

# ROYAL ORDNANCE, BISHOPTON



OUTLINE PLANNING APPLICATION FOR THE REGENERATION  
OF THE SITE TO FORM A MIXED USE COMMUNITY GROWTH AREA

## FOUL WATER DRAINAGE STRATEGY

May 2006



**FOUL DRAINAGE STRATEGY  
REPORT**

**FOR**

**PROPOSED REDEVELOPMENT OF  
RO BISHOPTON**

**Client**                      **Redrow Homes (Scotland) Limited**  
**BAE Systems Property Investments Limited**

**Project Number**    **185.0003**      **RO Bishopton**  
**Doc Ref**              **70266C**

<b>Rev</b>	<b>Status</b>	<b>Prepared</b>	<b>Approved</b>	<b>Date</b>
Original	For Comment	J Tod	J Tod	22/8/05
A	For Discussion	J Tod	J Tod	12/9/05
B	Final Draft	J Tod	J Tod	04/02/06
C	Final Issue	J Tod		09/05/06

### Foul Drainage Strategy Outline Planning Application



#### Introduction

The Royal Ordnance Factory at Bishopton is a around 1,000ha in extent and is located to the south west of Bishopton in Renfrewshire. The RO Bishopton site is separated from the main part of the village of Bishopton by the Glasgow to Greenock railway line. The site has over 2200 buildings across it's area and has been extensively developed over the years. Due to the nature of production on site there is a reasonable amount of separation on site with several areas of mature woodland being present within the grounds.

For the past century the site has been used, to different levels of intensity, for the production of explosives. The owners of the site, BAE Systems, announced their intention to cease manufacturing at the plant in December 1999.

Following this announcement a working group was established by the Scottish Executive to investigate the feasibility of remediating and redeveloping the site. The resulting study from the working group set out a number of differing development scenarios in relation to the core objectives set by the working group. Subsequent to this study further investigation was commissioned by BAE Systems to undertake a more detailed analysis of the regeneration proposals and in particular to consider in more detail the scale and mix of development which would satisfy both strategic planning requirements and be commercially viable.

The proposals from this additional study identified the potential for an expansion to the existing Bishopton settlement to the west with a mix of residential, commercial, business, community and recreational uses, with the majority of the site retained as undeveloped land with public access.

The proposed redevelopment comprises

- around 2,500 residential units
- about 150,000 m<sup>2</sup> of new employment floor space
- multi-modal transport junction
- local retail expansion
- local expansion of community facilities
- potential for a new primary school
- Woodland Park
- Landfill and Associated Buffer

The proposed land use plan is provided within Appendix 1 of this strategy report.

**Foul Drainage Strategy  
Outline Planning Application**

The proposed areas of land use within the application are as detailed below

<b>Land Use</b>	<b>Area (Ha)</b>
Residential	90.77
Employment (Business Park)	40.31
Commercial	1.91
Mixed Use (community, commercial, residential)	7.62
<b>Total Development Area</b>	<b>140.61</b>

Upton McGougan were commissioned by Redrow Homes (Scotland) Limited and BAE Property Investments Limited to consider the strategic servicing of the site in respect to foul drainage provision and compile a report in support of the Outline Planning Application.

The redevelopment of the site is envisaged to be undertaken over a period of up to 15 years. It is therefore possible that the options identified as the main strategy to be followed at this time may change over time to reflect changes in the regulatory regime and capacity or other technical issues in the infrastructure network over this period.

This high level foul drainage strategy report is therefore not considered to reflect the final strategy which will be adopted but to identify the most likely route which will be progressed at the outset of site redevelopment.

### Foul Drainage Strategy Outline Planning Application

---



#### Existing Drainage Regime

The existing drainage network on site is a combined foul and surface water system collecting at a private on site sewage treatment works around 200m south of Dargavel House (see location plan 01 in Appendix 2) operated by BAE Systems. A discharge consent regulated by SEPA is currently in force for the Sewage Treatment Works allowing discharge within certain conditions to the adjacent Dargavel Burn.

In addition to the sewage treatment works on site accepting discharge from buildings within the site boundary it is understood that for historic reasons the seven properties on Sachelcourt Avenue, to the south east of Gladstone Hill also discharge into the on site sewerage network.

