

# Repository Development Programme

## Tranche 1 Project

### Material Volumes Report

September 2026



Thinking  
differently  
about waste

# Repository Development Programme – Tranche 1

## Material Volumes Report LLWR

CCS1 RDP Phase 2-3  
60638194  
August 2026

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## Quality information

### Prepared by

Rob Hind  
Senior Civil 3D Modeller

### Checked by

Armando Delima  
Principal Civil Engineer

### Verified by

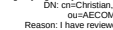
Scott Christian  
Nuclear Chief Engineer

### Approved by

Andrew Jenkinson  
Project Manager

  
Digitally signed by Hind, Robert  
DN: cn=Hind, Robert,  
ou=AECOMUsers  
Reason: I am the author of this  
document  
Date: 2026.09.28 13:12:39 +01'00'

  
Digitally signed by Delima, Armando  
DN: cn=Delima, Armando,  
ou=AECOMUsers  
Date: 2026.09.28 13:27:12  
+01'00'

  
Digitally signed by Christian, Scott  
DN: cn=Christian, Scott,  
ou=AECOMUsers  
Reason: I have reviewed this  
document  
Date: 2026.09.29 15:07:05 +01'00'

Christian,  
Scott

  
Digitally signed by  
Jenkinson, Andrew  
DN: cn=Jenkinson,  
Andrew, ou=AECOMUsers  
Date: 2026.09.29 12:51:59  
+01'00'

## Revision History

| Revision | Revision date     | Details                                                                                                           |
|----------|-------------------|-------------------------------------------------------------------------------------------------------------------|
| P1       | 21 September 2021 | First Issue                                                                                                       |
| P2       | 23 December 2021  | Updated following design changes and LLWR comments                                                                |
| P3       | 17 February 2022  | Updated based on LLWR comments and revised base models                                                            |
| P4       | 2 March 2022      | Further updated based on LLWR comments                                                                            |
| A        | 9 March 2022      | Formal issue                                                                                                      |
| AP1      | 11 November 2022  | Update related to new materials, i.e. Demolition Bags and Running Surface Calcareous/non calcareous and pH limits |
| AP2      | 06 December 2022  | Updated calcareous and pH limits                                                                                  |
| B        | 16 December 2022  | Approved Issue                                                                                                    |
| BP1      | 02 February 2023  | Model numbers updated in Sections 2 to 7                                                                          |
| C        | 03 March 2023     | Approved Issue                                                                                                    |
| D        | 10 July 2023      | DP7 regulating layer added                                                                                        |
| DP1      | 17 July 2026      | VOCD Update                                                                                                       |
| E        | 11 September 2026 | Approved Issue – Client Comments actioned                                                                         |
| EP1      | 23 September 2026 | Client comments – PH Limits update                                                                                |
| F        | 30 September 2026 | Client Approved Issue                                                                                             |

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## Document Acceptance

| Accepted by:      | Position                                          | Signature                                                                                                 | Date                                                                       |
|-------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Richard Blackwell | Senior RDP Project CS&A Responsible Engineer, NWS | <br>Richard Blackwell | Digitally signed by Richard Blackwell<br>Date: 2026.09.30 15:52:20 +01'00' |

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### Prepared for:

LLW Repository Ltd  
Pelham House  
Pelham Drive  
Calderbridge  
Cumbria  
CA20 1DB  
United Kingdom

### Prepared by:

AECOM Limited  
Tanyard Suite, Fleswick Court  
Westlakes Science & Technology Park  
Moor Row CA24 3HX  
United Kingdom

T: +44 (161) 237 6970  
aecom.com

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**\*Key: Updates from Rev D to E highlighted in Yellow**  
**Updates from Rev E to F highlighted in Pink**

# 1 Introduction

This Material Volume Report provides a summary of the main volumes of material that are anticipated to be required during the construction of the Profile Fill and Final Cap (DP1), Drainage (DP2), Haul Roads (DP5), Stockpiles (DP6), Existing Trench Cap Membrane Repair (DP7) and Vault 8 Closure (DP8).

No allowance has been made for the following:

- Bulking
- Compaction
- Loss of material during handling

## 2 Design Package 1 – Profile Fill and Final Cap

The volumes are based on the following 3D models which have been provided to LLWR under separate cover.

| Civil 3D File Name                                                                    |
|---------------------------------------------------------------------------------------|
| B1445-ACM-276-XX-M3-C-1002 – Final Cap                                                |
| B1445-ACM-276-XX-M3-C-1005 – RDP<br>Tranche 1 Surcharge V8S3                          |
| B1445-ACM-276-XX-M3-C-1006 – RDP<br>Tranche 1 Surcharge Trenches                      |
| B1445-ACM-278-XX-M3-C-1019 – RDP<br>Tranche 1 Vault 8 Trial Area                      |
| B1445-ACM-276-XX-M3-C-1021 – RDP<br>Tranche 1 Landscape Edging                        |
| B1445-ACM-276-XX-M3-C-1022 – RDP<br>Tranche 1 Void Fill V8 Surfaces                   |
| <b>B1445-ACM-276-XX-M3-C-1025 – RDP<br/>Tranche 1 Void Fill Tennis Court Surfaces</b> |

This section should be read in conjunction with the following documents:

- AEC-RDP-T1.00-SP-022 – Cut-off Wall Specification
- AEC-RDP-T1.00-SP-037 – Surcharge and Profile Fill Earthworks Specification
- AEC-RDP-T1.00-SP-045 – Series 3000 Landscape and Ecology Specification
- AEC-RDP-T1.00-SP-052 – Final Cap and Profile Fill Specification
- AEC-RDP-T1.00-MS-025 – Final Cap and Profile Fill Outline Installation Method Statement

## 2.1 Profile Fill and Final Cap Material Volumes

The table below summarises the raw volumes of the material associated with each element of the design. The total Tranche 1 Final Cap working area is circa 99,330 m<sup>2</sup>.

