

SITE PLAN

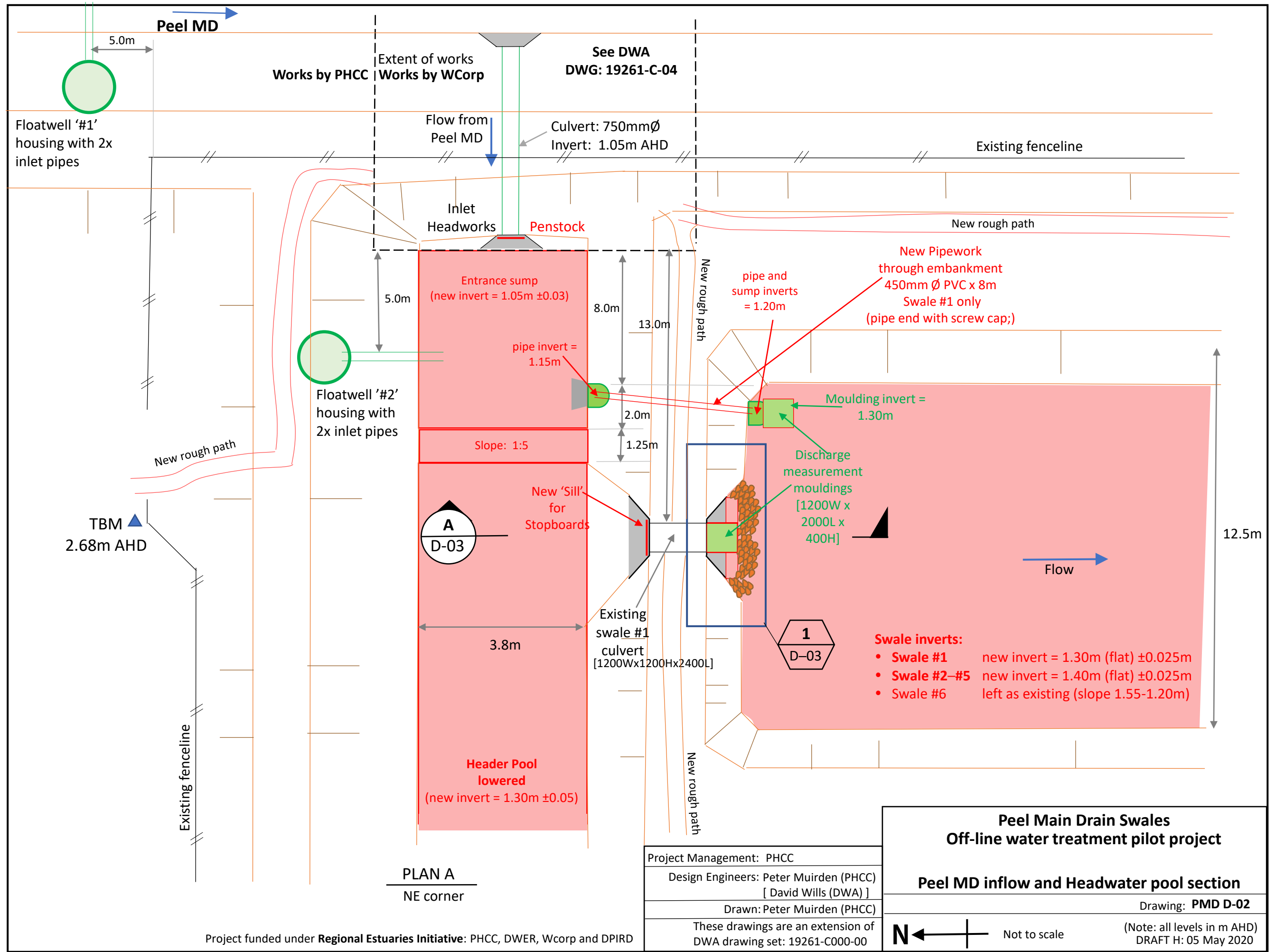
Project Management: PHCC
Design Engineers: Peter Muirden (PHCC) [David Wills (DWA)]
Drawn: Peter Muirden (PHCC)
These drawings are an extension of DWA drawing set: 19261-C000-00

**Peel Main Drain Swales
Off-line water treatment pilot project
Project layout – Plan section**

Drawing: **PMD D-01**

(Note: all levels in m AHD)
DRAFT J: 21 May 2020

N ← | Not to scale



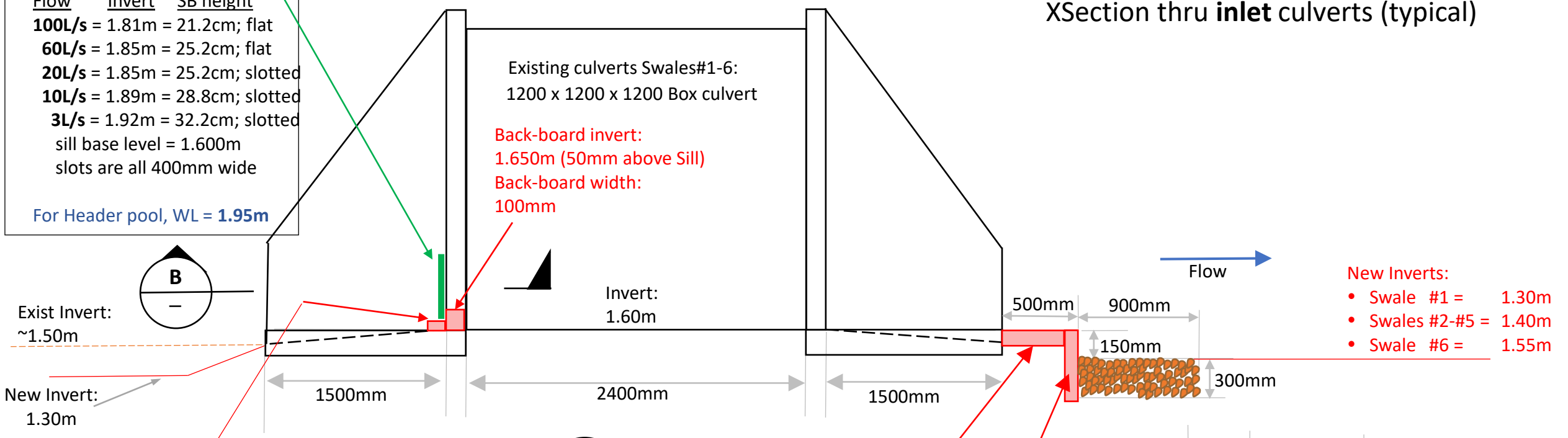
Stopboard sizing (not in contract):

