HOCHTIEF UK CONSTRUCTION

SNOWDONIA VISUAL IMPACT PROVISION

SOIL MANAGEMENT PLAN

C0233-HUK-GES-AX-RP-W-0001 P05

	Name	Position (Role)	Signature	Date
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Revision History

Rev	Date	Prepared	Checked	Approved	Reason for Issue
P01	25/11/2022	DGM	KOB	DMY	For issue
P02	14/12/2022	DGM	KOB	DMY	Addressing NG comments
P03	16-01-23	DGM	KOB	DMY	Dozer soil stripping added
C01	26-01-23	BBD	Accepted codes A by Client		For Construction
P04	13-02-23	DG	KOB	DMY	Terram on Formation
P05	17-02-23	DG	KOB	DMY	Addressing NG comments

Contents

1. Objective

This document sets out Hochtief UK Construction Ltd's (Hochtief) Soil Management Plan (SMP) for the stripping and storage of soils at the Snowdonia Visual Impact Provision project's (SVIP) Garth site.

The SMP shall follow Annex A BS3883 2015 Specification for Topsoil and the Department for Environment, Food and Rural Affairs (Defra) 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' (2009).

2. Soil handling areas and soil types

The proposed works comprise the site clearance and the construction of work compound. Access to the compound will come from the instatement of a temporary access road off Back Lane, Minffordd.

The site establishment phases are shown in Figure 1 below.

