

## Appendix A – Data Received

- A1 DATA COLLECTION LOG
- A2 SOUTHAMPTON CITY COUNCIL (SCC)
- A3 ASSOCIATION OF BRITISH PORTS (ABP)
- A4 ENVIRONMENT AGENCY (EA)
- A5 NETWORK RAIL (NR)
- A6 SOUTHERN WATER
- A7 WEST QUAY (WQ)
- A8 OTHER SOURCES

A1 DATA COLLECTION LOG

## Appendix A1 Southampton SWMP: Data Collection Status

Receiving Organisation	Document/Title of Information	Date Received	Comments	Data Quality Score
ABP	Surface Water Sewer Records	23-Sep-10	Cad file of surface water network	2
	Pumping Station information (near Gate 8)	23-Sep-10	Plan/section drawings	2
	Mayflower Park Pumping Station information	17-Mar-11	Drawings, photos pumping records service sheets, water samples	2
	Mayflower Park Pumping Station information	9-Dec-10	Mayflower Pump capacity	3
SCC (via Capita IT)	GIS data	2-Sep-10	Southern Water network records, Press-Related Articles (LCLIP), Grounds Maintenance Plots, Highway Gully positions, Parks and Open Spaces, Register of Public Highways	1
	GIS data	2-Sep-10	Southern Water surface water network	2
	LiDAR data	2-Sep-10	2 x 2m grid (entire coverage of Southampton)	1
	LiDAR data	2-Nov-10	1 x 1m grid (for small area in city centre)	1
	OS Tiles	19-Jan-11	Ordnance survey data	1
	EA Flood Data	3-Feb-11	River network, historic flood mapping, areas susceptible to ground water/surface water flooding (GIS layers)	1
	Southampton Historic Mapping	14-Feb-11		1
Highway Structures	2-Mar-11		1 to 2	
EA Main Rivers	10-Mar-11	GIS layer	1	
Environment Agency	Second Generation Flood Risk Maps	16-Dec-10	Received from SCC via Capita Symonds GIS	1 to 2
	Data Sets for Portsmouth CC	6-Sep-10	Irrelevant data (does not cover Southampton)	-
	Tanners Brook scoping report	23-Feb-11	Potential measures for watercourse improvement	2
	Rolles Brook study	8-Mar-11	Opportunities for river enhancement	1
Hampshire CC	County-wide Groundwater study	12-Nov-10		1 to 2
	Halcrow actions report (G/W flooding 2001-05)	28-Oct-10		1 to 2
Network Rail	Culverts under Network Rail land	30-Jul-10		2
	Culverts within SCC land	30-Jul-10		2
	Report/Meetings from May 2008 flooding event	5-Feb-11	Records/photos from SCC report	2
Southampton CC	Southampton LCLIP	13-Jul-10	Historical Data	1
	Stage 2 Strategic Flood Risk Assessment	13-Sep-10		1
	Flooding Hotspots list	24-Sep-10	Known drainage maintenance issues from SCC Highways	3
	Critical Infrastructure	12-Nov-10	Southampton Multi Agency flood response plan, appendices 3 and 4 (key risks and high risk areas)	2
Southern Water	Historical Data	10-Aug-10	Spreadsheet data of flooded areas converted to map	2
	Surface Water networks	6-Sep-10	GIS data	2
	Model files		Foul Water network	2
West Quay	Surface Water Sewer Records	1-Feb-11		2 to 3

Data Quality Score	Description	Explanations	Example
1	Best Possible	No better available; not possible to improve in the near future	Hi-res LiDAR River/sewer flow data Rain gauge data
2	Data with known deficiencies	Best replaced as soon as new data are available	Typical sewer or river model that is a few years old
3	Gross assumptions	Not invented but based on experience and judgement	Location, extent and depth of much surface water flooding
4	Heroic assumptions	An educated guess	Ground roughness for 2D models

A2 SOUTHAMPTON CITY COUNCIL (SCC)

**Southampton City Council**

**Flooding Hotspots – Highways & Parking Services September 2009 Investigation**

**Key**

Reason for flooding indicated by colour coding:

Inadequate gully cleansing or jetting maintenance regime
Subway pump blockage or maintenance regime
Requirement for implementation of a drainage scheme (minor to extensive)
Tidal outflow restriction
Southern Water – receiving main capacity restriction
Cause attributed to issues (eg. requirement to enlarge capacity) on 3 <sup>rd</sup> party land
Site expected not to suffer from future flooding due to programmed or completed works

Ref.	Location	Cause of Flooding (Highways Services Operational knowledge – Sept 09)
1	Hazel Rd o/s unit 13	Blocked gulley likely
2	Botley Road from Portsmouth Road to Lowry Gardens	Requires link from gulley to mains to be <u>properly</u> done
3	Bullar Road o/s Bed-E-Buys	Blocked gulley (temporary flood)
4	Selbourne Avenue o/s 55	Blocked gulley should resolve
5	Thornhill Park Rd 6-20	Leaves and detritus causing blockage of gullies
6	Forest Hills Drive o/s Forest View	Pipes blocked (highway maintenance responsibility)
7	East Street o/s Camera Shop	Gulley cleaning and pipework only
8	Honeysuckle Road o/s 26	Gulley cleaning and pipework only
9	Millbrook Road East o/s 43	Gulley cleaning and pipework only (requires deep clean – possibly much jetting)
10	Burgess Road opposite Corals bookmakers	Footway gullies require cleaning
11	New Road junction by Traffic Lights	Gulley cleansing job only
12	St Aubins Avenue o/s 68	Gulley cleansing job only
13	Hinkler Road j/w Ellwood Close	Gulley cleansing job only
14	Queens Terrace by parking bays	Gulley cleansing job only
15	Regents Park j/w Clifton Road	Gulley cleansing job only
16	University Rd by crossing	Gulley cleansing job only
17	Warren Avenue o/s park	Clean and jet only needed
18	Woodside Road o/s Woodside Court	Gulley cleansing job only
19	Woodmill Lane o/s car park	Gulley cleansing job only
20	Browning Avenue end of 'frying pan' turning point	Gulley cleansing job only
21	Derby Road j/w Oxford Avenue	Gulley cleansing job only
22	Kingsway by crossing and by North Front	Gulley cleansing job only
23	The Avenue subway	Pump in Avenue subway
24	Redbridge Road subway	Subway pumps only
25	Bridge Road under the bridge	Off-peak works needed to correct highways connections
26	Dell Road o/s 43	At base of high hill – further investigation / scheme required
27	Somerset Avenue j/w Cheriton Avenue	Caused by trash screen being blocked on culvert
28	St James Road j/w Belle Moor Rd	Mains checking and new pipework (large job)
29	Copperfield Road o/s 20	Natural springs are the cause (major scheme)
30	Old Mill Way within turnaround circle	Major maintenance scheme to pipe to Tanners Brook
31	Newtown Road o/s 72	Major gulley construction needed
32	Wide Lane roundabout	Major drainage scheme required – new pipes

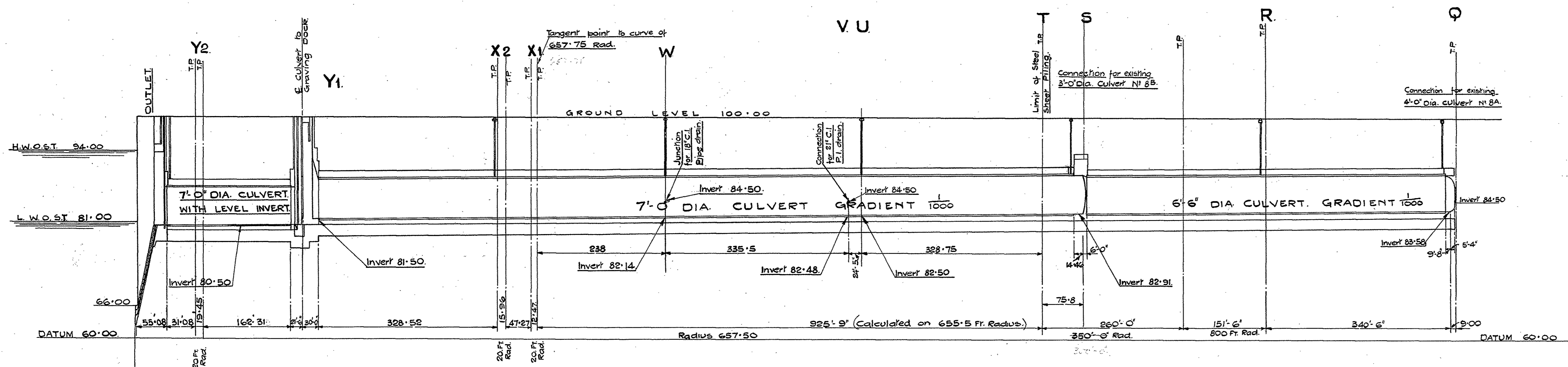
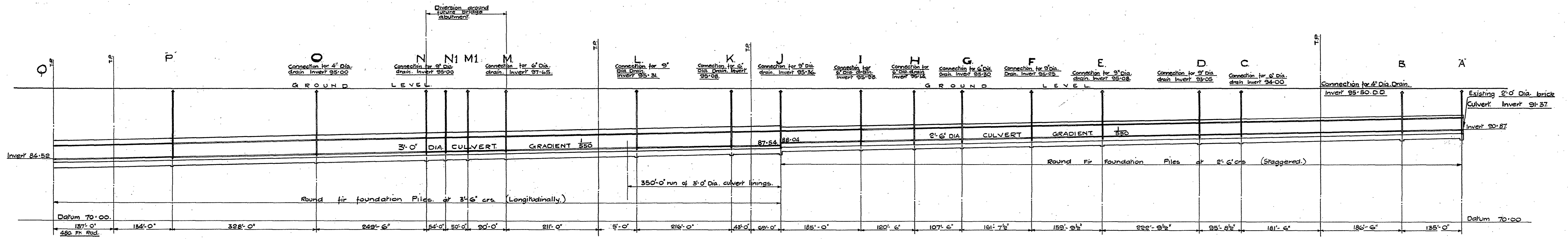
33	Platform Road by bus stop	Major drainage scheme needed (further gullies needed and corrective action)
34	Bursledon Road opposite Fire Station	Major drainage scheme to divert water from drainage ditch (open ditch maintenance needed)
35	Wimpson Lane j/w Mansel Road East	Road alignment as a result of footpath scheme (needs further scheme)
36	Wimpson Lane j/w Pennine Road	Re-piping job needed
37	Southern Road j/w West Quay Road	Investigated and scheme recommended
38	Bassett Avenue	Future scheme investigation needed
39	Weston Parade	High tides only
40	Test Lane j/w Gover Road	Tidal only
41	Albert Road North j/w Endle Street	Spring tides only
42	West End Road o/s 17	Blocked gully (temporary flood) (likely to be a Southern Water problem)
43	Firgrove Road o/s 78	Capacity in the mains (perhaps cleaning would help?)
44	Empress Road o/s Industrial Estate	Likely to be capacity issue with Southern Water mains?
45	Waterhouse Lane j/w Millbrook Road	Southern Water capacity restriction
46	Portsmouth Road	Ongoing scheme is addressing this and Southern Water capacity problem related
47	Redbridge Hill o/s Fire Station	Private land issue
48	Millbrook Point Road o/s garage	Network Rail ditch problem
49	Civic Centre Hill j/w Western Esplanade	ABP responsibility
50	Portsmouth Rd o/s St Marks Church	Being addressed at present ('Beany' kerbs etc) [still likely to be a problem but have to wait for scheme completion]
51	Athelston Rd o/s 78-98	Should be rectified by double gullies (resolved)
52	Athelston Rd j/w Garfield Road	Should be rectified by double gullies – probably corrected (resolved)
53	Barnfield Close o/s 23	Corrected by new pipework and gully (resolved)
54	Coxford Road o/s Wellow Court	Resolved by new channels being laid
55	Central Bridge j/w Itchen Bridge	Resolved
56	Mansbridge Road j/w Inchenside Close	Resolved
57	Inner Avenue j/w Archers Road	Resolved
58	Highfield Lane o/s Kingfishers Court	Likely to be resolved
59	Mount Pleasant Road by Railway line	Resolved
60	Wide Lane o/s Flemings Arms Pub	Resolved
61	Thornhill Road j/w Highclere Avenue	Resolved
62	Hulse Road o/s Police Station	Resolved
63	Charlotte Place roundabout to side of Hotel	Resolved
64	Lowerbrownhill Road j/w Colne Avenue	New road alignment has corrected issue (resolved)
65	Above Bar Street o/s Marlands	Resolved
66	Barry Road j/w Bursledon Road	Resolved
67	Mousehole Lane j/w Glenfield Avenue	Resolved by road alignment
68	Dale Valley Road o/s newsagents	Resolved
69	Millbrook Road slip road to Paynes Road	Resolved

A3 ASSOCIATION OF BRITISH PORTS (ABP)

# SOUTHERN RAILWAY — SOUTHAMPTON DOCKS. DOCKS EXTENSIONS — WESTERN SHORE. CULVERTS AND DRAINS STAGE 2. LONGITUDINAL SECTIONS.

CONTRACT N° 17

SCALE: 10 FEET TO 1 INCH VERTICAL.  
100 FEET TO 1 INCH HORIZONTAL.



NEG. N° 6063  
DRAWN - D.W.  
TRACED - A.D.M. 22.3.33  
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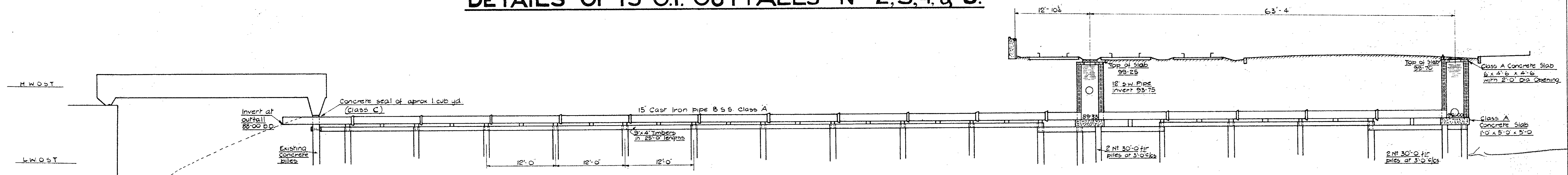


# SOUTHERN RAILWAY - SOUTHAMPTON DOCKS.

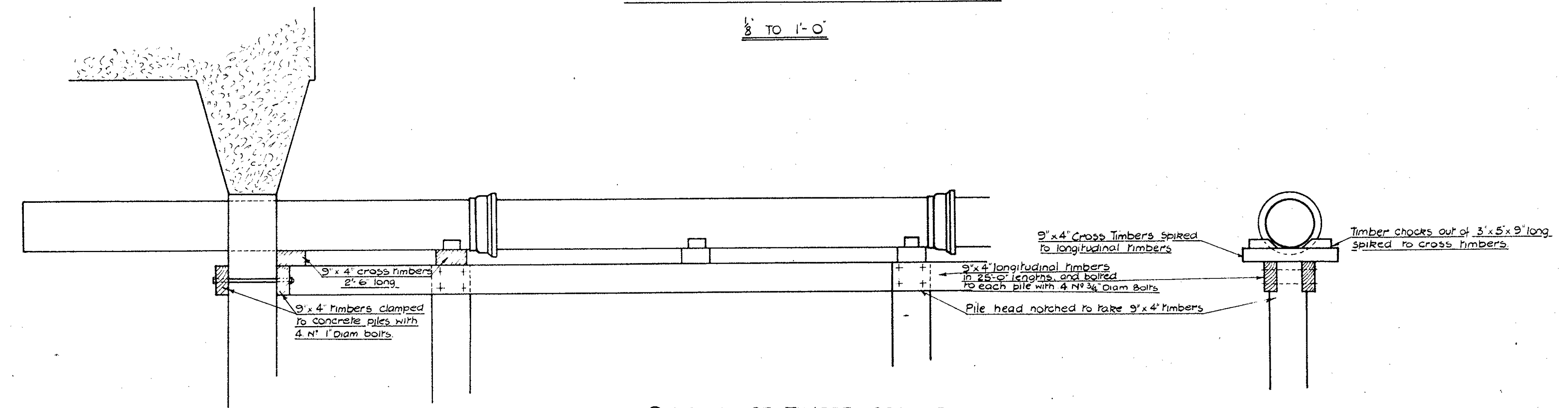
## DOCKS EXTENSIONS WESTERN SHORE.

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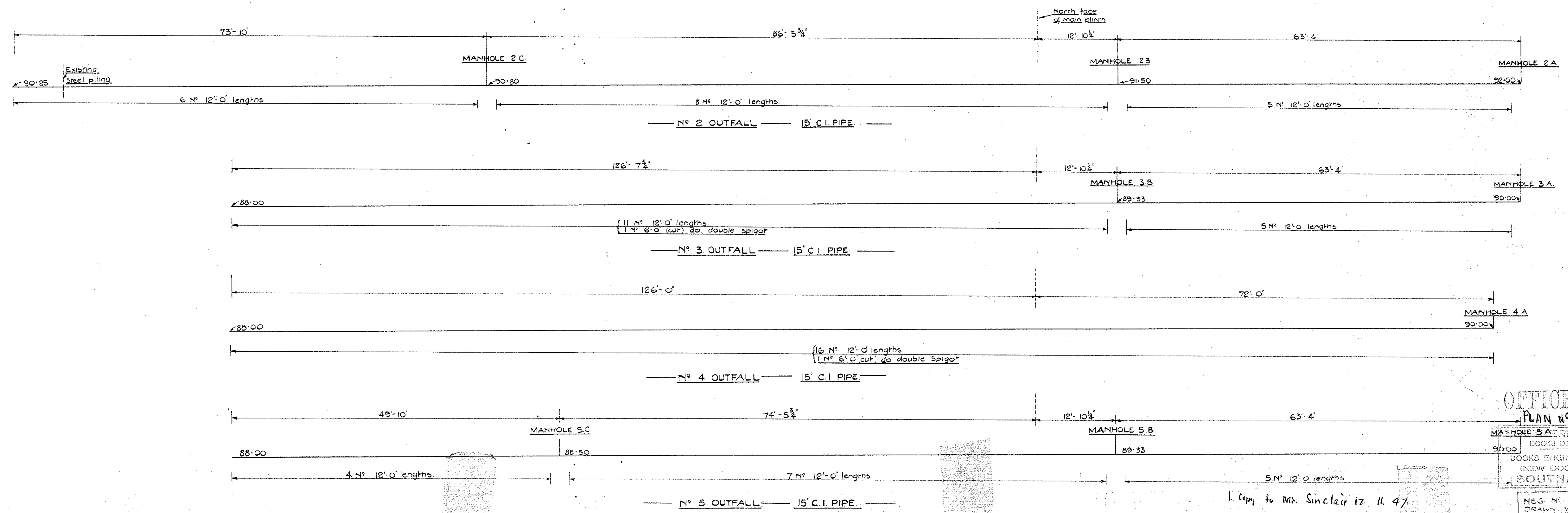
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— No 3 OUTFALL —  
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— DETAILS OF TIMBER CRADLE —  
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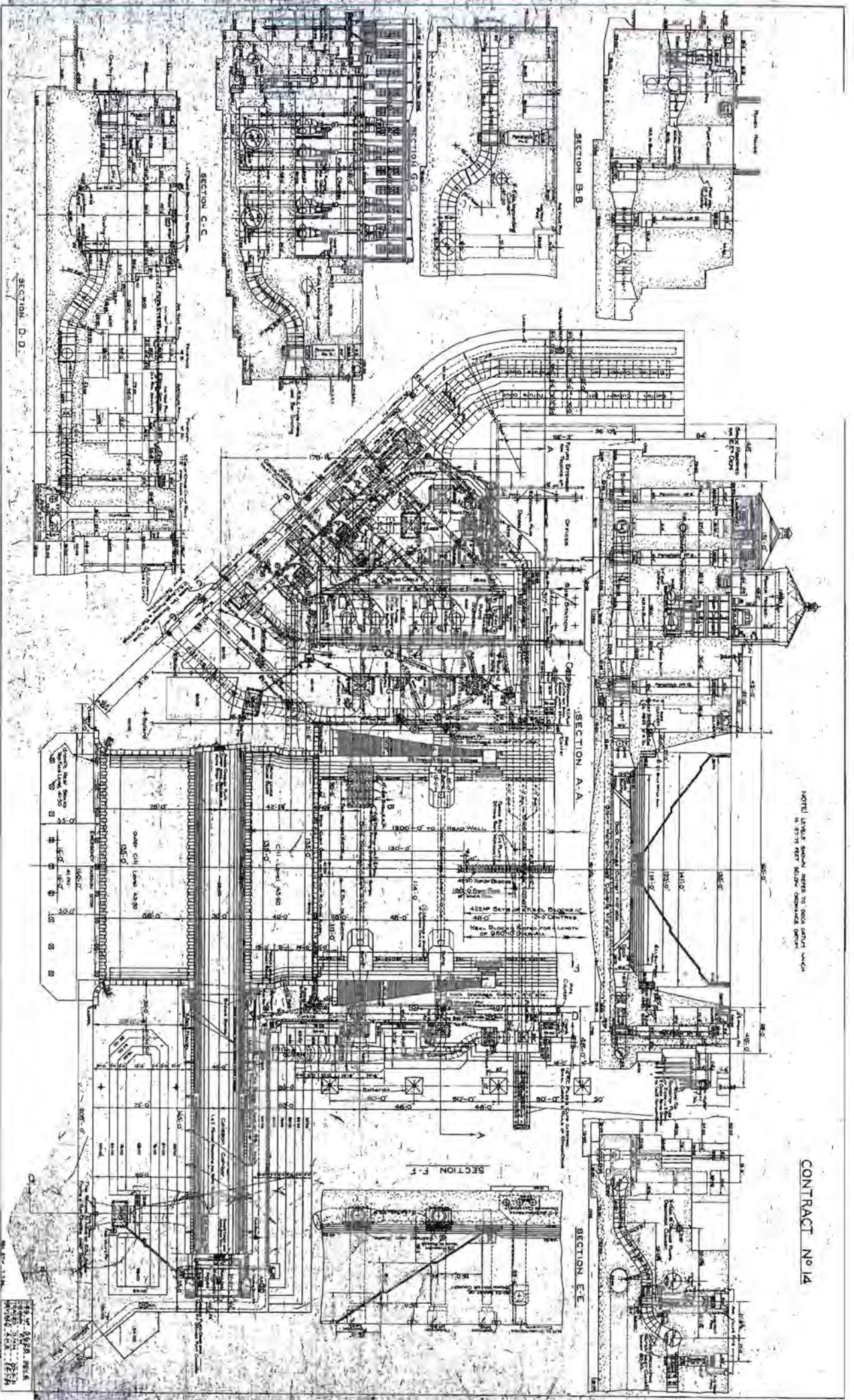


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SOUTHAMPTON DOCKS DEPARTMENT  
DOCKS ENGINEERS OFFICE  
(NEW DOCK WORKS.)  
SOUTHAMPTON.

1 Copy to Mr. Sinclair 12. 11. 47

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TRACED A.O.M.  
REVISOR

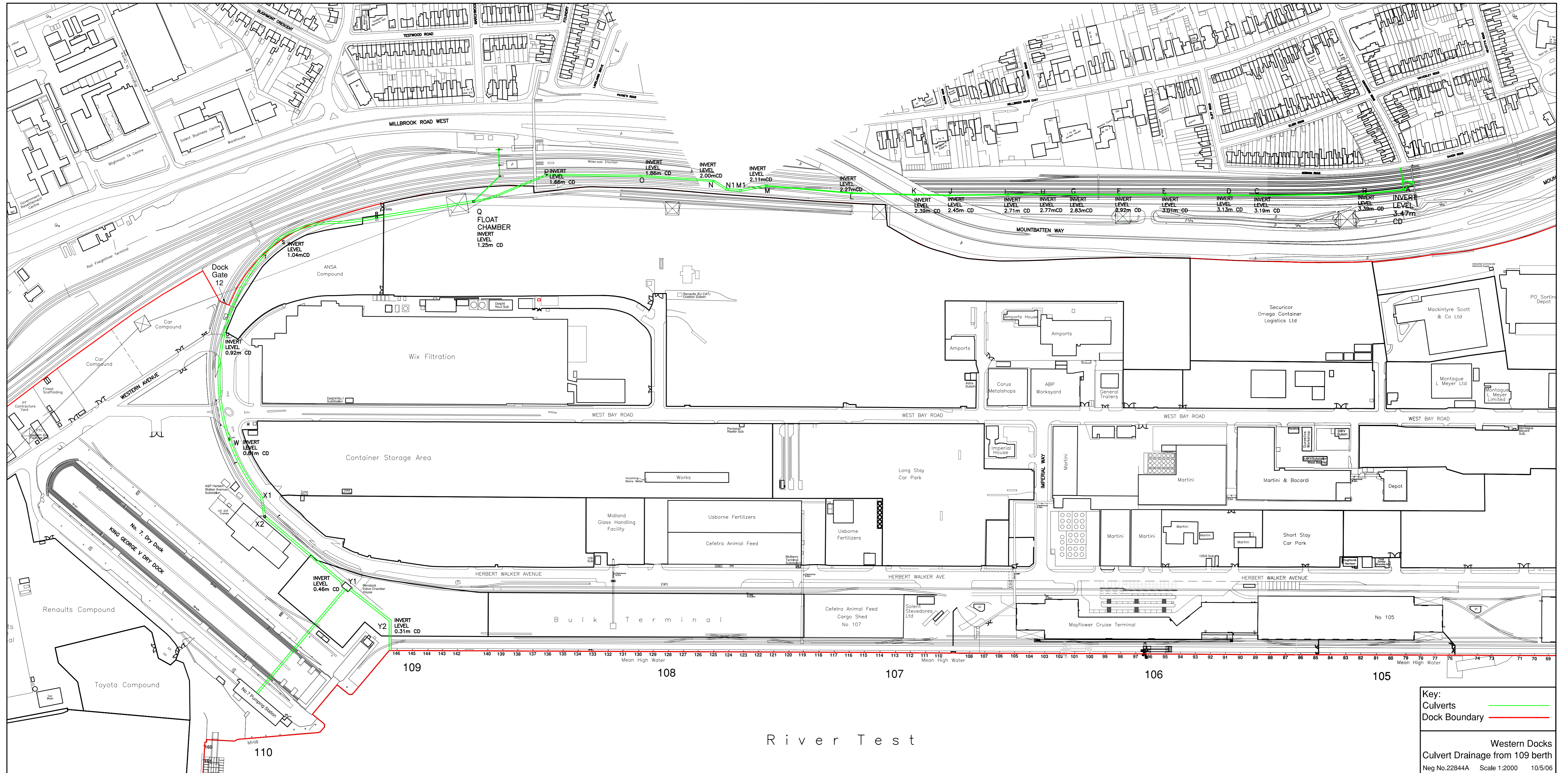
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NOTE: LEVELS SHOWN REFER TO BIRD LANTER LEVEL UNLESS NOTED OTHERWISE.

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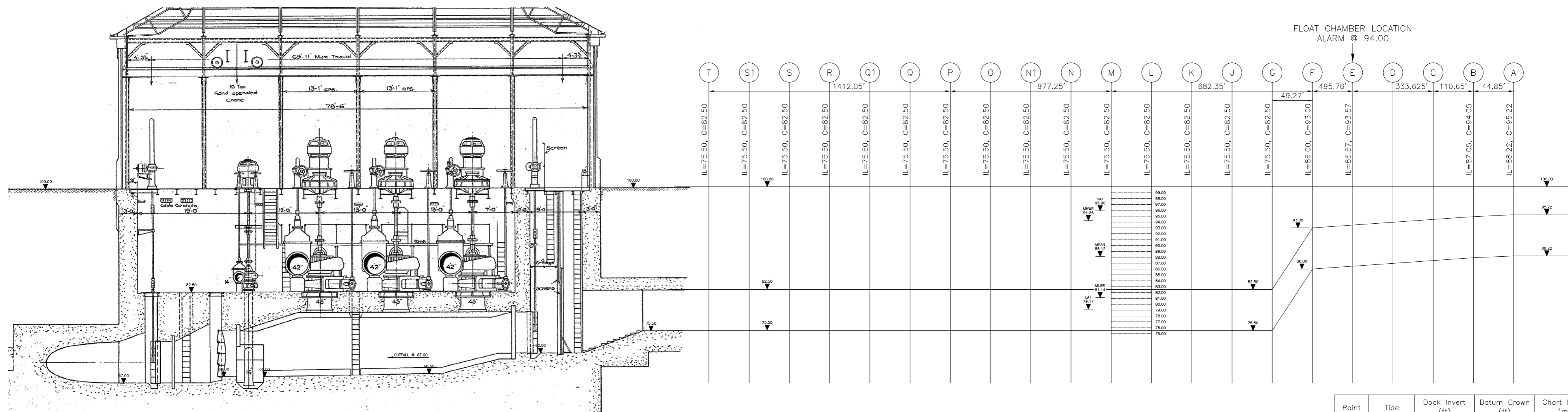
1/2" = 1'-0" SCALE  
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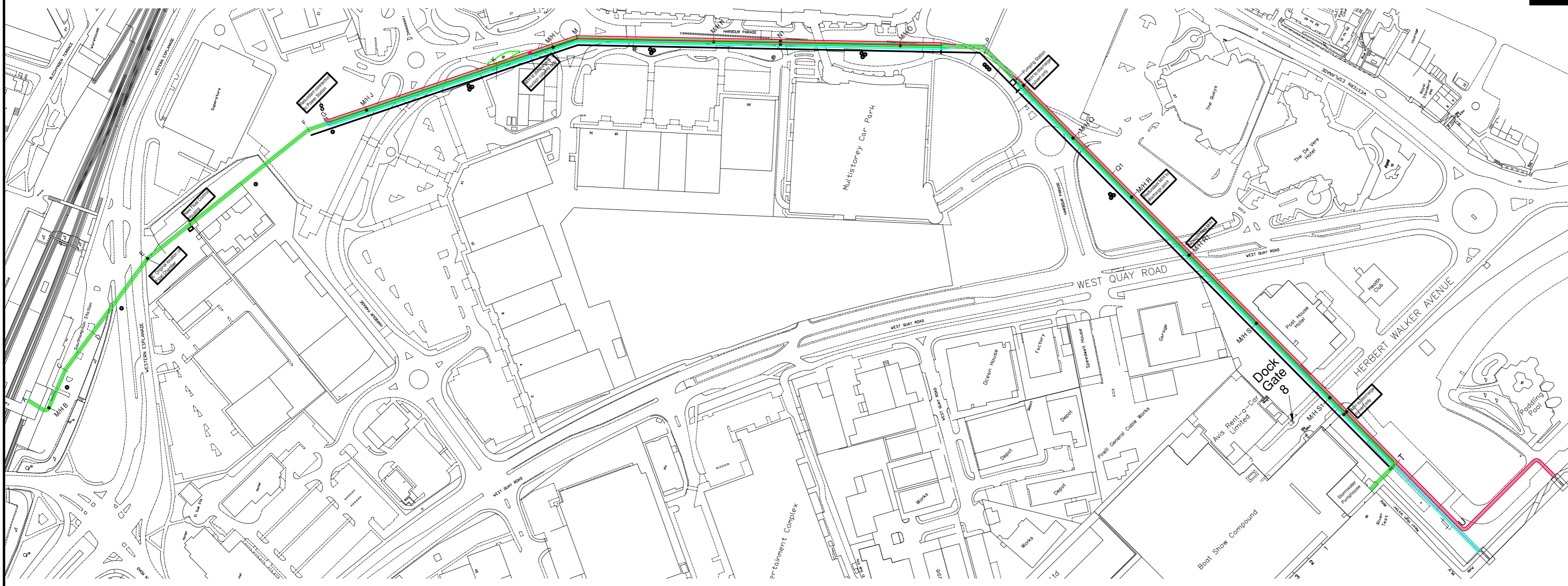
Key:  
 Culverts ————  
 Dock Boundary ————

Western Docks  
 Culvert Drainage from 109 berth  
 Neg No.22844A Scale 1:2000 10/5/06

River Test



Point	Tide	Dock Invert (ft)	Datum Crown (ft)	Chart Invert (m)	Datum Crown (m)
	HAT	95.90	-	5.00	-
	MHWS	94.26	-	4.50	-
A		88.22	95.22	2.66	4.79
	MEAN	88.12	-	2.63	-
B		87.05	94.05	2.30	4.44
E		86.57	93.57	2.16	4.29
F		86.00	93.00	1.98	4.12
	MLWS	81.14	-	0.50	-
	LAT	79.17	-	-0.10	-
G TO S1		75.50	82.50	-1.22	0.92
PUMPHOUSE SUMP		68.00	-	-3.50	-



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Revision	Drawn	Date

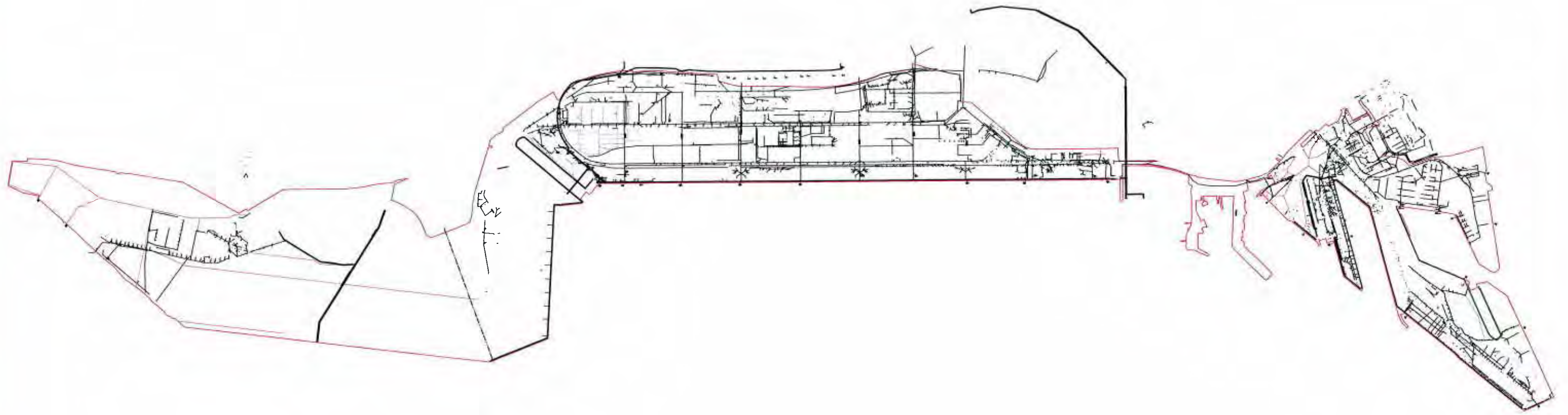


Associated British Ports  
 Ocean Gate  
 Atlantic Way  
 Southampton S014 3QN  
 Telephone 023 8048800  
 Facsimile 023 80336402

Project  
**8 Gate Storm Water Culvert**

Drawing  
**Section Through System**

Drawn NM	Scale 2" = 1'	Date 24/11/08
Drawing No. 30298	Subject No. 506	Revision -



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**ABP ASSOCIATED  
 BRITISH PORTS  
 SOUTHAMPTON**

Associated British Ports  
 Ocean Gate  
 Atlantic Way Telephone 023 8048800  
 Southampton SO4 3JH Facsimile 023 8033402

**PORT OF  
 SOUTHAMPTON**

**STORMWATER DRAINAGE  
 SYSTEM**

Drawn by: [Name] Scale: 1:100 Date: 15.08.10  
 Checked by: [Name] Subject No: 30478  
 Approved by: [Name]

# SOUTHAMPTON DOCKS EXTENSION.

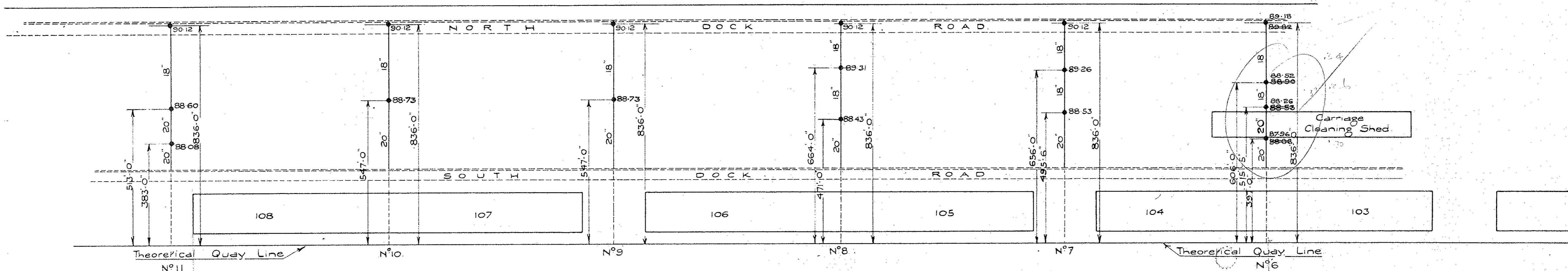
## EXTENSION OF OUTFALL DRAINS N<sup>OS</sup> 6 TO 11.

### POSITIONS OF MANHOLES.

Scale  $\frac{1}{2500}$ .

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**CONTRACT NO. 19.**  
**(ADDITIONAL WORKS.)**

*Scaled 11/1/58*



Outfalls to be constructed shown full.  
Existing outfalls shown dotted.

Levels shown are invert levels at manholes

OFFICE COPY.

SOUTHERN RAILWAY  
 DOCKS DEPARTMENT.  
 DOCKS ENGINEER'S OFFICE,  
 (NEW DOCK WORKS.)  
 SOUTHAMPTON.

NEG. N <sup>o</sup>	7331
DRAWN	PAYs.
TRACED	P.E.P. 4.12.34
REVISED	

2 Copies to Messrs. McAlpine. 7. 12. 34.  
 1 " " Contract Office 7. 12. 34.  
 1 " " Inspector. 7. 12. 34.

30" x 14"

A4 ENVIRONMENT AGENCY (EA)

enhancing... improving... cleaning... restoring.  
changing... tackling... protecting... reducing...  
create a better place... influencing... inspiring.  
advising... managing... adapting...

# Tanner's Brook

Scoping Report



We are the Environment Agency. It's our job to look after your environment and make it **a better place** - for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

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# List of abbreviations

ABP	Associated British Ports'
AQMZ	Air Quality management Zones
BAP	Biodiversity Action Plan
CFMP	Catchment Flood Management Plan
EAP	Environmental Action Plan
EIA	Environmental Impact Assessment
NO2	Nitrogen Dioxide
PAR	Project Appraisal Report
Ramsar	The Ramsar Convention (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat)
SAC	Special Area of Conservation
SINC	Site of Interest for Nature Conservation
SPA	Special Protection Area

# Summary

Tanner's Brook and Holly Brook run from north of the M27 into Southampton, where they join, before discharging into the Test Estuary and Southampton Water, via a culvert under the ABP Port Southampton. Both watercourses are heavily modified in their lower reaches and are subject to fluvial flooding at various locations. Flooding in Tanner's Brook is exacerbated during high tides due to tidal locking.

The Tanner's Brook and Holly Brook Pre-Feasibility study assessed outline options for restoring the two watercourses. Options were considered that aimed to reduce flood risk, improve the morphological and habitat quality, increase biodiversity, access and amenity value, and contribute towards the delivery of key objectives in the Test & Itchen Catchment Flood Management Plan (CFMP).

Five options have been developed to the Project Appraisal Report (PAR) stage and include a combination of the following:

- Complete removal of culverted stretches at the golf course, including two new ponds and earth embankments for flood storage;
- Amenity enhancements at Dale Valley Road Allotments involving the replacement of fencing and channel clearance;
- Provision of flood storage within Dale Valley Road Allotments, through excavation of the existing ground levels;
- Installation of eel passes at Shirley Pond;
- Installation of in-channel features and scraping at Mill Mead;
- Public realm enhancements and channel improvements at Millbrook; and
- Tidal control structure at ABP Port.

Two preferred options have been taken forward for the PAR stage.

Option 2 includes:

- Deculverting of Holly Brook over the Golf course (NGR SU410166)
- Improvements to river corridor at Dale Valley Road Allotments (NGR SU405154) and Dale Valley Gardens (NGR SU402149), including replacement of the existing fencing improve the aesthetics of the river corridor and clearing non-native species;
- Installation of eel passes at the two existing weirs adjacent to Shirley Pond (NGR SU395143); and
- Geomorphology improvements, including in channel features and shallow scrapes adjacent to the channel through Mill Mead (NGR SU391139).

Option 5 includes:

- Geomorphology improvements, including in channel features and shallow scrapes adjacent to the channel in select locations through Millbrook (SU388131); and
- Amenity improvements including resurfacing of pedestrian route, vegetation management and replanting, replacement of fencing and provision seating and signage in select locations through Millbrook (SU388131).

An internal screening exercise indicates that the works are unlikely to give rise to significant environmental effects and would therefore not require a statutory EIA. An Environmental Report will support works undertaken under the Environment Agency's permitted development rights. In the event planning permission is required, depending on the options selected, it may accompany the planning application for the project. An initial consequence based assessment including a breach analysis, will be required at the next stage of the project to identify if the proposed storage area would be a minimal risk and will not require supervision and inspection by qualified civil engineers, or otherwise, as defined by the Reservoirs Act 2010.

The environmental baseline for the project study area has been established and the environmental aspects that have been scoped into the Environmental Assessment will depend on the options taken forwards. Aspects that may be assessed will include:

- Population;
- Flora and Fauna;
- Water;
- Soils, Geology and Hydrogeology;
- Landscape and Visual Amenity; and
- Natural Resources.



# 1 Introduction

## 1.1 Purpose of the Document

The Scoping Report presents the findings of the scoping stage undertaken as part of the Environment Agency's Environmental Impact Assessment (EIA) process, for the Tanners Brook PAR. This document will also form part of the documentation required to gain internal approval for the project.

- Provide a record of the scoping process
- Identify the methodology for undertaking the assessment and evaluation stage of the EIA
- Identify what issues have been 'scoped' out of the EIA
- Identify opportunities
- Provide a record of the options appraisal process
- Identify the main impacts of preferred option
- Consult with statutory bodies and interested parties.

## 2 Baseline Summary

### 2.1 Context of the Project

The lower reaches of Tanner's Brook flows through the urban areas of Southampton, see Appendix A, and is heavily modified. Holly Brook is a key tributary of Tanners Brook and is also heavily modified, with significant stretches running within culverts or within an engineered channel.

The Holly Brook and Tanner's Brook catchments are both subject to fluvial flooding at various locations, which is exasperated during high tides when river flows are subjected to tidal locking, therefore further increasing the risk of flooding in the lower reaches of Tanner's Brook.

The Tanner's Brook and Holly Brook Pre-Feasibility study (2009) assessed outline options for restoring or re-naturalising Tanner's Brook and Holly Brook according to their ability to reduce the risk of flooding from Tanner's Brook and Holly Brook, as well as additional benefits such as improving the morphological and habitat quality of the watercourses, increasing biodiversity, access and amenity value, and contributing towards the delivery of Southampton river restoration policies and key objectives from the Test & Itchen Catchment Flood Management Plan (CFMP).

The options identified have been further developed through an Options Review, for the Project Appraisal Report (PAR) stage. The options proposed include a combination of the following:

- Complete removal of culverted stretches at the golf course, including two new ponds and earth embankments for flood storage;
- Amenity enhancements at Dale Valley Road Allotments involving the replacement of fencing and channel clearance;



- Provision of flood storage within Dale Valley Road Allotments, through excavation of the existing ground levels;
- Installation of eel passes at Shirley Pond;
- Installation of in-channel features and scraping at Mill Mead;
- Public realm enhancements and channel improvements at Millbrook; and
- Tidal control structure at ABP Docks.

