole	1500
40.030	4.573	304.9	97	4.240	0.445	3.420	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
40.000	User	-	90	0.035	0.032	0.032
41.000	User	-	90	0.019	0.017	0.017
40.001	User	-	90	0.036	0.032	0.032
40.002	-	-	100	0.000	0.000	0.000
42.000	User	-	90	0.023	0.021	0.021
43.000	User	-	90	0.019	0.017	0.017
42.001	User	-	90	0.034	0.031	0.031
40.003	-	-	100	0.000	0.000	0.000
44.000	User	-	90	0.036	0.032	0.032
44.001	User	-	90	0.011	0.010	0.010
44.002	-	-	100	0.000	0.000	0.000
45.000	User	-	90	0.034	0.030	0.030
46.000	User	-	90	0.026	0.023	0.023
45.001	User	-	90	0.017	0.015	0.015
40.004	-	-	100	0.000	0.000	0.000
47.000	User	-	90	0.067	0.061	0.061
47.001	-	-	100	0.000	0.000	0.000
48.000	User	-	90	0.022	0.020	0.020
	User	-	90	0.009	0.008	0.028
49.000	User	-	90	0.022	0.020	0.020
48.001	User	-	90	0.022	0.019	0.019
50.000	User	-	90	0.029	0.026	0.026
51.000	User	-	90	0.032	0.029	0.029
50.001	User	-	90	0.044	0.039	0.039
47.002	User	-	90	0.221	0.199	0.199
52.000	User	-	90	0.018	0.016	0.016
53.000	User	-	90	0.024	0.021	0.021
52.001	User	-	90	0.019	0.017	0.017
54.000	User	-	90	0.043	0.039	0.039
55.000	User	-	90	0.033	0.030	0.030
54.001	User	-	90	0.037	0.033	0.033
52.002	-	-	100	0.000	0.000	0.000
40.005	-	-	100	0.000	0.000	0.000
56.000	User	-	90	0.029	0.026	0.026
57.000	User	-	90	0.034	0.031	0.031
56.001	User	-	90	0.029	0.026	0.026
56.002	-	-	100	0.000	0.000	0.000
58.000	User	-	90	0.030	0.027	0.027
59.000	User	-	90	0.030	0.027	0.027
58.001	User	-	90	0.030	0.027	0.027
58.002	-	-	100	0.000	0.000	0.000
56.003	-	-	100	0.000	0.000	0.000
40.006	-	-	100	0.000	0.000	0.000
40.007	-	-	100	0.000	0.000	0.000
40.008	-	-	100	0.000	0.000	0.000
40.009	-	-	100	0.000	0.000	0.000
40.010	-	-	100	0.000	0.000	0.000
60.000	-	-	100	0.000	0.000	0.000
60.001	User	-	90	0.107	0.096	0.096
61.000	User	-	90	0.019	0.017	0.017
61.001	User	-	90	0.014	0.013	0.013
40.011	User	-	30	0.031	0.009	0.009
62.000	User	-	90	0.030	0.027	0.027
63.000	User	-	90	0.044	0.040	0.040
62.001	User	-	90	0.030	0.027	0.027
40.012	-	-	100	0.000	0.000	0.000
64.000	User	-	90	0.027	0.024	0.024
64.001	User	-	30	0.008	0.002	0.002
40.013	User	-	30	0.025	0.008	0.008
65.000	User	-	90	0.030	0.027	0.027
66.000	User	-	90	0.021	0.019	0.019
65.001	User	-	90	0.016	0.014	0.014

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
40.014	-	-	100	0.000	0.000	0.000
40.015	-	-	100	0.000	0.000	0.000
67.000	User	-	90	0.021	0.019	0.019
68.000	User	-	90	0.022	0.020	0.020
67.001	User	-	90	0.020	0.018	0.018
40.016	-	-	100	0.000	0.000	0.000
69.000	User	-	90	0.025	0.023	0.023
70.000	User	-	90	0.032	0.028	0.028
69.001	User	-	90	0.058	0.052	0.052
69.002	-	-	100	0.000	0.000	0.000
71.000	User	-	90	0.366	0.329	0.329
71.001	-	-	100	0.000	0.000	0.000
72.000	User	-	90	0.043	0.039	0.039
73.000	User	-	90	0.041	0.037	0.037
72.001	User	-	90	0.063	0.057	0.057
71.002	-	-	100	0.000	0.000	0.000
69.003	-	-	100	0.000	0.000	0.000
74.000	User	-	90	0.032	0.029	0.029
75.000	User	-	90	0.055	0.050	0.050
74.001	User	-	90	0.018	0.016	0.016
74.002	-	-	100	0.000	0.000	0.000
76.000	User	-	90	0.051	0.046	0.046
77.000	User	-	90	0.052	0.047	0.047
76.001	User	-	90	0.042	0.038	0.038
76.002	-	-	100	0.000	0.000	0.000
74.003	-	-	100	0.000	0.000	0.000
69.004	-	-	100	0.000	0.000	0.000
69.005	-	-	100	0.000	0.000	0.000
69.006	-	-	100	0.000	0.000	0.000
40.017	-	-	100	0.000	0.000	0.000
78.000	User	-	90	0.063	0.057	0.057
78.001	-	-	100	0.000	0.000	0.000
79.000	User	-	90	0.015	0.013	0.013
80.000	User	-	90	0.043	0.039	0.039
79.001	User	-	90	0.013	0.011	0.011
40.018	-	-	100	0.000	0.000	0.000
40.019	-	-	100	0.000	0.000	0.000
81.000	User	-	90	0.035	0.031	0.031
81.001	User	-	90	0.034	0.031	0.031
40.020	-	-	100	0.000	0.000	0.000
40.021	User	-	90	0.047	0.043	0.043
82.000	User	-	90	0.040	0.036	0.036
83.000	User	-	90	0.054	0.048	0.048
82.001	User	-	90	0.053	0.048	0.048
82.002	-	-	100	0.000	0.000	0.000
84.000	User	-	90	0.061	0.055	0.055
85.000	-	-	100	0.000	0.000	0.000
84.001	User	-	90	0.065	0.059	0.059
84.002	-	-	100	0.000	0.000	0.000
86.000	User	-	90	0.041	0.037	0.037
87.000	User	-	90	0.067	0.060	0.060
86.001	User	-	90	0.036	0.032	0.032
84.003	-	-	100	0.000	0.000	0.000
82.003	-	-	100	0.000	0.000	0.000
88.000	User	-	90	0.044	0.040	0.040
89.000	User	-	90	0.038	0.034	0.034
88.001	User	-	90	0.038	0.034	0.034
88.002	-	-	100	0.000	0.000	0.000
90.000	User	-	90	0.035	0.031	0.031
91.000	User	-	90	0.051	0.046	0.046
90.001	User	-	90	0.043	0.039	0.039
88.003	-	-	100	0.000	0.000	0.000

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
92.000	User	-	90	0.052	0.047	0.047
93.000	User	-	90	0.066	0.060	0.060
92.001	User	-	90	0.064	0.058	0.058
92.002	-	-	100	0.000	0.000	0.000
88.004	-	-	100	0.000	0.000	0.000
82.004	-	-	100	0.000	0.000	0.000
82.005	-	-	100	0.000	0.000	0.000
82.006	-	-	100	0.000	0.000	0.000
82.007	-	-	100	0.000	0.000	0.000
40.022	User	-	90	0.041	0.037	0.037
94.000	User	-	90	0.070	0.063	0.063
95.000	User	-	90	0.071	0.063	0.063
94.001	User	-	90	0.048	0.044	0.044
94.002	-	-	100	0.000	0.000	0.000
96.000	User	-	90	0.056	0.051	0.051
	User	-	90	0.079	0.071	0.122
97.000	User	-	90	0.062	0.056	0.056
96.001	User	-	90	0.054	0.048	0.048
96.002	-	-	100	0.000	0.000	0.000
94.003	-	-	100	0.000	0.000	0.000
98.000	-	-	100	0.000	0.000	0.000
99.000	User	-	90	0.051	0.046	0.046
98.001	User	-	90	0.061	0.055	0.055
98.002	-	-	100	0.000	0.000	0.000
100.000	User	-	90	0.059	0.053	0.053
101.000	User	-	90	0.061	0.055	0.055
100.001	User	-	90	0.074	0.067	0.067
100.002	-	-	100	0.000	0.000	0.000
98.003	-	-	100	0.000	0.000	0.000
94.004	-	-	100	0.000	0.000	0.000
94.005	-	-	100	0.000	0.000	0.000
94.006	-	-	100	0.000	0.000	0.000
94.007	-	-	100	0.000	0.000	0.000
40.023	User	-	90	0.013	0.011	0.011
102.000	-	-	100	0.000	0.000	0.000
102.001	-	-	100	0.000	0.000	0.000
102.002	-	-	100	0.000	0.000	0.000
103.000	User	-	90	0.029	0.026	0.026
104.000	User	-	90	0.021	0.019	0.019
103.001	-	-	100	0.000	0.000	0.000
102.003	User	-	90	0.045	0.041	0.041
105.000	User	-	90	0.013	0.011	0.011
105.001	User	-	90	0.006	0.006	0.006
102.004	-	-	100	0.000	0.000	0.000
40.024	-	-	100	0.000	0.000	0.000
106.000	User	-	90	0.013	0.012	0.012
	User	-	90	0.008	0.007	0.019
106.001	User	-	90	0.019	0.017	0.017
106.002	User	-	90	0.019	0.017	0.017
106.003	User	-	90	0.033	0.030	0.030
107.000	User	-	90	0.032	0.029	0.029
	User	-	90	0.010	0.009	0.037
107.001	User	-	90	0.050	0.045	0.045
	User	-	90	0.012	0.010	0.056
106.004	-	-	100	0.000	0.000	0.000
106.005	-	-	100	0.000	0.000	0.000
40.025	-	-	100	0.000	0.000	0.000
108.000	User	-	90	0.016	0.015	0.015
109.000	User	-	90	0.010	0.009	0.009
108.001	-	-	100	0.000	0.000	0.000
108.002	-	-	100	0.000	0.000	0.000
108.003	-	-	100	0.000	0.000	0.000

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
40.026	-	-	100	0.000	0.000	0.000
40.027	-	-	100	0.000	0.000	0.000
40.028	-	-	100	0.000	0.000	0.000
40.029	-	-	100	0.000	0.000	0.000
110.000	User	-	90	0.032	0.029	0.029
	User	-	30	0.006	0.002	0.031
111.000	User	-	90	0.033	0.030	0.030
	User	-	30	0.004	0.001	0.031
110.001	-	-	100	0.000	0.000	0.000
110.002	-	-	100	0.000	0.000	0.000
112.000	User	-	90	0.027	0.025	0.025
112.001	User	-	90	0.030	0.027	0.027
112.002	-	-	100	0.000	0.000	0.000
113.000	User	-	90	0.093	0.084	0.084
113.001	User	-	90	0.009	0.008	0.008
114.000	User	-	90	0.014	0.013	0.013
114.001	User	-	90	0.024	0.022	0.022
115.000	User	-	90	0.034	0.030	0.030
115.001	User	-	90	0.014	0.013	0.013
	User	-	90	0.010	0.009	0.022
	User	-	90	0.040	0.036	0.057
116.000	User	-	90	0.009	0.008	0.008
	User	-	90	0.018	0.017	0.025
115.002	User	-	90	0.007	0.006	0.006
114.002	-	-	100	0.000	0.000	0.000
117.000	User	-	90	0.016	0.015	0.015
118.000	User	-	90	0.008	0.007	0.007
	User	-	30	0.011	0.003	0.010
117.001	User	-	30	0.027	0.008	0.008
	User	-	90	0.009	0.008	0.016
	User	-	90	0.007	0.006	0.022
113.002	-	-	100	0.000	0.000	0.000
112.003	-	-	100	0.000	0.000	0.000
110.003	-	-	100	0.000	0.000	0.000
119.000	User	-	90	0.061	0.055	0.055
120.000	User	-	90	0.051	0.046	0.046
119.001	-	-	100	0.000	0.000	0.000
119.002	-	-	100	0.000	0.000	0.000
119.003	-	-	100	0.000	0.000	0.000
110.004	-	-	100	0.000	0.000	0.000
110.005	-	-	100	0.000	0.000	0.000
110.006	-	-	100	0.000	0.000	0.000
110.007	-	-	100	0.000	0.000	0.000
40.030	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				5.291	4.695	4.695

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Online Controls for Storm

Hydro-Brake Optimum® Manhole: 83, DS/PN: 40.008, Volume (m³): 19.6

Unit Reference	MD-SHE-0135-1070-2000-1070
Design Head (m)	2.000
Design Flow (l/s)	10.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	135
Invert Level (m)	1.733
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	10.7	Kick-Flo®	1.204	8.4
Flush-Flo™	0.585	10.6	Mean Flow over Head Range	-	9.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.9	0.800	10.4	2.000	10.7	4.000	14.8	7.000	19.3
0.200	8.9	1.000	9.8	2.200	11.1	4.500	15.7	7.500	20.0
0.300	9.9	1.200	8.4	2.400	11.6	5.000	16.5	8.000	20.6
0.400	10.4	1.400	9.0	2.600	12.1	5.500	17.2	8.500	21.2
0.500	10.6	1.600	9.6	3.000	12.9	6.000	18.0	9.000	21.8
0.600	10.6	1.800	10.1	3.500	13.9	6.500	18.7	9.500	22.4

Hydro-Brake Optimum® Manhole: 129, DS/PN: 69.006, Volume (m³): 19.7

Unit Reference	MD-SHE-0095-4700-1500-4700
Design Head (m)	1.500
Design Flow (l/s)	4.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	95
Invert Level (m)	2.675
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	4.7	Kick-Flo®	0.848	3.6
Flush-Flo™	0.418	4.5	Mean Flow over Head Range	-	4.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	0.800	3.9	2.000	5.4	4.000	7.4	7.000	9.7
0.200	4.1	1.000	3.9	2.200	5.6	4.500	7.9	7.500	10.0
0.300	4.4	1.200	4.2	2.400	5.8	5.000	8.3	8.000	10.3
0.400	4.5	1.400	4.5	2.600	6.1	5.500	8.6	8.500	10.6
0.500	4.5	1.600	4.8	3.000	6.5	6.000	9.0	9.000	10.9
0.600	4.4	1.800	5.1	3.500	7.0	6.500	9.4	9.500	11.2

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Hydro-Brake Optimum® Manhole: 170, DS/PN: 82.006, Volume (m³): 14.8

