



**Document Ref:** 2010/D0023/10/1503 Revision 1  
**Batch Name:** Batch 9  
**Project Title:** MTM 100125 – Amp5 Combined Medium Treatment  
Huddersfield  
**YW Project Ref:** D0023  
**Site:** **Silkstone WwTW**  
**System:** New Access  
**Risk Reference(s):** 112981  
**Solution ID(s):** 328537  
**Subject:** **Silkstone WwTW – Desk Study Summary of Findings**

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>                             | Silkstone WwTW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Project Reference</b>                         | 28533                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Site Location &amp; Description</b>           | <p>Silkstone WwTW, Silkstone, Barnsley, West Yorkshire (NGR: 429500, 406510).</p> <p>The site comprises a section of the works access road that is at risk of instability due to erosion from the Banks Bottom Dike. The site is located approximately 120m to the south west of the WwTW and other than the access road immediately to the south and the watercourse to the north, is generally bounded by agricultural land.</p>                                                                                                                                                                                                                                                                                                                              |
| <b>Proposed Works</b>                            | <ul style="list-style-type: none"> <li>A gabion retaining wall is proposed along a small section of the existing track providing access to the works. The gabion wall is proposed to protect the access track from slope instability due to riverbank erosion from the Banks Bottom Dike. The access road is around 3m to 4m above the watercourse.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Sources of Information</b>                    | <ul style="list-style-type: none"> <li>Ordnance Survey Outdoor Leisure 1, The Peak District – Dark Peak, 1:25,000 scale, dated 2009.</li> <li>Landmark Information Group, Envirocheck Report Reference 32723307_1_1, dated 07/10/2010.</li> <li>British Geological Survey, Map Sheet 87 Barnsley, Solid and Drift Edition, 1:50,000 scale, 2008.</li> <li>Coal Authority Report, Silkstone WwTW, Barnsley, reference 00044729-10, dated 08/10/2010.</li> <li><a href="http://www.BGS.ac.uk">www.BGS.ac.uk</a>, BGS lexicon of named rock units.</li> <li><a href="http://www.Zetica.com">www.Zetica.com</a>, unexploded ordnance threat assessment.</li> <li>Mapping and aerial photography, <a href="http://www.google.co.uk">www.google.co.uk</a>.</li> </ul> |
| <b>Geo-environmental Development Constraints</b> | <p><b>Geology</b></p> <ul style="list-style-type: none"> <li>Made Ground is likely to be present across the site associated with the construction of the access road and the presence of a slag heap immediately to the east.</li> <li>The historical maps indicate that the Silkstone Beck previously ran through the centre of the WwTW. A mixture of well-graded variable alluvial deposits inclusive of cobbles and boulders is likely to be unevenly distributed across the site. The geological map confirms the presence of</li> </ul>                                                                                                                                                                                                                   |

## SILKSTONE WWTW

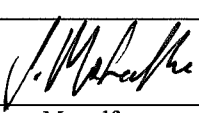
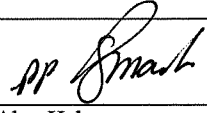
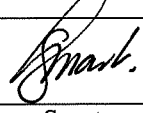
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|  | <p>alluvial deposits across the site. The bedrock comprises the Pennine Coal Measures Group and contains sandstones, mudstones, siltstones and subordinate coal seams.</p> <p><b>Mining &amp; Mineral Extraction</b></p> <ul style="list-style-type: none"> <li>• Stanhope Colliery, 'Old Shafts' and mines are recorded adjacent to the site on the historical maps. The closest of which are two mine shafts present around 50m and 60m to the east of the site. Furthermore, the Coal Authority confirm that the site is within the likely zone of influence from workings in 3 seams of coal at shallow to 140m depth, and last worked in 1972.</li> <li>• A BGS Recorded Mineral Site is present immediately to the west of the site. The Silkstone Brook Pits historically extracted deep coal.</li> <li>• The geological map indicates that the conjectured subcrop of the Silkstone Four Foot (Wheatley Lime, Clayton Common) Coal is present approximately 50m to the south west of the site, locally orientated north west to south east. The seam dips towards the north east, is between 0m to 1.60m thick and is shown to have been worked, furthermore, the coal seam is likely to underlie the site at shallow depth.</li> <li>• The Coal Authority also confirm that several disused mine shafts are located within the land adjacent to the site confirming that coal seams beneath the site are likely to have been worked at sometime in the past. Furthermore, additional shafts may exist elsewhere, of which the Coal Authority have no knowledge. The nearest shaft, referenced 429406-003 located around 50m to the east has no treatment details. Shaft reference 429406-002, present around 60m to the east has been capped to an unknown specification.</li> <li>• A mine-related subsidence claim has been made against the Coal Authority for the land immediately to the west of the site. No details of the claim are available, furthermore it is not known what measures, if any have been taken to mitigate against the subsidence.</li> </ul> <p><i>Mining and Mineral Extraction Summary</i></p> <p>The Silkstone Four Foot coal seam is anticipated at shallow depth beneath the site. This seam has previously been worked by opencast methods approximately 40m to the south west of the site. It is not certain if this seam has been worked beneath the site in the past, however, a coal mining subsidence claim area is present around 30m to the north of the site and 2no. historic mine shafts are noted around 50m to the east. It is therefore possible that historic workings are present at shallow depth within the vicinity of the proposed works.</p> <p>Based on the above it is considered that there is a risk to both the proposed works and the health and safety of construction workers from the collapse of historic mine workings. This risk should be investigated further as discussed below.</p> <p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>• The extreme southern section of the WwTW and the area proposed for gabion reinforcement are situated within recorded historic landfill sites. The Envirocheck Report notes that the landfill accepted household waste and liquid sludge. Highly variable decomposed material which may be</li> </ul> |
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**SILKSTONE WWTW**

