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| Project name | Wykham Park Farm, Banbury | | |
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| Author | Sean Mitchinson | | |
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1.1 Introduction

The purpose of this document is to address the requirements of Planning Condition 50 (Reference 14/01932/OUT) which calls for information pertaining to the implementation of the strategy for preliminary earthworks.

The main earthworks at Wykham Park Farm involve the creation of the site wide drainage network, including two attenuation basins and a swale system. In addition to this there is the creation of two platforms suitable for use as sports pitches and a landscaping mound in the south west area referred to in the report and drawings as the Southern Gateway Landscaping Mound. Other sources of material generation include the construction of the main spine road, Section 278 works and local centre bus loop. The intention of the earthwork's strategy is for all site won material and topsoil generated from the above works to be moved within the site boundary and for a cut & fill balance to be achieved.

1.2 Cut & Fill Analysis

Full cut & fill analysis details can be seen on drawing WPF_HYD_XX_XX_DR_C_2400. This details sources of all topsoil strip, suitable reusable cut material and where the stripped topsoil and cut material is to be reused.

1.2.1 Topsoil

Table 1 on the drawing above identifies the sources of Topsoil strip shown in figure 1 below. The Hydrock site investigation report WPF_HYD_XX_XX_RP_G_1001 identifies topsoil depths ranging from 0.15m to 0.4m across the site. For the purpose of the cut & fill analysis an average topsoil depth of 0.3m has been assumed. Where topsoil has been reused a thickness of 0.2m is specified. 0.2m of topsoil has been proposed as a typical value and is subject to detailed landscaping design.

For the purposes of this cut & fill analysis it has been assumed that no topsoil strip shall be taken from the proposed development parcels, in addition to this a zero-topsoil strip approach has been applied under Sports Pitch A due to archaeological restrictions.

A total topsoil strip volume of 24343m³ is generated from the various areas as shown in Figure 1.

| 1. Topsoil | | | |
|--|----------------------------|--|-----------------------------|
| <u>Volumes of 0.3m topsoils strip from each parcel, basins and swales, including volumes of topsoil reuse (assuming 0.2m reuse thickness except where indicated)</u> | | | |
| | Area (m ²) | Topsoil Strip Volume (m ³) | 200mm Topsoil Reuse Volumes |
| Parcel R1 | 28500 | | |
| Parcel R2 | 29000 | | |
| Parcel R3 | 34300 | | |
| Parcel R4 | 41600 | | |
| Parcel R5 | 40076 | | |
| Parcel R6 | 46600 | | |
| Parcel R7 | 20000 | | |
| Local Centre | 8000 | 2400 | |
| Secondary Sch | 18300 | | |
| Primary Sch | 30300 | | 4545 |
| Sports Pitch A | 12386 | | 2477 |
| Sports Pitch B | 11237 | 3371 | 2247 |
| South Gate Landscape Mound | 17053 | | 3410 |
| Storage Area A | 4641 | | 781 |
| Basin 1 | 13556 | 4067 | 2711 |
| Basin 2 | 2850 | 855 | 570 |
| Highway | 17590 | 5277 | |
| Swales | 27913 | 8373 | 5421 |
| Allotment | 9014 | | 2181 |
| Total | 408707m² | 24343m³ | 24343m³ |

Figure 1: Table of topsoil strip and re-use volumes (taken from dwg WPF-HYD-XX-XX-DR-C-2400)

A total volume of topsoil re-use at 22162m³ has been identified using the proposed thickness of 0.2m as previously stated. The remaining 2181m³ has been used to improve topsoil thickness at the proposed allotment area to the south east corner to ensure a minimum topsoil thickness of 0.4m. This provides a total topsoil reuse volume of 24343m³ providing a net balance.

1.2.2 Suitable Cut Material

The main sources of cut within the site include the swale infrastructure, attenuation basins and spine road network. The swale infrastructure produces 22819m³ of cut material, the attenuation basins produce 20234m³ and excavation of the spine road to the proposed formation level produces 13888m³ of material. This derives a total volume of site won cut material of 66018m³ (Including an allowance for arisings from drainage trenches). Figure 2 below highlights the separate sources of cut material and volume generated by each.

| 2. Sources and volumes of fill material | | |
|---|---------------------------|------------------------------|
| <u>Volumes of suitable fill material after 0.3m topsoil strip</u> | | |
| | Area (m ²) | Cut Volume (m ³) |
| Swale 1A | 1590 | 2848 |
| Swale 1B | 14961 | 5277 |
| Swale 2A | 2890 | 4240 |
| Swale 2B | 2441 | 2330 |
| Swale 2C | 5225 | 8124 |
| Basin 1 | 13556 | 16943 |
| Basin 2 | 2850 | 3291 |
| Highway | 17590 | 13888 |
| Drainage Arisings | | 1083 |
| Total | 67605m² | 58023m³ |
| <i>Total including Marlstone</i> | | <i>66018m³</i> |

Figure 2: Table cut material sources

This site won material is to be used to generate the two proposed sports pitches, the Southern Gateway Landscape platform and material storage areas in the north west corner of the site.