Unit Reference	MD-SHE-0093-4500-1500-4500
Design Head (m)	1.500
Design Flow (l/s)	4.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	93
Invert Level (m)	2.623
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	4.5	Kick-Flo®	0.828	3.4
Flush-Flo™	0.407	4.3	Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.9	0.800	3.6	2.000	5.1	4.000	7.1	7.000	9.3
0.200	3.9	1.000	3.7	2.200	5.4	4.500	7.5	7.500	9.6
0.300	4.2	1.200	4.1	2.400	5.6	5.000	7.9	8.000	9.9
0.400	4.3	1.400	4.4	2.600	5.8	5.500	8.3	8.500	10.2
0.500	4.2	1.600	4.6	3.000	6.2	6.000	8.6	9.000	10.5
0.600	4.1	1.800	4.9	3.500	6.7	6.500	9.0	9.500	10.7

Hydro-Brake Optimum® Manhole: 193, DS/PN: 94.006, Volume (m³): 13.2

Unit Reference	MD-SHE-0089-4000-1400-4000
Design Head (m)	1.400
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	89
Invert Level (m)	2.999
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	4.0	Kick-Flo®	0.791	3.1
Flush-Flo™	0.387	3.8	Mean Flow over Head Range	-	3.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	0.800	3.1	2.000	4.7	4.000	6.5	7.000	8.5
0.200	3.6	1.000	3.4	2.200	4.9	4.500	6.9	7.500	8.8
0.300	3.8	1.200	3.7	2.400	5.1	5.000	7.2	8.000	9.1
0.400	3.8	1.400	4.0	2.600	5.3	5.500	7.6	8.500	9.3
0.500	3.8	1.600	4.2	3.000	5.7	6.000	7.9	9.000	9.6
0.600	3.7	1.800	4.5	3.500	6.1	6.500	8.2	9.500	9.8

Hydro-Brake Optimum® Manhole: 223, DS/PN: 40.028, Volume (m³): 25.6

Unit Reference	MD-SHE-0184-2300-2850-2300
Design Head (m)	2.850
Design Flow (l/s)	23.0
Flush-Flo™	Calculated

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Hydro-Brake Optimum® Manhole: 223, DS/PN: 40.028, Volume (m³): 25.6

Objective	Minimise upstream storage
Diameter (mm)	184
Invert Level (m)	0.556
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.850	23.0	Kick-Flo®	1.647	17.7
Flush-Flo™	0.802	22.6	Mean Flow over Head Range	-	19.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.5	0.800	22.6	2.000	19.4	4.000	27.1	7.000	35.4
0.200	16.6	1.000	22.4	2.200	20.3	4.500	28.6	7.500	36.6
0.300	19.3	1.200	21.8	2.400	21.2	5.000	30.1	8.000	37.8
0.400	20.8	1.400	20.6	2.600	22.0	5.500	31.5	8.500	38.9
0.500	21.7	1.600	18.5	3.000	23.6	6.000	32.9	9.000	40.0
0.600	22.2	1.800	18.5	3.500	25.4	6.500	34.2	9.500	41.1

Hydro-Brake Optimum® Manhole: 254, DS/PN: 110.006, Volume (m³): 12.5

Unit Reference	MD-SHE-0079-3000-1200-3000
Design Head (m)	1.200
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	79
Invert Level (m)	1.823
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.0	Kick-Flo®	0.707	2.4
Flush-Flo™	0.348	2.9	Mean Flow over Head Range	-	2.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	0.800	2.5	2.000	3.8	4.000	5.2	7.000	6.8
0.200	2.8	1.000	2.8	2.200	4.0	4.500	5.5	7.500	7.0
0.300	2.9	1.200	3.0	2.400	4.1	5.000	5.8	8.000	7.3
0.400	2.9	1.400	3.2	2.600	4.3	5.500	6.1	8.500	7.5
0.500	2.8	1.600	3.4	3.000	4.6	6.000	6.3	9.000	7.7
0.600	2.7	1.800	3.6	3.500	4.9	6.500	6.6	9.500	7.9

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Storage Structures for Storm

Cellular Storage Manhole: 83, DS/PN: 40.008

Invert Level (m) 1.733 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	380.0	0.0	0.800	380.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: 129, DS/PN: 69.006

Invert Level (m) 2.675 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	360.0	0.0	0.800	360.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: 170, DS/PN: 82.006

Invert Level (m) 2.623 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	380.0	0.0	0.800	380.0	0.0	0.801	0.0	0.0

Cellular Storage Manhole: 193, DS/PN: 94.006

Invert Level (m) 2.999 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	375.0	375.0	0.800	375.0	375.0	0.801	0.0	375.0

Cellular Storage Manhole: 223, DS/PN: 40.028

Invert Level (m) 0.556 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	325.0	325.0	1.200	325.0	325.0	1.201	0.0	325.0

Cellular Storage Manhole: 254, DS/PN: 110.006

Invert Level (m) 1.823 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	350.0	350.0	0.800	350.0	350.0	0.801	0.0	350.0

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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	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.150	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 6 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.600
Region	England and Wales	Ratio R	0.437
Cv (Summer)	0.750		
Cv (Winter)	0.840		

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
40.000	40	15 Winter	2	+20%					4.136	-0.050	0.000	1.09
41.000	41	15 Winter	2	+20%					4.099	-0.061	0.000	0.53
40.001	42	15 Winter	2	+20%					3.726	-0.102	0.000	0.58
40.002	43	15 Winter	2	+20%					2.918	-0.121	0.000	0.43
42.000	44	15 Winter	2	+20%					4.124	-0.033	0.000	0.75
43.000	45	15 Winter	2	+20%					4.108	-0.036	0.000	0.81
42.001	46	15 Winter	2	+20%					3.513	-0.114	0.000	0.48
40.003	47	15 Winter	2	+20%					2.725	-0.073	0.000	0.77
44.000	48	15 Winter	2	+20%					4.107	-0.028	0.000	0.80
44.001	49	15 Winter	2	+20%					3.459	-0.044	0.000	0.85
44.002	50	15 Winter	2	+20%					2.973	-0.072	0.000	0.52
45.000	51	15 Winter	2	+20%					4.114	-0.031	0.000	0.77
46.000	52	15 Winter	2	+20%					4.210	-0.005	0.000	1.06
45.001	53	15 Winter	2	+20%					3.584	-0.112	0.000	0.50
40.004	54	15 Summer	2	+20%					2.505	-0.026	0.000	0.48
47.000	55	15 Winter	2	+20%					4.221	-0.049	0.000	0.76
47.001	56	15 Winter	2	+20%					3.876	-0.044	0.000	0.83
48.000	57	15 Winter	2	+20%					4.978	-0.089	0.000	0.32
49.000	58	15 Winter	2	+20%					4.963	-0.102	0.000	0.23
48.001	59	15 Winter	2	+20%					4.476	-0.113	0.000	0.49
50.000	60	15 Winter	2	+20%					5.077	-0.104	0.000	0.22
51.000	61	15 Winter	2	+20%					5.061	-0.099	0.000	0.25
50.001	62	15 Winter	2	+20%					4.598	-0.088	0.000	0.67
47.002	63	15 Winter	2	+20%					3.562	-0.094	0.000	0.80
52.000	64	15 Winter	2	+20%					4.947	-0.118	0.000	0.13
53.000	65	15 Winter	2	+20%					5.049	-0.111	0.000	0.18
52.001	66	15 Winter	2	+20%					4.443	-0.125	0.000	0.40
54.000	67	15 Winter	2	+20%					5.082	-0.080	0.000	0.38
55.000	68	15 Winter	2	+20%					5.042	-0.087	0.000	0.33
54.001	69	15 Winter	2	+20%					4.590	-0.081	0.000	0.72
52.002	70	15 Winter	2	+20%					4.041	-0.074	0.000	0.78
40.005	71	15 Summer	2	+20%					2.440	0.000	0.000	0.78
56.000	72	15 Winter	2	+20%					5.358	-0.093	0.000	0.29

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
40.000	40		7.2	FLOOD RISK*	
41.000	41		3.9	FLOOD RISK*	
40.001	42		17.2	OK	
40.002	43		16.8	OK	
42.000	44		4.7	FLOOD RISK*	
43.000	45		3.9	FLOOD RISK*	
42.001	46		14.4	OK	
40.003	47		30.1	OK	
44.000	48		7.3	FLOOD RISK*	
44.001	49		9.2	OK	
44.002	50		9.1	OK	
45.000	51		6.9	FLOOD RISK*	
46.000	52		5.2	FLOOD RISK*	
45.001	53		15.0	OK	
40.004	54		48.3	OK	
47.000	55		13.6	OK	
47.001	56		13.6	OK	
48.000	57		6.2	FLOOD RISK*	
49.000	58		4.6	FLOOD RISK*	
48.001	59		14.6	OK	
50.000	60		5.9	FLOOD RISK*	
51.000	61		6.6	FLOOD RISK*	
50.001	62		20.0	OK	
47.002	63		86.6	OK	
52.000	64		3.7	FLOOD RISK*	
53.000	65		4.8	FLOOD RISK*	
52.001	66		11.9	OK	
54.000	67		8.8	FLOOD RISK*	
55.000	68		6.8	FLOOD RISK*	
54.001	69		22.1	OK	
52.002	70		34.2	OK	
40.005	71		146.4	OK	
56.000	72		5.9	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.
57.000	73	15 Winter	2	+20%					5.352	-0.084	0.000	0.36
56.001	74	15 Winter	2	+20%					4.865	-0.097	0.000	0.60
56.002	75	15 Winter	2	+20%					4.295	-0.130	0.000	0.37
58.000	76	15 Winter	2	+20%					5.336	-0.090	0.000	0.31
59.000	77	15 Winter	2	+20%					5.347	-0.093	0.000	0.29
58.001	78	15 Winter	2	+20%					4.843	-0.100	0.000	0.58
58.002	79	15 Winter	2	+20%					4.291	-0.134	0.000	0.34
56.003	80	15 Winter	2	+20%					4.001	-0.171	0.000	0.39
40.006	81	15 Winter	2	+20%					2.415	0.000	0.000	1.18
40.007	82	15 Winter	2	+20%					2.184	-0.220	0.000	0.70
40.008	83	240 Winter	2	+20%					2.155	-0.178	0.000	0.06
40.009	84	60 Winter	2	+20%					1.815	-0.487	0.000	0.07
40.010	85	60 Winter	2	+20%					1.788	-0.491	0.000	0.05
60.000	86	120 Winter	2	+20%					4.179	-0.165	0.000	0.00
60.001	87	15 Winter	2	+20%					3.762	-0.079	0.000	0.74
61.000	88	15 Winter	2	+20%					4.096	-0.168	0.000	0.26
61.001	89	15 Winter	2	+20%					3.361	-0.067	0.000	0.59
40.011	90	15 Winter	2	+20%					1.781	-0.445	0.000	0.09
62.000	91	15 Winter	2	+20%					4.164	-0.103	0.000	0.54
63.000	92	15 Winter	2	+20%					4.223	-0.057	0.000	0.74
62.001	93	15 Winter	2	+20%					3.616	-0.089	0.000	0.66
40.012	94	15 Winter	2	+20%					1.740	-0.415	0.000	0.15
64.000	95	15 Winter	2	+20%					4.258	-0.145	0.000	0.19
64.001	96	15 Winter	2	+20%					4.006	-0.168	0.000	0.14
40.013	97	15 Winter	2	+20%					1.675	-0.396	0.000	0.17
65.000	98	15 Winter	2	+20%					4.170	-0.102	0.000	0.55
66.000	99	15 Winter	2	+20%					4.141	-0.142	0.000	0.38
65.001	100	15 Winter	2	+20%					3.628	-0.121	0.000	0.44
40.014	101	15 Winter	2	+20%					1.633	-0.389	0.000	0.21
40.015	102	15 Winter	2	+20%					1.581	-0.396	0.000	0.19
67.000	103	15 Winter	2	+20%					4.131	-0.155	0.000	0.32
68.000	104	15 Winter	2	+20%					4.064	-0.142	0.000	0.37
67.001	105	15 Winter	2	+20%					3.603	-0.124	0.000	0.41
40.016	106	15 Winter	2	+20%					1.522	-0.404	0.000	0.23
69.000	107	15 Winter	2	+20%					4.952	-0.098	0.000	0.26
70.000	108	15 Winter	2	+20%					5.053	-0.099	0.000	0.25
69.001	109	15 Winter	2	+20%					4.483	-0.080	0.000	0.73
69.002	110	15 Winter	2	+20%					4.006	-0.119	0.000	0.44
71.000	111	15 Winter	2	+20%					3.975	-0.380	0.000	0.17
71.001	112	15 Winter	2	+20%					3.677	-0.340	0.000	0.26
72.000	113	15 Winter	2	+20%					4.979	-0.071	0.000	0.44
73.000	114	15 Winter	2	+20%					4.974	-0.074	0.000	0.43
72.001	115	15 Winter	2	+20%					4.515	-0.051	0.000	0.94
71.002	116	15 Winter	2	+20%					3.590	-0.244	0.000	0.39
69.003	117	15 Winter	2	+20%					3.556	-0.147	0.000	0.62
74.000	118	15 Winter	2	+20%					5.165	-0.087	0.000	0.33
75.000	119	15 Winter	2	+20%					5.163	-0.054	0.000	0.58
74.001	120	15 Winter	2	+20%					4.725	-0.092	0.000	0.65
74.002	121	15 Winter	2	+20%					4.255	-0.125	0.000	0.41
76.000	122	15 Winter	2	+20%					5.223	-0.071	0.000	0.45
77.000	123	15 Winter	2	+20%					5.195	-0.058	0.000	0.55
76.001	124	15 Winter	2	+20%					4.791	-0.057	0.000	0.90
76.002	125	15 Winter	2	+20%					4.210	-0.190	0.000	0.29
74.003	126	15 Winter	2	+20%					3.900	-0.094	0.000	0.80
69.004	127	15 Winter	2	+20%					3.530	-0.122	0.000	0.95
69.005	128	15 Winter	2	+20%					3.302	-0.309	0.000	0.47
69.006	129	240 Winter	2	+20%					3.094	-0.181	0.000	0.01
40.017	130	15 Winter	2	+20%					1.436	-0.446	0.000	0.19
78.000	131	15 Winter	2	+20%					4.293	-0.092	0.000	0.46
78.001	132	15 Winter	2	+20%					3.761	-0.140	0.000	0.30