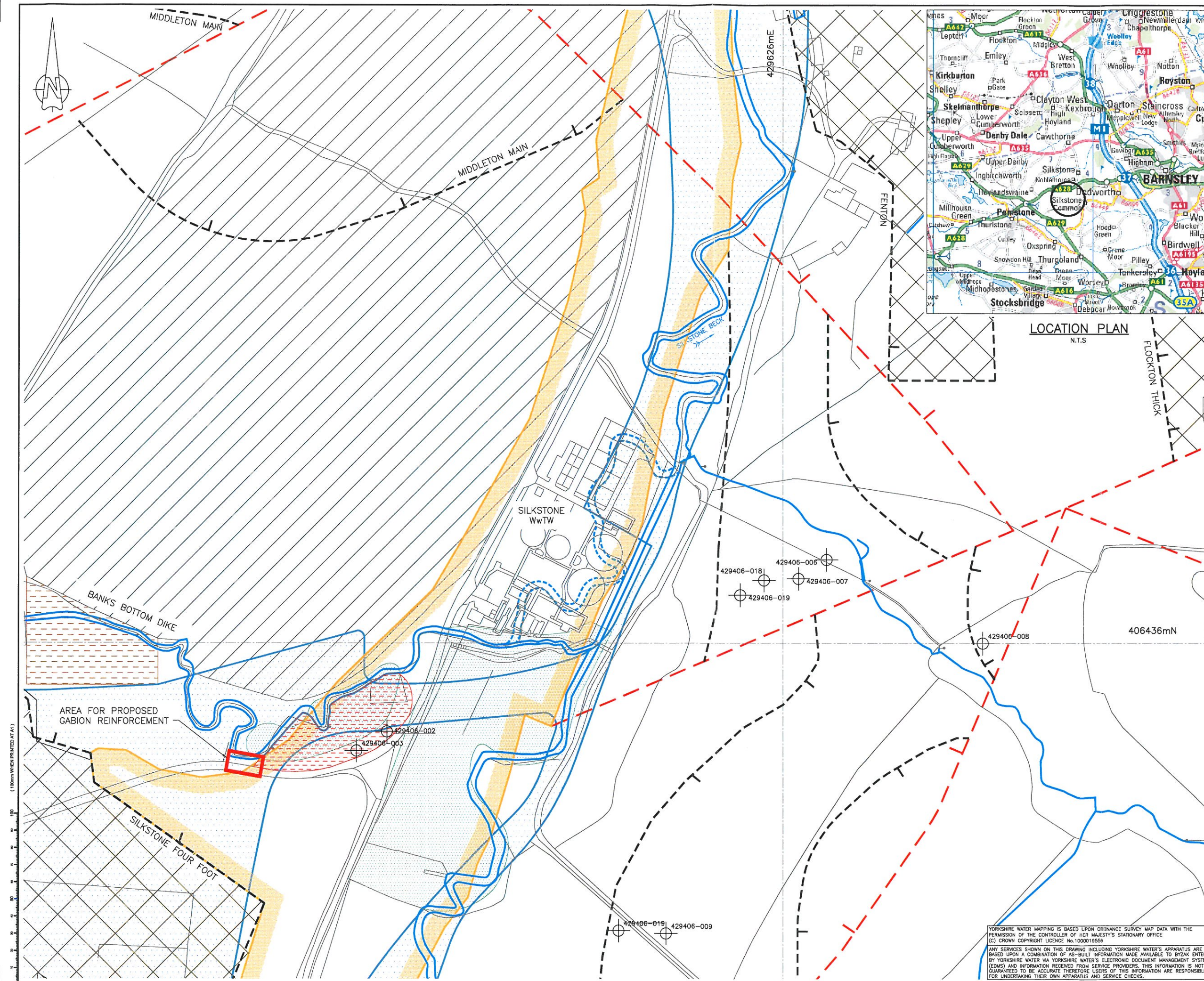
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|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>contaminated is has the potential to be present.</p> <ul style="list-style-type: none"> <li>• A slag heap is present within the immediate vicinity of the proposed gabion wall. The slag heap is likely to comprise variable, potentially contaminated material.</li> <li>• The majority of the site is considered to be at risk of flooding from the Banks Bottom Dike. Furthermore the site is suffering from riverbank erosion and associated slope stability problems. In the vicinity of the slag heap this process may be intensified due to the additional load posed on the riverbank.</li> </ul> <p><b>Other</b></p> <ul style="list-style-type: none"> <li>• Services are likely to be present across the site.</li> </ul> <p>A Geotechnical Risk Register and Hazard Map are attached.</p> |
| <b>Recommendations</b> | <p>It is recommended that a ground investigation is completed at the site to enable the safe design and construction of the works.</p> <p>The proposed ground investigation comprises a single rotary cored borehole (utilising open-hole techniques to rockhead) to a depth of 15mbgl. The borehole is recommended to confirm the absence of historic mine workings at shallow depth and provide information on the ground and groundwater conditions within the vicinity of the proposed works.</p> <p>The cost of the ground investigation inclusive of <i>in situ</i> and laboratory testing and the provision of a factual report is likely to be around £4,000.</p>                                                                                                                                |

