



APPENDIX A

STORMWATER REQUIREMENTS

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NOTE:

These requirements shall take precedence from the time of adoption and will be applied retrospectively.

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DESIGN RESPONSIBILITIES

The Stormwater drainage system is to be designed in accordance with

- 'Australian Rainfall and Runoff – 87: A guide to flood estimation'
- AS/NZS 3500.3: Stormwater Drainage
- AS/NZS 4058: Precast Concrete Pipes
- AS/NZS 3725: Design for installation of buried concrete pipes
- AS 1597: Precast reinforced concrete box culverts
- AS 1260: PVC-U pipes and fittings for drainage, waste and vent application
- 'The Queensland Urban Drainage Manual'
- 'DTEI's Standard Specification for Excavation and Reinstatement of Road Pavements'
- DPTI Specification for works on Roads.
- 'Council Standard Details'

1.1

The developer is responsible for familiarising and identifying themselves with the flood risk map to be supplied by the City of Playford and liaising with the City of Playford at the planning stage on flood levels and proposed remedial measures.

1.2

The developer is required, as a part of the DA approval, to submit an overall stormwater management plan. This should not be considered as a detailed design but should be able to demonstrate how existing predevelopment flows affect the site and how the site will cater for them and the post development flows in the future.

The format is to include, but not limited exclusively to: Introduction and description of the site including any existing drainage and easements;

- a) Narrative on calculation for determining the 1:5, 1:10 and 1:00 year storm, pre-development flow;
- b) Narrative and calculation of method of drainage and attenuation to prevent exceeding the pre-development flow;
- c) Narrative and calculation on method of detention (if required) within the site for a 1:100 year storm;
- d) Any necessary plans, sections and details and
- e) Supporting calculations and or Computer Models;

OVERARCHING DESIGN REQUIREMENTS

2.1.

The post development flow must not exceed the predevelopment flow

2.2.

The stormwater system for all developments is to incorporate a major and minor drainage system. The major system is to provide a safe and unobstructed overland flow path for large flood events. The minor system shall be capable of conveying the majority of rainfall events that occur throughout the year in an underground system

2.3

For residential developments the minor runoff system shall be capable of conveying the 1 in 5 year (Q5) ARI rainfall event via an underground stormwater system. For commercial developments the minor runoff system shall be capable of conveying the 1 in 10 year (Q10) ARI rainfall event. There is to be no ponding in the street and the limit of the downstream drainage system is not to be exceeded. The underground stormwater system is to be located within land owned and operated by Council (reserves and road reserves). All stormwater systems sited outside of Council owned land is to be vested in an easement in the name of City of Playford.

2.4

The major system is to be capable of conveying the 1 in 100 year (Q100) rainfall event in conjunction with the underground system. The flows generated from the major event are to be disposed of so that no property will be inundated during that event. These flows can be disposed of via a combination of the underground system and unobstructed overland flow routes; however the limit of the downstream drainage system must not be exceeded. These Overland flow routes are to be founded within the public realm i.e. road reserves and reserves and are not to be located in allotments.

2.5

Stormwater infrastructure such as rear of allotment drains that are located in private land are to be located within an easement in the name of the City of Playford. The easements are to be a minimum 3m wide with a minimum of 1m clearance from the edge of the pipe to the easement boundary.

2.6

While the option for a gravity drain exists pumping shall not be considered.

2.7

The use of Water Sensitive Urban Design treatment methods are encouraged and should be analysed and incorporated into the design

PIPED DRAINAGE SYSTEM

The underground stormwater infrastructure comprises of the underground pipe and pit system that conveys runoff generated by the minor storm events. The pits, pipes and culverts are to be constructed from reinforced concrete unless otherwise negotiated with Council. This infrastructure is to be vested to the City of Playford.