This Environmental Scoping Report supports the PAR and considers the outline options that have been developed. It describes the environmental baseline for the project, identifies the possibility of significant environmental impacts, sets out further work required to assessment impacts and identifies possible mitigation and opportunities for the project.

### 2.1.1 Site Location

Tanner's Brook rises on the south side of North Baddesley before flowing south, under the M27 and into the urban areas of Southampton, see Appendix A.

Holly Brook also rises to the north of the M27 before flowing south under the M27 into Chilworth Common and onto Southampton municipal golf course. It then flows on to its confluence with Tanner's Brook, in a culvert under the Romsey and Winchester Roads junction.

Downstream of the confluence, Tanner's Brook is constrained within a reinforced concrete lined channel, through Millbrook until exiting from the culvert under the ABP Port area at its confluence with the River Test Estuary and Southampton Water.

## 2.2 Existing Baseline

This section of the report describes the baseline conditions, within the study area, along Tanner's Brook and Holly Brook for each environmental aspect individually. A general baseline for the project area is provided for each aspect and where appropriate a more detailed baseline is provided for each of the individual scheme areas.

The baseline has been informed by a desk study, with reference to the Tanners Brook and Holly Brook Pre-Feasibility Study, consultation and a site visit on the 19th March 2010.

Consultation was carried out directly, or via the Environmental Agency, with:

- Hampshire Biological Records Centre;
- Natural England; and
- Southampton City Council.

Web sites and information sources consulted, as part of the desk study, included:

- Environment Agency (<http://www.environment-agency.gov.uk/>);
- Natural England (<http://www.naturalengland.org.uk/>);
- Southampton City Council ([www.southampton.gov.uk](http://www.southampton.gov.uk));
- UK National Air Quality Archive ([www.airquality.co.uk](http://www.airquality.co.uk));
- National Biodiversity Network Gateway ([www.nbn.org.uk](http://www.nbn.org.uk));
- Multi Agency Geographic Information for the Countryside ([www.magic.gov.uk](http://www.magic.gov.uk));

- Images of England ([www.imagesofengland.org.uk](http://www.imagesofengland.org.uk));
- Envirocheck report for Tanners Brook.
- Google maps (<http://maps.google.co.uk/>);

The Environmental Contextual Plan, Appendix B, and the Environmental Site Appraisal Plans, Appendix C, provide an over view of the key environmental constraints and opportunities considered in the design of the options.

## 2.2.1 Population

### **General Baseline**

Tanner's and Holly Brook both flow through a series of open spaces, recreation areas, and residential areas. Tanner's Brook runs close to the A35 downstream of it's confluence with Holly Brook until reaching the Oakley Road allotments. Downstream of the A3024 it crosses an industrial area before going into culvert under the ABP Port area and then discharging into the River Test Estuary and Southampton Water.

The majority of reaches within the study area are directly accessible or visible to the public, however a significant proportion is not, being either in culvert or constrained behind residential properties or safety fencing.

Within the study area the watercourses run within 200m of three schools and three hospital sites. The brooks are directly adjacent to the Dale Valley Road allotments, Holly Brook Close allotments and Oakley Road allotments.

### **Southampton Municipal Golf Course**

Holly Brook runs through the centre of the golf course, predominantly in culvert and then passes under the sports centre. Both the golf course and sports centre are public facilities and the route of the brook is therefore accessible to the general public using these facilities. The golf course car park and club house are over 200m to the east of the route. Residential properties are all relatively well screened from the route, and there are no public rights of way across the site. There are no public rights of way across the golf course.

### **Dale Valley Road Allotments**

Holly Brook runs adjacent to Dale Valley Road within the Hollybrook Allotments site. The brook is accessible by allotment holders and visible from Dale Valley road. The brook then flows down between residential gardens where it is hidden between garden fences and buildings. Southampton General Hospital is located approximately 400m to the west.

### **Shirley Pond**

Holly Brook comes out of culvert downstream of Warren Avenue. At this point it runs adjacent to a cycle path that runs between the brook and Shirley Pond and down to an area of public open space. Shirley Pond appears to be used for fishing and the open space is used for recreation by local residence. The site is in close proximity of a major road, the A35, and within 200m of Shirley Warren Primary School, to the north. Southampton General Hospital is located approximately 500m to the north east.

### **Mill Mead to Millbrook Road West**

After flowing beneath the A35 and A3057, Tanners Brook runs parallel to the A35 through Mill Mead, a wooded stretch. A footpath runs alongside the brook down past an industrial site to Oakley Road. There are residential properties to the south of the

watercourse, Western Community Hospital is located approximately 50m to the north, and Regents Park Community College approximately 150m to the south.

Downstream of Oakley Road the brook passes beside a surgery building, residential properties and Oakley Road Allotments down to Elmes Drive. A footbridge crosses the brook between King George's Avenue and the allotments. This is the only point along this reach that the brook is accessible.

Tanner's Brook Primary School is approximately 50m from the point that Elmes Drive crosses the brook. After passing under Elmes Drive the brook runs between residential properties. A footpath and Brookside Avenue run alongside this reach of the brook. The Brook then passes under the A3024, a major access route into Southampton.

### **ABP Port Area**

South of the A3024, Tanner's Brook runs through a commercial and industrial area and then under the railway lines into the docks area. Within the dock area the brook runs between a wastewater treatment works and a materials reprocessing area before entering a culvert under the dock area and then discharging into the estuary.

## **2.2.2 Flora and Fauna/ Biodiversity**

### **Desk Study**

The information below considers desk study information in the form of desk study data received from the following sources:

- Hampshire Biodiversity Information Centre (HBIC) for details of protected and otherwise notable species recorded within 2km of Tanner's Brook.
- Multi-Agency Graphical Information Centre website (MAGIC) for details of designated sites in close proximity to Tanners and Holly Brook.
- Environment Agency Reports:
  - Fisheries Survey Report, (Environment Agency, 2006), and;
  - An aquatic invertebrate survey of the upper reaches of Tanner's Brook and Holly Brook in 2006 (EA, 2007)

The data gleaned from desk study has been reviewed, to identify the most important ecological features adjacent to the site and is presented below.

### **Habitats**

Both Holly and Tanner's Brook flow through a diverse range of habitats which include areas of parkland, wet woodland, dry woodland, scrub, amenity grassland, semi-improved grassland, short/ephemeral perennial vegetation, tall ruderal vegetation, and ponds habitats. Whilst these habitats will support a diverse range of species, some of these habitats may be of importance in their own right and may qualify as UK BAP habitat types.

### **Designated Sites**

A number of designated sites are present in close proximity to Tanner's Brook and Holly Brook. International and National sites within 2km of the site and county designated sites within 500m of the site identified in Table 1.

The location of designated sites within the proximity of the proposed developments are shown on the Environmental Context Plan, Appendix B, and in the Environmental Site Appraisal Plans, Appendix C.

## Species

Desk study review with HBIC identified a large number of protected and notable species records within 2km of Tanner's and Holly Brook. Those of relevance to the scheme along with their closest respective grid square records are provided in the sections below.

### Bat Species

A number of bat species have been recorded adjacent to the scheme these include: Serotine *Eptesicus serotinus* (SU4116), Barbastelle *Barbastellus barbastellus* (unspecified location), Whiskered /Brandt's bat *Myotis mystacinus / brandtii* (SU3915, SU4117), Noctule *Nyctalus noctula* (SU4015, SU4116), Brown long-eared Bat *Plecotus auritus* (SU4014, SU4017), Natterer's *Myotis natterii* (SU4018, SU4118) Common Pipistrelle *Pipistrellus pipistrellus* (SU3914, SU4015, SU4116) and Soprano Pipistrelle *Pipistrellus pygmaeus* (SU3914).

### Other Mammals

Other mammals recorded include: hedgehog from Cexford Close and Tremona Rd (SU3914), Lordswood (SU4015) and Fitzroy Close (SU4117); Otter, where no specific record details are given, and species in relative proximity including Dormouse *Muscardinus avellanarius* (SU4118) and Badger *meles meles* (SU4118 and SU3916).

### Bird Species

A number of bird species have been recorded adjacent to the scheme these include: Kingfisher *Alcedo atthis* (SU3914), Teal *Anas crecca* (SU3913), Grey Heron *Ardea cinerea* (SU3913), Lesser Redpoll (SU3914), Lesser Spotted Woodpecker *Dendrocopos minor* (SU3914), Snipe *Gallinago gallinago* (SU3913), Herring Gull (SU3913), Whimbrel *Numenius phaeopus* (SU3913), Dunnock *Prunella modularis* (SU3913, SU3914), Water Rail *Rallus aquaticus* (SU4117, SU3914), Firecrest *Regulus ignicapilla* (SU3913), Greenshank *Tringa nebularia* (SU3913), Redwing *Turdus iliacus* (SU3913), Song Thrush *Turdus philomelus* (SU4015), Mistle Thrush *Turdus viscivorus* (SU4015) and Fieldfare *Turdus pilaris* (SU3913). There are also bird species for which no specific grid references are provided but may be adjacent to the site including: Nightjar *Caprimulgus europaeus*, Hobby *Falco subbuteo*, Woodlark *Lullula arborea*, Tree Sparrow *Passer montanus* and Grey Partridge *Perdix perdix*.

### Amphibian Species

Common Toad *Bufo bufo* have been recorded at Dale Rd (SU4014), Chilworth (SU4117) and Fitzroy Close (SU4117). The nearest record for Great Crested Newt *Triturus cristatus* is from Southampton Common Boating Lake (SU4215).

### Reptile Species

Slow-worm *Anguis fragilis* have been recorded at Paignton Road Allotments (SU3814), and at Dale Road, here they were translocated from SU4014 to SU4117; Grass Snake *Natrix natrix* have been recorded at Baddesley Common (SU3814); and Adder *Vipera berus* have been recorded at Baddesley Common (SU3813) and Emer Bog (SU3814).

### Fish

Fish species identified as present in Tanner's Brook are reported within the Fisheries Survey Report, (EA, 2006) for the area of Tanners' Brook upstream of its confluence with Holly Brook. The fish species recorded within the report are: Minnow *Phoxinus phoxinus*, 3-spined Stickleback *Gasterosteus aculeatus*, eel *Anguilla anguilla* and

flounder *Platichthys flesus*. In addition to these both trout and sea trout *Salmo trutta* have been recorded, adjacent to and downstream of Oakley Road allotments<sup>1</sup>.

### Terrestrial Invertebrates

A number of terrestrial invertebrate species have been recorded in grid squares adjacent to the site, these include Stag Beetle *Lucanus cervus* (SU3813, SU3913, SU3914, SU3915, SU4014, SU4015, SU4016, SU4115, SU4116), two species of Hoverfly *Volucella inamis* (SU3914, SU3915) and *Volucella zonaria* (SU3813, SU3914, SU4016), Southern Wood Ant *Formica rufa* (SU4015), the dragonfly species Downy Emerald *Cordulia aenea* (SU3914), the butterfly species White Admiral *Limenitis camilla* (SU4017, SU4016, SU4117), Silver –washed Fritillary *Argynnis paphia* (SU4017) and Grizzled Skipper *Pygnus malvae* (SU4017, SU4117), and 18 species of moth: Grey Dagger *Acronicta psi* (SU4116), Knotgrass *Acronicta rumicis* (SU4116), Beaded Chestnut *Agrochola lychnidis* (SU4116), Ear Moth *Amphipoea oculea* (SU4016), Minor Shoulder Knot *Brachylomia viminalis*(SU4116), Small Square Spot *Diarsia rubi*(SU4116), Small Phoenix *Ecliptopera silaceata*(SU4116), Small Emerald *Hemistola chrysoprasaria* (SU4117), The Rustic *Hoplodrina blanda*(SU4116), The Lackey *Macrosoma neustria* (SU4116), Dot Moth *Milanchra persicariaea* (SU4116), Shoulder-striped Wainscot *Mythimna comma* (SU4116), White Ermine *Spilosoma lubricipeda* (SU4016, SU4116), Buff Ermine *Synaphe luteum* (SU4116), Blood Vein *Timandra comae* (SU4116), The Cinnabar *Tyria jacobaeae* (SU4117), Oak Hook Tip *Watsonalla binaria* (SU4116), Dark-barred Twin-spot Carpet *Xanthorhoe birviata* (SU4116).

### Aquatic Invertebrates

Both Holly Brook and Tanner's Brook are likely to support aquatic invertebrate species. An aquatic invertebrate survey of the upper reaches of Tanner's Brook and Holly Brook in 2006 (EA, 2007) identified this area of the brook had low invertebrate species diversity. In addition, a personal comment from the Environment Agency identified the presence of American Crayfish within the catchment of Tanners and Holly Brook<sup>2</sup>.

### Plant Species

The plant species of note identified adjacent to the site include: Rough Horsetail *Equisetum hyemale* (SU3915), Wood Horsetail *Equisetum sylvaticum* (SU3915), Shore Horsetail (SU4115), Meadow Brome *Bromus commutatus* (SU3914), Slender Soft-brome *Bromus lepidus* (SU4015), Midland Hawthorn *Crataegus laevigata* (SU3914), Tall Ramping-fumitory *Fumaria bastardii* (SU3915, SU4015, SU3813), Round-leaved Crane's-bill *Geranium rotundifolia* (SU4115), Bluebell *Hyacinthoides non-scripta* (SU3915, SU4115, SU4117, SU4017, SU4016), Great Wood Rush *Luzula sylvatica* (SU4015), Welsh Poppy *Meconopsis cambrica* (SU4116), Weasel's-snout *Misopates orontium* (SU3814, SU3813, SU3913, SU3915, SU3914, SU4015), Rue-leaved Saxifrage *Saxifraga tridactylites* (SU3912), Corn Spurrey *Spergulara arvensis* (SU3915, SU3912, SU3914, SU4015), Autumn Lady's Tresses *Spiranthes spiralis* (SU4115), Clustered Clover *Trifolium glomeratum* (SU3813), Bladderwort *Utricularia australis* (SU4017), Heath Dog Violet *Viola canina* sub sp. *canina* (SU4116), Pale Dog Violet *Viola lactea* (SU4115), Wild Pansy *Viola tricolor* (SU4015).

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<sup>1</sup> Environment Agency communication 19/03/2010

<sup>2</sup> Environment Agency communication 14/06/2010

**Table 1 Designated sites**

<b>Site Name / Location</b>	<b>Designation</b>	<b>Description</b>	<b>Direct Distance from Site and Direction</b>	<b>Connective Distance and Connectivity to Site</b>	<b>Likelihood of scheme Impacts and Type of Impact, where Relevant</b>
Solent Maritime	Ramsar	Estuaries and adjacent coastal habitats	200m South	200m South Connected via the River Test.	Extremely Unlikely
Solent and Southampton Water	Special Protection Area	Marine and associated areas.	200m South and South-west	200m South Connected via the River Test.	Extremely Unlikely
Solent Maritime	Special Area of Conservation	Marine and associated areas.	200m South	200m South Connected via the River Test.	Extremely Unlikely
Eling and Bury Marshes	Site of Special Scientific Interest	Salt marsh habitats and intertidal mudflats.	200m South and South-west	200m South Connected via the River Test.	Extremely Unlikely
Southampton Common	Site of Special Scientific Interest	Valued habitats include broadleaved, mixed & yew woodland, neutral grassland and dwarf shrub lowland heath.	500m South-east	500m South-east, unconnected to Holly Brook and Tanners Brook. Habitat accessible for birds	Extremely Unlikely
Lower Test Valley	Site of Special Scientific Interest	Upper estuary, salt marsh, unimproved grasslands.	2500m West	2200m South-west Connected via the River Test.	Extremely Unlikely
Chilworth Common Plantation	Site of Interest for Nature Conservation	Ancient woodland where significant areas of the original semi-natural habitat remain, afforested / naturally wooded heathland.	Immediately adjacent to culverted area of Holly Brook	Site designation includes the issues of Holly Brook, directly connected to the culverted section of Holly Brook.	Unlikely negative impact, likely positive impact through provision of enhanced connectivity
Ride Through Plantation on Chilworth Common	Site of Interest for Nature Conservation	Unimproved grassland and heathland vegetation.	400m West	400m West Connected via habitats at the Golf Course and Lordswood.	Extremely Unlikely
Lord's Wood	Site of Interest for Nature Conservation	Ancient woodland, afforested / naturally wooded heathland,	300m West	300m west Connected via golf course habitats.	Unlikely negative impact, likely positive impact through provision of enhanced connectivity

### Site specific baseline

The following sections identify the key constraints and opportunities in the proximity of the preferred options. These are based on desk study review and information gleaned during an ecological walkover survey on 19th March 2010, which identified the valuable ecological features at each site.

#### Southampton Municipal Golf Course

The golf course is designated as a Site of Importance for Nature Conservation (SINC) and there are 3 additional SINC to the north and west.

Habitats include heavily managed grassland, pond habitats (possibly UK BAP value); wet woodland (including Alder *Alnus glutinosa carr*) (UK BAP habitat) and parkland and lowland woodland (likely to qualify as UK BAP habitat).

The habitats type and local records indicate the possible presence of species including bat, bird, reptile, amphibian and invertebrate species (including stag beetle *Lucanus cervus*), badger *Meles meles*, red squirrel *Sciurius vulgaris*, hedgehog *Erinaceus europaeus*, otter *Lutra lutra*, dormouse *Muscardinus avellanarius*, terrestrial, marginal and aquatic plant species, fungi and lower plant species.

The invasive species Japanese knotweed *Fallopia japonica* is present near to the entrance to the car park. south of the golf course (adjacent to Arnheim Road and Dunkirk Road).

#### Dale Valley Road Allotments

The Dale Valley Road Allotments, which adjoin the brook, are designated as a SINC, namely Hollybrook Bank and Allotments.

The habitats type and local records indicate the possible presence of species including bird species (song thrush *Turdus philomelos*), bat species, hedgehog, reptile species, amphibian species, fish species and invertebrate species. On the left hand bank of the brook rat *Rattus* species runs and burrows were evident.

Downstream of the allotments the brook and gardens are suitable for commuting /foraging bat species, birds, hedgehog, reptiles, amphibians and invertebrates.

The invasive species Japanese knotweed is present at the south side of the culvert under Holly Brook Avenue.

#### Shirley Pond Park

The area around Shirley pond, as part of Lordsdale Greenway, is designated as a SINC. The habitats present include the UK BAP habitat of ponds (Shirley Pond), rivers and streams, narrow bands of broad-leaved woodland, dead wood, and semi-improved grassland.

The Brook has occasional fern, sedge and moss and liverwort species covering the walls. Euryhaline Eel *Anguilla anguilla* are present both within and downstream of Shirley Pond<sup>3</sup>.

Shirley Pond includes areas of aquatic and marginal vegetation present. The pond is of value for wildfowl and geese, fish species and amphibian species. Other species for which the habitat is suitable include other bird species, bat species, reptile species and invertebrate species, including stag beetle.

Two weirs adjacent to the pond obstruct local fish movements up and down stream.

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<sup>3</sup> Environment Personal communication on 19/03/2010

## **Mill Mead**

Mill Mead, the area downstream of the Winchester Road and Romsey Road junction, is designated as a SINC, named Land East of Tebourba Way. At this point the Brook is un-vegetated.

The habitats here include the UK BAP habitats of wet woodland, ponds (mill leat) and lowland mixed deciduous woodland.

These habitats are suitable for bird species, bat species, hedgehog, reptile species, amphibian species, fish species, invertebrate species and plant species, including areas of marginal and aquatic vegetation

There are widespread stands of the invasive species Japanese knotweed along the stretch.

## **Oakley Road Allotments**

The Brook is culverted under Oakley Road and then flows east of the Millbrook Allotments.

The brook is contained within a concrete channel and is not considered to provide good habitat for aquatic life. Bank side vegetation is limited, although a few trees and dense bramble scrub persists.

The area contains habitats that may be suitable for bird species, bat species, hedgehog, reptile species, amphibian species, invertebrate species and plant species, including the non-native species Japanese knotweed.

Japanese knotweed is present at the back of gardens on King George Avenue.

## **Millbrook**

Tanner's Brook remains within a concrete channel through this stretch, providing poor habitat for aquatic species.

Along the bank top vegetation, including various trees and shrubs provides habitat of value for bird species, bat species, hedgehog, reptile species, invertebrate species and plant species. A significant roost of house sparrows was observed adjacent to Brookside Avenue.

The invasive species Japanese knotweed are present along this reach.

## **ABP Port Area**

As the brook leaves Tanners Bridge it remains within a concrete lined channel, passing through an industrial area. Between the rail line and the docks, the brook appears to have sand bars in channel and may have some marginal vegetation. Adjacent to the left hand bank and running parallel to the rail line is an area of trees and scrub, interspersed with open grassland,

This reach includes habitats that are of value for birds, bats, reptiles, amphibians, fish, hedgehog, invertebrates and plant species. The habitat value is increased due to its connectivity with the wider area of the rail corridor. Bat species may use the culvert under the docks as a roost.



## 2.2.3 Air Quality

### **General baseline**

Southampton City Council has identified 8 Air Quality management Zones (AQMZ) within the city, all declared because the locations did not meet Government air quality objectives for Nitrogen Dioxide (NO<sub>2</sub>) as a result of emissions from road traffic<sup>4</sup>.

### **Southampton Municipal Golf Course**

The route of Tanner's Brook, across the golf course is approximately 1km from the Winchester Road AQMZ, to the south. This stretch is approximately 600m from the M27, to the north, 800m from the A33, to the east, and 700m from the A35, to the south east.

### **Dale Valley Road Allotments**

The allotments site is approximately 500m from the Winchester Road AQMZ, where the A35 Winchester Road meets Burgess Road and Hill Lane.

### **Shirley Pond**

200m to the south east of Shirley Pond Holly Brook passes under the A 35 A3075 junction at the point of the Romsey Road AQMZ.

### **Mill Mead to Millbrook**

The north end of Mill Mead is directly adjacent to the Romsey Road AQMZ. At the southern end of the stretch Tanner's Brook flows under the A33, where it is 250m west of the Millbrook Road West AQMZ and approximately 1200m east of the Redbridge Road AQMZ.

### **ABP Port Area**

This section of Tanner's Brook is approximately 500m to the south west of the Millbrook Road West AQMZ and approximately 1500m southeast of the Redbridge Road AQMZ.

## 2.2.4 Water

### **General baseline**

Tanner's Brook flows in a south easterly direction from its source south of North Beardsley towards the Associated British Ports Container terminal, ultimately draining into the Test Estuary and Southampton Water. Holly Brook is a key tributary of Tanners Brook.

Both brooks have been heavily modified as a result of urban development. The channels have been straightened and culverted in certain sections consisting of reinforced concrete lining the channel. Flow is predominantly laminar although some meanders have been constructed in places. Holly Brook is culverted over a significant proportion of the upstream reaches in the study area. Further downstream it is constrained by urban development, however in some sections riffles and pools are present.

### **Flooding**

Significant flooding during a 1 in 100 year +20% flood event was identified at the culverts downstream of Dale Valley Gardens and downstream of Shirley pond due to

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<sup>4</sup> Southampton City Council. A breath of fresh air: Southampton air quality action plan update. 2009

exceedance of culvert capacity causing water to flow out of its banks and onto the floodplain.

There is also risk of flooding from tidal water due to sea water entering the culvert under the ABP and increase flood risk further upstream through tidal locking of the fluvial flows.

### **Water Quality**

There is no chemical water quality monitoring points on either Tanner's Brook or Holly Brook. However the Environment Agency have monitored water quality in the Tanners Brook on a monthly frequency for investigative purposes.

The Tanners Brook has suffered from several significant water quality stresses over the years. Spillages of formaldehyde and phenol from Bordens Chemicals factory at North Baddesley pre 1991, resulted in several pollutions of the Brook, requiring significant clean up of the ground. There have historically been many pollution incidents from the hospitals in Southampton. However from the mid 1990's the misconnections were identified and corrected.

The water quality of Holly Brook appears to be good upstream of the golf course. Leaching of iron is evident at times where it emerges from the first culvert at the top of the golf course and at points adjacent to Shirley Pond.

A macro-invertebrate survey undertaken by the Environment Agency in 2007<sup>5</sup> indicated water quality issues at the top end of Tanner's Brook, attributed to consented discharges. Organic enrichment on Holly Brook, downstream of the culvert under the golf course suggested an increase in organic enrichment, which was attributed to a possible discharge in that area. Rubbish was also identified in the watercourse at various locations.

### **Water Framework Directive**

The interim guidance document Tanners Brook and Monks Brook Water Framework Directive (WFD) Baseline Information by the Environment Agency defines Tanner's Brook as being a Heavily Modified river and of Moderate Ecological Status. The mitigation measures, identified as appropriate for the watercourse, include specific vegetative control techniques and channel maintenance strategies.

No assessment of Holly Brook has been made, in relation to the WFD.

## **2.2.5 Soil, Geology and Hydrogeology**

### **General baseline**

The predominant solid geology is Palaeogene Strata of the Bracklesham Group. This group is defined by a series of clays and marls, with sandy and lignitic beds. The Wittering Formation, which forms part of the Bracklesham Group, follows Tanner's Brook upstream to Alder Moor and Holly Brook upstream to 0.5km south of the Sports Centre. To the east of Shirley Warren, the Wittering Formation meets an area of London Clay, specifically Whitecliff Sand. Trending northeast from this area is a broad strip of London Clay which also covers the Sports Centre and Southampton Municipal Golf Course. It is possible, given the presence of the Holly Brook, that some associated alluvial deposits will be present in the near surface geology close to the historical route of the stream.

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<sup>5</sup> Environment Agency. The Freshwater Macro-Invertebrate Community Status of the Tanners Brook and Tributaries in the Southampton Area. 2007

The study site is underlain by loam, clay and sand, which limits the permeability of the geology. Tanner's Brook therefore exhibits a rapid or 'flashy' response to rainfall events.

The majority of the study area is classified as containing "Minor Aquifer underlying soils with a high leaching potential (HU)". Minor Aquifers provide base flow to rivers and, despite not yielding large volumes of water for abstraction, remain an important supply of local water. The northeast of the study area covered by the Southampton Municipal Golf Course and Dale Valley Road Allotments is classified as "Non-aquifer".

There are no abstractions from the Tanner's Brook catchment. None of the sites lie within a groundwater Source Protection Zone.

### **Southampton Municipal Golf Course**

A feasibility study for the de-culverting of Tanner's Brook identified no visual or olfactory evidence of contamination and no significant Made Ground.

Contamination testing indicated that soils did not present a significant risk to human health or controlled waters.

### **Shirley Pond and Mill Mead**

The area previously included a larger pond which was infilled between 1938 and 1947.

A site investigation has identified exceedances for lead, arsenic, PAH's and TPH, which suggest that the site soils may present a risk to human health<sup>6</sup>.

### **Oakley Road Allotments and Millbrook**

Potential sources of contamination at the Millbrook site include an historic iron works, varnish works and backfilled gravel pits to the north of the A36.

Between the A36 and the railway line, the Millbrook Trading estate to the west of the brook previously included a garage, an upholstery works, a builders' plant depot, stone masonry works, joinery works and electronic research laboratories.

### **ABP Port area**

The land to the south of the A3024 (Millbrook Road West) comprises Made Ground, which consists of 'areas filled with domestic and industrial refuse and dredged material from Southampton Water'.

A sewage works (STW), operated by Southern Water Services, is present out side of the port area, to the east. The STW has historically had consent to discharge into Tanner's's Brook, which was revoked in 2007.

## **2.2.6 Landscape and Visual Amenity**

### **General baseline**

Tanner's Brook and Holly Brook flow through a sequence of open spaces, residential and industrial areas in the west of Southampton.

### **Southampton Municipal Golf Course**

The golf course is characterised by undulating amenity grassland with scattered copses of mature trees, including a substantial area of woodland in the centre of the course. The northern and western boundaries of the course are enclosed by woodland, with residential properties to the east and Southampton Sports Centre to the south. Holly Brook is culverted throughout a majority of the golf course (with the exception of

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<sup>6</sup> Royal Haskoning. Holly Brook and Tanner's Brook Pre-feasibility Study.

the large wooded stretch), and informal drainage channels have been formed which break into the culvert in places. The brook opens into two small ponds in the northern extent of the course, with timber boarding around the banks. Views from outside of the golf course are buffered by belts of trees, and the topography. The key views over the site are from the golfing tees, and the footpaths between these, which are limited to those using the golf course.

### **Dale Valley Road Allotments**

In this location, Holly Brook runs through a narrow concrete banked channel between the rear of residential properties fronting onto Dale Valley Road and allotment gardens set on a gradual incline. In the north of the area, the brook runs alongside Dale Valley Road behind a close boarded timber panel fence, which restricts the public's view of the channel. For the rest of the reach, the watercourse is largely inaccessible at the rear of private gardens bounded by block walling and dense vegetation. In the south, the channel is culverted under Holly Brook Avenue.

### **Shirley Pond**

Holly Brook flows on the east side Shirley Pond, separated from the pond by a cycle track. In this location the brook is constrained on the west side by the cycle track but the east bank is relatively naturalised. The bank opposite the pond slopes up to residential gardens and includes some mature trees. To the south of the pond is Shirley Pond Park, part of the Lordsdale Greenway which is characterised by a thick buffer of trees and shrubs screening all residential developments backing onto the park. Shirley Pond Park offers a large informal recreational space.

### **Mill Mead**

In this location, Tanner's Brook runs through a steep sided valley between the rear of residential properties and a small area of woodland (designated SINC) alongside Tebourba Way. In the south of the area, a commercial property and associated hard standing reduces the informal open space to a narrow track at the top of the steep river banks. An informal route runs through the woodland, connecting at the northern end to a grass verge alongside the busy main road. Within the dense woodland is a perched linear water body, formerly a mill leat, with poor water quality. The brook flows in a trapezoidal concrete channel with little variability in planform.

### **Oakley Road Allotments**

This stretch of Tanner's Brook flows in a trapezoidal concrete channel between allotments and the rear gardens of residential properties. A private access road serving the allotments runs alongside the brook for the length of the reach. In the centre of the area, a pedestrian footbridge crosses the watercourse connecting the allotment access road with a narrow path between houses facing Kind George's Avenue. The southern end of the reach is defined by a footpath (Public Right of Way) beyond which is a school.

### **Millbrook**

This stretch of Tanner's Brook flows in a trapezoidal concrete channel between residential properties and local access roads. An informal path runs along the left bank for much of the area, before crossing over a pedestrian footbridge and running along the right bank to Millbrook Road West. Much of the path is narrow, although there are small areas of open space throughout the reach, with greater opportunities for ecological and amenity enhancements. In the north of the area, mature trees are situated close to the watercourse.

## **ABP Port area**

Tanner's Brook is largely culverted underneath the working port area, with the exception of a stretch of open channel between Western Avenue and the railway line and a canalised stretch between the railway line and Millbrook Road West in the north of the area. The immediate land use is entirely commercial / industrial and a majority of the ground cover is hard standing with minimal tree or vegetative cover.

### **2.2.7 Cultural Heritage, Archaeology and Material Asset**

#### **General baseline**

Tanner's Brook is sited within an abundant archaeological landscape. There is evidence of human activity from the Palaeolithic period through to the modern period, in the form of designated heritage assets such as Listed Buildings, Registered Parks & Gardens, Scheduled Monuments, Conservation Areas, and non-designated heritage assets recorded on the Historic Environment Record (HER), see Appendix D.

The key cultural and heritage resources identified in the proximity of the project site are described below.

#### **Scheduled Monuments**

There are two Scheduled Monuments in the proximity of Holly Brook. Castle Hill (Mon No. HA235) is west of the municipal golf course, approximately 400m from the channel. Chilworth Ring Earthwork (Mon No. HA79) is east of the municipal golf course, approximately 200m from the channel.

#### **Listed Buildings**

There is one Grade II Listed Building (Listed Building No. 135954) 230m west of the Dale Valley Road allotments site: Entrance Gates, Gate Piers & Walls to Holly Brook Cemetery.

There are three Grade II Listed Buildings within the locality of Shirley Pond. These include The Old Thatched House Inn, Public House (Listed Building No.135912) is 330m to the west, the Drinking Fountain, situated near Windsor Castle Public House (Listed Building No.135930) is 430m to the south east and the Church of St. James (Listed Building No.135915) 660m to the east.

There are two listed buildings within the locality of Millbrook. In Millbrook, the Grade II Listed Buildings the Church of the Holy Trinity (Listed Building No.135858) and 557 Millbrook Road (Listed Building No.135857) are approximately 260m west of Tanner's Brook.

#### **Registered Parks and Gardens**

Registered Parks & Gardens: The Southampton Cemetery, on the southern end of Southampton Common, is a Grade II Registered Park & Garden 1.4km east of the site.

#### **Conservation Areas**

The St James Conservation Area is approximately 400m east of Shirley Pond and 650m to the south of the Dale Valley Road allotments.

#### **Historic Environment Record sites**

Within the locality of the golf course, there are five areas of flint find spots from the Mesolithic and Neolithic periods; a linear Saxon parish earthwork boundary and a modern 'Golf Club' building.

Within the locality of the Dale Valley Road allotments there is one Palaeolithic flint findspot, two boundary crosses from both medieval and Post-medieval periods, a Post-medieval gate & wall, a modern church, air raid shelter, one Victoria house and three Regency houses.

Within the locality of Shirley Pond there are seven Palaeolithic flint findspots, a Palaeolithic peat deposit, one Mesolithic and two Neolithic flint findspots, a Neolithic axehead, a Bronze Age tool, a Saxon church & cemetery, medieval foundry/mill and gravestone, Post-medieval church, drinking fountain, tram/bus depot, icehouse, thatched house and former farmland & wooded area, and modern World War II tank traps, first aid post and a Regency and Victorian house.

In Millbrook, within the proximity of Tanner's Brook there are three Palaeolithic flint findspots, a palaeochannel, two Neolithic flint findspots, a linear Neolithic feature; a Bronze Age flint findspot, a possible Iron Age iron working site, two Roman coin findspots, a Saxon pottery find, medieval church, Post-medieval church, churchyard, gravestones and a mill/foundry/paintworks site.

In the locality of the port area there are a river terrace from the Palaeolithic period, a Neolithic linear feature, Saxon salt marsh; medieval church & churchyard, and two Post-medieval gravestones, a church & churchyard. No features have been identified within the port estate.

## 2.2.8 Natural Resources

### **General Baseline**

The land adjacent to Tanner's Brook has changed significantly since 1866; previously the area was occupied by rural farms which dominated the land use. The fields were interspaced by occasional industrial units including brickfields, breweries and iron works. In the late 19th century a number of gravel pits emerged associated with the growth in residential areas. In the early 20th century plantations were developed followed by allotment gardens in the mid to late 20th century utilising land around the brook.

All of the land potentially affected by the project is now non productive, consisting of residential or amenity land.

# 3 Projects Alternatives

## 3.1 Strategic Context

The Tanner's Brook Pre-Feasibility study (2008) was undertaken as part of a wider strategic approach to cover flood management in the Southampton area rather than in isolation. It consisted of a high level study which outlined the project objectives and identified a short list of options through an options appraisal assessment. The options identified by the study were:

Options to reduce flood risk:

- De-culvert the watercourse on existing alignment with creation of flood storage;
- De-culvert the watercourse and create new meanders with creation of flood storage;
- Increase culvert capacity downstream of Dale Valley Gardens; and,
- Install a flap gate / sea doors to prevent tidal flooding.

Options to improve biodiversity and river morphology:

- Reprofilng the channel banks to create more varied geomorphological and ecological conditions (Lordsdale Greenway, Shirley Pond Park);
- Wetland / pond creation and enhancement (Golf Course, Lordsdale Greenway, Shirley Pond Park);
- Tree management (Lordsdale Greenway, Mill Mead, Dale Valley Road);
- Widening of riparian zone (alongside allotments);
- Localised management of invasive species (Mill Mead);
- Removal of hard bank reinforcement/revetment, or replacement with soft engineering solution;
- Removal of hard bank reinforcement/revetment, or replacement with soft engineering solution;
- Increase in-channel morphological diversity;
- Re-opening existing culverts beneath the Associated British ports container terminal; and,
- Alteration of channel bed (within culvert) beneath the Associated British Ports container terminal.

Options to improve public access and amenity:

- Improve connectivity between green spaces (Sports Centre);
- Improve existing access and signage along the river (Lordsdale Greenway, Mill Mead, Mill Brook and Briars Wood to Shirley Pond Park); and,
- Creation of public access through Southampton City Council owned allotments (Dale Valley Road, Oakley Road).

The options under consideration in this report were developed from these.

## 3.2 Project Objectives

The purpose of this project, at the PAR stage, is to deliver appropriate enhancement opportunities within the study area, in line with three overarching themes:

- Flood risk and integrated urban drainage management;
- Biodiversity and river morphology; and
- Public amenity and access.

The key objectives of the project are to:

- Reduce the risk of fluvial flooding of residential properties in Dale Valley Road Allotments area on Holly Brook;
- Reduce the risk of tidal flooding of residential, industrial and commercial properties in the Millbrook area on Tanner's Brook;
- Re-establish natural processes;
- Create and enhance habitats, particularly UK Priority BAP Habitat, which would contribute to Outcome Measure 5;
- Improve public amenity and engagement with the watercourses;
- Improve public access along the watercourses; and
- Provide opportunities for education.

## 3.3 Options

The project optioneering has produced 5 options for consideration. The details of each option are set out below and graphic representations of the options are provided in Appendix E.

### **Option 1: Deculverting of Holly Brook over the Golf course**

- Breaking out the entire culverted stretch of Holly Brook running through the golf course; Creation of a narrow two stage channel on a new line across the existing fairways and new wetland habitats on the fringes of the existing woodland copses;
- Delivery of approximately 800m of BAP habitat Rivers and Streams;
- Re-grading of the banks of the existing ponds at the golf course;
- New outfall structure and associated earth embankment constructed to the south of the large woodland copse to regulate flows and create flood storage totalling 10,400m<sup>3</sup> within the woodland;
- Re-graded longitudinal profile south of the woodland with a slight increase in sinuosity;
- New outfall structure and associated earth embankment at the downstream end of the golf course to further regulate flows and create flood storage totalling 7,600m<sup>3</sup> on the golf course downstream of the woodland, retaining a narrow channel on the fairways but widening it out in the small woodland copses;
- Two pedestrian crossings provided on each fairway;
- Excavated material used to create the new bunds impounding the flood storage areas, with the remainder deposited outside the floodplain in appropriate locations on the edges of the golf course, creating new undulating features, including rubble material as available to create ecological hibernacula;



- Offline underground water storage tank provided at the southern end of the golf course for irrigation purposes;
- 3-4m length box culverts installed with guard railing to provide vehicular crossings across the channel where access is required; and
- removal of a small number of trees on the channel alignment in a copse near the northern end of the golf course. New trees will be planted to mitigate the loss of trees at a ratio of 1 no. removed to 3 no. new trees planted. The trees to be removed will be informed by an arboricultural survey, refer to Table 3.

### **Option 2 – Option 1 plus additional amenity and ecological improvements**

In addition to the points set out for Option 1 above Option 2 includes:

- Replacement of the existing solid timber panel fencing along Dale Valley Road and the timber and chain link fencing along Dale Valley Gardens with more open palisade style fencing to improve the aesthetics of the river corridor and let more light into the channel;
- Improved management of the river corridor at Dale Valley Road Allotments, clearing non-native species;
- Installation of eel passes at the two existing weirs immediately upstream and downstream of Shirley Pond;
- Installation of in-channel features within Tanner's Brook through Mill Mead, including rip-rap, bed material and suitably spaced flow deflectors; and
- Shallow scraping on the edge of the right hand channel of Tanner's Bank through Mill Mead to compensate for channel capacity lost. This will be located to avoid valuable vegetation and also stands of Japanese Knotweed.

### **Option 3 – Option 2 plus flood storage at Dale Valley Road Allotments**

In addition to the points set out for Option 2 above Option 3 includes:

- Excavation alongside the Holly Brook channel within the northern part of Dale Valley Road Allotments to create flood storage;
- Creation of a brook side amenity area in the excavated area for local users, including re-meandering of the channel;
- Loss of some mature vegetation and trees to facilitate the excavation; and
- Loss of a number of allotments to facilitate the excavation.

### **Option 4 – Tidal control structure at ABP Docks**

- Installation of a tidal control structure on the inlet to ABP Docks culvert, a 4.5 by 2.5m box culvert. This will prevent the tidal flow of water into the upstream stretch of Tanner's Brook; and
- A fish / eel pass will be incorporated into the structure.

### **Option 5 –Public realm enhancements and channel improvements at Millbrook**

Option 5 includes:

- Breaking out of the top half of the channel in select locations through Millbrook to create a marginal shelf and increase overall channel capacity to allow the low-flow to be narrowed using rip-rap;
- Re-surfacing of the pedestrian route running along the brook through Millbrook with a compacted gravel surface or equivalent;

- Selective clearance of low quality vegetation along the brook and replacement of fencing to improve the aesthetics of the watercourse and open up views; and
- Provision of new tree planting, seating and signage in select locations along the stretch where space allows.

### 3.4 Preferred Option

The options identified were selected by the project team and key internal and external stakeholders through a detailed analysis of both the qualitative and quantitative benefits of each of the options. The options were considered in light of the project objectives along the themes of flood risk, biodiversity and public amenity.

The works at the golf course and the flood storage at Dale Valley Road allotments would mitigate the fluvial flooding in the study reach, and a cost benefit analysis has been presented for each. However, these works would have limited amenity value due to the private ownership of the golf course, and limited ecological benefits to a majority of the reach. It is recommended that low cost, high value ecological and amenity enhancements are taken forward in conjunction with the flood risk mitigation works, maximising the value to the entire study area and meeting the core objectives of the project. Option 1 is therefore not selected as a preferred option.

Option 3, comprising flood storage at the Dale Valley Road allotments, is not part of the preferred option because it is unlikely to be progressed due to the high cost and marginal flood management benefits, and because it is unlikely that it would be granted planning permission. The Hollybrook allotments are currently well used and are identified as a protected site, under Policy CLT3 of the adopted Local Development Plan Review, although this status will be reviewed as part of the Sites and Policies Development Plan Document (DPD) that is currently being produced.

Option 4, comprising the construction of a tidal control structure at the ABP Docks site, has been assessed. It has been demonstrated that in order to mitigate tidal flooding, the option will have a high cost with marginal flood management benefits. Therefore, Option 4 is not part of the preferred option because it is unlikely to be progressed due to the high cost and marginal flood management and amenity benefits that it would provide.

The preferred options to be taken forward for the PAR stage are therefore Option 2, comprising deculverting of Holly Brook over the golf course including providing 18,000m<sup>3</sup> of flood storage plus additional amenity and ecological improvements, and the Option 5, comprising public realm enhancements and channel improvements at Millbrook.

# 4 EIA

## 4.1 Legislative and regulatory requirements

### **Planning and EIA**

The majority of the works proposed will be development in Tanner's and Holly Brook watercourses and are required in connection with the improvement of the watercourses. The works would therefore fall under the Environment Agency's permitted development rights by virtue of Part 15 A(b) of the Town and Country Planning (General Permitted Development) Order 1995, however the earth works and embankments within the golf course will not benefit from Permitted Development Rights and therefore Planning Permission is required.

