Mitcham DPA Assessments

Stormwater and Flooding

URPS

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Ref: 20190558R002B

tonkin

Building exceptional
outcomes together

Document History and Status

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1 Introduction

The City of Mitcham (Council) is proposing a number of Development Plan Amendments (DPAs) to promote growth in the following four key areas:

- Precinct 1: Daws Road / Goodwood Road
- Precinct 2: Blackwood Centre
- Precinct 3: Belair Road Centre
- Precinct 4: Goodwood Road / Cross Road

The proposed development in these precincts will encourage an increase in both housing and commercial density with proposed multi-story buildings. The increase in development density has the potential to increase impervious area within each of the precincts. This increase in impervious area will lead to an increase in runoff which, if unmitigated, could adversely affect the performance of the existing drainage systems within and downstream of each of the precincts.

The policies necessary to ensure that development within the various precincts is protected from flooding and which will ensure that runoff is properly managed to reduce downstream impacts are considered in this investigation.

The investigation has been divided into two broad sections. The first section addresses the requirements for protection of development from flooding, largely due to runoff from catchments within and upstream of the various precincts. The second section considers the requirements for managing stormwater runoff from proposed development within each precinct to ensure that existing development and drainage systems within and downstream of the precincts are not impacted.

2 Flood Protection

2.1 Background Data on Flooding

The following background data regarding flooding within the various precincts has been provided to us by Council and has been utilised for assessing the likely flooding issues within each area:

- Brownhill Creek Stormwater Management Plan (2016)

  This Plan contains floodplain maps for a 100 year average recurrence interval event for Brownhill Creek and is relevant to the Belair Road Precinct.

- Draft Sturt River Urban Catchments Stormwater Management Plan (2019)

  Draft floodplain maps for a 1% annual exceedance probability event (100 year average recurrence interval event) produced as part of ongoing investigations for the Sturt River Urban Catchments SMP were provided. These maps show the extent and depth of flooding due to overflow of underground stormwater systems across those parts of the City of Mitcham that drain to the Sturt River. The maps provided were for a future development scenario with an allowance for increased rainfall intensities as a result of climate change. The maps are relevant to the Goodwood Road and Daws Road Precincts.

- Stormwater Network Assessment – Brownhill Creek Urban Catchments (2017)

  This investigation contains a set of floodplain maps showing flood extent and depth within the urban catchments in the City of Mitcham draining to Brownhill Creek. The maps are for existing conditions and are relevant to the Belair Road Precinct.

2.2 Existing Development Plan

The current Development Plan contains a number of objectives and principles relating to the protection of development from flooding. Specifically, under the Council Wide Principles of Development Control, the following items are of relevance to flood protection:

Principle 9

Development should not be undertaken on land liable to inundation by drainage or flood waters.

Principle 11

Development should not take place in a manner which will interfere with or obstruct watercourses, or which may aggravate flooding elsewhere.

Principle 78 (a)

Major development and land division should incorporate stormwater management that directs major stormwater flows through areas of open space designed and controlled to prevent erosion and the likely entry of floodwaters into buildings based on an Annual Exceedance Probability of 1 percent

Principle 78(c)

Dwellings are able to be sited and designed such that ground floor levels will not be inundated by floodwaters generated by a 1-in-100 year flood event.

Principle 92

Land should not be divided where the development proposed thereon is liable to be detrimentally affected by inundation through drainage or flood waters or where land proposed to be divided for residential development would be in the 100-year return period flood path.

The current plan clearly anticipates that development should:

- Have buildings that are protected from inundation in a 100 year average recurrence interval event
- Should desirably be undertaken on land not inundated by a 100 year average recurrence interval flood event
- Where development is on land inundated by a 100 year average recurrence interval flood, it should not obstruct flow or aggravate flooding elsewhere

These requirements are all considered to be appropriate to development within the four precincts being considered as a part of this investigation. However, some strengthening and clarification of the requirements within the various precincts is considered appropriate. This is considered to be necessary for the following reasons:

- The Principles within the current Development Plan are silent in relation to the flood protection standard to be applied to buildings other than residential dwellings.
- The Principles within the current Development Plan do not provide any guidance in relation to freeboard requirements
- The Principles are largely formulated to deal with riverine flooding (for example from Brownhill Creek). Information now available in the form of floodplain maps showing inundation due to overflow of stormwater systems affects much larger areas, albeit with much shallower flooding. Given the shallow nature of flooding in many of these overflow areas, development can in many instances be undertaken provided that appropriate consideration of any redirection of floodwaters brought about by the development is properly considered.

The requirements for flood protection and the suitability of land within each of the precincts for increased development is discussed further below.

