South Tees Site Company Stockpile 5

FRA and Drainage Strategy Addendum

First Issue

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Revision History

Revision Ref/Date	Amendments	Issued to
19/01/2021	First Issue	Darren Edmends

Contract

This report describes work commissioned by Darren Edmends, on behalf of South Tees Site Company. Joseph Landells-Molloy of JBA Consulting carried out this work.

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Engineer

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Purpose

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1 Introduction

This supplementary flood risk and drainage statement has been prepared in support of a Section 73 Application relating to two additional stockpiles (Stockpile 4 and 5) within the Teesworks area. The statement forms an addendum to the original flood risk assessment and drainage strategy (41825-WOOD-XX-XX-RP-OW-0001_A_P01) prepared by Wood for the original application (R/2019/0427/FFM).

2 Site Details

2.1 Site Location

In addition to the initial six locations for temporary storage of imported soil material defined in the original report, South Tees Development Corporation (STDC) has identified two new areas located within the wider site planning boundary at the South Bank area, at approximate NGR 453522. The locations of the new storage mounds are shown in Appendix A (STDC-SIZ-SB-PLA-0002 South Bank Storage Mounds Site Plan - A3).

2.2 South Bank Storage Mounds

These areas at South Bank are for the temporary storage of imported soil material as described with the original report. STDC would be responsible for the management of the storage mounds prior to its future re-use in the development of the wider site.

The two new areas contain storage mounds referred to as 4A, 4B, 4C and 5, and are 0.8ha, 0.2ha, 0.5ha and 1.5ha in respective size.

These are located adjacent to the right bank of the former Holme Beck channel, immediately to the south of the Hanson site and to the west of the former SS-IL high tip. The site is currently used for aggregate processing.

The area generally falls away to the north west. At the southern areas of storage mounds 4A and 4C, current ground levels are approximately 11.0 mAOD rising to 12.5 mAOD at the current access track. This falls away to approximately 8.0 mAOD at the northern extent of storage mound 4A. The current ground levels at storage mound 5 are approximately 11.5 mAOD in southern areas falling away to approximately 9 mAOD at the northern and western extents. There are currently excavated and raised areas at storage mound 5 resulting from current use.

It is proposed to discharge runoff from the South Bank storage mounds to the former Holme Beck Channel and ultimately to the River Tees via the existing headwall.

3 Flood Risk Appraisal

3.1 Potential Sources of Flooding

3.1.1 Tidal and Fluvial

The South Bank storage mounds are located within Flood Zone 1, therefore, at low risk of tidal and fluvial flooding (less than 0.1% Annual Exceedance Probability (AEP)).

The extents of the tidal and fluvial Flood Zones are shown for the wider site boundary in Figure A.2 of the original report (41825-WOOD-XX-XX-DR-OW-0002_S2_P01.1).

3.1.2 Surface Water

The South Bank storage mounds are generally at very low risk from surface water flooding (less than 0.1% AEP) based on the EA surface water flood risk map. Any surface water flooding in close proximity to the site is highly localised and limited to ponding at low spots.

The extents of the EA surface water flood risk map are shown for the wider site boundary in Figure A.3 of the original report (41825-WOOD-XX-XXDR-OW-0003_S2_P01.1).

3.1.3 Flooding from Sewers

The risk of flooding from sewers is considered to the low based on the original report findings. No further assessment has been undertaken.

3.1.4 Flooding from Reservoirs

The risk of flooding from reservoirs is considered to the low based on the original report findings. No further assessment has been undertaken.

3.1.5 Flooding from Groundwater

The risk of flooding from groundwater is considered to the low based on the original report findings. No further assessment has been undertaken.

3.1.6 Artificial Sources

The risk of flooding from artificial sources such as existing water retaining structures within the existing steelwork site is considered to the low based on the original report findings. No further assessment has been undertaken.

3.2 Flood Risk Mitigation

The risk of flooding to the South Bank storage mounds is considered to be low from all sources. However, construction of the storage mounds will reduce permeability and increase runoff. Therefore, runoff will need to be managed appropriately to ensure that flood risk is not increased offsite.