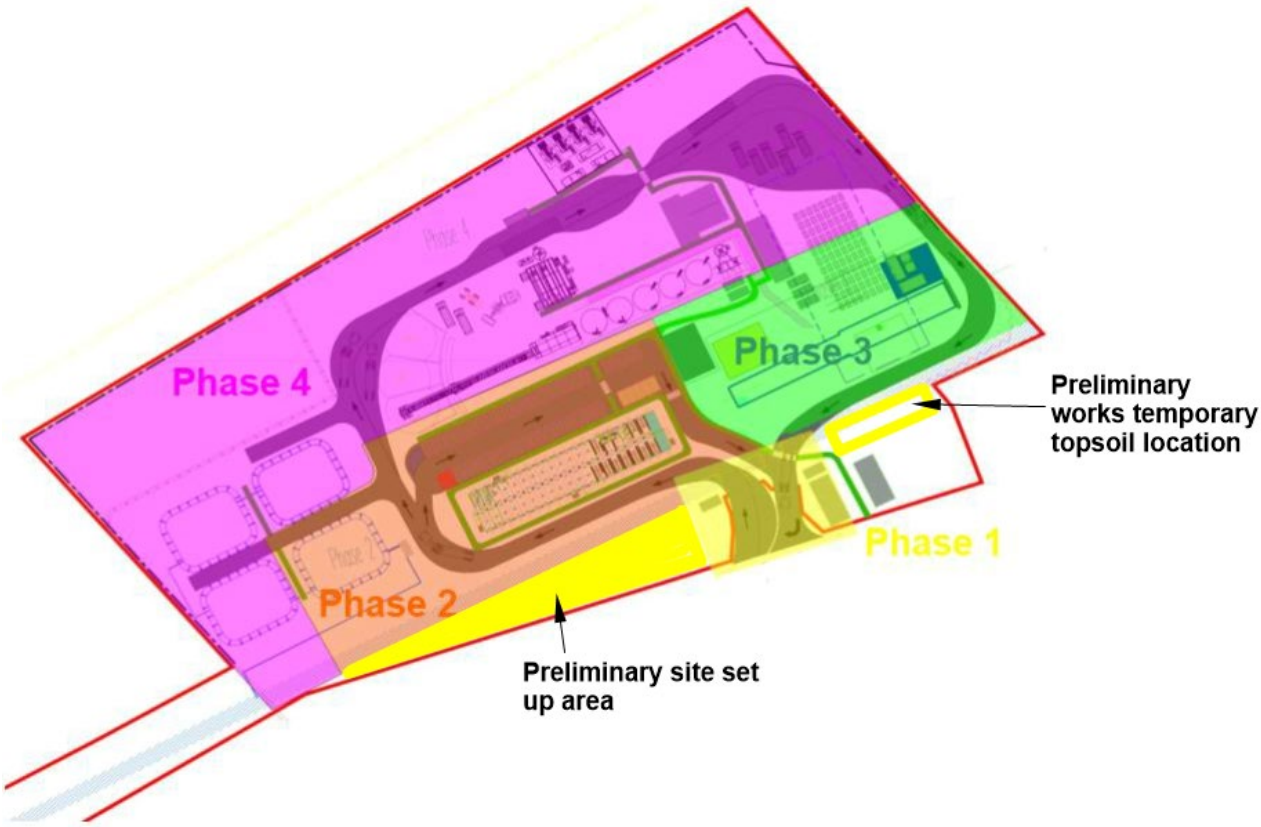

Figure 1. Garth Site Establishment Phases

The site is divided into Soil Handling Areas for the purposes of this SMP. The Soil Handling Areas reflect the different phases of site establishment and different types of soil handling required. The Soil Handling Areas are shown in Figure 2 below.