**Table 1: Quantities of materials associated with each element of the DP1 design**

| Element                                                                          | Limits on Calcareous Material <sup>10</sup> | pH Limits <sup>10</sup> | Material                                                                     | Quantity (m <sup>3</sup> ) |
|----------------------------------------------------------------------------------|---------------------------------------------|-------------------------|------------------------------------------------------------------------------|----------------------------|
| Topsoil Strip (Nominal depth 150mm)                                              | N/A                                         | N/A                     | Existing cap material                                                        | 9,870                      |
| Soft Spot Excavation (Area 5)                                                    | N/A                                         | N/A                     | Existing cap material                                                        | 171                        |
| Drainage for soft spot (Nominal depth 900mm), Area 5                             | No                                          | Yes                     | Type B                                                                       | 171                        |
| Running Surface – Vault 8 (Nominal depth 1700mm)                                 | Yes                                         | Yes                     | Type B                                                                       | 62,002                     |
| B720 Magazine Demolition Bags – Tennis Court (152 No., 6 cu.m.) assumed 97% full | No                                          | No                      | Concrete (crushed) and soil                                                  | 152                        |
| Magazine Demolition Bags – Tennis Court (No., 1 cu.m.) assumed 97% full          | No                                          | No                      | Concrete (crushed) and soil                                                  | 2,234                      |
| Magazine Demolition Bags – Vault 8 (No., 1 cu.m.) assumed 97% full               | No                                          | No                      | Concrete (crushed) and soil                                                  | 12,953                     |
| Void Fill surrounding Demolition Bags – Tennis Court                             | Yes                                         | Yes                     | Single Size Rounded Siliceous (Quartzitic) Washed Inert High-strength Gravel | 2,781                      |
| Void Fill surround Demolition Bags – Vault 8                                     | Yes                                         | Yes                     | Single Size Rounded Siliceous (Quartzitic) Washed Inert High-strength Gravel | 13,745                     |
| Terram T4000 Geotextile – Tennis Court                                           | N/A                                         | N/A                     | Terram T4000 Geotextile                                                      | 2,235m <sup>2</sup>        |
| Terram T4000 Geotextile – Vault 8                                                | N/A                                         | N/A                     | Terram T4000 Geotextile                                                      | 12,819m <sup>2</sup>       |
| Surcharge – Trenches (Area 1) <sup>6</sup>                                       | Yes                                         | Yes                     | Class 1A(3), or 1B(3)                                                        | 100,589                    |
| Surcharge – Trenches (Area 2) <sup>6</sup>                                       | Yes                                         | Yes                     | Class 1A(3), or 1B(3)                                                        | 26,175                     |
| Profile Fill                                                                     | Yes                                         | Yes                     | Class 1A(3), 1B(3), 2A(2), 2B(2), 2C(1)                                      | 63,551                     |
| Surcharge – Vault 8 Scenario 3 (Area BD) <sup>6</sup>                            | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)                                            | 63,303                     |

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| Element                                                                                   | Limits on Calcareous Material <sup>10</sup> | pH Limits <sup>10</sup> | Material                                | Quantity (m <sup>3</sup> ) |
|-------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------|-----------------------------------------|----------------------------|
| Surcharge – Vault 8 Scenario 3 (Area A Central) <sup>6</sup>                              | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)       | 58,428                     |
| Surcharge – Vault 8 Scenario 3 (Area C Central) <sup>6</sup>                              | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)       | 10,315                     |
| Surcharge – Vault 8 Scenario 3 (Area C SW) <sup>6</sup>                                   | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)       | 19,278                     |
| Surcharge – Vault 8 Scenario 3 (Area AC West) <sup>6</sup>                                | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)       | 66,662                     |
| Surcharge – Vault 8 Scenario 3 Trial Area <sup>7</sup>                                    | Yes                                         | Yes                     | Profile Fill Class 1A(3) or 1B(3)       | 51,239                     |
| Topsoil includes landscaping on North & East sides (Nominal depth 300mm)                  | Yes                                         | Yes                     | Class 5A/5B                             | 21,582                     |
| Subsoil includes landscaping on North & East sides and Leading Edge (Nominal depth 300mm) | Yes                                         | Yes                     | Class 2X1                               | 22,440                     |
| Leading Edge – Subsoil                                                                    | Yes                                         | Yes                     | Class 2X1                               | 4,973                      |
| Filter Sand (Nominal depth 150mm) <sup>2</sup>                                            | Yes                                         | Yes                     | Class 6S1                               | 10,293                     |
| Bio-Intrusion (Upper) (Nominal depth 150mm, Pea Gravel) <sup>2</sup>                      | Yes                                         | Yes                     | Class 6K1                               | 10,080                     |
| Bio-Intrusion (Lower) (Nominal depth 600mm) <sup>2</sup>                                  | Yes                                         | Yes                     | Class 6X1                               | 40,320                     |
| Drainage Course (Nominal depth 350mm) <sup>2</sup>                                        | Yes                                         | Yes                     | Type B                                  | 25,996                     |
| Drainage Layer (Nominal depth 150mm, Pea Gravel) <sup>2</sup>                             | Yes                                         | Yes                     | Type A (modified)                       | 12,803                     |
| BES (Nominal depth 600mm) <sup>8</sup>                                                    | Yes                                         | Yes                     | Class 2X2                               | 47,782                     |
| Cut off Wall – Slurry                                                                     | N/A                                         | N/A                     | Cementitious slurry                     | 3,486                      |
| Gas Collection (Nominal depth 400mm)                                                      | Yes                                         | Yes                     | Type C (modified)                       | 29,011                     |
| Profile Fill (Total required) <sup>3</sup>                                                | Yes                                         | Yes                     | Class 1A(3), 1B(3), 2A(2), 2B(2), 2C(1) | 190,837                    |
| Material Removed Below Strip level                                                        | N/A                                         | N/A                     | Existing cap material                   | 16,287                     |