4 Drainage Strategy

4.1 Baseline Surface Water Runoff

It is proposed to discharge site runoff to the adjacent former Holme Beck Channel which would then outfall to the River Tees via the existing headwall. Whilst unrestricted discharge could be permitted to the tidal River Tees, it is considered more appropriate to restrict runoff to provide attenuation and a level of surface water treatment through settlement of particulates. The greenfield Qbar and 1% AEP rates are presented in Table 4-1. In line with the original report, greenfield runoff rates have been calculated using the ICP SuDS method (see Appendix B).

Table 4-1: Baseline Discharge Rates

Site	Greenfield Qbar (l/s)	Greenfield 1% AEP (l/s)
South Bank 4A	3.0	6.3
South Bank 4B	0.8	1.6
South Bank 4C	1.9	3.9
South Bank 5	5.7	11.8
Total	11.4	23.6

4.2 Surface Water Drainage Strategy

In line with the original report, it is assumed that the storage mounds are fully impermeable. It is proposed to restrict runoff to the former Holme Beck Channel at the 1% AEP greenfield runoff rate. Images of the former Holme Beck Channel and River Tees headwall are presented in Figure 4-1.

Figure 4-1: Former Holme Beck Channel looking northwards from South Bank storage mounds location (left) and River Tees headwall (right)

Following the original report methodology, estimated attenuation volumes for the 1% AEP event plus 20% climate change are presented in Table 4 2. These were calculated using the Micro Drainage Quick Storage Estimate tool (see Appendix C). Given the close proximity of the South Bank storage mounds, it is likely that all will drain to the same surface attenuation. Between 1410 and 2248m^3 of attenuation should be provided to restrict runoff to 23.6 l/s and allow for settlement of particulates.

Table 4-2: Estimate Attenuation Volumes

Site	Site Area/ Impermeable Area (ha)	1% AEP Discharge Rate (l/s)	1% AEP + 20% CC Attenuation Lower Estimate (m^3)	1% AEP + 20% CC Attenuation Upper Estimate (m^3)
South Bank 4A	0.8	6.3	376	599
South Bank 4B	0.2	1.6	93	149
South Bank 4C	0.5	3.9	236	376
South Bank 5	1.5	11.8	705	1124
Total	3.0	23.6	1410	2248

5 Sediment Management

Management of sediment pollution associated with the construction of the South Bank storage mounds and associated drainage infrastructure will follow the methodology outlined in Section 5 of the original report.

6 Maintenance and Management Plan

Maintenance and management of the South Bank storage mounds and associated drainage infrastructure will follow the agreed plan set out in Section 6 of the original report.

7 Conclusions and Recommendations

This flood risk and drainage statement forms an addendum to the original flood risk assessment and drainage strategy (41825-WOOD-XX-XX-RP-OW-0001_A_P01) prepared by Wood for the original application (R/2019/0427/FFM). The statement covers two new areas for the temporary storage of imported soil material at the South Bank area.

7.1 Flood Risk Assessment

The risk of flooding arising from the South Bank storage mounds is considered to be very low from all sources. The areas are located within Flood Zone 1 and are generally at very low risk from surface water flooding based on the EA surface water flood risk map. Any surface water flooding in close proximity to the site is highly localised and limited to ponding at low spots.

7.2 Drainage Strategy

It is proposed to discharge surface water to the adjacent former Holme Beck Channel and ultimately to the River Tees via the existing headwall. Given the close proximity of the South Bank storage mounds, it is likely that all will drain to the same surface attenuation. Runoff from the two new areas is to be restricted to the total 1% AEP greenfield runoff rate from each storage mound (23.6l/s). Between 1410 and 2248m^3 of attenuation should be provided to attenuate the 1% AEP event plus 20% climate change event.

