# PROPOSED NEW DWELLING AT
# DEVONSIDE FARM
# SALINE

## DRAINAGE OPTIONS REPORT

**PREPARED FOR**
**GRAEME STEWART**

McGREGOR McMAHON
CONSULTING ENGINEERS
2 Castle Court • Carnegie Campus • Dunfermline • Fife • KY11 8PB
(T) 01383 734905 (F) 01383 731591 (E) admin@mmaeng.com

MCGREGOR MCMAHON
CONSULTING ENGINEERS
2 Castle Court • Carnegie Campus • Dunfermline • Fife • KY11 8PB
(T) 01383 734905 (F) 01383 731591 (E) admin@mmaeng.com

## Quality Management

| Issue/revision | Original Issue | Revision A | Revision B | Revision C |
|---|---|---|---|---|
| Remarks | FINAL | Updated to suit revised layout | | |
| Date | 16/11/2023 | 28/11/2023 | | |
| Prepared by | Sean Turner | Sean Turner | | |
| Checked by | Neil Stephen | Neil Stephen | | |
| Project number | 23805 | 23805 | | |
| File reference | 23805 Drainage Strategy Report | 23805 Drainage Strategy Report | | |

# Document Reference 23805 –Drainage Options Report Revision – A

**Contents**

## Design Criteria Summary

The project comprises of a new four-bedroom dwelling, with driveway and private garden space located at Devonside Farm, Saline.

The site currently does not have any drainage networks adopted by Scottish Water within the vicinity.

### Foul Drainage

There is no foul water sewers within the vicinity and no suitable existing private treatment facilities were identified.

Following guidance from British Water Flows and Loads 4, a four-bedroom property has a minimum population equivalent of 6 P with the ultimate discharge point being to the Foulbutts Burn via an existing drainage ditch and outfall within the farm boundary. The effluent from a septic tank is not deemed of suitable quality for discharge to a watercourse, and therefore a treatment plant will be specified.

It should be noted that the land surrounding the property is also under the same ownership, therefore no additional permission is required from third parties for the outfall to the drainage ditch.

The proposed treatment plant is a BioDisc BA with an allowable 8 P and an effluent quality of 20 mg/l BOD5, 873 mg/l COD, 5 mg/l Suspended Solids and 23 mg/l of Ammonium Nitrogen.

A partial soakaway, 10m$^2$, has been provided after treatment which will overflow into the drainage ditch. During dry months where flows in Foulbutts Burn may be lower, this should assist by reducing the remaining contamination entering the burn at times when dilution could be reduced.

### Surface Water Drainage

It is proposed that surface water run-off from the roof area and driveway will be managed and discharged via an existing drainage ditch to the Foulbutts Burn approximately 220m West from the development area.

The roof area of the new building is 218m$^2$ and external areas are 182m$^2$. The greenfield run-off from this area would equate to 0.16 litres, based on 4 l/sec/ha. This rate is very low and would require the use of a very small orifice control to achieve and would be prone to frequent blockages.

Sewers for Scotland 4 recommends the minimum orifice control for use on a private system is 30mm which has therefore been adopted to restrict the outflow to a more acceptable level.

An attenuation structure, constructed using standard Stormbloc Optimum cellular storage, 5.6x3.2m x 1.02 m deep is to be located within the garden area. This will provide sufficient attenuation from the surface water run-off from the roof and hardstanding areas.

Treatment of the surface water has been achieved within filter trenches for roof drainage, and porous paving for car parking spaces in accordance with the SEPA Simple Index Approach (SIA) on all required measures including; Suspended Solids, Metals and Hydrocarbons. A copy of the SEPA SIA Tool is included in Appendix A.

Based on the overall contributing hardstanding area, this would equate to an estimated discharge rate without attenuation of 4.45 l/sec (0.04 * 2.78 * 40 mm/hr).

Climate change has been determined using current guidance from Fife Council SuDS guide which recommends an allowance of 39% should be adopted.

This attenuation system has been simulated using Causeway Flow drainage design software to show the effects of 1:30, 1:100 and 1:200-year return periods including climate change. This output has been included in Appendix B.

This proposed cellular storage and associated drainage has been detailed on our drawing No. 23805-200.

## Surface Water Attenuation Conclusions

During a 1 in 30 year return period storm no water will escape from the system and there is no flooding. Water will be contained within the attenuation structure.
The discharge rate through the control manhole is 1.5 l/sec.

During a 1 in 100 year return period storm no water will escape from the system and there is no flooding. Water will be contained within the attenuation structure.
The discharge rate through the control manhole is 1.7 l/sec.

During a 1 in 200 year return period storm no water will escape from the system and there is no flooding. Water will be contained within the attenuation structure..
The discharge rate through the control manhole is 1.9 l/sec.

