WHITECHURCH STREAM FLOOD ALLEVIATION SCHEME

ENGINEERING SERVICES REPORT
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Prepared by:

**RPS**

Pietro Albano

Project Engineer

West Pier Business Campus

Dun Laoghaire, Co. Dublin A96 N6T7

T +353 1 488 2900

E pietro.albano@rpsgroup.com

Prepared for:

**SDCC**

David Grant

Project Resident Engineer

South Dublin County Council, County Hall

Tallaght, Dublin 24

T +353 1 414 9000

E dgrant@SDUBLINCOCO.ie
ENGINEERING SERVICES REPORT

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1 INTRODUCTION

RPS was appointed by South Dublin County Council to progress and complete a Planning Application under Section 177AE of the Planning and Development Act 2000 (as amended) in respect of the Whitechurch Flood Alleviation Scheme (FAS) (hereafter called the Scheme) in South Dublin.

The Scheme comprises of defence measures including new walls, removal and/or replacement of low-level bridges, provision of trash screens and debris traps, stream bank improvements, and removal of trees and other vegetation to accommodate the proposed Works. The proposed wall heights generally range from 1.2m-1.3m above ground. Only one location with 1.9m high wall exists where the wall ties into the existing culvert wingwall at Willbrook Lawn Culvert. All the Works are limited to within the flood plain of the Whitechurch Stream.

1.1 Site Location

The study area includes the Whitechurch Stream at Rathfarnham, South Dublin and associated infrastructure from the downstream face of the bridge crossing at Taylor’s Lane in St Enda’s Park down to the upstream face of the bridge inlet crossing Willbrook Road covering approximately 1.5km length. Figure 1-1 shows a high-level overview of the study area. The stream runs parallel along Whitechurch Road crossing it occasionally, one at a location near Sarah Curran Avenue and another at a location upstream of its confluence with the Owendoher River.

The site levels vary from 72.5m OD at Taylors Lane Bridge in St Enda’s Park to 49.5m OD at the northern boundary just upstream of the confluence with the Owendoher River. The Whitechurch Stream at this location is steep with average gradient of 1:65 (1.5%).

A detailed topographical survey along with an extended geotechnical investigation were conducted for the purposes of this Project. RPS also sourced data from a Structural Condition Survey which was completed by Amelio Utilities Ltd in May 2018 for OPW. The topographical survey undertaken during the CFRAM studies was also used for reference.

1.2 Purpose of Report

This report forms part of the Planning Application Documents under Section 177AE of the Planning and Development Act 2000 (as amended) and it is entirely based on the Preliminary Design completed by OPW. It aims to identify the existing services in the study area and identify conflicts and or potential conflicts and propose mitigation measures, where possible.
Figure 1.1 Site Location and Survey Area

Hydrological Connectivity Pathway

Indicative Extent of Survey Territory
2 OVERVIEW OF THE PROPOSED DEVELOPMENT

2.1 Proposed Site Infrastructure

The Scheme consists of a series of proposed flood alleviation measures for each of the 8no. areas divided for ease of reference as described below:

2.1.1.1 Area 1 - Area downstream of Taylor’s Lane and within St Enda’s Park, (Ch.: 0+000- 0+510.10),
- No flood alleviation measures proposed for this area.

2.1.1.2 Area 2 - Area between St Enda’s Park and Sarah Curran Bridge Inlet (Ch.: 0+510.10- 0+572.25),
- Localised bank raising with rip rap erosion protection on the left bank to the design Level of 65.1m OD for approx. 50m length,
- Removal of trees and bankside vegetation to accommodate the proposed Works,
- Debris Trap and slipway at a suitable location upstream of Sarah Curran Bridge.

2.1.1.3 Area 3 - Area downstream of Sarah Curran Bridge outlet to Whitechurch Road Bridge Inlet (weir) (Ch.: 0+578.80- 0+688.70),
- Tree removal along the left bank to reduce blockage risk at Whitechurch Rd. Bridge,
- Bank protection measures on the left bank,
- Replacement of the wooden foot bridge approximately at Ch. 620. The replacement bridge will be a timber bridge of similar size and in the same location as the existing.

Figure 2-1: Areas 1, 2 and 3

2.1.1.4 Area 4 - Area upstream of Sarah Curran Bridge (Ch.: 0+688.70- 0+750.00),
- Additional works as per Area 2

2.1.1.5 Area 5 - Area downstream of Whitechurch Road Bridge (Ch.: 0+750.00- 0+850.00),
- Additional works as per Area 3

2.1.1.6 Area 6 - Area downstream of Whitechurch Road Bridge to Trim Bridge (Ch.: 0+850.00- 0+900.00),
- No flood alleviation measures proposed for this area.