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| Element                                                          | Limits on Calcareous Material <sup>10</sup> | pH Limits <sup>10</sup> | Material             | Quantity (m³) |
|------------------------------------------------------------------|---------------------------------------------|-------------------------|----------------------|---------------|
| (East side of Trenches) <sup>5</sup>                             |                                             |                         |                      |               |
| Gabion Basket Fill – Leading Edge                                | Yes                                         | Yes                     | Class 6B1            | 1,326         |
| Leading Edge – Drainage Stone (along South edge of leading edge) | Yes                                         | Yes                     | SHW Cl. 505 Type A/B | 4,973         |

Table 2: Final Cap Geosynthetic Layers

| Element                                                   | Material       | Quantity (m²) |
|-----------------------------------------------------------|----------------|---------------|
| M10 Geotextile Separation layer                           | Terram 1000    | 102,180       |
| M9 Geotextile Composite Gas Collection Layer (Upsidedown) | POZIDRAIN      | 72,458        |
| M7 Drainage HDPE Layer                                    | HDPE           | 79,085        |
| M7 Geotextile Protection Geosynthetic                     | Terrex SNW40UV | 79,085        |
| M7 Geotextile Composite Drainage Layer                    | POZIDRAIN      | 79,085        |
| M5 Bio-Intrusion Separation Layer                         | Terram 4000    | 70,150        |
| M4 Geotextile Filter Layer                                | Terram 3000    | 69,380        |
| M4 Geotextile Separation Layer                            | Terram 1000    | 69,380        |
| 200mm Geocell                                             | Geocell        | 7,232         |
| Biaxial Geogrid                                           | Geogrid        | 7,232         |
| Leading Edge Erosamat 1a                                  | Woven Jute     | 7,232         |
| Leading Edge Geotextile fleece                            | Terrex SNW40UV | 7,232         |
| Leading Edge LLDPE                                        | LLDPE          | 7,232         |
| Leading Edge Composite Drainage Layer                     | POZIDRAIN      | 15,604        |
| Leading Edge Bund Geotextile fleece                       | Terrex SNW40UV | 8,372         |
| Leading Edge Bund LLDPE                                   | LLDPE          | 8,372         |

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<sup>1</sup>Volume/Area of fabric/separation layer is not included.

<sup>2</sup>Profile Fill volume is total adjusted volume of profile fill and excludes Void Fill volume (from DP8), Magazine Demolition Bags and surrounding Void Fill and Running Surface material, but does include for the increase in Profile Fill due to topsoil stripping over the trenches. This volume also includes the volume of Class 2 material that could be placed within the Profile Fill over the Trenches.

<sup>5</sup> Cut volume is excavation below stripped level, no Profile Fill placed in this area (primarily on east side of Trenches).

<sup>6</sup> Volumes of material to construct, excluding Void Fill to the surcharge height, for each zone in Scenario 3 (V8S3) without sequencing. Dependant on sequencing of operations, which is expected to be from East to West, some material will remain in place post-surcharge and the excess, above Final Cap Profile Fill level, is to be re-used to extend surcharge operations into the next zone. ONLY Scenario 3 volumes are shown as this is the worst case by volume.

<sup>7</sup> V8 Surcharge Trial Area is volume to construct, excluding Void Fill, to maximum top of Final Cap level.

<sup>8</sup> The volume of BES is the modelled volume of the BES and does not include the additional volume of BES that is required to carry out the various tie-ins to the Cut off Wall as shown in RD 1048.

<sup>10</sup> Refer to AEC-RDP-T1.00-SP-037 – Surcharge and Profile Fill Earthworks Specification, AEC-RDP-T1.00-SP-043 – Void Fill Specification, AEC-RDP-T1.00-SP-052 – Final Cap Specification, and AEC-RDP-T1.00-SP-045 – Specification Series 3000 Landscape and Ecology.

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The table below summarises the raw volumes of material specifically associated with the Inclibus monitoring infrastructure:

**Table 3: Monitoring Equipment Material**

| Element                                                                                                                          | Limits on Calcareous Material <sup>2</sup> | pH Limits <sup>2</sup> | Material                                      | Unit           | Quantity    |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------|-----------------------------------------------|----------------|-------------|
| Sand Surround                                                                                                                    | Yes                                        | Yes                    | Sand                                          | m <sup>3</sup> | 636         |
| LT-Inclibus – 2m string with No. 0 sensors                                                                                       | N/A                                        | N/A                    | RS485 data/power cable and fiberglass         | No.            | 952         |
| LT-Inclibus – 2m string with No. 1 sensor                                                                                        | N/A                                        | N/A                    | RS485 data/power cable and fiberglass         | No.            | 129         |
| LT-Inclibus – 2m string with No. 2 sensors                                                                                       | N/A                                        | N/A                    | RS485 data/power cable, fiberglass and sensor | No.            | 9           |
| LT-Inclibus – 2m string with No. 4 sensors                                                                                       | N/A                                        | N/A                    | RS485 data/power cable, fiberglass and sensor | No.            | 0           |
| LT-Inclibus – Custom fixing for reference sensor                                                                                 | N/A                                        | N/A                    | Stainless Steel                               | No.            | 11          |
| LT-Inclibus – Junction Boxes                                                                                                     | N/A                                        | N/A                    | Plastic                                       | No.            | 11          |
| LT-Inclibus – 8 or 16 twisted pairs shielded cable for long distance connection between junction box and datalogger <sup>1</sup> | N/A                                        | N/A                    | Proprietary cables                            | m.             | Up to 2,000 |
| LT-Inclibus Data Loggers, enclosure, telecommunications and power group                                                          | N/A                                        | N/A                    | Proprietary Data Logger                       | No.            | 3           |

<sup>1</sup> Cable length will be determined by the final location of the dataloggers and conduit quantity enough to cover the cable connecting the sensors so basically the total length of the alignment + 15%.