Following an internal screening exercise we have determined that the works within the Golf Course are not likely to give rise to significant environmental effects, due to the scale, location and nature of the impacts and will therefore not require a statutory EIA, Despite the indicative threshold of 1Ha being reached with reference to Schedule 2 10(i) Dams and other installations designed to hold water or store it on a long-term basis. A voluntary, informal assessment will be undertaken instead, and an "Environmental Report" will be produced to reflect the details of the current scheme and associated environmental issues and mitigation proposals.

A Screening and Scoping opinion has been requested from Southampton District Council under the Town and Country Planning (Environmental Impact Assessment) (England & Wales) Regulations (SI 1999 No. 293) using this Scoping Consultation Document. The scoping response is included in Appendix G.

### **Flood Defence Consent under the Land Drainage Act 1991**

The Holly Brook at Southampton Golf Course is designated as 'ordinary watercourse' and the Tanners Brook as 'main river'. The proposed works in these watercourses would normally require a Flood Defence Consent under the Land Drainage Act 1991 (ordinary watercourse) or the Water Resources Act 1991/Southern Region Byelaws (main river).

A Flood Defence Consent application will be submitted to Development and Flood Risk for the proposed works, and be accompanied by a full Flood Risk Assessment and details of consultation.

### **The Flood and Water Management Act and the Reservoirs Act**

The Flood and Water Management Act 2010 received Royal Assent on 8th April 2010 and updates the Reservoirs Act 1975. Although the Act has been passed, the secondary legislation which would provide guidance on how to comply with it doesn't yet exist. The Act makes extensive reference to 'risk management' but there is no formal way (yet) of assessing risk.

The flood storage in the golf course has the potential to be defined as a 'large raised reservoir' under the 2010 definition as it is designed to hold more than 10,000m<sup>3</sup> of water. There is also a provision within the Act for lowering the 10,000m<sup>3</sup> threshold. Current proposals for defining reservoirs requiring registration suggest a risk based approach will be used, therefore removing a definite volume based approach.

The Flood and Water Management Bill 2010 only distinguishes between high and low risk reservoirs and doesn't set out the precise mechanisms for designating a reservoir as high risk. One option that is being examined is for three regulatory categories (low,

medium, and high risk) and for a two stage process for assigning a reservoir to a regulatory category.

For the proposed flood storage on the golf course an initial consequence based assessment would be carried out by the Environment Agency, including a breach analysis, to identify if the storage area would be a minimal risk and not require supervision and inspection by qualified civil engineers.

If the flood storage would not constitute minimal risk then the proposed design would be assessed further by an inspecting engineer, who would assess the factors indicative of likelihood of failure together with the consequence of failure, to produce a final risk assessment for the reservoir. The Environment Agency would then assign the flood storage areas to the appropriate low, medium, or high risk category based on the risk assessment.

Depending on the design and the subsequent risk assessment an ARPE would be required to review the outline designs during the design stage and then to review the O & M Manuals, H & S File, supervise construction and undertake the necessary annual or bi-annual inspections as required during the design development and construction stages. In the absence of any new regulations to support the 2010 Act, this would be done following the current legislation for the Reservoirs Act 1975.

### **The Water Resources (Abstraction and Impounding) Regulations 2006**

An impoundment licence will be required for the works that impound, obstruct or impede the flow in an inland water, such as a dam, weir or similar, if the structure raises the upstream water level outside of the normal wetted perimeter of the stream.

### **Conservation of Habitats and Species Regulations 2010 and the Countryside Rights of Way Act 2000.**

Tanner Brook discharges into Southampton Water, close to habitats of Eling and Bury Marshes SSSI. This SSSI is part of the Solent and Southampton Water SPA and a Ramsar site and is a component of the Solent Maritime SAC. A section of the proposed development is also approximately 500m from Southampton Common SSSI.

Scoping assessments as required by The Conservation of Habitats and Species Regulations 2010 and the Countryside Rights of Way (CROW) Act 2000 will be undertaken to identify potential impacts of this proposal upon the designated sites. In the event potential impacts are identified full assessments will be undertaken, including details of full mitigation measures if required, prior to works starting on site. The assessments will be used to inform the detailed design and Environmental Action Plan (EAP), and will be submitted to the Local Planning Authority the planning application for the scheme.

## **4.2 Scoping and Methodology**

The assessment and evaluation stage of the non-statutory EIA will use a combination of prediction and evaluation techniques using proven and standard methodologies, expert judgement and would consider the results of previous similar projects and consultations. The existing baseline data in section 2.2 would be used as the basis of the assessments.

Table 2 below sets out the scoping and the methodology of the assessments required during the non-statutory EIA for the assessment. To avoid repetition the table refers to the locations and interventions that make up the options outlined in section 3. Where the possibility of impacts are identified, but not considered to be significant, they will be assessed during the non-statutory Environmental Assessment and documented in the Environmental Report. An Environmental Action Plan will also be produced to accompany the Environmental Report.

Table 3 sets out the ecology survey requirements associated with the assessment methodologies identified in Table 2. Where relevant the potential constraints and opportunities are illustrated in the Environmental Site Appraisal Plans (ESAPs) in Appendix C.

There are no environmental 'show stoppers' for the options, although the change of land use required at the Hollybrook Allotments to deliver Option 3 is a constraint that may significantly hinder the progression of this option.

**Table 2 Scoping and Methodology**

<b>Aspect</b>	<b>Site / Intervention</b>	<b>Likelihood of impacts</b>	<b>Scoping</b>	<b>Assessment Methodology</b>
Population	Golf course – deculverting and flood storage	Significant works over approximately 3 months during winter. Work will impact on use of golf course through closure of some fairways and the construction compound during construction. Potential for noise impacts on residential areas adjacent to golf course. Operational improvements through reduction in flooding. Beneficial impact from completed project.	In – construction and operational impacts	Assessment required for construction on operational impacts. Assessment of numbers and location of people using the golf course over the affected period. Identification of alternative options available. Consultation with the golf course.
	Dale Valley Road Allotments – amenity enhancements	Minor scope of work required. Limited construction impact, involving disruption to pedestrians and allotment holders. Operational benefits to population from scheme through enhanced amenity. Beneficial impact from completed project.	In – operational impacts	Assessment required for operational impacts. Possibly requirement of permission for footpath closure or diversion from Southampton City Council. Management of risk of impacts through the use of an Environmental Action Plan (EAP)
	Dale Valley Road Allotments – Flood Storage	During construction major excavation works impacting on local residence through increased risk of accident, noise and transport network. Permanent loss of allotments. Operational improvements to public through reduction in flooding.	In – construction and operational impacts	Assessment required for construction and operational impacts. Assessment of numbers and location of people affected. Identification and availability of alternative allotments. Consultation with the golf course.
	Shirley Pond – Installation of Eel Pass	Minor scope of work required – negligible impacts on population.	Out	No assessment required. Possibly requirement of permission for footpath closure or diversion from Southampton City Council. Management of risk of impacts through the use of an EAP

<b>Aspect</b>	<b>Site / Intervention</b>	<b>Likelihood of impacts</b>	<b>Scoping</b>	<b>Assessment Methodology</b>
	Mill Mead - habitat enhancements	Minor scope of work required, limited construction impact. Possible operational benefits from scheme.	In – operational impacts	Assessment required for operational impacts. Possibly requirement of permission for footpath closure from Southampton City Council. Management of risk of impacts through the use of an EAP
	Millbrook - Public realm enhancements	Minor scope of work required, limited construction impact. Operational benefits to population from scheme.	In – operational impacts	Assessment required for operational impacts. Possibly requirement of permission for footpath closure or diversion from Southampton City Council. Management of risk of construction impacts through the use of an EAP
Flora and Fauna/ Biodiversity	Golf course – deculverting and flood storage	Possibility of impacts on protected species and opportunity for significant habitat improvements	In – construction and operational impacts.	Survey work required, see table 3.
	Dale Valley Road Allotments – amenity enhancements	Minor work with limited likelihood of impacts on ecology or biodiversity. Possible impacts on reptiles, birds and Japanese knotweed.	In – construction and operational impacts.	Survey work required, see table 3. Vegetation clearance outside of bird breeding season.
	Dale Valley Road Allotments – Flood Storage	Possibility of impacts on protected species and opportunity for significant improvement of habitats.	In – construction and operational impacts.	Survey work required, see table 3. Vegetation clearance outside of bird breeding season.

	Shirley Pond – Installation of Eel Pass	Minor work with limited likelihood of impacts on ecology or biodiversity. Possible impacts on reptiles, amphibians and invertebrate, including stag beetle. Beneficial impacts on eel following scheme.	In – construction and operational impacts.	Survey work required, see table 3. Vegetation clearance outside of bird breeding season.
	Mill Mead - habitat enhancements	Possibility of impacts on protected species and Japanese knotweed. Opportunity for improvement of habitats.	In – construction and operational impacts.	Survey work required, see table 3. Vegetation clearance outside of bird breeding season.
	Millbrook - Public realm enhancements	Possibility of impacts on protected species and Japanese knotweed. Opportunity for improvement of habitats.	In – construction and operational impact.	Survey work required, see table 3. Vegetation clearance outside of bird breeding season.
Air Quality	Golf course – deculverting and flood storage	Possibility of limited impacts on golf course users and local residence from emissions from plant.	Out	None required Mitigation measures to be identified and managed using an EAP.
	Dale Valley Road Allotments – amenity enhancements	Minor work with limited likelihood of for air quality impacts.		
	Dale Valley Road Allotments – Flood Storage	Possibility of limited impacts on allotment users and local residence from emissions from plant.		
	Shirley Pond – Installation of Eel Pass	Minor work with limited likelihood of for air quality impacts		
	Mill Mead - habitat enhancements			
	Millbrook - Public realm enhancements			
Water	Golf course – deculverting and flood storage	Construction works may have a significant impact on water quality. Negligible impact is expected following completion. No significant impact on hydrogeology	In – construction and operational impacts.	Assessment of construction impacts on water quality. Review of Flood Risk Assessment required for operational impacts.



		Works would have a significant impact on flooding within the catchment following completion.		
	Dale Valley Road Allotments – amenity enhancements	Minor work with limited possibility for water quality impacts	Out	Construction water quality impact to be managed through an EAP.
	Dale Valley Road Allotments – Flood Storage	Construction works may have a significant impact on water quality. Negligible impact is expected following completion. No significant impact on hydrogeology Works would have a significant impact on flooding within the catchment following	In – construction and operational impacts.	Assessment of construction impacts on water quality. Review of Flood Risk Assessment required for operational impacts. Freshwater Invertebrate sampling will need to be undertaken.
	Shirley Pond – Installation of Eel Pass	Minor work with limited possibility for water quality impacts	Out	Construction water quality impact to be managed through an EAP.
	Mill Mead - habitat enhancements	Construction works may have a significant Impact on water quality. Negligible impact is expected following completion. No significant impact on hydrogeology	In – construction impacts.	Assessment of construction impacts on water quality. Construction water quality impact to be managed through an EAP.

	Millbrook - Public realm enhancements	Construction works may have a significant Impact on water quality. Negligible impact is expected following completion. No significant impact on hydrogeology	In – construction impacts.	Assessment of construction impacts on water quality. Construction water quality impact to be managed through a EAP.
Soils, Geology and Hydrogeology	Golf course – deculverting and flood storage	Significant excavation with possible areas of contamination.	In - construction and operational impacts.	Site specific ground investigation required
	Dale Valley Road Allotments – amenity enhancements	Minor work with limited possibility for impacts.	Out	None required.
	Dale Valley Road Allotments – Flood Storage	Significant excavation with possible areas of contamination.	In - construction and operational impacts.	Site specific ground investigation required
	Shirley Pond – Installation of Eel Pass	Minor work with limited possibility for impacts.	Out	None required.
	Mill Mead - habitat enhancements	Some excavation with possible areas of contamination.	In - construction and operational impacts.	Site specific ground investigation required
	Millbrook - Public realm enhancements. Plus in channel works.	Some excavation with possible areas of contamination.	In – construction and operational impacts.	Site specific ground investigation required
	APB Docks – Tidal Control Structure.	Probably area of contamination.	In - construction	Site specific ground investigation required

Landscape and Visual Amenity	Golf course – deculverting and flood storage	The landscape and visual impacts during construction are of low significance and mainly relate to the disruption to golf course users and the loss of mature trees. Much of the municipal golf course is presently shielded from local residents and the impacts will be restricted.	In	Landscape and visual impact assessment, in line with standard guidelines set out in the Landscape and Environmental Design Guidance (National Environmental Assessment Service Operational Guidance 3) and the Guideline for Landscape and Visual Impact Assessment (the Landscape Institute/ Institute of Environmental Management and Assessment. Second Edition . 2002.)
	Dale Valley Road Allotments – amenity enhancements	The landscape and visual impacts during construction are of low significance and mainly relate to the disruption to local residents. Some positive operational impacts from the scheme	In	
	Dale Valley Road Allotments – Flood Storage	This will have a visual and landscape impact on local residents and allotment users.	In	
	Shirley Pond – Installation of Eel Pass	Negligible landscape and visual impacts.	Out	None required EAP to manage mitigation measures during construction.
	Mill Mead - habitat enhancements	The landscape and visual impacts during construction are of low significance and mainly relate to the disruption to local residents. Possible positive operational impacts from the scheme	Out	None required EAP to manage mitigation measures during construction.
	Millbrook - Public realm enhancements	The landscape and visual impacts during construction are of low significance and mainly relate to the disruption to local residents. Some positive operational impacts from the scheme	Out	None required EAP to manage mitigation measures during construction.

Cultural Heritage and Archaeology	Golf course – deculverting and flood storage	No impacts due to distance from heritage assets and buried archaeological remains. Possible find spots during excavation.	Out	None required. Liaison with the Southampton City Council Planning Archaeologist to agree mitigation for unexpected finds, such as a watching brief.
	Dale Valley Road Allotments – amenity enhancements	No impacts due to distance from cultural and archaeological site.	Out	None required.
	Dale Valley Road Allotments – Flood Storage	No impacts due to distance from heritage assets and buried archaeological remains. Possible find spots during excavation.	Out	None required. Liaison with the Southampton City Council Planning Archaeologist to agree mitigation for unexpected finds, such as a watching brief.
	Shirley Pond – Installation of Eel Pass	No impacts due to distance from cultural and archaeological site. Out	Out	None required.
	Mill Mead – habitat enhancements	No impacts due to distance from heritage assets and buried archaeological remains. Possible find spots during excavation.	Out	None required. Liaison with the Southampton City Council Planning Archaeologist to agree mitigation for unexpected finds, such as a watching brief.
	Millbrook – Public realm enhancements			

Natural Resources	Golf course – deculverting and flood storage	Impacts during construction are negligible. The rubble material will be sourced from the excavated, crushed & screened concrete culverts.	Out	None required. SWMP required for waste management Excavated material used to create new bunds may require an EPR Permit and/or may fall into the Definition of Waste: Code of Practice - reuse of excavated material. Further information on the type and quantity of material to be excavated and reused would be required.
	Dale Valley Road Allotments – amenity enhancements	Impacts negligible	Out	None required. SWMP required for waste management
	Dale Valley Road Allotments – Flood Storage	Generation of excavation waste, but in context of local and regional construction waste not significant	Out	None required. SWMP required for waste management
	Shirley Pond – Installation of Eel Pass	Generation of excavation waste, but in context of local and regional construction waste not significant	Out	None required. SWMP required for waste management
	Mill Mead – habitat enhancements	Generation of excavation waste, but in context of local and regional construction waste not significant	Out	None required. SWMP required for waste management
	Millbrook – Public realm enhancements	Impacts negligible	Out	None required. SWMP required for waste management
	General	Consumption of construction materials during construction and fossil fuels to power vehicles and construction plant.	In	Resources to be consumed should be quantified along with the potential impacts.

The survey requirements identified in Table 3 have been informed by ecological desk study information review combined with information gleaned on potential ecological receptors during the ecological walkover survey, and are related to the scheme options identified. Other specialist work required are set out in Table 4.

**Table 3 Ecological Surveys**

<b>Species</b>	<b>Location</b>	<b>Scope and Programme</b>
Great Crested Newt	2 ponds on Southampton golf course	Optimum time for surveys is between March and July. 4 Surveys initially to identify presence / absence. Further to presence 2 further surveys for population numbers. If present will likely require receptor ponds dug to allow translocation of GCN, prior to July.
	Shirley Pond (depending on construction method)	
Reptiles	Southampton golf course.	Optimum time for surveys from March to July to identify presence absence. If present to be translocated from works area to suitable receptor site.
	Shirley Pond (depending on construction method)	
	Mill Mead (access to)	
Bat	Trees to be removed from northern end of golf course	Site to be visited before February to identify whether high/ medium/low potential, and record on plan, with reasons. If medium / high then use of endoscope to check for roosts during May to September.
	Culvert inflow and outflow from ponds at golf course	
	Shirley Pond	
	Trees to be removed or vegetation clearance within Mill Mead.	
Otter	Golf course	Presence / absence survey – Survey recorded directly onto maps
Badger	Golf course	Presence / absence survey – Survey recorded directly onto maps
Breeding birds	Trees to be removed on golf course	Works to be carried out outside of the bird nesting season. From September onwards. However if any nesting birds are found work to stop immediately.
	Trees to be removed or vegetation clearance within Mill Mead.	
Aquatic invertebrates	Various locations on Tanners Brook and Holly Brook, upstream and downstream of proposed options.	Optimal times are between March - May and October to November. to capture seasonal variation of species richness. To be carried out by the Environment Agency pre and post stream restoration. Crayfish – Confirmed that American crayfish are present in the catchment. Disinfection of construction equipment required following work.
Fish	Various locations on Tanners Brook and Holly Brook	To be carried out by the Environment Agency
Trees	Golf Course	Detailed tree survey to be

		undertaken by an Arboriculturalist, to provide root protection areas, and recommendations for tree removal and tree works.
Hedgehog	Mill Mead	BAP species – Pre construction mitigation to avoid impact on individuals
Stag Beetle	Mill Mead	BAP species – Pre construction mitigation to avoid impact on individuals
Japanese knotweed	All locations where intrusive works or vegetation clearance is planned.	Excavation and access to be carried out only 7m from stands of knotweed. Where access or works required within this area, mitigation to be developed for waste exemption or to remove the risk.

**Table 4 Further specialist work to be undertaken**

<b>Work package</b>	<b>Location</b>	<b>Scope</b>
Landscape planting plan with schedule	Golf course and Mill Mead.	Planting plan and schedule to be produced for replacement trees, at the Golf course, and for the hedgerow planting, at Mill Mead.
Heritage Statement	Scheme area.	Heritage Statement to be produced to identify potential sensitivity for the undertaking of the archaeological watching brief.
Land contamination assessment	For sites identified as a potential risk in Table 2.	Land Contamination assessment

## 4.3 Uncertainties

There are a number of known constraints and uncertainties that could have an impact on the proposed development these are highlighted below.

### **Flora and Fauna/ Biodiversity**

Whilst every effort is made to scope for appropriate species presence, many species are mobile and /or have seasonal occurrence in a particular area, therefore no account can be made for species that are not evident during the further surveys proposed, or that appear post-survey period.

### **Water**

No chemical water quality data is available for either Tanner's Brook or Holly Brook. Biological water quality data is available but the most recent sampling was undertaken in 2007. There is also no groundwater quality or flow data available.

### **Soils, Geology and Hydrogeology**

There is a potential risk of contaminated land. This should be confirmed following further Site Investigation work. Previous water quality issues resulting from pollution incident up stream may or may not have deposited contaminants in the fluvial beds. Site investigation soil sampling analysis will provide details of the levels of contaminants in the material.

### **Cultural Heritage and Archaeology**

The baseline data review undertaken for this scoping report has identified the potential for archaeological remains to exist in the vicinity of the proposed scheme. However, it is not known whether any currently unidentified remains would be directly impacted upon by the scheme.



# 5 Opportunities

Opportunities to provide mitigation and where feasible environmental and social benefits will be explored throughout this project; including those opportunities to promote Biodiversity Action Plan (BAP) targets such as ponds and renaturalised water courses.

Mitigation is directly related to the actions required to avoid or prevent reduce or offset or remedy the physical impacts of the project. Compensation is only applicable where the Environment Agency are unable to mitigate.

Opportunities identified for this project, over and above the flood alleviation, include:

- Deculverting and naturalisation of water course;
- Increased connectivity of habitats;
- Linking of wooded / scrub cover for bat species, dormouse and red squirrel;
- Enhancement of wet woodland area;
- Provision of marginal and aquatic habitats for colonisation of wetland plant species;
- Provision of standing dead wood as nesting and foraging habitat for Lesser Woodpecker (using Alder and Birch cut from other locations) on the golf course;
- Additional provision of riparian habitat with riffles and pools and gravel beds suitable for aquatic or marginal plants and aquatic invertebrates;
- Creation of wet grassland habitat adjacent to newly created channel for bird species, on the golf course;
- Pond enhancement and creation;
- Provision of an eel pass at Shirley Pond Park;
- Improved amenity use adjacent to Tanners and Holly Brook;
- Improving WFD compliance through delivery of WFD mitigation measures (see below);
- Development of appropriate maintenance strategies, including water level management strategies on the golf course;
- Planting of trees and shrubs at Southampton Golf Course;
- Potential input of community artist in the design of railings at Dale Valley Road Allotments and Mill Brook areas; and,
- Potential for external funding and community involvement in providing the amenity enhancements (fencing, seating, footpath resurfacing and interpretation boards) in the Dale Valley Road and Mill Brook areas.

## 5.1 Water framework Directives Opportunities

There are several local WFD mitigation measures identified for Tanner's Brook and there are also several mitigation measures identified in Annex B of the SE River Basin Management Plan (SERBMP) which the Scheme will assist in delivering, towards achieving Good Ecological Potential. These mitigation measures have been reviewed and assessed, and the appropriate measures have been included in this project.

Mitigation measures included in the options are:

- *Operational and structural changes to sluices, weirs etc* - By managing water levels in the golf course, flood storage will be improved without the need for new structures in the watercourse;
- *Preserve and, where possible, restore historic aquatic habitats*: by deculverting Holly Brook in the golf course area to its historic alignment, the associated aquatic habitats will be restored;
- *Increase in-channel morphological diversity* - by deculverting Holly Brook in the golf course area and providing in-channel flow deflectors and habitat in the Mill Mead and Millbrook areas, in-channel morphology diversity will be increased;
- *Re-opening existing culverts* – Holly Brook within the golf course area will be re-opened;
- *Alteration of channel bed (within culvert)* – deculverting, regrading and re-meandering of Holly Brook in the golf course area will introduce a more natural bed substrate and bed profile, mimicking reference reaches upstream;
- *Flood bunds (earth banks, in place of floodwalls)* – earth embankments will be used to provide flood storage in the golf course area;
- *Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution* – Setting back the top of Tanners Brook in the Mill Mead and Mill Brook areas and providing in channel features will reduce the amount of hard bank reinforcement when compared to the existing scenario;
- *Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone* – Providing two stage channels in the golf course and two news ponds in the golf course area will enhance the ecological value in the catchment;
- *Educate landowners on sensitive management practices (urbanisation)* – there is potential to educate the golf course landowners to manage flows and the ecological potential of the Holly Brook in the golf course area;
- *Retain marginal aquatic and riparian habitats (channel alteration)* – Marginal aquatic and riparian habitats will be retained and managed in the golf course, Dale Valley Road, Mill Mead and Mill Brook areas; and,
- *Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works* - By including an eel pass in the Shirley pond area, fish migration will be improved due to the implementation of the scheme.

The Scheme will not prevent the achievement of any of the Mitigation Measures identified within the SERBMP, in realising Good Ecological Potential by 2027.

# 6 Constraints Plan

The ESAPs, see Appendix C, illustrates the appraisal and identification of constraints and opportunities associated with the proposed options, including:

- Existing drainage systems;
- The lie of Holly and Tanner's Brook;
- Any identified issues with Holly and Tanner's Brook;
- Possible impacts on nearby receptors;
- UK Priority BAP Habitats and possible loss of ecological value;
- Water bodies of interest;
- Opportunities for restoration and improvement;
- General baseline information;
- Channel dimensions; and
- Land use.

The development of the proposed outline scheme has been structured around a number of key objectives, for each of these objectives the project aims to identify:

- BAP habitat or species that could benefit from the work;
- Potential flood risk benefits and habitat benefits;
- Partnership opportunities where local authorities own the land (i.e. through riparian tenure of land);
- Key issues required to be addressed in forthcoming work;
- Impact on protected species; and,
- Likely disposal or water management issues.

# 7 Consultation

## 7.1 To date

### 7.1.1 Internal Consultation

Consultation with Environment Agency officers has been ongoing throughout the development of the Scoping Document.

Initial consultation was carried out with an Environment Agency representative along with members of Southampton City Council.

### 7.1.2 External Consultation

The following representatives have been consulted:

- Hampshire Biodiversity Information Centre (HBIC);
- Southampton Municipal Golf Course;
- Southampton City Council; and
- Associated British Ports.

### 7.1.3 Internal Consultation Responses

Internal consultation with specialists within the Environment Agency has been undertaken using the Scoping Consultation Document with comments received and incorporated as follows:

Table 4 Internal consultee responses

<b>Environment Agency Specialists</b>	<b>Summary of Response</b>	<b>Corresponding Action</b>
Archaeology, Steve Kemp	No comment received	
Asset Systems Management, Ian Tripp	No comment received	
Biodiversity, Tim Sykes	Suggested consult Hampshire Wildlife Trust	HWT added.
Development Control, Rob Waite	<p>I have assumed that the flood alleviation benefits of all the options contained within the report have been fully assessed and modelled within a Flood Risk Assessment. I have not seen any reports detailing the flood risk benefits of the options and so at this stage my comments are of a more general nature.</p> <p>The Holly Brook as it flows through Southampton Golf Course has not got an associated flood zoning identified on the Agency's indicative flood zone map. The Tanners Brook has been modelled from the Southampton Sports Centre throughout it's length to Millbrook and the industrial areas to the south. The proposed channel works could have implications for the flood map and hence potentially development within these areas, therefore, I would advise</p>	

Environment Agency Specialists	Summary of Response	Corresponding Action
	<p>consultation with the Area FRM team over this issue, if this has not already taken place, to ensure that they are fully aware of any potential implications for the indicative flood zone map. Furthermore, the implications for the PUSH SFRA should be considered, although I guess this will probably be picked up through consultation with Southampton City Council.</p> <p>Depending upon the option or options taken forward planning permission maybe required. If this is the case a full FRA should accompany any planning application. This should be acknowledged within section 4.1 - Legislative and Regulatory Requirements.</p> <p>The Holly Brook at Southampton GC is designated as 'ordinary watercourse' and the Tanners Brook as 'main river'. The proposed works in these watercourses would normally require a Flood Defence Consent under the Land Drainage Act 1991 (ordinary watercourse) or the Water Resources Act 1991/Southern Region Byelaws (main river). However, the Agency does not formally consent it's own works but would issue a letter of 'deemed consent' authorising the works. To ensure openness a Flood Defence Consent application should be submitted to D&amp;FR for any proposed works, and be accompanied by a full FRA and details of consultation. It might be useful to acknowledge this process within section 4.1 - Legislative and Regulatory Requirements.</p> <p>It should also be noted that the proposed weir and bund structures at Southampton GC are likely to require an impoundment licence. The National Permitting Service should be consulted for further advice on this issue. Further to the banded flood storage area, no information has been supplied as to the potential volume of storage expected. It needs to be confirmed whether these structures would fall within the remit of the Reservoirs Act, taking into consideration any changes contained within the Flood and Water Management Act. A breach analysis should also be carried out determining the implications of a sudden breach in these structures and flood risk to downstream areas.</p>	<p>Report amended to reflect.</p> <p>Report amended to reflect.</p> <p>A 'Breach Analysis' to be provided as part of the Flood Risk Assessment.</p>
Ecological Appraisal, Adam Fulton	No comment received	
Environment Management, Bill Scott	The report says that no water quality data is available for the Tanners Brook. Historically we have monitored chemical water quality in the Tanners brook on a monthly frequency. I understand that the Brook was never part of the Water Quality classification scheme monitoring programme put was monitored for	Report amended to reflect.

Environment Agency Specialists	Summary of Response	Corresponding Action
	<p>investigative purposes.</p> <p>I believe we monitored at North Baddesley, Maybush and at Millbrook.            Sampling points            North Baddesley G0003962            Maybush G0003960 closed since August 2006            Millbrook G0003958 closed since August 2006.</p> <p>Since 2006, 2 more sampling points were added            Holly Brook G0006160            Lordshill G0006159.</p> <p>The Tanners Brook has suffered from several significant water quality stresses over the years as follows:</p> <p>Bordens Chemicals used to operate a factory at North Baddesley, which resulted in several pollutions of the Brook. Pre 1991 I understand that there was a storage tank failure leading to a major loss of formaldehyde causing a major impact on water quality and aquatic life down the length of the brook. There were also numerous pollution incidents involving phenol and formaldehyde. Bordens went many years ago replaced by housing developments. Significant clean up of the ground was required.</p> <p>We have also had several pollution incidents emanating from the Hospitals in Southampton. Working with the Hospitals in the mid 1990 when they were released from the protection of crown immunity many misconnections were identified and corrected. In the last few years we have had no significant pollution incidents from these sources. However these site and the urban catchments still remain a risk to water quality.</p> <p>I am pleased to note that the risk of pollution during construction has been identified. We are happy to be further consulted on the further assessments and plans</p>	<p>Report amended to reflect.</p> <p>Report amended to reflect.</p>
Estates – James Godber	No comment received	
External relations, Kim Newton,	No comment received	
Fisheries, Heb Leman	No comment received	

Groundwater and Contaminated Land, Simon Deacon	<p>Excavated material used to create new bunds may require an EPR Permit and/or may fall into the Definition of Waste: Code of Practice - <u>reuse of excavated material</u> (see attached). Further details can be gathered from Bill Scott on this though I guess further information on the type and quantity of material to be excavated and reused would be beneficial.</p> <p>Any material to be excavated is not expected to be contaminated as the golf course does not have any record of historical contaminative uses. However as discussed, previous water quality issues resulting from pollution incident up stream may or may not have deposited contaminants in the fluvial beds. Site investigation soil sampling analysis will provide details of the levels of contaminants in the material.</p> <p>Can you make it clear that the rubble material will be sourced from the excavated, crushed &amp; screened concrete culverts.</p> <p>All the other sections relating to Water Quality, Soils, geology, and hydrogeology are satisfactory</p>	<p>Report amended to reflect.</p> <p>Report amended to reflect.</p> <p>Report amended to reflect.</p>
Landscape, Joshua Peacock	No comment received	
Legal, Peter Bilbrough	Comment on reference to legislation.	Incorporated.
Operations Manager, Bradley Randall	No comment received	
Planning Liaison, Laura Bourke	No comment received	
Recreation, Allison Thorpe	No comment received	

#### 7.1.4 External Consultation

Following the process of internal consultation external consultation with a number of statutory and non-statutory consultees has been undertaken using the Scoping Consultation Document. Comments received and incorporated as follows:

External consultee	Summary of Response	Corresponding Action
Natural England – Val Pollard Rec.d 2011-01-12	<p>I have asked my colleagues to let me know if they are aware of any mechanisms for securing assistance for the interpretation and seating in Option 5, via any community led (and funded) initiatives, and will let you know about this.</p> <p>We have checked our records and based on the information provided, we can confirm that this water course discharges into Southampton Water, close to habitats of Eling and Bury Marshes SSSI. This SSSI is part of the Solent and Southampton Water SPA and a</p>	

External consultee	Summary of Response	Corresponding Action
	<p>Ramsar site and is a component of the Solent Maritime SAC. A section of the proposed development is also approximately 500m from Southampton Common SSSI.</p> <p>Planning Policy Statement 9 and its accompanying circular (ODPM Circular 06/2005) provide information on the protection afforded to SPAs, SACs, Ramsar Sites and SSSIs through the planning system.</p> <p>Having considered the information provided, including the Environment Agency's Scoping Consultation Document, Natural England can confirm that subject to a detailed assessment of the potential impacts of this proposal upon the designated sites, including full mitigation measures should they be required (as outlined in the Scoping Document) being submitted with any subsequent planning application we have no requirement for a full EIA.</p> <p>This application has the potential to adversely affect populations of Great crested newt and other legally protected species. Consequently, Natural England recommends a detailed assessment of the potential impacts resulting from this proposal on protected species accompanies any subsequent planning application, irrespective of whether an EIA is required. In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out by suitably qualified and where necessary, licensed, consultants.</p>	<p>Requirement for scoping necessary assessments added to section 4.1</p>
<p>English Heritage – Richard Massey – Rec.d 2011-01-06</p>	<p>From supplied information, it is clear that the Tanner's Brook proposals would have no direct implications for any designated aspects of the Historic Environment. The proposed works of de-culverting and flood storage over the Golf Course in the northern margins of the scheme have possible implications for an area which, in view of its relative proximity to scheduled ancient monuments HA 235 and HA 79, may be considered to be of moderate archaeological potential. It is therefore recommended that appropriate consultation is made with local authority Historic Environment Records in order to assess any potential archaeological impact in this area. It is not considered that the scope of proposed works would be such as to have a significant adverse impact on the setting and historic character of these two scheduled monuments.</p> <p>Beyond the golf course, the proposed works would appear to have no direct effect on known heritage assets, and would in general have a very low level of impact on any associated archaeological or geo-archaeological deposits. Again I would recommend a more detailed assessment of local authority HER data to confirm this. Certainly the proposed scheme of works would appear to have low impact on the limited number of listed structures located within the zone of</p>	<p>The local authority Historic Environment Records were consulted as part of the scoping exercise.</p>



External consultee	Summary of Response	Corresponding Action
	visual influence of Tanner's Brook, and most proposals would in fact represent an enhancement of the visual amenity of the areas concerned. I therefore have no substantive comments to make at this stage and would be happy to approve the proposals, subject of course to further detailed advice from local authority archaeologists.	
Hampshire Wildlife Trust – John Durnell	No comment rec.d to date	
RSPB - Fay Bouri	No comment rec.d to date	
Associated British Ports (ABP) – Sue Simmonite Rec.d 2011-01-07	<p>Potential options identified in the document to relieve fluvial flooding incidents at Tanners Brook and Holly Brook have the potential to impact on the Port of Southampton estate, which is owned and operated by Associated British Ports (ABP).</p> <p>As a general comment we would suggest that the summary and conclusion provide greater clarity and emphasis that both options 2 and 5 are the preferred options to be taken forward. In arriving at this conclusion, ABP seeks assurance from the Environment Agency that the implementation of both of these options will not displace any flood waters so as to compromise the activities, operations and assets of the Port of Southampton.</p> <p>Option 4 is the installation of a “tidal control structure on the inlet to ABP Docks, a 4.5m by 2.5m box culvert. This will prevent the tidal flow of water into the upstream stretch of Tanners Brook; and a fish /eel pass ...” ABP agrees with the conclusion that this option is disproportionately and prohibitively expensive as well as delivering marginal flood and amenity benefits.</p> <p>A few specific points arise from reading the scoping document:</p> <ul style="list-style-type: none"> <li>• You have incorrectly defined ABP in the list of abbreviations. The text should read ‘Associated British Ports’.</li> <li>• The document speculates that the ABP port area reach of Tanners Brook provides habitat which could be of value for a range of species. We do not consider it appropriate to include speculation within this document unless detailed surveys have been undertaken.</li> <li>• Please note that the Southern Water works described on Page 18 are outwith the ABP port estate.</li> <li>• Within section 2.2.7 which describes Cultural</li> </ul>	<p>Preferred options highlighted in the summary and conclusions.</p> <p>Text amended</p> <p>The description of the habitat potential at this point is appropriate to the assessment undertaken, including review of site photographs and overhead images.</p> <p>Text amended</p>

External consultee	Summary of Response	Corresponding Action
	<p>Heritage, Archaeology and Material Assets, we believe that the text may be interpreted by some that there may be an number of features in or on the Port estate. To avoid future misinterpretation, we would suggest that this passage of text is clarified to reflect ABP's understanding that none of the features described is actually within the Port estate.</p> <ul style="list-style-type: none"> <li>• Re-opening and/or altering the culverts beneath the container terminal are mentioned as options to improve biodiversity and morphology. Again, we agree with the conclusion that such options are disproportionately and prohibitively expensive as well as delivering marginal flood and amenity benefits.</li> <li>• Please note that section 7.1.2 should include ABP as we have previously been consulted on this matter.</li> </ul> <p>ABP is happy not to be consulted further (7.2.2) other than to receive confirmation that the preferred options will not in any way compromise the activities, operations and assets of the Port of Southampton.</p>	<p>Text amended</p> <p>ABP included</p>
<p>Giles Bryony – Southampton City Council (SCC) – Planning Officer, Development Control Services</p>	<p>The LPA Screening option is included as Appendix G. The response includes the following:</p> <p>The LPA considers that the works proposed do not require the formal submission of an Environmental Impact Assessment.</p> <p>The following documents should be submitted with a planning application;</p> <ul style="list-style-type: none"> <li>• Full plans included sections where relevant;</li> <li>• Biodiversity survey and report;</li> <li>• Flood risk assessment;</li> <li>• Arboricultural report;</li> <li>• Landscaping plan and planting schedule;</li> <li>• Heritage statement;</li> <li>• Lighting assessment (if relevant); and</li> <li>• Land contamination assessment.</li> </ul> <p>This list is not exhaustive,</p>	<p>All documents identified as necessary in the SCC Screening opinion will be included as part of the formal planning application for the scheme.</p>
<p>Paul Fuge – My Time Active Rec.d 2011-01-11</p>	<p>Whilst we support in principle the project, I would think that the main questions for us would be related to the Environment Agency in terms of what they have planned, but these are:</p> <ul style="list-style-type: none"> <li>• The timing of the project and the subsequent impact on the course ie would we need to shut the course completely, one hole at a time or a multiple of holes. During the wet winter months the course is also affected by heavy machinery, so we would be keen to see what</li> <li>• How many trees would be removed, and what we</li> </ul>	<p>MyTime Active will be consulted during detailed design.</p>

External consultee	Summary of Response	Corresponding Action
	<p>would have to replace this with? During the first discussions, it was mentioned that any trees removed would be replaced by new ones. Would these be mature and would they also be put in areas at our behest, perhaps allowing us to positively alter some holes?</p> <ul style="list-style-type: none"> <li>• What are the cost implications to us in terms of bridges that will be put into place?</li> <li>• Will we be able to commission additional work during the project to assist with course drainage? This would obviously be useful to us as it would mean we do not have to organise a separate contractor visit, and the difficulties of course closure etc...</li> </ul> <p>At this time, I am sure that there will be other questions that arise, but these are the main ones.</p>	

# 8 Conclusion

Five options have been developed consisting of a variety of interventions. Three of the options deliver flood alleviation: deculverting of the golf course, the flood storage at Dale Valley Road allotments and the tidal control structure. In addition the first two options have the potential to deliver significant biodiversity improvement, delivering WFD mitigation measures and creating UK BAP Habitats. However the amenity benefits of these schemes are limited.

Further options are provided to deliver further biodiversity benefits and amenity benefits, including an improvement to the visibility of Holly Brook at the Dale Valley Road Allotments and public realm improvements in Mill Brook.

Two preferred options have been taken forward for the PAR stage, including Option 2, comprising deculverting of Holly Brook over the golf course including providing flood storage plus additional amenity and ecological improvements, and the Option 5, comprising public realm enhancements and channel improvements at Millbrook.

The environmental aspects identified as key, in relation to the options, are:

- Population;
- Flora and Fauna;
- Water;
- Soils, Geology and Hydrogeology;
- Landscape and Visual Amenity; and
- Natural Resources.

The environmental aspects scoped out of an EIA, are:

- Air Quality; and
- Cultural Heritage and Archaeology.

A non statutory Environmental Report will be undertaken at the next stage of the project. Further species surveys are required at this stage, to inform the detailed design and to ensure the options do not have adverse impacts on protected or other species. An initial consequence based assessment including a breach analysis, will be required at the next stage of the project to identify if the proposed storage area would be a minimal risk and will not require supervision and inspection by qualified civil engineers, or otherwise, as defined by the Reservoirs Act 2010.