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
57.000	73		7.0	FLOOD RISK*	
56.001	74		18.1	OK	
56.002	75		18.1	OK	
58.000	76		6.1	FLOOD RISK*	
59.000	77		6.1	FLOOD RISK*	
58.001	78		17.4	OK	
58.002	79		17.5	OK	
56.003	80		35.4	OK	
40.006	81		197.5	OK	
40.007	82		194.0	OK	
40.008	83		10.1	OK	
40.009	84		9.9	OK	
40.010	85		9.9	OK	
60.000	86		0.0	OK	
60.001	87		18.8	OK	
61.000	88		3.9	FLOOD RISK*	
61.001	89		6.4	OK	
40.011	90		23.6	OK	
62.000	91		6.1	FLOOD RISK*	
63.000	92		8.9	FLOOD RISK*	
62.001	93		19.8	OK	
40.012	94		40.7	OK	
64.000	95		5.4	FLOOD RISK*	
64.001	96		5.9	OK	
40.013	97		44.3	OK	
65.000	98		6.2	FLOOD RISK*	
66.000	99		4.2	FLOOD RISK*	
65.001	100		13.1	OK	
40.014	101		51.9	OK	
40.015	102		51.3	OK	
67.000	103		4.3	FLOOD RISK*	
68.000	104		4.6	FLOOD RISK*	
67.001	105		12.3	OK	
40.016	106		56.6	OK	
69.000	107		5.1	FLOOD RISK*	
70.000	108		6.4	FLOOD RISK*	
69.001	109		21.7	OK	
69.002	110		21.7	OK	
71.000	111		75.5	OK	
71.001	112		74.1	OK	
72.000	113		8.7	FLOOD RISK*	
73.000	114		8.4	FLOOD RISK*	
72.001	115		28.1	OK	
71.002	116		96.8	OK	
69.003	117		117.4	OK	
74.000	118		6.4	FLOOD RISK*	
75.000	119		11.3	FLOOD RISK*	
74.001	120		20.9	OK	
74.002	121		20.7	OK	
76.000	122		10.5	FLOOD RISK*	
77.000	123		10.8	FLOOD RISK*	
76.001	124		28.7	OK	
76.002	125		28.7	OK	
74.003	126		48.9	OK	
69.004	127		165.7	OK	
69.005	128		165.9	OK	
69.006	129		4.5	OK	
40.017	130		60.4	OK	
78.000	131		13.0	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
78.001	132		12.9	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
79.000	133	15 Winter	2	+20%					4.028	-0.178	0.000	0.22
80.000	134	15 Winter	2	+20%					4.135	-0.075	0.000	0.66
79.001	135	15 Winter	2	+20%					3.603	-0.117	0.000	0.46
40.018	136	600 Winter	2	+20%					1.429	-0.413	0.000	0.06
40.019	137	600 Winter	2	+20%					1.420	-0.337	0.000	0.06
81.000	138	15 Winter	2	+20%					4.101	-0.109	0.000	0.51
81.001	139	15 Winter	2	+20%					3.597	-0.121	0.000	0.43
40.020	140	600 Winter	2	+20%					1.409	-0.261	0.000	0.06
40.021	141	600 Winter	2	+20%					1.396	-0.189	0.000	0.07
82.000	142	15 Winter	2	+20%					4.950	-0.075	0.000	0.43
83.000	143	15 Winter	2	+20%					5.156	-0.061	0.000	0.53
82.001	144	15 Winter	2	+20%					4.506	-0.050	0.000	0.96
82.002	145	15 Winter	2	+20%					4.042	-0.085	0.000	0.70
84.000	146	15 Winter	2	+20%					5.150	-0.046	0.000	0.64
85.000	147	120 Winter	2	+20%					4.899	-0.165	0.000	0.00
84.001	148	15 Winter	2	+20%					4.550	-0.070	0.000	0.80
84.002	149	15 Winter	2	+20%					3.994	-0.108	0.000	0.52
86.000	150	15 Winter	2	+20%					4.989	-0.074	0.000	0.43
87.000	151	15 Winter	2	+20%					4.988	-0.038	0.000	0.70
86.001	152	15 Winter	2	+20%					4.510	-0.051	0.000	0.95
84.003	153	15 Winter	2	+20%					3.595	-0.147	0.000	0.51
82.003	154	15 Winter	2	+20%					3.319	-0.078	0.000	0.64
88.000	155	15 Winter	2	+20%					5.169	-0.070	0.000	0.46
89.000	156	15 Winter	2	+20%					5.172	-0.079	0.000	0.39
88.001	157	15 Winter	2	+20%					4.694	-0.077	0.000	0.75
88.002	158	15 Winter	2	+20%					4.321	-0.101	0.000	0.57
90.000	159	15 Winter	2	+20%					5.170	-0.083	0.000	0.36
91.000	160	15 Winter	2	+20%					5.142	-0.061	0.000	0.53
90.001	161	15 Winter	2	+20%					4.780	-0.085	0.000	0.70
88.003	162	15 Winter	2	+20%					4.029	-0.142	0.000	0.53
92.000	163	15 Winter	2	+20%					4.981	-0.222	0.000	0.16
93.000	164	15 Winter	2	+20%					5.257	-0.108	0.000	0.34
92.001	165	15 Winter	2	+20%					4.635	-0.084	0.000	0.70
92.002	166	15 Winter	2	+20%					4.211	-0.163	0.000	0.42
88.004	167	15 Winter	2	+20%					3.778	-0.142	0.000	0.80
82.004	168	15 Winter	2	+20%					3.299	-0.060	0.000	1.00
82.005	169	15 Winter	2	+20%					3.162	-0.130	0.000	0.84
82.006	170	240 Winter	2	+20%					3.001	-0.072	0.000	0.04
82.007	171	240 Winter	2	+20%					2.560	-0.402	0.000	0.03
40.022	172	600 Winter	2	+20%					1.376	-0.124	0.000	0.11
94.000	173	15 Winter	2	+20%					5.071	-0.205	0.000	0.22
95.000	174	15 Winter	2	+20%					5.391	-0.219	0.000	0.17
94.001	175	15 Winter	2	+20%					4.743	-0.143	0.000	0.53
94.002	176	15 Winter	2	+20%					4.202	-0.162	0.000	0.43
96.000	177	15 Winter	2	+20%					5.340	-0.176	0.000	0.31
97.000	178	15 Winter	2	+20%					5.064	-0.212	0.000	0.19
96.001	179	15 Winter	2	+20%					4.835	-0.135	0.000	0.57
96.002	180	15 Winter	2	+20%					4.288	-0.149	0.000	0.50
94.003	181	15 Winter	2	+20%					3.997	-0.112	0.000	0.83
98.000	182	120 Winter	2	+20%					4.956	-0.210	0.000	0.00
99.000	183	15 Winter	2	+20%					4.938	-0.135	0.000	0.19
98.001	184	15 Winter	2	+20%					4.592	-0.083	0.000	0.70
98.002	185	15 Winter	2	+20%					4.067	-0.111	0.000	0.51
100.000	186	15 Winter	2	+20%					4.957	-0.115	0.000	0.30
101.000	187	15 Winter	2	+20%					5.178	-0.119	0.000	0.28
100.001	188	15 Winter	2	+20%					4.548	-0.128	0.000	0.61
100.002	189	15 Winter	2	+20%					3.998	-0.177	0.000	0.35
98.003	190	15 Winter	2	+20%					3.558	-0.245	0.000	0.34
94.004	191	15 Winter	2	+20%					3.539	-0.172	0.000	0.78
94.005	192	15 Winter	2	+20%					3.418	-0.252	0.000	0.53

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
79.000	133		3.1	FLOOD RISK*	
80.000	134		8.7	FLOOD RISK*	
79.001	135		13.8	OK	
40.018	136		23.5	OK	
40.019	137		23.4	OK	
81.000	138		7.0	FLOOD RISK*	
81.001	139		12.8	OK	
40.020	140		24.4	OK	
40.021	141		24.7	OK	
82.000	142		8.4	FLOOD RISK*	
83.000	143		11.1	FLOOD RISK*	
82.001	144		28.7	OK	
82.002	145		28.5	OK	
84.000	146		12.6	FLOOD RISK*	
85.000	147		0.0	OK	
84.001	148		23.9	OK	
84.002	149		23.3	OK	
86.000	150		8.5	FLOOD RISK*	
87.000	151		13.8	FLOOD RISK*	
86.001	152		28.4	OK	
84.003	153		51.1	OK	
82.003	154		76.9	OK	
88.000	155		9.0	FLOOD RISK*	
89.000	156		7.7	FLOOD RISK*	
88.001	157		23.3	OK	
88.002	158		22.8	OK	
90.000	159		7.0	FLOOD RISK*	
91.000	160		10.5	FLOOD RISK*	
90.001	161		25.0	OK	
88.003	162		47.1	OK	
92.000	163		10.8	FLOOD RISK*	
93.000	164		13.7	FLOOD RISK*	
92.001	165		35.6	OK	
92.002	166		35.3	OK	
88.004	167		82.7	OK	
82.004	168		157.4	OK	
82.005	169		154.9	OK	
82.006	170		4.3	OK	
82.007	171		4.3	OK	
40.022	172		28.2	OK	
94.000	173		14.3	FLOOD RISK*	
95.000	174		14.4	FLOOD RISK*	
94.001	175		37.3	OK	
94.002	176		37.0	OK	
96.000	177		27.4	FLOOD RISK*	
97.000	178		12.6	FLOOD RISK*	
96.001	179		49.7	OK	
96.002	180		49.4	OK	
94.003	181		85.8	OK	
98.000	182		0.0	OK	
99.000	183		10.4	FLOOD RISK*	
98.001	184		21.0	OK	
98.002	185		21.3	OK	
100.000	186		12.0	FLOOD RISK*	
101.000	187		12.5	FLOOD RISK*	
100.001	188		37.5	OK	
100.002	189		37.4	OK	
98.003	190		58.0	OK	
94.004	191		143.7	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.005	192		140.7	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
94.006	193	240 Winter	2	+20%					3.336	-0.188	0.000	0.03
94.007	194	240 Winter	2	+20%					2.531	-0.569	0.000	0.01
40.023	195	720 Winter	2	+20%					1.366	-0.062	0.000	0.11
102.000	196	120 Winter	2	+20%					3.087	-0.150	0.000	0.00
102.001	197	120 Winter	2	+20%					3.006	-0.150	0.000	0.00
102.002	198	120 Winter	2	+20%					2.924	-0.150	0.000	0.00
103.000	199	15 Winter	2	+20%					4.069	-0.162	0.000	0.71
104.000	200	15 Winter	2	+20%					4.057	-0.147	0.000	0.35
103.001	201	15 Winter	2	+20%					3.468	-0.134	0.000	0.34
102.003	202	15 Winter	2	+20%					2.788	-0.026	0.000	0.40
105.000	203	15 Winter	2	+20%					4.192	-0.103	0.000	0.23
105.001	204	15 Winter	2	+20%					3.591	-0.105	0.000	0.19
102.004	205	15 Winter	2	+20%					2.746	-0.045	0.000	0.82
40.024	206	720 Winter	2	+20%					1.342	-0.061	0.000	0.13
106.000	207	15 Winter	2	+20%					4.086	-0.158	0.000	0.12
106.001	208	15 Winter	2	+20%					4.028	-0.140	0.000	0.17
106.002	209	15 Winter	2	+20%					3.825	-0.225	0.000	0.20
106.003	210	15 Winter	2	+20%					3.784	-0.194	0.000	0.33
107.000	211	15 Winter	2	+20%					4.175	-0.080	0.000	0.38
107.001	212	15 Winter	2	+20%					3.964	-0.200	0.000	0.33
106.004	213	15 Winter	2	+20%					3.638	-0.083	0.000	0.71
106.005	214	15 Winter	2	+20%					3.109	-0.178	0.000	0.35
40.025	215	720 Winter	2	+20%					1.332	-0.061	0.000	0.18
108.000	216	15 Winter	2	+20%					4.302	-0.116	0.000	0.15
109.000	217	15 Winter	2	+20%					4.198	-0.126	0.000	0.10
108.001	218	15 Winter	2	+20%					3.732	-0.081	0.000	0.43
108.002	219	15 Winter	2	+20%					3.677	-0.096	0.000	0.28
108.003	220	15 Winter	2	+20%					3.178	-0.235	0.000	0.10
40.026	221	720 Winter	2	+20%					1.312	-0.055	0.000	0.13
40.027	222	720 Winter	2	+20%					1.299	-0.058	0.000	0.08
40.028	223	720 Winter	2	+20%					1.229	-0.077	0.000	0.07
40.029	224	600 Winter	2	+20%					0.662	-0.309	0.000	0.15
110.000	225	15 Winter	2	+20%					4.162	-0.085	0.000	0.35
111.000	226	15 Winter	2	+20%					4.156	-0.083	0.000	0.36
110.001	227	15 Winter	2	+20%					3.641	-0.043	0.000	0.84
110.002	228	15 Winter	2	+20%					3.177	-0.148	0.000	0.26
112.000	229	15 Winter	2	+20%					5.032	-0.106	0.000	0.21
112.001	230	15 Winter	2	+20%					4.513	-0.061	0.000	0.65
112.002	231	15 Winter	2	+20%					3.541	-0.083	0.000	0.41
113.000	232	15 Winter	2	+20%					4.226	-0.085	0.000	0.47
113.001	233	15 Winter	2	+20%					3.684	-0.084	0.000	0.70
114.000	234	15 Winter	2	+20%					3.041	-0.109	0.000	0.17
114.001	235	15 Winter	2	+20%					2.911	-0.073	0.000	0.51
115.000	236	15 Winter	2	+20%					4.154	-0.086	0.000	0.34
115.001	237	15 Winter	2	+20%					3.898	-0.193	0.000	0.35
116.000	238	15 Winter	2	+20%					4.141	-0.094	0.000	0.36
115.002	239	15 Winter	2	+20%					3.636	-0.067	0.000	0.83
114.002	240	15 Winter	2	+20%					2.839	-0.076	0.000	0.75
117.000	241	15 Winter	2	+20%					4.101	-0.134	0.000	0.51
118.000	242	15 Winter	2	+20%					4.076	-0.162	0.000	0.40
117.001	243	15 Winter	2	+20%					3.473	-0.038	0.000	0.91
113.002	244	15 Winter	2	+20%					2.548	-0.052	0.000	1.00
112.003	245	15 Winter	2	+20%					2.375	-0.193	0.000	0.55
110.003	246	15 Winter	2	+20%					2.343	-0.175	0.000	0.65
119.000	247	15 Winter	2	+20%					4.339	-0.060	0.000	0.53
120.000	248	15 Winter	2	+20%					4.262	-0.060	0.000	0.53
119.001	249	15 Winter	2	+20%					3.778	-0.097	0.000	0.60
119.002	250	15 Winter	2	+20%					3.295	-0.122	0.000	0.42
119.003	251	15 Winter	2	+20%					3.097	-0.089	0.000	0.68
110.004	252	15 Winter	2	+20%					2.332	-0.166	0.000	0.81