<sup>2</sup> Refer to AEC-RDP-T1.00-SP-050 – Observational Monitoring Specification.

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**Table 4: Profile Fill and Surcharge Volumes Associated with V8S3 scenario**

This data is to be read in conjunction with the Table 1 Surcharge related volumes.

| Surcharge area   | Limits on Calcareous Material <sup>1</sup> | pH Limits <sup>1</sup> | Surcharge and Profile Fill Material (m <sup>3</sup> ) | Available for Re-use (Surcharge) (m <sup>3</sup> ) | Profile Fill to Remain (m <sup>3</sup> ) |
|------------------|--------------------------------------------|------------------------|-------------------------------------------------------|----------------------------------------------------|------------------------------------------|
| Area 1           | Yes                                        | Yes                    | 102,632                                               | 100,589                                            | 2,043                                    |
| Area 2           | Yes                                        | Yes                    | 89,726                                                | 26,175                                             | 63,551                                   |
| Area BD          | Yes                                        | Yes                    | 114,977                                               | 41,217                                             | 73,780                                   |
| Area A Central   | Yes                                        | Yes                    | 68,302                                                | 30,856                                             | 37,446                                   |
| Area C Central   | Yes                                        | Yes                    | 27,054                                                | 8,830                                              | 18,224                                   |
| Area C SouthWest | Yes                                        | Yes                    | 29,921                                                | 15,224                                             | 14,697                                   |
| Area AC West     | Yes                                        | Yes                    | 69,772                                                | 55,018                                             | 14,754                                   |
| Trial Area       | Yes                                        | Yes                    | 51,239                                                | 8,478                                              | 42,761                                   |

<sup>1</sup> Refer to AEC-RDP-T1.00-SP-037 – Surcharge and Profile Fill Earthworks Specification.

### 3 Design Package 2 – Drainage

The volumes are based on the following 3D models which have been provided to LLWR under separate cover.

| Civil 3D File Name                                                              |
|---------------------------------------------------------------------------------|
| B1445-ACM-263-XX-M3-C – 1007 – RDP<br>Tranche 1 Surface Drainage Final Channels |
| B1445-ACM-263-XX-M3-C – 1008 – RDP<br>Tranche 1 Surface Drainage Final Lagoons  |
| B1445-ACM-263-XX-M3-C – 1009 – RDP<br>Tranche 1 Surface Drainage Temp Channels  |
| B1445-ACM-278-XX-M3-C – 1015 – RDP<br>Tranche 1 Stockpiles A                    |
| B1445-ACM-278-XX-M3-C – 1016 – RDP<br>Tranche 1 Stockpiles B                    |
| B1445-ACM-263-XX-M3-C – 1023 – RDP<br>Tranche 1 Surface Drainage Temp Lagoons   |

This section should be read in conjunction with the following documents:

- AEC-RDP-T1.00-SP-033 – Drainage Works Specification

#### 3.1 Drainage Material Volumes

The table below summarises the raw volumes of the material associated with the design. The total working area is circa 30,282 m<sup>2</sup>.

**Table 4: Quantities of materials associated with each element of DP2**

| Element                          | Cut/Fill             | Material                                                          | Quantity (m <sup>3</sup> )         | Comment                                          |
|----------------------------------|----------------------|-------------------------------------------------------------------|------------------------------------|--------------------------------------------------|
| Nominal Fill                     | Fill                 | Class 2A                                                          | 2,000 <sup>1</sup>                 | Nominal Amount.<br>Material to be non-calcareous |
| Lagoon A                         | Cut                  | Excavation                                                        | Included within T1<br>West Channel |                                                  |
| Lagoon B                         | Fill                 | Class 2A1                                                         | 622                                | Minor Civils<br>Contract                         |
| Lagoon B                         | Fill                 | Class 5 Top Soil                                                  | 180                                | Minor Civils<br>Contract                         |
| Lagoon B Inlet Ground<br>Raising | Fill                 | Class 1 or Class<br>2A1 General Fill.<br>See DP2<br>Specification | 631                                | Minor Civils<br>Contract                         |
| Lagoon B Inlet Ground<br>Raising | Fill                 | Class 5 Top Soil                                                  | 96                                 | Minor Civils<br>Contract                         |
| Lagoon C                         | Cut                  | Excavation                                                        | 725                                |                                                  |
| Lagoon C                         | Fill                 | Class 5 Top Soil                                                  | 195                                |                                                  |
| Lagoon C                         | Fill (Small<br>Bund) | Class 2A General<br>Fill. See DP2<br>Specification                | 100                                |                                                  |
| Lagoon D                         | Constructed          | Constructed                                                       | Constructed                        |                                                  |