Flow	Invert	SB height
100L/s	= 1.81m	= 21.2cm; flat
60L/s	= 1.85m	= 25.2cm; flat
20L/s	= 1.85m	= 25.2cm; slotted
10L/s	= 1.89m	= 28.8cm; slotted
3L/s	= 1.92m	= 32.2cm; slotted

sill base level = 1.600m
slots are all 400mm wide

For Header pool, WL = 1.95m

XSection thru inlet culverts (typical)



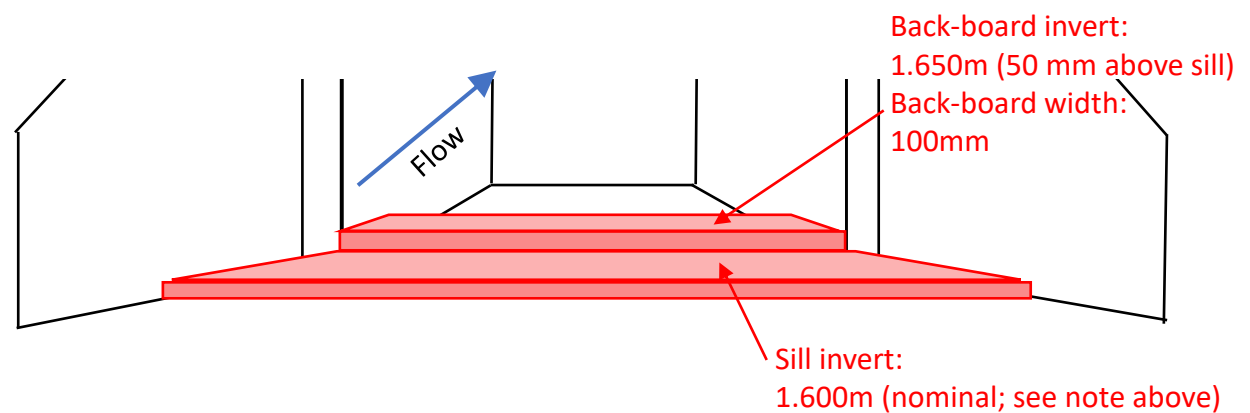
- New Inverts:**
- Swale #1 = 1.30m
 - Swales #2-#5 = 1.40m
 - Swale #6 = 1.55m

Sill:
Invert of sill : 1.600m (nominal)
Sill dimensions:
100D x 100H x 1600L

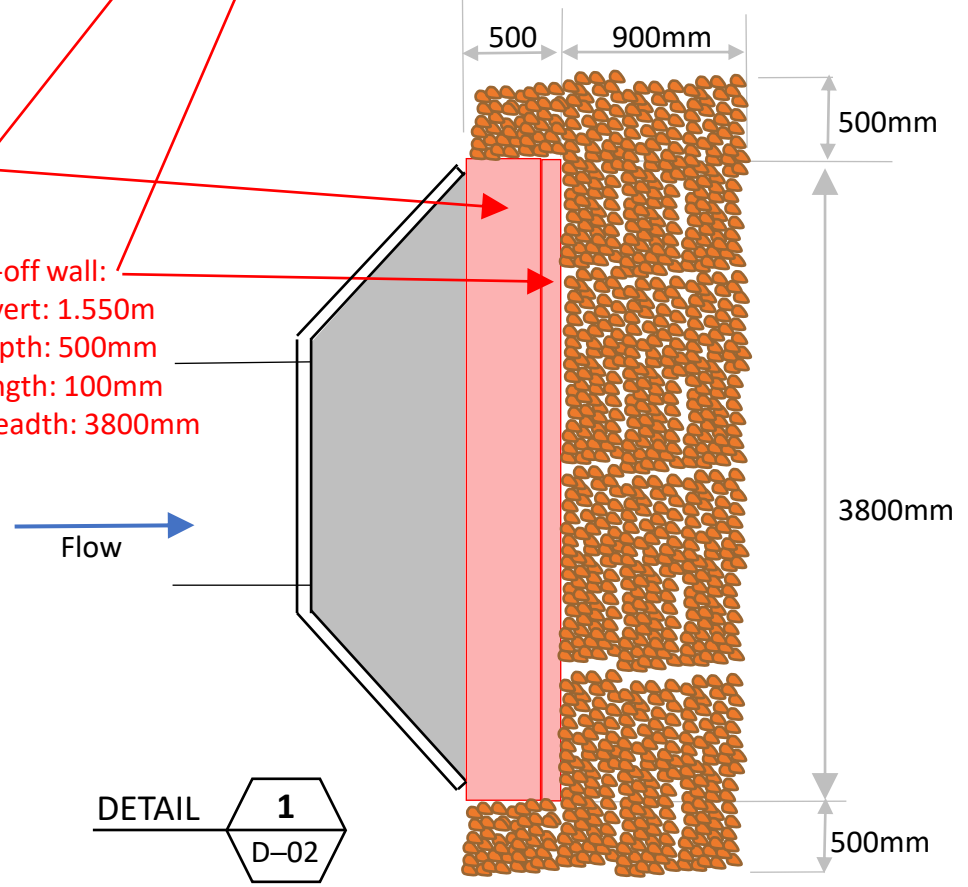
NOTE:
There is a 'relative' tolerance of 2mm between Sills on each of the six culverts.