## Maintenance Schedule

The maintenance provision for the development drainage is as follows;

| Drainage Component | Maintenance Arrangements | Maintenance By |
|---|---|---|
| Piped storm drainage | Clear by rodding or high-pressure jetting if these become blocked. | Property Owner |
| Filter Trenches | These will be jetted out from the silt trap or rodding accesses to clear any silting of the perforated pipes/stone filter medium on an annual basis. | Property Owner |
| Cellular Storage | Check silt traps on a bi-annual basis or at an increased frequency if required. Arrange inspections of cellular storage using specialist equipment, recommended once every two years. | Property Owner |
| Orifice Control and Inspection Chambers | Checked for blockages on an annual basis. | Property Owner |

## Summary

On this basis, adequate attenuation has been provided to cater for all storm events up to the 200-year return period.

**Sean Turner**

Direct Email sean.turner@mcgregor-mcmahon.com

# Appendix A – SEPA Simple Index Approach

# SIMPLE INDEX APPROACH: TOOL



**1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).**

**2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.**

**3. Relevant design examples are included in the SuDS Manual Appendix C.**

**4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.**

**5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.**

**DROP DOWN LIST** — RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

**USER ENTRY** — USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

**STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme**

**This step requires the user to select the appropriate land use type for the area from which the runoff is occurring**

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

| | *Runoff Area Land Use Description* | *Hazard Level* | *Pollution Hazard Indices* Total Suspended Solids | Metals | Hydrocarbons | *DESIGN CONDITIONS* 1 | 2 |
|---|---|---|---|---|---|---|---|
| **Select land use type from the drop down list (or 'Other' if none applicable):** | Individual driveway | Low | 0.5 | 0.4 | 0.4 | | |
| **If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:** | | | | | | | |
| | **Landuse Pollution Hazard Index** | **Low** | **0.5** | **0.4** | **0.4** | | |

**STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components**

**This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component**

**If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B**

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

| | *SuDS Component Description* | *Pollution Mitigation Indices* | | | *DESIGN CONDITIONS* | | |
|---|---|---|---|---|---|---|---|
| | | **Total Suspended Solids** | **Metals** | **Hydrocarbons** | 1 | 2 | 3 |
| **Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:** → | Pervious pavement (where the pavement is not designed as an infiltration component) | 0.7 | 0.6 | 0.7 | SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B | | |
| **Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:** → | None | | | | | | |
| **Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:** → | None | | | | | | |
| **If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | **Aggregated Surface Water Pollution Mitigation Index** | **0.7** | **0.6** | **0.7** | | | |

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

**Is the runoff now discharged to an infiltration component?**

**Yes ?** Go to Step 2B
**No ?** Go to Step 2C

**STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection**

**This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater**

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

***DESIGN CONDITIONS***

| | | *Pollution Mitigation Indices* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Total Suspended Solids | Metals | Hydrocarbons | 1 | 2 | 3 | 4 |
| **Select type of groundwater protection from the drop down list:** → | None | | | | | | | |
| **If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:** | | | | | | | | |
| **Groundwater Protection Pollution Mitigation Index** | | **0** | **0** | **0** | | | | |

**STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area**

**This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices**

| | *Combined Pollution Mitigation Indices* | | |
|---|---|---|---|
| | Total Suspended Solids | Metals | Hydrocarbons |
| **Combined Pollution Mitigation Indices for the Runoff Area** | **0.7** | **0.6** | **0.7** |

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

**STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components**

**This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type**

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

***DESIGN CONDITIONS***

| *Sufficiency of Pollution Mitigation Indices* | | | | |
|---|---|---|---|---|
| Total Suspended Solids | Metals | Hydrocarbons | 1 | |
| **Sufficient** | **Sufficient** | **Sufficient** | Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England | |

# SIMPLE INDEX APPROACH: TOOL



**1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).**

**2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.**

**3. Relevant design examples are included in the SuDS Manual Appendix C.**

**4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.**

**5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.**

**DROP DOWN LIST** — RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP

**USER ENTRY** — USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

**STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme**

**This step requires the user to select the appropriate land use type for the area from which the runoff is occurring**

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

| | *Runoff Area Land Use Description* | *Hazard Level* | *Pollution Hazard Indices* Total Suspended Solids | Metals | Hydrocarbons | *DESIGN CONDITIONS* 1 | 2 |
|---|---|---|---|---|---|---|---|
| **Select land use type from the drop down list (or 'Other' if none applicable):** → | Residential roofing | Very low | 0.2 | 0.2 | 0.05 | | |
| **If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:** | | | | | | | |
| | **Landuse Pollution Hazard Index** | **Very low** | **0.2** | **0.2** | **0.05** | | |

**STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components**

**This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component**

**If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B**

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

| | *SuDS Component Description* | *Pollution Mitigation Indices* Total Suspended Solids | Metals | Hydrocarbons | *DESIGN CONDITIONS* 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| **Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:** → | Filter strip | 0.4 | 0.4 | 0.5 | SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B | | |
| **Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:** → | None | | | | | | |
| **Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:** → | None | | | | | | |
| **If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | **Aggregated Surface Water Pollution Mitigation Index** | **0.4** | **0.4** | **0.5** | | | |

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

**Is the runoff now discharged to an infiltration component?**

**Yes ?** Go to Step 2B
**No ?** Go to Step 2C

**STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection**

**This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater**

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

***DESIGN CONDITIONS***

| | | *Pollution Mitigation Indices* | | | |
|---|---|---|---|---|---|
| | | **Total Suspended Solids** | **Metals** | **Hydrocarbons** | |
| **Select type of groundwater protection from the drop down list:** → | None | | | | 1 2 3 4 |
| **If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:** | | | | | |
| **Groundwater Protection Pollution Mitigation Index** | | **0** | **0** | **0** | |

**STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area**

**This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices**

| | *Combined Pollution Mitigation Indices* | | |
|---|---|---|---|
| | **Total Suspended Solids** | **Metals** | **Hydrocarbons** |
| **Combined Pollution Mitigation Indices for the Runoff Area** | **0.4** | **0.4** | **0.5** |

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

**STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components**

**This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type**

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

***DESIGN CONDITIONS***

| *Sufficiency of Pollution Mitigation Indices* | | | |
|---|---|---|---|
| **Total Suspended Solids** | **Metals** | **Hydrocarbons** | 1 |
| **Sufficient** | **Sufficient** | **Sufficient** | |

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

# Appendix B – Causeway Flow Calculations

## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FEH-22 | Minimum Velocity (m/s) | 1.00 |
| Return Period (years) | 2 | Connection Type | Level Soffits |
| Additional Flow (%) | 10 | Minimum Backdrop Height (m) | 0.200 |
| CV | 0.750 | Preferred Cover Depth (m) | 1.200 |
| Time of Entry (mins) | 5.00 | Include Intermediate Ground | ✓ |
| Maximum Time of Concentration (mins) | 30.00 | Enforce best practice design rules | ✓ |
| Maximum Rainfall (mm/hr) | 50.0 | | |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Easting (m) | Northing (m) | Depth (m) |
|---|---|---|---|---|---|---|---|
| Attenuation | 0.040 | 5.00 | 100.000 | 600 | 0.000 | 0.000 | 1.000 |

## Simulation Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Analysis Speed | Detailed | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 0.750 | Skip Steady State | x | Check Discharge Rate(s) | x |
| Winter CV | 0.840 | Drain Down Time (mins) | 240 | Check Discharge Volume | x |

**Storm Durations**

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 30 | 39 | 10 | 0 |
| 100 | 39 | 10 | 0 |
| 200 | 39 | 10 | 0 |

## Node Attenuation Online Orifice Control

| | | | | | |
|---|---|---|---|---|---|
| Flap Valve | x | Invert Level (m) | 98.950 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | ✓ | Diameter (m) | 0.030 | | |

## Node Attenuation Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 99.000 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 0.96 | Time to half empty (mins) | 125 |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 17.9 | 0.0 | 0.990 | 17.9 | 0.0 | 0.991 | 0.0 | 0.0 |

**Results for 30 year +39% CC +10% A Critical Storm Duration. Lowest mass balance: 99.75%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 120 minute winter | Attenuation | 94 | 99.621 | 0.621 | 6.3 | 11.3966 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | Outflow (l/s) | Discharge Vol (m³) |
|---|---|---|---|---|
| 120 minute winter | Attenuation | Orifice | 1.5 | 18.1 |

**Results for 100 year +39% CC +10% A Critical Storm Duration. Lowest mass balance: 99.75%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 60 minute winter | Attenuation | 59 | 99.830 | 0.830 | 13.2 | 15.2381 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | Outflow (l/s) | Discharge Vol (m³) |
|---|---|---|---|---|
| 60 minute winter | Attenuation | Orifice | 1.7 | 19.3 |

**Results for 200 year +39% CC +10% A Critical Storm Duration. Lowest mass balance: 99.75%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 60 minute winter | Attenuation | 60 | 99.958 | 0.958 | 15.1 | 17.5795 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | Outflow (l/s) | Discharge Vol (m³) |
|---|---|---|---|---|
| 60 minute winter | Attenuation | Orifice | 1.9 | 21.4 |