PIT REQUIREMENTS

The developer is required, as a part of the DA approval, to submit an overall concept plan demonstrating how flow from the existing predevelopment catchments affects the site and how the site will cater for them

The City of Playford has 4 types of pit structures:

- a) Side entry pits that capture the runoff conveyed by the kerb and water table
- b) Grated inlet pits that capture runoff within spoon drains and carparks
- c) Field gully pits that capture runoff in overflow paths and reserves
- d) Junction boxes that act as inspection points

SIDE ENTRY PITS

3.1

Two types of side entry pits are currently used by The City of Playford. Side entry pits that are located in areas considered at risk from vehicular runover i.e. adjacent junctions, are to be constructed in accordance with standard detail SD71 which is a lintel frame side entry pit. All other side entry pits are to be as per standard detail SD24 and 25.

3.2

Each side entry pit is to allow for a minimum of 85% capture from upstream flows.

3.3

At a sag point the underground drainage is to be designed for a 1 in 20 year (Q20) ARI flow provided there is an overland flow path for gap flows from the Q100 ARI storm event. If an overland flow path cannot be achieved then the underground system is to be designed Q100 ARI storm event.

3.4

Sag Pit systems are to be designed with 20% blockage of the pit inlet capacity, 10% on grade and 50% sag with no overland flow path.

GRATED INLET PITS

3.5

All grated inlet pits are to be constructed in accordance with standard detail SD36

3.6

The use of grated inlet pits is to be negotiated with Council in situations where side entry pits cannot be used

3.7

Each grated inlet pit is to allow for a minimum of 85% capture from upstream flows.

3.8

Each grated inlet pit is to be design with 20% blockage of the pit inlet capacity

3.9

Grated inlet pits are to have heavy duty lids to allow for traffic movements over the top of them.

FIELD INLET PITS**3.10**

All field inlet pits are to be constructed in accordance with standard detail SD26

3.11

Field gully pits are to be regularly maintained to ensure they do not block

JUNCTION BOX**3.12**

Junction boxes are to be provided at the conjunction of two or more pipes, change of pipe grade, change in pipe size and changes in horizontal pipe alignments

3.13

All junction boxes are to be constructed in accordance with standard detail SD21

3.14

Junction boxes to be minimum 600 mm x 600 mm, with heavy duty lids when situated within a road reserve

3.15

All pits that are deeper than 1.5m are required to be at least 900mm x 900mm with step irons

3.16

150mm freeboard from the top of the pit to the hGL is to be achieved in the minor system so that no pit surcharges during a minor storm event.

PIPE REQUIREMENTS**3.17**

All pipes are to be reinforced concrete pipe (RCP) with rubber ring joints.

- a) Minimum Pipe diameter = 375 mm.
- b) Minimum Pipe cover = 600 mm.
- c) Pipe grade:
 - 1% (preferred)
 - 0.5% (minimum)
 - 20% (maximum)
- d) Minimum Pipe Class:
 - Class 2 (behind kerb)
 - Class 4 (under roads and other trafficable areas)

3.18

Rear of Allotment Drains (refer stormwater easements):

- a) Material = RCP (preferred), UPVC is acceptable.
- b) For UPVC pipe class SN4 with solvent welded joints
- c) Pipe diameter:
 - 300 mm (preferred)
 - 225 mm (minimum for horizontal run)
 - 100 mm (minimum for riser).
- d) Pipe grade:
 - 1 % (preferred)
 - 0.5 % (minimum)
- e) Risers must be joined to horizontal run using a 45o connection, in direction of flow

CULVERT REQUIREMENTS**3.19**

All culverts are to have;

- a) Minimum Culvert height = 300 mm
- b) Recommended Culvert cover = 300 mm.
- c) Culvert grade:
 - 1 % (preferred)
 - 0.5 % (minimum).

OPEN CHANNELS

The City of Playford has an existing stormwater system that incorporates open channels to convey the major and minor storm events from developed catchments. Open drains are to be constructed with the primary function being the conveying of stormwater from stormwater outfalls and overflows from adjacent catchments. They are to be founded within the public realm i.e. road reserves and reserves and are not to be located in easements on private allotments.

