

**MC2191 Rissington**  
**Bund and Pond Construction and**  
**Export of Excess Soils.**

**Victory Field, Upper Rissington**  
**Report**

June 2017

Produced for  
**Bovis Homes Limited | Western region**  
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### APPROVAL BY SITE MANAGER

I Confirm I have read reviewed and amended this method statement and will amend the method statement to suit my method of working and traffic management on site.

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# 1 Introduction

This report is prepared for the site at Victory Fields, Upper Rissington, Cheltenham. GL54 2QB

The site is a new residential development practically completed with occupants in the new residences which required management of material stockpiles and final earthworks to landscape and POS areas.

The project involved processing existing material stockpiles, pond construction, earthworks and topsoil to landscape areas.

The following summarises the activities completed:

1. Mobilise to site
2. Pre-start inductions, briefings, checks and inspections
3. Assess and set up work areas, fencing and traffic routes
4. Confirm status of existing services and features, identify and protect as required
5. Puncture / break existing concrete slab to Fill Area 1 footprint
6. Process existing material stockpiles
7. Return material to fill areas and place to required profiles
8. Regrade existing fill areas to required profiles
9. Earthworks cut & fill to pond area (as design by others)
10. Load & haul surplus materials to Moreton site / return load with topsoil under MMP
11. Load unsuitable materials for disposal off-site (by others)
12. Place topsoil to landscape areas
13. Demobilise from site

## 1.1 Design

The following documents were referenced as the design documents,

1. WSP, Drawing 0412-EWK-100-N, 16<sup>th</sup> September 2016, Earthworks Strategy Proposed Fill Areas.
2. Services Drawing – Multiple (see HSE - CPP).
3. Bovis/Linden, February 2017, Residual Hazards Plan Feb 17.
4. Hydrock Consulting Limited, Document Ref: C14761/004, 14<sup>th</sup> September 2016, Former RAF Rissington – Geotechnical Design Check of Proposed Attenuation Pond.
5. Linden/Bovis Homes – Earthworks Specification, Attenuation Pond Construction – RAF Rissington, R/14761/002
6. WSP, Drawing 0412-GA-201-D, 04<sup>th</sup> January 2017, Proposed Pond General Arrangement.
7. Materials Management Plant – by Merebrook

## **1.2 Preliminaries/Enabling works**

The preliminaries and enabling works included;

1. Functions associated with being Principle Contractor, Health and Safety plan, RAMS, Traffic Plan (including off-site and onsite routes), service drawings.
2. Community engagement (e.g. letter drop) and liaison with the local school on traffic flows.
3. Support to Merebrook Consulting with the Materials Management Plan.
4. Production of an agreed Digital Model for the final formation and finish levels. To include the pond area, landscaping bund and an additional area requested.
5. Site Establishment, set up self-contained drying room, canteen small office and toilet. Supplied and erected additional fencing and signage to that already in place to define the work areas.
6. Setup GPS base station at known coordinates to allow accurate machine control. Upload digital model to intelligent plant (1 or more excavator and 1 dozer).
7. Appointed site manage team to oversee the works.
8. Breaking of the concrete pavement to allow sufficient drainage through the slab to the underlying material.

## 2 Stockpile Management

The stockpiles were managed as shown in Table 1, below.

The non soils waste material i.e. timber, plastic, metal etc., was sorted and placed in skips provided by Bovis/Linden for recycling/disposal.

The soils were then assessed on site in line with the requirements of the MMP. As-dug natural soils were either sent to Morton-in-Marsh site or reused in the bund.

Non-natural soils (made ground) or natural soils that were mixed with made ground was used in the landscape bund construction.



Upper Rissington – Victory Fields

Table 1. Stockpile and Material Processing.

Location	Volume (m3)	Soil Type	Operation	Fill Area
<b>Stockpile A</b>	2,960	Very Clayey sandy GRAVEL with very occasion made ground on surface (fly tipped waste)	- Surface picked, (waste to off-site licenced disposal location) - As dug soils to off-site - Mixed soils retained on site	On site bund and Moreton-in-Marsh
<b>Stockpile B</b>	3,479	Very Clayey very sandy GRAVEL with very occasion made ground on surface (fly tipped waste)	Surface picked, (waste to off-site licenced disposal location)	Moreton-in-Marsh
<b>Stockpile C</b>	14,175	Very Clayey very sandy GRAVEL natural ground, with extensive on surface fly tipped construction waste.	Waste encountered through the stockpile - Surface picked, (waste to off-site licenced disposal location) - As dug soils to offsite - Mixed soils retained on site.	On site bund and Moreton-in-Marsh
<b>Stockpile D</b>	3,607	Mixed Crusher run with made ground	Sorted (waste to off-site licenced disposal location) Granular material (reused)	On site bund and Moreton-in-Marsh
<b>Stockpile D1</b>	2,930	Crusher run with very high fines content	Sorted (waste to off-site licenced disposal location) Soils retained	On site bund
<b>Stockpile G</b>	503	Very Clayey sandy GRAVEL with very occasion made ground on surface (fly tipped waste)	Sorted (waste to off-site licenced disposal location) Soils retained	On site bund