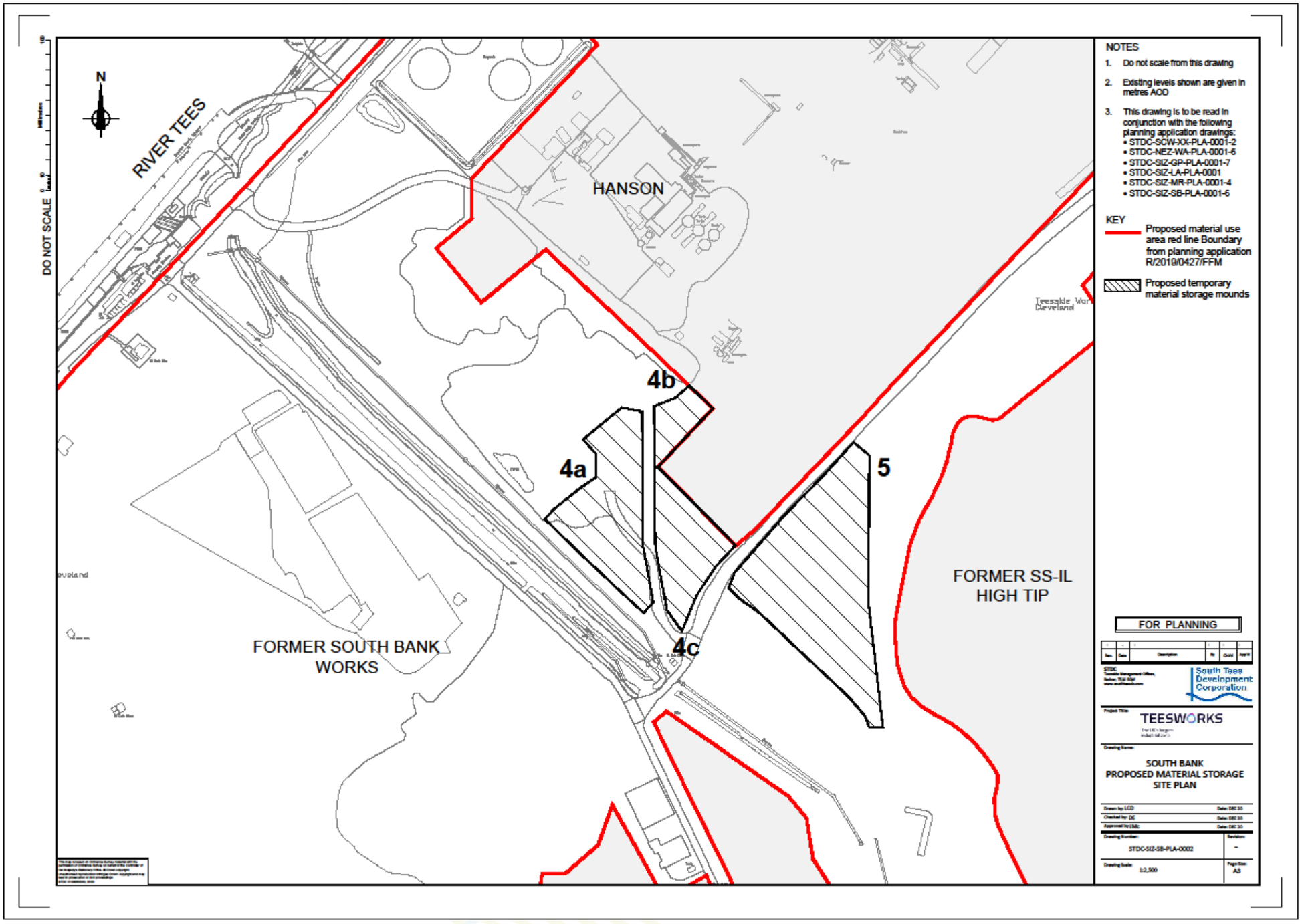
Runoff from the storage mounds will contain sediment and this will be managed in accordance with the methodology agreed in the original report.

It will be the Contractors responsibility to ensure that appropriate measures are incorporated into the CEMP for the stockpiling works and that any Environment Agency permits required to discharge to the River Tees are in place prior to the commencement of works.