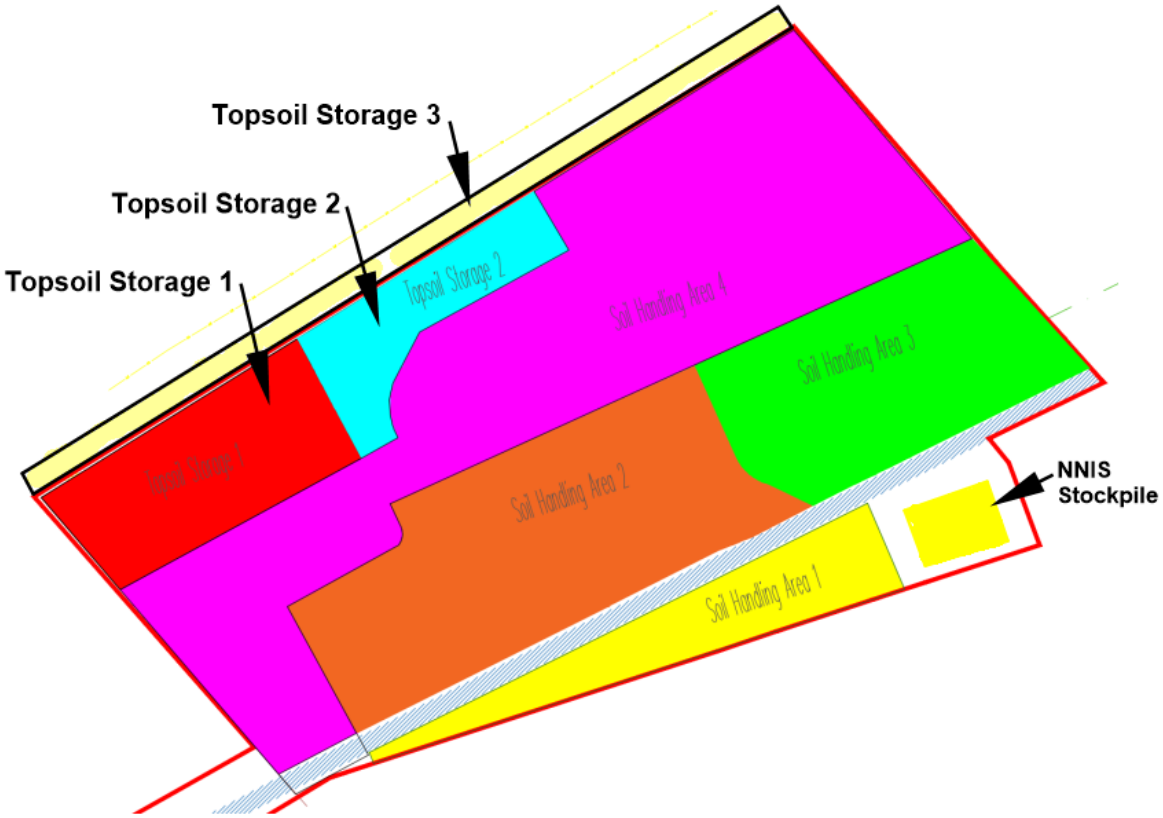

Figure 2. Garth Soil Handling Areas

The topsoil to be stripped is a brown sandy loam. This is expected to have a high resilience to structural damage during soil handling because of its relatively high sand content. The average topsoil depth from surface level to the base of the topsoil horizon is 200mm. The depth of topsoil over the site is expected to range between 150 - 240mm.

Table 1 below describes the expected volume of topsoil generated following a phased top soil strip.

The upper subsoil is a light brown silty sand which is expected to be highly resilient to structural damage. The expected loads on the subsoil will arise from:

- site access road pavement materials;
- temporary compound pavement materials;
- embankment and general fill; and
- traffic loads (DMRB 11.5 tonne standard axle).

No exceptional loads have been identified. Based on this assessment, it is considered that the agricultural subsoils remaining in situ will not be subject to structural damage that cannot be rectified from the loads described above. It is accepted that in these cases removing subsoils would degrade them more than

leaving them in situ during the construction phase, as subsoil structure would deteriorate during excavation and would need to re-establish itself following restoration. It is reasonably anticipated that the agricultural soils under the temporary construction compounds can therefore be successfully restored as part of the 5-year aftercare period.

Subsoils and superficial deposits within the compound area will require limited excavation as part of the cut/fill earthworks to achieve a level platform for the construction compound. The upper subsoil is assumed to be formation level for much of the site compound therefore limited subsoil stockpile storage will be required.

The excavated formation level will be covered with Terram geotextile (or similar) prior to placing granular material onto the subsoil. The Terram layer will help protect the compounds' SUDS schemes by reducing blinding with fines in the granular material. In addition when the temporary hardstandings are removed subsequently the Terram layer will help minimise subsoil loss in the granular material removed from site.

Table 1. Garth Soil Handling Areas

Soil Handling Area	Footprint Area (m^2)	Topsoil volume (m^3)		Notes
		240mm depth soil strip and 35% bulking factor	3m high stockpile with 1:2 edge batter	
1	2205	714.42		NNIS present
2	6161	1996.16		
3	4190	1357.56		
4	11836	3834.86		
Topsoil Stockpile				
NNIS			714.42	NNIS present
1	2756		6298.68	
2	1660		3100.00	
3	720		540 *	See note 1 and 2
	Total	7188.58	9938.68	excludes NNIS

Notes
1. Stockpile 3 is a windrow (3m wide x 1.5m high x 240m long) on the edge of a gas main exclusion zone.
2. Wales and West agreed (email to Rhys Davies, Hochtief 29-11-22) to reduce the adjacent gas main exclusion zone from 15m to 3m. This would enable Stockpile 3 to extend 12m outside of the redline boundary and provide an additional area of Topsoil storage of 2880m^2. This will create a minimum additional storage volume of 4320 (12m wide x 1.5m high x 240m long). Redline boundary exceedance to be approved.

Soil Handling Area 1 is assumed to be contaminated with Japanese Knotweed (JKW). Therefore the soil in this area will be stored either close by (see fig 2) to avoid moving the soil away from the contaminated area and or will be taken off site

to a suitable licenced waste treatment facility. The soil in this area will be excavated and stockpiled in accordance with bio-security requirements.

The topsoil from Soil Handling Area 2 will be stored in Topsoil Stockpile 3 until full and then in Topsoil Stockpile 1.