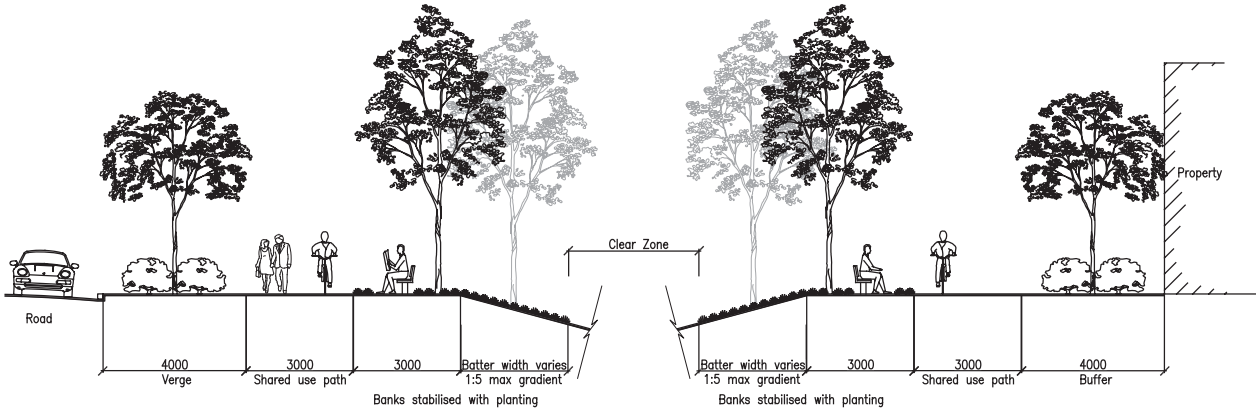


FIGURE 4.1 - Open Channel Cross Section

DESIGN CRITERIA

4.1

A 3 m wide access easement must be provided on either side of the drainage easement. This does not apply to road side swale drains.

4.2

To be designed and constructed in order to minimise bed erosion and scouring A minimum longitudinal grade of 0.5% unless further negotiated with Council

4.3

1 in 5 batter slopes are to be achieved on the side slopes on the drain. The slopes are to be stabilised with either grass and native planting or geotextile matting and native vegetation. Steeper slopes are to be negotiated with Council. The vegetation is to be established prior to practical completion of the drain being achieved

4.4

Structures and high amenity landscape treatments within the drainage reserve are to be located above the Q100 flow line. Existing fences and structures may be required to be modified in order to not obstruct the conveyance of the Q100 flow.

4.5

Open drains are to be maintained for a period of 2 years after practical completion of the drain works has been achieved

OUTFALL REQUIREMENTS

4.6

Pipes discharging to open drains are to terminate with a headwall. Headwalls are to be constructed in accordance with standard detail SD20 for pipes up to 600mm dia. and SD23 for pipes above 600mm dia.

4.7

Downstream of the headwall appropriate scour protection is required. This can be achieved through Reno mattresses, rocks, concrete or other appropriate means. The scour treatment is to be constructed to direct flow to its intended path and protect nearby embankments.

4.8

Outfalls are to be located as close as possible to the invert of the open drain; if this cannot be achieved then scour protection is to be provided from the outfall to the invert of the existing drain.

4.9

The incoming pipe into the headwall shall be a grade no greater than 2%

4.10

The velocity of the water discharging from the headwall is to be no greater than 1.5 m/s. For velocities greater than 1.5l/s further scour treatment is required to break up the flow and reduce the velocity

DETENTION SYSTEMS

New building development generally results in increased flows from the site due to an increase in impervious surfaces such as roof and pavements. The discharge of this increased flow into the existing stormwater drainage may increase the risk of flooding downstream properties and adversely effect on natural watercourses and drainage infrastructure downstream.

Detention systems may be required to mitigate these increased flows to maintain Council existing stormwater systems. Stormwater detention systems are to be incorporated within the development unless otherwise negotiated with Council. Systems that are to be sited externally from the development are to form part of an external infrastructure agreement.

The detention system is to be sized to ensure that the peak flow rate discharging from the post developed site does not exceed the peak flow rate for the pre-developed site. If Council has a set discharge limit then the detention system is to be designed in order to detain the peak flow rate from the post developed site to the set discharge limit.