Appendices

A Drawings

A.1 STDC-SIZ-SB-PLA-0002 South Bank Storage Mounds Site Plan - A3



B Greenfield Runoff Rates Micro Drainage Results

B.1 Storage Mound 4A

JBA Consulting		Page 1
The Old School House St. Joseph's Street Tadcaster LS24 9HA		Micro Drainage
Date 12/01/2021 15:42 File	Designed by jflownw Checked by	
Micro Drainage	Source Control 2018.1.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.800	Urban	0.000
SAAR (mm)	615	Region Number	Region 3

Results l/s

QBAR Rural	3.0
QBAR Urban	3.0
Q100 years	6.3
Q1 year	2.6
Q30 years	5.3
Q100 years	6.3

B.2 Storage Mound 4B

JBA Consulting		Page 1
The Old School House St. Joseph's Street Tadcaster LS24 9HA		Micro Drainage
Date 12/01/2021 15:53 File	Designed by jflownw Checked by	
Micro Drainage	Source Control 2018.1.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.200	Urban	0.000
SAAR (mm)	615	Region Number	Region 3

Results	l/s
QBAR Rural	0.8
QBAR Urban	0.8
Q100 years	1.6
Q1 year	0.6
Q30 years	1.3
Q100 years	1.6

B.3 Storage Mound 4C

JBA Consulting		Page 1
The Old School House St. Joseph's Street Tadcaster LS24 9HA		Micro Drainage
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Micro Drainage	Source Control 2018.1.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.500	Urban	0.000
SAAR (mm)	615	Region Number	Region 3

Results l/s

QBAR Rural	1.9
QBAR Urban	1.9
Q100 years	3.9
Q1 year	1.6
Q30 years	3.3
Q100 years	3.9

B.4 Storage Mound 5

JBA Consulting		Page 1
The Old School House St. Joseph's Street Tadcaster LS24 9HA		Micro Drainage
Date 12/01/2021 15:55 File	Designed by jflownw Checked by	
Micro Drainage	Source Control 2018.1.1	