Other discharges of industrial effluent are known to have occurred, with limited treatment, direct to site watercourses over the years and it may therefore be the case that existing buildings and facilities continue to be capable of discharge direct to watercourses. A series of drainage ditches and trenches across the site indicate that this was the situation through the life of the operation of the factory.

In 2002 Scottish Water undertook an assessment of the existing on-site treatment works which identified that the facility is in poor condition and would require significant investment to bring it to adoptable standards.

#### Options for Redevelopment

Within the proposed redevelopment of the site it is intended that separate surface water and foul drainage systems be adopted. The redevelopment will remove most of the original operational factory development and consequently, with the exception of legacy discharges from the Environmental Test Facility and the properties on Sachelcourt Avenue, surface water from the development will be excluded from the foul sewerage network, being treated and accommodated separately through a Sustainable Urban Drainage System.

With regard to the foul drainage system it is proposed under each of the options identified that the system will be collected in the southern part of the development area to accommodate the existing site topography. Collection will occur at either the existing sewage treatment works or at a new main pumping station within the development area.

In order to achieve this it will be necessary to utilise satellite pumping stations, with integrated emergency storage and emergency overflows to adjacent watercourses/ surface water sewers, within the development area to locally lift sewerage into a gravity sewer system to accommodate the lengths of development whilst meeting required adoptable standards and dealing with the ground conditions on site. The design and location of these satellite pumping stations will be undertaken within the detailed drainage network design allowing site configuration, phasing and layouts to be accommodated. The number of satellite pumping stations will be minimised.

The following options have been considered in servicing the redevelopment of the RO Bishopton Site for foul sewerage provision

**1 Upgrade the Existing Site Treatment Works**

In 2002, during the assessment of the existing treatment works by Scottish Water, preliminary costs for upgrading were identified at around £4m.

With a tightening of discharge consents likely to be implemented over the life of the redevelopment and the reduction in dilution of foul sewerage at the treatment works through removal of the surface water from the system then there are serious and fundamental issues surrounding the ability of the existing facility, even upgraded, to achieve the treated water quality levels required for ongoing discharge consents.

Following discussions with SEPA we understand that they would be concerned with the discharge of effluent from a sewage treatment works servicing the proposed development to either the Dargavel Burn, where it is considered that limited dilution would be available, or to the River Gryffe which is a high quality salmonic river with low flow characteristics during the summer months. Consequently the preferred SEPA route would be to seek a solution which avoids the discharge of effluent to a local watercourse. Discharge to either of these watercourses would require extensive modelling of the dilution characteristics to be expected.

The Dargavel Burn cannot be considered a major watercourse and consequently even with secondary or tertiary treatment options in place in addition to upgrades of the existing works, there would remain concerns that during dry spells flow rates in the Dargavel would be insufficient to allow adequate dilution of discharge effluent to meet discharge consents. Similar concerns exist regarding the River Gryffe.

Consequently it is unlikely that the upgrading of the existing site sewage treatment works can be considered as a realistic option to service the proposed development in the longer term. The treatment works could however serve a useful function during the course of remediation works on site as a backstop for control of discharge to the Dargavel Burn.

## 2 Discharge to the Local Sewerage Network

The existing sewerage system within Bishopton is understood to be mainly a combined foul and surface water piped system. The system flows generally south and discharges to a Scottish Water pumping station on the east of the A8 from where it is pumped to discharge into the sewerage network on the outskirts of the town of Erskine and flows to Erskine WWTW.

Locally within Bishopton there are some areas of separate sewerage systems however these combine in the main combined sewer running through Bishopton.

Due to local topography of the site being lower than Bishopton, this option will require the construction of a strategic pumping station with associated storage and dosing facilities in the southern part of the development zone.

From this new pumping station the sewerage would be pumped to a suitable connection point within the Bishopton system, either an existing pumping station or a suitable manhole.

The existing sewerage network between Bishopton and Erskine WWTW would require to have the capacity available to deal with the complete flows from the proposed development however this could only be confirmed through undertaking a Drainage Impact Study (DIS) on the existing network to identify existing capacity or determine the required infrastructure upgrades.