Apron extension:
- invert: 1.550m
- depth: 100mm
- length: 500mm
- breadth: 3800mm

Cut-off wall:
- invert: 1.550m
- depth: 500mm
- length: 100mm
- breadth: 3800mm



ISO-SECTION B



Peel Main Drain Swales Off-line water treatment pilot project

Swale inlet culverts

Project Management: PHCC
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Drawing: PMD D-03
Not to scale (Note: all levels in m AHD) DRAFT J: 21 May 2020

Peel MD

Culv Invert: 0.80m

See DWA
DWG: 19261-C-04

Works by WCorp Works by PHCC

Existing fenceline

Flow to
Peel MD

New rough path

Culverts: 3x600mmØ
Invert: 0.90m AHD

Outlet
Headworks

Existing fenceline

Outlet sump
(new invert = 0.90m (0.03))

Slope: 1:5

new invert:
East end = 1.05m

Keep batter: 1:2

~17.5m

11.0m

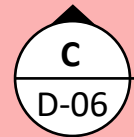
2.0m

0.75m

Keep batter: 1:2

Swale #1
Base altered
(new invert = **1.30m** ±0.025m)

Flow



New inlet 'Apron' for
Stopboards
Invert RL 1.25m
(to 500 from culvert)

New 'Levee'
of roadbase
at RL 1.80m
x 1.2m wide

New outlet
'Apron'
RL 1.30m

Slope: 1:10

~4.7m

Gravel (100 deep):
Top of gravel slopes
at 1:10 between
Apron and Tailwater
pool.
Make a 'V' shape to
ensure water flow
in middle of rocks

4.0m

New culvert
located at
centre-line of
swale
Invert RL 1.30m
[1200Wx375Hx1200L]

New 'Levee'
of roadbase
at RL **1.80m**
x 1.2m wide

4.0m

Slope: 1:10

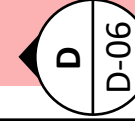
Tailwater Pool
lowered

new invert:
East end = 1.05m
West end = 1.15m

[RL 0.1m
above
rock
protection]

Keep batter: 1:2

New rough path



PLAN B
SE corner

Peel Main Drain Swales
Off-line water treatment pilot project

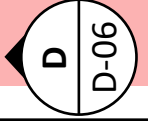
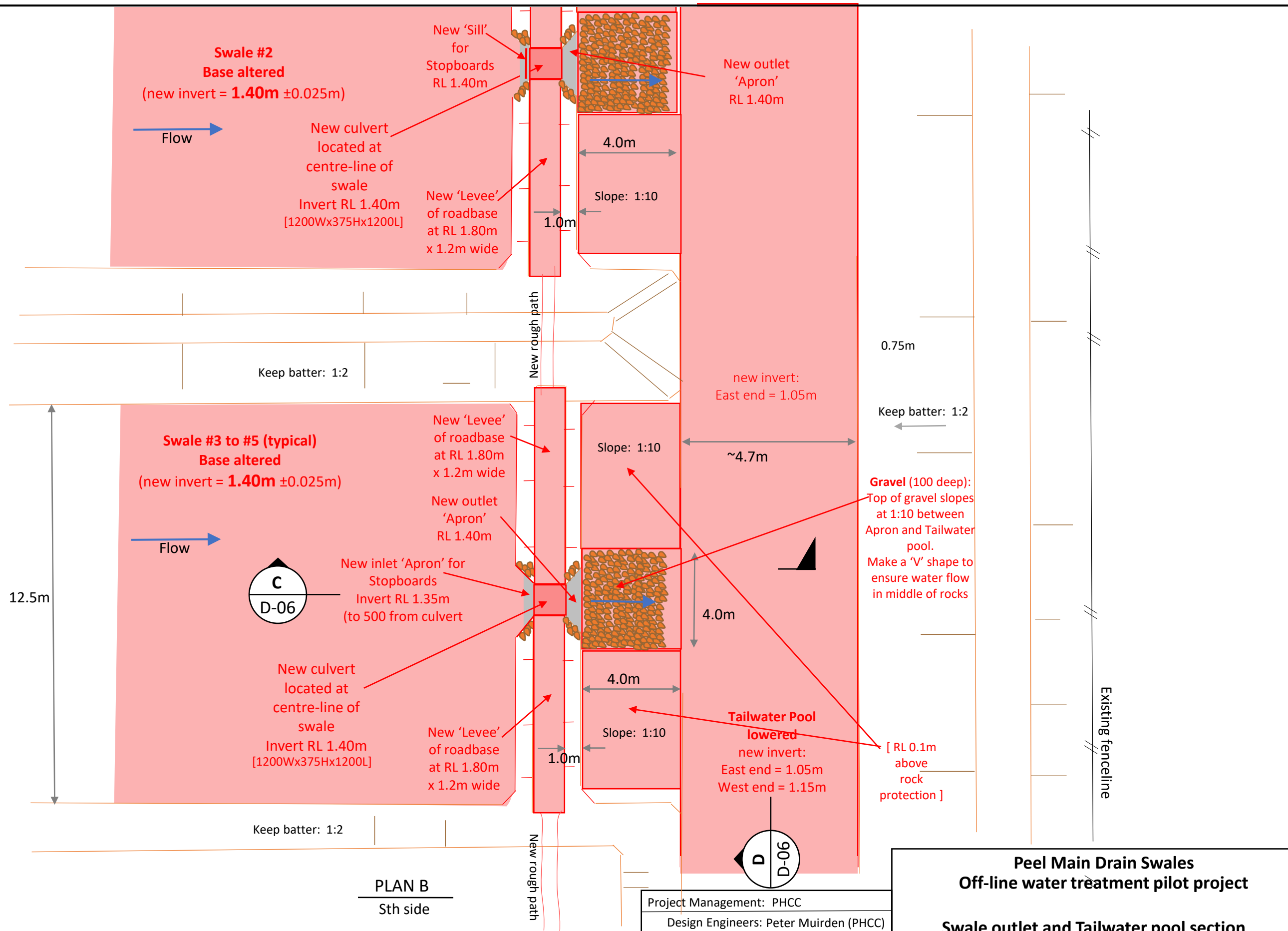
Swale outlet and Tailwater pool section