2.1.1.7 Area 7 - Area downstream of Trim Bridge (Ch.: 0+900.00- 1+000.00),
- No flood alleviation measures proposed for this area.

2.1.1.8 Area 8 - Area downstream of Trim Bridge to Trim Bridge Inlet (Ch.: 1+000.00- 1+050.00),
- Additional works as per Area 2

Figure 2-1: Areas 1, 2 and 3
2.1.1.4 Area 4 – Area from Whitechurch Road Bridge Outlet to St Gatiens Culvert inlet (Ch.: 0+700-0+803.03),

- Tree clearing and vegetation removal on the right bank will be required to reduce blockage risk and to accommodate new flood defence walls.
- Bank protection will be required on the left bank.
- Underpinning will be required on the left bank.
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – south of St Gatiens Court.
- New flood wall on the right bank side tying to existing stone wall (Level 62.95mOD) approximately 27m downstream of Whitechurch Rd. Bridge Outlet.
- New head wall at culvert inlet at level 62mOD with return wall on left bank which will replace existing railing.
- New right bank flood wall replacing existing fence. Design level at 62mOD. Wall height 1.1m-1.3m.
- Permanent sheet piling underneath new walls at St. Gatiens culvert inlet, extended upstream for approximately 30m.

2.1.1.5 Area 5 - Area from St Gatiens Court Culvert to the outlet of the Garage Culvert at Rathfarnham Ford (Ch.: 0+828.07-0+918.61),

- Removal of existing trees and vegetation from the right bank of Whitechurch Stream will be required to facilitate the works
- New head wall at St. Gatiens Court culvert outlet at level 61.8mOD with return wall left bank replacing railing and tying into existing wall
- New right bank flood wall replacing existing low wall and fence. Wall height generally 1.2m but raising to 1.9m at the Garage culvert
- Permanent sheet piling underneath new walls at St. Gatiens culvert outlet, extended downstream for 30m
- New head wall at culvert inlet level 60.4 mOD with return wall left bank tying into existing left bank wall. Wall height 1.9m
- New right bank flood wall tying into new head wall at Garage Culvert inlet at level 60.4mOD
- Permanent sheet piling underneath new wall at Garage Culvert inlet, extended upstream for 30m
- Proposed tree planting, bulb planting and grass seeding on Whitechurch Road – North of St Gatiens Court.
- Staged Trash screen with water level gauge to be provided at Garage Culvert inlet

2.1.1.6 Area 6 - Area from Garage Culvert at Rathfarnham Ford to Willbrook Lawn Twin Culvert Outlet (Ch.: 0+983.91-1+132.91)

- Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required to facilitate the works;
- Increase concrete plinth around culvert opening to 600mm above ground level and install new railing,
• New head wall to culvert outlet level 58.25mOD. Flood wall left and right bank tying into head wall to design level 58.25mOD. Wall height 1.2m above path level. Right bank wall to tie into existing wall downstream of existing bridge.

• Permanent sheet piling underneath new walls left and right bank, at Garage Culvert outlet, extended downstream for approximately 30m

• Retention of existing right bank walls downstream of existing bridge at Capri Site. Wall to be cladded with stone.

• Proposed beech hedgerow within existing open space upstream of Willbrook Lawn twin culvert

• Replace metal railing at parking area off Whitechurch Stream Bridge with low level 400mm defence wall and raling to tie into bridge parapet and raling.

• Replace left bank existing metal railing with low level defence wall with railing on the left bank, upstream of the inlet of Whitechurch Stream Bridge with wall height 600mm above existing ground levels. Wall and railing to tie into bridge parapet and raling.

Figure 2-2: Areas 4, 5, and 6

2.1.1.7  Area 7 - Area from the outlet of the Twin Culvert at Willbrook Lawn to the Inlet of Bridge crossing Whitechurch Road (Ch.: 1+140.41- 1+410.43).

• Return wall around dual culvert inlet to tie into bridge parapet and existing boundary wall.

• Proposed tree planting on Whitechurch Road within existing open space immediately south of the junction between Whitechurch Road and Willbrook Lawn

• Localised left bank raising with rip rap erosion protection and permanent supports to be provided to decked structures along the bank.