ICP SUDS Mean Annual Flood

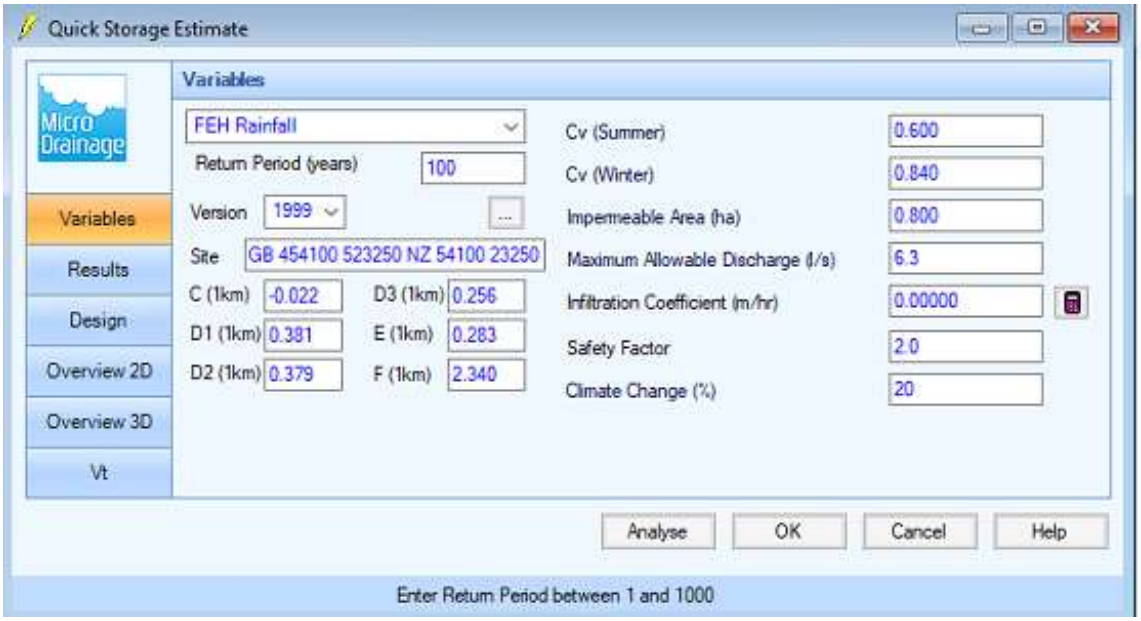
Input

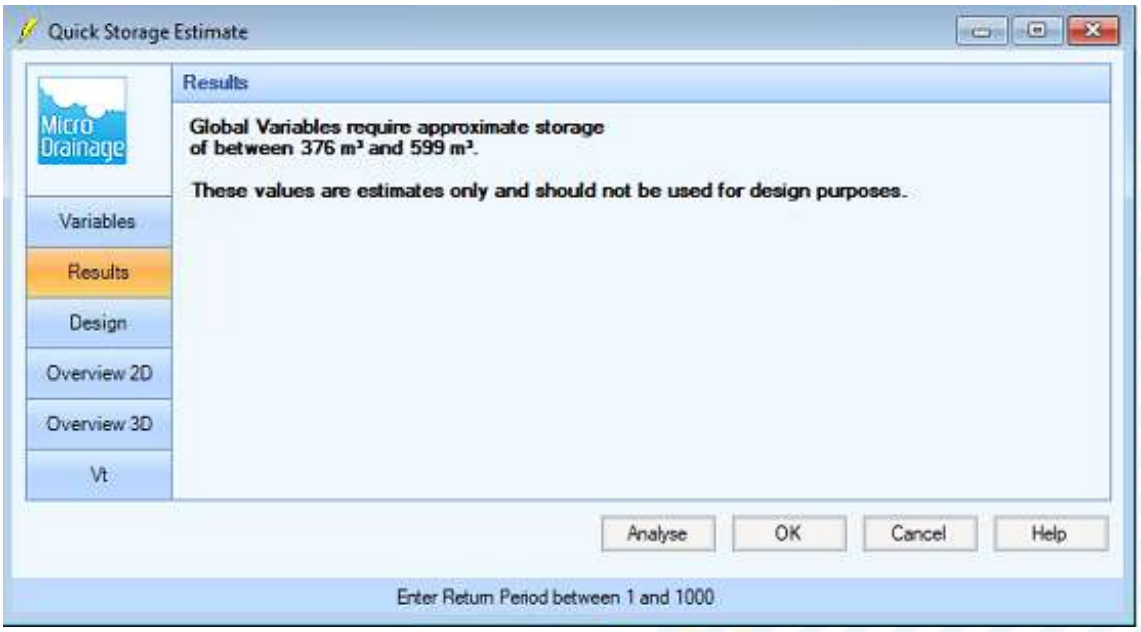
Return Period (years)	100	Soil	0.450
Area (ha)	1.500	Urban	0.000
SAAR (mm)	615	Region Number	Region 3

Results	l/s
QBAR Rural	5.7
QBAR Urban	5.7
Q100 years	11.8
Q1 year	4.9
Q30 years	10.0
Q100 years	11.8

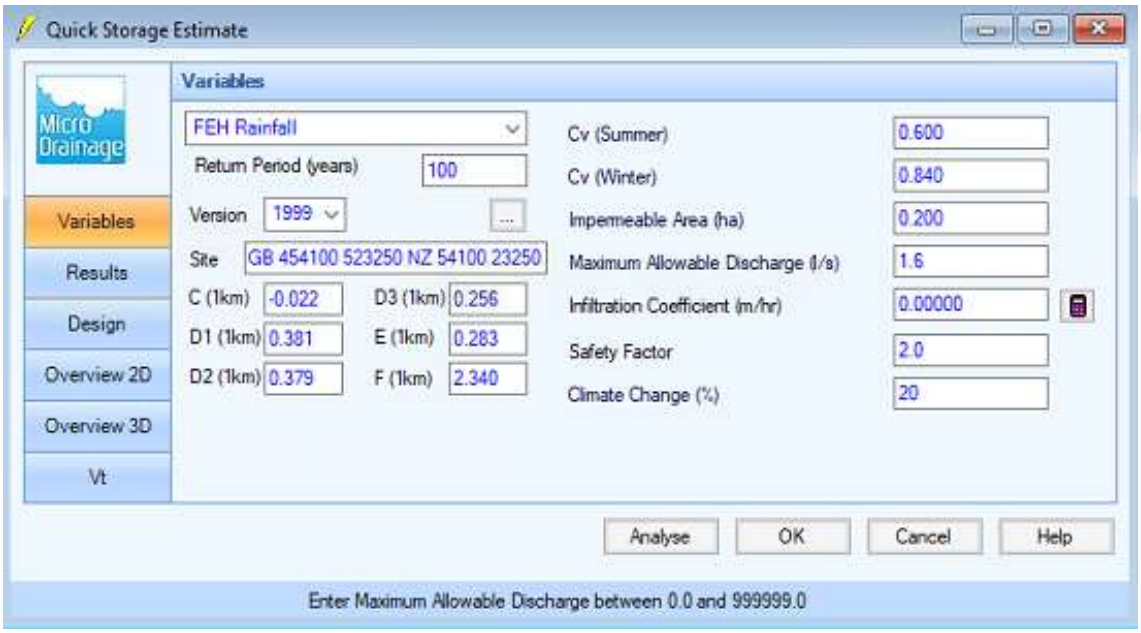
C Micro Drainage Quick Storage Estimates