2.3 Belair Road Precinct

Land within this precinct is subject to riverine flooding from Brownhill Creek and also shallow flooding due to overflow of stormwater systems. Measures to protect future development within this precinct from flooding and to ensure that development does not adversely affect flooding elsewhere are set out below.

Riverine Flooding – Brownhill Creek

Within this precinct, flooding due to Brownhill Creek is largely contained to the channel and areas immediately adjacent to the channel in a 100 year average recurrence interval event. The extent of flooding is defined on maps contained within the Brownhill and Keswick Creeks Stormwater Management Plan.

The following Principles of Development Control are considered to be appropriate:

- Development should not be undertaken within the 100 year average recurrence interval floodplain of Brownhill Creek as shown on maps contained within the Brownhill and Keswick Creeks Stormwater Management Plan (2016)
- Where development is proposed within the 100 year average recurrence interval floodplain of Brownhill Creek it must be demonstrated that the proposed development will not exacerbate flood risk on any adjacent properties up to and including a 100 year average recurrence interval event.
- New buildings within and adjacent to the floodplain of Brownhill Creek are to be constructed with a finished floor level at least 300 mm above the 100 year average recurrence interval flood level.
- Construction of new buildings over the existing creek channel is not permitted.

Stormwater Flooding

Floodplain maps contained within the City of Mitcham Stormwater Network Assessment report (2017) indicate that allotments in some parts of the precinct are at risk of shallow overflows of stormwater (up to 100 mm deep) in a 100 year average recurrence interval event. Roads within the area generally have a good grade from east to west and can provide adequate flow paths provided that adjacent development is elevated above the likely flood level.

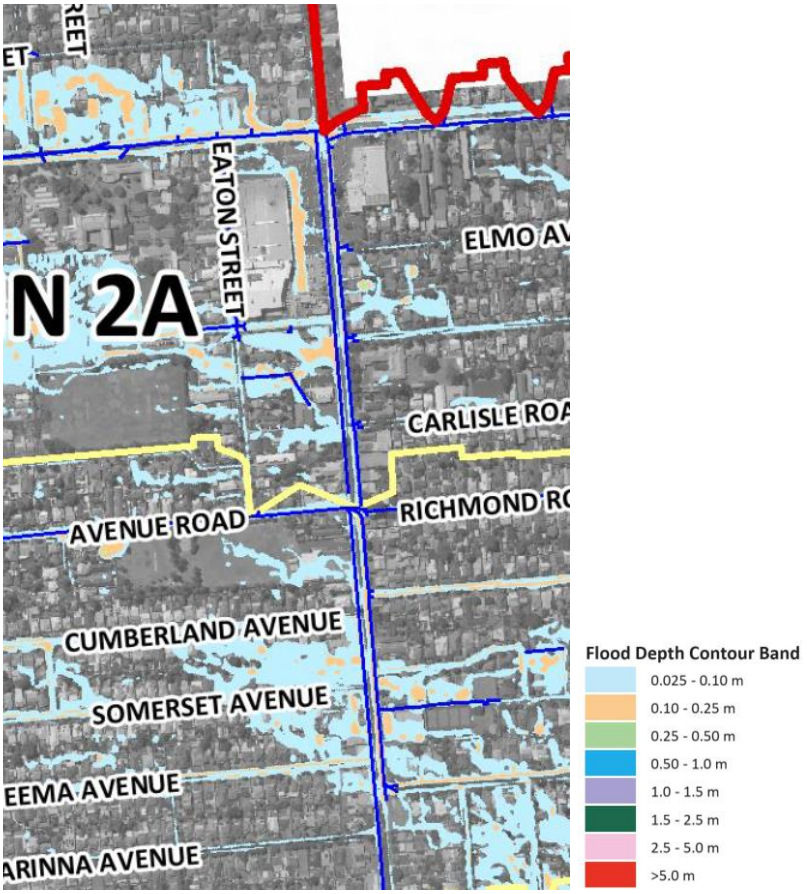
The following Principle of Development Control is considered to be appropriate to manage the impacts of this flooding:

- New development should be set with a finished floor level at least 300 mm above the adjacent top of kerb unless it can be demonstrated that the development is protected from flooding in a 100 year average recurrence interval event with appropriate freeboard.

2.4 Goodwood Road Precinct

Draft maps produced for the Sturt River Urban Catchments Stormwater Management Plan indicate that in a 100 year average recurrence interval (ARI) event shallow flooding of some allotments within the precinct could occur. An extract from the maps is provided in Figure 2.1 below. Protection from this flooding by managing floor levels and ensuring that development does not exacerbate flooding elsewhere is considered to be an appropriate strategy.