• Left bank wire mesh fence panels at 1.2 m height above the footpath

• Proposed beech hedgerow along left bank fence.

• Right bank railing to be placed above existing wall. Top of railing at 1.2 m height above the footpath.

• Removal of existing trees and vegetation from both sides of Whitechurch Stream will be required. Existing walls right bank to be maintained at current level, however remedial works will be required.

• Suitably designed staged trash screen with water level gauge to be provided upstream of bridge/culvert face with access from the funeral home.

• Proposed planting at the open spaces immediately adjacent to the car park, upstream and downstream of the pedestrian bridge in Willbrook Lawn.
2.1.1.8 Area 8 - Bridge crossing Whitechurch Road outlet to Willbrook Road Culvert inlet (confluence with Owendoher) (Ch.: 1+420.20-1+455)

- Tree and bankside vegetation management to reduce blockage risk to the culvert discharging to Owendoher.
3 EXISTING SERVICES

The services addressed in this report include:

- Stormwater Drainage,
- Foul Sewer,
- Potable Water Supply,
- Other services including gas, electricity and telecom.

The conditions of these services in relation to the proposed Works are described in detail in the next sections.

3.1 Stormwater Drainage

3.1.1 Area 1: Downstream of Taylor's Lane and Within St Enda's Park

Previous surveys identified an existing 400mm dia. stormwater PE pipe discharging into Whitechurch Stream downstream of the footbridge on the north side of Taylor's lane.

There are also two surface water outfalls located downstream of the ornamental pond on either side of the weir. This area is not impacted by any Works, so no mitigation measures were required.

3.1.2 Area 2: Area between St Enda's Park and Sarah Curran Bridge

There are currently two surface water outfalls located on the upstream left and right side of the Sarah Curran Bridge which are shown in the pictures below.

Figure 3-1: Surfacewater Outfalls Downstream of the Weir/Drop Structure
3.1.3 Area 3: Area from Downstream of Sarah Curran Bridge to Bridge Crossing Whitechurch Road

The stormwater drainage network from the area to the west of Sarah Curran Bridge appears to discharge at a location downstream of the bridge although the exact location was not visible. Further investigation may be required to confirm the exact location of the outfall to avoid a possible impact on the proposed Works in this area.

3.1.4 Area 4: Area from Bridge at Whitechurch Road to St Gatiens Culvert

A 525mm diameter concrete stormwater pipe outfalls downstream of the Whitechurch Road Bridge on the left side. This is the outfall of a network that drains the south side of Whitechurch Road. The utility survey identified two other stormwater outfalls at River chainages 720m and 775m approximately.

There exists a 300mm diameter concrete stormwater outfall at the outlet of St Gatiens Court Culvert (see Figure 3-3). The utility survey indicated that this pipe is connected to an adjacent stormwater manhole which could represent a potential constraint on the proposed new head wall. A diversion or temporary blockage may be required during construction.
Figure 3-3: 300 mm dia. Concrete Pipe close to the outlet of St Gatiens Court Culvert

No other potential impacts between the proposed flood defence wall and the existing stormwater network have been identified in this area.

3.1.5 Area 5: Area from St Gatiens Court Culvert to the Outlet of Garage Culvert at Rathfarnham Ford

In this area, there is a 225mm diameter PVC stormwater outfall right at the inlet to the Garage Culvert. This network drains St Enda’s Drive and hence must be diverted or temporarily blocked during construction of the proposed wall.

The culvert condition survey indicated 8no. outfall pipes within the Garage Culvert, one of which is shown in Figure 3-4. However, no Works are proposed in this section of the culvert other than increasing the concrete plinth around the culvert opening in the premises of Rathfarnham Ford.

Figure 3-4: 200mm dia. PVC Outfall Pipe Inside the Garage Culvert

3.1.6 Area 6: Area from Garage Culvert at Rathfarnham Ford to Willbrook Lawn Twin Culvert Outlet

Right at the Garage culvert outlet, there is a stormwater outfall that drains the Garage area at ch.1,020 m.