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| Element                              | Cut/Fill          | Material                                     | Quantity (m <sup>3</sup> ) | Comment               |
|--------------------------------------|-------------------|----------------------------------------------|----------------------------|-----------------------|
| Lagoon E                             | Cut               | Excavation                                   | 8,053                      | Minor Civils Contract |
| Lagoon E                             | Fill              | Class 5 Top Soil                             | 700                        | Minor Civils Contract |
| Lagoon E                             | Fill (Small Bund) | Class 2A General Fill. See DP2 Specification | 40                         | Minor Civils Contract |
| Lagoon F                             | Cut               | Excavation                                   | 4,031                      |                       |
| Lagoon F                             | Fill              | Class 5 Top Soil                             | 293                        |                       |
| Lagoon B West Access Track           | Fill              | DP2 Specification Appendix 11/101/Class 2A1  | 103                        |                       |
| Lagoon F West Access Track           | Fill              | DP2 Specification Appendix 11/101/Class 2A1  | 49                         |                       |
| T1 West Channel (Drigg)              | Cut               | Excavation                                   | 4,319                      |                       |
| T1 West Channel (Drigg)              | Fill              | Class 2A General Fill                        | 3,954                      |                       |
| T1 West Channel (Drigg)              | Fill              | Class 6B1 <sup>2</sup>                       | 247                        |                       |
| T1 West Channel (Drigg)              | Fill              | Class 5 Top Soil                             | 1,715                      |                       |
| T1 East Channel                      | Cut               | Excavation                                   | 1,694                      |                       |
| T1 East Channel                      | Fill              | Class 5 Top Soil                             | 376                        |                       |
| T1 East Channel                      | Fill              | Class 6B1 <sup>2</sup>                       | 106                        |                       |
| T1 East Channel                      | Fill              | Class 2A General Fill                        | 206                        |                       |
| T1 Temporary Channel                 | Cut               | Excavation                                   | 7,009                      |                       |
| T1 Temporary Channel                 | Fill              | Class 5 Top Soil                             | 941                        |                       |
| Retaining Wall Back of Wall Drainage | Fill              | 6N                                           | 514                        |                       |

<sup>1</sup>Estimated amount of material required to backfill around the CoW and under the Final Cap swale. This volume is unable to be modelled as it is dependent on the amount of excavation around the CoW and the amount of unsuitable material that is required to be removed.

<sup>2</sup>This is the drainage stone that is the toe of the Final Cap as it enters the Final Cap drain, as shown in RD 389.

**Table 5: Quantities of materials associated with DP2 and Stockpile**

| Element     | Swale No | Limits on Calcareous Material | pH Limits <sup>3</sup> | Total cut including 150mm cut for topsoil (m <sup>3</sup> )                 | Fill (m <sup>3</sup> ) | Comment |
|-------------|----------|-------------------------------|------------------------|-----------------------------------------------------------------------------|------------------------|---------|
| Stockpile A | 1        | Yes                           | Yes                    | 489                                                                         | 934                    |         |
|             | 2        | Yes                           | Yes                    | 126                                                                         | 82                     |         |
|             | 3        | Yes                           | Yes                    | 598                                                                         | 743                    |         |
|             | 4        | Yes                           | Yes                    | 63                                                                          | 46                     |         |
|             | 5        | Yes                           | Yes                    | 239                                                                         | 205                    |         |
|             | 6        | Yes                           | Yes                    | 142                                                                         | 221                    |         |
|             | 7        | Yes                           | Yes                    | 31                                                                          | 20                     |         |
| Stockpile B | 1        | No                            | No                     | Unable to quantify Stockpile B, unknown levels post demolition of magazines |                        |         |
|             | 3        | No                            | No                     |                                                                             |                        |         |
|             | 4        | No                            | No                     |                                                                             |                        |         |

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| Element     | Swale No | Limits on Calcareous Material | pH Limits <sup>3</sup> | Total cut including 150mm cut for topsoil (m <sup>3</sup> ) | Fill (m <sup>3</sup> ) | Comment     |
|-------------|----------|-------------------------------|------------------------|-------------------------------------------------------------|------------------------|-------------|
| Stockpile C | 1        | No                            | No                     | 1,842                                                       | 0                      | Constructed |
|             | 2        | No                            | No                     | 2,562                                                       | 0                      | Constructed |
| Stockpile D | 1        | No                            | No                     | 411                                                         | 5                      | Constructed |

## 4 Design Package 5 – Haul Roads

The volumes area based on the following 3D models which have been provided to LLWR under separate cover.

| Civil 3D File Name                                                                                         |
|------------------------------------------------------------------------------------------------------------|
| B701-ACM-270-XX-M3-C – 1011 – RDP<br>Tranche 1 Haul Roads – DP5 Major Civils<br>Haul Roads (ch. 950-1400)  |
| B701-ACM-270-XX-M3-C – 1013 – RDP<br>Tranche 1 Haul Roads – DP5 Major Civils<br>Haul Roads (ch. 1580-1830) |
| B701-ACM-270-XX-M3-C – 1014 – RDP<br>Tranche 1 Haul Roads – DP5 Major Civils<br>Haul Road Extension        |
| B701-ACM-270-XX-M3-C – 1017 – RDP<br>Tranche 1 Haul Roads – Access Track – on<br>DP1 Final Cap east side   |

This section should be read in conjunction with the following documents:

- AEC-RDP-T1.00-SP-026 – Haul Road Specification

### 4.1 Haul Roads Material Volumes

The table below summarises the raw volumes of the material associated with each element of the design.

**Table 6: Quantities of materials associated with each element of the DP5 design**

| Element                                  | Limits on Calcareous Material | pH Limits <sup>3</sup> | Material                        | Volume (m <sup>3</sup> ) <sup>1</sup> |
|------------------------------------------|-------------------------------|------------------------|---------------------------------|---------------------------------------|
| <b>Main Haul Road (Ch. 950 – 1400)</b>   |                               |                        |                                 |                                       |
| Excavated Material                       | N/A                           | N/A                    | Existing site material (varies) | 2,783                                 |
| Haul road embankment fill material       | No                            | No                     | Engineering Fill Class ½        | 1,512                                 |
| Pavement P1: 200mm Running surface       | No                            | No                     | HDM50                           | 41                                    |
| Pavement P1: 225mm Sub-base              | No                            | No                     | Type 1 sub-base                 | 52                                    |
| Pavement P1: 425mm Capping               | No                            | No                     | 6F1-5                           | 93                                    |
| Pavement Type P2: 450mm Sub-base         | No                            | No                     | Type 1 sub-base                 | 2,372                                 |
| Pavement Type P2: 200mm Drainage Blanket | No                            | No                     | Class 6C                        | 1,054                                 |