DETENTION REQUIREMENTS

5.1

The City of Playford allows for 3 types of detention systems

- a) Open detention basins located with reserves
- b) Underground storage tanks located within Council reserves
- c) Oversized pipe network located within Council road reserves and reserves

OPEN BASINS

5.2

Maximum depth of 1.5m

5.3

Batter slopes of 1 in 6; batters greater than 1 in 6 will require approval by Council following a review of the design and proposed landscape treatment

5.4

The landscaping within the basin is to be in accordance with the landscape approval and is to be established prior to the Council accepting handover of the basin works.

5.5

Infalls and Outfalls are to have appropriate scour protection to ensure both the batters and invert of the basin do not erode

5.6

A low flow channel is to be provided from the in-fall headwall to the outfall headwall of the basin. The invert of the basin is to be locally graded to the low channel in order to avoid ponding of water within the basin.

5.7

Structures within detention basins are to be sited above the 1 in 5 ARI levels

UNDERGROUND STORAGE TANKS**5.8**

Tanks are only to be considered if they can be freely drained and ensure there is a provision of usable open space within the reserve.

5.9

Tanks are to be concrete and constructed in accordance with Australian standards AS3600

5.10

A 900 x 900 access sump with step irons is to be provided to ensure the tank can be maintained.

5.11

The developer is to maintain the tank for a period of 3 years to ensure the system works effectively. A maintenance schedule is to be prepared for Council after handover of the asset

OVERSIZED PIPES**5.12**

Pipes are only to be considered if they can be freely drained and there is no viable space to utilise either detention basins or tanks.

5.13

Pipes are to be concrete and constructed in accordance with Australian standards AS 4058 and AS 3725

5.14

A 600 x 600 access sump with step irons is to be provided to ensure the tank can be maintained.

5.15

The developer is to maintain the tank for a period of 3 years to ensure the system works effectively. A maintenance schedule is to be prepared for Council after handover of the asset.

ENVIRONMENTAL

The construction of new developments has an environmental effect of the existing waterways. There are several contaminants that cause problems downstream that Council are seeking to limit and/or remove.

Measures should be undertaken by the developer to minimise the level of contaminants discharging from the site in question into the Council stormwater infrastructure. All stormwater flows that discharge into open channels, detention systems and existing Council stormwater pipes are to be treated in order to remove gross pollutants. Traps are to be maintained by the developer for a period of 12 months after Practical Completion is granted

Typical forms of control to be used should be trash racks, gross pollutant traps and oil interceptors. On private owned developments these systems are to be located within the property boundaries of the development and are the responsibility of the developer. Where roads and drainage are to be adopted discussion on specification of device and access for maintenance is required with Council.

All outfalls from the detention system are to be in accordance with the stormwater outfalls guidelines.

Any stormwater works undertaken within existing watercourses are to be in accordance with the guidelines set by the NRM board for water affecting activity

SITE CONTAMINATION REQUIREMENTS

6.1

All developments throughout the construction stage require a sedimentation control plan in order to minimise the effects of construction.

6.2

Silt control measures are required to be installed during construction and are to be in accordance with the EPA's Code of Practice "Stormwater Pollution Prevention for the Building and Construction industry". This includes the use of vegetated buffers, hay bales, filter/ silt fences, and sediment traps/ basins. Trash collection devices, in particular gross pollution traps, may be required, where indicated by Council e.g where the development discharges to a natural watercourse.

6.3

The minimum standard of treatment shall be able to remove the following percentages of pollutants from the typical annual urban load (Ref: CSIRO "Urban Stormwater Best Practice Environmental Management Guidelines"):

Suspended solids	80% reduction
Total Phosphorus	45% reduction
Total Nitrogen	45% reduction
Litter	70% reduction

6.4

For drainage structures, concrete lined channels and exposed soil surfaces will not be accepted, only established and managed 'soft engineering' i.e. grass lined and landscaped.

6.5

All batter slopes are to be stabilised for detention basins, drains and swales to the approval of Council immediately prior to issuing practical completion for civil works. These measures are to be indicated within the civil scope of works and will be subject to approvals.

6.6

Construction is to be in accordance with best practices in order to achieve sustainability objectives set out in Council's Environmental Policy.