Another 2no. stormwater pipes are present at ch. 1,110 m and ch.1,040 m and upstream of the twin culvert inlet.
There are 5no. outfall pipes within the twin Garage Culvert, listed in order from upstream to downstream as shown in Figure 3-5:

1. 250 mm dia. concrete pipe
2. 250 mm dia. PVC pipe
3. 250 mm dia. concrete pipe
4. 250 mm dia. concrete pipe
5. 100 mm dia. concrete pipe

The 250 mm dia. concrete pipe at the entrance of the culvert could represent a potential clash with the proposed flood defence wall and must be diverted or temporarily blocked during construction.
Figure 3-5: Stormwater Outfalls in the Twin Culvert Plan at Rathfarnham Ford

3.1.7 Area 7: Area from the outlet of the Twin Culvert at Willbrook Lawn to the inlet of the Bridge Crossing Willbrook Rd.

There is a 225mm diameter concrete stormwater pipe visible under the footbridge downstream of the twin culvert outlet (Figure 3-6). There are five others that drain Whitechurch Road at ch. 1,360m; 1,375m; 1,390m; 1,410m; and 1,425m in this area.
3.2 Foul Drainage

A 300mm dia. concrete combined sewer pipe along Whitechurch Road connects to a 600mm dia. concrete combined sewer pipe in Willbrook Road. This network crosses the stream twice: at the bridge between Areas 3 and 4 at the south side of the Scheme (Figure 3-7, Figure 3-8, Figure 3-9) and at the bridge in Area 7 at the northern end of the stream (Figure 3-10 and Figure 3-11).
The Condition and Utility Surveys (Appendix A) under the Whitechurch Road Bridge showed two pipes: one small and another bigger pipe. The surveys didn’t identify the use of these (i.e. foul, electricity or gas).
Figure 3-10: Pipe Crossing Whitechurch Road Bridge (Area 7)
Other smaller foul sewer pipes do exist along this section of the Scheme connected to private properties and crossing the stream at several locations. The first pipe, a 225mm dia. concrete pipe, traverses in a northerly direction crossing St. Gatien’s Culvert at the outlet and goes underneath Whitechurch Road before turning to St. Enda’s Drive.

A second pipe comes from Rathfarnham Ford area crossing the stream at the outlet of the Garage Culvert (Area 5). The utility surveys did not establish the exact cover of this pipe at crossing so further investigation may be required. This pipe joins a 225mm dia. concrete pipe and continues in a northerly direction along Whitechurch Road into a 600mm dia. Concrete pipe at Willbrook Road.
A ground investigation carried out as part of this Scheme determined that there is a possible leakage from the sewage pipe underneath Whitechurch Road in Area 7. The exact location of the leakage must be identified and controlled to avoid pollution issues to the Whitechurch Stream during construction.

### 3.3 Water Supply

A 4" dia. Cast-Iron water main crosses underneath the Sarah Curran Bridge, as shown in the figures below, (Figure 3-12, Figure 3-13, Figure 3-14 and Figure 3-15). This pipe runs along Sarah Curran Avenue at the northern corner of St Enda's Park, and hence no diversion of this utility service is required at this location.

![Figure 3-12: Suspended Pipe Crossing Sarah Curran Bridge](image1)

![Figure 3-13: Close-up View of the Pipe Crossing Sarah Curran Bridge](image2)
Another 4” dia. Cast-Iron water main runs along the Whitechurch Road crossing the bridge between Areas 3 and 4 (Figure 3-7, Figure 3-8 and Figure 3-9). A branch of the this watermain crosses St. Gatiens Culvert next to a foul sewer. Two other watermains cross the stream before entering the twin Culvert (Figure 3-8 and Figure 3-9). A cast iron 150mm dia. main is visible suspended on the upstream side of the bridge deck while another 14” Cast Iron main lies above the twin culvert (Figure 3-16 and Figure 3-17).
The other water supply pipe within the Works area is found at ch.1,415m and runs along Whitechurch Road. This is a 4" dia. uPVC water main that crosses the bridge in Area 7 between the combined and foul sewers (Figure 3-10 and Figure 3-11) at the confluence of the Whitechurch Stream and the Owendoher River.

All these water mains are on Whitechurch Road running parallel to the stream and cross via bridges or culverts and their impact on the Scheme is limited to only the crossing points.
3.4 Other Services

Gas
A 180mm dia. PE-80 [8 In] 25mbar Gas line crosses downstream of Sarah Curran Bridge on the southern side (Figure 3-14 and Figure 3-15). A second 125mm dia. PE-80 25mbar line runs all the way to Willbrook Road, i.e. from the south to the northern end of the Scheme. This pipe first crosses the bridge between Areas 3 and 4 and then connects to other branches coming from east and west. It then crosses the stream at the bridge in Area 7 together with the foul sewer and watermain.