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| Element                                                 | Limits on Calcareous Material | pH Limits <sup>3</sup> | Material                              | Volume (m <sup>3</sup> ) <sup>1</sup> |
|---------------------------------------------------------|-------------------------------|------------------------|---------------------------------------|---------------------------------------|
| Topsoil strip                                           | N/A                           | N/A                    | Assumed av. 150mm existing topsoil    | 999                                   |
| <b>Main Haul Road (Ch. 1580 – 1740)</b>                 |                               |                        |                                       |                                       |
| Excavated Material                                      | N/A                           | N/A                    | Existing site material (varies)       | 628                                   |
| Haul road embankment fill material                      | Yes                           | No                     | Engineering Fill Class ½              | 4,087                                 |
| Pavement P1: 200mm Running surface                      | Yes                           | No                     | HDM50                                 | 85                                    |
| Pavement P1: 225mm Sub-base                             | Yes                           | No                     | Type 1 sub-base                       | 107                                   |
| Pavement P1: 425mm Capping                              | Yes                           | No                     | 6F1-5                                 | 192                                   |
| Pavement Type P2: 450mm Sub-base                        | Yes                           | No                     | Type 1 sub-base                       | 989                                   |
| Pavement Type P2: 200mm Drainage Blanket                | Yes                           | No                     | Class 6C                              | 440                                   |
| <b>Main Haul Road (Ch. 1740 – 1830)</b>                 |                               |                        |                                       |                                       |
| Pavement fill                                           | Yes                           | No                     | Engineering Fill Class ½ <sup>2</sup> | 15,647                                |
| <b>V8/9 Haul Road Extension (Ch. 0 – 260)</b>           |                               |                        |                                       |                                       |
| Excavated Material                                      | N/A                           | N/A                    | Existing site material (varies)       | 96                                    |
| Haul road fill material                                 | No                            | No                     | Engineering Fill Class ½              | 698                                   |
| Pavement P1: 200mm Running surface                      | No                            | No                     | HDM50                                 | 56                                    |
| Pavement P1: 225mm Sub-base                             | No                            | No                     | Type 1 sub-base                       | 72                                    |
| Pavement P1: 425mm Capping                              | No                            | No                     | 6F1-5                                 | 128                                   |
| Pavement Type P2: 450mm Sub-base                        | No                            | No                     | Type 1 sub-base                       | 1,618                                 |
| Pavement Type P2: 200mm Drainage Blanket                | No                            | No                     | Class 6C                              | 718                                   |
| Topsoil strip                                           | N/A                           | N/A                    | Assumed av. 150mm existing topsoil    | 720                                   |
| <b>Final Cap Access Track (East Side) (Ch. 0 – 206)</b> |                               |                        |                                       |                                       |
| Access Track fill material                              | Yes                           | Yes                    | Engineering Fill Class ½              | 67                                    |
| Pavement P1: 670mm Sub-base                             | Yes                           | Yes                    | Type 3 sub-base                       | 668                                   |
| Pavement P1: 30mm Base                                  | Yes                           | Yes                    | Grit Sand or RootZone 60:40           | 30                                    |
| Pavement P1: 50mm Capping                               | Yes                           | Yes                    | GridForce GF50                        | 50                                    |

<sup>1</sup> The volume is based on LLWR's base model below Mound 1 and Mound 2.

<sup>2</sup> This element of the access track is Contractor design. This has been assumed to be Engineering Fill Class ½. As such, the access track has not been designed and the total fill value has been shown.

<sup>3</sup> Refer to AEC-RDP-T1.00-SP-026 – Haul Road Specification.

## 5 Design Package 6 – Stockpiles

The volumes are based on the 3D models which have been provided to LLWR under separate cover.

|                                                                      |
|----------------------------------------------------------------------|
| <b>Civil 3D File Name</b>                                            |
| <b>B1445-ACM-278-XX-M3-C – 1015 – RDP<br/>Tranche 1 Stockpiles A</b> |
| <b>B1445-ACM-278-XX-M3-C – 1016 – RDP<br/>Tranche 1 Stockpiles B</b> |

This section should be read in conjunction with the following documents:

- AEC-RDP-T1.00-SP-027 – Stockpiles Specification

### 5.1 Stockpile Material Volumes

The table below summarises the raw quantity of materials associated with each element of the design. Material volumes are associated with the creation of the stockpile running surfaces. The total working area is circa 67,830 m<sup>2</sup> (for Stockpile A and Stockpile B East & West).

**Table 7: Quantities of materials associated with each element of DP6 design.**

| <b>Element</b>                                                                                                        | <b>Limits on Calcareous Material</b> | <b>pH Limits</b> | <b>Material</b>           | <b>Volume (m<sup>3</sup>)</b> |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------|---------------------------|-------------------------------|
| Stockpile A                                                                                                           | Yes                                  | Yes              | Class 6F Engineering Fill | 17,300                        |
| Stockpile B – East                                                                                                    | No                                   | No               | Class 6F Engineering Fill | 3,500                         |
| Stockpile B – West                                                                                                    | No                                   | No               | Class 6F Engineering Fill | 5,900                         |
| <b>Total Fill</b>                                                                                                     |                                      |                  |                           | <b>26,700</b>                 |
| Stockpile B – PCM<br>Magazines, Stockpile<br>B drainage swale,<br>East cut slope, and<br>material cut to<br>formation | N/A                                  | N/A              | Site Won material         | 48,588 <sup>2</sup>           |
| <b>Total Cut<sup>1</sup></b>                                                                                          |                                      |                  |                           | <b>48,588</b>                 |

<sup>1</sup> The cut volume shown is the volume of material generated from the demolition of the PCM Magazines as well, Stockpile B drainage swale, east cut slope, and the material around the PCM Magazines cut to formation. It should be noted that within the area to be occupied by Stockpile B, it is understood the PCM demolition works will be completed prior to any works on the Stockpile B running surface. The demolition works will provide a formation level of 375 mm (or other depth dependent on CBR value) below the design running surface levels. As such the excavation and/or fill workings to achieve this formation are not able to be included within Table 7.