The topsoil in Soil Handling Area 3 will be stored in Topsoil Stockpile 1.

The topsoil in Soil Handling Area 4 will be stored in Topsoil stockpile 1 and part of Topsoil stockpile 2. The unused footprint of Stockpile 2 will be excavated to remove topsoil which will be added to the Topsoil 2 Stockpile. The exposed subsoil area on the stockpile 2 will then be used to store subsoil excavated from the lagoons and the launch shaft area. The subsoil stockpile will extend up to a height of 5m with a 1:2 edge batter.

3. Soil Handling

Planning and briefing

Daily morning briefings will include reference to the this soil management plan to ensure that each member of the team carrying out the works is fully briefed as to how each stage of soil handling and land restoration shall proceed. The persons responsible for site management shall have the necessary authority and resources to supervise, monitor and control the works:

Project Manager, David Murray, 07816 450562 david.murray@hochtief.co.uk

Works Manager, Kevin OBrian, 07966 499358 kevin.o'brien@hochtief.co.uk

Existing land drainage infrastructure

The excavations will not be sufficiently deep to disturb or damage agricultural land drains but a watching brief for land drainage systems will be made during excavation. If found, the land drainage system will be investigated and provisions made to secure the continued operation of the land drainage system including by providing alternative outfalls and any other necessary linking pipework.

Soil Handling Constraints

The site engineer (or sub-agent) will be responsible for undertaking daily pre-start assessments of the prevailing soil conditions to confirm the soil concerned is in a suitable condition to be excavated, trafficked and or compacted.

All soil materials to be disturbed and reused, for whatever purpose shall be handled:

- under the appropriate weather and soil conditions, using the appropriate machinery;

- when they are in a reasonably dry and friable state, which is when soil structures are least susceptible to lasting damage by compaction and smearing;

- when field tests determine their suitability for handling;

Topsoil shall not be handled or trafficked when the ground is frozen or covered with Snow.

The surface of the material to be handled or trafficked, whether topsoil or subsoil, shall be free of surface ponding and standing water.

Rainfall Criteria Determining Soil Handling

The rainfall criteria to be used to determine when soils can be handled shall be as follows:

- if there is light rain or drizzle, handling can proceed for up to four hours unless the soils are already in too moist a state (see Table 2);
- if there is light rain, handling will cease if the rain has not stopped in 15 minutes;
- if there is heavy rain (as from intense showers, slow-moving depressions) handling shall stop immediately;
- if sustained heavy rainfall (e.g. ≥10mm in 24 hours) occurs during soil stripping operations, work must be suspended and not re-started until the ground has had at least a full dry day or agreed moisture criteria (see Table 2) can be met;
- soil shall not be handled or trafficked during or shortly after heavy precipitation (including rain, snow and hail) in a waterlogged condition, and when there are pools of water on the ground surface; and
- after rainfall has ceased, field tests (see Table 2) shall be applied to determine when handling may re-start.

Field Tests to Determine Soil Handling Conditions

The field tests that shall be applied to all soil materials that are to be disturbed and reused are described in Table 3 and 4 below.

In order to determine the suitability of soil conditions in advance of soil handling, soils shall be sampled from several evenly distributed sampling points within each soil handling area.

At each sampling point one sample per soil horizon to be stripped shall be taken and assessed as set out in Tables 2-4 below. Decisions will be based on at least 80% of the samples passing the particular test. Records (including photographs) of all tests shall be kept.