Project Management: PHCC
Design Engineers: Peter Muirden (PHCC) [David Wills (DWA)]
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Drawing: **PMD D-04**

(Note: all levels in m AHD)
DRAFT F: 20 April 2020

N ← Not to scale



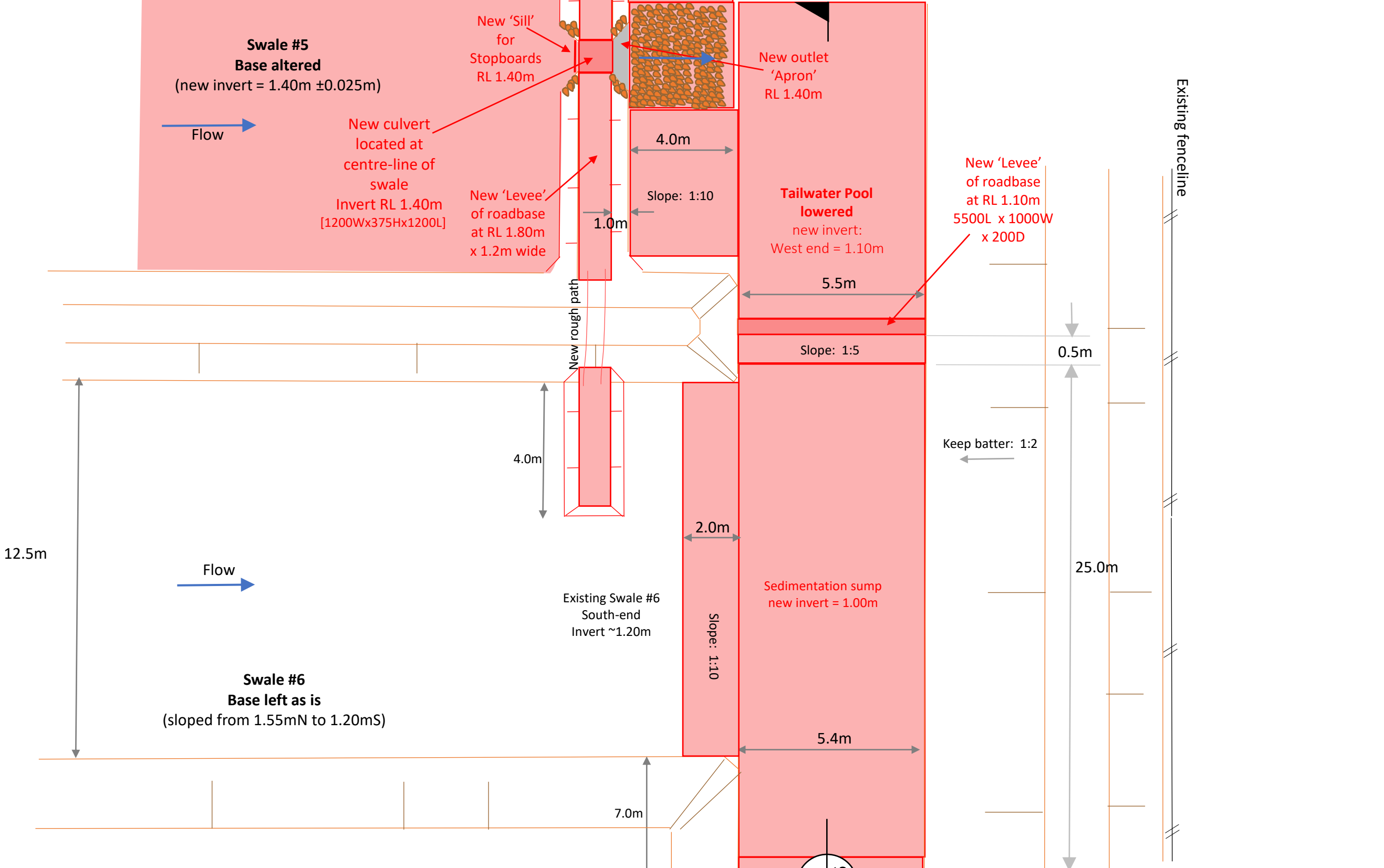
PLAN B
Sth side

Peel Main Drain Swales Off-line water treatment pilot project	
Swale outlet and Tailwater pool section	
Drawing: PMD D-05	