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.006	193		3.8	OK	
94.007	194		3.8	OK	
40.023	195		29.7	OK	
102.000	196		0.0	OK	
102.001	197		0.0	OK	
102.002	198		0.0	OK	
103.000	199		5.9	FLOOD RISK*	
104.000	200		4.4	FLOOD RISK*	
103.001	201		10.3	OK	
102.003	202		17.7	OK	
105.000	203		2.6	FLOOD RISK*	
105.001	204		3.7	OK	
102.004	205		21.4	OK	
40.024	206		30.9	OK	
106.000	207		4.4	FLOOD RISK*	
106.001	208		7.8	FLOOD RISK*	
106.002	209		11.2	OK	
106.003	210		17.0	OK	
107.000	211		8.5	FLOOD RISK*	
107.001	212		19.2	FLOOD RISK*	
106.004	213		36.3	OK	
106.005	214		36.3	OK	
40.025	215		33.7	OK	
108.000	216		3.3	FLOOD RISK*	
109.000	217		2.0	FLOOD RISK*	
108.001	218		5.3	OK	
108.002	219		5.3	OK	
108.003	220		5.3	OK	
40.026	221		33.5	OK	
40.027	222		33.2	OK	
40.028	223		22.0	OK	
40.029	224		22.0	OK	
110.000	225		6.9	FLOOD RISK*	
111.000	226		7.1	FLOOD RISK*	
110.001	227		14.1	OK	
110.002	228		14.2	OK	
112.000	229		5.6	FLOOD RISK*	
112.001	230		10.8	OK	
112.002	231		10.9	OK	
113.000	232		19.1	FLOOD RISK*	
113.001	233		20.8	OK	
114.000	234		2.9	OK	
114.001	235		7.0	OK	
115.000	236		6.9	FLOOD RISK*	
115.001	237		18.0	OK	
116.000	238		5.6	FLOOD RISK*	
115.002	239		24.8	OK	
114.002	240		31.2	OK	
117.000	241		3.3	FLOOD RISK*	
118.000	242		2.3	FLOOD RISK*	
117.001	243		9.9	OK	
113.002	244		61.3	OK	
112.003	245		71.6	OK	
110.003	246		85.1	OK	
119.000	247		12.5	FLOOD RISK*	
120.000	248		10.4	FLOOD RISK*	
119.001	249		22.9	OK	
119.002	250		23.1	OK	
119.003	251		23.1	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.004	252		107.3	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
110.005	253	15 Winter	2	+20%					2.182	-0.294	0.000	0.40
110.006	254	240 Winter	2	+20%					2.098	-0.250	0.000	0.01
110.007	255	240 Winter	2	+20%					1.751	-0.478	0.000	0.02
40.030	256	600 Winter	2	+20%					0.623	-0.212	0.000	0.39

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.005	253		106.2	OK	
110.006	254		2.9	OK	
110.007	255		2.9	OK	
40.030	256		24.9	OK	