<b>Stockpile L</b>	2,449	Very Clayey sandy GRAVEL with very occasion made ground on surface (fly tipped waste)	Surface picked, (waste to off-site licenced disposal location)	Moreton-in-Marsh
<b>Pond Excavation</b>	8,640	As Dung Sub soil and rock	Oversized separated.	Moreton-in-Marsh
<b>Oversize from Pond</b>	250	As dug Boulders and Rock	Crushed	On site bund



### 3 Bund Construction

The bund was constructed as detailed in the WSP drawings.

Prior to construction, the concrete slab was punctured to provide a drainage pathway for groundwater from the bund to the deeper aquifer.

Placement of Subsoils (about 18285m<sup>3</sup>) over the broken up concrete slab to form design levels. Soils were placed by GPS dozer to the landscape profile and compacted by tracking in and rolling with a 14t vibrating roller (see photos Appendix

Placement of 150mm layer of Topsoil (2523m<sup>3</sup>) over the bund.

The final as built drawing of the bund is shown on drawings;

- Bov-219\_AS-BUILT\_(BUNDS)
- Bov-219\_AS-BUILT\_(FULL SITE)
- Bov-219\_AS-BUILT\_(SHOPS)

Drawing are provided in Appendix A.

## 4 Sub Soil Material Export

Approximately 15600m<sup>3</sup> was due to be exported under the MMP from the site to the Bovis Homes site in Morton-in-Marsh.

Table 2 below; shows the loads recorded leaving the Rissington site and arriving at Moreton site. Based on the loads and a density of material of 1.9t/m<sup>3</sup> a total of 17,063m<sup>3</sup> (+/- 10%) was taken to Moreton.

A road sweeper was employed to keep the roads on and off site clear of debris. A banksman was employed to marshal the traffic and ensure all records are kept of the number of vehicle movements were kept.

### Upper Rissington – Victory Fields

**Table 2. Material Exported to Moreton-in-Marsh.**

<u>Date</u>	<u>6F2 to Moreton</u>	<u>Natural Fill</u>
15/03/2017	36	
16/03/2017	51	
17/03/2017	36	
20/03/2017	41	
21/03/2017	49	
22/03/2017	8	3
28/03/2017		43
29/03/2017		35
30/03/2017		34
31/03/2017		23
03/04/2017		50
04/04/2017		53
05/04/2017		60
06/04/2017		58
07/04/2017		48
10/04/2017		65
11/04/2017		72
12/04/2017		67
13/04/2017		55
18/04/2017		71
19/04/2017		<b>75</b>
20/04/2017		<b>69</b>

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21/04/2017		<b>48</b>	
24/04/2017		42	
25/04/2017		63	
26/04/2017		81	
27/04/2017		80	
28/04/2017		53	
02/05/2017		71	
03/05/2017	2	75	
04/05/2017		2	
<b>Total</b>	<b>223</b>	<b>1396</b>	<b>1621</b>

Based on 4 axel HGV's with net capacity of 18.5 to 19.5 tonnes.

## 5 Flood Retention Pond

The retention pond bund was constructed as detailed in the Linden/Bovis Homes – Earthworks Specification, Attenuation Pond Construction – RAF Rissington, R/14761/002, the WSP drawings and the Hydrock design statements..

Key Activities included;

1. Generation of fines material by screening of the natural soil. The fines were used as a formation layer and stockpiles on site for later use by the groundworks contractor as a protection layer for the liner.
2. Removal of the existing material placed in the area of the pond retention dam and rolling of the formation level.
3. Inspection and infilling of the gull with fines material and rolling the base and sides with 14t vibrating roller.
4. Engineer a new formation and build a new dam constructed in accordance with the Highways Agency, series 600 specification.
5. Testing of the compaction and placed material of the dam by an independent testing contractor.