Table 2: Assessing suitability of soil for handling

If the soil sample is wet, films of water are visible on the surfaces of grains and aggregates and/or when a soil sample is squeezed in the hand and it readily deforms into a cohesive "ball".	NO HANDLING It should be noted that some (engineering) soils will be permanently in this condition (e.g. alluvial clays), and these materials should be improved by drying or stabilising. Alternatively, other soils may be used.
If peat soils are dry and brittle (i.e. when water is not squeezed out under moderate hard pressure)	NO HANDLING
Peds (structures) break up/crumble readily when squeezed in the hand rather than forming into a ball	HANDLING OK
If the sample is moist, there is a slight dampness when squeezed between the fingers but it does not significantly change colour (darken) on further wetting	NO HANDLING BY DOZERS BUT MAY BE HANDLED BY TRACKED EXCAVATORS IF CONSISTENCY TEST (TABLE 3) IS PASSED
If the sample is dry and brittle it will look dry and change colour (darken) if water is added	HANDLING OK IF CONSISTENCY TEST (TABLE 3) IS PASSED

Table 3: Consistency test

Impossible to mould a soil sample into a ball by hand because the soil is too hard (dry)	HANDLING OK
Impossible to mould a soil sample into a ball by hand because the soil is too loose (dry)	HANDLING OK
Impossible to mould a soil sample into a ball by hand because the soil is too loose (wet)	NO HANDLING
Possible to mould a soil sample into a ball by hand	GO TO TABLE 4

Table 4: Additional consistency test when sample can be moulded into a ball

Impossible to roll the ball into a thread of 3mm diameter on a flat non-adhesive surface using light pressure from the flat of the hand; the soil crumbles or disintegrates	HANDLING OK
Possible to roll the ball into a thread of 3mm diameter on a flat non-adhesive surface using light pressure from the flat of the hand	NO HANDLING Soils with a plasticity of greater than 1 x plastic limit (i.e. soils which fail this test) could still be usable as engineering soils. So this test should only be applied to soils that are to be retained e.g. for agricultural use, not as a general criterion of when excavation may take place.

Soil Stripping and Machinery

The machinery used for soil handling on land that is to be restored to agriculture shall normally conform to the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra 2009).

The Code of Practice itself indicates that the preferred method for minimising damage to topsoil and subsoil is to use excavators and dump trucks. Stripping, stockpiling and replacing soils from agricultural land that is to be restored to agriculture shall normally require a 360° excavator at each 'end' of the operation.

Alternative stripping methods that can be shown to afford the same degree of soil protection are acceptable. Dozers may be used for soil stripping where this does not significantly damage the soil being handled and to form soil mounds with dry and non-plastic soils. Alternative stripping methods should be approved by the Project Manager and Works Manager.

For whichever method is selected, dump trucks shall stand and travel only on the base material exposed after stripping the topsoil and subsoil needed to create the formation level.

The site shall be cleared of vegetation before soils are stripped by cutting and arisings removed as far as practicable.

The quantity of each soil material to be excavated from a given soil handling area should be calculated and recorded before stripping to ensure the proposed stockpile location will have sufficient storage capacity.

All soil handling machinery is to use specified marked haul routes from which topsoil (and subsoil, as appropriate) has been stripped, except for the purposes of exposing a subsoil working surface to facilitate stripping operations.

The excavator will strip a marked-out route to the stockpile location so the dump trucks can start to run on formation level. The excavator will start closest to the stockpile location so as to minimise the trafficking on undisturbed soils.
There is no requirement to strip topsoils from beneath the topsoil stockpiles.

The excavator will clear in 5m wide strips down to formation level to a depth of 240mm before moving onto the next section. The upper subsoils are predominantly high resilience and will be protected with geotextile membrane prior to commencing the capping layer.

Stripped topsoils will be loaded into dumptrucks and transported to the temporary soil stockpiles on the area already stripped. Further details of stockpile construction are described below. The machinery to be used in stripping the soils, transporting them to the stockpile ad forming stockpiles will comprise:

- 1 No. 20t-30t Excavator; and
- 2-3 No. 25t- 30t Dumptrucks;
- suitable Dozer

In limited circumstances it is acceptable for machinery for enabling works and construction of access roads to travel across unstripped topsoil. This travel should be routed along areas of soil which are due to be stripped. Where this is not possible then the contractor should take precautions to avoid damage to the soil e.g. through the use of ground protection mats, and make good any damage, such as wheelings and soil compaction that occurs.