In discussion with Scottish Water on this subject it has been confirmed that should upgrading of the existing infrastructure network be undertaken to accommodate any works identified from a DIS, this increased capacity could not be reserved over the life of the development for the proposed site redevelopment and could be utilised by other developments in the wider area.

**Foul Drainage Strategy  
Outline Planning Application**



With regards to phasing of the works it would be necessary to construct an appropriately sized rising main to accommodate the whole development at the outset although during the life of the works it should be possible to add additional pumps to accommodate the growth over the life of the development. Excessive storage will require to be avoided at the early stages of the development to avoid septicity of sewerage occurring however this can be accommodated through the use of modular storage constructed in line with the growth of the development or through float switch settings allowing the required storage to be constructed from the outset but not utilised until required.

Erskine WWTW has recently been upgraded and we have been advised by Scottish water that available capacity at the WWTW is of the order of 10,000 population equivalent (p.e.). At the average Renfrewshire population of 2.3 persons per household this equates to the equivalent of around 4350 residential units which can be accommodated at Erskine WWTW within the current upgrade.

Whilst no guarantees are provided by Scottish Water on the availability of this capacity over the longer period, it appears unlikely at this time on the basis of 10,000 p.e. capacity currently being available that further upgrades or infrastructure strengthening works would be necessary to Erskine WWTW through the lifetime of the proposed development.

#### 3 Discharge Directly to Erskine WWTW

As identified above, Erskine WWTW has recently been upgraded and available treatment capacity of 10,000 p.e. has been identified at Erskine WWTW which could accommodate the proposed redevelopment at RO Bishopton.

As with the option of discharging to the existing local sewerage network, this option would require similar on site infrastructure. In this instance the rising main from the pumping station would bypass the existing sewerage infrastructure network and be taken to discharge directly into Erskine WWTW.

This approach has the advantage that no additional load is applied to the existing sewerage infrastructure network and that it is unlikely that connections from outwith the proposed redevelopment would be connected to the rising main.

Whilst the rising main would require to be sized at the appropriate size for the final development, options similar to those identified above would be possible for adding pumps and controlling storage through the life of the development.

This option was identified with Scottish Water as providing the most cost effective solution to the proposed development. In 2002 the cost of constructing an appropriately sized main pumping station with storage and dosing facilities was estimated at around £1M with the cost of rising main estimated at around £2.2M.

Of benefit to the planning application is that this option has been identified with Scottish Water as being cost effective and achievable whilst allowing significant parts of the infrastructure installed under this option to be dedicated to servicing the development over its full life.

### Foul Drainage Strategy Outline Planning Application



#### Scottish Water

During the course of evaluating the strategic options available to service the proposed redevelopment, various discussions and correspondence have been entered into with Scottish Water.

From these discussions it is clear that at this stage in the proposed redevelopment of the site that Drainage Impact Studies into the options for discharging to the existing sewerage network are of limited long term value and are unlikely to provide confidence that identified capacity within the existing sewerage network at this time will be available when development commences or be reserved through the life of the proposed development.

The discussions have however confirmed that in the recent upgrading of Erskine WWTW, whilst predominantly geared to accommodating wastewater from Linwood and Johnston catchments, currently provides additional capacity to accommodate discharge from 10,000 p.e. which can be utilised in the redevelopment of RO Bishopton.

[The initial planning for the expansion of the Erskine WWTW included for ROB as it was, at the time, a strategic development opportunity for the long-term identified in planning policy]

In the discussions with Scottish Water it was confirmed that the robust approach to the strategic foul sewerage servicing of the development site is to construct new pumping, storage and treatment facilities locally to the site whilst discharging from this new pumping facility directly to Erskine WWTW.

Copies of correspondence from Scottish Water related to this matter are included within Appendix 3.

Drawing 185.0001-STW01, (Appendix 4) identifies a potential route to the Erskine WWTW from within the development site.

#### Strategic Recommendation

The strategic solution to achieving foul sewerage capacity for the proposed development at RO Bishopton with most confidence that this will be available over the life of the development is to construct a new main site pumping facility in the vicinity of the existing waste water treatment works on site discharging directly to Erskine WWTW.