Figure 2.1 : Extract from Draft 100 year ARI Floodplain Map (Goodwood Road Precinct)



The following Principles of Development Control are considered to be appropriate to manage the impacts of this flooding:

- New development should be set with a finished floor level at least 300 mm above the adjacent top of kerb unless it can be demonstrated that the development is protected from flooding in a 100 year average recurrence interval event with appropriate freeboard.
- Where development is proposed within areas inundated to greater than 100 mm depth in a 100 year average recurrence interval event, as shown on maps produced for the Sturt River Urban Catchments Stormwater Management Plan, the development should incorporate sufficient overflow paths or other measures to ensure that flood risk is not exacerbated on adjacent properties.

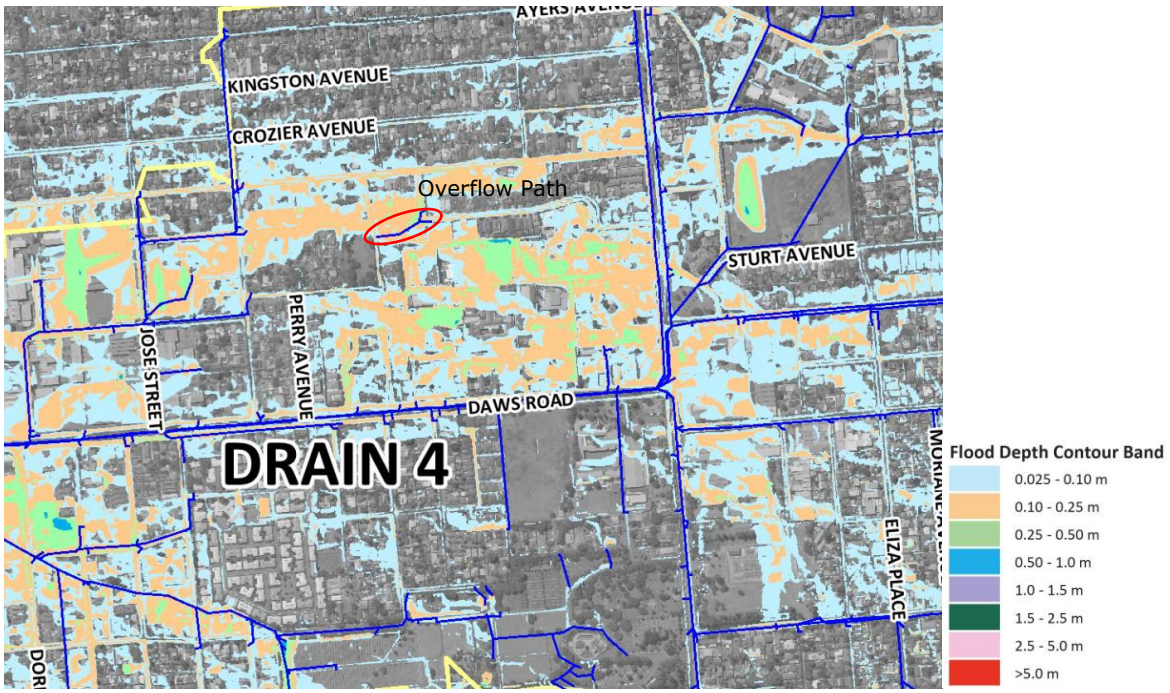
2.5 Daws Road Precinct

Draft maps produced for the Sturt River Urban Catchments Stormwater Management Plan indicate that in a 100 year average recurrence interval (ARI) event, flooding of a number of allotments to greater than 100 mm could occur. An extract from the maps is provided in Figure 2.2 below.

The maps show that within the existing Daws Road Mixed Use Zone, flooding of up to 500 mm in depth could occur. Elsewhere, the maps indicate flow paths following a general east – west alignment either along roadways or through allotments adjacent to roadways.

Within the existing Mixed Use Zone, there is sufficient open space to allow flow paths to be provided between buildings. Further development of the site will need to ensure that these flow paths are maintained and that floor levels of buildings are appropriately managed. Elsewhere, the east-west alignment of the existing road network could be used to provide flow paths, provided that development of adjacent allotments is raised sufficiently to provide adequate protection from flooding. Provision of a flow path from the western end of Rockville Avenue to Grantley Avenue would be desirable to promote this flow path as shown in Figure 2.2 below. Alternatively, upgrade of the existing pipe system to a 100 year ARI standard may be required in this location.

Figure 2.2 : Extract from Draft 100 year ARI Floodplain Map (Daws Road Precinct)



If development on allotments outside the existing Mixed Use Zone is raised to promote flow paths along the roadways through the precinct, some elevation of flood levels along these roadways could occur.

Further modelling could be undertaken to establish the post-development flood levels along these roadways for the purposes of setting finished floor levels. However, in the absence of this modelling an interim set of development principles based on an increased freeboard allowance above the 100 year average recurrence interval flood could be applied until the modelling results are obtained.