# 9 Appendices



## Appendix A: Site Location





## Appendix B: Environmental Context Plan



## Appendix C: Environmental Site Appraisal Plans



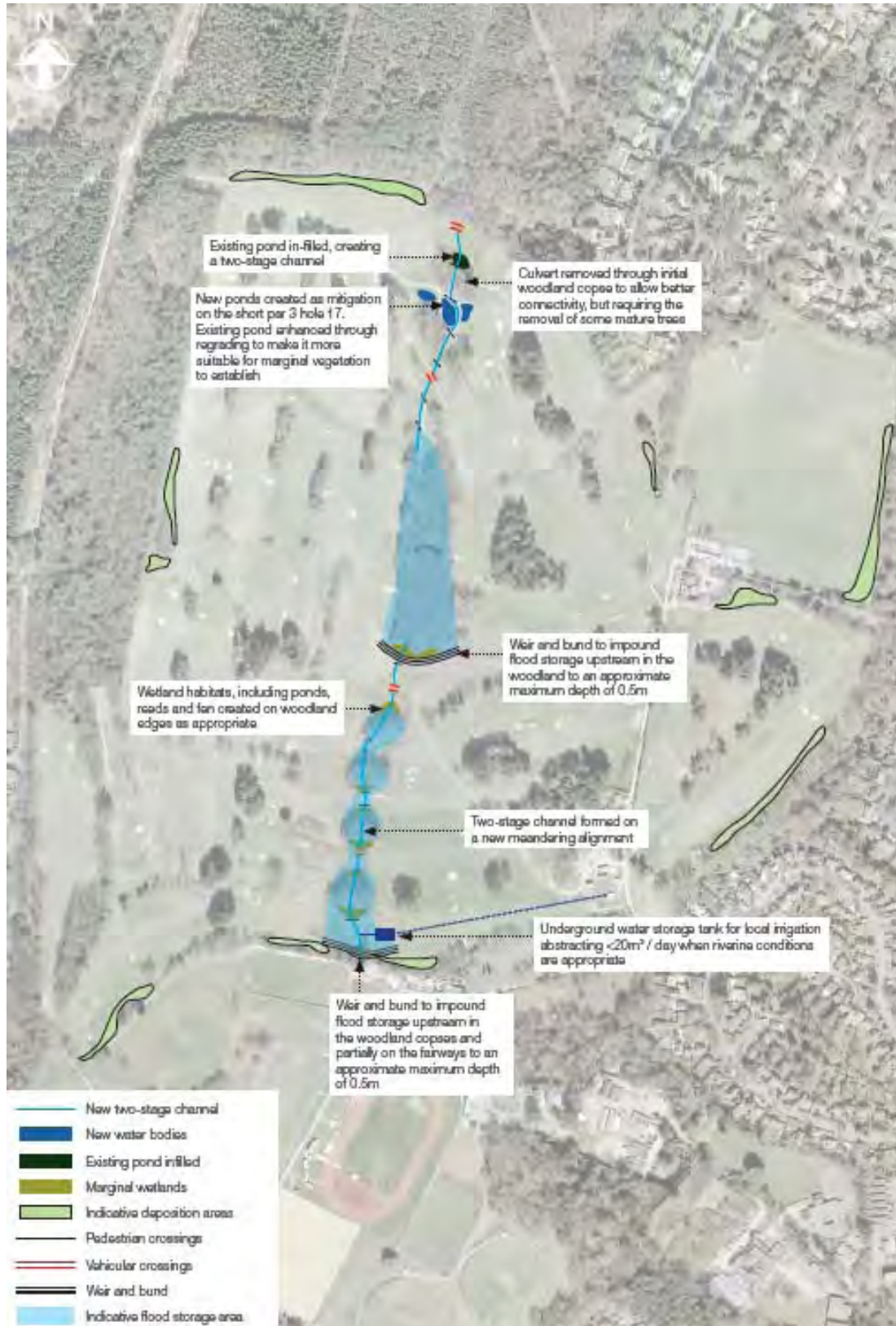
## Appendix D Cultural Heritage, Archaeology



# Appendix E Options Assessed

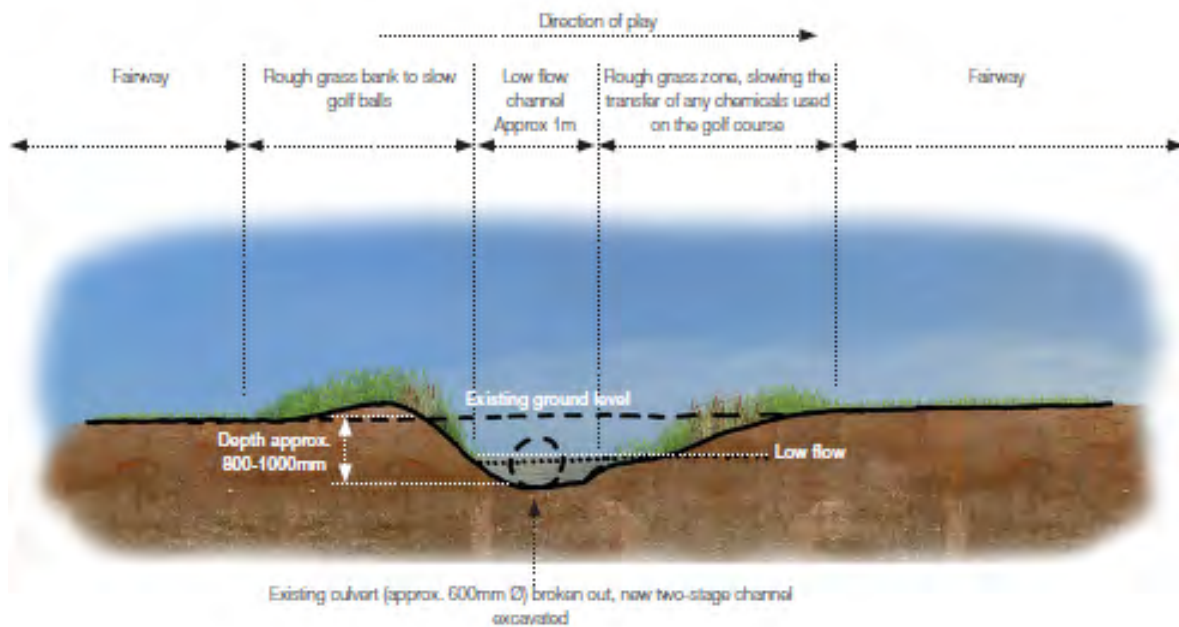
## Appendix E1: Option 1

### Deculverting of Holly Brook over Southampton Golf course



#### Section through restored 2 stage channel





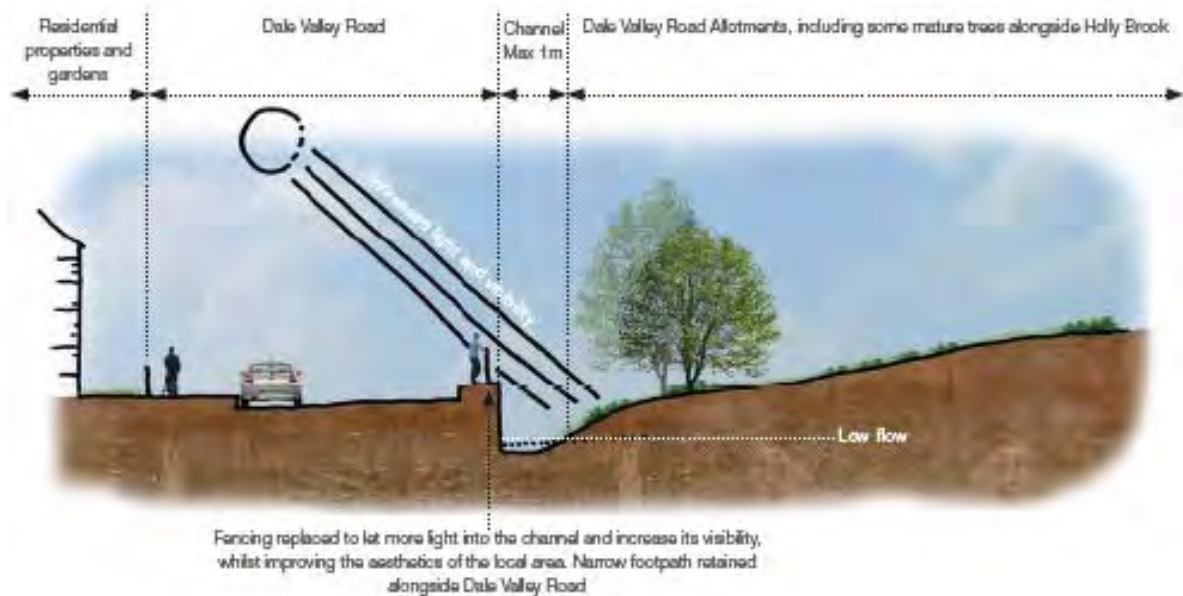
## Appendix E2: Option 2

### Option 1 plus additional amenity and ecological improvements

#### Amenity enhancement at Dale Valley Road Allotments



Figure 17  
Dale Valley Road Allotments - Option 4 - Plan of new fencing locations



### Eel Pass at Shirley Pond Park. Eel pass location plan

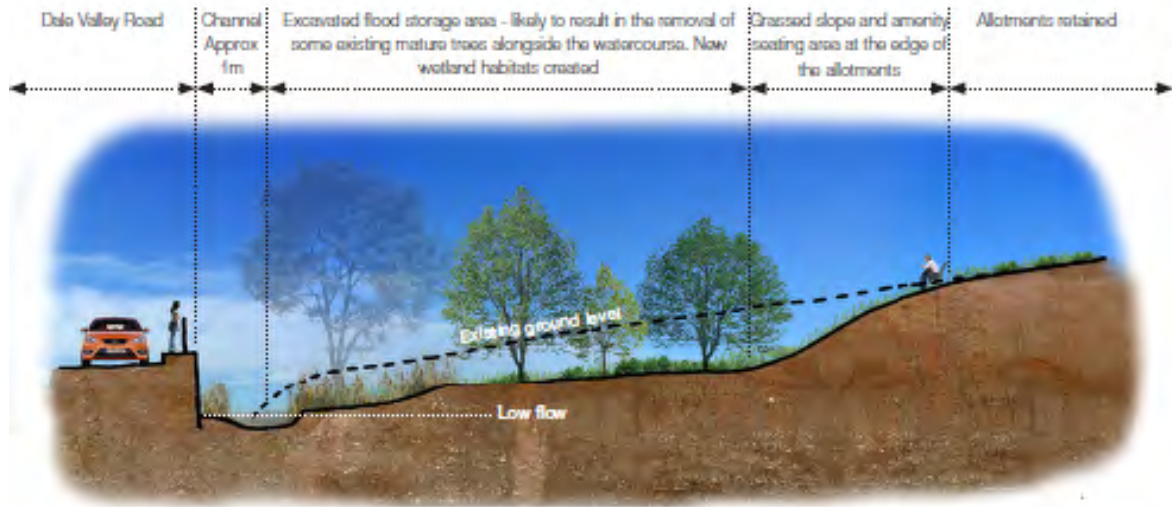


## Appendix E3: Option 3

### Option 2 plus flood storage at Dale Valley Road Allotments



### Cross Section through Flood Storage area at Dale Valley Road Allotments



## Appendix E4: Option 4

### Tidal control structure at ABP Docks



## Appendix E5: Option 5

**Option 4 plus public realm enhancements and channel improvements at Millbrook**

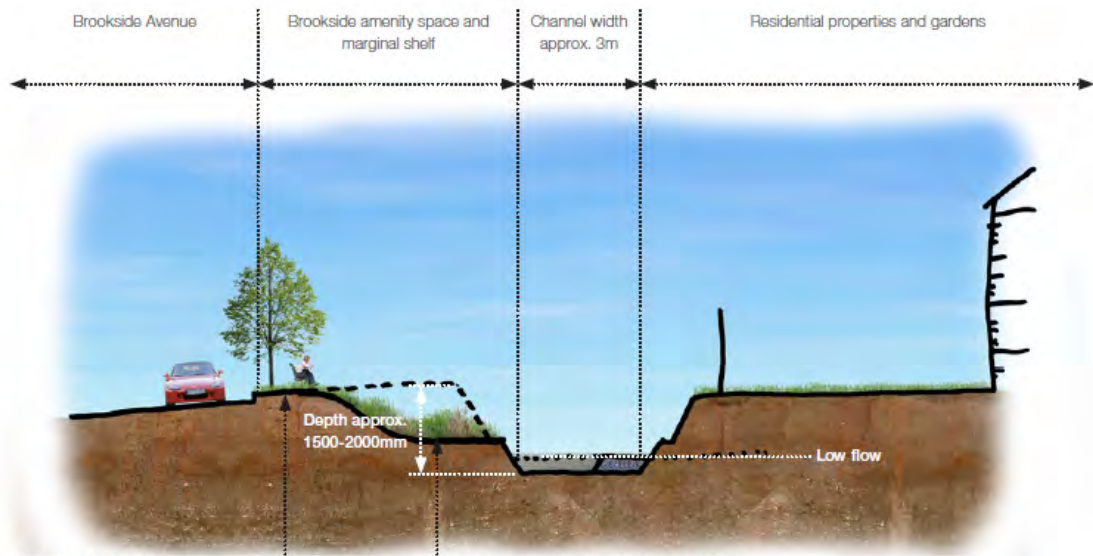
**Amenity enhancement through Millbrook**



**Cross sections through public realm enhancements and channel improvements at Millbrook**

Brookside Avenue

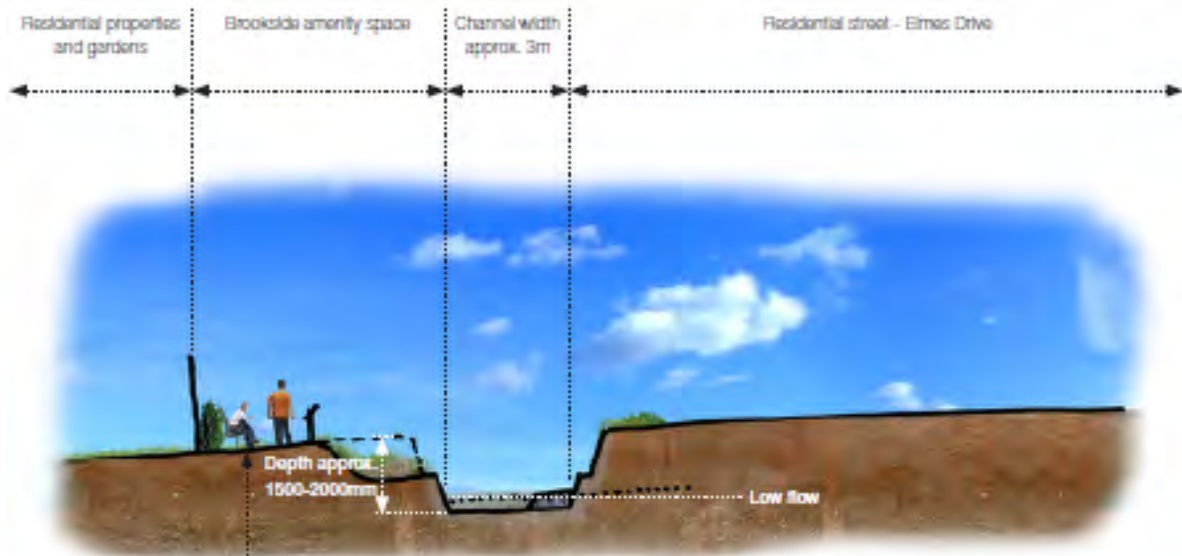




Replacement or removal of fencing, selective clearance of vegetation and pruning of existing trees to open up views to Tanner's Brook. Provision of new seating in areas where space allows

Excavation to create a marginal shelf within the channel, increasing overall capacity to allow rip rap to be installed in the low flow channel to reduce its overall width by approximately 1/3rd

### Vulcan Close



Replacement of fencing and selective clearance of vegetation to open up views to Tanner's Brook. Provision of new seating, informative signage and tree planting, and resurfacing the existing footpath. Excavation to create a marginal shelf within the channel, increasing overall capacity to allow rip rap to be installed in the low flow channel to reduce its overall width by approximately 1/3rd

## Appendix F: Indicative Landscape Plans



# Appendix G: Southampton City Council Screening Opinion



## **DEVELOPMENT CONTROL SERVICE**

### **Planning & Sustainability**

Southampton City Council  
Ground Floor  
Civic Centre  
Southampton SO14 7LS

Please ask for: **Bryony Giles**  
Direct Dial:

Email:  
Our Ref: 10/01799/SCR

Joshua Peacock  
NEAS,  
Environment Agency,  
Guildbourne House,  
Chatsworth Road,  
Worthing,  
BN11 1LD

21<sup>st</sup> January 2011

Dear Joshua,

**Re: Request for a Screening Opinion under Part II Regulation 5 and Scoping Opinion if required under Part IV Regulation 10 of the Town and Country Planning Environmental Impact Assessment England and Wales Regulations 1999 prior to a planning application for works to Tanners Brook to include a combination of the following, i complete removal of culverted stretches at the golf course, including two new ponds and earth embankments for flood storage ii amenity enhancements at Dale Valley Road Allotments involving the replacement of fencing and channel clearance, iii provision of flood storage within Dale Valley Road Allotments, through excavation of the existing ground levels, iv installation of eel passes at Shirley Pond, v installation of in-channel features and scraping at Mill Mead, vi public realm enhancements and channel improvements at Millbrook, and, vii tidal control structure at ABP Port.**

I refer to you letter, plans and attachments, that were received by this Authority on 21<sup>st</sup> December 2010, seeking a Screening Opinion by the Local Planning Authority (LPA) under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations (1999) (herein called "the Regs") on the proposed works as detailed in the above description of development.

Thank you firstly for the agreed extension to the 21 day timescale in accordance with Part II (5(4)) of the Regs. In accordance with Part II (5 (3)) of the Regs I confirm that the details as submitted provide sufficient information for a screening assessment to be undertaken and considered.

On the basis of the submitted details, namely:

- Screening and scoping opinion request letter, dated 20<sup>th</sup> November 2011
- Scoping Consultation Document

I agree that the proposed works are considered to fall within the definition of a schedule 2 project as outline in part 10 (i) Infrastructure projects and schedule 3 of the Regs, as supported by Circular 02/99 "Environmental Impact Assessment", therefore applies.

As you're aware the circular advises that the LPA needs to ascertain whether or not the proposed development is likely to have significant effects upon the environment (paragraph 32 refers) and that an Environmental Impact Assessment (EIA) will be required for major development which are of more than local importance, are unusually complex, are proposed for particularly environmentally sensitive locations and that have potentially hazardous environmental effects.

### **Local Importance**

The works are required to restore the Tanner's Brook and Holly Brook watercourse which runs from the north of the M27 into Southampton, before discharging into the Test Estuary and Southampton Water.

The main purpose of the project is to deliver appropriate enhancement opportunities, within the study area, in line with three overarching themes:

- Flood risk and integrated urban drainage management
- Biodiversity and river morphology; and
- Public amenity and access

Five options for the improvement works have been developed which include;

Option 1: Deculverting of Holly Brook over the Golf Course

Option 2: Option 1 plus additional amenity and ecological improvements

Option 3: Option 2 plus flood storage at Dale Valley Road Allotments

Option 4: Tidal control structure at ABP docks

Option5: Public realm enhancements and channel improvements at Millbrook

The scoping consultation document indicates that the preferred options to be taken forward (for the project appraisal report by the applicant) are Option 2 comprising deculverting of Holly Brook over the golf course including providing 18,000m<sup>3</sup> of flood storage plus additional amenity and ecological improvements, and Option 5, comprising public realm enhancements and channel improvements at Millbrook.

The preferred options (2 and 5) are not considered to have more than local importance.

### **Environmental Location and Effects**

As you are aware the water course discharges into Southampton Water, close to habitats of Eling and Bury Marshes SSSI. This SSSI is part of the Solent and Southampton Water SPA and a Ramar site and is a component of the Solent Maritime SAC. A section of the proposed development is also approximately 500m from Southampton Common SSSI. Planning Policy Statement 9 and its accompanying circular (ODPM Circular 06/2005) provide information on the protection afforded to SPAs, SACs, Ramsar Sites and SSSIs through the planning system.

The Environment Agency and Natural England are of the opinion that the works do not require an EIA as the works are not likely to give rise to significant effects on the environment by virtue of its nature, size or location.

The Council's Ecologist agrees than an EIA will not be required providing that only options 2 and 5 of the screening and scoping report is to be progressed and providing mitigation measures can be secured (through planning conditions).

It is noted that there is a need to undertake additional environmental assessments before the scheme progresses. Natural England have identified that the works have the potential to adversely affect populations of Great crested newt and other legally protected species. Consequently, it is recommended that a detailed assessment of the potential impacts resulting from this proposal on protected species accompanies any subsequent planning application. This should include emergence checks to support the existing bat surveys.

Measures to control construction phase impact should also be set out in a construction environmental management plan, the details of which would be secured through a planning condition.

Any elements of the scheme that require planning consent and have the potential for impacts upon protected species or sites must be supported by appropriate survey information in order for the application to be registered.

### **Other Matters**

The council's Trees Team (in their response dated 07.01.2011) have recognised the potential benefits of replacing poor specimen trees as part of the works. They would therefore not object to the loss of existing trees subject to new tree planting to mitigate against this loss. It is recommended that any works on site comply with NJUG Guidelines, BS 5837 and BS 3998 as appropriate. A detailed tree survey will need to be submitted with the forthcoming planning application.

The council's Planning Archaeologist has identified that whilst the scheme is in an archaeologically sensitive area, the archaeology is unlikely to be an overriding constraint to the scheme. A watching brief on any ground works will be the best way of mitigating the potential archaeological impact. The mitigation strategy should be discussed with the council's Planning Archaeologist and submitted with the planning application.

BAA has not raised any objections to the proposed works.

The Highways Agency not raised any objection to the proposed works.

It is accepted that the impacts of the development can be controlled by the planning application process without the need for an Environmental Impact Assessment.

### **Conclusion (s)**

**In light of the above the LPA considers that following our assessment of the selection criteria, as required by Schedule 3 of the Regs, the works proposed as indicated in your Screening Request do not require the formal submission of an Environmental Impact Assessment.** That said, it is anticipated that the issues you have identified in the report will need to be addressed in the planning application.

In addition, the following documents should be submitted with a planning application;

- Full plans included sections where relevant
- Biodiversity survey and report
- Flood risk assessment
- Arboricultural report
- Landscaping plan and planting schedule
- Heritage statement
- Lighting assessment (if relevant)
- Land contamination assessment



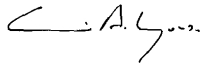
This list is not exhaustive, further information may be required following a revision to local validation criteria which is in the process of under going public consultation. Please refer to the council's website [www.southampton.gov.uk](http://www.southampton.gov.uk) for further information or contact the case officer (Bryony Giles) directly to confirm the information required.

Please note that should the proposed nature of the development significantly change a further request for a Screening Opinion should be submitted to the LPA for consideration.

I trust that the above information is of assistance. If there are any points in this letter that require further clarification of you require copies of the formal consultation responds please do not hesitate to contact Bryony Giles, the case officer, on 023 8083 2603.

This opinion is 'without prejudice' to any decision that may be made as a result of a planning application being registered and is given in the context of the planning policies, regulations and guidance applicable today.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'C. Lyons'.

Dr. Chris Lyons  
Planning & Development Manager



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01	30/06/10	MJ	MR	AC
Draft				
Issue	Date	By	Chkd	Appd

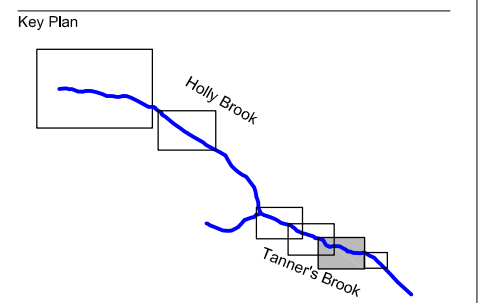
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Client



Job Title  
**Tanner's Brook  
 Project Appraisal Report**



Drawing Title  
**Scoping Consultation Document  
 Indicative Landscape Plan  
 Millbrook**

Scale at A3  
 1:2000

Discipline

Drawing Status  
**Draft**

Job No <b>212346-00</b>	Drawing No <b>Figure 03-05</b>	Issue <b>01</b>
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- Legend:**
- Brook study reaches:
- Oakley Road Allotments
  - Millbrook
  - ABP Docks
- Text
- Scheme Proposals
  - Key Issues
  - Mitigation measures
- Fence replacement and selective vegetation clearance
  - Footpath resurfacing
  - Channel bank regrading

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Excavated material (not used in the construction of the flood bunds) deposited outside the floodplain in appropriate locations on the edges of the golf course, creating new undulating features, including rubble material generated from breaking the culvert out to create buried ecological hibernacula

Trees and shrubs planted into the nutrient rich material generated from the floodplain excavation, partly as mitigation for the loss of trees at the upstream end of the golf course

Simple timber bridges installed to provide two pedestrian crossings over each fairway, where access is not otherwise provided through vehicular crossings.

New ponds created on the short par 3 hole 17, in addition to the existing pond being enhanced through regrading to make it more suitable for marginal vegetation to develop

Banks of existing pond regraded to make it more suitable for marginal vegetation to establish and slow golf balls to limit the number entering the water

New weir structure and associated small bund (with clay core) constructed, using site won material, to the south of the large woodland copse to regulate flows and create flood storage within the woodland (to a maximum depth of approx 0.5m). Longitudinal profile of the brook regraded south of the woodland with a slight increase in sinuosity

3-4m length of 1m x 1m box culvert (approx) installed to provide vehicular crossings for maintenance vehicles where required (four in total). Guard railing provided above the open channel. 100mm topsoil cover to allow for seeding. Geogrid installed to protect grass from excessive wear.

Offline underground water storage tank for local irrigation, abstracting <20m3/day when riverine conditions are appropriate

Breaking out of culvert likely to result in the loss of between 5 and 10 mature trees, requiring mitigation within the golf course

Breaking out the entire culverted stretch of Holly Brook running through the golf course, creating a narrow two stage channel on a new line across the existing fairways

Creation of new wetland habitats on the fringes of the existing woodland copses

New weir structure and associated small bund (with clay core) constructed, using site won material, at the downstream end of the golf course to further regulate flows and create flood storage downstream of the large woodland (to a maximum depth of approx 0.5m), retaining a narrow channel on the fairways but widening it out in the small woodland copses

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Issue	Date	By	Chkd	Appd

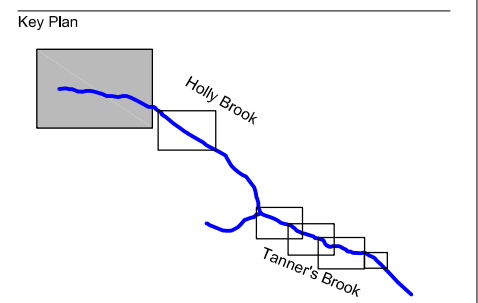
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Job Title  
**Tanner's Brook  
Project Appraisal Report**



Drawing Title  
**Scoping Consultation Document  
Indicative Landscape Plan  
Southampton Municipal Golf Course**

Scale at A3  
1:5000

Discipline

Drawing Status  
**Draft**

Job No <b>212346-00</b>	Drawing No <b>Figure 03-01</b>	Issue <b>01</b>
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**Legend:**

Brook study reaches:  
 - Southampton Municipal Golf Course (purple line)  
 - Southampton Sports Centre (red line)

Text -> Scheme Proposals  
 Text -> Key Issues  
 Text -> Mitigation measures

Tees Fairways Greens  
 (Constraints - 18 hole course) (green squares)  
 Tees Fairways Greens  
 (Constraints - 9 hole course) (brown squares)

New two-stage channel alignment (cyan line)  
 Weir and bund alignment (magenta line)  
 Vehicular crossings (red line)  
 Pedestrian crossings (yellow line)



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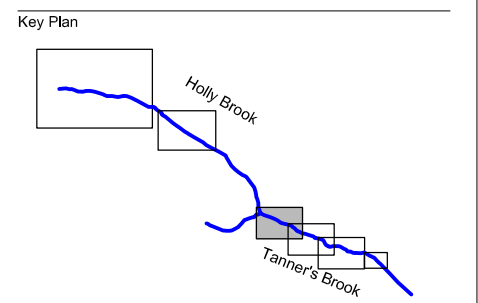
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Job Title  
**Tanner's Brook  
 Project Appraisal Report**



Drawing Title  
**Scoping Consultation Document  
 Indicative Landscape Plan  
 Mill Mead**

Scale at A3  
 1:2000

Discipline

Drawing Status  
**Draft**

Job No <b>212346-00</b>	Drawing No <b>Figure 03-03</b>	Issue <b>01</b>
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- Legend:**
- Brook study reaches:
- Romsey Road Culvert
  - Lordsdale Greenway (Lower)
  - Mill Mead
  - Oakley Road Allotments
- Text Scheme Proposals
- Text — Key Issues
- Text — Mitigation measures

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## ROLLES BROOK, SOUTHAMPTON

### Opportunities for River Enhancement on the Rolles Brook, Southampton



For

*Environment Agency*

*8<sup>th</sup> March 2010*

Report by

the River Restoration Centre

RRC, Cranfield, Bedford. MK43 0AL

[rrc@theRRC.co.uk](mailto:rrc@theRRC.co.uk)

Prepared by

*Jenny Mant*

### **1. Site Visit Attendees:**

Jenny Mant (RRC)

Ian Miller (Environment Agency)

### **2. Introduction:**

The aim of this short site visit is to evaluate opportunities for river enhancement along the Rolles brook, a small water course of some 4-5km in length which flows from Southampton Common, around the edge of the Cemetery near the King Edward V1 school and eventually joins with the river Test. The Brook has recently been become designated as main river because of concern about its contribution to local food risk.

Historically much of this brook has been heavily impacted by major areas of urbanisation particularly during the early to mid 1900s, clearly observable from the first series 1870s ordnance survey maps and onwards. This is especially so in the lower sections with the exception of reach G (as shown on Figure 1), which runs through a more natural area maintained by Southampton Council. Upstream, close to the Cemetery, the brook appears to have already been either diverted, or at least confined, within a straightened channel along the old parish boundary by the 1870s.

The site assessment completed by the River Restoration Centre finishes at Commercial Road where the brook goes into a continuous culvert under roads and other infrastructure before joining the river Test. For the purposes of this report, this small, primarily spring fed, heavily urban-impacted watercourse has been divided into 8 distinctive reaches, based mainly on landuse features.

### **3. Reaches**

The following provides an overview of each reach as shown in Figure 1, outlines any opportunities, issues and if necessary, next steps to consider. It is based on limited data and a short walk over site visit on the 10<sup>th</sup> September 2010.

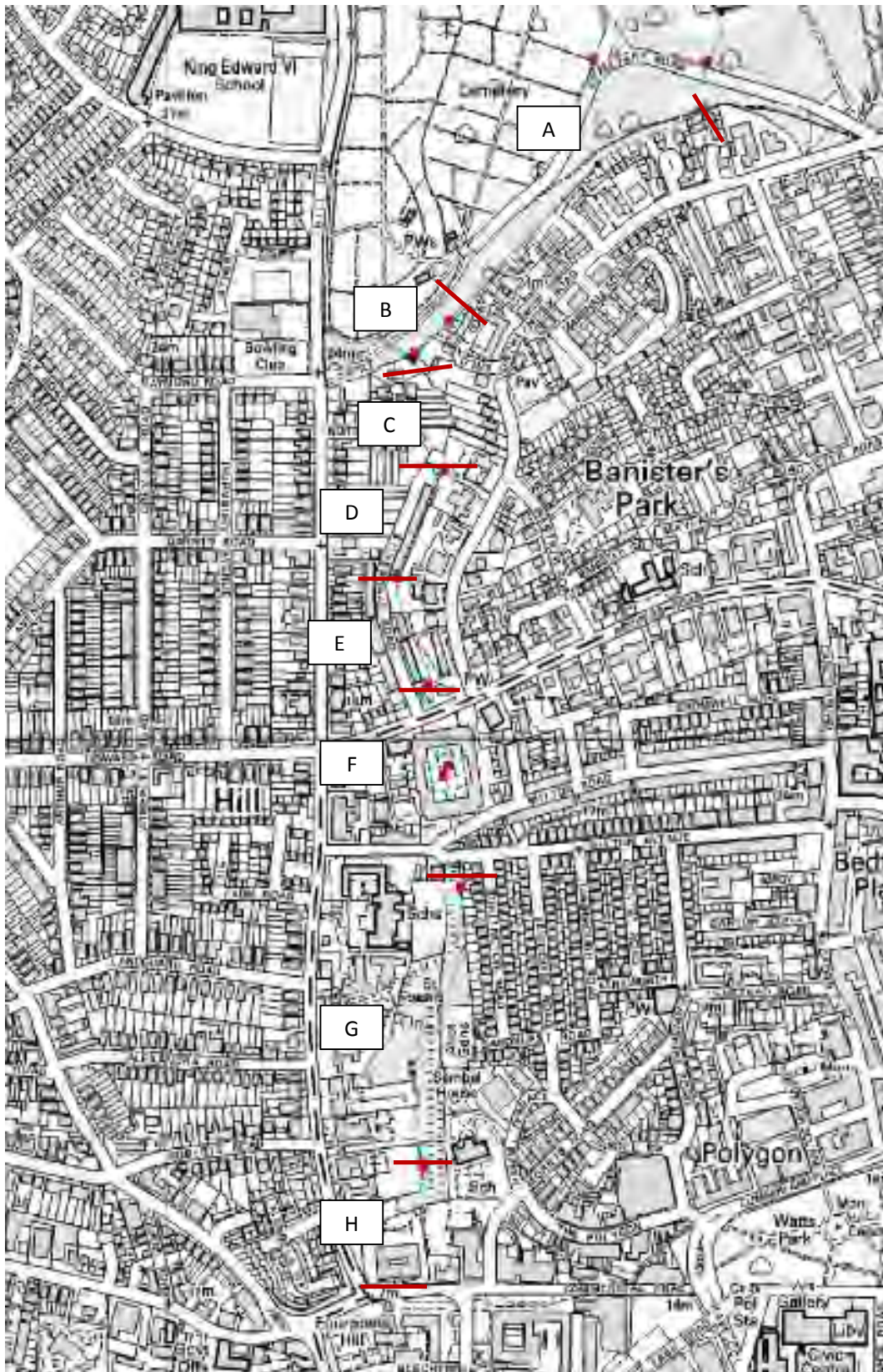


Figure 1. Map showing approximate location of potential enhancement reaches



### ***Reach A***

This is the most upstream section of the brook that was visited during the site visit. On the day of the visit, the watercourse was dry along this section which would be in keeping with a natural ground water spring-fed system in the upper part of a watercourse of this type, at the end of the summer period. The river has, historically, been straightened and probably managed to coincide with the old line of the parliamentary and municipal boundary. The brook here, is dominated by a large stone wall on its left bank, ensuring that in times of flow there is no likelihood of flood risk increase to neighbouring properties and that any out of bank flow would be diverted towards the common (see Figure 2). The brook supports a gravel bed along this section and does not appear to have been overly managed in recent years and hence should provide some good habitat diversity in this seasonally flowing river section.

### ***Key recommendations***

Leave this section as it is and keep maintenance to a minimum to provide for a range of habitat features. Only remove large woody vegetation if it is creating a major unacceptable blockage or, could over the longer term, affect the integrity of the wall on the left hand bank.



**Figure 2. Ephemeraally flowing upstream section of Rolles Brook along side very high wall protecting properties behind.**

### ***Reach B***

This section comprises an old culverted section constructed sometime in the 1930s. The rationale for this appears to have long since vanished. Indeed, the culvert entrance is poorly maintained and on the day of the site visit there was a considerable amount of trash accumulation (Figure 3). There was indication that, during periods of high flow, the water overtops this culverted section with a resultant new, more natural channel route forming. It may be possible to remove this culvert however, on closer inspection much of the old culvert has already disintegrated with remnants of a 'tiled' culvert base visible. The benefit therefore of physically removing material from this site is questionable.

At the upstream part of this reach close to the culvert entrance there is a large stand of Japanese Knotweed (Figure 4) which should be eradicated to prevent further spread downstream.

### ***Key Recommendations***

It would be worth the Environment Agency's Operations Delivery team looking at this section in more detail to assess whether or not it would be an easy and cost effective job to remove the remains of this culvert to aid natural recovery.

An eradication programme for the Japanese Knotweed is recommended.



**Figure 3. Small culvert entrance now blocked and in bad state of repair (culvert requirement no longer obvious).**



**Figure 4. Large stand of Japanese Knotweed near culvert entrance**

### **Reach C**

It was not possible to see this whole reach since it runs between houses on both sides. The properties are situated away from the brook edge and at a higher land level. Therefore it is unlikely that they will be affected by fluvial flooding. This is however, based solely on a visual inspection of local gradients since there is no additional hydrological data for this sub catchment. From the brief observation of this section, it appears that much of this section is heavily maintained (with 'independent' water features present in gardens). It is likely that any flooding in this section is from water backing up behind and around garden fences with road additional and pathway run off etc inputs (see Figure 5) contributing to this flooding rather than via natural fluvial processes.



**Figure 5. Fencing and pathways river provide key connectivity of water from roads etc to the river (note the river location in this photograph is just beyond the trees and garage in the dip).**

#### *Key Recommendations*

The state of the section both from a flood risk and ecological benefit point of view was difficult to assess in the context of a sort site visit. It is recommended that the Environment Agency inspect this section to allow for an improved (if necessary) maintenance regime that accounts for both above issues.

#### *Reach D*

This whole section is now culverted. The development of Grenville Court (estimated to have been built some time in the 1960 or 70s) is likely to define the approximate original course; the historical maps indicate this and also show that the river at this section, was fairly sinuous in planform. The rationale for this assumption is because this is at the lowest point in the valley through this reach. There are no opportunities in this section to change this configuration since the only open space is on the left hand bank which is at a higher level. Any attempt to reinstate a watercourse at this point would result in a perched, over deep brook. It is assumed there is no fluvial flood risk (with the exception possibly, of vehicles) at this point since properties are built over garages (Figure 6). Any flooding here would most likely be from road run-off or any blockage that might occur in the culvert.

## Key Recommendations

None.



Figure 6. Garages situated under Grenville Court prevent fluvial flooding to properties above.

## Reach E

The beginning of this reach is marked by a short section that is relatively natural with a gravel bed and a mixture of trees (Figure 7). Just downstream of this section is a recently installed screen (Figure 8) to help prevent trash (both urban and natural) migrating downstream through another culverted section (Figure 9) hence reducing culvert blockage potential.

Interestingly, there is secondary watercourse running along this culverted section which flows under the hard standing for the privately owned garages in this area. This small drain appears to be connected to the main culverted section of the brook and it is understood (*pers coms* with local resident) that it rarely (if ever) goes over the bank top. On the day of the site visit there was very little flow in the drain and therefore, it is assumed that this flow is maintained by a hidden sluice/board structure. This drain is tree lined on one side but at the same time supports a mix of macrophytes mainly associated with slow flowing watercourses indicating that this drain is not often maintained. As a result it should support some ecological habitats.

Much of the flooding in this area is as a result of poor drainage (supported by anecdotal evidence from a local resident who indicated that under heavy rainfall conditions most flood water flowed under the garages from the surrounding roads and headed towards the small drain). With a trash screen in place urban runoff is expected to be the main contributing factors to any flooding.



**Figure 7. Section immediately downstream of Grenville Court.**



**Figure 8. Recently constructed trash screen at upstream section of culverted section.**



**Figure 9. Main flow of brook is through a culvert under concrete hard standing.**



**Figure 10. Small drain running along the edge of car parking area.**

### *Key Recommendations*

The small section at the upstream part of this reach, whilst semi-natural, is heavily overgrown. Some thinning of the larger trees would be beneficial to allow for a better mix of shade and light-penetrating areas.

The small drain supports a small micro-habitat which is beneficial. However, there was also a lot of silt present. It would be worth investigating if any more water could be diverted along this course during periods of low flow. Any investigation would need to check the gradient along this drain to ensure that there was sufficient gradient to support a running flow of water since it was impossible to assess this from a walk over survey. However, if such an option was considered care would need

to be taken that no additional fine material and debris was deposited in the next culvert downstream.

### **Reach F**

This reach is completely culverted through a new residential development. As such there is no opportunity for enhancement.

#### *Key Recommendations*

None

### **Reach G**

This is the most natural section of the Rolles brook which should be support a range of ecological habitats (see Figure 11). It is understood that this area is maintained by Southampton Council and it appeared that very little maintenance had been carried out on the brook for some time which has allowed for natural recovery although it should be noted that there are some areas of Himalayan Balsam present in places. On site there was discussion about opportunities to reinstate an old pond (which appears from historical maps to be the remnant of an old manmade fish ponds). If the aim is to create a public amenity in terms of a small fish pond then such a project could be considered. However, reinstatement would require careful design to ensure that the result was not a stagnant water body. To achieve this would require a design that included a sweetening flow or pumping system to ensure the pond does not become stagnant. From an ecological point of view it would be preferable to consider creating a series of small scrapes at different depths that would form ephemeral ponds that dried out at different rates and times. This would increase habitat heterogeneity and connectivity to floodplain habitats.

Close to the downstream end of this section there is a small drain that transfers water from a car park area (just upstream of Rosida Gardens). Whilst a small consideration in the context of the brook, nonetheless, water quality is clearly worse locally as a result. Future planning should consider the impact on the brook of these small drains and a preferred option would be to include a SUDs type filtering system into the brook.

Just downstream of this car parking area the watercourse becomes dominated by thick stands of Japanese Knotweed at the bottom of Rosida Gardens and Shelley Court (Figure 12). In terms of habitat improvement the best options would be to undergo an eradication programme. However, the section is around 100-200m in length and eradication would require significant resources and commitment to spray, bury deeply or consider other Knotweed control measures. It is expected that such measure would need to be carried out over a number of years.





**Figure 11. Most natural section of the Rolles brook with good habitat features.**



**Figure 12. Dominant stands of Japanese Knotweed.**



**Figure 13. Section with native marginal vegetation.**

#### *Key Recommendations*

Maintenance should be kept to a minimum through this more natural reach. Some tree coppicing may be required from time to time to ensure that some light is able to penetrate the watercourse and a macrophyte community develops in places. Alongside this it may be necessary to carry out some Himalayan Balsam removal, to ensure that native aquatic marginal vegetation can become dominant (see Figure 13). It may be possible to consider this as a community project.

In addition there are some opportunities to create some scrapes in this section to increase floodplain habitat.

It is recommended that there is a focus on how to treat the Japanese Knotweed. Currently, it is contained to the section of previously disturbed land but, at the very least, its growth should be contained within this area.

#### **Reach H**

Options were discussed about the potential to deculvert this section. However, part of the proposed section (behind West Hill Court) has now been developed as a car parking hardstand and therefore, opportunity for deculverting is confined to a short reach of around 50m (Figure.14). Whilst generally, the River Restoration Centre would support any opportunity to restore a watercourse, in this case the benefit is questionable given the costs that would likely be incurred by such a scheme. Flood risk modelling would be required given the location of the brook to local infrastructure and there is likely to be a significant amount of spoil to move since a new channel

should be cut. In addition earth works would be necessary to re-profile and re-landscape the communal garden area of this residential site; the project could quite conceivably cost in the region of £50K+. Any disturbed land comes with the risk of the growth of stands of Japanese Knotweed. In this location especially, given that the upstream section is choked with the weed and currently the trash screen is completely covered with Japanese Knotweed debris, the probability of contamination at the proposed restoration site is extremely high (Figure 15). Therefore it is recommended that before any deculverting of this section is considered eradication of Japanese Knotweed upstream is seen as a priority.



**Figure 14. Section of Rolles Brook considered for deculverting.**



**Figure 15. Blocked trash screen with primarily with Japanese Knotweed debris.**

### *Key Recommendations*

There is the potential to deculvert a small section of watercourse, any evaluation of this site behind West Hill Court should not be considered unless the Japanese Knotweed upstream can be effectively controlled. Whilst generally, deculverting is seen as beneficial in this case serious consideration should be given to the real benefits of doing this here, at a section which marks the boundary between a more natural section and a long reach that will have to remain culverted as the watercourse flows under roads and other urban infrastructure; in this case spending time and effort on other sections may be more ecologically beneficial and economically sound.

## **Conclusions**

Overall the opportunities to enhance this brook are extremely limited, because of the major urban constraints. Small habitat enhancements through section G are likely to be of benefit together with controlling the stands of Japanese Knotweed at some locations. Most important in the context of this brook is to ensure that there is no further deterioration in habitat quality.

## **Note:**

These notes are compiled on the basis of RRC's extensive expertise and a short walk over site visit. RRC seeks to provide advice and suggestions to facilitate river restoration progress, but is careful not to produce detailed design drawings etc. In this way the Centre limits its liability. Liability for any options should be with those tasked with completing the detailed work and technical feasibility if necessary.



## Environmental Services

### Culvert Inspection Services Framework Scheme 2009/10 SSD Culvert Inspection Programme

#### Survey and Condition Assessment Report

Watercourse: Shelly Court, Hill Lane, Southampton

Site: Shelly Court, Hill Lane, Southampton

Asset Ref: SSD H35

Quick Ref: 07131R5000101R01

365 Ref: 461942

Contract Number: 23105



Watercourse: Shelly Court, Hill Lane, Southampton  
 Site: Shelly Court, Hill Lane, Southampton  
 Survey Date: 15/02/2010

National Grid Ref: N/A  
 Asset Ref: SSD H35  
 Quick Reference: 07131R5000101R01

**Objective**

A survey of asset ref: SSD H35 was undertaken on Monday, 15 February 2010 for the Environment Agency to ascertain the structural integrity, service condition and route of the culvert.

The weather conditions were Dry and the flow rate was medium at a depth of approximately 50mm

**Locations and Route**

Inlet Location: Rear of Shelley Court  
 Outlet Location: Unknown - unable to locate outlet

The route is as shown on the attached plan

The culvert runs from the inlet to the outlet in a southerly direction, running under road and rail

**Inlet/Headwall Details**

Size(mm): 800x800  
 Construction Material: Concrete  
 Shape: Circular  
 Location Details: In wooded area  
 Access Restrictions: Steep banks, soft ground  
 Construction Features: Trash screen  
 Health and Safety notes: None  
 Condition: Good

Easting: 441321 Northing: 112474  
 Invert Level: 1.923 Soffit Level: 2.723


**Notes:**
**Outlet/Headwall Details**

Size(mm): N/A  
 Construction Material: N/A  
 Shape: N/A  
 Location Details: N/A  
 Access Restrictions: N/A  
 Construction Features: N/A  
 Health and Safety notes: N/A  
 Condition: N/A

Easting: N/A Northing: N/A  
 Invert Level: N/A Soffit Level: N/A

Photograph not available

**Notes:** Unable to locate outlet - water levels too high to locate through CCTV

**Culvert Details - CCTV inspection summary**

Size: Varies - see section summary below  
 Shape: Circular  
 Construction Material: Concrete  
 Total Culvert Length (m): Unknown (451.3m surveyed, unable to locate outlet)  
 Number of Manholes: 12  
 Attention Priority: High - Large amount of structural defects present in section 1  
 Life Expectancy: Full assessment can be given after proposed remedial works have been carried out.