The pumping station would be provided with storage and dosing facilities. The volume of storage could be increased over the lifetime of the development to accommodate the phased development either through constructing additional storage or managing the level of storage through mechanical means. The rising mains from the pumping station would be routed out of the site through one of the existing access points and taken, via a route to be agreed with Scottish Water, directly to Erskine WWTW.

Available capacity has been identified at the upgraded Erskine WWTW to accommodate 10,000 p.e. This translates to around 4350 residential units and is more than proposed for the redevelopment of the site. Whilst Scottish Water have advised that this capacity cannot be reserved solely for the development at RO Bishopton, there do not currently appear to be other sizeable developments proposed within the Erskine WWTW catchment area which would reduce this capacity significantly.

Within the development area a foul sewerage network comprising of gravity sewers discharging to local satellite pumping stations will be adopted due to the relatively flat nature of the site. The satellite pumping stations will either discharge to the main pumping station or provide a local 'lift' within the network to discharge within the gravity system. The number of satellite pumping stations will be minimised.

Whilst discharge directly to Erskine WWTW forms the basis of the foul sewerage strategy in support of the outline planning application, at detailed stages Drainage Impact Studies will be commissioned through Scottish Water to identify whether capacity is available within in the existing local sewerage network or available through local upgrades.

**Foul Drainage Strategy  
Outline Planning Application**



Should reasonable capacity be identified as available then this would allow utilisation of the existing network for the first phase(s) of the development, increasing the sustainability of the proposed development through improving the efficient usage of existing sewerage assets and subsequently reducing the size and energy usage of any new sewerage infrastructure to be constructed.

Upton McGougan  
May 2006

RO Bishopton

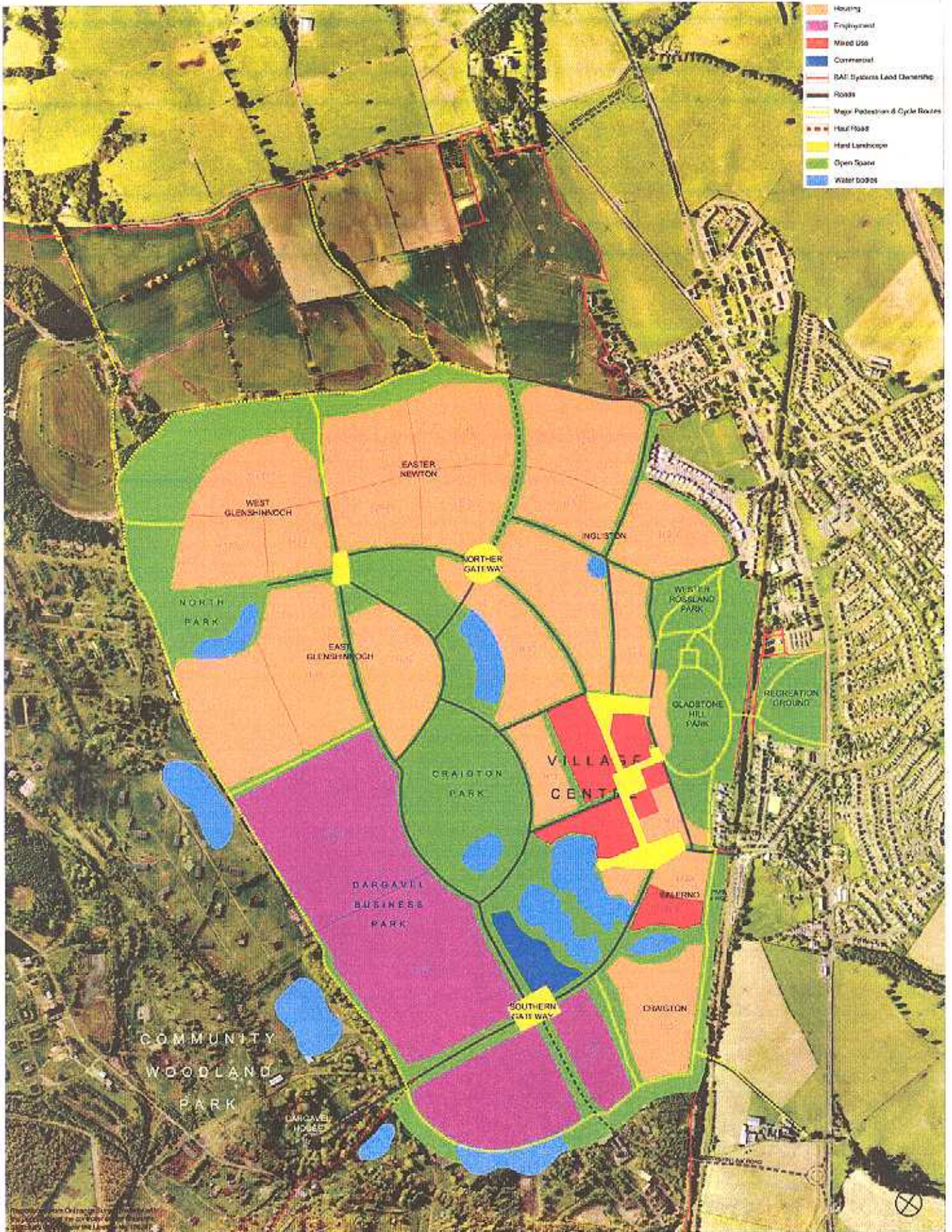
**Foul Drainage Strategy  
Outline Planning Application**