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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	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.150	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 6 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 20.600	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.437	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	30
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
40.000	40	15 Winter	30	+20%					4.183	-0.003	0.000
41.000	41	15 Winter	30	+20%					4.155	-0.005	0.000
40.001	42	240 Winter	30	+20%	30/15 Summer				3.953	0.125	0.000
40.002	43	240 Winter	30	+20%	30/15 Summer				3.952	0.913	0.000
42.000	44	15 Winter	30	+20%					4.153	-0.004	0.000
43.000	45	15 Winter	30	+20%					4.140	-0.004	0.000
42.001	46	240 Winter	30	+20%	30/180 Winter				3.950	0.323	0.000
40.003	47	240 Winter	30	+20%	30/15 Summer				3.950	1.152	0.000
44.000	48	15 Winter	30	+20%					4.132	-0.003	0.000
44.001	49	240 Winter	30	+20%	30/15 Summer				3.948	0.445	0.000
44.002	50	240 Winter	30	+20%	30/120 Winter				3.947	0.902	0.000
45.000	51	15 Winter	30	+20%					4.142	-0.003	0.000
46.000	52	15 Winter	30	+20%					4.212	-0.003	0.000
45.001	53	240 Winter	30	+20%	30/180 Winter				3.946	0.250	0.000
40.004	54	240 Winter	30	+20%	30/15 Summer				3.945	1.414	0.000
47.000	55	15 Winter	30	+20%	30/15 Summer				5.078	0.808	0.000
47.001	56	15 Winter	30	+20%	30/15 Summer				4.499	0.579	0.000
48.000	57	15 Winter	30	+20%					5.017	-0.050	0.000
49.000	58	15 Winter	30	+20%					4.993	-0.072	0.000
48.001	59	15 Winter	30	+20%					4.558	-0.031	0.000
50.000	60	15 Winter	30	+20%					5.105	-0.076	0.000
51.000	61	15 Winter	30	+20%					5.094	-0.066	0.000
50.001	62	15 Winter	30	+20%	30/15 Summer				4.733	0.047	0.000
47.002	63	15 Winter	30	+20%	30/15 Summer				4.166	0.510	0.000
52.000	64	15 Winter	30	+20%					4.966	-0.099	0.000
53.000	65	15 Winter	30	+20%					5.073	-0.087	0.000
52.001	66	15 Winter	30	+20%					4.500	-0.068	0.000
54.000	67	15 Winter	30	+20%					5.127	-0.035	0.000
55.000	68	15 Winter	30	+20%					5.082	-0.047	0.000
54.001	69	15 Winter	30	+20%	30/15 Summer				4.720	0.049	0.000
52.002	70	15 Winter	30	+20%	30/15 Summer				4.412	0.297	0.000
40.005	71	240 Winter	30	+20%	30/15 Summer				3.943	1.503	0.000
56.000	72	15 Winter	30	+20%					5.395	-0.056	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
40.000	40	1.39		9.2	FLOOD RISK*	
41.000	41	0.99		7.3	FLOOD RISK*	
40.001	42	0.21		6.3	SURCHARGED	
40.002	43	0.16		6.3	FLOOD RISK	
42.000	44	1.00		6.2	FLOOD RISK*	
43.000	45	1.10		5.3	FLOOD RISK*	
42.001	46	0.18		5.3	FLOOD RISK	
40.003	47	0.30		11.6	FLOOD RISK	
44.000	48	1.01		9.2	FLOOD RISK*	
44.001	49	0.30		3.3	FLOOD RISK	
44.002	50	0.19		3.3	SURCHARGED	
45.000	51	1.00		9.0	FLOOD RISK*	
46.000	52	1.08		5.3	FLOOD RISK*	
45.001	53	0.18		5.4	FLOOD RISK	
40.004	54	0.20		19.9	FLOOD RISK	
47.000	55	1.26		22.5	SURCHARGED	
47.001	56	1.52		24.8	SURCHARGED	
48.000	57	0.60		11.8	FLOOD RISK*	
49.000	58	0.44		8.7	FLOOD RISK*	
48.001	59	0.97		29.0	OK	
50.000	60	0.42		11.2	FLOOD RISK*	
51.000	61	0.48		12.4	FLOOD RISK*	
50.001	62	1.40		41.7	SURCHARGED	
47.002	63	1.60		172.2	SURCHARGED	
52.000	64	0.25		7.0	FLOOD RISK*	
53.000	65	0.33		9.1	FLOOD RISK*	
52.001	66	0.81		24.1	OK	
54.000	67	0.72		16.8	FLOOD RISK*	
55.000	68	0.62		12.9	FLOOD RISK*	
54.001	69	1.45		44.4	SURCHARGED	
52.002	70	1.56		68.1	SURCHARGED	
40.005	71	0.33		62.8	SURCHARGED	
56.000	72	0.55		11.2	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)
57.000	73	15 Winter	30	+20%					5.395	-0.041	0.000
56.001	74	15 Winter	30	+20%	30/15 Summer				5.005	0.043	0.000
56.002	75	15 Winter	30	+20%					4.347	-0.078	0.000
58.000	76	15 Winter	30	+20%					5.375	-0.051	0.000
59.000	77	15 Winter	30	+20%					5.384	-0.056	0.000
58.001	78	15 Winter	30	+20%	30/15 Summer				4.983	0.040	0.000
58.002	79	15 Winter	30	+20%					4.341	-0.084	0.000
56.003	80	15 Winter	30	+20%					4.073	-0.099	0.000
40.006	81	240 Winter	30	+20%	30/15 Summer				3.942	1.527	0.000
40.007	82	240 Winter	30	+20%	30/15 Summer				3.941	1.537	0.000
40.008	83	240 Winter	30	+20%	30/30 Winter				3.939	1.606	0.000
40.009	84	960 Winter	30	+20%					1.956	-0.346	0.000
40.010	85	960 Winter	30	+20%					1.954	-0.325	0.000
60.000	86	120 Winter	30	+20%					4.179	-0.165	0.000
60.001	87	15 Winter	30	+20%	30/15 Summer				3.902	0.061	0.000
61.000	88	15 Winter	30	+20%					4.150	-0.114	0.000
61.001	89	15 Winter	30	+20%	30/15 Summer				3.446	0.018	0.000
40.011	90	960 Winter	30	+20%					1.950	-0.276	0.000
62.000	91	15 Winter	30	+20%					4.262	-0.005	0.000
63.000	92	15 Winter	30	+20%					4.277	-0.003	0.000
62.001	93	15 Winter	30	+20%	30/15 Summer				3.733	0.028	0.000
40.012	94	960 Winter	30	+20%					1.943	-0.212	0.000
64.000	95	15 Winter	30	+20%					4.293	-0.110	0.000
64.001	96	15 Winter	30	+20%					4.031	-0.143	0.000
40.013	97	960 Winter	30	+20%					1.933	-0.138	0.000
65.000	98	15 Winter	30	+20%					4.267	-0.005	0.000
66.000	99	15 Winter	30	+20%					4.218	-0.065	0.000
65.001	100	15 Winter	30	+20%					3.686	-0.063	0.000
40.014	101	960 Winter	30	+20%					1.922	-0.100	0.000
40.015	102	960 Winter	30	+20%					1.907	-0.070	0.000
67.000	103	15 Winter	30	+20%					4.197	-0.089	0.000
68.000	104	15 Winter	30	+20%					4.140	-0.066	0.000
67.001	105	15 Winter	30	+20%					3.661	-0.066	0.000
40.016	106	960 Winter	30	+20%					1.887	-0.039	0.000
69.000	107	15 Winter	30	+20%					4.985	-0.065	0.000
70.000	108	15 Winter	30	+20%					5.084	-0.068	0.000
69.001	109	15 Winter	30	+20%	30/15 Summer				4.648	0.085	0.000
69.002	110	15 Winter	30	+20%	30/15 Winter				4.154	0.029	0.000
71.000	111	15 Winter	30	+20%					4.098	-0.257	0.000
71.001	112	15 Winter	30	+20%	30/15 Summer				4.052	0.035	0.000
72.000	113	15 Winter	30	+20%					5.032	-0.018	0.000
73.000	114	15 Winter	30	+20%					5.024	-0.024	0.000
72.001	115	15 Winter	30	+20%	30/15 Summer				4.716	0.150	0.000
71.002	116	15 Winter	30	+20%	30/15 Summer				3.934	0.100	0.000
69.003	117	360 Winter	30	+20%	30/15 Summer				3.839	0.136	0.000
74.000	118	15 Winter	30	+20%					5.205	-0.047	0.000
75.000	119	15 Winter	30	+20%					5.213	-0.004	0.000
74.001	120	15 Winter	30	+20%	30/15 Summer				4.831	0.014	0.000
74.002	121	15 Winter	30	+20%					4.303	-0.077	0.000
76.000	122	15 Winter	30	+20%					5.277	-0.017	0.000
77.000	123	15 Winter	30	+20%					5.248	-0.005	0.000
76.001	124	15 Winter	30	+20%	30/15 Summer				4.951	0.103	0.000
76.002	125	15 Winter	30	+20%					4.264	-0.136	0.000
74.003	126	15 Winter	30	+20%	30/15 Summer				4.069	0.075	0.000
69.004	127	360 Winter	30	+20%	30/15 Summer				3.838	0.186	0.000
69.005	128	360 Winter	30	+20%	30/240 Winter				3.837	0.226	0.000
69.006	129	360 Winter	30	+20%	30/60 Winter				3.836	0.561	0.000
40.017	130	960 Winter	30	+20%					1.860	-0.022	0.000
78.000	131	15 Winter	30	+20%					4.369	-0.016	0.000
78.001	132	15 Winter	30	+20%					3.800	-0.101	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
57.000	73	0.68		13.3	FLOOD RISK*	
56.001	74	1.21		36.2	SURCHARGED	
56.002	75	0.74		36.1	OK	
58.000	76	0.59		11.7	FLOOD RISK*	
59.000	77	0.56		11.5	FLOOD RISK*	
58.001	78	1.19		35.5	SURCHARGED	
58.002	79	0.69		35.1	OK	
56.003	80	0.78		71.7	OK	
40.006	81	0.44		73.6	SURCHARGED	
40.007	82	0.26		72.7	SURCHARGED	
40.008	83	0.07		10.8	SURCHARGED	
40.009	84	0.07		10.5	OK	
40.010	85	0.05		10.5	OK	
60.000	86	0.00		0.0	OK	
60.001	87	1.78		45.0	SURCHARGED	
61.000	88	0.50		7.5	FLOOD RISK*	
61.001	89	1.19		12.9	SURCHARGED	
40.011	90	0.05		13.7	OK	
62.000	91	1.00		11.2	FLOOD RISK*	
63.000	92	1.00		11.9	FLOOD RISK*	
62.001	93	1.16		34.6	SURCHARGED	
40.012	94	0.06		16.0	OK	
64.000	95	0.37		10.3	FLOOD RISK*	
64.001	96	0.28		11.4	OK	
40.013	97	0.06		16.8	OK	
65.000	98	1.00		11.2	FLOOD RISK*	
66.000	99	0.72		8.0	FLOOD RISK*	
65.001	100	0.84		25.1	OK	
40.014	101	0.07		18.2	OK	
40.015	102	0.07		18.0	OK	
67.000	103	0.61		8.1	FLOOD RISK*	
68.000	104	0.71		8.7	FLOOD RISK*	
67.001	105	0.81		24.3	OK	
40.016	106	0.08		19.2	OK	
69.000	107	0.49		9.7	FLOOD RISK*	
70.000	108	0.47		12.2	FLOOD RISK*	
69.001	109	1.54		46.1	SURCHARGED	
69.002	110	0.91		44.3	SURCHARGED	
71.000	111	0.32		143.6	OK	
71.001	112	0.43		121.1	SURCHARGED	
72.000	113	0.84		16.6	FLOOD RISK*	
73.000	114	0.79		15.6	FLOOD RISK*	
72.001	115	1.92		57.5	SURCHARGED	
71.002	116	0.69		171.5	SURCHARGED	
69.003	117	0.17		31.8	SURCHARGED	
74.000	118	0.62		12.3	FLOOD RISK*	
75.000	119	0.98		19.3	FLOOD RISK*	
74.001	120	1.19		38.8	SURCHARGED	
74.002	121	0.75		38.5	OK	
76.000	122	0.85		19.9	FLOOD RISK*	
77.000	123	0.98		19.2	FLOOD RISK*	
76.001	124	1.74		55.5	SURCHARGED	
76.002	125	0.57		55.8	OK	
74.003	126	1.55		94.6	SURCHARGED	
69.004	127	0.25		44.5	SURCHARGED	
69.005	128	0.13		44.4	SURCHARGED	
69.006	129	0.01		4.5	SURCHARGED	
40.017	130	0.07		23.4	OK	
78.000	131	0.88		24.6	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
78.001	132	0.57		24.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)
79.000	133	15 Winter	30	+20%					4.074	-0.132	0.000
80.000	134	15 Winter	30	+20%					4.206	-0.004	0.000
79.001	135	15 Winter	30	+20%					3.650	-0.070	0.000
40.018	136	960 Winter	30	+20%					1.816	-0.026	0.000
40.019	137	1440 Winter	30	+20%	30/960 Winter				1.758	0.001	0.000
81.000	138	15 Winter	30	+20%					4.205	-0.005	0.000
81.001	139	15 Winter	30	+20%					3.660	-0.058	0.000
40.020	140	1440 Winter	30	+20%	30/600 Winter				1.756	0.086	0.000
40.021	141	1440 Winter	30	+20%	30/480 Winter				1.753	0.168	0.000
82.000	142	15 Winter	30	+20%					5.000	-0.025	0.000
83.000	143	15 Winter	30	+20%					5.212	-0.005	0.000
82.001	144	15 Winter	30	+20%	30/15 Summer				4.701	0.145	0.000
82.002	145	15 Winter	30	+20%	30/15 Summer				4.382	0.255	0.000
84.000	146	15 Winter	30	+20%					5.192	-0.004	0.000
85.000	147	120 Winter	30	+20%					4.899	-0.165	0.000
84.001	148	15 Summer	30	+20%	30/15 Summer				4.697	0.077	0.000
84.002	149	15 Winter	30	+20%	30/15 Summer				4.336	0.234	0.000
86.000	150	15 Winter	30	+20%					5.040	-0.023	0.000
87.000	151	15 Winter	30	+20%					5.024	-0.002	0.000
86.001	152	15 Winter	30	+20%	30/15 Summer				4.662	0.101	0.000
84.003	153	15 Winter	30	+20%	30/15 Summer				4.107	0.365	0.000
82.003	154	15 Winter	30	+20%	30/15 Summer				3.886	0.489	0.000
88.000	155	15 Winter	30	+20%					5.224	-0.015	0.000
89.000	156	15 Winter	30	+20%					5.219	-0.032	0.000
88.001	157	15 Winter	30	+20%	30/15 Summer				4.830	0.059	0.000
88.002	158	15 Winter	30	+20%	30/15 Summer				4.530	0.108	0.000
90.000	159	15 Winter	30	+20%					5.214	-0.039	0.000
91.000	160	15 Winter	30	+20%					5.198	-0.005	0.000
90.001	161	15 Winter	30	+20%	30/15 Summer				4.920	0.055	0.000
88.003	162	15 Winter	30	+20%	30/15 Summer				4.213	0.042	0.000
92.000	163	15 Winter	30	+20%					5.025	-0.178	0.000
93.000	164	15 Winter	30	+20%					5.310	-0.055	0.000
92.001	165	15 Winter	30	+20%	30/15 Summer				4.838	0.119	0.000
92.002	166	15 Winter	30	+20%					4.287	-0.087	0.000
88.004	167	15 Winter	30	+20%	30/15 Summer				3.940	0.020	0.000
82.004	168	15 Winter	30	+20%	30/15 Summer				3.840	0.481	0.000
82.005	169	15 Winter	30	+20%	30/15 Summer				3.577	0.285	0.000
82.006	170	480 Winter	30	+20%	30/30 Winter				3.412	0.339	0.000
82.007	171	720 Winter	30	+20%					2.560	-0.402	0.000
40.022	172	1440 Winter	30	+20%	30/240 Winter				1.751	0.251	0.000
94.000	173	15 Winter	30	+20%					5.126	-0.150	0.000
95.000	174	15 Winter	30	+20%					5.436	-0.174	0.000
94.001	175	15 Winter	30	+20%					4.886	0.000	0.000
94.002	176	15 Winter	30	+20%	30/15 Winter				4.372	0.008	0.000
96.000	177	15 Winter	30	+20%					5.417	-0.099	0.000
97.000	178	15 Winter	30	+20%					5.114	-0.162	0.000
96.001	179	15 Winter	30	+20%	30/15 Summer				4.991	0.021	0.000
96.002	180	15 Winter	30	+20%	30/15 Summer				4.517	0.080	0.000
94.003	181	15 Winter	30	+20%	30/15 Summer				4.206	0.097	0.000
98.000	182	120 Winter	30	+20%					4.956	-0.210	0.000
99.000	183	15 Winter	30	+20%					4.972	-0.101	0.000
98.001	184	15 Winter	30	+20%	30/15 Summer				4.758	0.083	0.000
98.002	185	15 Winter	30	+20%	30/15 Summer				4.198	0.020	0.000
100.000	186	15 Winter	30	+20%					5.004	-0.068	0.000
101.000	187	15 Winter	30	+20%					5.223	-0.074	0.000
100.001	188	15 Winter	30	+20%	30/15 Summer				4.746	0.070	0.000
100.002	189	15 Winter	30	+20%					4.066	-0.109	0.000
98.003	190	15 Winter	30	+20%	30/15 Summer				3.891	0.088	0.000
94.004	191	15 Winter	30	+20%	30/15 Summer				3.791	0.080	0.000
94.005	192	360 Winter	30	+20%	30/240 Winter				3.696	0.026	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
79.000	133	0.42		5.8	FLOOD RISK*	
80.000	134	1.00		13.2	FLOOD RISK*	
79.001	135	0.80		23.8	OK	
40.018	136	0.07		25.9	OK	
40.019	137	0.06		21.5	SURCHARGED	
81.000	138	0.97		13.3	FLOOD RISK*	
81.001	139	0.86		25.7	OK	
40.020	140	0.05		21.5	SURCHARGED	
40.021	141	0.06		21.6	SURCHARGED	
82.000	142	0.79		15.4	FLOOD RISK*	
83.000	143	0.98		20.6	FLOOD RISK*	
82.001	144	1.89		56.5	SURCHARGED	
82.002	145	1.39		56.2	SURCHARGED	
84.000	146	0.99		19.4	FLOOD RISK*	
85.000	147	0.00		0.0	OK	
84.001	148	1.56		46.6	SURCHARGED	
84.002	149	0.98		43.9	SURCHARGED	
86.000	150	0.82		16.1	FLOOD RISK*	
87.000	151	0.99		19.6	FLOOD RISK*	
86.001	152	1.65		49.4	SURCHARGED	
84.003	153	0.82		81.7	SURCHARGED	
82.003	154	1.09		131.5	SURCHARGED	
88.000	155	0.87		17.1	FLOOD RISK*	
89.000	156	0.74		14.6	FLOOD RISK*	
88.001	157	1.50		46.7	SURCHARGED	
88.002	158	1.12		45.0	SURCHARGED	
90.000	159	0.68		13.4	FLOOD RISK*	
91.000	160	0.96		19.0	FLOOD RISK*	
90.001	161	1.38		49.1	SURCHARGED	
88.003	162	1.03		91.3	SURCHARGED	
92.000	163	0.30		20.1	FLOOD RISK*	
93.000	164	0.64		26.0	FLOOD RISK*	
92.001	165	1.39		71.0	SURCHARGED	
92.002	166	0.84		69.8	OK	
88.004	167	1.57		161.4	SURCHARGED	
82.004	168	1.82		287.0	SURCHARGED	
82.005	169	1.52		280.1	SURCHARGED	
82.006	170	0.04		4.3	SURCHARGED	
82.007	171	0.03		4.3	OK	
40.022	172	0.10		26.3	SURCHARGED	
94.000	173	0.41		26.9	FLOOD RISK*	
95.000	174	0.32		27.3	FLOOD RISK*	
94.001	175	1.02		72.6	OK	
94.002	176	0.83		72.3	SURCHARGED	
96.000	177	0.59		52.1	FLOOD RISK*	
97.000	178	0.36		23.9	FLOOD RISK*	
96.001	179	1.12		97.4	SURCHARGED	
96.002	180	0.95		94.5	SURCHARGED	
94.003	181	1.61		167.1	SURCHARGED	
98.000	182	0.00		0.0	OK	
99.000	183	0.37		19.8	FLOOD RISK*	
98.001	184	1.51		45.1	SURCHARGED	
98.002	185	1.06		44.7	SURCHARGED	
100.000	186	0.56		22.5	FLOOD RISK*	
101.000	187	0.53		23.7	FLOOD RISK*	
100.001	188	1.23		75.7	SURCHARGED	
100.002	189	0.71		75.5	OK	
98.003	190	0.65		111.5	SURCHARGED	
94.004	191	1.51		276.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.005	192	0.14		36.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)
94.006	193	360 Winter	30	+20%	30/60 Winter				3.695	0.171	0.000
94.007	194	60 Winter	30	+20%					2.531	-0.569	0.000
40.023	195	1440 Winter	30	+20%	30/120 Winter				1.749	0.321	0.000
102.000	196	15 Winter	30	+20%					3.143	-0.094	0.000
102.001	197	15 Winter	30	+20%	30/15 Winter				3.172	0.016	0.000
102.002	198	15 Winter	30	+20%	30/15 Summer				3.172	0.098	0.000
103.000	199	15 Winter	30	+20%					4.214	-0.017	0.000
104.000	200	15 Winter	30	+20%					4.130	-0.074	0.000
103.001	201	15 Winter	30	+20%					3.510	-0.092	0.000
102.003	202	15 Winter	30	+20%	30/15 Summer				3.227	0.413	0.000
105.000	203	15 Winter	30	+20%					4.222	-0.073	0.000
105.001	204	15 Winter	30	+20%					3.611	-0.085	0.000
102.004	205	15 Winter	30	+20%	30/15 Summer				3.119	0.328	0.000
40.024	206	1440 Winter	30	+20%	30/180 Winter				1.747	0.344	0.000
106.000	207	15 Winter	30	+20%					4.109	-0.135	0.000
106.001	208	15 Winter	30	+20%					4.065	-0.103	0.000
106.002	209	15 Winter	30	+20%					3.934	-0.116	0.000
106.003	210	15 Winter	30	+20%					3.912	-0.066	0.000
107.000	211	15 Winter	30	+20%					4.220	-0.035	0.000
107.001	212	15 Winter	30	+20%					4.039	-0.125	0.000
106.004	213	15 Winter	30	+20%	30/15 Summer				3.882	0.161	0.000
106.005	214	15 Winter	30	+20%					3.179	-0.108	0.000
40.025	215	1440 Winter	30	+20%	30/120 Summer				1.746	0.353	0.000
108.000	216	15 Winter	30	+20%					4.323	-0.095	0.000
109.000	217	15 Winter	30	+20%					4.216	-0.108	0.000
108.001	218	15 Winter	30	+20%					3.767	-0.046	0.000
108.002	219	15 Winter	30	+20%					3.701	-0.072	0.000
108.003	220	15 Winter	30	+20%					3.204	-0.209	0.000
40.026	221	1440 Winter	30	+20%	30/120 Winter				1.742	0.375	0.000
40.027	222	1440 Winter	30	+20%	30/120 Winter				1.741	0.384	0.000
40.028	223	1440 Winter	30	+20%	30/120 Winter				1.738	0.432	0.000
40.029	224	1440 Winter	30	+20%					0.664	-0.307	0.000
110.000	225	15 Winter	30	+20%					4.204	-0.043	0.000
111.000	226	15 Winter	30	+20%					4.199	-0.040	0.000
110.001	227	15 Winter	30	+20%	30/15 Summer				3.803	0.119	0.000
110.002	228	15 Winter	30	+20%					3.211	-0.114	0.000
112.000	229	15 Winter	30	+20%					5.060	-0.078	0.000
112.001	230	15 Winter	30	+20%	30/15 Summer				4.638	0.064	0.000
112.002	231	15 Winter	30	+20%					3.583	-0.041	0.000
113.000	232	15 Winter	30	+20%					4.297	-0.014	0.000
113.001	233	15 Winter	30	+20%	30/15 Summer				3.799	0.031	0.000
114.000	234	15 Winter	30	+20%	30/15 Summer				3.572	0.422	0.000
114.001	235	15 Winter	30	+20%	30/15 Summer				3.550	0.566	0.000
115.000	236	15 Winter	30	+20%					4.196	-0.044	0.000
115.001	237	15 Winter	30	+20%					3.981	-0.110	0.000
116.000	238	15 Winter	30	+20%					4.177	-0.058	0.000
115.002	239	15 Winter	30	+20%	30/15 Summer				3.815	0.112	0.000
114.002	240	15 Winter	30	+20%	30/15 Summer				3.480	0.565	0.000
117.000	241	15 Winter	30	+20%					4.184	-0.051	0.000
118.000	242	15 Winter	30	+20%					4.136	-0.102	0.000
117.001	243	15 Winter	30	+20%	30/15 Summer				3.590	0.079	0.000
113.002	244	15 Winter	30	+20%	30/15 Summer				2.834	0.234	0.000
112.003	245	15 Summer	30	+20%	30/15 Summer				2.609	0.041	0.000
110.003	246	15 Winter	30	+20%	30/15 Summer				2.538	0.020	0.000
119.000	247	15 Winter	30	+20%					4.394	-0.005	0.000
120.000	248	15 Winter	30	+20%					4.317	-0.005	0.000
119.001	249	15 Winter	30	+20%	30/15 Summer				3.882	0.007	0.000
119.002	250	15 Winter	30	+20%					3.349	-0.068	0.000
119.003	251	15 Winter	30	+20%	30/15 Summer				3.210	0.024	0.000
110.004	252	15 Winter	30	+20%	30/15 Summer				2.505	0.007	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.006	193	0.03		3.8	SURCHARGED	
94.007	194	0.01		3.8	OK	
40.023	195	0.11		30.3	SURCHARGED	
102.000	196	0.03		0.5	OK	
102.001	197	0.17		2.9	SURCHARGED	
102.002	198	0.31		5.4	SURCHARGED	
103.000	199	1.35		11.3	FLOOD RISK*	
104.000	200	0.67		8.3	FLOOD RISK*	
103.001	201	0.65		19.6	OK	
102.003	202	0.68		30.2	SURCHARGED	
105.000	203	0.43		5.0	FLOOD RISK*	
105.001	204	0.38		7.4	OK	
102.004	205	1.43		37.3	SURCHARGED	
40.024	206	0.14		31.7	SURCHARGED	
106.000	207	0.23		8.4	FLOOD RISK*	
106.001	208	0.36		16.4	FLOOD RISK*	
106.002	209	0.43		23.5	FLOOD RISK*	
106.003	210	0.71		36.4	FLOOD RISK*	
107.000	211	0.72		16.1	FLOOD RISK*	
107.001	212	0.73		42.0	FLOOD RISK*	
106.004	213	1.51		76.8	SURCHARGED	
106.005	214	0.74		76.8	OK	
40.025	215	0.18		34.4	SURCHARGED	
108.000	216	0.28		6.3	FLOOD RISK*	
109.000	217	0.19		3.7	FLOOD RISK*	
108.001	218	0.81		10.1	OK	
108.002	219	0.53		10.2	OK	
108.003	220	0.20		10.1	OK	
40.026	221	0.13		34.7	SURCHARGED	
40.027	222	0.08		34.6	SURCHARGED	
40.028	223	0.07		22.6	SURCHARGED	
40.029	224	0.15		22.6	OK	
110.000	225	0.66		13.2	FLOOD RISK*	
111.000	226	0.68		13.4	FLOOD RISK*	
110.001	227	1.60		26.9	SURCHARGED	
110.002	228	0.49		27.1	OK	
112.000	229	0.39		10.6	FLOOD RISK*	
112.001	230	1.38		23.0	SURCHARGED	
112.002	231	0.85		22.9	OK	
113.000	232	0.88		36.2	FLOOD RISK*	
113.001	233	1.35		40.0	SURCHARGED	
114.000	234	0.42		7.2	SURCHARGED	
114.001	235	1.18		16.1	SURCHARGED	
115.000	236	0.65		12.9	FLOOD RISK*	
115.001	237	0.76		39.1	FLOOD RISK*	
116.000	238	0.69		10.7	FLOOD RISK*	
115.002	239	1.74		52.1	SURCHARGED	
114.002	240	1.43		59.6	SURCHARGED	
117.000	241	0.97		6.3	FLOOD RISK*	
118.000	242	0.76		4.5	FLOOD RISK*	
117.001	243	1.85		20.1	SURCHARGED	
113.002	244	1.90		116.7	SURCHARGED	
112.003	245	1.03		133.3	SURCHARGED	
110.003	246	1.26		164.8	SURCHARGED	
119.000	247	0.98		23.0	FLOOD RISK*	
120.000	248	0.98		19.2	FLOOD RISK*	
119.001	249	1.11		42.2	SURCHARGED	
119.002	250	0.77		42.3	OK	
119.003	251	1.25		42.4	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.004	252	1.56		208.2	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
110.005	253	360 Winter	30	+20%					2.381	-0.095	0.000
110.006	254	360 Winter	30	+20%	30/180 Winter				2.380	0.032	0.000
110.007	255	1440 Summer	30	+20%					1.751	-0.478	0.000
40.030	256	1440 Winter	30	+20%					0.625	-0.210	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.005	253	0.10		27.9	OK	
110.006	254	0.01		2.9	SURCHARGED	
110.007	255	0.02		2.9	OK	
40.030	256	0.40		25.5	OK	