A third 90mm dia. PE-80 25mbar branch at St Gatien’s Court crosses the Culvert. Further to the north, another 90mm dia. PE-80 25mbar gas line crosses the stream upstream of the twin culvert together with the suspended watermain.

Electricity
Electricity lines between Whitechurch Road and St. Enda’s Drive interface with the Works. Several underground power lines were noted crossing the stream at:

- Access to St. Gatiens Ct,
- Inlet of Garage Culvert (Figure 3-18),
- Access bridge upstream of the Twin Culvert inlet.

![Figure 3-18: Possible Electricity Line at the Entrance to Garage Culvert](image)

Overhead wires also exist within the Works area. Details are provided in Appendix A.

The following Works locations have proximity to the overhead power lines:

- Downstream of Sarah Curran Bridge in Area 3, i.e. 7 meters above the pavement,
- Along the access road adjacent to the stream in Area 3, i.e. 6 meters above the pavement,
- Over Whitechurch Road Bridge between Areas 3 and 4, i.e. 6 meters above pavement,
- Over the access bridge to the derelict property in Area 6, i.e. 6 meters above pavement.

Telecom
Telecom lines exist along entire area of the Scheme. 2n. 85mm dia. PP line cross downstream of Sarah Curran Bridge at the southern boundary. Another 85mm dia. ST and 4x100mm dia. PP lines run from...
Whitechurch Road to St. Gatien’s Court crossing the bridge Between Areas 3 and 4. From St Gatien’s Court to the north, the 85mm ST and 4no. 100mm dia. PP lines run separately crossing the bridge in Area 7.

Other telecom lines stream crossing points include:

- At St Gatiens Court access,
- At the access bridge upstream of the Twin Culvert inlet,
- At Willbrook Lawn.

### 3.5 Ancillary services

Further engagement with electricity and telecoms service providers will take place before construction as the proposed Works will require water supply of three phase electricity.

### 3.6 Summary

Table 3-1 provides a summary of identified clashes between services and the proposed flood defence Scheme. Confirmed clashes which will require a diversion are highlighted in red. Services at less than 1m clearance are identified as potential clashes and are highlighted in yellow.
### Table 3-1: Summary of Identified Services in the Works Area

<table>
<thead>
<tr>
<th>Service Type</th>
<th>River Chainage</th>
<th>Overhead wires</th>
<th>Telecom line</th>
<th>Electricity</th>
<th>Gas</th>
<th>Watermain</th>
<th>Foul sewer</th>
<th>Stormwater</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>580-600</strong></td>
<td>Right bank. 5 m high from ground level. Ensure safe working distance.</td>
<td></td>
<td></td>
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<tr>
<td><strong>580</strong></td>
<td>Left bank. Potential clash depending on the extent of remedial Works needed on the wall as well as during tree clearing</td>
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<tr>
<td><strong>690</strong></td>
<td>Right bank. 6 m high from slope top, potential clash with tree clearing</td>
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<tr>
<td><strong>703</strong></td>
<td>Unidentified suspended pipe service downstream of the Whitechurch Road Bridge</td>
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<tr>
<td><strong>730</strong></td>
<td>Right bank. 0.5 m distance from proposed wall</td>
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<tr>
<td><strong>775</strong></td>
<td>Right bank. Potential clash with proposed wall - possible outfall into stream</td>
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<td></td>
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<tr>
<td><strong>805</strong></td>
<td>Right bank. Clash with proposed wall. Utility depth &lt;0.4 m.</td>
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<tr>
<td><strong>826-830</strong></td>
<td>Right bank. Clash with proposed wall. Utility depth &lt;0.4 m.</td>
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<tr>
<td><strong>835-840</strong></td>
<td>Right Bank. 0.5 m distance from the proposed wall. Utility depth &lt;0.4 m.</td>
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<tr>
<td><strong>826-860</strong></td>
<td>Right bank. Clash with proposed wall at all length</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>860</strong></td>
<td>Right bank. Overhead wires junction: 1m distance from wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>907</strong></td>
<td>Right bank. Clash. Utility depth 0.2 m.</td>
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<td></td>
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<tr>
<td><strong>911</strong></td>
<td>Right bank. clash. Utility depth 0.4 m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>920</strong></td>
<td>2 lines present. One clashes, the other line’s distance &lt; 0.2m from the proposed wall</td>
<td></td>
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<tr>
<td><strong>1020</strong></td>
<td>Clash. Utility crosses underneath the riverbed.</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Key: - Red - confirmed, Yellow - services within 1m distance from the proposed Works.
<table>
<thead>
<tr>
<th>Time</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1030</td>
<td>Right bank. Clash with the proposed wall. Utility depth 0.5 m</td>
</tr>
<tr>
<td>1030-1130</td>
<td>Clash with the proposed wall for entire length of the wall (crossing or at a distance &lt;0.5m)</td>
</tr>
<tr>
<td>1070</td>
<td>6 m high from ground level</td>
</tr>
<tr>
<td>1100</td>
<td>Left bank. Clash with the proposed wall. No depth defined for the utility in the utility survey</td>
</tr>
<tr>
<td>1110-1130</td>
<td>Left bank. 3m distance from proposed wall, depth 0.9 m</td>
</tr>
<tr>
<td></td>
<td>Left bank. 3 m distance from proposed wall, 0.5 m depth</td>
</tr>
<tr>
<td></td>
<td>Left bank. 2.5 m distance from proposed wall. No depth defined from the utility survey</td>
</tr>
<tr>
<td>1134</td>
<td>Whitechurch access bridge. 1 m distance from proposed wall, utility depth &lt;0.2 m</td>
</tr>
<tr>
<td>1134</td>
<td>Right bank. Clash with proposed wall. Utility depth 0.7m from ground level.</td>
</tr>
<tr>
<td>1150</td>
<td>Right bank. Clash with proposed wall. Utility depth &lt;0.2m from slope bottom ground.</td>
</tr>
<tr>
<td>1250-1410</td>
<td>Right bank. Utility line above proposed wall, min distance 6.6 from ground level</td>
</tr>
<tr>
<td></td>
<td>Right bank. Clashes with proposed wall. Depth 0.5 m from ground level</td>
</tr>
<tr>
<td>1300</td>
<td>Right bank. Clash with proposed wall. Utility depth 0.5 m from ground level</td>
</tr>
<tr>
<td>1360</td>
<td>Right bank. Potential clash wall- outfall, depth 0.5 m from ground level</td>
</tr>
</tbody>
</table>