**Chainage Summary**

Node	Grid Reference	Cover/Soffit	Lowest	Location	D/S Node	D/S Length
		Level	Invert Level			
INLET	441321 112474	2.723	1.923	Rear of Shelley Court	MH1	53.1
MH1	N/A N/A	N/A	N/A	In wooded area	MH2	6.3
MH2	441329 112414	5.517	2.79	Car Park	MH3	34.5
MH3	441328 112378	5.628	3.53	In flower bed in car park	MH4	46.3
MH4	441332 112332	5.071	N/A	Access road off Commercial Road	MH5	11.4
MH5	441332 112318	5.174	1.97	On Pavement opposite MH4	MH6	17
MH6	441337 112303	N/A	2.7	Opposite Frobisher House	MH7	42.8
MH7	441380 112292	5.598	N/A	Wyndham Place	MH8	67.1
MH8	441365 112228	4.205	N/A	Blechynden Tce and Wyndham Pl	MH9	40.2
MH9	441324 112228	3.475	1.38	Opp. access behind Grenville Hse	MH10	31.7
MH10	441290 112227	2.909	1.16	Opposite Grenville Hse	MH11	37.4
MH11	N/A N/A	N/A	N/A	Unknown - unable to locate (rail)	MH12	63.5
MH12	N/A N/A	N/A	N/A	Unknown - unable to locate (rail)	OUTLET	N/A
OUTLET	N/A N/A	N/A	N/A	Unknown - unable to locate outlet		

**MH 1-->INLET**

Length (m) 53.1  
 Service Condition Mass Roots @ 13.5m; Mass Roots @ 22m;  
 Fracture @ 7.2m; Deformed @ 11.4m; Intruding Connection @ 24.2m; Deformed @ 39.4m; Deformed  
 Structural Condition @ 45.5m; Intruding Connection @ 51.8m; Deformed @ 53.1m;  
 Recommendation Line fractures; Dig down to rectify deformity; Root cut mass roots; Robot cut intruding connection;

**MH 2-->MH 1**

Length (m) 6.3  
 Service Condition No problems detected  
 Structural Condition No problems detected  
 Recommendation None

**MH 2-->MH 3**

Length (m) 34.5  
 Service Condition No problems detected  
 Structural Condition No problems detected  
 Recommendation None

**MH 6-->MH 7**

Length (m) 42.8  
 Service Condition Debris @ 10.5m; Debris @ 41.2m;  
 Structural Condition No problems detected  
 Recommendation Jet-Wash/Clear Culvert;

**MH 7-->MH 8**

Length (m) 67.1  
 Debris @ 17.2m; Obstruction @ 17.9m; Obstruction @ 22.4m; Obstruction @ 35.1m; Obstruction @ 9.2m; Obstruction @ 39.6m; Debris @ 67.1m;  
 Service Condition  
 Structural Condition No problems detected  
 Recommendation Jet-Wash/Clear Culvert; Remove Obstruction;

**MH 8-->MH 9**

Length (m) 40.2  
 Service Condition No problems detected  
 Structural Condition Intruding Connection @ 23m;  
 Recommendation Robot cut intruding connection;

**MH 9-->MH 10**

Length (m) 31.7  
 Service Condition Debris @ 18.1m; Obstruction @ 18.1m;  
 Structural Condition No problems detected  
 Recommendation Jet-Wash/Clear Culvert; Remove Obstruction;

**MH 10-->MH 11**

Length (m) 37.4  
 Service Condition No problems detected  
 Structural Condition Intruding Connection @ 23.2m; Intruding Connection @ 0.2m; Intruding Connection @ 13.5m;  
 Recommendation Robot cut intruding connection;

**MH 11-->MH 12**

Length (m) 63.5  
 Service Condition No problems detected  
 Structural Condition Infiltration @ 27.6m;  
 Recommendation Line area affected by infiltration;

**MH 3-->MH 4**

Length (m) 46.3  
 Service Condition Obstruction @ 3.7m; Debris @ 6.9m; Debris @ 46.3m;  
 Structural Condition Hole @ 12.9m; Intruding Connection @ 16.9m; Intruding Connection @ 24.8m;  
 Recommendation Remove Obstruction; Jet-Wash/Clear Culvert; Line over hole; Robot cut intruding connection;

**MH 4-->MH 5**

Length (m) 11.4  
 Service Condition Debris @ 11.4m; Debris @ 0m; Obstruction @ 7.3m;  
 Structural Condition No problems detected  
 Recommendation Jet-Wash/Clear Culvert; Remove Obstruction;

**MH 5-->MH 6**

Length (m) 17  
 Service Condition No problems detected  
 Structural Condition No problems detected  
 Recommendation None



### MANHOLE RECORD CARD

CHAMBER REFERENCE: **MH02**

MAINTAINER: **ENVIRONMENT AGENCY**

WEATHER: **DRY**

ASSET REFERENCE: **07131R5000101R01**

LOCATION: **CAR PARK REAR OF SKANIDIA HOUSE**

QUICK REFERENCE: **SSDH35**

YEAR LAID: **Z** STATUS: **WC** FUNCTION: **WC** NODE TYPE: **M**

SURVEYED DATE: **15/02/2010**

COVER	SHAPE: <b>D</b>	HINGED	<b>N</b>	LOCK	<b>N</b>	DUTY	<b>H</b>	SIZE (mm): <b>620</b> x <b>620</b>	TOXIC ATMOSPHERE	<b>N</b>
SHAFT	SIDE ENTRY: <b>N</b>	REGULAT COURSE	<b>3</b>	DEPTH (m): <b>0.75</b>	<b>0.75</b>	LNDGS	<b>N</b>	SIZE (mm): <b>610</b> x <b>610</b>	EVIDENCE OF VERMIN	<b>N</b>
CHAMBER	SOFFIT: <b>S</b>	STEPS	<b>3</b>	LADDERS	<b>N</b>			SIZE (mm): <b>1800</b> x	CONSTRUCT CODE	<b>CO</b>

DEPTH OF FLOW (mm): <b>20</b>	DEPTH OF SILT (mm): <b>0</b>	HEIGHT SURCH (mm): <b>100</b>	COVER LEVEL (m): <b>5.52</b>
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	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)	BACKDROP DIAM(mm)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
INCOMING PIPE	A	<b>MH01</b>	<b>C</b>	<b>1200</b> x		<b>CO</b>	<b>2.71</b>	<b>2.81</b>
	B	<b>UNKNOWN</b>	<b>C</b>	<b>225</b> x		<b>VC</b>	<b>2.10</b>	<b>3.42</b>
	C			x				
	D			x				
	E			x				
	F			x				

	DOWNSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)	COND	CRITY	PIPE MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
OUTGOING PIPE	X	<b>MH03</b>	<b>C</b>	<b>1200</b> x		<b>CO</b>	<b>2.73</b>	<b>2.79</b>
	Y			x				

CONDITION (Y if attention required): COVER **N** IRONS/LADDERS **N** SHAFT **N** CHAMBER **N** BENCHING **N** OTHER **N**

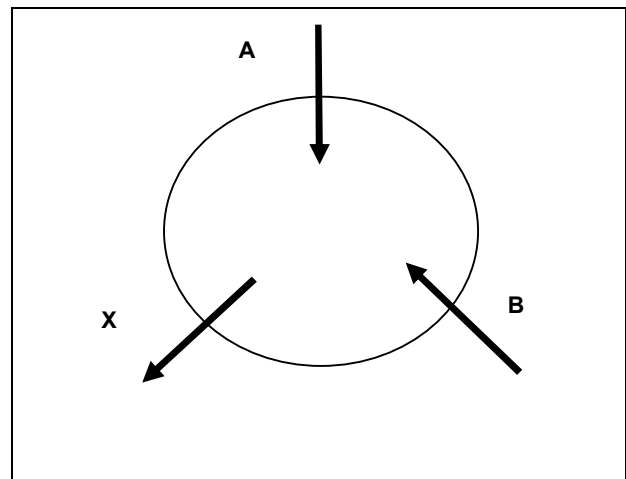
REMARKS: **1800 CONCRETE CHAMBER WITH REGULATE COURSE IN BETWEEN**

LOCATION PHOTO



Not to scale

INTERNAL SKETCH



Not to scale





**MANHOLE RECORD CARD**

CHAMBER REFERENCE **MH06**

MAINTAINER: **ENVIRONMENT AGENCY**

WEATHER: DRY

ASSET REFERENCE **07131R5000101R01**

LOCATION

**VERGE O/S MIGUELS FISH BAR**

QUICK REFERENCE **SSDH35**

YEAR LAID

<b>Z</b>	STATUS	<b>WC</b>	FUNCTION	<b>WC</b>	NODE TYPE	<b>M</b>
	HINGED	<b>N</b>	LOCK	<b>N</b>	DUTY	<b>H</b>

SURVEYED DATE **16/02/2010**

COVER

SHAPE	<b>D</b>	DEPTH (mm)	<b>580</b>	x	<b>580</b>	TOXIC ATMOSPHERE	<b>N</b>
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SHAFT

SIDE ENTRY	<b>N</b>	REGULAT COURSE	<b>10</b>	DEPTH (m)	<b>1.20</b>	EVIDENCE OF VERMIN	<b>N</b>
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CHAMBER

SOFFIT	<b>S</b>	STEPS	<b>6</b>	LADDERS	<b>N</b>	LNDGS	<b>N</b>	SIZE (mm)	<b>1800</b>	x	CONSTRUCT CODE	<b>CO</b>
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DEPTH OF FLOW (mm)

<b>30</b>	DEPTH OF SILT (mm)	<b>0</b>	HEIGHT SURCH (mm)	<b>200</b>	COVER LEVEL (m)	<b>5.90</b>
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	INCOMING PIPE	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		BACKDROP DIAM(mm)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
		A	<b>UNKNOWN</b>	<b>C</b>	<b>150</b>	<b>x</b>		<b>VC</b>		<b>2.90</b>
B	<b>MH05</b>	<b>C</b>	<b>1200</b>	<b>x</b>		<b>CO</b>		<b>3.10</b>	<b>2.80</b>	
C				<b>x</b>						
D				<b>x</b>						
E				<b>x</b>						
F				<b>x</b>						

	OUTGOING PIPE	DOWNSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		BACKDROP DIAM(mm)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)	COND	CRITY
		X	<b>MH07</b>	<b>C</b>	<b>1200</b>	<b>x</b>		<b>CO</b>		<b>3.20</b>	<b>2.70</b>	
Y				<b>x</b>								

CONDITION (Y if attention required)

COVER	<b>N</b>	IRONS/LADDERS	<b>N</b>	SHAFT	<b>N</b>	CHAMBER	<b>N</b>	BENCHING	<b>N</b>	OTHER	<b>N</b>
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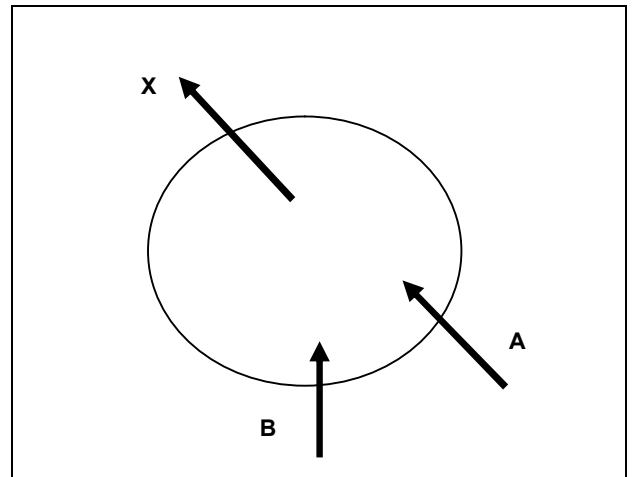
REMARKS

**LOCATION PHOTO**



Not to scale

**INTERNAL SKETCH**



Not to scale

### MANHOLE RECORD CARD

CHAMBER REFERENCE: **MH09**

MAINTAINER: **ENVIRONMENT AGENCY**

WEATHER:

ASSET REFERENCE: **07131R5000101R01**

LOCATION

**IN ROAD OPP TRAIN STATION**

QUICK REFERENCE: **SSDH35**

YEAR LAID

<b>Z</b>	STATUS	<b>WC</b>	FUNCTION	<b>WC</b>	NODE TYPE	<b>M</b>
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SURVEYED DATE: **16/02/2010**

COVER

SHAPE	<b>D</b>	HINGED	<b>N</b>	LOCK	<b>N</b>	DUTY	<b>H</b>	SIZE (mm)	<b>620</b> x <b>620</b>	TOXIC ATMOSPHERE	<b>N</b>
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SHAFT

SIDE ENTRY	<b>N</b>	REGULAT COURSE	<b>2</b>	DEPTH (m)	<b>0.70</b>	SIZE (mm)	<b>610</b> x <b>610</b>	EVIDENCE OF VERMIN	<b>N</b>
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CHAMBER

SOFFIT	<b>S</b>	STEPS	<b>2</b>	LADDERS	<b>N</b>	LNDGS	<b>1</b>	SIZE (mm)	<b>2880</b> x <b>2200</b>	CONSTRUCT CODE	<b>BR</b>
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DEPTH OF FLOW (mm)

<b>20</b>	DEPTH OF SILT (mm)	<b>0</b>	HEIGHT SURCH (mm)	<b>150</b>
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COVER LEVEL (m): **3.48**

	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		BACKDROP DIAM(mm)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
INCOMING PIPE	A	<b>UNKNOWN</b>	<b>C</b>	<b>150</b>	<b>x</b>		<b>VC</b>	<b>1.20</b>	<b>2.28</b>
	B	<b>MH08</b>	<b>C</b>	<b>1200</b>	<b>x</b>		<b>CO</b>	<b>2.05</b>	<b>1.43</b>
	C	<b>UNKNOWN</b>	<b>C</b>	<b>600</b>	<b>x</b>		<b>CO</b>	<b>1.70</b>	<b>1.78</b>
	D				<b>x</b>				
	E				<b>x</b>				
	F				<b>x</b>				

	DOWNSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		COND	CRITY	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
OUTGOING PIPE	X	<b>MH10</b>	<b>C</b>	<b>700</b>	<b>x</b>		<b>CO</b>		<b>2.10</b>	<b>1.38</b>
	Y				<b>x</b>					

CONDITION (Y if attention required)

COVER **N** IRONS/LADDERS **N** SHAFT **N** CHAMBER **N** BENCHING **N** OTHER **N**

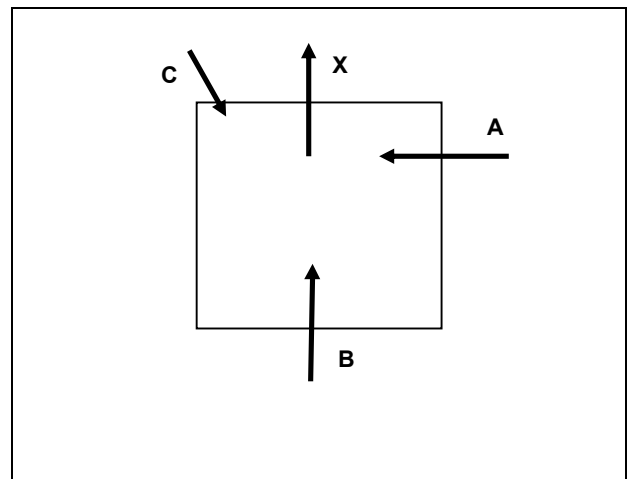
REMARKS

LOCATION PHOTO



Not to scale

INTERNAL SKETCH



Not to scale

### MANHOLE RECORD CARD

CHAMBER REFERENCE: **MH10**

MAINTAINER: **ENVIRONMENT AGENCY**

WEATHER: **DRY**

ASSET REFERENCE: **07131R5000101R01**

LOCATION: **O/S SOUTHAMPTON CENTRAL TRAIN STATION**

QUICK REFERENCE: **SSDH35**

YEAR LAID: **Z** STATUS: **WC** FUNCTION: **WC** NODE TYPE: **M**

SURVEYED DATE: **17/02/2010**

COVER	SHAPE: <b>C</b>	HINGED	<b>N</b>	LOCK	<b>N</b>	DUTY	<b>H</b>	SIZE (mm): <b>580</b> x	TOXIC ATMOSPHERE	<b>N</b>
SHAFT	SIDE ENTRY: <b>N</b>	REGULAT COURSE	<b>0</b>	DEPTH (m): <b>0.60</b>				SIZE (mm): <b>600</b> x <b>500</b>	EVIDENCE OF VERMIN	<b>N</b>
CHAMBER	SOFFIT: <b>T</b>	STEPS	<b>2</b>	LADDERS	<b>N</b>	LNDGS	<b>N</b>	SIZE (mm): <b>900</b> x <b>1000</b>	CONSTRUCT CODE	<b>BR</b>
DEPTH OF FLOW (mm)	<b>200</b>	DEPTH OF SILT (mm)	<b>0</b>	HEIGHT SURCH (mm)	<b>400</b>				COVER LEVEL (m)	<b>2.91</b>

INCOMING PIPE	UPSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		BACKDROP DIAM(mm)	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
	A	<b>UNKNOWN</b>	<b>C</b>	<b>450</b>	<b>x</b>		<b>CO</b>		<b>1.85</b>
B	<b>UNKNOWN</b>	<b>C</b>	<b>150</b>	<b>x</b>		<b>VC</b>		<b>1.37</b>	<b>1.54</b>
C				<b>x</b>					
D				<b>x</b>					
E				<b>x</b>					
F				<b>x</b>					

OUTGOING PIPE	DOWNSTREAM REFERENCE	PIPE SHAPE	PIPE SIZE (mm) (diam)		COND	CRITY	PIPE MATERIAL	LINING MATERIAL	DEPTH FROM COVER (m)	INVERT LEVEL (m)
	X	<b>MH11</b>	<b>ARCH</b>	<b>900</b>	<b>x</b>	<b>1000</b>		<b>CO</b>		<b>1.75</b>
Y				<b>x</b>						

CONDITION (Y if attention required): COVER **N** IRONS/LADDERS **N** SHAFT **N** CHAMBER **N** BENCHING **N** OTHER **N**

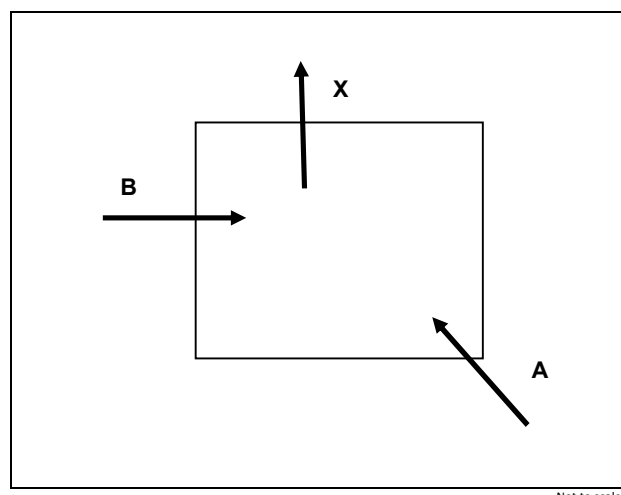
REMARKS: **CONNECTION FROM MH09 DROPS IN BLIND UP STREAM**

LOCATION PHOTO



Not to scale

INTERNAL SKETCH



Not to scale



**Key:**

- Chamber inlet
- Chamber Outlet
- Manhole (M#)
- Chamber
- Line of Chamber assumed
- Chamber Outlet position assumed
- GPS Location point
- with level in m.

NOTES:  
1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.  
2. OBTAINANCE SURVEY MATERIAL, REPRODUCED WITH THE  
CONSENT LICENSE NO. 100023000.

NO.	REMARKS	DATE	BY
1	ISSUED FOR PERMITS	10/11/2010	SSD
2	ISSUED FOR PERMITS	10/11/2010	SSD
3	ISSUED FOR PERMITS	10/11/2010	SSD
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98	ISSUED FOR PERMITS	10/11/2010	SSD
99	ISSUED FOR PERMITS	10/11/2010	SSD
100	ISSUED FOR PERMITS	10/11/2010	SSD

**Farrer**

**Environment Agency**

SOLENT, SOUTH DOWNS  
SOLENT

PROJECT/REFERENCE: 07131HS000101R01

SURVEY/DATE: MARCH 2010

SCALE: 1:500

DRAWN: GRS

CHECKED: GRS

DATE: MAR 10

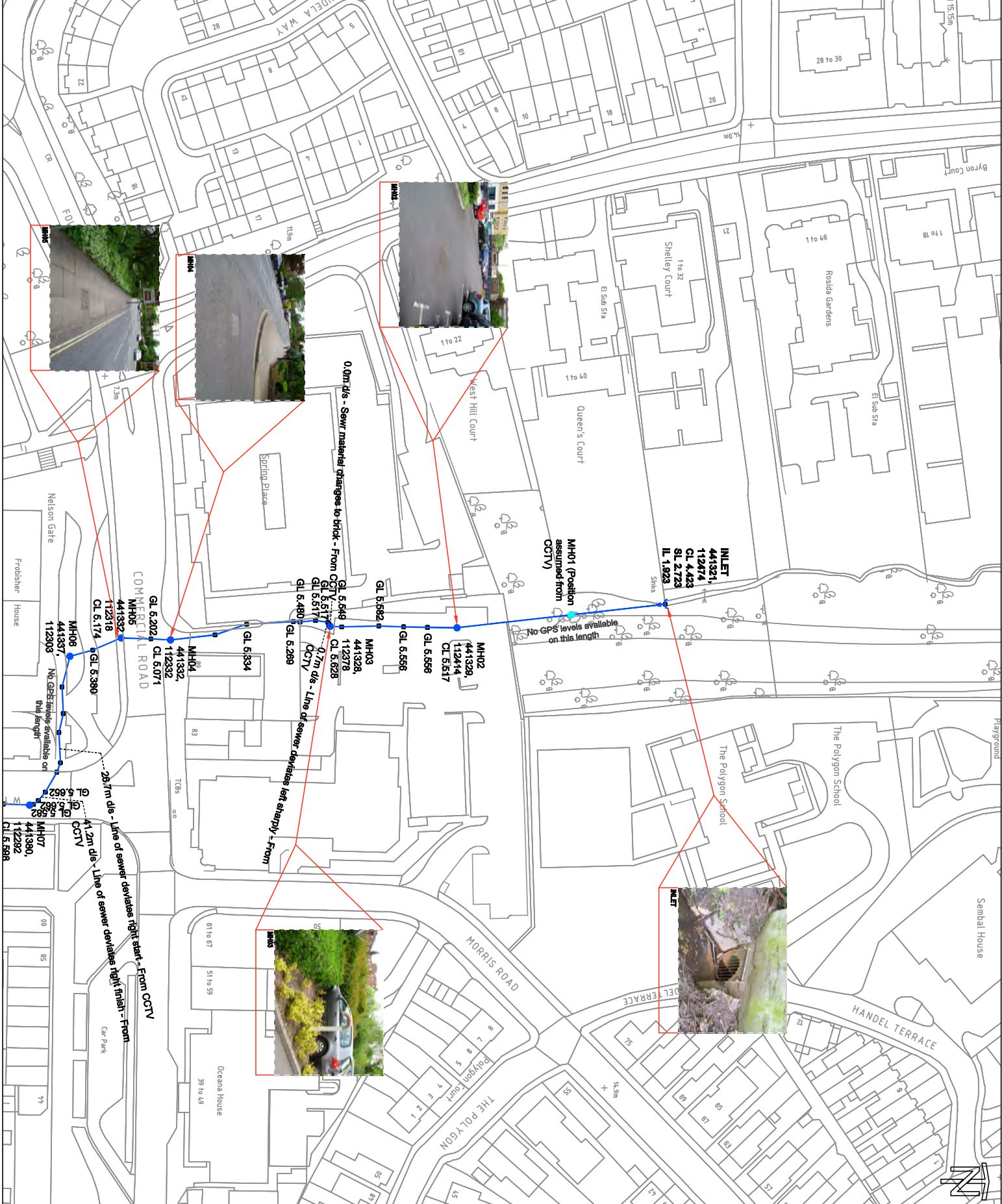
PROJECT NO: SSD\_H35\_001

ISSUED FOR PERMITS: 0

SURVEYED BY: FARBER CONSULTING

SSD-H35

LINE OF CULVERT SURVEY





**Key:**

- Culvert Inlet
- Culvert Outlet
- Manhole (MH)
- Culvert
- Line of Culvert assumed
- Culvert Outlet position assumed
- GPS Location point with level in m.

1. A REPORT HAS BEEN PRODUCED FOR THIS SURVEY.  
 2. ORDINANCE SURVEY MATERIAL REPRODUCED WITH THE PERMISSION OF THE CONTROLLER OF H.M.S.O. © CROWN COPYRIGHT LICENCE NO. 100028380.

**NOTES:**

**SURVEY LEGEND**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	100mm dia pipe		150mm dia pipe
	200mm dia pipe		300mm dia pipe
	400mm dia pipe		600mm dia pipe
	900mm dia pipe		1200mm dia pipe
	1500mm dia pipe		1800mm dia pipe
	2100mm dia pipe		2400mm dia pipe
	2700mm dia pipe		3000mm dia pipe
	3300mm dia pipe		3600mm dia pipe
	3900mm dia pipe		4200mm dia pipe
	4500mm dia pipe		4800mm dia pipe
	5100mm dia pipe		5400mm dia pipe
	5700mm dia pipe		6000mm dia pipe
	6300mm dia pipe		6600mm dia pipe
	6900mm dia pipe		7200mm dia pipe
	7500mm dia pipe		7800mm dia pipe
	8100mm dia pipe		8400mm dia pipe
	8700mm dia pipe		9000mm dia pipe
	9300mm dia pipe		9600mm dia pipe
	9900mm dia pipe		10200mm dia pipe
	10500mm dia pipe		10800mm dia pipe
	11100mm dia pipe		11400mm dia pipe
	11700mm dia pipe		12000mm dia pipe
	12300mm dia pipe		12600mm dia pipe
	12900mm dia pipe		13200mm dia pipe
	13500mm dia pipe		13800mm dia pipe
	14100mm dia pipe		14400mm dia pipe
	14700mm dia pipe		15000mm dia pipe
	15300mm dia pipe		15600mm dia pipe
	15900mm dia pipe		16200mm dia pipe
	16500mm dia pipe		16800mm dia pipe
	17100mm dia pipe		17400mm dia pipe
	17700mm dia pipe		18000mm dia pipe
	18300mm dia pipe		18600mm dia pipe
	18900mm dia pipe		19200mm dia pipe
	19500mm dia pipe		19800mm dia pipe
	20100mm dia pipe		20400mm dia pipe
	20700mm dia pipe		21000mm dia pipe
	21300mm dia pipe		21600mm dia pipe
	21900mm dia pipe		22200mm dia pipe
	22500mm dia pipe		22800mm dia pipe
	23100mm dia pipe		23400mm dia pipe
	23700mm dia pipe		24000mm dia pipe
	24300mm dia pipe		24600mm dia pipe
	24900mm dia pipe		25200mm dia pipe
	25500mm dia pipe		25800mm dia pipe
	26100mm dia pipe		26400mm dia pipe
	26700mm dia pipe		27000mm dia pipe
	27300mm dia pipe		27600mm dia pipe
	27900mm dia pipe		28200mm dia pipe
	28500mm dia pipe		28800mm dia pipe
	29100mm dia pipe		29400mm dia pipe
	29700mm dia pipe		30000mm dia pipe

REV.	AMENDMENT	DATE

CONTROL USED:	STATIONS ESTABLISHED:
TYPE	NAME
N/A	N/A
RTK GPS USED	N/A
N/A	N/A
N/A	N/A
N/A	N/A



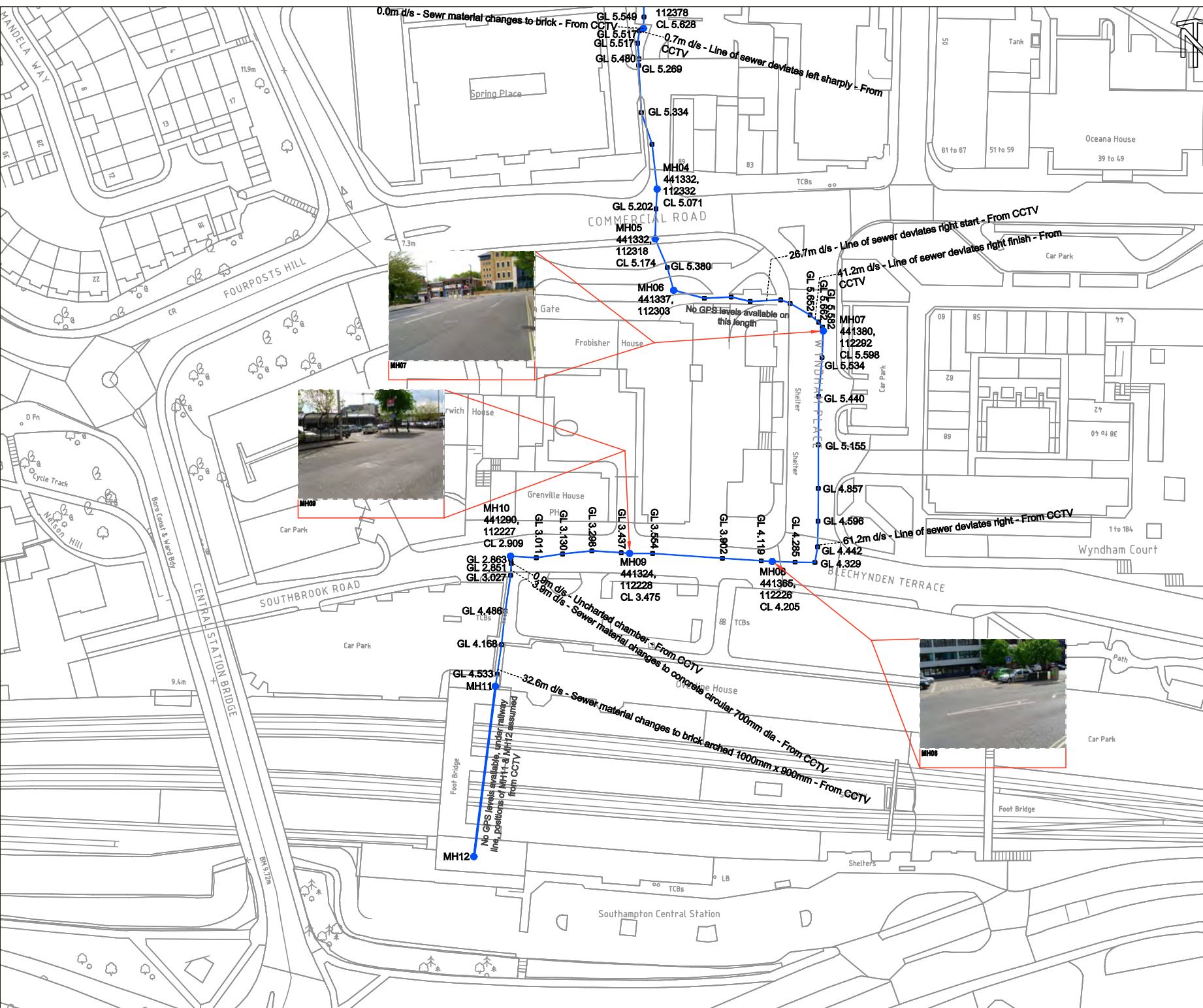
SOLENT, SOUTH DOWNS  
SOLENT

PROJECT/WATERCOURSE  
07131R5000101R01

SITE/LIMITS  
SSD-H35  
LINE OF CULVERT SURVEY

SURVEYED BY: FARRER CONSULTING  
 SURVEY DATE: MARCH 2010  
 SCALE: 1:500  
 DATUM: GPS  
 GRID: GRID

DRN: A.B. CHKD: J.B.  
 DATE: MAR 10 DATE: MAR 10  
 DRAWING NO: SSD\_H35\_001  
 REV: 0







## Service / Operational Defects (SRM 4)

 Project name:  
**HILL LANE - SOUTHAMPTON**

 Contract number:  
**SSD H35**

Contact:

 Date:  
**15/02/2010**

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Cat.	Peak Score	Grade	Mean Score	Total Score
1	INLET X	U	W	C 800	15/02/2010	CO	53.1	53.1	5	Z	10	5	0.6	33
2	MH 1 X	U	W	C 1200	15/02/2010	CO	6.3	6.3	-	Z	0	1	0	0
3	MH 2 X	D	W	C 1200	15/02/2010	CO	34.5	34.5	-	Z	0	1	0	0
4	MH 3 X	D	W	C 1200	15/02/2010	CO	46.3	46.3	2	Z	10	5	5.1	235
5	MH 4 X	D	W	A 1200/1200	15/02/2010	BR	11.4	11.4	2	Z	10	5	5.7	65
6	MH 5 X	D	W	C 1200	15/02/2010	CO	17	17	1	Z	1	2	0.7	12
7	MH 6 X	D	W	C 1200	16/02/2010	CO	42.8	42.8	1	Z	2	3	1.4	62
8	MH 7 X	D	W	C 1200	16/02/2010	CO	67.1	67.1	2	Z	10	5	2.2	150
9	MH 8 X	D	W	C 1200	16/02/2010	CO	40.2	40.2	1	Z	10	5	1.0	40
10	MH 9 X	D	W	C 700	16/02/2010	CO	31.7	31.7	2	Z	12	5	0.6	20
11	MH 10 X	D	W	A 1000/900	17/02/2010	BR	37.4	37.4	-	Z	10	5	1.3	50
12	MH 11 X	D	W	A 1500/1000	17/02/2010	BR	63.5	63.5	5	Z	2	3	0.0	2



## Structural Defects (SRM 4)

 Project name:  
**HILL LANE - SOUTHAMPTON**

 Contract number:  
**SSD H35**

Contact:

 Date:  
**15/02/2010**

No.	PLR	Dir.	Use	Shape / Size	Date	Mat.	Total Length	Insp. Length	Peak HWG	Cat.	Peak Score	Grade	Mean Score	Total Score
1	INLET X	U	W	C 800	15/02/2010	CO	53.1	53.1	5	Z	165	5	147.7	7845
2	MH 1 X	U	W	C 1200	15/02/2010	CO	6.3	6.3	-	Z	0	1	0	0
3	MH 2 X	D	W	C 1200	15/02/2010	CO	34.5	34.5	-	Z	0	1	0	0
4	MH 3 X	D	W	C 1200	15/02/2010	CO	46.3	46.3	4	Z	80	4	1.7	80
5	MH 4 X	D	W	A 1200/1200	15/02/2010	BR	11.4	11.4	-	Z	0	1	0	0
6	MH 5 X	D	W	C 1200	15/02/2010	CO	17	17	-	Z	0	1	0	0
7	MH 6 X	D	W	C 1200	16/02/2010	CO	42.8	42.8	-	Z	0	1	0	0
8	MH 7 X	D	W	C 1200	16/02/2010	CO	67.1	67.1	-	Z	0	1	0	0
9	MH 8 X	D	W	C 1200	16/02/2010	CO	40.2	40.2	-	Z	0	1	0	0
10	MH 9 X	D	W	C 700	16/02/2010	CO	31.7	31.7	-	Z	0	1	0	0
11	MH 10 X	D	W	A 1000/900	17/02/2010	BR	37.4	37.4	-	Z	0	1	0	0
12	MH 11 X	D	W	A 1500/1000	17/02/2010	BR	63.5	63.5	-	Z	0	1	0	0



## Defect Grade Description

Project name: <b>HILL LANE - SOUTHAMPTON</b>	Contract number: <b>SSD H35</b>	Contact:	Date: <b>15/02/2010</b>
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<b><u>1:</u></b>	<p style="color: green;">Occurrences without damage: for example, laterals, joints etc.</p> <p style="color: green; text-align: center;"><b>NO DEFECTS WERE DETECTED.</b></p> <p style="color: green; text-align: center;"><b>////-- NOTE: GRADE DESCRIPTION DOES NOT RELATE TO EA CONDITION ASSESSMENT MANUAL/T98 SPECIFICATION. --////</b></p>
<b><u>2:</u></b>	<p style="color: blue;">Constructional deficiencies or occurrences with insignificant influence to tightness, hydraulic or static pressure of pipe: f.e. wide joints, badly torched intakes, minor deformation of plastic pipes, minor erosions etc.</p> <p style="color: blue; text-align: center;"><b>REHABILITATION CAN BE SCHEDULED LONG-TERM.</b></p>
<b><u>3:</u></b>	<p style="color: orange;">Constructional deficiencies diminishing static, hydraulic and tightness: f.e. open joints, untorched intakes, cracks, minor drainage obstructions such as calcide build ups, protruding laterals, minor damages to pipe wall, individual root penetrations, corroded pipe walls etc.</p> <p style="color: orange; text-align: center;"><b>REHABILITATION IS NECESSARY MEDIUM-TERM WITHIN 3 TO 5 YEARS.</b></p>
<b><u>4:</u></b>	<p style="color: magenta;">Constructional damages with nonsufficient static safety, hydraulic or tightness: f.e. axial/radial pipebursts, pipe deformations, visually noticeable infiltration/exfiltration, cavities in pipe-wall, severe protruding, laterals severe root penetrations, severe corrosion of pipe wall etc.</p> <p style="color: magenta; text-align: center;"><b>REHABILITATION PROCEDURE IS URGENT AND HAS TO BE COMPLETED WITHIN 1 TO 2 YEARS. NECESSITY FOR EMERGENCY OPERATIONS HAS TO BE EXAMINED.</b></p>
<b><u>5:</u></b>	<p style="color: red;">Pipe is already or will shortly be impermeable: f.e. collapsed pipe, deeply rooted pipe or other drainage obstructions. Pipe loses water or danger of backwater in basements etc.</p> <p style="color: red; text-align: center;"><b>REHABILITATION IS URGENT AND SHORT-TERM. IN ORDER TO PREVENT FURTHER DAMAGE, NECESSARY TEMPORARY SPOT REPAIR HAS TO BE CONDUCTED ON EMERGENCY LEVEL.</b></p>

# Inspection report

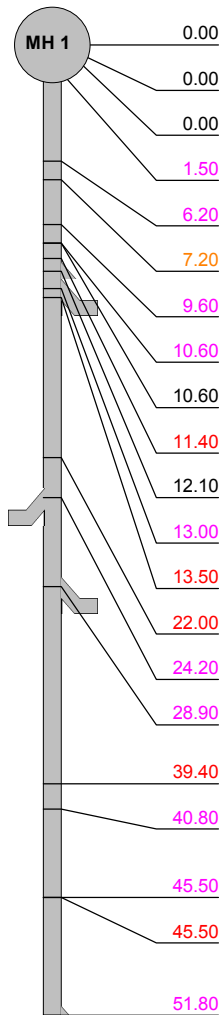
Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>1</b>	PLR: <b>INLET X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 1</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>INLET</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>53.1 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 800</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **UTL BURIED**

1:403	position	code	observation	grade
	0.00	ST	Start of Survey	0
	0.00	MH	Manhole Remark: MH 1	0
	0.00	WL	Water level, 05 % height/diameter	0
	1.50	S1 FM	Multiple Fractures from 06 to 06 o'clock, Start	4
	6.20	F1 FM	Multiple Fractures from 06 to 06 o'clock, Finish	4
	7.20	FC	Circumferential Fracture, from 06 to 04 o'clock	3
	9.60	S2 FM	Multiple Fractures from 06 to 06 o'clock, Start	4
	10.60	B	Sewer Broken, from 07 to 10 o'clock	4
	10.60	GO	General Observation, Remark: REPAIR MADE	0
	11.40	S3 D	Sewer Deformed, 10 %, Start	5
	12.10	CN	Connection, at 10 o'clock, dia 225 mm	0
	13.00	CNI	Connection, at 10 o'clock, dia 150 mm, intrusion 80 mm	4
	13.50	RM	Mass Roots 10 % cross-sectional area loss	5
	22.00	RM	Mass Roots 10 % cross-sectional area loss	5
	24.20	CNI	Connection, at 02 o'clock, dia 225 mm, intrusion 100 mm	4
	28.90	CNI	Connection, at 09 o'clock, dia 150 mm, intrusion 40 mm	4
	39.40	C3 D	Sewer Deformed, 20 %, Changed	5
	40.80	S4 B	Sewer Broken, from 05 to 07 o'clock, Start	4
	45.50	F4 B	Sewer Broken, from 05 to 07 o'clock, Finish	4
	45.50	C3 D	Sewer Deformed, 05 %, Changed	5
	51.80	CXI	Connection defective, at 09 o'clock, dia 150 mm, intrusion 150 mm	4





## Inspection report

Date: <b>15/02/2010</b>	Job nr.: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>1</b>	PLR: <b>INLET X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

1:403	position	code	observation	grade
	<u>51.80</u>	CXI	Connection defective, at 09 o'clock, dia 150 mm, intrusion 150 mm	4
	<u>53.10</u>	<b>F3</b>	<b>D</b> Sewer Deformed, 05 %, Finish	5
	<u>53.10</u>	<b>F2</b>	<b>FM</b> Multiple Fractures from 06 to 06 o'clock, Finish	4
	<u>53.10</u>	GO	General Observation, Remark: TRASH SCREEN	0
	<u>53.10</u>	MH	Manhole Remark: INLET	0
	<u>53.10</u>	FH	Finish Survey	0

**INLET**

**Depth: 0.0**

### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>15/02/2010</b>	section number: <b>1</b>	PLR: <b>INLET X</b>
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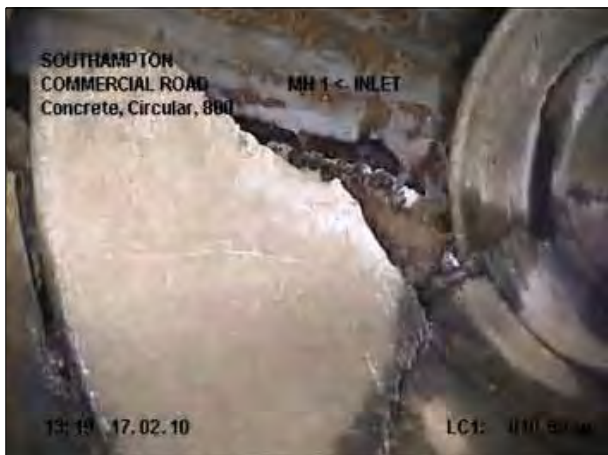


Photo: 10\_8a, Tape No.: 1  
10.6m, Sewer Broken, from 07 to 10 o'clock



Photo: 11\_9a, Tape No.: 1  
10.6m, General Observation, Remark: REPAIR MADE



Photo: 14\_12a, Tape No.: 1  
13m, Connection, at 10 o'clock, dia 150 mm, intrusion 80 mm



Photo: 15\_13a, Tape No.: 1  
13.5m, Mass Roots 10 % cross-sectional area loss

### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>15/02/2010</b>	section number: <b>1</b>	PLR: <b>INLET X</b>
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Photo: 16\_14a, Tape No.: 1  
22m, Mass Roots 10 % cross-sectional area loss



Photo: 17\_15a, Tape No.: 1  
24.2m, Connection, at 02 o'clock, dia 225 mm, intrusion 100 mm



Photo: 18\_16a, Tape No.: 1  
28.9m, Connection, at 09 o'clock, dia 150 mm, intrusion 40 mm



