



### Design Settings

|                                      |        |                                    |               |
|--------------------------------------|--------|------------------------------------|---------------|
| Rainfall Methodology                 | FEH-22 | Minimum Velocity (m/s)             | 1.00          |
| Return Period (years)                | 2      | Connection Type                    | Level Soffits |
| Additional Flow (%)                  | 0      | 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<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Width<br>(mm) | Depth<br>(m) | Invert<br>Level<br>(m) |
|----------|--------------|------------------|-----------------------|------------------|---------------|--------------|------------------------|
| Diff1    | 0.015        | 5.00             | 19.293                | 700              | 300           | 0.443        | 18.850                 |
| S23      | 0.000        |                  | 19.510                | 1350             |               | 0.736        | 18.774                 |
| S23a     | 0.000        |                  | 19.000                | 1350             |               | 0.700        | 18.300                 |
| Headwall | 0.000        |                  | 19.000                | 1                |               | 0.719        | 18.281                 |

### Links

| Name  | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|-------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000 | Diff1      | S23        | 5.520         | 0.600          | 18.850       | 18.774       | 0.076       | 72.6           | 150         | 5.08             | 50.0            |
| 1.001 | S23        | S23a       | 71.140        | 0.600          | 18.774       | 18.300       | 0.474       | 150.1          | 150         | 6.53             | 48.7            |
| 1.002 | S23a       | Headwall   | 2.910         | 0.600          | 18.300       | 18.281       | 0.019       | 150.0          | 150         | 6.59             | 48.5            |

| Name  | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) | US<br>Depth<br>(m) | DS<br>Depth<br>(m) | Σ Area<br>(ha) | Σ Add<br>Inflow<br>(l/s) | Pro<br>Depth<br>(mm) | Pro<br>Velocity<br>(m/s) |
|-------|--------------|--------------|---------------|--------------------|--------------------|----------------|--------------------------|----------------------|--------------------------|
| 1.000 | 1.181        | 20.9         | 2.0           | 0.293              | 0.586              | 0.015          | 0.0                      | 31                   | 0.747                    |
| 1.001 | 0.818        | 14.5         | 2.0           | 0.586              | 0.550              | 0.015          | 0.0                      | 37                   | 0.571                    |
| 1.002 | 0.818        | 14.5         | 2.0           | 0.550              | 0.569              | 0.015          | 0.0                      | 37                   | 0.571                    |

### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.000 | 5.520         | 72.6           | 150         | Circular     | 19.293       | 18.850       | 0.293           | 19.510       | 18.774       | 0.586           |
| 1.001 | 71.140        | 150.1          | 150         | Circular     | 19.510       | 18.774       | 0.586           | 19.000       | 18.300       | 0.550           |
| 1.002 | 2.910         | 150.0          | 150         | Circular     | 19.000       | 18.300       | 0.550           | 19.000       | 18.281       | 0.569           |

| Link  | US<br>Node | Dia<br>(mm) | Width<br>(mm) | Node<br>Type | MH<br>Type | DS<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type |
|-------|------------|-------------|---------------|--------------|------------|------------|-------------|--------------|------------|
| 1.000 | Diff1      | 700         | 300           | Manhole      | Adoptable  | S23        | 1350        | Manhole      | Adoptable  |
| 1.001 | S23        | 1350        |               | Manhole      | Adoptable  | S23a       | 1350        | Manhole      | Adoptable  |
| 1.002 | S23a       | 1350        |               | Manhole      | Adoptable  | Headwall   | 1           | Manhole      | Adoptable  |

### Manhole Schedule

| Node  | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Width<br>(mm) | Connections | Link  | IL<br>(m) | Dia<br>(mm) |
|-------|-----------|--------------|-------------|---------------|-------------|-------|-----------|-------------|
| Diff1 | 19.293    | 0.443        | 700         | 300           |             |       |           |             |
|       |           |              |             |               | 0           | 1.000 | 18.850    | 150         |
| S23   | 19.510    | 0.736        | 1350        |               | 1           | 1.000 | 18.774    | 150         |
|       |           |              |             |               | 0           | 1.001 | 18.774    | 150         |



#### Manhole Schedule

| Node     | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Width<br>(mm) | Connections | Link  | IL<br>(m) | Dia<br>(mm) |
|----------|-----------|--------------|-------------|---------------|-------------|-------|-----------|-------------|
| S23a     | 19.000    | 0.700        | 1350        |               | 1           | 1.001 | 18.300    | 150         |
|          |           |              |             |               | 0           | 1.002 | 18.300    | 150         |
| Headwall | 19.000    | 0.719        | 1           |               | 1           | 1.002 | 18.281    | 150         |

#### Simulation Settings

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

#### Storm Durations

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

| Return Period<br>(years) | Climate Change<br>(CC %) | Additional Area<br>(A %) | Additional Flow<br>(Q %) |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 100                      | 45                       | 0                        | 0                        |

#### Node S23 Online Hydro-Brake® Control

|                          |        |                         |                                |
|--------------------------|--------|-------------------------|--------------------------------|
| Flap Valve               | x      | Objective               | (HE) Minimise upstream storage |
| Replaces Downstream Link | x      | Sump Available          | ✓                              |
| Invert Level (m)         | 18.774 | Product Number          | CTL-SHE-0065-1500-0500-1500    |
| Design Depth (m)         | 0.500  | Min Outlet Diameter (m) | 0.100                          |
| Design Flow (l/s)        | 1.5    | Min Node Diameter (mm)  | 1200                           |

#### Node Diff1 Carpark Storage Structure

|                             |         |                           |        |               |      |
|-----------------------------|---------|---------------------------|--------|---------------|------|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 18.850 | Slope (1:X)   | 20.0 |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) | 24     | Depth (m)     |      |
| Safety Factor               | 2.0     | Width (m)                 | 5.300  | Inf Depth (m) |      |
| Porosity                    | 0.30    | Length (m)                | 28.300 |               |      |



**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event        | US Node  | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|----------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 30 minute winter  | Diff1    | 29          | 19.266    | 0.416     | 7.9          | 3.1502        | 0.0000     | FLOOD RISK |
| 30 minute winter  | S23      | 29          | 19.265    | 0.491     | 3.0          | 0.7027        | 0.0000     | FLOOD RISK |
| 240 minute winter | S23a     | 124         | 18.335    | 0.035     | 1.5          | 0.0502        | 0.0000     | OK         |
| 240 minute winter | Headwall | 124         | 18.314    | 0.033     | 1.5          | 0.0000        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node | Link  | DS Node  | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|-------|----------|---------------|----------------|----------|---------------|--------------------|
| 30 minute winter               | Diff1   | 1.000 | S23      | 3.0           | 0.603          | 0.142    | 0.0972        |                    |
| 30 minute winter               | S23     | 1.001 | S23a     | 1.5           | 0.570          | 0.104    | 0.2108        |                    |
| 240 minute winter              | S23a    | 1.002 | Headwall | 1.5           | 0.504          | 0.104    | 0.0087        | 11.5               |