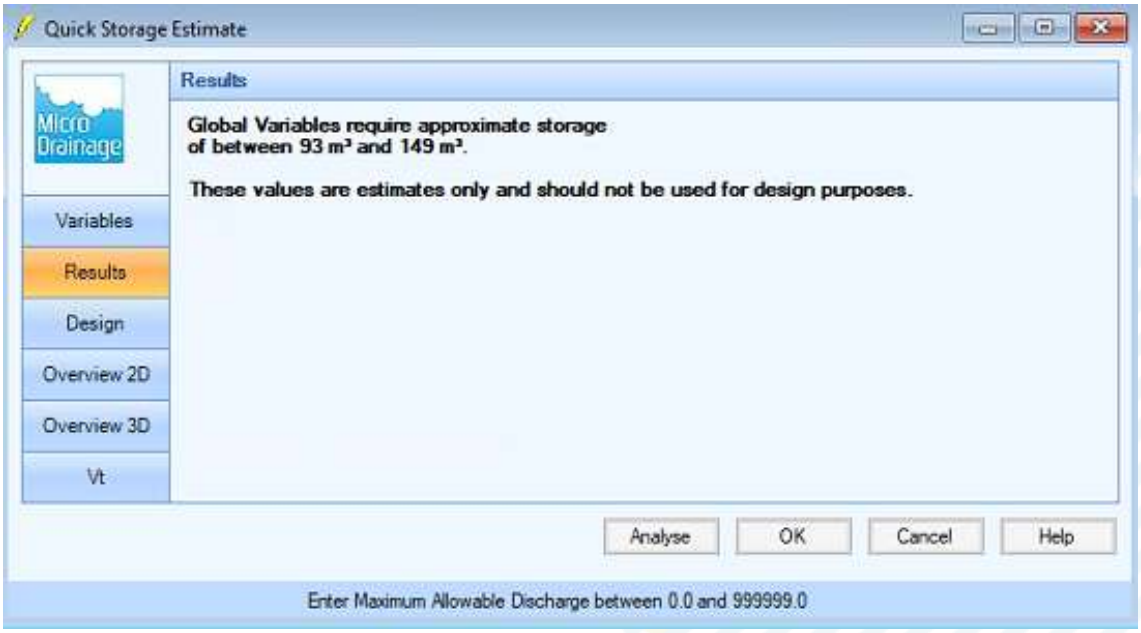
C.1 Storage Mound 4A



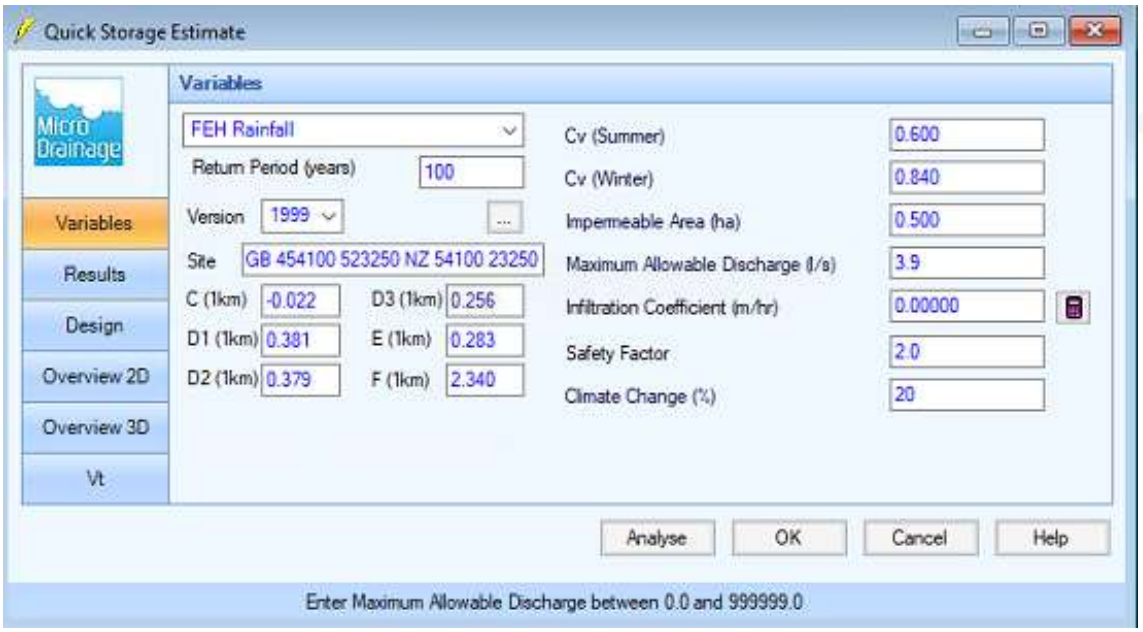