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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	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.150	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 6 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 20.600	Cv (Summer) 0.750
Region England and Wales		Ratio R 0.437	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
40.000	40	15 Winter	100	+20%					4.185	-0.001
41.000	41	360 Winter	100	+20%	100/120 Winter	100/120 Winter			4.167	0.007
40.001	42	120 Winter	100	+20%	100/15 Summer				4.181	0.353
40.002	43	120 Winter	100	+20%	100/15 Summer				4.184	1.145
42.000	44	360 Winter	100	+20%	100/180 Winter	100/180 Winter			4.162	0.005
43.000	45	360 Winter	100	+20%	100/120 Winter	100/120 Winter			4.155	0.011
42.001	46	240 Winter	100	+20%	100/15 Summer	100/60 Winter			4.168	0.541
40.003	47	240 Winter	100	+20%	100/15 Summer	100/60 Winter			4.177	1.379
44.000	48	360 Winter	100	+20%	100/60 Winter	100/60 Winter			4.155	0.020
44.001	49	60 Winter	100	+20%	100/15 Summer				4.213	0.710
44.002	50	240 Winter	100	+20%	100/15 Summer				4.224	1.179
45.000	51	240 Winter	100	+20%	100/60 Winter	100/60 Winter			4.170	0.025
46.000	52	15 Winter	100	+20%					4.215	0.000
45.001	53	180 Winter	100	+20%	100/60 Summer	100/60 Winter			4.213	0.517
40.004	54	120 Winter	100	+20%	100/15 Summer	100/60 Winter			4.237	1.706
47.000	55	15 Winter	100	+20%	100/15 Summer	100/15 Summer			5.683	1.413
47.001	56	15 Winter	100	+20%	100/15 Summer	100/15 Winter			5.101	1.181
48.000	57	15 Winter	100	+20%					5.041	-0.026
49.000	58	15 Winter	100	+20%					5.011	-0.054
48.001	59	15 Winter	100	+20%	100/15 Summer				4.750	0.161
50.000	60	15 Winter	100	+20%					5.122	-0.059
51.000	61	15 Winter	100	+20%					5.113	-0.047
50.001	62	15 Winter	100	+20%	100/15 Summer				4.810	0.124
47.002	63	15 Winter	100	+20%	100/15 Summer				4.674	1.018
52.000	64	15 Winter	100	+20%					4.978	-0.087
53.000	65	15 Winter	100	+20%					5.087	-0.073
52.001	66	15 Winter	100	+20%	100/15 Summer				4.777	0.209
54.000	67	15 Winter	100	+20%					5.155	-0.007
55.000	68	15 Winter	100	+20%					5.106	-0.023
54.001	69	15 Winter	100	+20%	100/15 Summer				4.860	0.189
52.002	70	15 Winter	100	+20%	100/15 Summer				4.704	0.589
40.005	71	180 Winter	100	+20%	100/15 Summer				4.502	2.062
56.000	72	15 Winter	100	+20%					5.417	-0.034

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
40.000	40	0.000	1.41		9.3	FLOOD RISK*	
41.000	41	6.639	0.17		1.3	FLOOD	6
40.001	42	0.000	0.47		14.1	FLOOD RISK	
40.002	43	0.000	0.36		14.1	FLOOD RISK	
42.000	44	5.110	0.24		1.5	FLOOD	5
43.000	45	11.181	0.52		2.5	FLOOD	9
42.001	46	51.269	0.27		8.1	FLOOD	16
40.003	47	0.251	0.39		15.1	FLOOD	4
44.000	48	19.986	0.33		3.0	FLOOD	16
44.001	49	0.000	1.10		12.0	FLOOD RISK	
44.002	50	0.000	0.25		4.3	FLOOD RISK	
45.000	51	24.721	0.46		4.1	FLOOD	15
46.000	52	0.000	1.10		5.4	FLOOD RISK*	
45.001	53	27.153	0.52		15.6	FLOOD	11
40.004	54	9.273	0.44		44.4	FLOOD	4
47.000	55	0.824	1.61		28.8	FLOOD	2
47.001	56	0.002	1.87		30.7	FLOOD	
48.000	57	0.000	0.78		15.4	FLOOD RISK*	
49.000	58	0.000	0.58		11.4	FLOOD RISK*	
48.001	59	0.000	1.27		38.0	SURCHARGED	
50.000	60	0.000	0.54		14.6	FLOOD RISK*	
51.000	61	0.000	0.62		16.1	FLOOD RISK*	
50.001	62	0.000	1.79		53.6	SURCHARGED	
47.002	63	0.000	2.05		221.4	SURCHARGED	
52.000	64	0.000	0.33		9.1	FLOOD RISK*	
53.000	65	0.000	0.44		11.9	FLOOD RISK*	
52.001	66	0.000	0.98		29.4	SURCHARGED	
54.000	67	0.000	0.93		21.7	FLOOD RISK*	
55.000	68	0.000	0.81		16.8	FLOOD RISK*	
54.001	69	0.000	1.87		57.1	FLOOD RISK	
52.002	70	0.000	1.94		84.7	SURCHARGED	
40.005	71	0.000	0.57		106.6	SURCHARGED	
56.000	72	0.000	0.72		14.6	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
57.000	73	15 Winter	100	+20%					5.422	-0.014
56.001	74	15 Winter	100	+20%	100/15 Summer				5.055	0.093
56.002	75	180 Winter	100	+20%	100/60 Winter				4.553	0.128
58.000	76	15 Winter	100	+20%					5.398	-0.028
59.000	77	15 Winter	100	+20%					5.406	-0.034
58.001	78	15 Winter	100	+20%	100/15 Summer				5.030	0.087
58.002	79	180 Winter	100	+20%	100/60 Winter				4.551	0.126
56.003	80	120 Winter	100	+20%	100/60 Winter				4.563	0.391
40.006	81	180 Winter	100	+20%	100/15 Summer				4.533	2.118
40.007	82	180 Winter	100	+20%	100/15 Summer				4.563	2.159
40.008	83	180 Winter	100	+20%	100/15 Winter				4.593	2.260
40.009	84	720 Winter	100	+20%	100/240 Winter				3.956	1.654
40.010	85	720 Winter	100	+20%	100/240 Winter				3.955	1.676
60.000	86	120 Winter	100	+20%					4.179	-0.165
60.001	87	15 Winter	100	+20%	100/15 Summer				3.972	0.131
61.000	88	15 Winter	100	+20%					4.184	-0.080
61.001	89	960 Winter	100	+20%	100/15 Summer				3.953	0.525
40.011	90	960 Winter	100	+20%	100/240 Winter				3.953	1.727
62.000	91	15 Winter	100	+20%					4.263	-0.004
63.000	92	15 Winter	100	+20%	100/15 Winter	100/15 Winter			4.280	0.000
62.001	93	960 Winter	100	+20%	100/15 Summer				3.952	0.247
40.012	94	960 Winter	100	+20%	100/240 Winter				3.952	1.797
64.000	95	15 Winter	100	+20%					4.314	-0.089
64.001	96	15 Winter	100	+20%					4.044	-0.130
40.013	97	960 Winter	100	+20%	100/240 Winter				3.950	1.879
65.000	98	15 Winter	100	+20%					4.269	-0.003
66.000	99	15 Winter	100	+20%					4.265	-0.018
65.001	100	960 Winter	100	+20%	100/600 Winter				3.949	0.200
40.014	101	960 Winter	100	+20%	100/240 Winter				3.948	1.926
40.015	102	960 Winter	100	+20%	100/240 Winter				3.947	1.970
67.000	103	15 Winter	100	+20%					4.238	-0.048
68.000	104	15 Winter	100	+20%					4.188	-0.018
67.001	105	960 Winter	100	+20%	100/15 Summer				3.945	0.218
40.016	106	960 Winter	100	+20%	100/180 Winter				3.945	2.019
69.000	107	15 Winter	100	+20%					5.004	-0.046
70.000	108	15 Winter	100	+20%					5.103	-0.049
69.001	109	480 Winter	100	+20%	100/15 Summer				4.955	0.392
69.002	110	480 Winter	100	+20%	100/15 Summer				4.954	0.829
71.000	111	480 Winter	100	+20%	100/15 Summer				4.925	0.570
71.001	112	480 Winter	100	+20%	100/15 Summer	100/120 Winter			4.925	0.908
72.000	113	15 Winter	100	+20%					5.046	-0.004
73.000	114	15 Winter	100	+20%					5.043	-0.005
72.001	115	480 Winter	100	+20%	100/15 Summer				4.978	0.412
71.002	116	480 Winter	100	+20%	100/15 Summer				4.975	1.141
69.003	117	480 Winter	100	+20%	100/15 Summer				4.998	1.295
74.000	118	15 Winter	100	+20%					5.230	-0.022
75.000	119	15 Winter	100	+20%					5.215	-0.002
74.001	120	480 Winter	100	+20%	100/15 Summer				4.996	0.179
74.002	121	360 Winter	100	+20%	100/15 Summer				4.992	0.612
76.000	122	15 Winter	100	+20%					5.290	-0.004
77.000	123	15 Winter	100	+20%					5.251	-0.002
76.001	124	15 Summer	100	+20%	100/15 Summer				5.003	0.155
76.002	125	480 Winter	100	+20%	100/120 Winter				4.991	0.591
74.003	126	360 Winter	100	+20%	100/15 Summer				4.995	1.001
69.004	127	480 Winter	100	+20%	100/15 Summer				5.012	1.360
69.005	128	600 Winter	100	+20%	100/15 Summer				5.024	1.413
69.006	129	480 Winter	100	+20%	100/30 Summer				5.032	1.757
40.017	130	960 Winter	100	+20%	100/240 Winter				3.944	2.062
78.000	131	15 Winter	100	+20%					4.382	-0.003
78.001	132	960 Winter	100	+20%	100/720 Winter				3.942	0.041