Project Management: PHCC
 Design Engineers: Peter Muirden (PHCC)
 [David Wills (DWA)]
 Drawn: Peter Muirden (PHCC)
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(Note: all levels in m AHD)
DRAFT G: 28 April 2020



12.5m

Swale #5
Base altered
 (new invert = 1.40m ± 0.025m)

Flow →

New culvert located at centre-line of swale
 Invert RL 1.40m
 [1200Wx375Hx1200L]

New 'Levee' of roadbase at RL 1.80m x 1.2m wide

New 'Sill' for Stopboards RL 1.40m

New rough path

4.0m

Slope: 1:10

New outlet 'Apron' RL 1.40m

Tailwater Pool lowered
 new invert: West end = 1.10m

New 'Levee' of roadbase at RL 1.10m
 5500L x 1000W x 200D

5.5m

Slope: 1:5

0.5m

Keep batter: 1:2

Swale #6
Base left as is
 (sloped from 1.55mN to 1.20mS)

Flow →

Existing Swale #6 South-end Invert ~1.20m

Slope: 1:10

Sedimentation sump
 new invert = 1.00m

25.0m

5.4m

7.0m

D
D-06

Existing fenceline

PLAN C
 SW corner

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Peel Main Drain Swales
Off-line water treatment pilot project

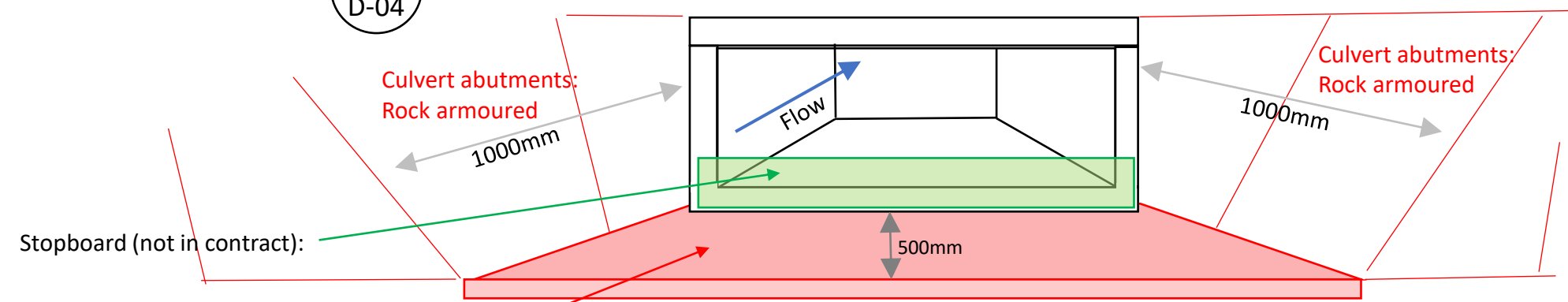
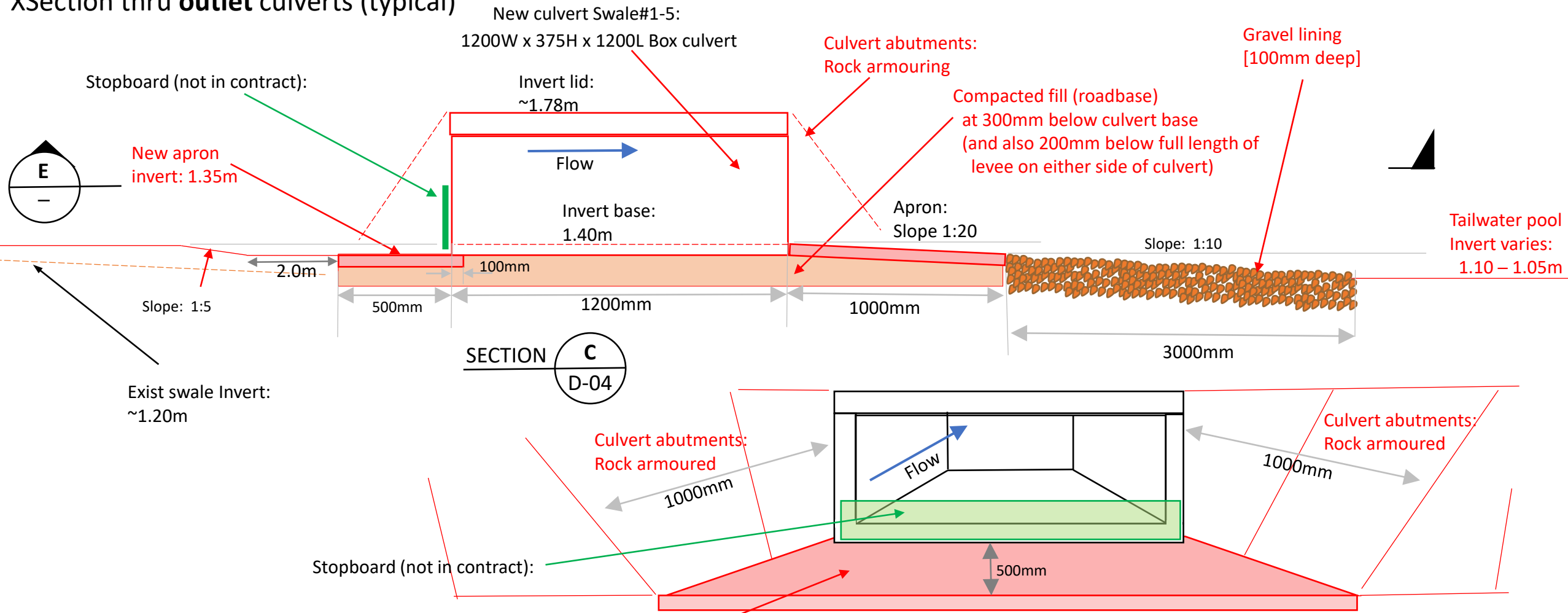
SW corner and its Tailwater pool section