Photo: 21\_18a, Tape No.: 1  
40.8m, Sewer Broken, from 05 to 07 o'clock, Start

**Inspection photos**

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>15/02/2010</b>	section number: <b>1</b>	PLR: <b>INLET X</b>
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Photo: 24\_21a, Tape No.: 1  
51.8m, Connection defective, at 09 o'clock, dia 150 mm,  
intrusion  
150 mm





## Inspection report

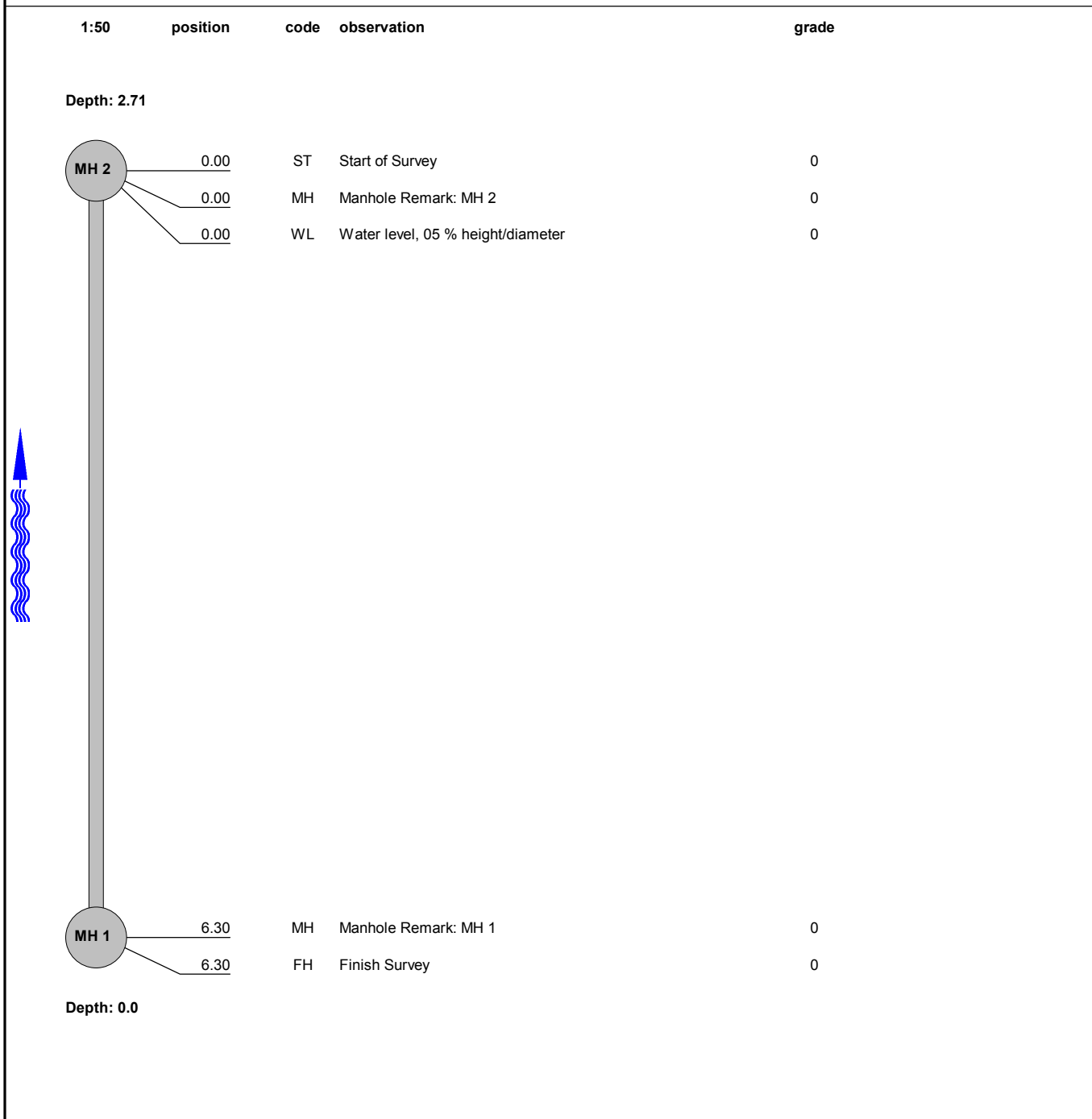
Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>2</b>	PLR: <b>MH 1 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 2</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 1</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>6.3 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:

Location details: **MH IN CAR PARK OF SKANDIA BUILDING**





# Inspection report

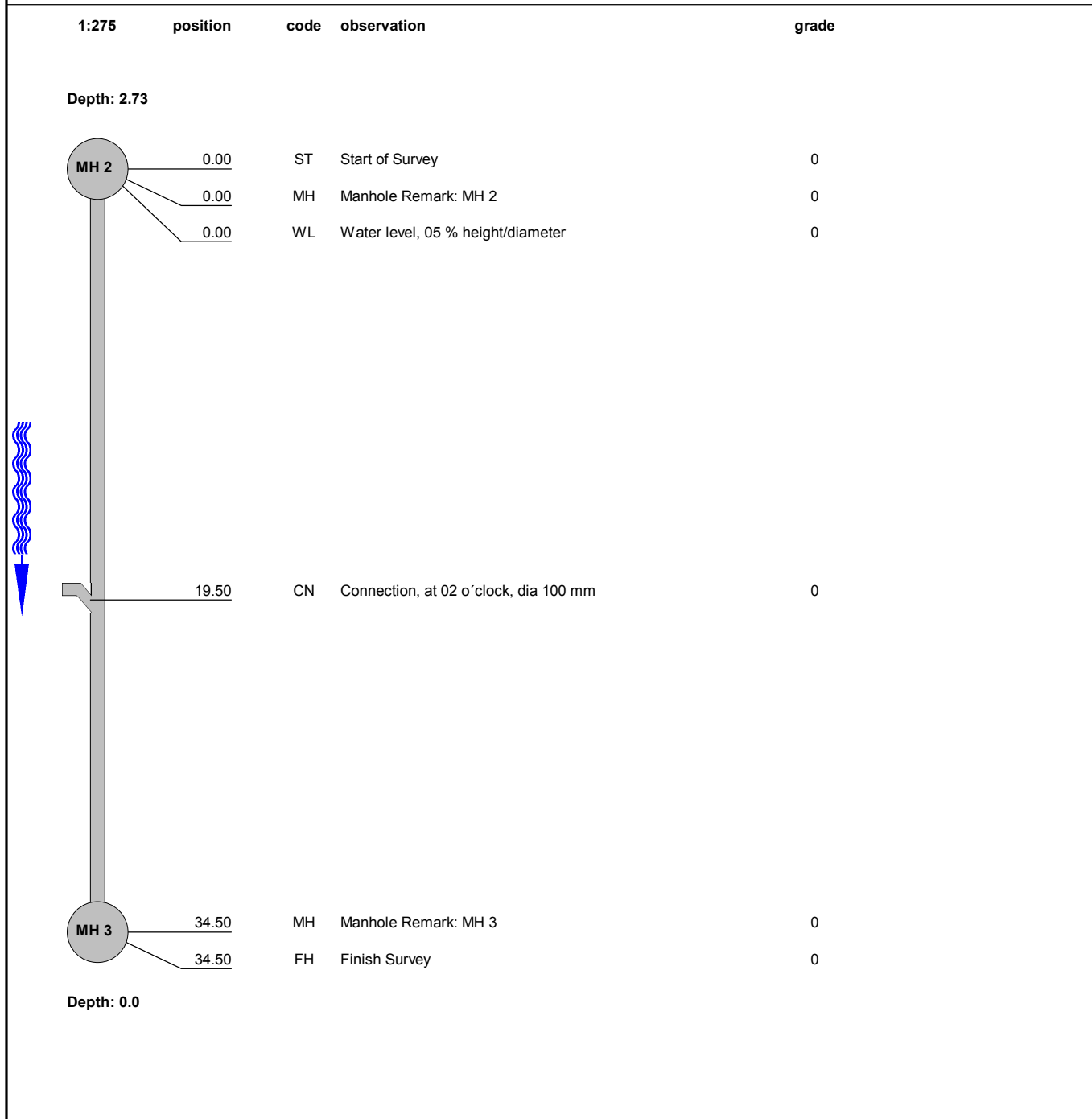
Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>3</b>	PLR: <b>MH 2 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 2</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 3</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>34.5 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:

Location details: **MH IN CAR PARK OF SKANDIA BUILDING**



# Inspection report

Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>4</b>	PLR: <b>MH 3 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 3</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 4</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>46.3 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH ON VERGE IN CAR PARK OF SKANDIA BUILDING**

1:350	position	code	observation	grade
<b>Depth: 0.0</b>				
	0.00	ST	Start of Survey	0
	0.00	MH	Manhole Remark: MH 3	0
	0.00	WL	Water level, 05 % height/diameter	0
	0.00	MC	Sewer Material changes at this point, Brick	0
	0.70	LL	Line of Sewer deviates left, Remark: SHARPLY	0
	2.20	WL	Water level, 20 % height/diameter	0
	3.70	OB	Obstruction, 30 % height/diameter loss	2
	6.90	S1 DE	Debris, 30 % cross-sectional area loss, Start	1
	12.90	H	Hole in sewer from 01 to 02 o'clock	4
	16.90	CNI	Connection, at 11 o'clock, dia 225 mm, intrusion 200 mm	4
	24.80	CNI	Connection, at 11 o'clock, dia 150 mm, intrusion 100 mm	4
	31.90	CN	Connection, at 12 o'clock, dia 150 mm	0
	44.50	CNI	Connection, at 08 o'clock, dia 225 mm, intrusion 80 mm	4
	46.30	F1 DE	Debris, 30 % cross-sectional area loss, Finish	1
	46.30	MH	Manhole Remark: MH 4	0
46.30	FH	Finish Survey	0	
<b>Depth: 0.0</b>				

3.7 m //

12.9 m //

24.8 m //

44.5 m //

### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>15/02/2010</b>	section number: <b>4</b>	PLR: <b>MH 3 X</b>
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Photo: 47\_7a, Tape No.: 1  
3.7m, Obstruction, 30 % height/diameter loss



Photo: 49\_9a, Tape No.: 1  
12.9m, Hole in sewer from 01 to 02 o'clock



Photo: 51\_11a, Tape No.: 1  
24.8m, Connection, at 11 o'clock, dia 150 mm, intrusion 100 mm



Photo: 53\_13a, Tape No.: 1  
44.5m, Connection, at 08 o'clock, dia 225 mm, intrusion 80 mm



# Inspection report

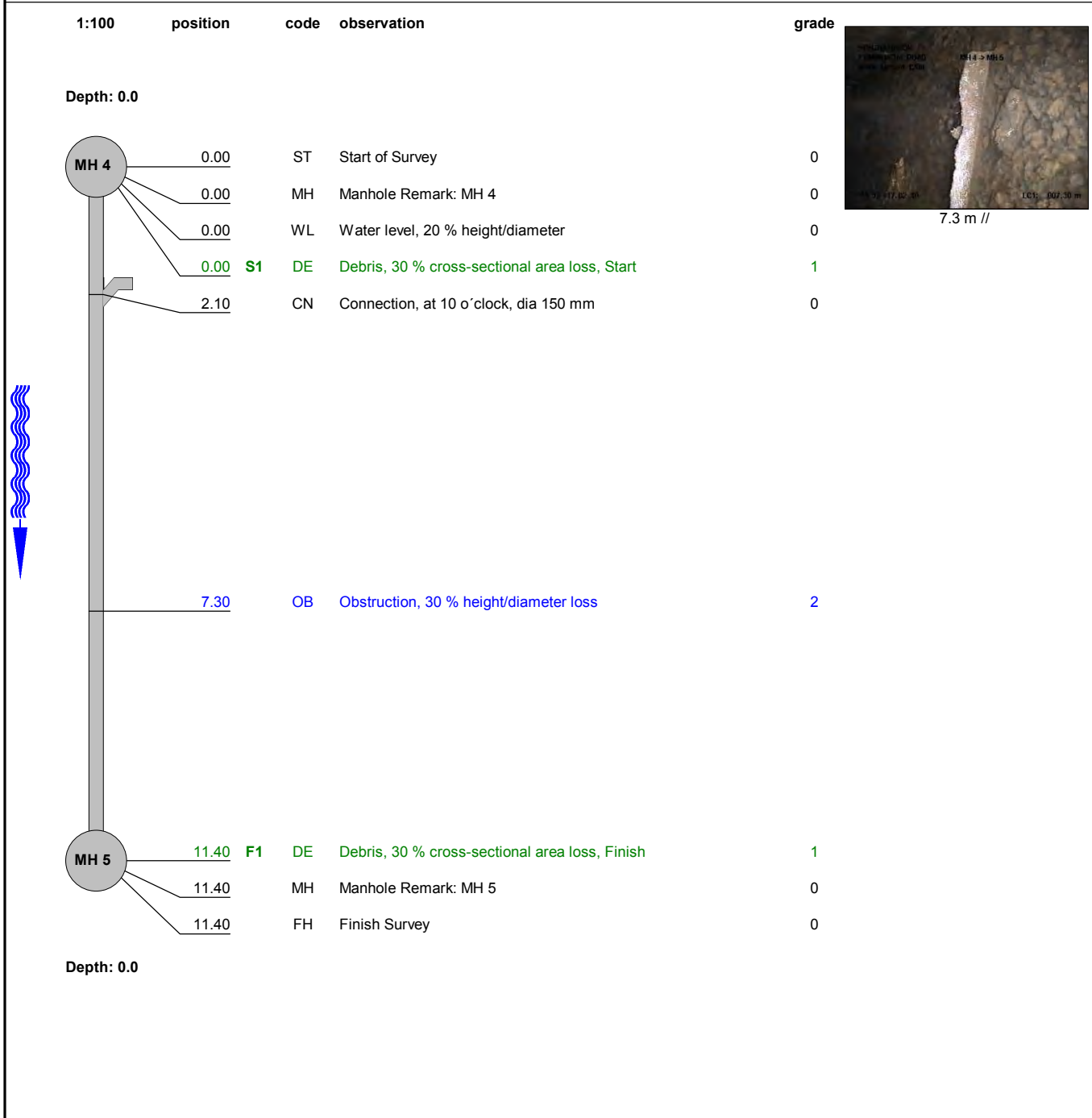
Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>5</b>	PLR: <b>MH 4 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 4</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 5</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>11.4 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Arched 1200/1200</b>
Use: <b>Watercourse</b>	Material: <b>Brick Pipe length: Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:

Location details: **MH IN MIDDLE OF ROAD**





### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>15/02/2010</b>	section number: <b>5</b>	PLR: <b>MH 4 X</b>
------------------------------	---------------------------------	----------------------------	-----------------------------	-----------------------



Photo: 62\_6a, Tape No.: 1  
7.3m, Obstruction, 30 % height/diameter loss



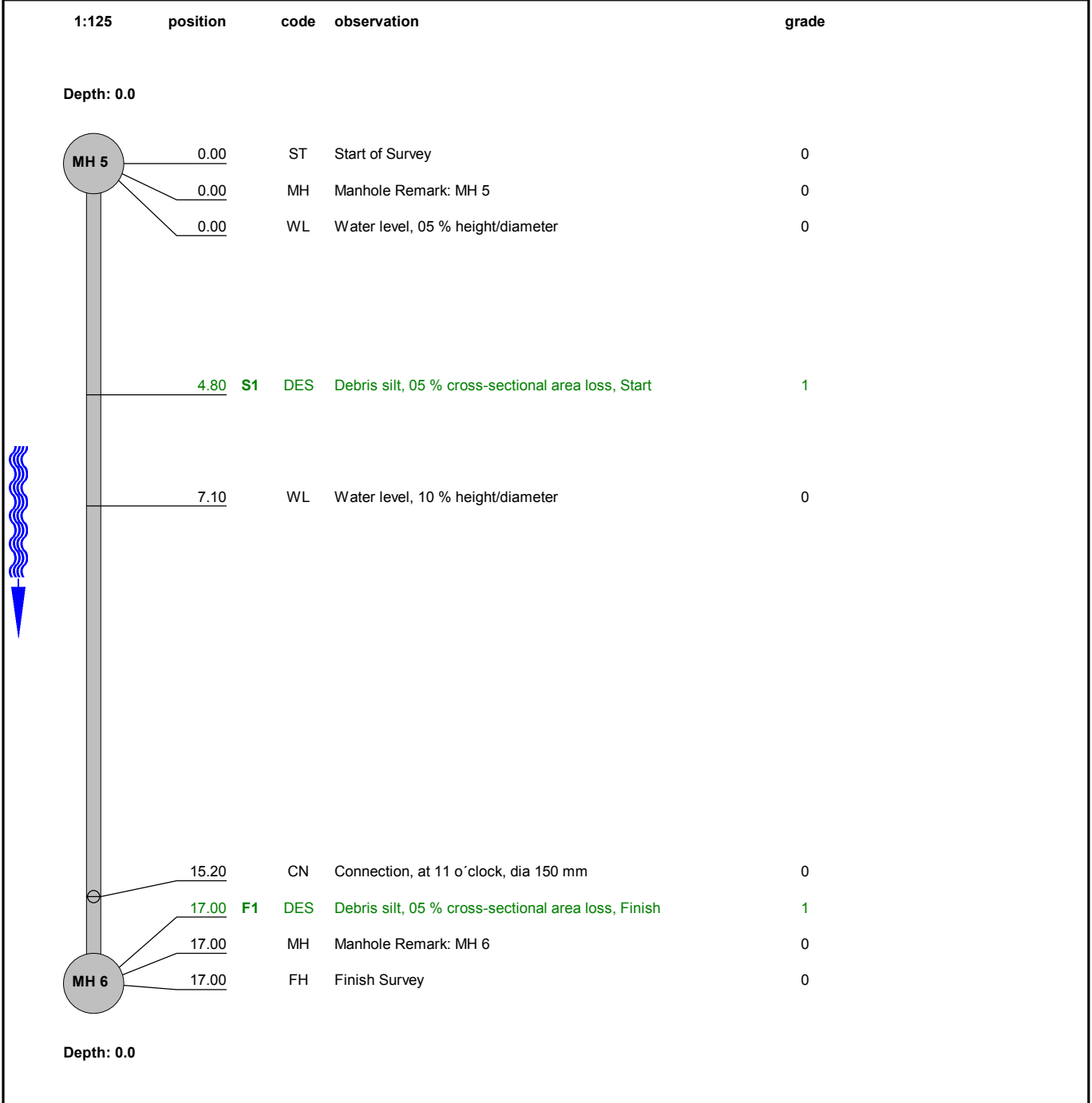
# Inspection report

Date: <b>15/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>6</b>	PLR: <b>MH 5 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 5</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 6</b>
Location: <b>Footpath or verge</b>	Tape No.: <b>1</b>	Total length: <b>17 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH ON VERGE**





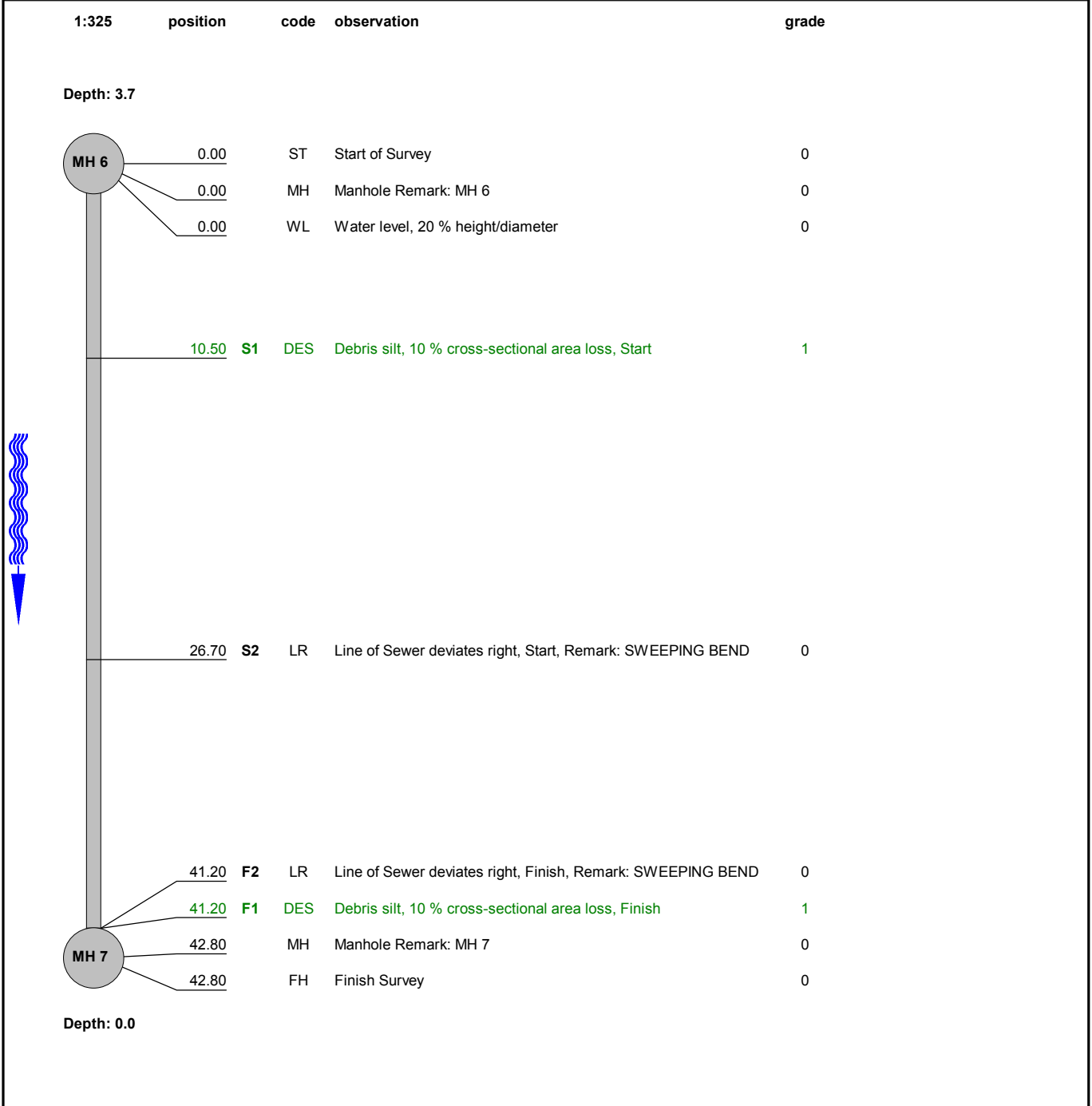
# Inspection report

Date: <b>16/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>7</b>	PLR: <b>MH 6 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 6</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 7</b>
Location: <b>Footpath or verge</b>	Tape No.: <b>1</b>	Total length: <b>42.8 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH ON RAISED FLOWER BEDS BESIDE FOOTPATH**





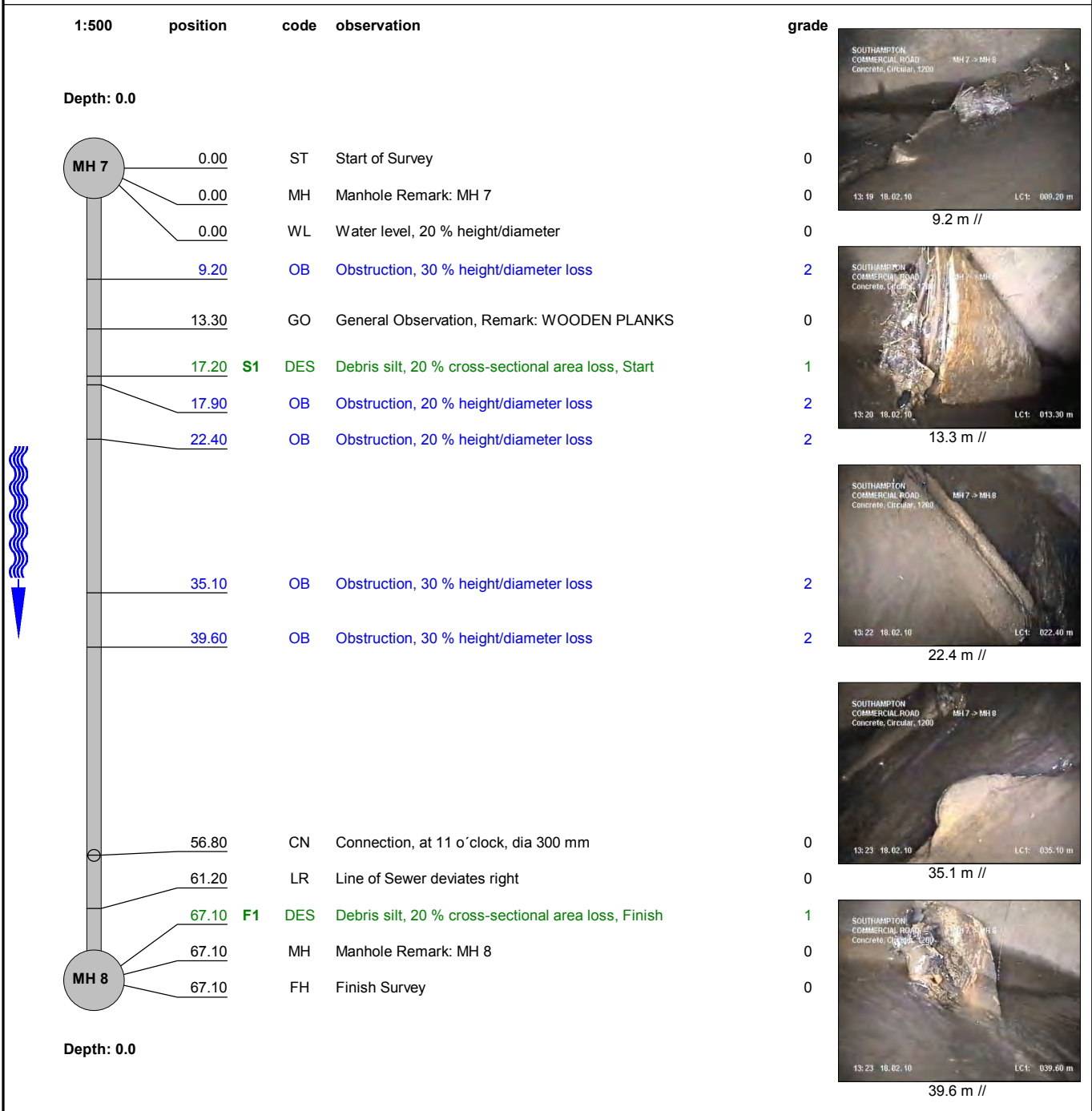
# Inspection report

Date: <b>16/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>8</b>	PLR: <b>MH 7 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 7</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 8</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>67.1 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH LOCATED IN MIDDLE OF WYNDHAM PLACE ROAD**



### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>16/02/2010</b>	section number: <b>8</b>	PLR: <b>MH 7 X</b>
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Photo: 88\_4a, Tape No.: 1  
9.2m, Obstruction, 30 % height/diameter loss



Photo: 89\_5a, Tape No.: 1  
13.3m, General Observation, Remark: WOODEN PLANKS



Photo: 92\_8a, Tape No.: 1  
22.4m, Obstruction, 20 % height/diameter loss



Photo: 93\_9a, Tape No.: 1  
35.1m, Obstruction, 30 % height/diameter loss



### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>16/02/2010</b>	section number: <b>8</b>	PLR: <b>MH 7 X</b>
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Photo: 94\_10a, Tape No.: 1  
39.6m, Obstruction, 30 % height/diameter loss



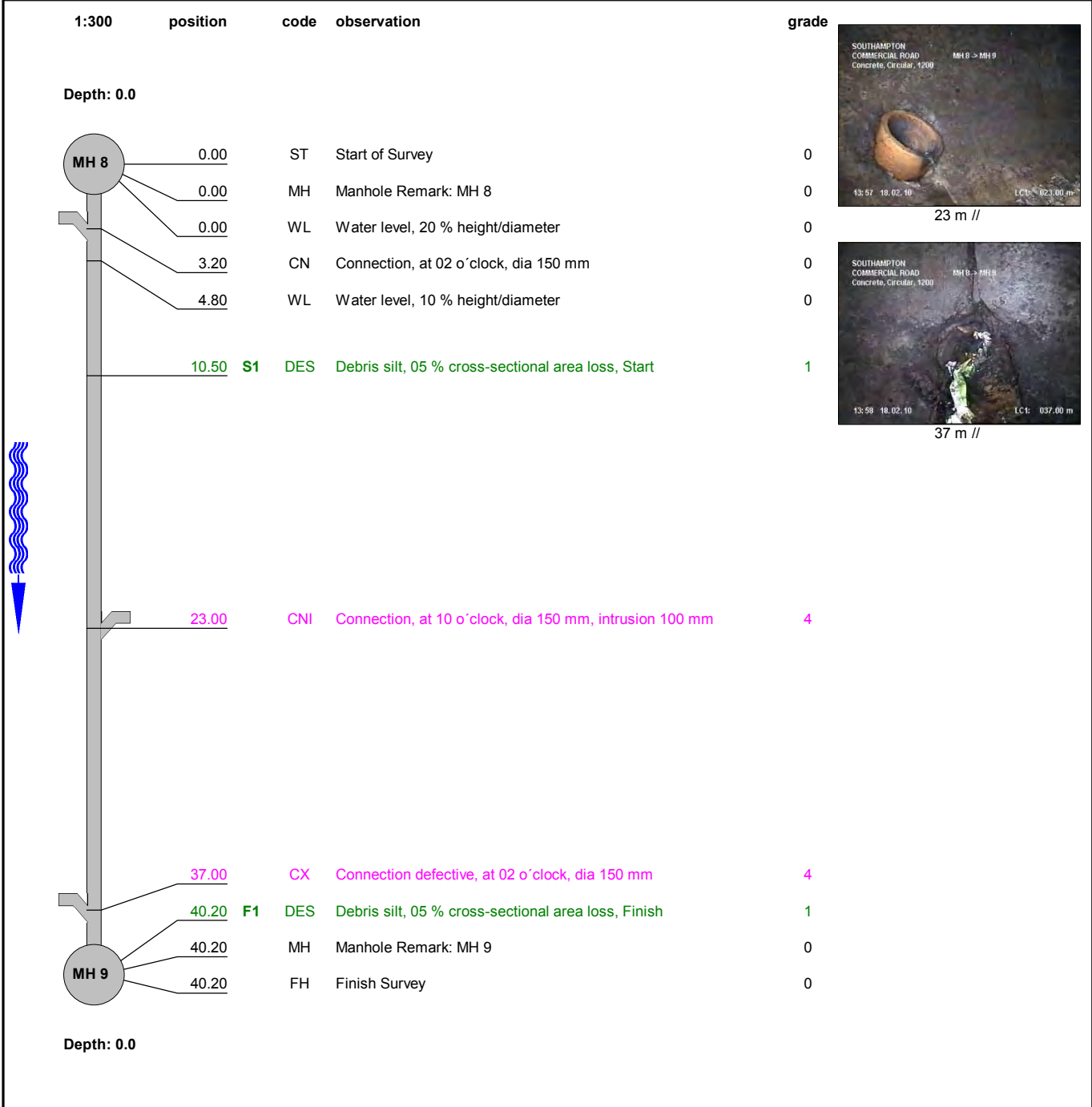
# Inspection report

Date: <b>16/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>9</b>	PLR: <b>MH 8 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>COMMERCIAL ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 8</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 9</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>40.2 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 1200</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH IN MIDDLE OF ROAD**



### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>COMMERCIAL ROAD</b>	Date: <b>16/02/2010</b>	section number: <b>9</b>	PLR: <b>MH 8 X</b>
------------------------------	---------------------------------	----------------------------	-----------------------------	-----------------------



Photo: 106\_7a, Tape No.: 1  
23m, Connection, at 10 o'clock, dia 150 mm, intrusion 100 mm



Photo: 107\_8a, Tape No.: 1  
37m, Connection defective, at 02 o'clock, dia 150 mm



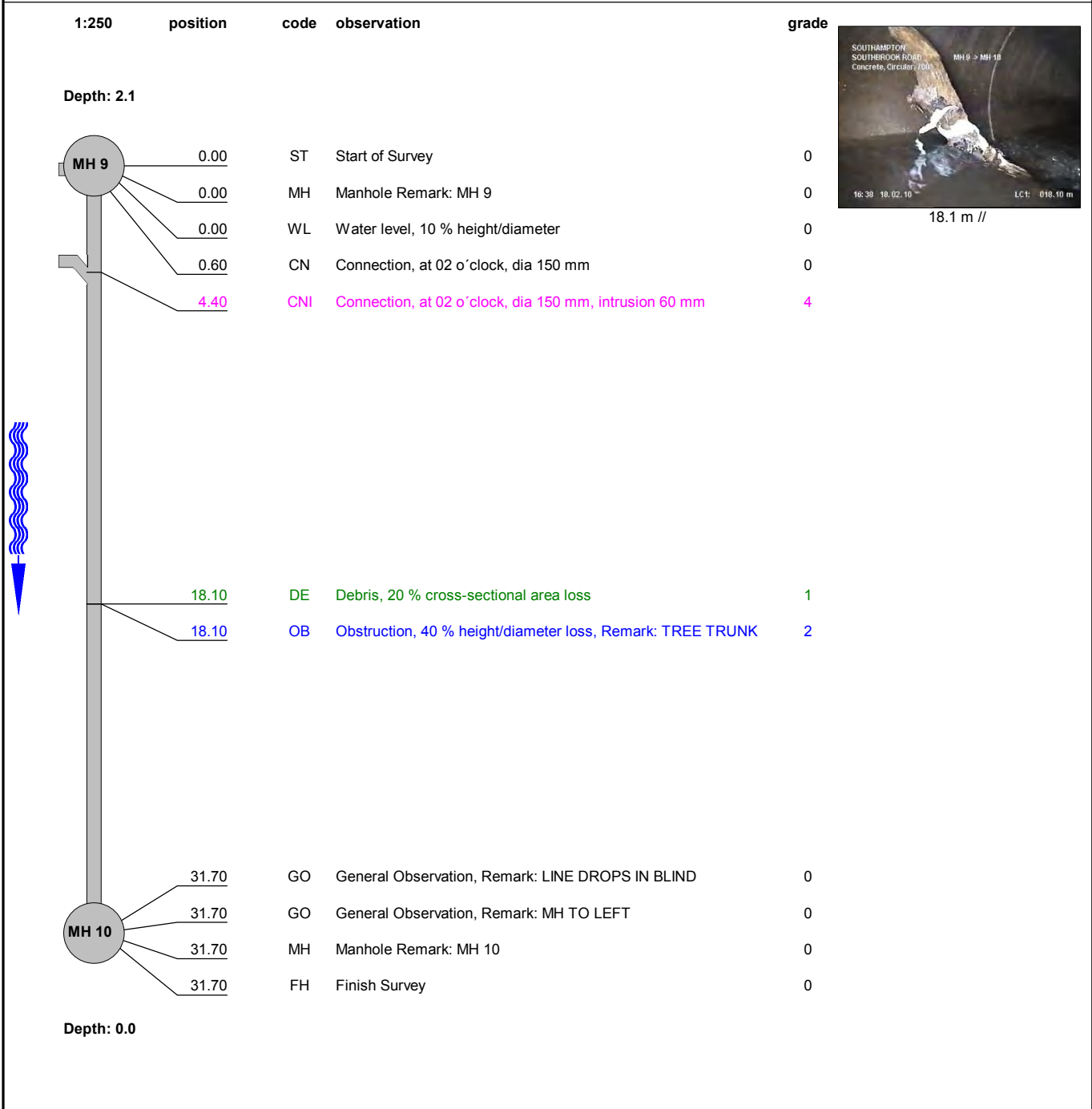
# Inspection report

Date: <b>16/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>10</b>	PLR: <b>MH 9 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>SOUTHBROOK ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 9</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 10</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>31.7 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Circular 700</b>
Use: <b>Watercourse</b>	Material: <b>Concrete</b> Pipe length: <b>Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **MH IN ROAD OPPOSITE JUNCTION**



**Inspection photos**

Place: <b>SOUTHAMPTON</b>	Road: <b>SOUTHBROOK ROAD</b>	Date: <b>16/02/2010</b>	section number: <b>10</b>	PLR: <b>MH 9 X</b>
------------------------------	---------------------------------	----------------------------	------------------------------	-----------------------



Photo: 117\_7a, Tape No.: 1  
18.1m, Obstruction, 40 % height/diameter loss, Remark: TREE  
TRUNK

# Inspection report

Date: <b>17/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>11</b>	PLR: <b>MH 10 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

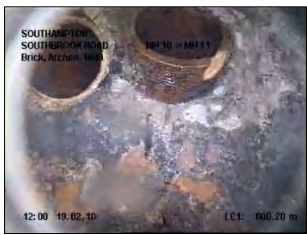
Road: <b>SOUTHBROOK ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 10</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 11</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>37.4 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Arched 1000/900</b>
Use: <b>Watercourse</b>	Material: <b>Brick Pipe length: Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:

Location details: **MH IN ROAD OUTSIDE STATION**

1:275	position	code	observation	grade
<b>Depth: 1.7</b>				
	0.00	ST	Start of Survey	0
	0.00	MH	Manhole Remark: MH 10	0
	0.00	WL	Water level, 20 % height/diameter	0
	0.10	CN	Connection, at 09 o'clock, dia 700 mm, Remark: COMES FROM MH 9	0
	0.10	GO	General Observation, Remark: THIS CONNECTION IS WHERE MH 9 CONNECTS	0
	0.20	CNI	Connection, at 01 o'clock, dia 150 mm, intrusion 100 mm	4
	0.20	CN	Connection, at 01 o'clock, dia 150 mm	0
	0.80	CN	Connection, at 09 o'clock, dia 700 mm, Remark: OVERFLOW PIPE FROM MH 9	0
	0.90	GP	General Condition photograph, Remark: SERVICE PIPE PASSING THROUGH	0
	0.90	GO	General Observation, Remark: UNCHARTED CHAMBER	0
	3.90	MC	Sewer Material changes at this point, Concrete	0
	3.90	DC	Dimension of sewer changes, new dimension dia 700 mm	0
	3.90	WL	Water level, 05 % height/diameter	0
	3.90	SC	Sewer shape changes at this point, Remark: CHANGES TO CIRCULAR	0
	11.90	CNI	Connection, at 09 o'clock, dia 350 mm, intrusion 50 mm	4
	13.50	CNI	Connection, at 12 o'clock, dia 100 mm, intrusion 150 mm	4
	23.20	CNI	Connection, at 10 o'clock, dia 150 mm, intrusion 100 mm	4
	24.50	CNI	Connection, at 12 o'clock, dia 100 mm, intrusion 40 mm	4
	32.60	MC	Sewer Material changes at this point, Brick	0
	32.60	SC	Sewer shape changes at this point, Remark: CHANGES TO ARCHED	0
	32.60	GO	General Observation, Remark: PIPE SIZE CHANGES TO 1000 X 900	0
	36.80	CNI	Connection, at 09 o'clock, dia 150 mm, intrusion 80 mm	4
	37.40	MH	Manhole Remark: MH 11	0
	37.40	FH	Finish Survey	0
<b>Depth: 0.0</b>				





### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>SOUTHBROOK ROAD</b>	Date: <b>17/02/2010</b>	section number: <b>11</b>	PLR: <b>MH 10 X</b>
------------------------------	---------------------------------	----------------------------	------------------------------	------------------------



Photo: 128\_6a, Tape No.: 1  
0.2m, Connection, at 01 o'clock, dia 150 mm, intrusion 100 mm



Photo: 131\_9a, Tape No.: 1  
0.9m, General Condition photograph, Remark: SERVICE PIPE PASSING THROUGH



Photo: 131\_9b, Tape No.: 1  
0.9m, General Condition photograph, Remark: SERVICE PIPE PASSING THROUGH



Photo: 11\_15a, Tape No.: 1  
11.9m, Connection, at 09 o'clock, dia 350 mm, intrusion 50 mm

### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>SOUTHBROOK ROAD</b>	Date: <b>17/02/2010</b>	section number: <b>11</b>	PLR: <b>MH 10 X</b>
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Photo: 11\_16a, Tape No.: 1  
13.5m, Connection, at 12 o'clock, dia 100 mm, intrusion 150 mm

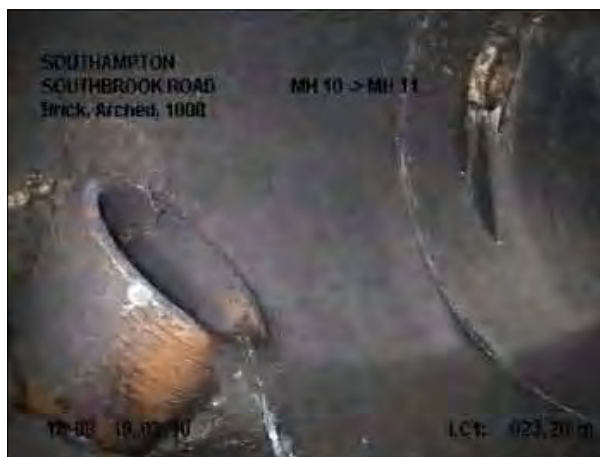


Photo: 11\_17a, Tape No.: 1  
23.2m, Connection, at 10 o'clock, dia 150 mm, intrusion 100 mm



Photo: 11\_18a, Tape No.: 1  
24.5m, Connection, at 12 o'clock, dia 100 mm, intrusion 40 mm



Photo: 146\_22a, Tape No.: 1  
36.8m, Connection, at 09 o'clock, dia 150 mm, intrusion 80 mm