**Drawing Number      Drawing Title**

2010/D0023/03/1300      Geotechnical Hazard Map

| Main Contributor                                                                    | Issued By                                                                           | Checked By                                                                            |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |
| Steven Metcalfe                                                                     | Alan Helmore                                                                        | Graeme Smart                                                                          |



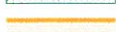


NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE

2. ALL LEVELS IN METRES A.O.D. UNLESS STATED OTHERWISE

LEGEND:

|                                                                                     |                                                                         |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|  | SITE BOUNDARY                                                           |
|  | EXTENT OF FLOOD RISK AREA (AS SHOWN IN ENVIRONMENTAL REPORT)            |
|  | HISTORIC WATERCOURSE                                                    |
|  | COAL SEAM (DIP DIRECTION NOTED BY TICK) COAL SEAM LABELLED WHERE KNOWN. |
|  | GEOLOGICAL FAULT (DOWNTROW NOTED BY TICK)                               |
|  | DISUSED MINESHAFT                                                       |
|  | HISTORIC MINE                                                           |
|  | SLAG HEAP (HISTORICAL MAPS)                                             |
|  | COAL AUTHORITY MINE SUBSIDENCE CLAIM AREA                               |
|  | BGS RECORDED LANDFILL AND MINERAL SITE                                  |
|  | EXTENT OF ALLUVIAL MATERIAL                                             |
|  | INFILLED GROUND (MAINLY RESTORED OPEN CAST SITES)                       |

|     |      |             |    |      |        |
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| REV | DATE | DESCRIPTION | BY | CHKD | APPR'D |
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REVISIONS

|     |      |             |    |      |        |
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| REV | DATE | DESCRIPTION | BY | CHKD | APPR'D |
| A   | 2010 | FIRST ISSUE | AM | MS   | AS     |

MULTIDISCIPLINARY CHECK BOX

|     |      |     |    |    |    |     |       |     |       |
|-----|------|-----|----|----|----|-----|-------|-----|-------|
| REV | DATE | CIV | PR | ME | EL | ICA | STRUC | GEO | P&ENV |
| A   |      |     |    |    |    |     |       |     |       |

BYZAK ENTEC  
LIVINGSTONE HOUSE  
CHADWICK STREET  
LEEDS  
LS10 1LJ

EMPLOYER  
YORKSHIRE WATER  
SERVICES LTD.

YWS PROJECT NO.  
D0023

YWS PROJECT TITLE  
MTM100140  
AMP5 MEDIUM TREATMENT  
BATCH 9  
SILKSTONE WwtW

TITLE  
GEOTECHNICAL HAZARD MAP

LEAD DISCIPLINE / CATEGORY  
GEOTECHNICAL

STATUS  
DETAILED DESIGN

|                              |                       |
|------------------------------|-----------------------|
| DRAWING SCALE (DO NOT SCALE) | ORIGINAL DRAWING SIZE |
| 1:1000                       | 594 x 841 – A1        |

|                                  |           |
|----------------------------------|-----------|
| DRAWING No<br>2010/D0023/03/1300 | REV.<br>A |
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## Geotechnical Risk Register

GRR 01

Entec UK Ltd

Entec Project Number: 28533\_Silkstone

Project Title: Silkstone STW

Stage: Desk Study

Compiled by: SM 15.11.2010 Checked by: AH

The risk register is a means of documenting perceived risks and their importance and recording actions taken to manage them. The key elements of a geotechnical risk register are as follows:

1. Identify the geotechnical risks.
2. Identify the methods of construction that may be incorporated into the project.
3. Scale the risks according to probability and impact.
4. Based on the severity of each risk, decide on the type of action.
5. Identify how each risk should be managed.
6. Record the actions taken to manage the risk.
7. Reassess the severity of each risk after action has been taken.
8. Review the risk register at regular intervals and communicate.