Drawing: **PMD D-06**

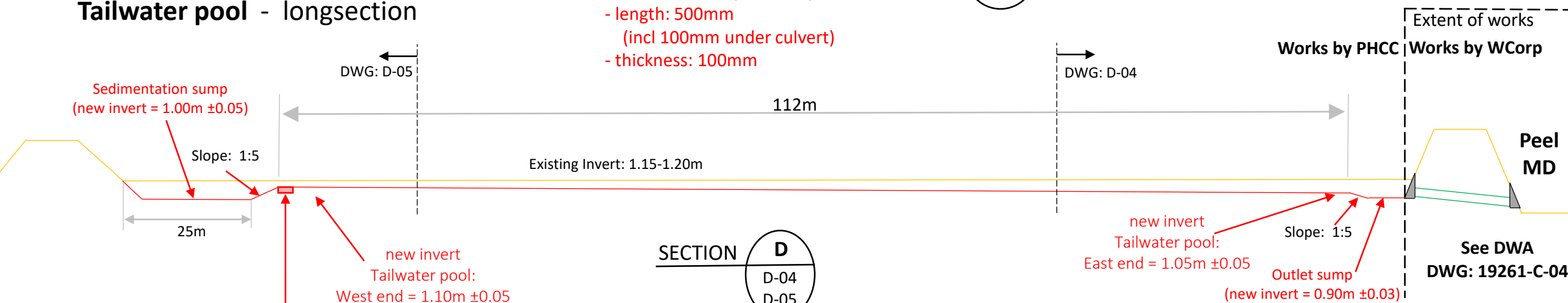
N ← | → Not to scale

(Note: all levels in m AHD)
 DRAFT G: 28 April 2020

XSection thru outlet culverts (typical)



Tailwater pool - longsection

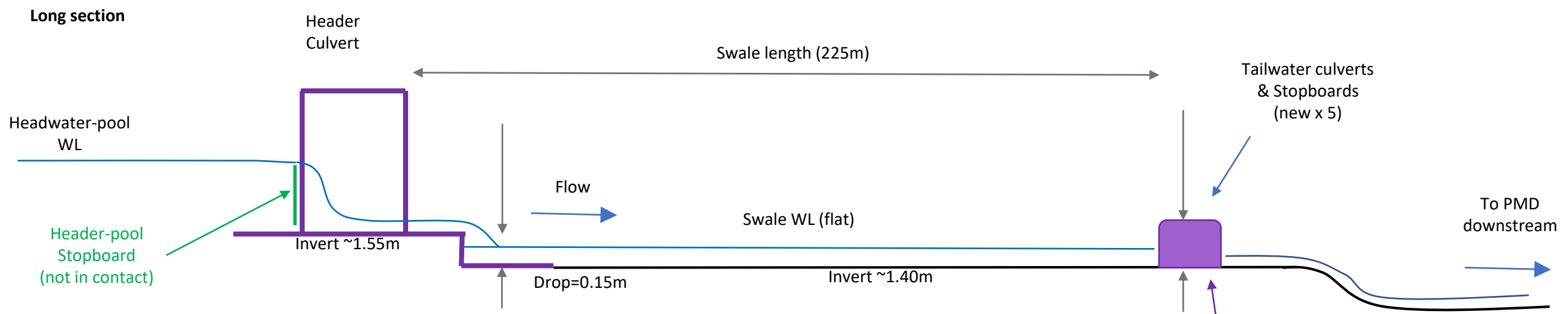


New 'Levee' of roadbase at RL 1.10m
5500L x 1200W x 200D

Project funded under **Regional Estuaries Initiative**: PHCC, DWER, Wcorp and DPIRD

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Drawn: Peter Muirden (PHCC)
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Peel Main Drain Swales	
Off-line water treatment pilot project	
Swale outlet and Tailwater pool section	
Drawing: PMD D-07	
Not to scale	(Note: all levels in m AHD) DRAFT G: 27 April 2020



Notes: Tailwater control:

- Tailwater stopboard structure is shallow box culvert 'U' and lid (375mmH) on a roadbase keyed 200mm into swale clay; invert of culvert is at 1.40m and culvert is mounted on 300mm roadbase
- inlet of culvert is to have a concrete apron set at >50mm below culvert invert (1600Wx500Lx100D).
- outlet of culvert is to have a concrete apron at invert of culvert sloping to 50mm below culvert invert.