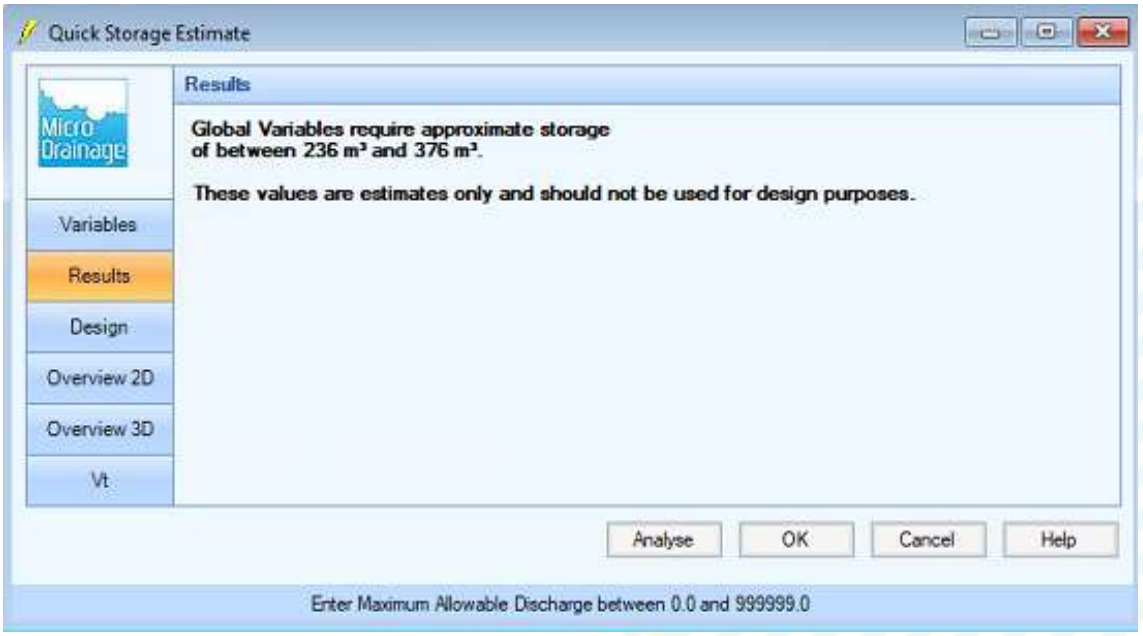
C.2 Storage Mound 4B



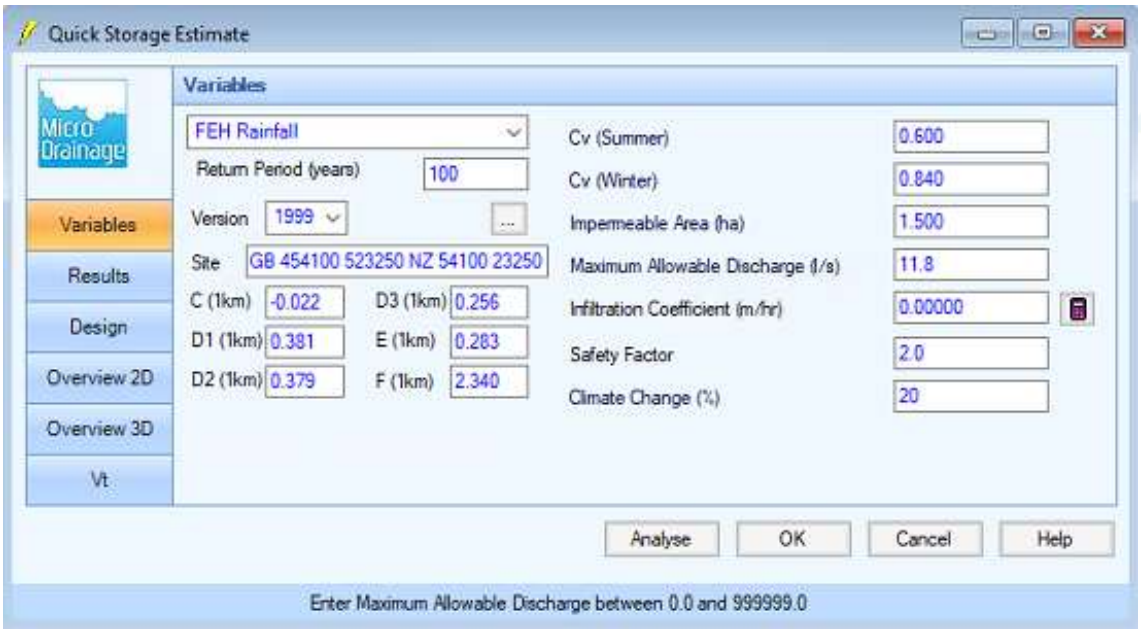


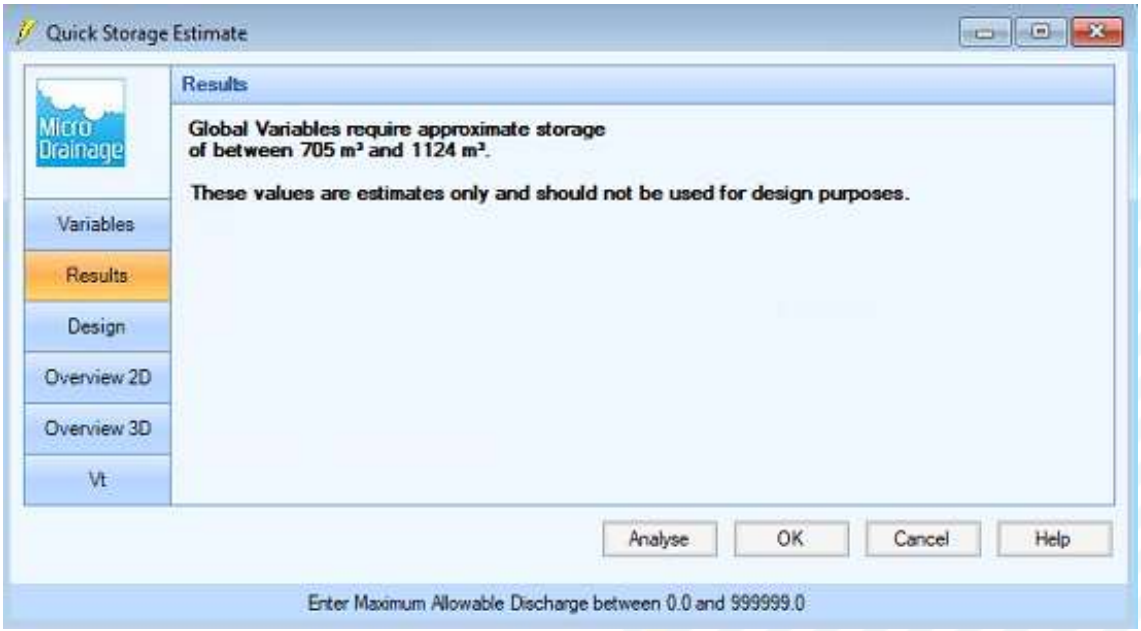
C.3 Storage Mound 4C





C.4 Storage Mound 5





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