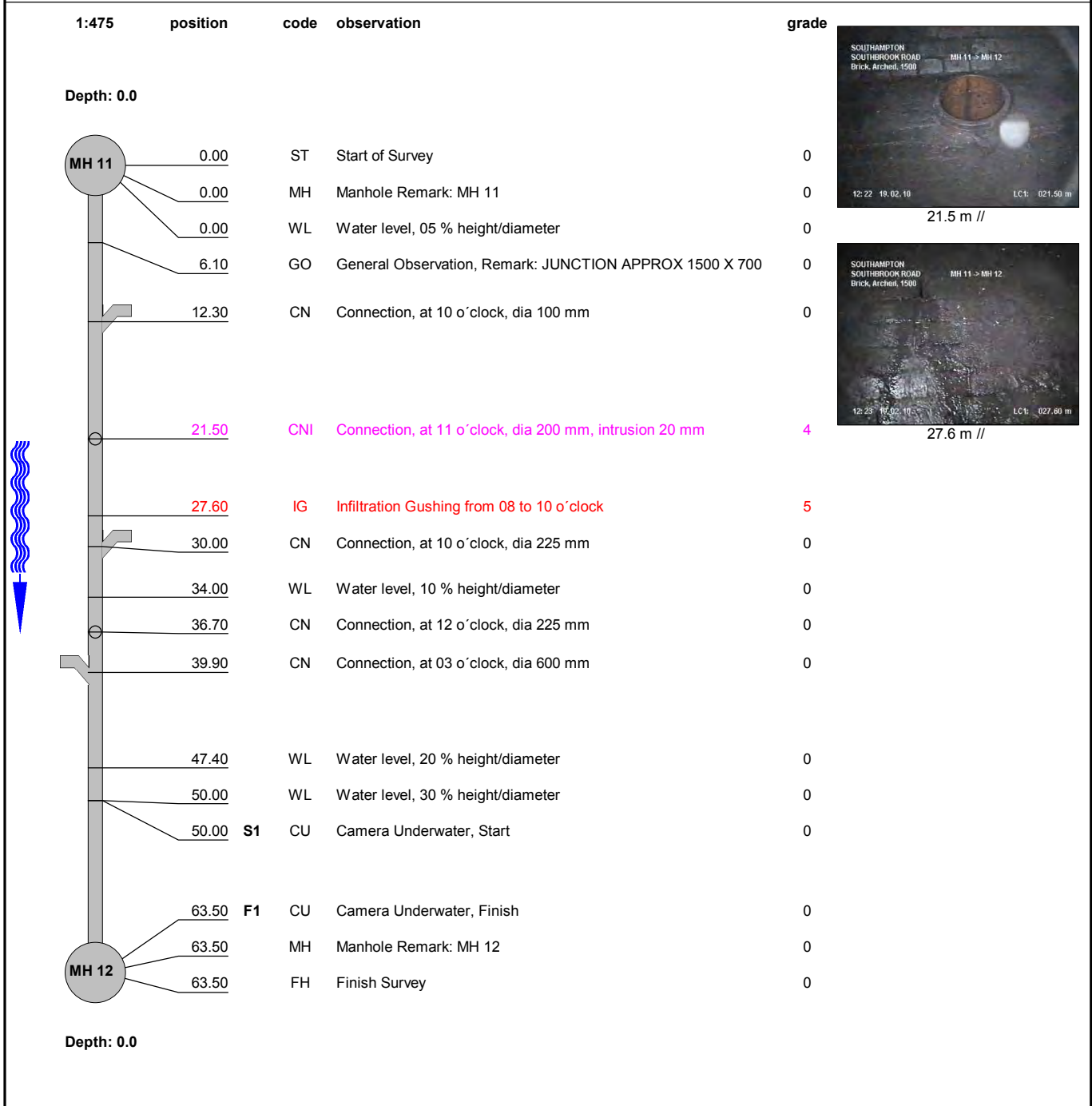
# Inspection report

Date: <b>17/02/2010</b>	Job N°: <b>SSD H35</b>	Weather: <b>Dry</b>	Operator: <b>365ES-GB</b>	section number: <b>12</b>	PLR: <b>MH 11 X</b>
Present:	Vehicle: <b>3138</b>	Camera: <b>ORPHEUS</b>	Preset:	Cleaned: <b>No</b>	Grade:

Road: <b>SOUTHBROOK ROAD</b>	Division: <b>Z</b>	start MH: <b>MH 11</b>
Place: <b>SOUTHAMPTON</b>	District: <b>Z</b>	end MH: <b>MH 12</b>
Location: <b>Light road</b>	Tape No.: <b>1</b>	Total length: <b>63.5 m</b>

Purpose: <b>Asset condition</b>	Size/Shape: <b>Arched 1500/1000</b>
Use: <b>Watercourse</b>	Material: <b>Brick Pipe length: Z</b>
Catchment: <b>Z</b>	Lining:
	Category: <b>Z</b>

Comment:  
Location details: **UTL IN TRAIN STATION**



### Inspection photos

Place: <b>SOUTHAMPTON</b>	Road: <b>SOUTHBROOK ROAD</b>	Date: <b>17/02/2010</b>	section number: <b>12</b>	PLR: <b>MH 11 X</b>
------------------------------	---------------------------------	----------------------------	------------------------------	------------------------



Photo: 157\_6a, Tape No.: 1  
21.5m, Connection, at 11 o'clock, dia 200 mm, intrusion 20 mm



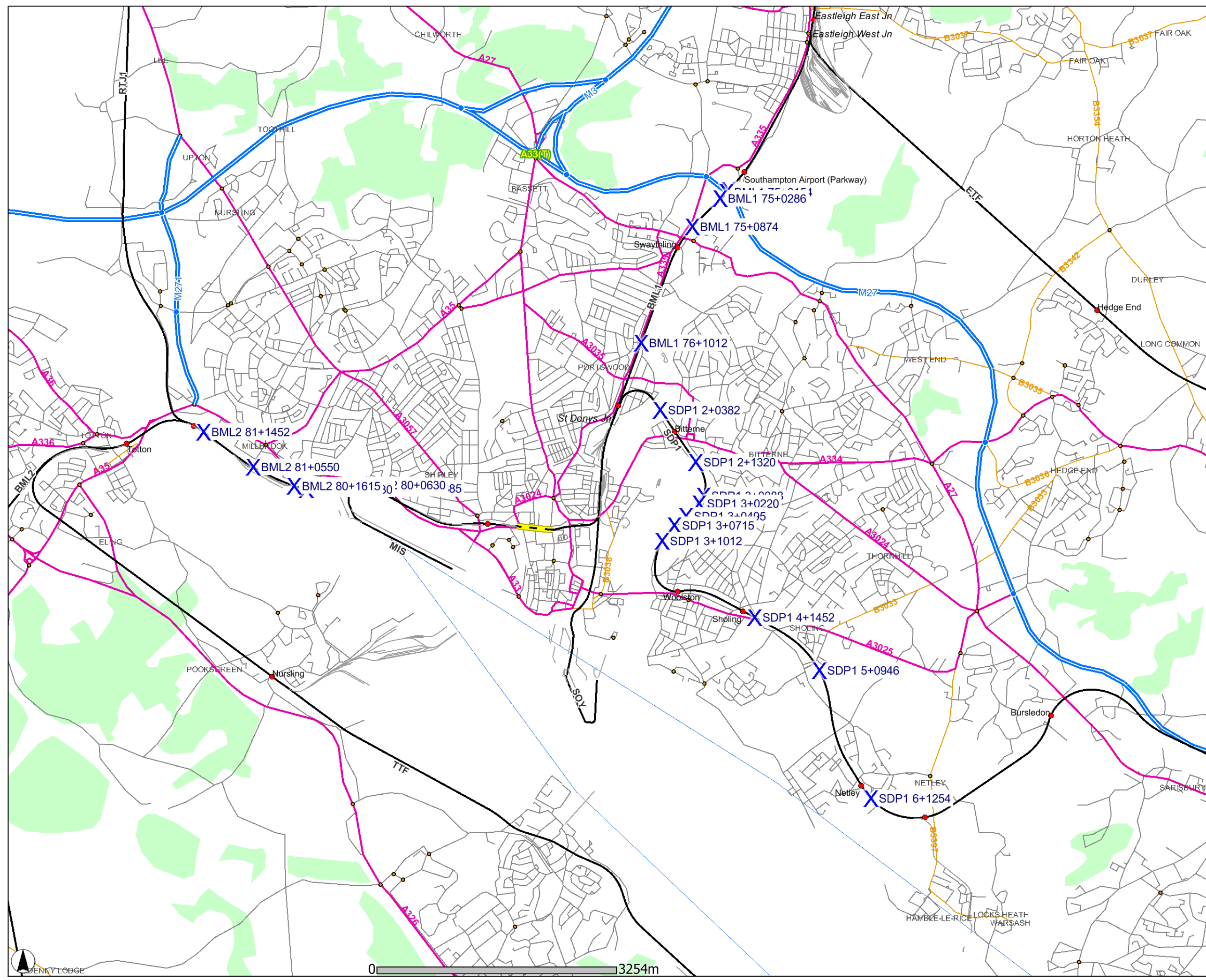
Photo: 158\_7a, Tape No.: 1  
27.6m, Infiltration Gushing from 08 to 10 o'clock

A5 NETWORK RAIL (NR)

A5 NETWORK RAIL (NR)

## Culverts Within City of Southampton Boundary

Stoneham (M27 - Dept Of Transport) Overbridge E1/202c	SU44571667	BML1	75.0114	
Pipe Culvert E1202ab	SU44501660	BML1	75.0154	Brick barrel 930mm Ø
Culvert E1/202b	SU44401650	BML1	75.0286	Brick barrel 890mm Ø
Swaythling Farm (Over Monk's Brook) Underbridge E1/203	SU44101619	BML1	75.0874	Brick arch 4.5m wide x 4.1m high
Public Sewer Culvert (Built On) E1/206b	SU43401460	BML1	76.1012	Conc barrel 1.5x1.2m
Culvert E2/8a	SU39801260	BML2	80.0385	CI / Conc barrel 900 / 1200mm Ø
Culvert E2/8b	SU39501270	BML2	80.0630	Conc barrel 900mm Ø
Culvert (Shirley Sewer) E2/9a	SU38801260	BML2	80.1430	?? 500mm Ø
Tanner's Brook Underbridge E2/10	SU38691269	BML2	80.1615	Conc/steel decking on brick abutments ??
Millbrook Surface Outfall (Luggy Creek) Underbridge E2/10a	SU38101300	BML2	81.0550	Not found on site. Land adjacent to railway has been developed, enclosing the culvert end.
River Itchen E15/2	SU43671370	SDP1	2.0382	Wrought Iron girders, timber deck on brick abutments 34.90m span x 22.15m width x 5.18m high
Pipe Culvert E15/X4a	SU44201290	SDP1	2.1320	Cast In-Situ Reinforced Concrete ??
Culvert E15/4a (Southampton County Council)	SU44251255	SDP1	3.0088	Brick 800mm Ø
Culvert (457mm Diam Drain) E15/4aa	SU44101240	SDP1	3.0220	Cast In-Situ Reinforced Concrete ??
Culvert E15/4ab	SU44001220	SDP1	3.0495	Not Found on site
Culvert E15/4ac Su43901220	SU43901220	SDP1	3.0715	Concrete Pipe 460mm Ø
Culvert (Feeds River Itchen) E15/4b (Southampton County Council)	SU43801210	SDP1	3.1012	Concrete Pipe 440mm Ø
Itchen Ferry Road E15/6	SU43601145	SDP1	3.1557	Steel Girders on brick abutments 8.18m Spam x 8.53m wifth x 4.55m high
Skew Culvert (Under Spring Road) E15/11a	SU44901080	SDP1	4.1452	Brick Arch 2.44m wide x 1.44m high



**SOUTHAMPTON SWRA**  
Culverts Under Network Rail Land

Plot Scale	1:50000
Plot Date	26/7/2010





# Southampton City Highway & Storm Water Systems Stakeholder's Meeting

25<sup>th</sup> September 2008

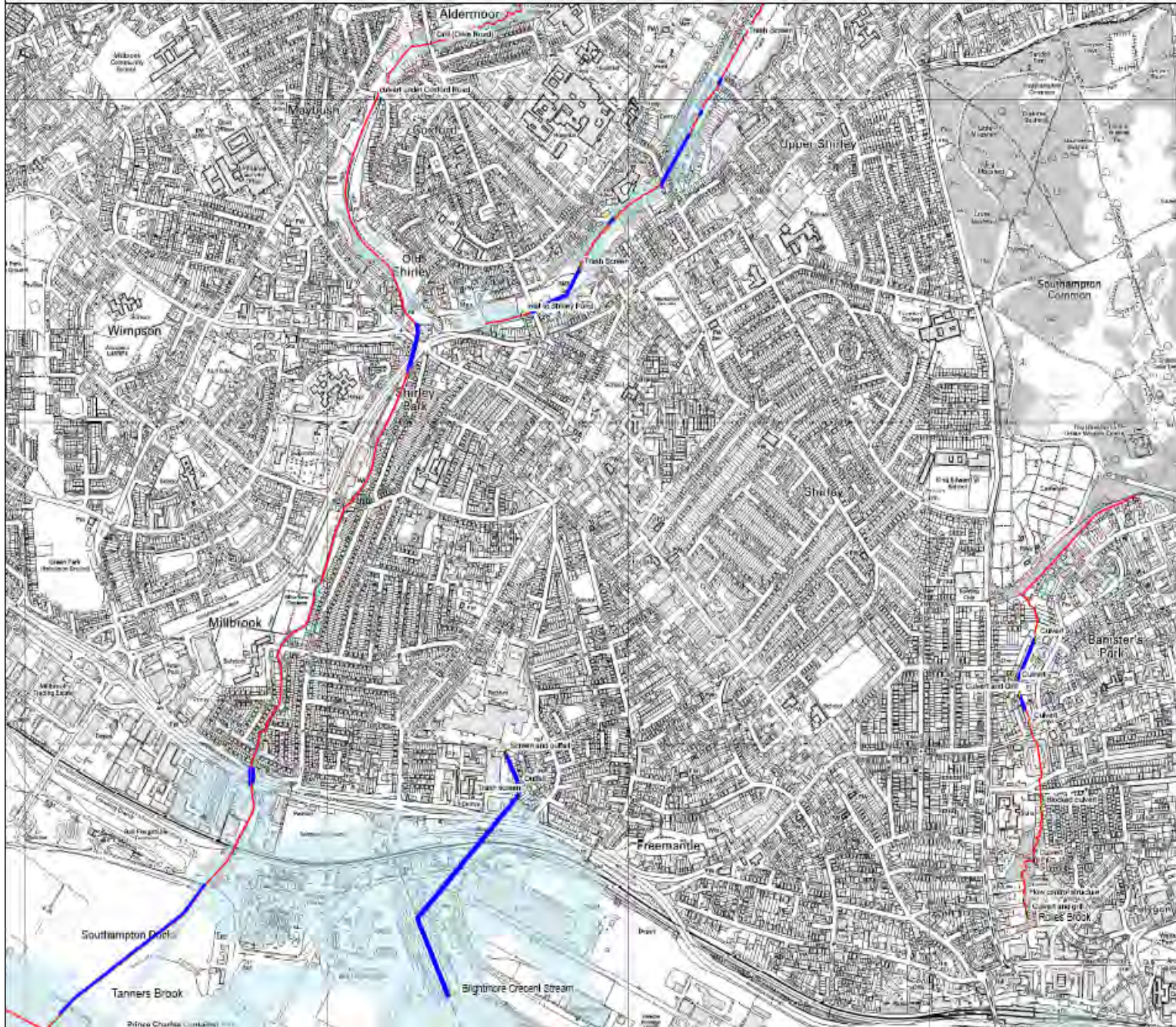


# Agenda




- Introduction
- Follow Up Actions By Stakeholders Post 25th June 2008
  - West Quay Culvert & 101 Berth Pump
  - Millbrook Culvert & Dry Dock Pump
  - Millbrook Surface Water Outflow/Tanners Brook Ditch Clearance
  - Gully Clearance Regime
- Flood Issues in Southampton 05th September 2008
- Communications – Future Contact
- Flood Plan Update
- Strategic Flood Group
- Any Other Business

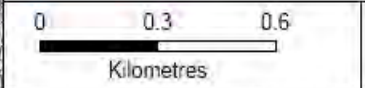
# Introduction

# Southampton - Tanners Brook, Blightmore Crecent & Rolles Brook

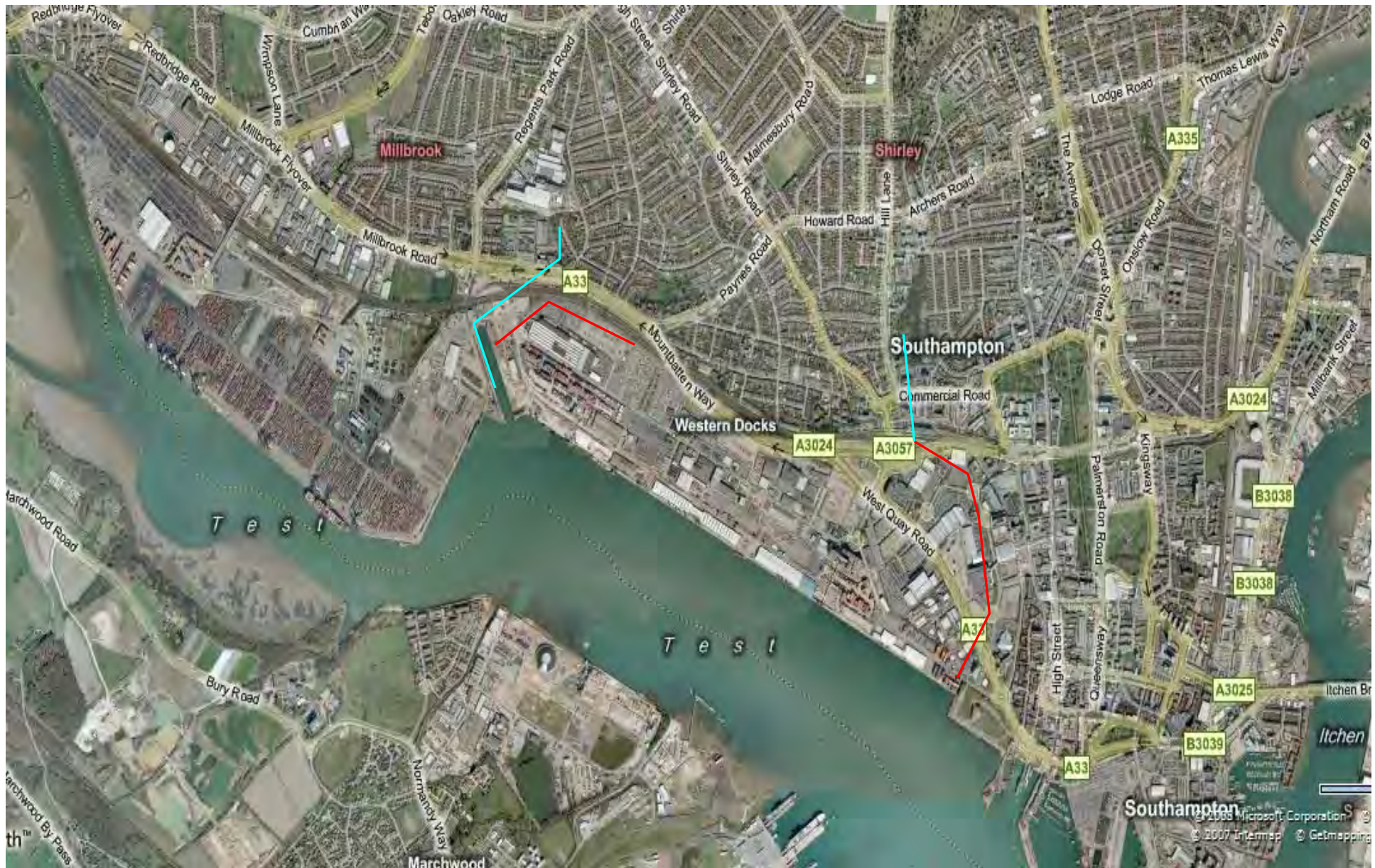


## Legend

-  Classified channel
-  Overbank (1974)
-  Flow zone (1974)



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# Culvert Locations & EA Identified Culvert Water Course





Pump Locations?



# West Quay Culvert

## 26 May 2008 Bank Holiday Monday

- **06.30am** – Southampton City Council out of hours standby receive phone call that Millbrook Road East/Western Esplanade beginning to flood and road closures will be required. SCC close: Southern Road, Civic Centre Road and Mountbatten Way
- **07:32am** – Network Rail receive first call indicating waters rising in the station area
- **08:30am** – Southampton Central Station closed
- **08:35am** – Flooding reported on level 1 of MSCP
- **08:39am** – Level 1 of MSCP closed
- **08:50am** – Drain doctor call out declined by DM for MSCP as rain easing
- **11:00am** – 3 ABP pumps turned on after alarm
- **11:05am** – MSCP partially re-opens
- **12:30pm** – 3 ABP pumps turned off
- **12:35pm** – MSCP fully opened and fully operational
- **13:15pm** – 2 ABP pumps turned on (1&3) again after further alarm
- **13:45pm** – ABP pump 3 turned off
- **14:00pm** – ABP Pump 2 turned on
- **14:45pm** – ABP pumps 1 & 2 turned off
- **16:30pm** – Southampton Central Station re-opens for business
- **19:15pm** – 2 ABP pumps (1&2) turned on again after alarm
- **20:15pm** – 2 ABP pumps turned off.

## Millbrook Culvert

### **26 May 2008 Bank Holiday Monday**

- **04:00am** – Southampton City Council out of hours standby receive phone call about carriageway flooding at junction of Paynes Road and Millbrook West, situation being monitored by the police. Contact attempted with ABP to turn pumps on.
- **04:15am** – 2 ABP Pumps turned on (F&G)
- **04:45am** – Another ABP pump turned on (B)
- **06:30am** – Millbrook Road West situation deteriorating SCC close Waterhouse lane, Regents Park Road and Paynes Road for the police.
- **08:00am** – 1 ABP Pump turned off (B)
- **09:00am** – 1 ABP Pump turned on (B)
- **09:30am** – 1 ABP Pump turned off (B)
- **10:30am** – 1 ABP Pump turned on (B)
- **10:45am** – 2 ABP Pumps turned off (F&G)
- **11:15am** – 2 ABP Pumps turned on (F&G)
- **14:00am** – 2 ABP Pumps turned off (F&G)



# Millbrook Surface Water Outfall into Tanner's Brook

# Gulley Clearance Regime

# **Flooding Issues in Southampton 05<sup>th</sup> September 2008**

# Communications

# Communications – Network Rail

RAILWAY				
<b>Southampton Central Railway Station</b>	Bletchynnden Terrace Southampton SO15 1QJ	0845 504050 or [REDACTED] [REDACTED] (London Control)	Via British Transport Police	X 441323.4 Y 112166.6
<b>Network Rail Trackbeds and lineside equipment, traction current and signaling</b>	Wessex Integrated Control Centre Electrical Control Room (Eastleigh) Network Rail National Operations Centre Southampton Main Sub Station St. Denys TP Sub Station Northam Train Depot Radcliffe Road, SO140PH	[REDACTED]	(24hr emergency only) (Eastleigh 24hr emergency only)	SU 428121 SU 431137 X:442880.3 Y:112630.6
<b>Train Operating Companies</b>	Awaits South West trains Arriva Cross Country Southern EWS - Freightliner			

## Communications – Utilities Water

UTILITIES - WATER				
<b>Southern Water Portswood Wastewater Treatment Works</b>	Kent Road Portswood Southampton SO17 2LJ		Southern Water	SU 4347 1454
<b>Southern Water Woolston Wastewater Treatment works</b>	Victoria Road Woolston Southampton SO19 9EF		Southern Water	SU 4348 1036
<b>Southern Water Millbrook Sludge Treatment Centre</b>	Western Docks (Gate 10 or 20) Millbrook Southampton SO15 OHH		Southern Water	SU 3880 1250
<b>Southern Water Platform Road Wastewater Pumping Station</b>	Platform Road (opposite God's house gate in the old City wall) Southampton		Southern Water	SU 4210 1089

# Communications – ABP

ABP DRAINAGE PUMPING STATIONS				
Water Pumping station (drainage related)	Mayflower Park		Via ABP VTS Tower	X;441515.6 Y:111204.7
Water Pumping station (drainage related)	King George Dry Dock		Via ABP VTS Tower	X;439343.7 ?? Y:112361.3 ??

## Communications – Southampton City Council

<b>Action line:</b> 08:30 am - 5:00 pm Monday to Friday	<b>0800 5 19 19 19</b>	
<b>Emergency or out of hours:</b> 5pm - 8.30am	<b>023 8022 3344</b>	
<b>Emergency/Out of Hours:</b>		<b>NOT FOR PUBLIC USE</b>
<b>Standby Officer:</b>		<b>Extreme Circumstances</b>



# Communications – One Number?

# Flood Plan Update

# Strategic Flood Group

# **Any Other Business**



# Southampton City Highway & Storm Water Systems – Stakeholder’s Follow up & Feedback.

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## Introduction

Following the meeting held on Wednesday 25<sup>th</sup> June a period of information gathering and collating has been occurring into which you have all fed various bits of information. The following is a publication of all the information received from the various stakeholders’. I believe there is still information that can be added to this report to further illuminate and help resolve city drainage issues and I know that some work is still ongoing by



individuals and their contractors within their areas, which will hopefully be fed to the group as the results become available.

## **West Quay Culvert – Appendix 1**

26 May 2008 Bank Holiday Monday

**06:30am** – Southampton City Council out of hours standby receive phone call that Millbrook Road East/Western Esplanade beginning to flood and road closures will be required. SCC close: Southern Road, Civic Centre Road and Mountbatten Way

**07:32am** – Network Rail receive first call indicating waters rising in the station area

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**16:30pm** – Southampton Central Station re-opens for business

**19:15pm** – 2 ABP pumps (1&2) turned on again after alarm

**20:15pm** – 2 ABP pumps turned off.

## **Millbrook Culvert – Appendix 2**

26 May 2008 Bank Holiday Monday

**04:00am** – Southampton City Council out of hours standby receive phone call about carriageway flooding at junction of Paynes Road and Millbrook West, situation being monitored by the police. Contact attempted with ABP to turn pumps on.

**04:15am** – 2 ABP Pumps turned on (F&G)

**04:45am** – Another ABP pump turned on (B)

**06:30am** – Millbrook Road West situation deteriorating SCC close Waterhouse lane, Regents Park Road and Paynes Road for the police.

**08:00am** – 1 ABP Pump turned off (B)

**09:00am** – 1 ABP Pump turned on (B)

**09:30am** – 1 ABP Pump turned off (B)

**10:30am** – 1 ABP Pump turned on (B)

**10:45am** – 2 ABP Pumps turned off (F&G)

**11:15am** – 2 ABP Pumps turned on (F&G)

**14:00am** – 2 ABP Pumps turned off (F&G)

Atkins survey reports commissioned by Network Rail on the two culverts that flow from Millbrook Road under the railway opposite Foundry Land and Waterhouse Lane into an ABP culvert have been made available. The last survey report dated 08/01/2008 is included in Appendix 2.



The ABP Pump activity report can be found in Appendix 1.

### **Millbrook Recreation Park Ditch – Appendix 3**

The meeting on the 25<sup>th</sup> June identified a few issues with this area mainly focused on the Millbrook Recreation park where a gravity system flow into a ditch which in turn flows into Tanners Brook. The state of the ditch was very bad and blocked by vegetation and rubbish. Questions of ownership have been resolved, with Network Rail taking the lead and programming cleaning. There is currently no date for this occurring. Southern Water also agreed to investigate their pipes in the park.

Questions of ownership of Tanner's Brook itself have been raised by Network Rail after seeing debris building up further down the channel (see email in Appendix 3). The map provided by the Environment Agency in Appendix 3 shows that this brook is classed as main river.

### **Any other Issues**

This report is a living document and any further information fed back to the group can be added and items updated. So please do not hesitate to contact:

James Brown

[James.brown@southampton.gov.uk](mailto:James.brown@southampton.gov.uk)

023 8083 2668

### **Next Meeting Proposed**

The minutes suggested another meeting to be held in September.

I suggest that this meeting is programmed soon to ensure availability of the stakeholders. The following dates are when the Southampton City Council partners are all available:

Friday 19<sup>th</sup> September

Monday 22<sup>nd</sup> September

Friday 26<sup>th</sup> September

Please let me know which of these dates you are available on and I will book the meeting on the most popular.



## Appendix 1 – West Quay Culvert

3 of 3

OFFICER **A. HOLDING** EMERGENCY CALL OUT RECORD DATE **25/05/08**

Call Received	Location	Description of Incident	Informed By	Action Taken	S	L	Start+Finish	Total Cost	Job	Order
06:30 am	Millbrook rd west Western Esplanade	Whole area flooded Road closures required.	Police inc 238 E17072	The following roads closed off for police: Southdown rd, Waterhouse lane Lagatts park rd Mountbatten way Civic Centre rd Paynes Road.	1 X	2 X	6:30-8:30 6:30-9:30	67340	214084	136
07:00 am	Butley Road Jct Ship Lane	fallen tree	Call centre E17077	pruned to Tree people.				67341		
8:30	Depot	Handover		Handover standing						
Rates	Supervisor Rate crew Rate & Vehicle Additional Materials	£40.00 per hour £74.63 per hour Cost + 50%		first call out most charged £74.63						

Figure 1: Copy of SCC Standby Sheets for 26/05/08

### WestQuay Daily Summary

**Date:** 26/05/2008 08:35:00 **Entered By:** Darren Cross

**Incident Type:** Car Parks **Location:** MSCP

**Unit Involved:** **Staff Involved:** Thome Dixon

**Event Summary:** @08:35 DM Thom calls Control as level 01 of the MSCP has flooded

**Action/Result:** @08:35 DM Thom calls Control as level 01 of the MSCP has flooded  
DM Thom also updates Control as the lifts are also flooding  
stairs/wells 02,06,07 are all flooding also  
@08:39 DM Thom updates Control as the flooding is so bad he is closing off level 01 of the MSCP,  
Senior [Hanne], informed of present situation  
Romane informed to change the signs for MSCP to show as closed  
@08:50 Control asks DM Andy if he wants Drain Doctor to be called, DM Andy declines this  
as  
the rain has eased off at present  
@08:56 DM Andy authorises Podium Car Park and centre doors to be opened  
@09:10 DM Andy asks for exits 03 and 04 to be opened for store managers to remove their vehicles  
10.45 Andy Collier contacted Solent News desk  
10.55 AC contacted HMS emergency no - R Webster  
@11:05 DM Thom informs Control the MSCP is open but only on green side  
11.15 AC updated Mick Townsend - N Holder prepared statement  
@12:35 DM Andy authorises all of the MSCP to be open and fully operational

Figure 2: West Quay Daily Summary



**Figure 3: Central Station & Western Esplanade**



**Figure 4: Central Station**



**Figure 5: West Quay MSCP**



**Figure 6: MSCP flooding**

**No. 7 Pump Station**

Pump	B		E		F		G		Remarks
	On	Off	On	Off	On	Off	On	Off	
26-May-08	04:45	08:00	-	-	04:15	10:45	04:15	10:45	Alarmed
26-May-08	09:00	09:30	-	-	11:15	14:00	11:15	14:00	Alarmed
26-May-08	10:30	12:30	-	-	-	-	-	-	Alarmed

**Stormwater pump Station**

Pump	One		Two		Three		Remarks
	On	Off	On	Off	On	Off	
26-May-08	11:00	12:30	11:00	12:30	11:00	12:30	Alarmed
26-May-08	13:15	14:45	14:00	14:45	13:15	13:45	Alarmed
26-May-08	19:15	20:15	19:15	20:15	-	-	Alarmed

Key	
B	Main Dry Dock Pum
E,F & G	Main Drainer Pumps
1,2 & 3	Main Pumps

Notes ~ Alarm calls recived during normal working hours (Mon - Fri) 07:30 to 16:00 are normally attended to within half an hour, outside of these hours normal attendance is within one hour of receiving call out.

**Figure 7: Table of ABP Pump Activity**

## Appendix 2 – Millbrook Road Culvert

Page 2 of

OFFICER A. HOLDING EMERGENCY CALL OUT RECORD DATE 25/5/08

Call Received	Location	Description of Incident	Informed By	Action Taken	S	L	Start+Finish	Total Cost
17.00	Depot	Push up Spoil	A. Holding	Spoil pushed up		2 1hr	17.00-18.00	67335
17.45	Mountbatten way <i>(Exact location not known)</i>	barrier in c/way	call centre E17069	found to be Tesco's trolley which was removed		2 1hr	18.00-20.00	67336
20.30	Tebourke way near Jct Winchester Rd	Bollard in the c/way	call centre E17070	Concrete bollard found in Percy Rd. removed.		2 1hr	20.30-21.30	67337
22.30	Wimpson Lane Jct Millbrook RAB	pot hole in junction being guided to by TM on RAB.	police inc 1308. E17071 <b>PRR</b>	paraded to Colas.				67338
04.00	Paynes Rd Jct Millbrook Road West.	c/way flooding police monitoring and awaiting what to do next.	police call centre E17072	try to call ABP to turn on/check pump unable to get through <i>(see notes)</i>			26/5/08	67339
Rates	Supervisor Rate crew Rate & Vehicle Additional Materials	£40.00 per hour £74.63 per hour Cost + 50%		first call out most charged £74.63				

3 of 3

OFFICER A. HOLDING EMERGENCY CALL OUT RECORD DATE 25/5/08

Call Received	Location	Description of Incident	Informed By	Action Taken	S	L	Start+Finish	Total Cost	JOB	ORDER
06:30 am	Millbrook Rd West Western Esplanade	whole area flooded road closures required.	police inc 238 E17072	The following roads closed off for police: Southdown Rd, Waters Lane Pagents Park Rd Mountbatten Way Civic Centre Rd Paynes Road.	1 x 2hr	2 x 3hr	6.30-8.30 6.30-9.30	67340	214084	136
07:00 am	Bathley Road Jct Shop Lane	fallen tree	call centre E17077	paraded to Tree people.				67341		
8:30	Depot	Handover		handover standby.						
Rates	Supervisor Rate crew Rate & Vehicle Additional Materials	£40.00 per hour £74.63 per hour Cost + 50%		first call out most charged £74.63						

Figure 1: SCC Standby Sheet 26/05/08

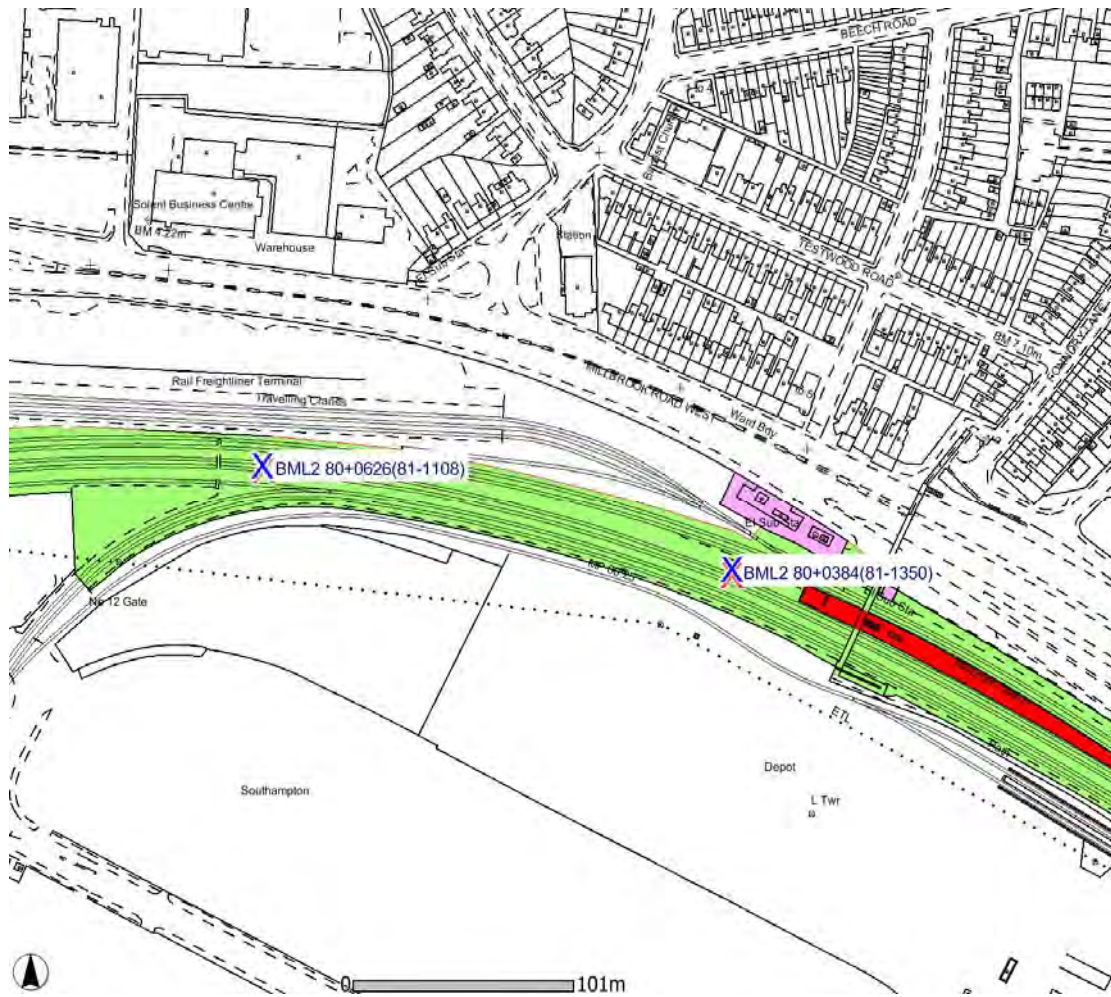




Figure 2: Positions of Network Rails Culverts and Land

**Millbrook Road Culvert (Foundry Lane/ Marchwood Road)**  
 Network Rail Structure Inspected 08/01/2008.  
 80miles 0627yards

		<b>NETWORK RAIL</b> Southern Region Underwater Examination Report										
Structure No	E2/8B	ELR	BML2	Exam Date	08/01/2008			Page	2	of	20	
Area	SE		BRS	-	Mileage	80	m	0627	yds	OS Ref	SU 395 127	
Route	Northam (short Mile) - Dorchester Jn								Group	B	Type	C
Name	Culvert											





**ELEVATION PHOTOGRAPH**



Ordnance Survey extract  
 indicating structure location  
 grid reference SU 395 127

**LOCATION MAP**

		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>									
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008		<b>Page</b>	4	<b>of</b>	20	
<b>Area</b>	SE	<b>BRS</b>	-	<b>Mileage</b>	80	m	0627	yds	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										

With Reference to last report		
	Yes / No	Comment
Changes in Bed Profile	No	
Changes in Bed Material	No	
Evidence of Scour	No	
Change of Construction	No	
Works Since Last Exam	No	



#### Description of Structure

The structure is a culvert which channels a watercourse flowing southwards beneath the fast, slow and docks branch lines of the Waterloo (Main Lines) - Weymouth Line (Bournemouth Main Line), being located between Millbrook and Redbridge Stations. From the north-western end of the platforms at Millbrook Station, culvert BML2 Br E2/8A runs approximately north to south below the railway, angling westwards through 2No shallow bends, until the watercourse discharges into a second culvert BML2 Br E2/8B which is the subject of this underwater examination. BML2 Br E2/8B continues running from north-east to south west until it discharges into a third culvert below. This side culvert runs parallel to the railway below the southern cess before it channels the water into the River Test at the dockside. The subject of this examination structure BML2 Br E2/8B is constructed of 900mm Ø concrete socket and spigot pipe sections.

#### Access & Inspection Details

From Millbrook Station, the culvert was accessed via the cess to the south of the railway where an inspection chamber is located within the boundary fence, approximately 1/4 of a mile west of Millbrook Station Platform. This access chamber is situated within a third unknown structure south of and lower than BML2 Br E2/8B, and as the water flow within the culvert system is tidal, access can only be gained at low tide. At high tide the water level rises to the level of the access soffit.



		<b>NETWORK RAIL</b> <b>Southern Region</b> Underwater Examination Report									
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008			<b>Page</b>	5	<b>of</b>	20
<b>Area</b>	SE		BRS	<b>Mileage</b>	80	m	0627	<b>yds</b>	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										

## Condition

### Watercourse

The culvert is directly affected by the tidal patterns in the area, with the results varying from full submersion to being completely dry. The watercourse flows from the northern culvert BML2 Br E2/8A into culvert BML2 Br E2/8B and via this culvert into the third lower unknown culvert to the south of the railway, which channels the water into the River Test at the dockside.

### Access chamber

Access was gained via the chamber located within the adjacent culvert to the south of BML2 Br E2/8B below the southern cess of the railway. The galvanized steel step irons down to the chamber are heavily corroded and covered in debris. The chamber itself is constructed from 600mm diameter concrete pipe sections and is 4.5m deep from ground level to the invert of the culvert. The start of BML2 Br E2/8B begins 8000mm east of this access point. In keeping with previous inspections, this access point was taken to be the start of the examination. As noted in the last inspection, there is an area of spalling to the bottom of the access chamber concrete.

### Culvert barrel

There remain open joints to the concrete sections in the first half of the culvert length.

#### **-8000mm**

Downstream Access Chamber within adjacent unknown culvert.

#### **-8000mm - 0mm**

2000mm Ø concrete culvert running parallel to the railway. Generally fair condition allowing access to the head of culvert BML2 Br E2/8B.

#### **-5000mm - 0mm**

Water was found to be leaking from the sidewall on the Redbridge side over an area of 1m<sup>2</sup>.

#### **0mm**

Large cast insitu concrete 'bell mouth' entrance into higher culvert BML2 Br E2/8B.

#### **0mm - 12000mm**

900mm Ø concrete socket and spigot pipe lengths, each section being 1000mm long and all in a fair condition.

#### **12000mm**



Access chamber. Part masonry, part concrete with a 200mm inlet entering through both the east and west sidewalls. A third inlet, 300mm in diameter is located 100mm above the upstream crown of the pipe. All three inlets were dry at the time of the examination. 2No iron step rungs were found to be missing since the last inspection.

#### **13000mm - 35000mm**

At 13000mm the construction changes slightly, with 2000mm long 900mm Ø concrete socket and spigot pipe lengths which were found to be in a fair condition.

#### **13000mm.**

Spalling in the crown of the barrel is exposing rebar corrosion to a depth of 2mm at the joint between the sections 200mm x 300mm x 100mm deep. Also, a transverse fracture runs down the barrel from the crown to the invert on the

		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>										
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008			<b>Page</b>	6	of	20	
<b>Area</b>	SE		<b>BRS</b>	-	<b>Mileage</b>	80	m	0627	yds	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn								<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert											

Redbridge side open to a maximum width of 2mm.

**17000mm.**

An area of concrete patchwork repair to the Redbridge side, measuring 1500mm x 900mm remains in good condition.

**35000mm**

Access chamber. Part masonry, part cast insitu concrete with corrugated steel lid.



**36000mm - 44000mm**

Access chamber. Part masonry, part cast insitu concrete with cast iron lid. At this point the limit of the inspection was reached leading to the adjacent BML2 Br E2/8A which is the subject of a seperate underwater inspection.

### Conclusions & Recommendations

The structure itself remains in an overall fair condition with minor deterioration since the last examination.

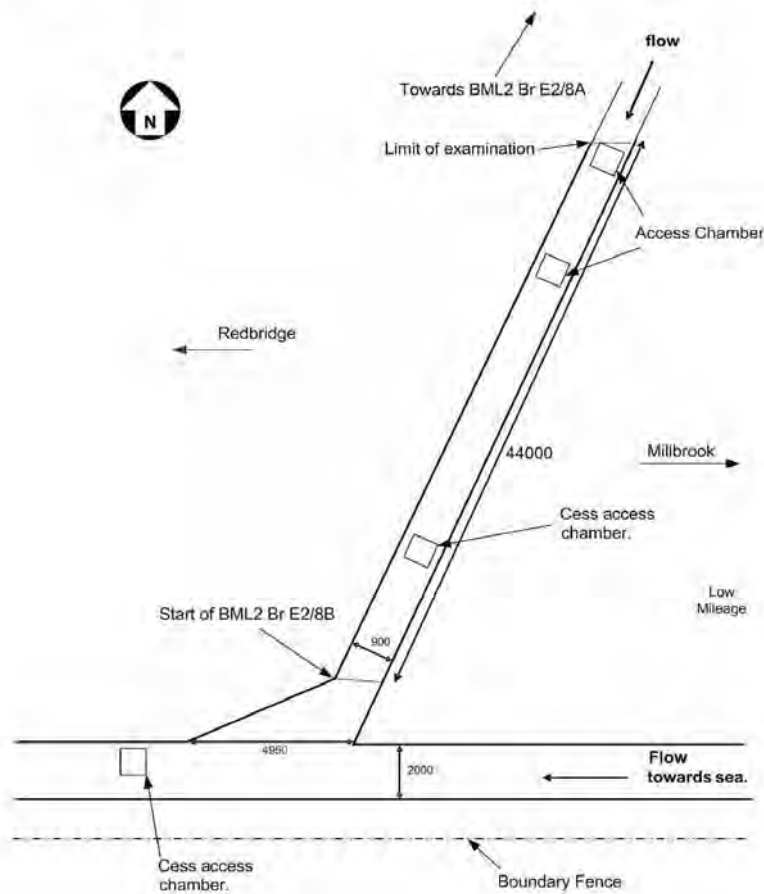
Particularly, the area of spalling at 13000mm should be repaired. The water seepage at 12000mm adjacent to the central access chamber should continue be monitored for increase in surface area coverage and corrosion. The access chamber continues to require either new step irons to be fitted or the existing irons should be refurbished to allow safe access into the chamber. The cess access chamber requires the 2No missing rungs to be replaced.