Dimensions of outlet apron are:
1600mm (W) x 1000mm (L) x 100mm (D)

Stopboards (not in contract)

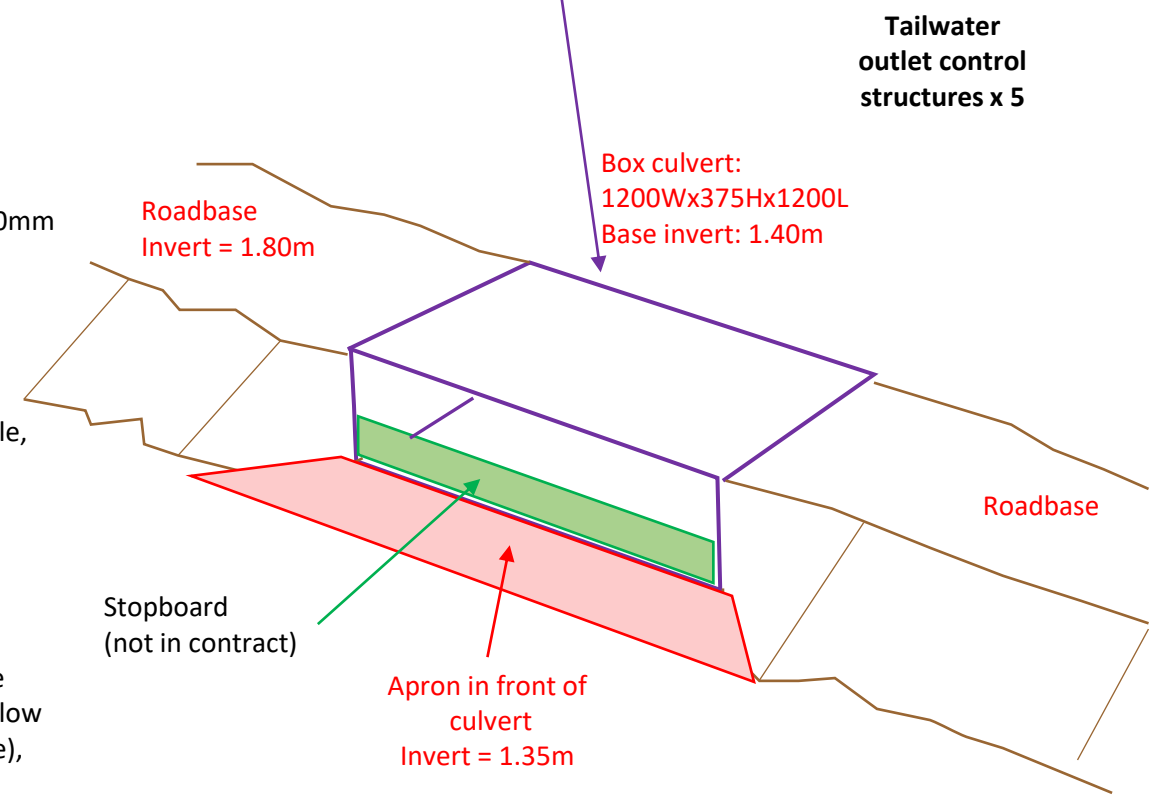
- stopboards will set the level of water in Swale; Stopboard specs: H4 treated pine: 1600mm long x ~50mm W
- Timber heights: 2x80mm + 2x100mm + 2x150mm + 2x200mm + 2x250mm
- Each side of culvert is to have two ramset SS bolts mounted (4 bolts). One at invert of culvert, the 2nd at 110mm above invert.

Headwater control:

- Each header culvert requires a sill at 1.60m (nominal) to mount stopboards, however, there is a relative tolerance of the Sill invert between each of the six header culvert sill's of only 2mm.
- Header culvert stopboards sitting on this sill (& ramset bolted to headwall), set flow-rate through each Swale, based on header-pool WL.
- Nominal WL in Header pool is set at 1.89m AHD for the selected stopboard heights (in DWG: D-03)
- The Header pool WL is controlled via a penstock (controlling flow from Peel MD).

Swale Flow rates:

- Each of the swales will have inflow set by stopboards and a theoretical flow developed that is related to the head in the Headwater Pool. These need to be verified by discharge measurements undertaken in the outflow channel of the Header Culvert. Currently, this is likely to be using a constructed narrow channel (1.2m wide), attached to the outlet of the culvert.



**Peel Main Drain Swales
Off-line water treatment pilot project**

Swale schematic section

Drawing: **PMD D-08**

N ← | → Not to scale (Note: all levels in m AHD)
DRAFT F: 20 April 2020

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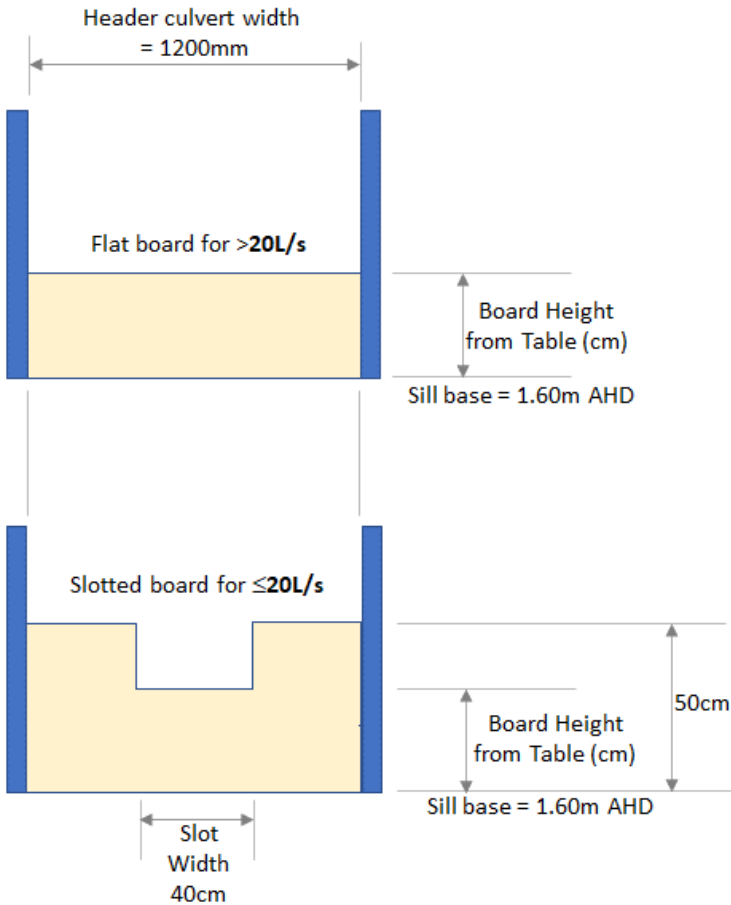
Headwater culvert stopboards