The volumes of material required to generate these features is shown in the Figure 3 below.

| 3. Cut & Fill Volumes | | |
|--|----------------------------|--|
| <u>Where reusable fill is generated the following areas have been adjusted to reduce the volume of site won material</u> | | |
| Total reusable fill material available taken from table 2 = 66018m ³ | | |
| | Area (m ²) | Fill Volume required (m ³) |
| Sports Pitch A | 12368 | 9108 (4125 Marlstone Rock) |
| Sports Pitch B | 13595 | 2936 |
| South Gate Landscape Mound | 11941 | 51286 (3870 Marlstone Rock) |
| Storage Area 1a | 2262 | 2688 |
| Total | 109216m² | 66018m³ |
| An allowance for a 0.2m topsoil layer has been allowed for in the above volumes | | |
| Total volume of fill material taken from Table 2 = 66018m ³ | | |
| 66018 - 66018 = <u>0m³</u> | | |

Figure 3: Site won material re-use table

The volume of material required to generate the features shown in Figure 3 is 66018m³ as shown in Figure 2 the total volume of cut generated is 66018m³ allowing a balance of the site won material to be achieved. Refer to drawing WPF_HYD_XX_XX_DR_C_2400 for locations of the features listed above. Cross sections of each of the features can also be found on the following drawings.

Southern Gateway Landscaping: Refer to drawing **WPF-HYD-XX-XX-DR-C-0212**

Sports Pitch A: Refer to drawing **WPF-HYD-XX-XX-DR-C-0210**

Sports Pitch B: Refer to drawing **WPF-HYD-XX-XX-DR-C-0211**

1.2.3 Contaminated Material

The Ground Investigation report (Ref WPF_HYD_XX_XX_RP_G_1001) identifies the presence of elevated levels of arsenic within the Marlstone Rock formation found within the site boundary. Drawing WPF-HYD-XX-GI-DR-G-1002 shows the geological zonation plan, which displays the areas where the Marlstone Rock formations are outcropping (green hatch to the very eastern edge of the site.) The Ground investigation report concludes that any excavated Marlstone Rock material should be capped with a 600mm layer of clean cover where Marlstone Rock formations are deposited.

The proposed swale network cuts through these areas of Marlstone Rock formation. Swale 1B, Swale 2B and the proposed foul drainage along the southern boundary generated the volumes of Marlstone Rock as shown in Figure 4

| 4. Marlstone Rock Volumes | |
|--|--------------------|
| <u>Volumes of contaminated material removed through swale excavation and topsoil strip</u> | |
| | Volume (m³) |
| Swale 1B | 5619 |
| Swale 2B | 1542 |
| Southern Foul Drainage Network | 834 |
| Total Volume | 7995m³ |
| Volume stored in Sports Pitch A | 4125 |
| Volume Stored in Leap | 3870 |
| Total | 7995m³ |
| This contaminated fill has been placed within the Leap and Sports Pitch A with a minimum of 600mm cover. | |

Figure 4: Sources of Marlstone Rock Excavation

The total excavated volume of Marlstone Rock is 7995m³. It is proposed that this contaminated material be placed in the build up of the Southern Gateway Landscaping area and Sports Pitch A. Figure 3 shows the volumes of Marlstone Rock material to be lost in each of these areas 4125m³ in Sports Pitch A and 3870m³ in the Southern Gateway Landscaping area. A minimum of 600mm of cover is provided in these two areas over the Marlstone Rock deposits. The cross-sectional drawings HYD WPF-HYD-XX-XX-DR-C-0212 and WPF-HYD-XX-XX-DR-C-0210 shows the locations where the Marlstone Rock material is to be deposited.

An additional plan and note by EDP which also supports this discharge of conditions submission, has been produced to demonstrate the impact of the proposed earthworks on the existing tree root protection areas. This can be seen on drawing WPF-HYD-XX-XX-DR-C-2510. This plan highlights the areas of tree planting that will be removed as part of the earthworks/infrastructure as well as those areas avoided along swale routes.

1.3 Conclusions

- The cut & fill analysis shows that a balance of materials can be achieved without the need for materials to be taken off-site. However, the cut and fill analysis has made some assumptions on topsoil thicknesses and bulking factors. The southern gateway mound could be used as a balancing area for additional fill material with a tolerance of approximately +/- 200mm. These details are to be approved as a subsequent landscape reserved matters submission.
- A 0.3m topsoil strip generates a calculated volume of 24343m³ with all the stripped material being used within the site boundary
- Cut material generated from the creation of the green infrastructure (basins & swales) and grey infrastructure (Spine Road) can be fully utilised to generate the sports pitches and Southern Gateway Landscape area, resulting in a net balance and zero cart-away materials.
- Where contaminated material is to be excavated from the marlstone rock outcrops it will be covered with a 600mm capping layer of clean material in line with recommendations from the Ground Investigation.
- Contaminated Marlstone Rock material is to be deposited in the Southern Gateway Landscape area and Sports Pitch A platform providing a minimum 600mm of clean cover.