		<b>NETWORK RAIL Southern Region Underwater Examination Report</b>									
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008			<b>Page</b>	8	<b>of</b>	20
<b>Area</b>	SE		BRS	<b>Mileage</b>	80	m	0627	<b>yds</b>	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										

**Appendix A  
Sketch Plan & Details**

Dimensions in mm



Not to Scale



		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>									
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008			<b>Page</b>	9	of	20
<b>Area</b>	SE	<b>BRS</b>	-	<b>Mileage</b>	80	m	0627	<b>yds</b>	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										

**Appendix B**  
**Photograph List**



		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>									
<b>Structure No</b>	E2/8B	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008		<b>Page</b>	11	<b>of</b>	20	
<b>Area</b>	SE	<b>BRS</b>	-	<b>Mileage</b>	80	m	0627	<b>yds</b>	<b>OS Ref</b>	SU 395 127	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										





Photograph No 3 Water seepage at -5000mm to 0mm



Photograph No 4 Looking Downstream

**Network Rail Culvert inspected 08/01/08 80miles 0385yds**

		<p align="center"><b>NETWORK RAIL</b> Southern Region Underwater Examination Report</p>										
Structure No	E2/8A	ELR	BML2	Exam Date	08/01/2008			Page	2	of	21	
Area	SE	BRS	-	Mileage	80	m	0385	yds	OS Ref	SU 398 126		
Route	Northam (short Mile) - Dorchester Jn								Group	B	Type	C
Name	Culvert											





**ELEVATION PHOTOGRAPH**



Ordnance Survey extract indicating structure location grid reference SU 398 126

**LOCATION MAP**

		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>									
<b>Structure No</b>	E2/8A	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008		<b>Page</b>	4	<b>of</b>	21	
<b>Area</b>	SE	<b>BRS</b>	-	<b>Mileage</b>	80	m	0385	<b>yds</b>	<b>OS Ref</b>	SU 398 126	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										

With Reference to last report		
	Yes / No	Comment
Changes in Bed Profile	N/A	
Changes in Bed Material	N/A	
Evidence of Scour	N/A	
Change of Construction	Yes	A new boundary fence has been constructed across the northern inspection chamber, with the manhole cover itself having been buried beneath earth since the last inspection
Works Since Last Exam	Yes	A new boundary fence has been constructed across the northern inspection chamber, with the manhole cover itself having been buried beneath earth since the last inspection

#### Description of Structure

The structure is a culvert which channels a watercourse flowing southwards beneath the fast, slow and docks branch lines of the Waterloo (Main Lines) - Weymouth Line (Bournemouth Main Line), being located between Millbrook and Redbridge Stations.

From the north-western end of the platforms at Millbrook Station, the culvert runs approximately north to south below the railway, angling westwards through 2No shallow bends, until the watercourse discharges into a second culvert (BML2 Br E2/8B) which channels the water into the River Test at the dockside.



The structure is constructed in a series of differing elements, namely corrugated steel lining, cast iron piping, cast in situ concrete and pre-cast concrete sections.

Since the last inspection a new boundary fence has been constructed which crosses the manhole access to the north.

#### Access & Inspection Details

From Millbrook Station, the culvert was accessed via the cess to the north of the railway where an inspection chamber is located within the boundary fence.

Access was inhibited by the fence having been relocated across the inspection chamber, with the manhole cover itself having been buried beneath earth since the last inspection.

		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>										
<b>Structure No</b>	E2/8A	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008			<b>Page</b>	5	of	21	
<b>Area</b>	SE	<b>BRS</b>		-	<b>Mileage</b>	80	m	0385	yds	<b>OS Ref</b>	SU 398 126	
<b>Route</b>	Northam (short Mile) - Dorchester Jn								<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert											

### Condition

#### WATERCOURSE

The watercourse flows from the north into the access chamber and via the culvert into the secondary lower culvert to the south west of the railway. (Photos 3 & 4)

#### ACCESS CHAMBER

The access chamber to the north is located approximately 20 metres off the western end of Millbrook Station platform, in the northern cess adjacent to the railway boundary fence. (Photos 1 & 5)

Since the last inspection a new boundary fence has been constructed which crosses the manhole cover, inhibiting access as the manhole cover itself has been buried beneath earth since the last inspection.

Within the chamber 3No inlets enter the culvert, with 1No at the north and 2No at the eastern sidewall.

In addition, 3No vertical steel/cast iron pipes are located against the western sidewall measuring 750mm Ø, 360mm Ø and 300mm Ø.

Minor weathering to the walls, no major defects noted. (Photo 6)

#### BARREL

0mm at the access chamber downstream southern sidewall

##### 0mm - 2500mm

At this point, the culvert barrel consists of a 900mm Ø corrugated steel pipe lining, which remains in an overall fair condition with some surface corrosion to a depth of 3mm within the low haunch.

There are no indications of holing, hollow patches, fracturing or deformation. (Photos 7 & 8)

##### 2000mm - 20600mm

Consisting of 900mm Ø cast iron pipe lining, this section remains in an overall fair condition with an isolated case of graphitic corrosion at 3000mm where the 200mm Ø area of corrosion noted to the low haunch at the last inspection remains unchanged with a penetration of 2-3mm.

Overall, there are no indications of holing, hollow patches, fracturing or deformation. (Photos 9 & 10)

##### 19500mm - 20600mm

Here can be found an access chamber leading down from Millbrook Station.

Consisting of a cast in-situ rectangular chamber from ground level that discharges at its base through 2No 300mm Ø earthenware pipes into the culvert, 1No to the west & 1No to the south, the chamber leads through a 400mm Ø down pipe into the culvert itself. (Photo 11)

##### 20600mm - 28100mm

This section is constructed in 1200mm Ø pre-cast concrete pipe lining, and remains in an overall fair condition, other than a 5mm vertical fracture passing transversely through the pipe lining at 24100mm.

This fracture is long standing, remaining unchanged since the last inspection and does not affect the integrity of the structure. (Photos 3 & 4)

##### 28100mm - 29950mm

Consisting of a 1200mm Ø cast insitu concrete lining, this section was found to be in an overall fair condition. (Photo 12)

Light honeycombing of the crown where cement compaction has not been undertaken properly, as noted in the previous reports.

This section of lining acts as a transitional piece allowing the culvert to change direction at either end.



##### 29500mm - 55450mm

This section of the culvert consists of 1200mm Ø pre-cast concrete pipe lining and was found to be in an overall fair condition with no defects noted, and no change in condition since the last inspection. (Photo 13)

From this point, the culvert runs down to a second culvert at lower level (BML2 Br E2/8B) from where the watercourse flows away to the River Test and the adjacent docks.

The bend in the pipe to the lower culvert is formed from cast insitu concrete, and marks the limit of this examination.

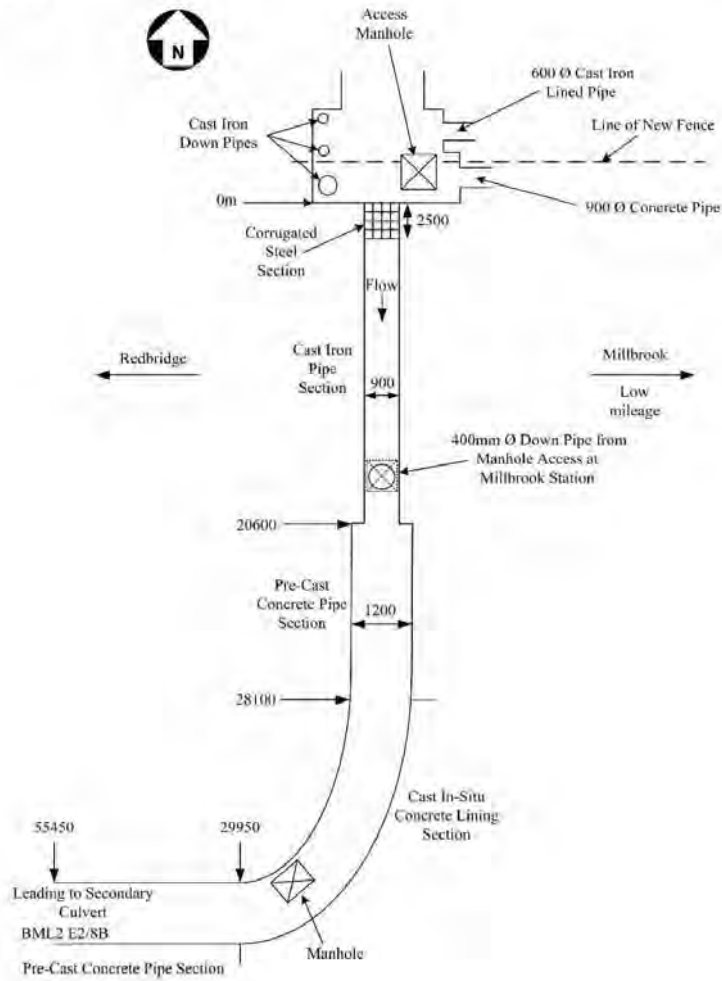




		<b>NETWORK RAIL Southern Region</b>					
<b>Underwater Examination Report</b>		<b>Structure No</b> E2/8A		<b>ELR</b>	<b>BML2</b>	<b>Exam Date</b> 08/01/2008	<b>Page</b> 8 of 21
<b>Area</b> SE	<b>BRS</b>	<b>Mileage</b> 80 m	0385	<b>yds</b>	<b>OS Ref</b> SU 398 126		
<b>Route</b> Northam (short Mile) - Dorchester Jn						<b>Group</b> B	<b>Type</b> C
<b>Name</b> Culvert							

**Appendix A  
Sketch Plan & Details**

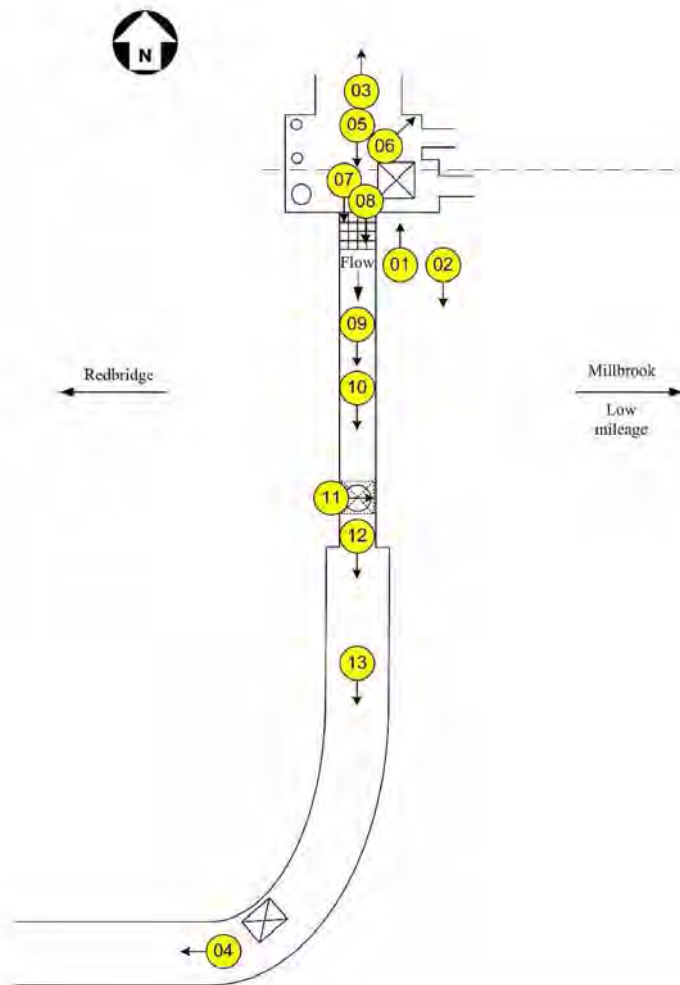
Dimensions in mm



Not to Scale



		<b>NETWORK RAIL Southern Region Underwater Examination Report</b>									
Structure No	E2/8A	ELR	BML2	Exam Date	08/01/2008		Page	9	of	21	
Area	SE	BRS	-	Mileage	80	m	0385	yds	OS Ref	SU 398 126	
Route	Northam (short Mile) - Dorchester Jn							Group	B	Type	C
Name	Culvert										

**Appendix B  
Photograph List**



		<b>NETWORK RAIL</b> <b>Southern Region</b> <b>Underwater Examination Report</b>									
<b>Structure No</b>	E2/8A	<b>ELR</b>	BML2	<b>Exam Date</b>	08/01/2008		<b>Page</b>	13	<b>of</b>	21	
<b>Area</b>	SE	<b>BRS</b>	-	<b>Mileage</b>	80	m	0385	<b>yds</b>	<b>OS Ref</b>	SU 398 126	
<b>Route</b>	Northam (short Mile) - Dorchester Jn							<b>Group</b>	B	<b>Type</b>	C
<b>Name</b>	Culvert										



Photograph No 7 Corrugated Steel Section



Photograph No 8 Corrugated Steel Section



## Appendix 3 – Millbrook Recreation Park Ditch and Culvert

**RE: Southampton Flooding (Millbrook Ditches)**

Jackson Tony (Woking,

You forwarded this message on 01/07/2008 09:21

To: Brown, James

Attachments: Millbrook Ditches plan.pdf (126 KB)

[www.networkrail.co.uk](http://www.networkrail.co.uk)

**From:** Yarnay Arthur

**Sent:** 30 June 2008 18:14

**To:** Smith Gideon; Jackson Tony (Woking)

**Subject:** Southampton Flooding (Millbrook Ditches)

Gideon / Tony

I have now visited this site and find that there are two ditches that flow into TANNERS BROOK, one from the Millbrook Recreation ground to Tanners Brook; this one has a tidal flap at the Tanners Brook end. The other one flows from the country end back toward Southampton discharging into the brook

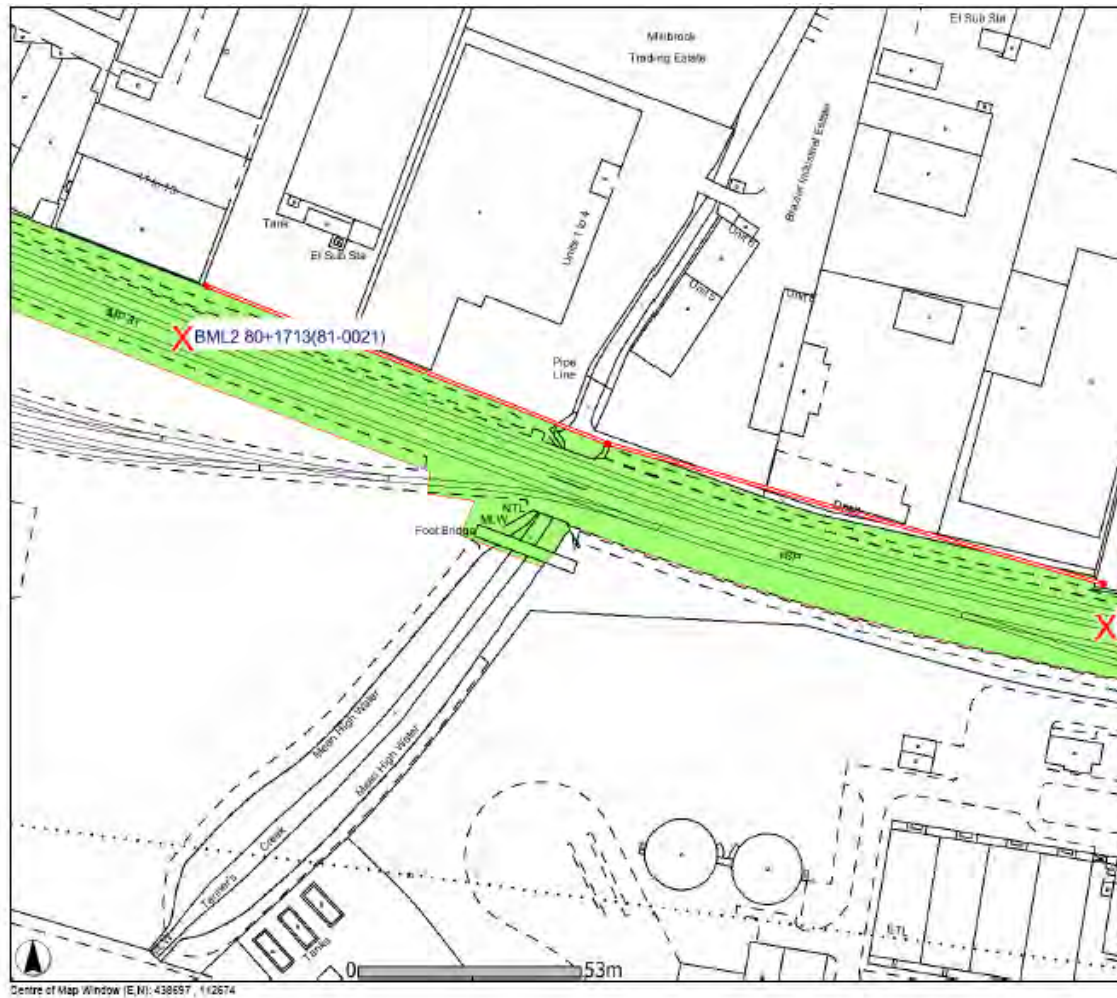
Both ditches are really clogged up with vegetation and I will arise a WAIF to get the ditches cleared. I cannot say how long this will take. We have a 12 week lead time but with the work that Wessex Drainage team have on it could be much longer. As an example I am only just getting some of period 13/07 work done this week.

I am attaching a plan showing the overall mileages and some photos taken today. You will note that there a photo of Tanners Brook under the railway bridge showing a dam build up in the brook itself towards the ABP Port area. This should also be cleared up by either the Council or who ever has responsibility for the brook

Please pass this information on to James Brown

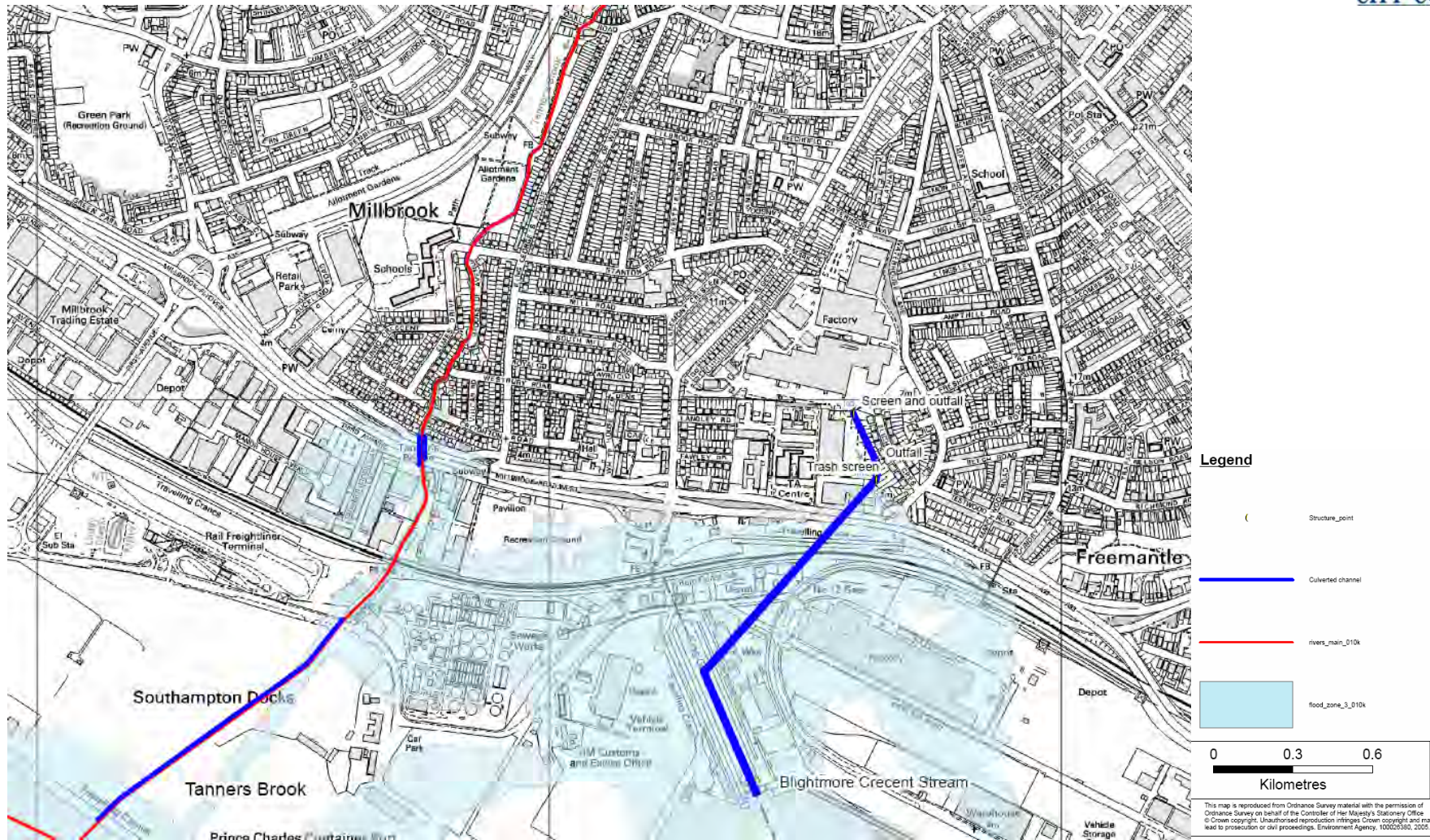
Arthur Yarnay,  
Maintenance Protection Co-ordinator (Eastleigh)

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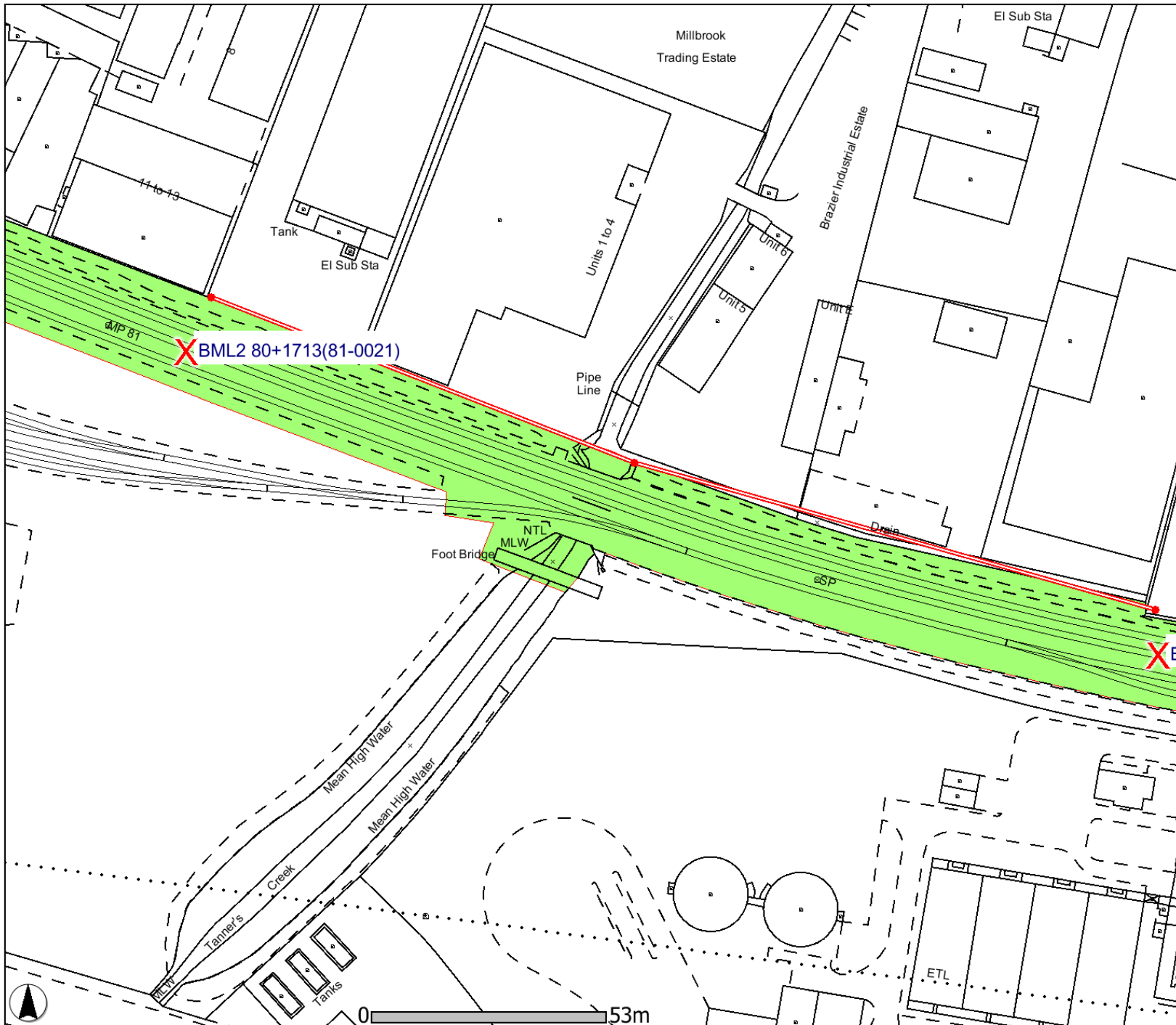


<b>MILLBROOK DITCHES</b> Tanner's Brook	
Plot Scale	1:1309
Plot Date	30/6/2008
	
Output Created from the GI Portal - A4 Landscape	

Figure 1: Plan of Network Rail owned drainage ditches.



**Figure 2: EA Map showing ownership of main rivers.**



## MILLBROOK DITCHES Tanner's Brook

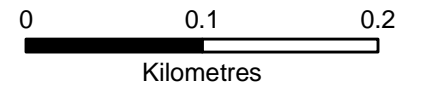
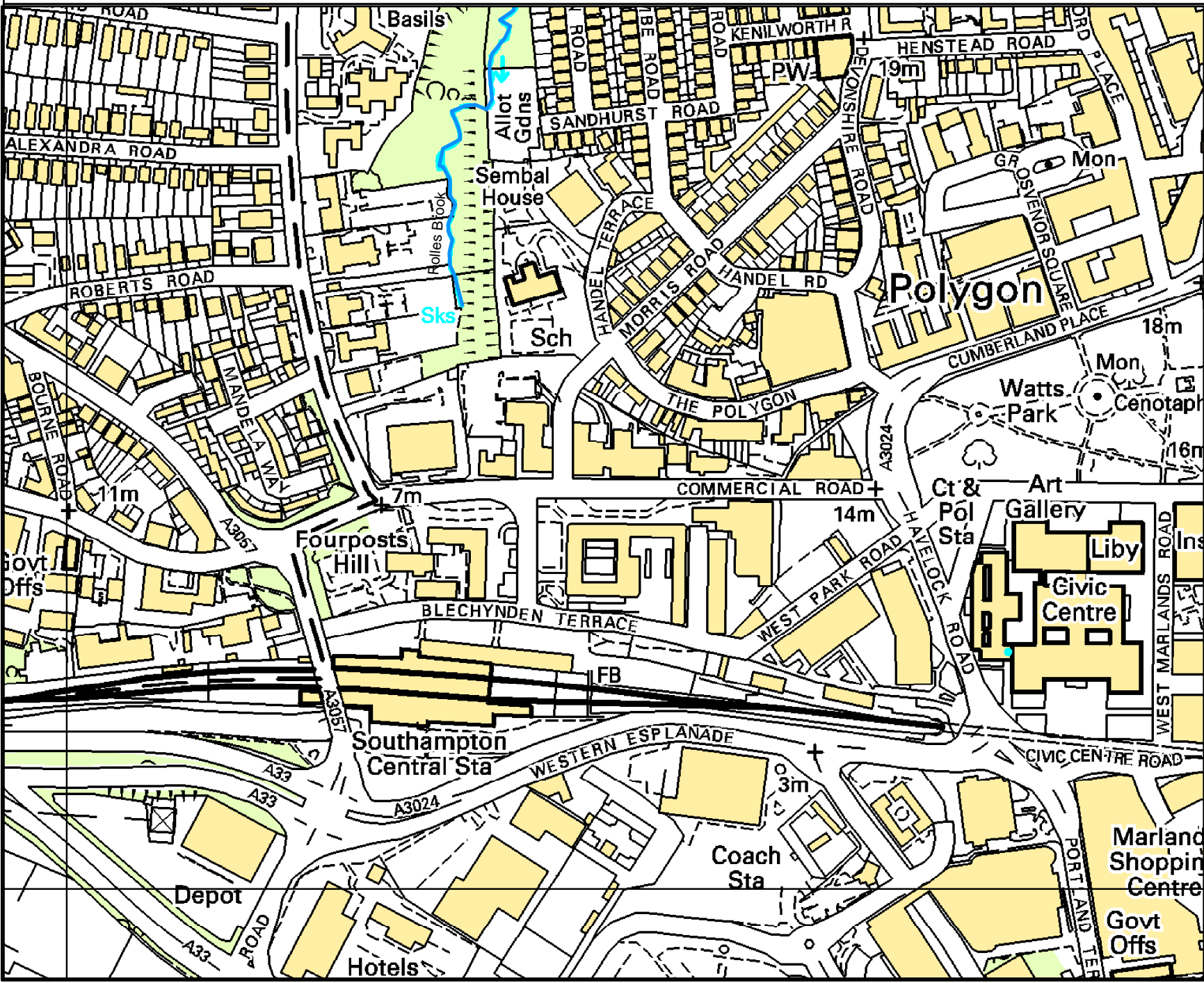
Plot Scale	1:1309
Plot Date	30/6/2008



# Main River Designation at Southampton Central Train Station

## Legend

 Main River





A6 SOUTHERN WATER

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Southampton SWMP

March 2011

NB – Southern Water have supplied information in a GIS format which has been incorporated into the figures

A7 WEST QUAY (WQ)

## Smith, Joshua (Capita Symonds)

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**From:** Roy Oliphant : uk]  
**Sent:** 19 February 2010 16:13  
**To:** Sheppard, Rowan  
**Subject:** Storm Water Stakeholders & Water Penetration  
**Attachments:** Bargate St Leak photo No.2.JPG; Bargate St Leak photo No. 1.JPG; Portland Terrace Surface gully No.4.JPG; Portland Terrace Damp to wall No.3.JPG

Rowan

I have lost touch regarding the ongoing situation with the stakeholders meetings. Is the group still meeting? I wonder if you can update me.

Further, at a previous meeting I mentioned to you and David Bialas/Southern Water of two water ingress problems affecting the centre from I believe, external sources.

1. Stream of water percolates through the base of the Bargate Street subway and runs onto our Arundel Circus paved area (see photos No.1 & 2). This only appears following heavy rain and I suspect there is either a broken storm water drain on Portland Terrace, or I understand this area was formally spa location.
2. Water percolates into our A2 service yard off Western Esplanade (North), through the slab/retaining wall which runs parallel with Portland Terrace and approximately 70m north along the same line from the Bargate subway leak position. At the same location the retaining wall on Portland Terrace appears damp, and has a storm water gully immediately beneath (see photos No. 3 & 4).

Southern Water have completed some investigation in the past and leak detection but say water is not from them. I have involved SCC highways team also with no conclusion.

This has become a H&S issue for us which I can't resolve without SCC and SW assisting as investigation works are require, which may involve excavation along the highway.

Can you assist?

Regards

### Roy Oliphant

Facilities Manager  
WestQuay Southampton

### WestQuay is now open till 8pm every week night and 7pm on Saturdays!

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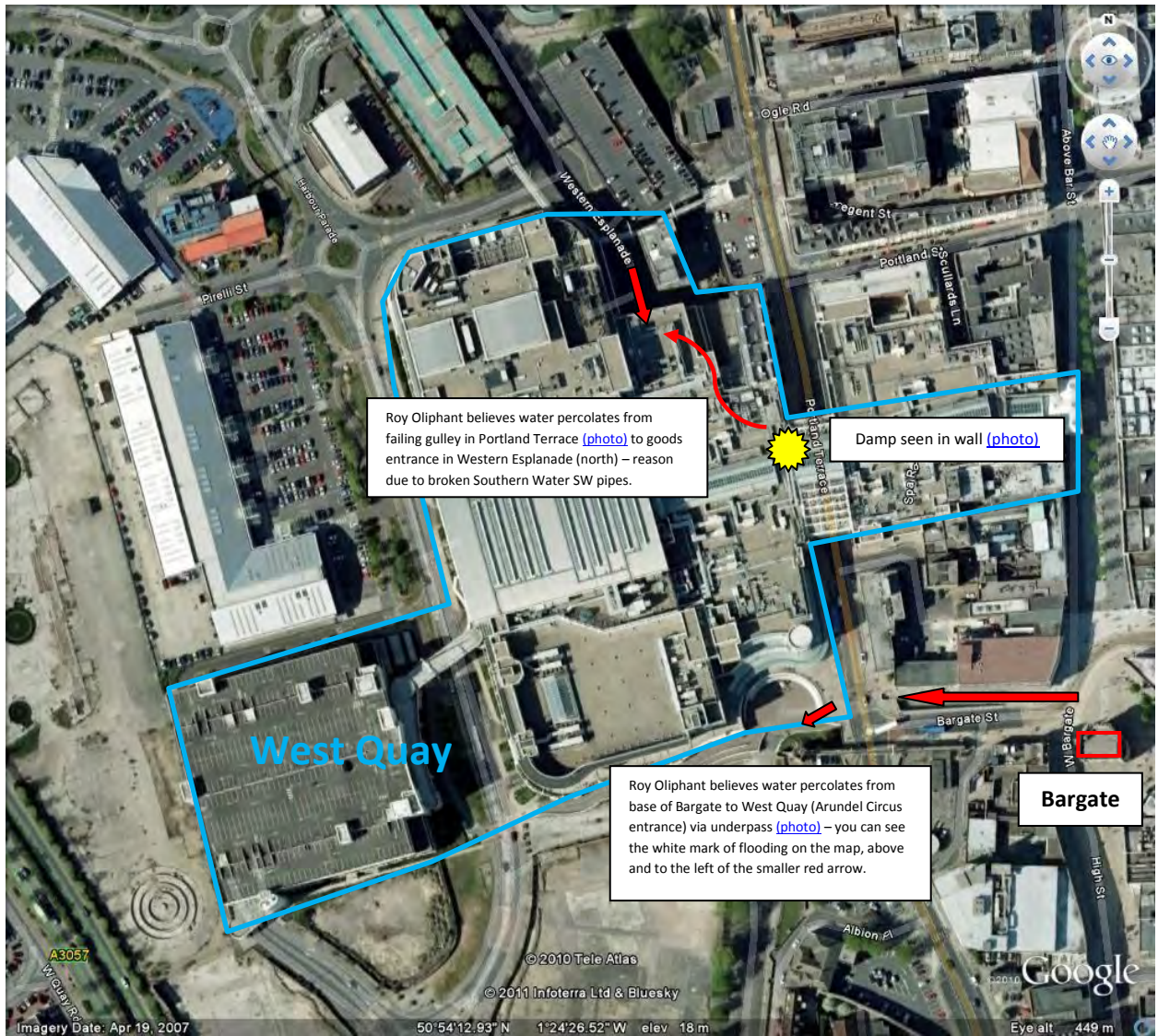
If you want to know more about WestQuay, visit us on the web at <<http://www.west-quay.co.uk>> or telephone WestQuay on 02380 23 6789.

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# West Quay comments (Roy Oliphant 01-02-11)



26.May 2008 09:17:42



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26.May 2008 09:21:10



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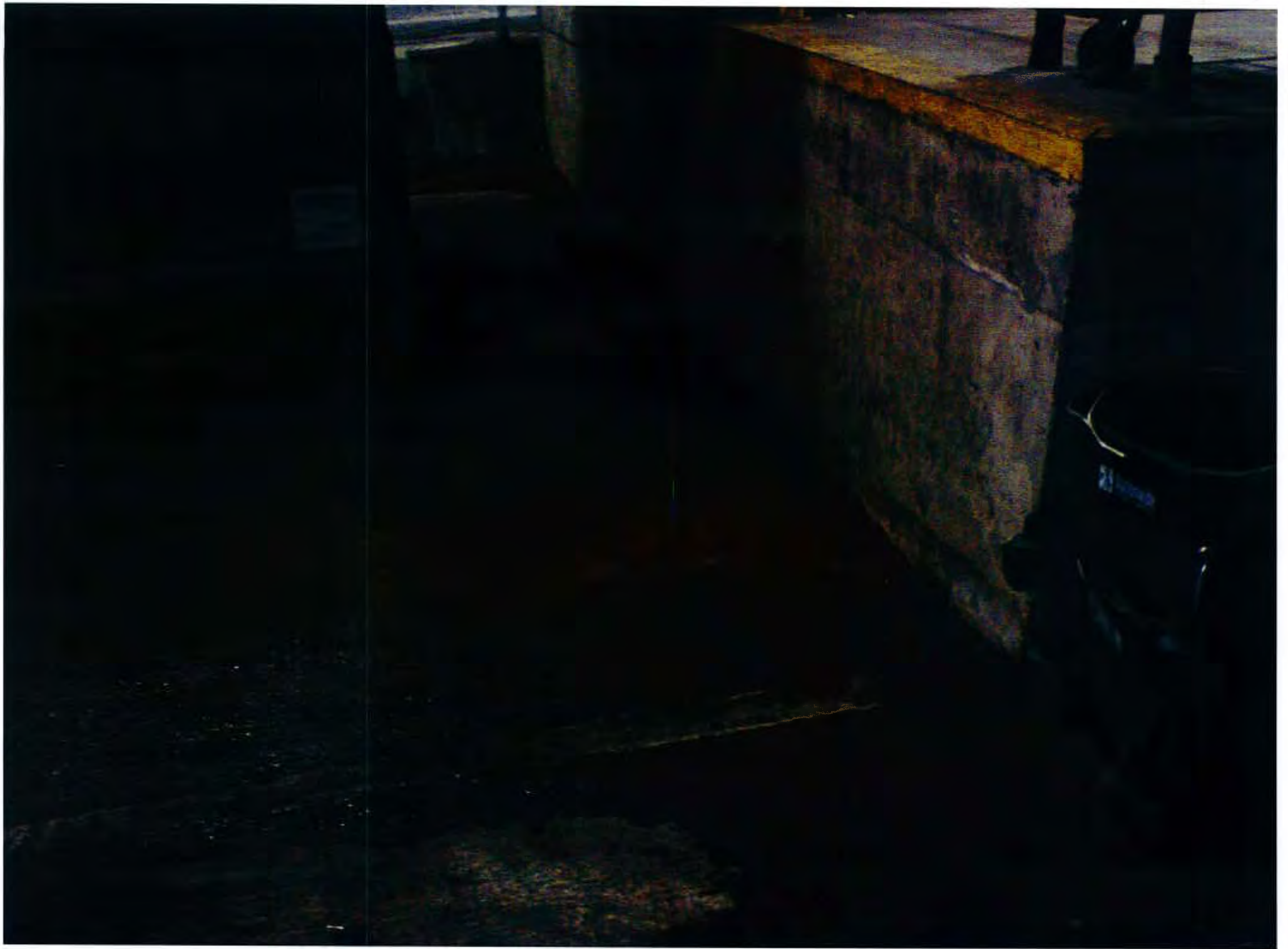
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A8 OTHER SOURCES

# Hampshire County Council -- Groundwater Map

# Hampshire - FRM Flooding Hotspots



## Legend

HCC\_recorded\_flooding

Flood\_caus

- Lack of Capacity
- Maintenance Issue
- Works carried out/planned

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# Appendix C– Flooding Hotspot Scoring Matrix



## Appendix D– Assess Options

## Southampton SWMP: Scoring System for Sub-options

Benefits						
Score	Reduced surface water flood risk	Reduced social and health impacts	Reduced emergency costs	Reducing pollution entering watercourses	Contribution to creating or enhancing biodiversity or amenity	Adaptability to climate change
5	Flood risk significantly mitigated (more than one hotspot)	Significant social and health benefits contributing to improvement of local communities	Substantial reduction in emergency costs - reduced number of incidents, reduced severity.	Significant reduction, achieving compliance with full WFD directive	Significant biodiversity/amenity created - new parks with better facilities, new or extended ecosystems	Significant adaptability to climate change beyond current PPS guidelines
4	Flood risk moderately mitigated (more than one hotspot)					Slight adaptability to climate change beyond current PPS guidelines
3	Flood risk significantly mitigated (one hotspot)	Moderate social and health benefits contributing to partial enhancement of local communities	Moderate reduction in emergency costs - targeting of high-risk areas, improved response times.	Moderate reduction, achieving compliance with notable WFD directive	Moderate biodiversity/amenity created - improved open space amenity/ecosystems	Significant adaptability to climate change in line with current PPS guidelines
2	Flood risk moderately mitigated (one hotspot)					Moderate adaptability to climate change in line with current PPS guidelines
1	Flood risk slightly mitigated local to area of implementation	Slight social and health benefits		Slight reduction, achieving partial WFD directive	Slight biodiversity/amenity created	Slight adaptability to climate change in line with current PPS guidelines
0	No reduction of flooding risk	No social and health benefits	No reduction in emergency costs	Pollution levels unchanged	Biodiversity/amenity areas unaffected	No adaptability to climate change

Costs							
Score	Capital Costs	Operational Costs	Carbon Costs	Disruption to services	Environmental Costs	'Do nothing' Costs (applicable only to the baseline 'do nothing' option)	Opportunity Costs
0	No Capital Costs	No Operational Costs	Nominal carbon cost - non structural measures, e.g. flood warning	No disruption	Nominal Environmental Costs - no deterioration of habitats or flow characteristics	No damages - no difference if actions were implemented or not	No Opportunity Costs - no benefits foregone
-1	Very Low Capital Costs	Very Low Operational Costs	Very Low Carbon Cost	Slight disruption - pedestrian diversions through city	Very Low Environmental Costs	Slight damages	Slight Opportunity Costs - SUDS schemes rather than park/childrens playground
-2	Low Capital Costs	Low Operational Costs	Low Carbon Cost - minor earthworks	Low disruption	Low Environmental Costs	Low damages	Low Opportunity Costs
-3	Moderate Capital Costs	Moderate Operational Costs	Moderate Carbon Cost - earthworks with minor inputs of other materials	Moderate disruption - utilities stop supply for several hours for works, local road diversions	Moderate Environmental Costs	Moderate damages - gradual deterioration of assets, i.e. pumping stations	Moderate Opportunity Costs - green areas retained on urban fringe (losing potential expansion opportunity)
-4	High Capital Costs	High Operational Costs	High Carbon Cost	High disruption	High Environmental Costs	Significant damages	High Opportunity Costs
-5	Very high Capital Costs	Very high Operational Costs	Very high carbon costs - significant below ground civils, e.g. new sewer infrastructure	Very high disruption - key transport routes are closed for several months	Very high Environmental Costs - installation of new sewer infrastructure (storage tanks, etc) through Greenways	Very significant damages - lack of action causes a severe decline in drainage systems through city, causing increased, severe flooding	Very high Opportunity Costs - high-value land, which cannot be re-used without significant remediation works beforehand (crate storage in prime developable locations)