Retaining Wall Engineering

This engineering schedule demonstrates the retaining wall capacity and minimum installation parameters, (site, soil, drainage, angles, heights, angle of influence etc), required for our tanks. Be prudent and conservative in your approach to projects, for advice speak to your structural engineer, if you don't have a structural engineer, we recommend Smith+Deans (www.smithdeans.com) who performed the calculations on which this schedule is based and have a first-hand understanding of the structural and retaining capacities of our tanks.

Minimum Installation Requirements

Soil Retaining Design Parameters:

1. Max fill density = 18kN/m³
2. Fill soil friction angle = 30°
3. Minimum soil bearing capacity = 100kPa
4. Surcharge = 2.5 kPa
5. Designed as fully drained
6. Minimum 50mm crushed rock base.

Note :

1. Ensure lid to be filled with soil prior to backfilling .
2. Sand bedding is not acceptable

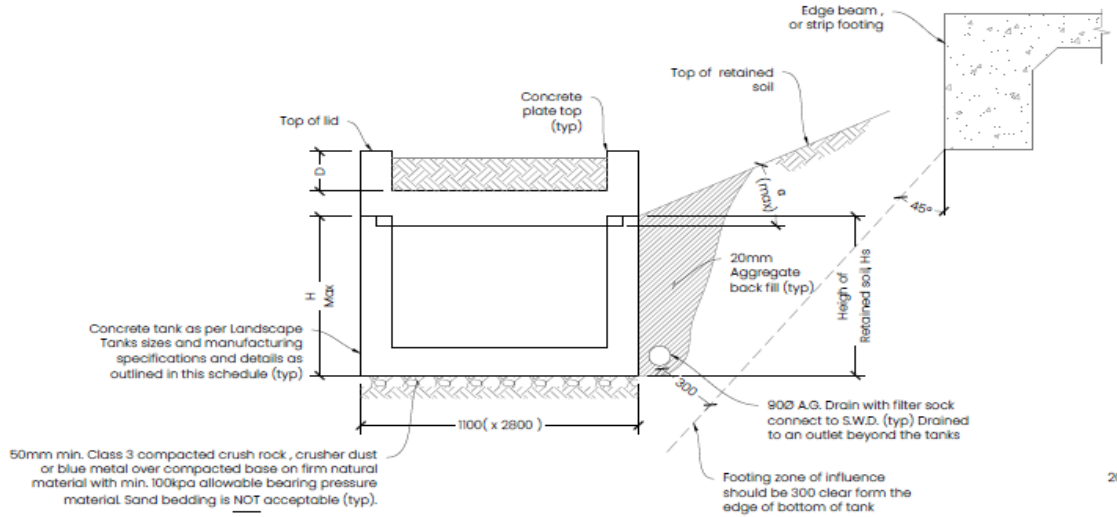
Maximum Retained Soil Parameters

H (mm)	D (mm)	Max Retaing Soil Batter (α)	Max Retained Soil Height, Hs (mm)
830	STD	20	1000
	DEEP	14	1095
110	STD	10	1170
	DEEP	10	1365
1430	STD	20	1200
	DEEP	15	1300
1430	STD	10	1655 *
	DEEP	10	1655 *

* - Denotes additional footing required. Refer to Detail B.

General Notes:

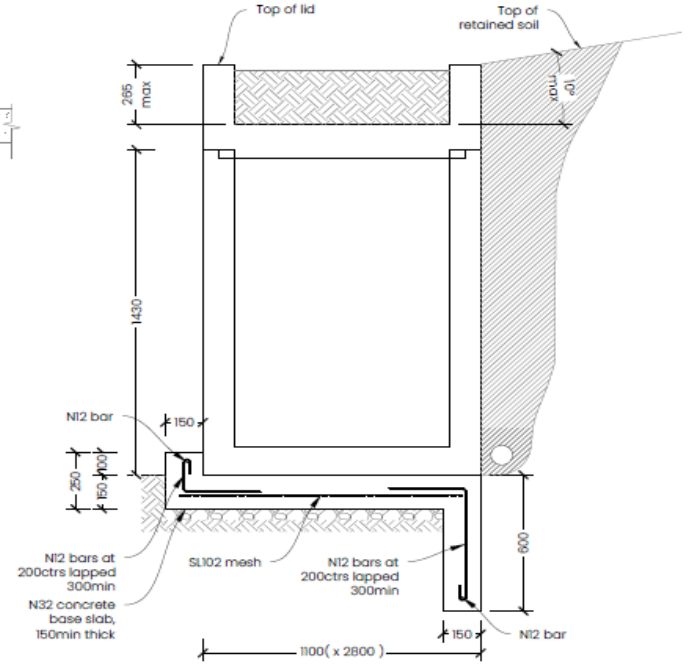
G1 These drawings shall not be used for construction until issued as "Approved for Construction" by Partnear.
G2 During Construction, the Contractor shall be responsible for maintaining the structure and all excavations in a stable condition and ensuring no part is over stressed by construction activities.
G3 Workmanship and materials are to be in accordance with the relevant Australian Standards, the Building Code of Australia, Occupational Health and Safety Regulations and the local statutory authorities' requirements.
G4 Any discrepancy or ambiguity between these drawings and other disciplines should be approved by the client and/or Project Manager before work commences.
G5 No responsibility shall be taken for material or workmanship errors during construction or discrepancies with the schedules and details provided.
G6 Products specified in these drawings must be adopted and departure is only permissible with approval by Partnear.
G7 Do not scale from the drawings.
G8 The structure has been designed to be installed and to be lifted at the locations noted. Any alternative proposed loading scenario, lifting or temporary propping must be discussed with Partnear.
G9 Foundation material to be firm natural material or approved compacted material with minimum allowable bearing capacity of 100kPa. Foundations to be engineer inspected prior to installation of the structure to confirm stability of founding material.