The risk register is a live document and should be reviewed on a regular basis and at the end of each stage of the project.

The probability (P) that a given event will occur is given by the following:

| <u>Scale</u> | <u>Likelihood</u> | <u>Chance per section of work</u><br>(Amend to suit local conditions and to be agreed with the Client) |
|--------------|-------------------|--------------------------------------------------------------------------------------------------------|
| 1            | Negligible        | < 1 in 100                                                                                             |
| 2            | Unlikely          | 1 in 100 to 1 in 10                                                                                    |
| 3            | Possible          | 1 in 10 to 1 in 5                                                                                      |
| 4            | Probable          | 1 in 5 to 1 in 2                                                                                       |
| 5            | Almost certain    | > 1 in 2                                                                                               |

The impact (I) of a given event is given by the following:

| <u>Scale</u> | <u>Effect</u> | <u>Increase in cost or time (% increase)</u><br>(Amend to suit local conditions and to be agreed with the Client) |
|--------------|---------------|-------------------------------------------------------------------------------------------------------------------|
| 1            | Negligible    | < 1%                                                                                                              |
| 2            | Very low      | 1% to 4%                                                                                                          |
| 3            | Low           | 4% to 8%                                                                                                          |
| 4            | High          | 8% to 15%                                                                                                         |
| 5            | Very high     | > 15%                                                                                                             |

The risk after the application of risk control measures should be reviewed in the light of the following table:

| <u>Degree of Risk</u> | <u>Risk Level</u> | <u>Action Required</u>                                                                                  |
|-----------------------|-------------------|---------------------------------------------------------------------------------------------------------|
| 1 - 4                 | Trivial           | None                                                                                                    |
| 5 - 9                 | Tolerable         | Consider more cost-effective solutions or improvements                                                  |
| 10 - 15               | Substantial       | Work must not start until risk has been reduced                                                         |
| 16 - 25               | Intolerable       | Work must not start until risk has been reduced. If risk cannot be reduced, project should not proceed. |

The risks and their potential impacts may vary between the various stages of the project, such as the risk to and from buried services, where the impact can be much higher during a ground investigation than during a desk study.

| Stage      | Risk No | Hazard                                                                                               | Prior to RCM    |            |                  | Risk Control Measure (RCM)                                                                                                                                       | After RCM       |            |                  |
|------------|---------|------------------------------------------------------------------------------------------------------|-----------------|------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|------------------|
|            |         |                                                                                                      | Probability (P) | Impact (I) | Risk (R = P x I) |                                                                                                                                                                  | Probability (P) | Impact (I) | Risk (R = P x I) |
| Desk Study | DS 01   | Possible presence of contaminated Made Ground associated with WwTW, slag heap and historic landfill. | 4               | 4          | 16               | Contractors to wear appropriate PPE during ground investigation, samples of Made Ground to be taken and tested for contamination.                                | 2               | 2          | 4                |
|            | DS 02   | Presence of variable water-bearing alluvial material.                                                | 3               | 3          | 9                | Complete ground investigation to investigate nature of ground and groundwater conditions.                                                                        | 2               | 2          | 4                |
|            | DS 03   | Slope instability within the vicinity of the proposed gabion wall.                                   | 3               | 4          | 12               | Complete ground investigation to obtain geotechnical parameters to enable slope stability assessment to be completed.                                            | 2               | 2          | 4                |
|            | DS 04   | Large areas of the site are considered to be at risk from flooding from the Banks Bottom Dike.       | 4               | 4          | 16               | Proposed works should take into account the affects of river flooding.                                                                                           | 2               | 2          | 4                |
|            | DS 05   | Health and safety issues, working close to active services.                                          | 4               | 5          | 20               | Avoid existing services where possible and adopt revelant PPE.                                                                                                   | 2               | 2          | 4                |
|            | DS 06   | Existing underground and overhead services.                                                          | 4               | 4          | 16               | Obtain service plans from utility companies, C.A.T scan the site prior to commencing works, avoid overhead cables. Call out service providers in critical areas. | 2               | 2          | 4                |