Key: - Red - confirmed. Yellow - services within 1m distance from the proposed Works
4 BUILDINGS

A Desktop Archaeological Study carried out for this project which concluded that there will be no impact on any of the existing monuments from the proposed development. However, a pre-construction survey and construction monitoring is recommended.

Some private businesses (a Creche and a Funeral Home amongst others) will have a direct or indirect interface with the Works. There will be also a requirement for access to premises to facilitate the Works. Access permission will be sought to the following areas:

1. Bank improvement in Area 3,
2. At the inlet of St. Gatien's Court culvert in Area 4 on the left bank,
3. At Rathfarnham Ford culvert outlet,
4. Willbrook twin culvert in Area 6, and
5. Area 5, at the Garage culvert opening.
5 ROADS AND ACCESS

5.1 Overview
The proposed Scheme will utilise the two semi-urban narrow single carriageway roads: Sarah Curran Avenue and Whitechurch Road. A narrow footpath at the edge of these roads may require diversion during construction. There is no plan proposed to change the existing road layout under this scheme. However, machinery will take up part of the footpath and the carriageway during construction and hence an appropriate temporary traffic management plan (as shown in Appendix B) must be in place during construction.

5.2 Access
Access to the Works area will be through the Sarah Curran Avenue and Whitechurch Road. Areas 2, 3 and 5 are accessed via a public entrance to St Enda’s Park Car Park. Other Works area will require access permission from landowners. Area 4, the remaining parts of Area 5, 6 and 7 are accessed from the right bank of the stream at the pedestrian walkway.

5.3 Parking Areas
There is a car parking area on the east of the Whitechurch Stream along Sarah Curran Avenue (Figure 5-1). Currently, the parking area is used for visitor parking. This area is proposed to be used as a site compound.

Figure 5-1: Proposed Site Compound in St Enda’s Car Park, in the vicinity of Area 2
6 FLOODING

The Whitechurch Stream catchment is approximately 7.3km² with an estimated Qmed value of 3.26m³/sec. The average slope of the catchment is 1:18 (i.e. 5.6%), which is close to the highest end (6%) of a typical flashy (torrential) catchment with a basin response time of less than 3 hours and flow velocities more than 3m/sec. Because of this, the stream is susceptible to the occurrence of sudden, short and violent flood events that leaves little or no response time for flood warning systems to be effective.