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
57.000	73	0.000	0.88		17.4	FLOOD RISK*	
56.001	74	0.000	1.58		47.1	SURCHARGED	
56.002	75	0.000	0.22		10.6	SURCHARGED	
58.000	76	0.000	0.77		15.2	FLOOD RISK*	
59.000	77	0.000	0.73		15.0	FLOOD RISK*	
58.001	78	0.000	1.54		46.1	SURCHARGED	
58.002	79	0.000	0.20		10.3	SURCHARGED	
56.003	80	0.000	0.41		37.7	SURCHARGED	
40.006	81	0.000	0.76		127.5	SURCHARGED	
40.007	82	0.000	0.46		127.3	SURCHARGED	
40.008	83	0.000	0.07		11.7	SURCHARGED	
40.009	84	0.000	0.08		10.8	SURCHARGED	
40.010	85	0.000	0.05		10.8	SURCHARGED	
60.000	86	0.000	0.00		0.0	OK	
60.001	87	0.000	2.31		58.5	SURCHARGED	
61.000	88	0.000	0.65		9.7	FLOOD RISK*	
61.001	89	0.000	0.09		1.0	SURCHARGED	
40.011	90	0.000	0.05		14.6	SURCHARGED	
62.000	91	0.000	1.00		11.3	FLOOD RISK*	
63.000	92	0.016	1.04		12.4	FLOOD	1
62.001	93	0.000	0.10		3.1	FLOOD RISK	
40.012	94	0.000	0.06		17.4	SURCHARGED	
64.000	95	0.000	0.48		13.5	FLOOD RISK*	
64.001	96	0.000	0.36		14.8	OK	
40.013	97	0.000	0.07		18.1	SURCHARGED	
65.000	98	0.000	1.00		11.3	FLOOD RISK*	
66.000	99	0.000	0.94		10.4	FLOOD RISK*	
65.001	100	0.000	0.07		2.0	FLOOD RISK	
40.014	101	0.000	0.08		19.6	SURCHARGED	
40.015	102	0.000	0.07		19.2	SURCHARGED	
67.000	103	0.000	0.79		10.6	FLOOD RISK*	
68.000	104	0.000	0.92		11.3	FLOOD RISK*	
67.001	105	0.000	0.06		1.9	FLOOD RISK	
40.016	106	0.000	0.08		20.4	SURCHARGED	
69.000	107	0.000	0.63		12.7	FLOOD RISK*	
70.000	108	0.000	0.61		15.9	FLOOD RISK*	
69.001	109	0.000	0.30		8.9	FLOOD RISK	
69.002	110	0.000	0.15		7.1	FLOOD RISK	
71.000	111	0.000	0.04		19.1	SURCHARGED	
71.001	112	70.581	0.10		29.3	FLOOD	15
72.000	113	0.000	0.98		19.3	FLOOD RISK*	
73.000	114	0.000	0.97		19.2	FLOOD RISK*	
72.001	115	0.000	0.45		13.5	FLOOD RISK	
71.002	116	0.000	0.11		26.7	FLOOD RISK	
69.003	117	0.000	0.17		32.3	FLOOD RISK	
74.000	118	0.000	0.81		16.0	FLOOD RISK*	
75.000	119	0.000	1.00		19.7	FLOOD RISK*	
74.001	120	0.000	0.17		5.5	FLOOD RISK	
74.002	121	0.000	0.13		6.9	SURCHARGED	
76.000	122	0.000	0.98		22.9	FLOOD RISK*	
77.000	123	0.000	1.00		19.6	FLOOD RISK*	
76.001	124	0.000	2.04		65.0	SURCHARGED	
76.002	125	0.000	0.09		9.1	SURCHARGED	
74.003	126	0.000	0.27		16.8	SURCHARGED	
69.004	127	0.000	0.26		45.1	SURCHARGED	
69.005	128	0.000	0.11		36.9	SURCHARGED	
69.006	129	0.000	0.01		5.8	FLOOD RISK	
40.017	130	0.000	0.08		24.6	SURCHARGED	
78.000	131	0.000	0.98		27.3	FLOOD RISK*	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
78.001	132	0.000	0.04		1.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
79.000	133	15 Winter	100	+20%					4.103	-0.103
80.000	134	15 Winter	100	+20%					4.209	-0.001
79.001	135	960 Winter	100	+20%	100/600 Winter				3.942	0.222
40.018	136	960 Winter	100	+20%	100/240 Winter				3.942	2.100
40.019	137	960 Winter	100	+20%	100/180 Winter				3.940	2.183
81.000	138	15 Winter	100	+20%					4.206	-0.004
81.001	139	960 Winter	100	+20%	100/15 Summer				3.938	0.220
40.020	140	960 Winter	100	+20%	100/180 Winter				3.937	2.267
40.021	141	960 Winter	100	+20%	100/120 Winter				3.935	2.350
82.000	142	600 Winter	100	+20%	100/180 Winter	100/180 Winter			5.044	0.019
83.000	143	15 Winter	100	+20%					5.214	-0.003
82.001	144	240 Winter	100	+20%	100/15 Summer	100/180 Winter			5.053	0.497
82.002	145	240 Winter	100	+20%	100/15 Summer	100/180 Winter			5.072	0.945
84.000	146	15 Winter	100	+20%	100/15 Winter	100/15 Winter			5.196	0.000
85.000	147	360 Winter	100	+20%					5.060	-0.004
84.001	148	240 Winter	100	+20%	100/15 Summer				5.061	0.441
84.002	149	240 Winter	100	+20%	100/15 Summer	100/120 Winter			5.061	0.959
86.000	150	15 Winter	100	+20%					5.058	-0.005
87.000	151	600 Winter	100	+20%	100/15 Summer	100/15 Summer			5.048	0.022
86.001	152	360 Winter	100	+20%	100/15 Summer	100/180 Winter			5.056	0.495
84.003	153	360 Winter	100	+20%	100/15 Summer	100/180 Winter			5.069	1.327
82.003	154	360 Winter	100	+20%	100/15 Summer	100/120 Winter			5.066	1.669
88.000	155	15 Winter	100	+20%					5.235	-0.004
89.000	156	15 Winter	100	+20%					5.246	-0.005
88.001	157	360 Winter	100	+20%	100/15 Summer				5.101	0.330
88.002	158	360 Winter	100	+20%	100/15 Summer				5.097	0.675
90.000	159	15 Winter	100	+20%					5.240	-0.013
91.000	160	15 Winter	100	+20%					5.200	-0.003
90.001	161	480 Winter	100	+20%	100/15 Summer				5.109	0.244
88.003	162	480 Winter	100	+20%	100/15 Summer				5.112	0.941
92.000	163	240 Winter	100	+20%					5.102	-0.101
93.000	164	15 Winter	100	+20%					5.342	-0.023
92.001	165	360 Winter	100	+20%	100/15 Summer				5.097	0.378
92.002	166	480 Winter	100	+20%	100/15 Summer				5.105	0.731
88.004	167	360 Winter	100	+20%	100/15 Summer				5.149	1.229
82.004	168	360 Winter	100	+20%	100/15 Summer				5.147	1.788
82.005	169	240 Winter	100	+20%	100/15 Summer	100/180 Winter			5.176	1.884
82.006	170	240 Winter	100	+20%	100/15 Summer				5.310	2.237
82.007	171	960 Winter	100	+20%	100/360 Winter				3.934	0.972
40.022	172	960 Winter	100	+20%	100/120 Winter				3.933	2.433
94.000	173	15 Winter	100	+20%					5.159	-0.117
95.000	174	15 Winter	100	+20%					5.463	-0.147
94.001	175	360 Winter	100	+20%	100/15 Summer				5.095	0.209
94.002	176	240 Winter	100	+20%	100/15 Summer				5.099	0.735
96.000	177	15 Winter	100	+20%					5.465	-0.051
97.000	178	15 Winter	100	+20%					5.151	-0.125
96.001	179	240 Winter	100	+20%	100/15 Summer				5.095	0.125
96.002	180	240 Winter	100	+20%	100/15 Summer				5.096	0.659
94.003	181	240 Winter	100	+20%	100/15 Summer				5.144	1.035
98.000	182	360 Winter	100	+20%					5.087	-0.079
99.000	183	240 Winter	100	+20%	100/240 Winter	100/240 Winter			5.073	0.000
98.001	184	360 Winter	100	+20%	100/15 Summer				5.088	0.413
98.002	185	360 Winter	100	+20%	100/15 Summer				5.090	0.912
100.000	186	480 Winter	100	+20%					5.058	-0.014
101.000	187	15 Winter	100	+20%					5.249	-0.048
100.001	188	480 Winter	100	+20%	100/15 Summer	100/240 Winter			5.058	0.382
100.002	189	480 Winter	100	+20%	100/15 Summer	100/180 Winter			5.058	0.883
98.003	190	360 Winter	100	+20%	100/15 Summer	100/180 Winter			5.101	1.298
94.004	191	720 Winter	100	+20%	100/15 Summer	100/240 Winter			5.149	1.438
94.005	192	600 Winter	100	+20%	100/15 Summer	100/240 Winter			5.159	1.489

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
79.000	133	0.000	0.54		7.6	FLOOD RISK*	
80.000	134	0.000	1.01		13.4	FLOOD RISK*	
79.001	135	0.000	0.07		2.1	FLOOD RISK	
40.018	136	0.000	0.07		27.3	SURCHARGED	
40.019	137	0.000	0.07		26.9	SURCHARGED	
81.000	138	0.000	1.00		13.7	FLOOD RISK*	
81.001	139	0.000	0.07		2.0	FLOOD RISK	
40.020	140	0.000	0.07		28.0	SURCHARGED	
40.021	141	0.000	0.08		28.5	FLOOD RISK	
82.000	142	18.898	0.22		4.4	FLOOD	7
83.000	143	0.000	0.99		20.9	FLOOD RISK*	
82.001	144	2.764	0.45		13.5	FLOOD	5
82.002	145	0.057	0.33		13.5	FLOOD	5
84.000	146	0.118	1.02		20.1	FLOOD	1
85.000	147	0.000	0.06		1.3	FLOOD RISK*	
84.001	148	0.000	0.39		11.5	FLOOD RISK	
84.002	149	0.941	0.26		11.5	FLOOD	6
86.000	150	0.000	0.98		19.2	FLOOD RISK*	
87.000	151	22.282	0.31		6.2	FLOOD	9
86.001	152	5.976	0.40		11.9	FLOOD	6
84.003	153	0.122	0.18		17.8	FLOOD	5
82.003	154	3.433	0.27		32.6	FLOOD	9
88.000	155	0.000	0.98		19.3	FLOOD RISK*	
89.000	156	0.000	0.96		18.9	FLOOD RISK*	
88.001	157	0.000	0.26		8.0	FLOOD RISK	
88.002	158	0.000	0.20		7.9	FLOOD RISK	
90.000	159	0.000	0.89		17.4	FLOOD RISK*	
91.000	160	0.000	0.99		19.5	FLOOD RISK*	
90.001	161	0.000	0.33		11.6	FLOOD RISK	
88.003	162	0.000	0.15		13.1	FLOOD RISK	
92.000	163	0.000	0.07		4.8	FLOOD RISK*	
93.000	164	0.000	0.83		33.8	FLOOD RISK*	
92.001	165	0.000	0.33		16.9	FLOOD RISK	
92.002	166	0.000	0.15		12.7	FLOOD RISK	
88.004	167	0.000	0.28		28.3	FLOOD RISK	
82.004	168	0.000	0.36		56.4	FLOOD RISK	
82.005	169	1.266	0.40		73.7	FLOOD	5
82.006	170	0.000	0.05		5.7	FLOOD RISK	
82.007	171	0.000	0.03		5.7	SURCHARGED	
40.022	172	0.000	0.13		33.7	SURCHARGED	
94.000	173	0.000	0.53		34.9	FLOOD RISK*	
95.000	174	0.000	0.42		35.5	FLOOD RISK*	
94.001	175	0.000	0.18		12.9	FLOOD RISK	
94.002	176	0.000	0.20		17.2	FLOOD RISK	
96.000	177	0.000	0.77		67.5	FLOOD RISK*	
97.000	178	0.000	0.47		30.9	FLOOD RISK*	
96.001	179	0.000	0.26		22.9	FLOOD RISK	
96.002	180	0.000	0.23		22.9	FLOOD RISK	
94.003	181	0.000	0.39		40.1	FLOOD RISK	
98.000	182	0.000	0.03		1.2	FLOOD RISK*	
99.000	183	0.262	0.09		4.9	FLOOD	5
98.001	184	0.000	0.41		12.2	FLOOD RISK	
98.002	185	0.000	0.25		10.4	FLOOD RISK	
100.000	186	0.000	0.08		3.1	FLOOD RISK*	
101.000	187	0.000	0.69		30.8	FLOOD RISK*	
100.001	188	7.621	0.25		15.5	FLOOD	5
100.002	189	8.174	0.18		18.9	FLOOD	7
98.003	190	1.143	0.13		21.6	FLOOD	7
94.004	191	0.001	0.15		28.2	FLOOD	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.005	192	0.702	0.12		31.2	FLOOD	6