Action when existing land drains exposed.

If land drains are exposed during the topsoil strip action needs to be taken immediately to prevent silt laden runoff from entering the exposed drains and risk causing a pollution event. The water management plan (Appendix B1 and B3) describes a range of measures that can be adopted to control silt laden runoff from agricultural drainage. The nature of the exposure will inform the most appropriate remedial measure. This could include re-piping, capping or diverting the exposed pipe section. It could also include controlling seepage into the exposed pipework with silt fencing / or silt matting or similar material.

The following is taken from the Water Management Plan Appendix B1 Agricultural Drainage

> **"Action when existing land drains exposed**
> If land drains are exposed during the topsoil strip action needs to be taken immediately to prevent silt laden runoff from entering the exposed drains and risk causing a pollution event. The water management plan (Appendix B1 and B3) describes a range of measures that can be adopted to control silt laden runoff from agricultural drainage.
>
> Remedial measures could also include controlling seepage into the exposed pipework with silt fencing / or silt matting or similar material" (ref SVIP Soil Management Plan).
>
> The nature of the exposure will inform the most appropriate remedial measure. This could include:
> - re-piping or diverting the exposed pipe section. The drainage installer will be required to provide drainage installation records so that these can be referred to during compound reinstatement works and handed over in the project's as-built records;
> - cutting off and capping existing land drains to stop any potential silt run off into ditches or open excavations. During the demobilisation and reinstatement of the construction compound some land drains that had been temporarily blocked (e.g. to permit lagoon or shaft construction) will be reinstated. The drainage installer will be required to provide drainage installation records so that these can be handed over in the project's as-built records."

Stockpile Construction

Separate stockpiles are required for different soil types. In addition topsoils will be stored as discrete soil handling areas.

Areas to be used for storing soil stockpiles shall first be cleared of vegetation.

Once completed all soil stockpiles will be clearly labelled to describe the soil type (Topsoil or Subsoil) and the source area (see Fig 2). This is to ensure that the soil can be returned to its original area during the site's in reinstatement.

Topsoil stockpile heights of 3 - 4m shall be used for topsoil that can be stripped and stockpiled in a dry state but heights may need to be greater where storage space is limited.

Areas to be used for storing subsoils shall be cleared of vegetation and stripped of topsoil to the full specified depths and this topsoil shall be temporarily stockpiled. Subsoil stockpile heights of up to 5m are to be used. Subsoil stockpiles will generally be higher than topsoil stockpiles but shall not usually exceed 5 - 6m unless they are required to provide visual or acoustic screening.

Sufficient stockpile areas shall be allocated for the storage of the soils generated from the given soil handling areas assuming a 35% bulking factor.

The maximum side slopes of stockpiles that are to be grass seeded and maintained shall be 1 in 2 (25°)

As a general rule, the soil shall be dry (e.g. drier than the plastic limit) when it goes into the stockpile, and it shall be stored in such a way that it remains dry, and thereby in a suitable state for excavation and re-spreading at the end of the storage period. Soil in a dry and non-plastic state is less prone to compaction, tends to retain a larger proportion of its structure, will respread easily and topsoil will break down into a suitable tilth.

Soil shall be stored in areas of the site where it can be left undisturbed and will not interfere with site operations. The location and seeding of stockpiles shall also be considered from a temporary mitigation perspective. Stockpiles shall not be positioned within the root or crown spread of trees, in hollows or adjacent to ditches, watercourses (unless controls are put in place to prevent siltation), or where existing or future excavations are planned. The Scheme's CEMP requires that excavated material will be stored at least 10m away from watercourses, and gaps will be provided in stored material to prevent the impoundment of flood waters. In some cases ditches may be required to control stockpile runoff and contain erosion.