<sup>2</sup> This volume has been provided by LLWR and is not based on any modelling by AECOM. The figure is subject to reassessment following PCM Magazine completion.

Note that the assumed depth of Engineering Fill (refer to AEC-RDP-T1.00-SP-027 for permitted material types) for all areas is 375 mm as a worst-case scenario. This could be less depending on the CBR formation.

## 6 Design Package 7 – Existing Trench Cap Membrane Repair

The volumes are based on the 3D models which have been provided to LLWR under separate cover.

|                                                          |
|----------------------------------------------------------|
| <b>Civil 3D File Name</b>                                |
| <b>B1445-ACM-276-XX-M3-C – 1001 – Interim Trench Cap</b> |

This section should be read in conjunction with the following documents:

- RD 413, 415, 1002 and 1005
- AEC-RDP-T1.00-SP-024 – Specification
- AEC-RDP-T1.00-MS-012 – Outline Installation Method Statement

Note that AEC-RDP-T1.00-RP-155 is to be superseded by this document.

### 6.1 Existing Trench Cap Membrane Repair Material Volumes.

The table below summarises the raw volumes of the material associated with each element of the design. The total working area to be capped is circa 124,734 m<sup>2</sup>. Material volumes associated with Stockpile Area A and the haul road are not included.

**Table 8: Quantities of materials / items associated with each element of the DP7 design**

| Element                                                         | Limits on Calcareous Material <sup>4</sup> | pH Limits <sup>4</sup> | Material                         | Quantity (m <sup>3</sup> ) |
|-----------------------------------------------------------------|--------------------------------------------|------------------------|----------------------------------|----------------------------|
| Drainage                                                        | N/A (cement is calcareous)                 | No                     | No fines concrete                | 181                        |
| Topsoil Strip – DP7                                             | N/A                                        | N/A                    | Existing Topsoil                 | 18,734                     |
| Soft Spot Excavation (Areas 1, 2, 3, &4)                        | N/A                                        | N/A                    | Existing cap material            | 3,022                      |
| Drainage for soft spot (Nominal depth 900mm), Areas 1, 2, 3 & 4 | No                                         | Yes                    | Type B                           | 3,022                      |
| Membrane Repair Works <sup>2</sup>                              | No                                         | Yes                    | Profile Fill (Class 2A/2B)       | 84,334                     |
| Membrane Repair Works                                           | Yes                                        | No                     | Regulating Layer (Class 6X)      | 18,421                     |
| Membrane Repair Works – HDPE skirt formation                    | Yes                                        | No                     | Regulating Layer (Class 6X)      | 540                        |
| Membrane Repair Works                                           | Yes                                        | Yes                    | Sub Soil (Class 2X)              | 15,658                     |
| Membrane Repair Works                                           | Yes                                        | Yes                    | Topsoil (Class 5A/5B)            | 4,575                      |
| Membrane Repair Works                                           | Yes                                        | No                     | Engineering Fill (Class 1A1/1B1) | 35,884                     |
| Eastern Screening Bund – Core                                   | Yes                                        | No                     | Class 1C1                        | 18,537                     |
| Eastern Screening Bund – Void <sup>3</sup>                      | Yes                                        | No                     | Class 4A1                        | 12,072                     |

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| Element                                              | Limits on Calcareous Material <sup>4</sup> | pH Limits <sup>4</sup> | Material                            | Quantity (m <sup>3</sup> ) |
|------------------------------------------------------|--------------------------------------------|------------------------|-------------------------------------|----------------------------|
| Eastern Screening Bund – Topsoil                     | Yes                                        | Yes                    | Top Soil (Class 5A/5B)              | 1,281                      |
| Screening Bund Footpath                              | Yes                                        | No                     | Step Infill (Class 6N)              | 46                         |
| Screening Bund Footpath                              | Yes                                        | No                     | Handrail Foundation (Granular Fill) | 3                          |
| <b>Estimated Total Imported Material<sup>5</sup></b> |                                            |                        |                                     | <b>205,172</b>             |

<sup>2</sup> LLWR have assumed that site won material from Mounds 1 and 2 will be used within the Profile Fill.

<sup>3</sup> Note the volume of void space represents the maximum available space/ fill associated with filling the inside and outside shoulders to their full height. The outside shoulder is required to be top soiled to its full height so it can be hydroseeded. The inside faces of the screen bunds are only required to be infilled where the access steps are required.

<sup>4</sup> Refer to AEC-RDP-T1.00-SP-024 – Existing Trench Cap Membrane Repair Specification.

<sup>5</sup> Total imported material. Assuming that all the material excavated from the soft spots will be used within the DP7 works, this is deemed a cut and fill item and as such this soft spot material is not included within the calculation. Not including the stripped topsoil or the void space in the shoulders of the bunds.

It is estimated that there will be circa 18,734 m<sup>3</sup> of topsoil stripped from the footprint of the DP7 works. The topsoil is assumed to be stripped at 150 mm. The total topsoil required to be used in the DP7 design, i.e. Detail 1 and surface of screening bund, is estimated to be the following:

- Topsoil required for Detail 1 – 4,575 m<sup>3</sup>
- Topsoil required for Eastern Bund – 1,281 m<sup>3</sup>

LLWR have provided an estimated breakdown of the suitable and unsuitable material located within Mound 1, and Mound 2, as shown in Table 9. The intended usage of the material will be dependent on the results of the onsite testing to see if the material is compliant with the material stated within the materials specification(s).