Water Storage Tank

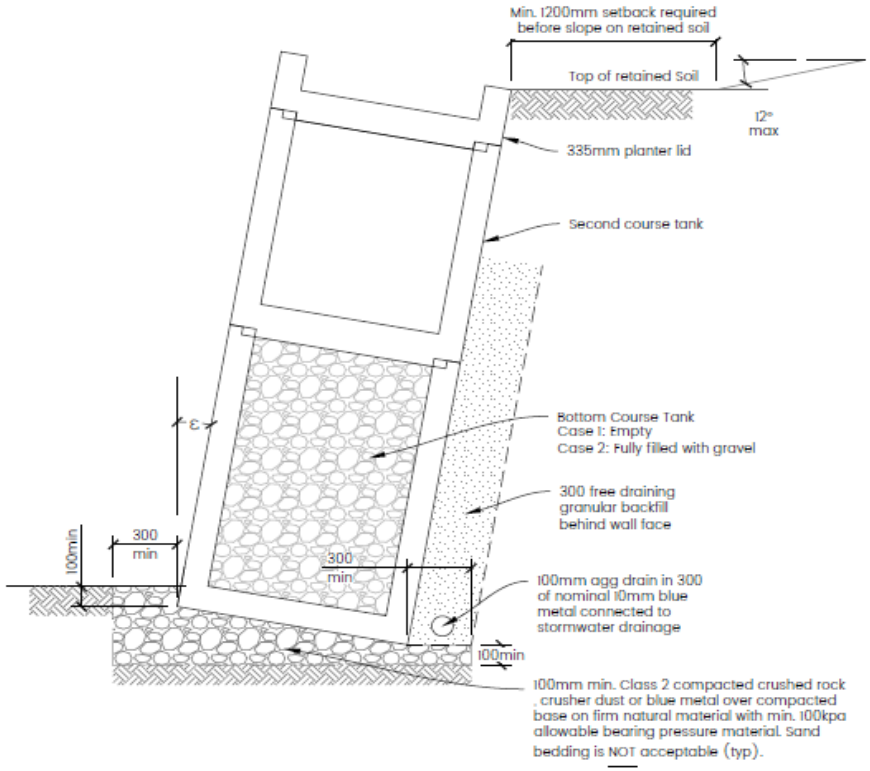
Battered Retained Soil Detail

Not to scale



Detail B

Battered Retained Soil Detail



Stacked Tank Retaining Wall with compacted crushed rock foundation

Tank Schedule				
Retained Soil Height (mm)	Tank Arrangement	Minimum Wall Inclination ε	Bottom Course	Foundation Base
2470	Medium Second Course Medium Bottom Course 335mm deep Planter Lid	13°	Empty Bottom Course	Compacted Base
2510	Medium Second Course Medium Bottom Course 335mm deep Planter Lid	7°	Filled with gravel	Compacted Base
2510	Medium Second Course Medium Bottom Course 335mm deep Planter Lid	7°	Empty Bottom Course	Concrete Base
2530	Medium Second Course Medium Bottom Course 335mm deep Planter Lid	3°	Filled with gravel	Concrete Base
2770	Medium Second Course Large Bottom Course 335mm deep Planter Lid	15°	Empty Bottom Course	Compacted Base
3050	Large Second Course Large Bottom Course 335mm deep Planter Lid	17°	Empty Bottom Course	Compacted Base
3100	Large Second Course Large Bottom Course 335mm deep Planter Lid	14°	Empty Bottom Course	Concrete Base
3160	Large Second Course Large Bottom Course 335mm deep Planter Lid	8°	Filled with gravel	Compacted Base
3170	Large Second Course Large Bottom Course 335mm deep Planter Lid	7°	Filled with gravel	Concrete Base

Design Assumptions:

1. A geotechnical site classification should be undertaken to verify compliance with the following deisgn assumptions
2. Minimum allowable bearing capacity of 100kPa must be achieved for the foundation soils.
3. This design is only applicable for the following soil classifications (A, S, M classifications) This design is NOT APPLICABLE to reacitve clays (M-D, HI, H2, E, P classifications). Additional design may be required for highly reacitve sites based on the geotechnical conditions.
4. A curing time of 7 days is required prior to the placement of Landscape Tanks.
5. A curing time of 28 days is required prior to filling of water.