Stopboard sizing for nominal flow rates:

- | Flow | Invert | SB height |
|--------|---------|-------------------|
| 200L/s | = 1.73m | = 13.1cm; flat |
| 100L/s | = 1.81m | = 21.2cm; flat |
| 60L/s | = 1.85m | = 25.2cm; flat |
| 20L/s | = 1.85m | = 25.2cm; slotted |
| 10L/s | = 1.89m | = 28.8cm; slotted |
| 3L/s | = 1.92m | = 32.2cm; slotted |
| 1L/s | = 1.94m | = 33.7cm; slotted |
- sill base level = 1.600m RL
 - slots are all 400mm wide
 - Timber: 1600 wide x 15mm thick
 - Timber is treated marine ply

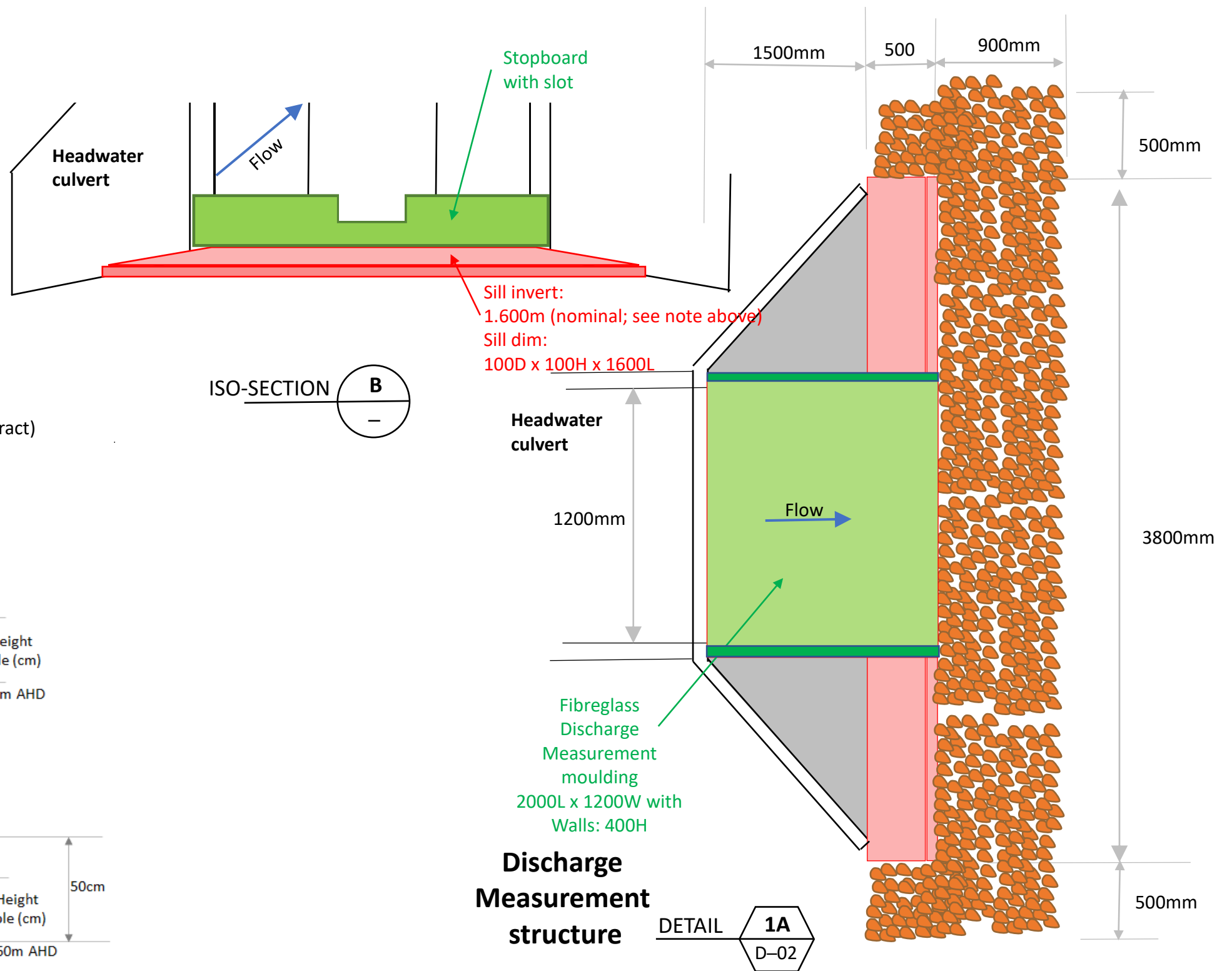
Nominal Header pool, WL = 1.95m RL

(not in contract)



- Tailwater culvert stopboard dimensions:**
- Heights: 80mm, 100mm, 150mm, 200mm, 250mm
 - Timber: 1600mm wide x 15mm thick
 - Timber: marine ply

Project funded under **Regional Estuaries Initiative**: PHCC, DWER, Wcorp and DPIRD



**Peel Main Drain Swales
Off-line water treatment pilot project**

Miscellaneous drawings

Drawing: PMD D-09

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N ← Not to scale

(Note: all levels in m AHD)
DRAFT J: 21 May 2020