Excavation of approximately 7,990m<sup>3</sup> required to reduce the levels to the formation level required for pond construction.

The oversized rock from the excavations was processed (about 250m<sup>3</sup>) and reused.

Filling to profile (eastern side of the pond) of 3,045m<sup>3</sup> of excavated material. Layers 250mm rolled by heavy roller (14t vibration mode) with the number of passes as specified by Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements of the HA specification. .

The balance of the material 4,945m<sup>3</sup> was exported to Morton site.

The pond Construction is shown on the drawing Bov-2191\_AS-BUILT\_(POND).

### 5.1 Insitu Testing.

Structural Soils of Bedminster, Bristol BS3 4AG was commissioned to undertake Insitu testing of the compacted embankment material.

The full report is including in Appendix 2 – In Situ Testing and are summarised below.

#### 5.1.1 Hand Penetrometer & Hand Vane

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Table 3. Summary Of Hand Penetrometer & Hand Vane Test Results.

Exploratory Position ID	Moisture Content (%)	Vane Type	Average Reading (kPa)	Sample Description
HSV1	14	HVP	>130	Brown gravelly CLAY
HSV2	17	HVP	>130	Brown gravelly CLAY
HSV3	16	HVP	>130	Brown gravelly CLAY
HSV4	22	HVP	>130	Brown gravelly CLAY
HSV5	24	HVP	124	Brown gravelly CLAY
HSV6	22	HVP	127	Brown gravelly CLAY
HSV7	15	HVP	>130	Light brown gravelly CLAY
HSV8	17	HVP	>130	Brown clayey GRAVEL
HSV9	17	HVP	>130	Brown gravelly CLAY

5.1.2 In-Situ Density Tests

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Table 4. Summary of In-Situ Density Tests

Location	Depth of Probe (m)	Date of Test	NDG Bulk density (Mg/m <sup>3</sup> )	Corrected Bulk density (Mg/m <sup>3</sup> )	Moisture Content (%)	Description of Sample
NDM1	0.20	17/03/17	1.78	1.73	14	Brown gravelly CLAY
NDM2	0.20	17/03/17	2.15	2.06	17	Brown gravelly CLAY
NDM3	0.20	17/03/17	2.02	1.94	16	Brown gravelly CLAY
NDM4	0.20	17/03/17	1.83	1.77	22	Brown gravelly CLAY
NDM5	0.20	17/03/17	1.82	1.77	24	Brown gravelly CLAY
NDM6	0.20	17/03/17	1.86	1.80	22	Brown gravelly CLAY
NDM7	0.20	17/03/17	1.96	1.89	15	Light brown gravelly CLAY
NDM8	0.20	17/03/17	1.76	1.71	17	Brown clayey GRAVEL
NDM9	0.20	17/03/17	1.98	1.91	17	Brown gravelly CLAY

## 6 Topsoil Import and Trimming

Topsoil was imported from the Bovis Moreton-in-Marsh site and placed;

- On the newly constructed bund,
- On the Areas 2,3,4,5,6,7
- Stockpiled adjacent to pond for later placement over liner.
- Stockpiled on site for later use to complete landscaping of the southern bund post construction of the footpaths.

Topsoil summary of loads imported is shown below;

**Upper Rissington – Victory Fields**  
**Table 5. Summary of Top Soil Importation**

<u>Date</u>	-	<u>LOADS TOPSOIL to</u> <u>RISSINGTON SITE</u>
15/03/2017		36
16/03/2017		51
17/03/2017		36
20/03/2017		41
21/03/2017		48
22/03/2017		11
28/03/2017		44
29/03/2017		35
30/03/2017		34
31/03/2017		22
03/04/2017		51
04/04/2017		52
05/04/2017		62
06/04/2017		58
07/04/2017		47
10/04/2017		64
11/04/2017		71
12/04/2017		66
13/04/2017		54
18/04/2017		71
<b>Total</b>		<b>954</b>

Based on 4 axel HGV's with net capacity of 18.5 to 19.5 tonnes.

Based on the loads and a density of material of  $1.8\text{t/m}^3$ , a total of  $10,335\text{m}^3$  (+/- 10%) was taken to the Upper Rissington Site.

All areas of the perimeter bund were trimmed with 150mm of topsoil expect;

- Area under stockpiles F that was trimmed and covered with a minimum of 160mm layer of topsoil.
- Area under stockpile B that was left uncovered due to zoning as a development area.



**Appendix 1  
As Built Drawings**