General Notes

G1 All dimensions are in millimeters, unless noted otherwise.
G2 All levels shall be obtained from the Architectural drawings.
G3 These drawings shall be read in conjunction with all Architectural and other consultants' drawings and specifications and with such other written instructions as shall be issued during the course of the contract. All and any discrepancy on these drawings must be referred to the Superintendent or Authorised Person prior to proceeding with the work.
G4 These drawings shall not be used for construction unless noted as "Construction" on the drawings.
G5 DO NOT scale or rely on dimensions from these drawings. All dimensions relevant to set out and construction shall be verified by the contractor before construction and fabrication has commenced.
G6 The work on these drawings has been designed for the parameters outlined in the drawings.
G7 The Contractor is responsible for all temporary works. During Construction, the Contractor maintain the structure and all excavations in a stable condition and ensuring no part is over stressed.
G8 Workmanship and materials are in accordance with the relevant Australian Standards, the Building Code of Australia, Occupational Health and Safety Regulations and the local statutory authorities' requirements.
G10 Products specified in these drawings must be adopted unless approved otherwise.
G11 All services are to be located before construction commences.

Concrete Notes

C1. All workmanship and materials shall be in accordance with AS3600 and AS2870.
C2 Concrete shall have the following properties unless noted otherwise:

Element	Grade	Cover	Aggregate	Slump
Slab Top	N25	40	20	80

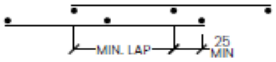
C3 Do not add water to the mix after batching.
C4 All admixtures to comply with AS1478 and must not reduce strength of concrete. All admixtures to be used in accordance with manufacturers recommendations.
C5 Design of formwork is the contractors responsibility. All formwork to comply with AS1509. Do not use reinforcement to support formwork.
C6 Do not make penetrations, holes, recesses, or embed pipes other than those shown on drawings without approval.

Foundations

F1 To avoid swelling of foundations and slab movements, the area around the excavation shall be adequately drained, during and after construction, to ensure no ponding of water adjacent to the slab area.
F2 All slabs shall be cast on a minimum thickness of 50mm of bedding sand and 0.2mm HDPE membrane prior to placing concrete.

Reinforcement

R1 Provide minimum mesh laps to cross wires of reinforcing mesh, so that two outermost main wires of one sheet overlap two outermost main wires of adjacent sheet by at least 25mm, thus

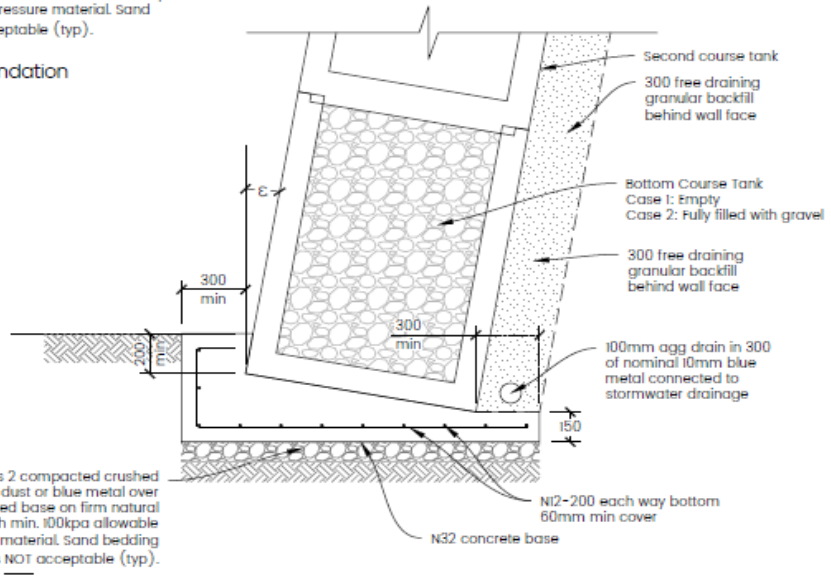


Soil Retaining Design Parameters:

1. Max fill density = 18kN/m³
2. Fill soil friction angle = 30°
3. Minimum soil bearing capacity = 100kPa
4. Surcharge = 5.0 kPa
5. Designed as fully drained

Note :

1. Ensure lid to be filled with soil prior to backfilling.
2. Sand bedding is not acceptable



Stacked Tank Retaining Wall with Concrete Foundation

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