If space limitations mean that two different soil types must exceptionally be stored on top of each other on the same footprint, then a suitable indicator (such as a geotextile membrane) shall be placed between them. Such composite stockpiles shall have the indicator placed horizontally between the layers: topsoil will always be the upper layer. It shall also be acceptable to store different materials adjacent to each other, with a geotextile membrane or other indicator vertically separating them, and with marker posts in locations that have been surveyed and recorded.

Method 1 should be applied to soil that is in a dry and non-plastic state and aims to create a large core of dry soil, and to restrict the amount of water that can get into the stockpile during the storage period. Dry soil that is stored in this manner can remain so for a period of years and it is re-useable within days of respreading.

The soil is loose-tipped in heaps from a dump truck, starting at the furthest point in the storage area and working back toward the access point. When the entire storage area has been filled with heaps, a tracked machine (excavator or dozer) levels them and firms the surface in order for a second layer of heaps to be tipped. This sequence is repeated until the stockpile reaches its planned height of 3m. To help shed rainwater and prevent ponding and infiltration a tracked machine compacts and re-grades the sides and top of the stockpile to form a smooth gradient.

Any subsoil requiring storage can be stockpiled to a height of 5m. To help shed rainwater and prevent ponding and infiltration the dozer will compact and re-grade the sides and top of the stockpile to form a smooth gradient.

Method 2 should be applied if the construction programme or prevailing weather conditions result in soil having to be stockpiled when wet and/or plastic in consistency. This method minimises the amount of compaction, while at the same time maximising the surface area of the stockpile to enable the soil to dry out further. It also allows the soil to be heaped up into a 'Method 1' type stockpile, once it has dried out.

The soil is tipped in a line of heaps to form a 'windrow' starting at the furthest point in the storage area and working back toward the access point. Any additional windrows are spaced sufficiently apart to allow tracked plant to gain access between them so that the soil can be heaped up to a maximum height of 1.5m; to avoid compaction, no machinery, even tracked plant, traverses the windrow. Once the soil has dried out and is non-plastic in consistency (which usually requires several weeks of dry and windy or warm weather), the windrows are combined to form larger stockpiles, using a tracked excavator. The surface of the stockpile is then regraded and compacted by a tracked machine (dozer or excavator) to reduce rainwater infiltration.

4. Stockpile Maintenance

Once the stockpile has been completed the area shall be cordoned off with secure fencing to prevent any disturbance or contamination by other construction activities. No wheeled vehicles shall run on soil stockpiles. Silt fencing will be installed around the base of soil stockpiles to control the risk of silt runoff.

The Schemes Habitat Management Plan describes the use of weed suppressing membrane or herbicide spraying prior to stockpile seeding. If there is no evidence of weeds in the topsoil stripped and the topsoil can be promptly seeded with grass seed then this may be un-necessary for the rapid establishment of a robust sward of grass.

The topsoil stockpile(s) surface shall be seeded with a low maintenance grass mix to minimise run-off and soil erosion, reduce the generation of dust arising from soil stockpiles, help reduce infestation by nuisance weeds that might spread seed onto adjacent land, and avoid the increase in CO2 emissions from the surface of topsoil mounds as a result of increased oxidation of organic matter

A suitable low maintenance grass mix should include: perennial ryegrass, fescue (red fescue and hard fescue), meadow grass, common bent and white clover.

The management of grass cover and weeds shall be undertaken during the summer months by mowing or strimming to prevent the weeds from shedding their seeds.

The site shall be monitored for signs of ponding, as indicated by standing water. Where it occurs, temporary drainage measures or regrading will be put into effect

The stockpiles will require periodic inspection to confirm:

- they have been constructed to the prescribed height of 3m and fenced off;
- records have been kept of the volumes for each soil handling area;
- the stockpiles have been seeded with a low maintenance grass mix (to include perennial ryegrass, fescue (red fescue and hard fescue), meadow grass, common bent and white clover;
- the seed has germinated and vegetation has been established on the stockpile;
- the vegetation is mown or strimmed during summer prior to seeds being set;
- the stockpiles do not collect water during winter or periods of sustained rainfall.