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
94.006	193	720 Winter	100	+20%	100/30 Summer				5.212	1.688
94.007	194	960 Winter	100	+20%	100/360 Winter				3.932	0.832
40.023	195	960 Winter	100	+20%	100/120 Summer				3.931	2.503
102.000	196	960 Winter	100	+20%	100/15 Summer				3.926	0.689
102.001	197	960 Winter	100	+20%	100/15 Summer				3.926	0.770
102.002	198	960 Winter	100	+20%	100/15 Summer				3.927	0.853
103.000	199	15 Winter	100	+20%					4.227	-0.004
104.000	200	15 Winter	100	+20%					4.175	-0.029
103.001	201	960 Winter	100	+20%	100/600 Winter				3.929	0.327
102.003	202	960 Winter	100	+20%	100/15 Summer				3.929	1.115
105.000	203	15 Winter	100	+20%					4.239	-0.056
105.001	204	960 Winter	100	+20%	100/600 Winter				3.929	0.233
102.004	205	960 Winter	100	+20%	100/15 Summer				3.929	1.138
40.024	206	960 Winter	100	+20%	100/60 Winter				3.929	2.526
106.000	207	15 Winter	100	+20%					4.236	-0.008
106.001	208	15 Winter	100	+20%	100/15 Summer				4.215	0.047
106.002	209	15 Winter	100	+20%	100/15 Summer				4.174	0.124
106.003	210	15 Winter	100	+20%	100/15 Summer				4.078	0.100
107.000	211	15 Winter	100	+20%					4.248	-0.007
107.001	212	15 Winter	100	+20%					4.079	-0.085
106.004	213	15 Winter	100	+20%	100/15 Summer				3.994	0.273
106.005	214	960 Winter	100	+20%	100/360 Winter				3.925	0.638
40.025	215	960 Winter	100	+20%	100/60 Winter				3.927	2.534
108.000	216	15 Winter	100	+20%					4.335	-0.083
109.000	217	15 Winter	100	+20%					4.224	-0.100
108.001	218	960 Winter	100	+20%	100/600 Winter				3.924	0.111
108.002	219	960 Winter	100	+20%	100/600 Winter				3.923	0.150
108.003	220	960 Winter	100	+20%	100/480 Winter				3.924	0.511
40.026	221	960 Winter	100	+20%	100/60 Winter				3.924	2.557
40.027	222	960 Winter	100	+20%	100/60 Summer				3.923	2.566
40.028	223	960 Winter	100	+20%	100/60 Summer				3.920	2.614
40.029	224	720 Winter	100	+20%					0.669	-0.302
110.000	225	15 Winter	100	+20%					4.230	-0.017
111.000	226	15 Winter	100	+20%					4.226	-0.013
110.001	227	15 Winter	100	+20%	100/15 Summer				3.940	0.256
110.002	228	15 Winter	100	+20%					3.231	-0.094
112.000	229	15 Winter	100	+20%					5.076	-0.062
112.001	230	15 Winter	100	+20%	100/15 Summer				4.735	0.161
112.002	231	15 Winter	100	+20%	100/15 Summer				3.736	0.112
113.000	232	15 Winter	100	+20%	100/15 Summer	100/15 Summer			4.312	0.001
113.001	233	15 Summer	100	+20%	100/15 Summer				3.832	0.064
114.000	234	15 Winter	100	+20%	100/15 Summer				4.008	0.858
114.001	235	15 Winter	100	+20%	100/15 Summer				3.982	0.998
115.000	236	15 Winter	100	+20%					4.221	-0.019
115.001	237	15 Winter	100	+20%	100/15 Winter				4.126	0.035
116.000	238	15 Winter	100	+20%					4.198	-0.037
115.002	239	15 Winter	100	+20%	100/15 Summer				4.040	0.337
114.002	240	15 Winter	100	+20%	100/15 Summer				3.882	0.967
117.000	241	15 Winter	100	+20%					4.230	-0.005
118.000	242	15 Winter	100	+20%					4.173	-0.065
117.001	243	15 Winter	100	+20%	100/15 Summer				3.668	0.157
113.002	244	15 Winter	100	+20%	100/15 Summer				2.986	0.386
112.003	245	15 Winter	100	+20%	100/15 Summer				2.667	0.099
110.003	246	480 Winter	100	+20%	100/15 Summer				2.596	0.078
119.000	247	15 Winter	100	+20%					4.397	-0.002
120.000	248	15 Winter	100	+20%					4.320	-0.002
119.001	249	15 Summer	100	+20%	100/15 Summer				3.887	0.012
119.002	250	15 Winter	100	+20%					3.354	-0.063
119.003	251	15 Summer	100	+20%	100/15 Summer				3.213	0.027
110.004	252	480 Winter	100	+20%	100/15 Summer				2.596	0.098

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
94.006	193	0.000	0.03		4.8	FLOOD RISK	
94.007	194	0.000	0.01		4.5	SURCHARGED	
40.023	195	0.000	0.14		37.0	SURCHARGED	
102.000	196	0.000	0.01		0.2	SURCHARGED	
102.001	197	0.000	0.02		0.4	SURCHARGED	
102.002	198	0.000	0.03		0.5	SURCHARGED	
103.000	199	0.000	1.42		11.9	FLOOD RISK*	
104.000	200	0.000	0.87		10.8	FLOOD RISK*	
103.001	201	0.000	0.05		1.5	FLOOD RISK	
102.003	202	0.000	0.06		2.8	SURCHARGED	
105.000	203	0.000	0.56		6.5	FLOOD RISK*	
105.001	204	0.000	0.03		0.6	SURCHARGED	
102.004	205	0.000	0.13		3.4	SURCHARGED	
40.024	206	0.000	0.17		39.1	SURCHARGED	
106.000	207	0.000	0.27		10.1	FLOOD RISK*	
106.001	208	0.000	0.42		19.3	FLOOD RISK*	
106.002	209	0.000	0.50		27.8	FLOOD RISK*	
106.003	210	0.000	0.79		40.4	FLOOD RISK*	
107.000	211	0.000	0.94		21.0	FLOOD RISK*	
107.001	212	0.000	0.95		54.5	FLOOD RISK*	
106.004	213	0.000	1.78		90.3	FLOOD RISK	
106.005	214	0.000	0.06		5.8	SURCHARGED	
40.025	215	0.000	0.23		42.7	SURCHARGED	
108.000	216	0.000	0.36		8.2	FLOOD RISK*	
109.000	217	0.000	0.25		4.9	FLOOD RISK*	
108.001	218	0.000	0.06		0.8	SURCHARGED	
108.002	219	0.000	0.04		0.8	SURCHARGED	
108.003	220	0.000	0.01		0.8	SURCHARGED	
40.026	221	0.000	0.16		43.1	SURCHARGED	
40.027	222	0.000	0.10		42.9	SURCHARGED	
40.028	223	0.000	0.07		24.4	SURCHARGED	
40.029	224	0.000	0.16		24.4	OK	
110.000	225	0.000	0.85		17.1	FLOOD RISK*	
111.000	226	0.000	0.89		17.4	FLOOD RISK*	
110.001	227	0.000	2.08		35.0	SURCHARGED	
110.002	228	0.000	0.64		35.2	OK	
112.000	229	0.000	0.51		13.7	FLOOD RISK*	
112.001	230	0.000	1.80		29.9	SURCHARGED	
112.002	231	0.000	1.10		29.4	SURCHARGED	
113.000	232	0.704	1.04		42.4	FLOOD	2
113.001	233	0.000	1.60		47.4	SURCHARGED	
114.000	234	0.000	0.62		10.7	SURCHARGED	
114.001	235	0.000	1.59		21.8	SURCHARGED	
115.000	236	0.000	0.84		16.8	FLOOD RISK*	
115.001	237	0.000	0.98		50.2	FLOOD RISK*	
116.000	238	0.000	0.90		14.0	FLOOD RISK*	
115.002	239	0.000	2.12		63.5	FLOOD RISK	
114.002	240	0.000	1.69		70.4	SURCHARGED	
117.000	241	0.000	1.24		8.1	FLOOD RISK*	
118.000	242	0.000	0.99		5.8	FLOOD RISK*	
117.001	243	0.000	2.41		26.1	SURCHARGED	
113.002	244	0.000	2.28		139.7	SURCHARGED	
112.003	245	0.000	1.31		168.6	SURCHARGED	
110.003	246	0.000	0.18		22.9	SURCHARGED	
119.000	247	0.000	1.00		23.5	FLOOD RISK*	
120.000	248	0.000	1.00		19.6	FLOOD RISK*	
119.001	249	0.000	1.13		42.9	SURCHARGED	
119.002	250	0.000	0.79		43.1	OK	
119.003	251	0.000	1.27		42.9	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.004	252	0.000	0.21		28.5	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
110.005	253	480 Winter	100	+20%	100/120 Winter				2.596	0.120	0.000
110.006	254	480 Winter	100	+20%	100/60 Winter				2.595	0.247	0.000
110.007	255	15 Summer	100	+20%					1.751	-0.478	0.000
40.030	256	720 Winter	100	+20%					0.630	-0.205	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
110.005	253	0.11		28.2	SURCHARGED	
110.006	254	0.01		2.9	SURCHARGED	
110.007	255	0.02		2.9	OK	
40.030	256	0.43		26.8	OK	

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Appendix C.

C.1. Thames Water Meeting MoM

Bangura, Allan

From: Bangura, Allan
Sent: 23 September 2016 11:32
To: nick.ayling@thameswater.co.uk
Cc: James Shearman; Hellyer.William@tpsconsult.co.uk; Tim Halley
Subject: RE: LCY CADP - Thames Water Consultation Notes
Attachments: LCY CADP Thames Water MOM 120413.pdf; Condition 84 Scope for TW.DOCX; Condition 69 Scope for TW.DOCX

Good morning Nick,

Thank you again for your time on Monday and for providing a copy of the 'Guidance – working near our assets' document.

I have compiled notes from the team with regards to our meeting and have summarised the key items below. Please review and let me know if you have any queries. I will then update as required and distribute to the wider project team.

Please also note the following (colour-coded to correspond with the meeting notes below):

- I have attached a copy of the Condition 69 and Condition 84 scoping documents for your convenience
- I attach a copy of minutes from a previous meeting with Thames Water for your records
- I can confirm that, as per the Surface Water Drainage Strategy, existing flows have been estimated based on a 50mm/hr rainfall intensity which typically equates to a 1 in 1 or 1 in 2 year event

I am on leave next week but will be back on Tuesday 4th of October so I aim to provide outstanding information the week I return, as indicated below.

CADP – Pre-Commencement Condition Meeting between LCY and Thames Water (TW)
Monday 19 September 2016

Attendees:
Nick Ayling (NA) – Thames Water
James Shearman (JS) – LCA
Tim Halley (TH) – LCA
Will Hellyer (WH) – TPS
Allan Bangura (AB) – Atkins

CONDITION 69 – Sustainable Drainage

- TH/AB explained the proposed CADP infrastructure and associated drainage strategy which was included in the Updated Environmental Statement considered during the planning appeal. The drainage strategy achieves a 63% reduction from the CADP development overall based on reducing existing flows landside to greenfield run-off rates, where practicable, to compensate for an increase airside**.** TH explained that the build out of CADP is likely to be continuous but phased to deliver some of the infrastructure first (the Interim Works) with the remainder (Completed Works) being delivered immediately after the first phase. NA stated that TW would likely expect that, notwithstanding the reduction of 63% achieved when CADP is fully built out, there would be no increase in flows (compared to existing) for the interim development.
- Given the requirements of condition 69 it was agreed that LCY would need to provide details of how the interim development would achieve this. It was also agreed that LCY would share a draft submission with TW at the same time as sharing with the EA ahead of submission to London Borough of Newham.
- NA suggested that the turnaround for TW comments should be up to 2 weeks and that any draft should issue directly to him

- JS explained existing airfield discharge consent to the Thames Water surface water sewer and that the CADP would utilise similar principles. NA stated that this should be discussed with his TW colleagues.
- NA requested that AB provide additional information to include slides showing:
  1. colour catchment areas
  2. percentage reduction from development to the various TW main sewers
  3. details of critical storm event figures used to assess existing flow. NA stated that critical storms for 1 in 15 and 1 in 20 year event were typically used for TW.

  AB to provide updated slides for next consultation meeting – **w/c 10/10/2016 (TBC)**.

- WH to provide more detail of airfield drainage arrangement including expected rising main size in the submission
- AB to send NA a copy of the existing drainage survey information
  - AB to provide previous Minutes of Meeting to NA
  - NA stated that the existing drainage pipes serving the forecourt area, car parks and service yard may actually be owned by Thames Water due to a Private Sewer Transfer directive in 2011. AB to investigate based on land ownership information and connections from other asset owners (e.g. DLR). AB to provide by **07/10/2016**.

CONDITION 84 – Piling

- WH explained approach to discharging requirements of condition 84. NA stated that TW would wish to understand impacts of any piling (impact or otherwise) occurring within 15m of TW assets (as per 'Guidance - working near our assets'). Any building within 3m of a TW asset will require a 'near to' assessment.
- NA to provide a copy of the 'Guidance - working near our assets' document
- NA noted that it would be preferable to include details of all piling with reference to the 'Guidance – working near our assets'. NA confirmed that little information would be required for areas at a significant distance from the TW asset, for example the dock piling. However, LCY to review information for the West Terminal Extension and West Energy Centre and provide a draft to NA to review **07/10/2016**.

- NA confirmed he will also be the main point of contact for Potable Water and Foul Water connections.

Have a god weekend.

Kind regards,

Allan Bangura
Infrastructure

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| Linkedin: www.linkedin.com/company/atkins | YouTube: www.youtube.com/wsatkinsplc |

C.2. Thames Water Correspondence

From: Devcon Team <devcon.team@thameswater.co.uk>
Sent: 23 March 2018 14:53
To: Tim Halley
Subject: RE: REF. 37717 - CADP1 Conditions 66 & 69 (email 1)

Hi Tim,

I have run the information that you sent us past the Asset Planner and he has agreed that the details would be acceptable.

Regards

Margaret Keen
Developer Services - Planner
0203 577 9948 (Ext: 89948)
margaret.keen@thameswater.co.uk

Thames Water Utilities Ltd, Maple Lodge STW, Denham Way, Rickmansworth, Hertfordshire WD3 9SQ

From: Tim Halley [mailto:Tim.Halley@londoncityairport.com]
Sent: 21 March 2018 17:09
To: Devcon Team
Cc: Oscar Wong
Subject: REF. 37717 - CADP1 Conditions 66 & 69 (email 1)
Importance: High

FAO Margaret Keen
London City Airport Development Programme (CADP1)
Your Ref. 37717

Dear Margaret,

Further to our discussion just now, please find attached for review and comment draft drainage schemes to satisfy condition 66 (non-return valve) and 69 (sustainable drainage scheme) of the CADP planning permission.

As discussed, details under conditions 66 & 69 were previously approved by London Borough of Newham in May 2017 (ref. 17/00778/AOD) for the first of two phases approved under CADP Condition 4 (the Interim Works). Prior to submitting that application, the Thames Water (Nick Ayling) reviewed and confirmed no objections to the details (see email below and Thames Water Ref. 37717).

We are now taking forward the drainage details under conditions 66 & 69 for the full CADP build alongside a new phasing plan to build CADP in a quicker single phase without the need to build the interim drainage scheme serving the first phase. Prior to submission of the application to London Borough of Newham, I would like to ensure that

there are similarly no objections from Thames Water on the current details being provided. The attached draft is consistent with the Drainage Strategy approved as part of the planning permission and the proposed flow rates all remain the same. However, as confirmed previously, reductions of 63% were reliant on unrestricted flows at the site. It has since been found that some restricted flows are already in place and hence the % reductions are 44% and not 63%. All other aspects of the scheme remain the same.

I would be grateful if you could confirm receipt and whether we could hold a call next week to address any queries on the attached prior to formal submission.

I will need to send over the appendices in subsequent emails due to file sizes, happy to also send a link or disk if that would help?

Kind regards,

Tim Halley
Head of Planning

Phone: 07899985381

Email: Tim.Halley@londoncityairport.com
Website: www.londoncityairport.com

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Thames Water Limited (company number 2366623) and Thames Water Utilities Limited (company number 2366661)

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