Several on site surveys were undertaken along the Whitechurch Stream to better understand flooding mechanisms, morphological characteristics and inline structures that exacerbate the risk of flooding. It is noted that the stream channel traverses via several narrow bridges and culverts, heavily vegetated sections including trees projecting into the channel, sharp corners and several utilities underneath bridge openings. Under no flooding situation, the water surface is well below the banks and confined within the channel. Where the stream is even slightly curved, inertia throws this fast-moving current against the outside of the curve. Near the inner bank, the quietest waters accumulate. The finest sediments deposited in the channel itself are fine sands.

![Figure 6-1: Fine Deposits Downstream of the Taylor’s Lane within St. Enda’s Park](image1)

Bottom coarse sediments are concentrated mainly in the vicinity of inline structures as culverts or bridges.

![Figure 6-2: Coarse Sediments Upstream of Sarah Curran Bridge](image2)

Silts and muds may be also found along the stream, but these are at the boundary of the proper channel. Signs of blockages are visible, caused mainly by trees.
Figure 6-3: Trees in the Riverbank Downstream of Rathfarnham Ford Culvert

As the Works are on the flood plains, flooding may occur during extreme events as result of overbank flows, blockage of culverts and bridges or surface water drainage pipes.
7 EARTHWORKS AND TREE FELLING

A Site Investigation (SI) was carried out in the form of slit trenches, trial pits and boreholes to determine the exact location and nature of services in the Works area. The findings of the SI Works are summarised as follows:

- Topsoil: encountered in 100 to 200 mm thickness in most exploratory holes.
- Silty/Sandy Gravel: Sandy gravelly clay, frequently with low cobble content and occasionally with bands of clayey sand and gravel. Typically, firm in upper horizons, becoming stiff with increasing depth.
- Bedrock (Limestone): Rockhead was encountered during rotary drilling at depths ranging from 3.6 m in BH03 to 5.9 m in BH01.

The Slit trenches excavated during the SI indicated the presence of different service lines which may interfere with the proposed flood defence Works. Some of these services are listed in Table 3-1. A summary of those encountered are listed in Table 7-1.

Table 7-1: Service that Interface with the Proposed Flood Defence Works

<table>
<thead>
<tr>
<th>Slit Trench ID (River Chainage)</th>
<th>Services interfering with the proposed Flood Defence Works</th>
</tr>
</thead>
</table>
| ST5 (910)                       | - 3 Service ducts (125 mm ø PVC) under the footpath between the grass area and Whitechurch Road at 0.5m depth.  
- 100 mm ø cast iron possible watermain and a 100 mm ø cast iron possible gas line at 0.16m and 0.6 depth respectively between the footpath and the road. |
| ST6 (1050)                      | - 2 cable ducts PVC 100mm ø at 0.45m depth  
- 100 mm ø cast iron possible watermain and a PVC 100mm ø possible gas line at 0.6 depth between the footpath and the road. |
| ST7 (1123)                      | - 300 mm ø concrete sewage pipe and 250 mm ø clay pipe possible sewage in grassed area at 1.55m and 1.6m depth, respectively.  
- 2 cable ducts PVC 100 mm under footpath at 0.4m depth and approx. 2m from existing wall |
| ST8 (1278) ST9 (1340) ST10 (1400) | - 2 cable ducts PVC 100 mm ø under footpath at 0.4m depth and approx. 2m from existing wall.  
- 100 mm cast iron pipe possibly watermain under the footpath at 0.26m depth.  
- 125 mm ø cast iron pipe possibly gas main at approximately 1m from the footpath below the road at 0.75m depth. |

Flood alleviation measures such as bank raising and hard defence construction along with tree removal will require specific earthworks design. It is intended that the proposed ground levels will match the existing ground levels as much as possible while taking into consideration, operational and physical constraints for the drainage of surface water from roads and hardstanding areas. Proposed site levels are indicated on the relevant planning drawings.

Earthworks in general will be fully identified following completion of the geotechnical analysis. In this regard, it is intended to remove the topsoil to accommodate the Works.