---



**Appendix 1**

**Land Use Plan for Development Area**



Proposed Development Outline Plan. This plan shows the proposed development on the site of the former Royal Ordnance Bishopton. The plan is for information only and does not constitute an offer of any land or interest in land.

**Cass Associates**  
 Suite 104 The Tin Factory  
 82 Wood Street Liverpool L14 0D  
 Tel 0151 707 0110 Fax 0151 707 0332  
 Email: [cl@casassociates.co.uk](mailto:cl@casassociates.co.uk)

Drawing 516

**SITE PLAN**

scale: 1:12,500 @ A4

date: 21.12.05

dir: SW

ROYAL ORDNANCE, BISHOPTON

APPENDIX 1



Appendix 2  
Location Plan for Sewage  
Treatment Works





Appendix 3  
Scottish Water  
Correspondence

29 September 2005

Upton McGougan Ltd  
6 Forres Street  
Edinburgh  
EH3 6BJ

**SCOTTISH WATER**

419 Balmore Road  
Glasgow  
G22 6NU

T: 0141 355 5038  
F: 0141 355 5449  
W: [www.scottishwater.co.uk](http://www.scottishwater.co.uk)

FAO James Tod

Dear Sirs,

**Bishopton ROF**  
**Your Ref : 185.0003/JT/GC**

I refer to your letter dated 26<sup>th</sup> September 2005 regarding the above development and I apologise for the delay in my reply but I have been awaiting information from other parties within Scottish Water.

At the present time Erskine STW has the capacity to accommodate the anticipated flows from your development and additional development in the catchment. As Scottish Water cannot reserve capacity and as the development will be constructed in at least five housing stages and any number of commercial/industrial stages we cannot guarantee that the latter stages of your development will be able to connect to the STW. An assessment of the works capacity may also be required for the later stages of the development.

I have forwarded the necessary information to our Asset Planners and I anticipate I will have the costs for the Drainage Impact Assessment at the end of next week.

I have also read the report you submitted earlier this month and agree in principle with your proposals and recommendations.

With regards the water supply, there is sufficient capacity within the water network to serve the development at the present time but flow and pressure tests may be required to assess each new phase prior to construction.

With regard to your planning submission, providing it is acceptable to Renfrewshire Council, I will confirm that we will not object to the application as there is available capacity at the water and sewage works at the present time and I will also add the following conditions:

Con/d....

29 September 2005

Upton McGougan

- 1 A drainage impact assessment will be required and providing the developer confirms he will carry out any mitigation required we will not object to the application and the works can proceed.
- 2 Flow and pressure tests will be required on the water network prior to each phase commencing.
- 3 The developer must confirm that should the available capacity on the infrastructure or treatment works have to be increased during the lifetime of the project, he will enter into further discussions with Scottish Water regarding any upgrading and agree to pay for any studies as dictated by the Scottish Executive and constraints placed on Scottish Water, at that time, before development can proceed.