**Table 9: Estimated volume of the material located within the onsite mounds within LLWR**

| Element      | Total Volume (m <sup>3</sup> ) <sup>1</sup> | Suitable Material (m <sup>3</sup> ) <sup>2</sup> | Unsuitable Material (m <sup>3</sup> ) <sup>2</sup> |
|--------------|---------------------------------------------|--------------------------------------------------|----------------------------------------------------|
| Mound 1      | 31,208                                      | 24,966                                           | 6,242                                              |
| Mound 2      | 60,308                                      | 48,246                                           | 12,062                                             |
| <b>Total</b> | <b>91,516</b>                               | <b>73,212</b>                                    | <b>18,304</b>                                      |

<sup>1</sup>Volumes have been provided by LLWR.

<sup>2</sup>The suitability ratio for the material has been estimated by LLWR to be 80:20 (suitable to unsuitable) at this stage. Further testing would be required to refine this estimate.

## 7 Design Package 8 – Vault 8 Closure

The volumes are based on the 3D models which have been provided to LLWR under separate cover.

### Civil 3D File Name

**B1445-ACM-276-XX-M3-C – 1022 – RDP  
Tranche 1 Void Fill Surfaces**

This section should be read in conjunction with the following documents:

- AEC-RDP-T1.00-MS-024 – Vault 8 Closure Outline Installation Method Statement
- AEC-RDP-T1.00-SP-043 – Void Fill Specification
- AEC-RDP-T1.00-SP-049 – Temporary Working Platforms Specification
- AEC-RDP-T1.00-SP-050 – Observational Monitoring System Specification

### 7.1 Vault 8 Closure Material Volumes

The table below summarises the raw quantity of the materials / items associated with each element of the design in Vault 8. The total working area is circa 32,530 m<sup>2</sup>.

**Table 10: Quantities of materials / items associated with each element of the DP8 design**

| Element                                                                                                                          | Limits on Calcareous Material <sup>5</sup> | pH Limits <sup>5</sup> | Material                                                                     | Unit           | Quantity            |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------|------------------------------------------------------------------------------|----------------|---------------------|
| Void Fill                                                                                                                        | Yes                                        | Yes                    | Single Size Rounded Siliceous (Quartzitic) Washed Inert High-strength Gravel |                | 20,990 <sup>4</sup> |
| Sand Surround                                                                                                                    | Yes                                        | Yes                    | Sand                                                                         | m <sup>3</sup> | 283                 |
| Working Platforms                                                                                                                | N/A                                        | N/A                    | Steel                                                                        | m <sup>3</sup> | 3.57                |
| LT-Inclibus – 2m string with No. 0 sensors                                                                                       | N/A                                        | N/A                    | RS485 data/power cable and fiberglass                                        | No.            | 12                  |
| LT-Inclibus – 2m string with No. 1 sensor                                                                                        | N/A                                        | N/A                    | RS485 data/power cable, fiberglass and sensor                                | No.            | 54                  |
| LT-Inclibus – 2m string with No. 4 sensor                                                                                        | N/A                                        | N/A                    | RS485 data/power cable, fiberglass and sensor                                | No.            | 60                  |
| LT-Inclibus – Custom fixing for reference sensor                                                                                 | N/A                                        | N/A                    | Stainless Steel                                                              | No.            | 6                   |
| LT-Inclibus – Junction Boxes                                                                                                     | N/A                                        | N/A                    | Plastic                                                                      | No.            | 6                   |
| LT-Inclibus – 8 or 16 twisted pairs shielded cable for long distance connection between junction box and datalogger <sup>1</sup> | N/A                                        | N/A                    | Proprietary cables                                                           | m.             | Up to 5700          |
| LT-Inclibus Data Loggers, enclosure,                                                                                             | N/A                                        | N/A                    | Proprietary Data Logger                                                      | No.            | 2                   |

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|                                                           |     |     |                                   |     |               |
|-----------------------------------------------------------|-----|-----|-----------------------------------|-----|---------------|
| Rod Settlement System – inner and outer rods <sup>2</sup> | N/A | N/A | Proprietary Rod Settlement System | m.  | 36            |
| Rod Settlement System – base plate <sup>2</sup>           | N/A | N/A | Proprietary Rod Settlement System | No. | 3             |
| Rod Settlement System – inner and outer rods <sup>3</sup> | N/A | N/A | Proprietary Rod Settlement System | m.  | 17            |
| Rod Settlement System – base plate <sup>3</sup>           | N/A | N/A | Proprietary Rod Settlement System | No. | 1             |
| <b>Estimated Total Imported Material</b>                  |     |     |                                   |     | <b>28,341</b> |

<sup>1</sup> Cable length will be determined by the final location of the datalogger and conduit quantity enough to cover the cable connecting the sensors so basically the total length of the alignment + 15%

<sup>2</sup> 3 No. of Rod Settlement Systems are to be installed:  
 2 No. Rod Settlement System (12 m long) to be installed on container stacks in Trial Area  
 1 No. Rod Settlement System (12 m long) next to 'fixed' point for the LT-Inclibus system on the Secant Pile Wall

<sup>3</sup> If a suitable location can be found an additional Rod Settlement System (17 m long) will be installed with the base plate sitting on the base slab of the Vault 8

<sup>4</sup> Refer to AEC-RDP-T1.00-SP-043 – Void Fill Specification and AEC-RDP-T1.00-SP-050 – Observational Monitoring System Specification.