All the soil excavated will be stored and managed in the compound located in St Enda’s Car park (Figure 5-1).
8 HEALTH & SAFETY

A designer’s risk assessment for the Works, as required by the Safety, Health, and Welfare at Work Construction Regulations 2013, was compiled by OPW (the designers) and was passed to RPS. Principles of prevention were considered when the assessment was completed. Identified hazards were designed out where possible and mitigation measures where not. The Contractor (or OPW) will be provided with the Preliminary Health and Safety Plan, prior to the construction stage which contains a record of any residual risks arising during construction.
9 CONCLUSION

This report was compiled in support of the Whitechurch Stream FAS Planning Application under Section 177AE of the Planning and Development Act 2000 (as amended). Its aim was to identify existing services in the study area and identify conflicts wherever they might exist within the proposed Scheme boundary and propose mitigation measures where required. Information on utility services within the Scheme relied on from various sources including utility surveys, ground investigation, culvert condition surveys, etc. carried out between May 2018 and December 2019.

The services identified at the subject site run along Whitechurch Road parallel to the stream above or underground crossing the stream under bridges and culverts. Interfaces with the proposed Scheme were identified at different Works areas of the Scheme and hence diversion or other suitable methods must be used during construction to mitigate impacts on these services.
Appendix A: Utility Survey
Utilities Key (Existing Services):

- Overhead Cable Lines
- Gas Lines
- Telecom Lines - with Poles
- Electrical Lines - with ESB Boxes
- Foul Sewer Lines
- Storm Water Lines (Manhole & Chamber Points)
- Watermain Lines
- Combined Sewer Lines
- UNKNOWN SERVICE
- Storm (Surface) Water Lines
- Traffic Ducting - with CCTV Cameras
- Virgin / UPC Ducting Lines
- Lighting Lines - with Lamp Post
- Land (French) Drain
- UNKNOWN CABLES / DUCTS
- Internet Cable Lines
- Service Kiosks
- Valve Chambers

Legend:
- Compensatory Landscape Proposals
- Bridge Removal
- Trash Screen
- Bridge Replacement
- Bank Raising
- Debris Trap
- Possible Remedial Works
- Defence Walls
- Whitechurch Stream (Body of Water)
- Site Extents

Notes:
- All notes, text and symbols on this drawing are intended to give a clear and accurate representation of existing conditions.
- The alignment of any new works may vary from the existing route and should be verified by the recipient.
- This drawing is the property of MPS and is subject to copyright.
- No part of this drawing may be reproduced in any form or by any means without MPS’s written consent.

Construction Information:
- Sheet No. A3
- Scale: 1:50
- Date: 12.05.2013
- Description: Proposed Layout Plan - Existing Utility Drawings
- Site: Whitechurch

Details:
- Drawing No.
- Project Name
- Firm Name
- Contact Person
- Phone Number
- Email Address
- Website

Scale: 1:50 @ A3
Date: 12/05/13

MPS1302-00-A2-DR-C0020-0050
PS

PLANs

PLANNING APPLICATION - PROPOSAL DRAWINGS

SCALE: 1:50

DRAWING NO.

50

PS

2013
Appendix B: Active Traffic Management System
Traffic Management System for Excavations Level 2

Works Cross Section

Traffic Management System for Excavations/Boreholes Level 2
Traffic Management System for Excavations Level 2

Works Cross Section

0.5 ~3.0m

Traffic Management System for Excavations/Boreholes Level 2

General Notes:

The information provided herein is for general reference only. Due diligence is recommended in interpreting the data for specific applications.
Traffic Management System for Excavations Level 2

Works Cross Section
Traffic Management System for Excavations Level 2

Works Cross Section

Traffic Management System for Excavations/Boreholes Level 2
Site Location Area

Design Parameters

- **Road Level:** Level 2
- **Roadworks Type:** Type A&B
- **Speed Limit (Kmph):** 50
- **Temporary Sign:**
  - Sign Visibility (m): 50
  - Number of Signs: 3
  - Advance Sign Spacing (m): 25
- **Rate of Taper:**
  - Taper at Lane: 1 in 15
  - Taper at hard shoulder: 1 in 10
- **Safety Zone:**
  - Longitudinal (m): 25
  - Lateral (m): 0.5
- **Lane Spacing:**
  - Taper: 3.0
  - Longitudinal: 8.0
  - Minimum Lane Width (m): 3.6

Traffic Management System

- **Method:** Static Lane Closure
- **Maximum Canted Area:** 500 m
- **Maximum Traffic Volume:** AADT=5000

Traffic Management System for Excavations Level 2 - Site Entry

Works Cross Section

- **Carriageway**
- **Work Zone**
- **Lateral Safety Zone**

0.5 ~ 3.0m

Traffic Management System for Excavations Level 2 - Site Entry