5. Reuse of stockpiled soils

Following the completion of the works, the construction items and capping will be removed and the area returned to its original configuration and use, using the topsoil from the temporary stockpiles.

The restoration and remediation of soils will be the reverse of soil stripping. Within the compound area, the cut and fill earthworks will be reversed using the subsoil/superficial deposits excavated to create a platform that is consistent with original levels minus 240mm of topsoil.

The subsoil platform will be inspected by the specialist soils advisor to confirm that it is not compacted before it receives the 240mm depth of topsoil. If compaction is found in the replaced subsoil, the subsoil will be ripped to a depth up to 300mm from the surface of the replaced subsoil with a winged-tine subsoiler. The specialist soils advisor is David Grantham BEng, CEng, M.I. Soil Sci. CEnv although the nominated person may change during the project.

The topsoil will be taken out of the stockpile using the excavator and loaded into dump trucks to be transported to the compound area, where it will be loose-tipped in strips. The dump trucks will follow a single haul route to the areas to be tipped in order to avoid excessive tracking on the replaced and de-compacted subsoil. This haul route will require decompaction prior to topsoils being replaced on it. The loose tip of topsoil will be levelled by the dozer within the strip to a depth of 240mm to align with the levels of adjoining undisturbed land.

For areas outside the compound, once the capping has been removed from the access road and any subsoil stockpile removed, the original upper subsoil will be

exposed which will require ripping to a depth of 300mm from the surface of the exposed upper subsoil with a winged-tine subsoiler. Deeper subsoiling will be required if, based on the advice of the specialist soils advisor, compaction extends to depths of more than 300mm from the exposed surface. A watching brief shall be made to ensure that the deep ripping does not damage any agricultural land drains. Any damage will require further investigation and replacement or repair by the remediation contractor.

The topsoil will be taken out of the stockpile using the excavator and loaded into dump trucks to be transported to the strip of ripped upper subsoil, where it will be loose-tipped onto the strip. The loose tip will be levelled by the dozer within the strip to a depth of 240mm to align with the levels of adjoining undisturbed land.

The footprint of the topsoil stockpile will be ripped to a depth of 300mm from the surface with a winged-tine subsoiler. Deeper subsoiling will be required if compaction extends to depths of more than 300mm from the surface, based on the advice of the specialist soils advisor.

The restoration shall be warranted by the Contractor through self-certification. Following certification the finished restoration shall be cultivated to a seed bed appropriate to the first crop or vegetation as agreed with landowners. A period of aftercare at Garth (usually five years) will be managed by the landowner in accordance with Landscape Maintenance and Planting Schedules Proposed Landscape Schemes (ref. C0233-ACM-PLA-AX-RP-L-0001).

6. Records to be kept by Hochtief

The following SMP records are to be kept by Hochtief.

- the method of assessing the suitability of soil handling based on plastic limit (i.e. to avoid moving soils when wet and plastic so that they do not compact when handled);
- depth of stripped topsoil and subsoil in given soil handling areas;
- equipment used for stripping topsoil and constructing stockpiles;
- soil stockpile: location (OS Grid reference), footprint, height, volume, source of excavated material in the stockpile (ref. soil handing area);
- management of soil stockpiles including dates of inspections and remedial actions undertaken;
- soil stockpile seed mix;
- method of alleviating compaction prior to replacing topsoil;
- schedule of aftercare maintenance to be referenced in the HUK Landscape Maintenance and Habitat Management Plans. This will include secondary treatments such as subsoiling, drainage reinstatement and advice on vegetation establishment for a period of up to five years following completion of the relevant construction work.
- a final report to describe the final handover condition of the agricultural soil.

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