If you have any questions regarding the above please contact me at the above address.

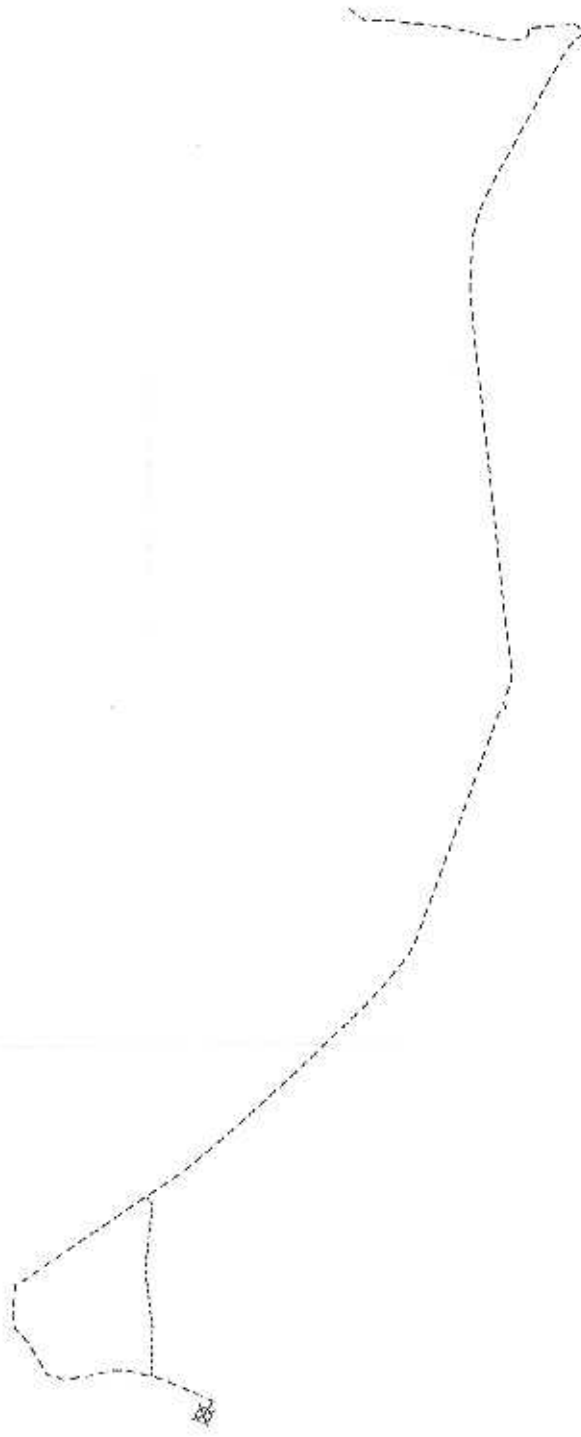
Yours faithfully

A black rectangular redaction box covering the signature of Kevin John O'Hare.

Kevin John O'Hare  
Development Planner

**Appendix 4**

**Potential Route to  
Erskine WWTW**




  
 City of Bishopton  
 1000 10th Street  
 Bishopton, ON L9R 1A5  
 Tel: 416-223-1100  
 Fax: 416-223-1101  
 www.bishopton.ca

PROJECT:  
**PROPOSED REDEVELOPMENT  
 OF RD BISHOPTON**

PROJECT NO.	DATE	DESCRIPTION
185-0003-SW01	2014-05-10	POTENTIAL LINE OF SEWER FROM RD BISHOPTON TO BRISGALC WHTW UNDER ADOPTED HIGHWAY
DATE	BY	SCALE
2014-05-10	1:10,000	2014-05-10

185-0003-SW01  
 POTENTIAL LINE OF SEWER FROM  
 RD BISHOPTON TO BRISGALC WHTW  
 UNDER ADOPTED HIGHWAY

ALL  
 SHEET NO. 1  
 OF 1  
 DATE: 2014-05-10