The following Principles of Development Control are proposed:

- New development should be set with a finished floor level at least 400 mm above the 100 year average recurrence interval flood level as show on the maps produced for the Sturt River Urban Catchments Stormwater Management Plan.
- Within the Daw Park Hospital site, development should ensure that overflow paths are maintained for a 100 year average recurrence interval event to ensure that flood risk is not exacerbated to buildings within the site or on adjacent properties.

2.6 Main Road Blackwood Precinct

This precinct straddles the crest of a hill. No floodplain mapping is available.

Some historical flooding is known to have occurred through properties along the eastern side of Main Road, which was addressed by upgrading pipe systems and provision of overflow paths along driveways.

The existing Council Wide Principles of development control are considered to be appropriate for managing floor levels and any overflow paths in this area.

3 Stormwater Management

3.1 Background

Increasing the density of development within each of the Precincts is likely to impact on stormwater runoff in the following ways:

- The increase in impervious area associated with an increase in development density will lead to increase in runoff volume and peak flow
- Construction of more efficient stormwater systems within new developments may lead to an increase in peak discharges
- For commercial and mixed use developments in particular, stormwater quality may be impacted

These impacts can be managed, but the strategy to address these impacts will be dependent on staging of development.

Assuming that redevelopment within each precinct will occur on a piecemeal basis, the provision of larger scale stormwater management measures to manage the impacts of increased runoff such as detention and retention systems in reserves, major outfall upgrades and so on is likely to be precluded.

The strategy is therefore likely to require on-site measures to manage the effects of development.

3.2 Peak Flow Management

Existing Development Plan Provisions

The existing Development Plan contains a number of Principles relating to peak flow management. However, these Principles are unclear in their objectives and are not necessarily considered to be appropriate for development within the Precincts being considered as part of this DPA.

Specifically, Council Wide Principle 78 (b), which relates to the management of runoff from residential development to mitigate peak flows refers to the use of tanks and retention areas, but does not specify a discharge requirement or objective for the design of these systems. The conditions in Table Mit/1 for detached dwellings may not apply to medium density development that could be possible within the proposed DPA zones. The Development Plan appears to be silent on the management of peak flows from other forms of development, other than some specific objectives for areas located outside the proposed DPA zones.

Current Underground System Standard

The existing underground drainage systems within the various precincts are generally likely to cater for the 2 to 5 year average recurrence interval peak flows from existing development. However, we note that parts of the proposed Blackwood Precinct to the west of Main Road have little if any underground drainage and may not currently meet this standard. Extension of the underground system to better service this area may be required in the future (whether or not rezoning were to occur). Elsewhere, within the various precincts, there may be areas where extension of the existing underground network may be desirable to better management gutter flows widths, even with the current levels of development. We have not considered as a part of this investigation the requirement for extensions to the underground network that may have been required whether or not rezoning were to occur, or the opportunities presented by rezoning for partial cost recovery of some of these works. Such investigations could be undertaken but are outside the scope of this current engagement.

Proposed Principles of Development Control – Peak Flow Management

The underlying philosophy adopted for the development of the proposed Principles of Development Control for management of peak flows within each of the Precincts has been that:

- The standard of the underground system should not be reduced by the proposed development within the various precincts. As a result, limits on peak discharge for a 5 year average recurrence interval event are proposed as a part of this DPA.
- The standard of protection offered in a 100 year average recurrence interval event should not be reduced by the proposed development so that flooding of downstream properties is not exacerbated. Limits on peak discharges from proposed development in a 100 year average recurrence interval event are therefore also proposed.

Council is currently preparing a Stormwater Management Plan (Sturt River Urban Catchments Stormwater Plan) covering the Precincts at Goodwood Road and Daws Road. We understand that within this Plan, it is being recommended that limits on peak discharge are being proposed that are based on achieving the above by:

- Limiting the peak discharge from a development site in a 5 year event to the peak flow that would be generated from the site assuming an equivalent impervious area fraction of 0.25.
- Limiting the peak discharge from a development site in a 100 year event to the peak flow that would be generated from the site assuming an equivalent impervious area fraction of 0.45.

Adoption of these requirements for the Goodwood and Daws Road Precincts is proposed as part of the DPA for consistency with the Stormwater Management Plan.

The existing range of impervious area fractions within Mitcham Precinct appear to be similar to those in the Goodwood and Daws Road Precincts. As a result, similar discharge requirements to those set out above could be applied to this area.

At Blackwood, parts of the catchment, particularly the residential areas to the west of Main Road, have impervious area fractions below 0.25. It is therefore proposed that for this Precinct, alternative (higher) requirements for management of peak flows be used.

The following Principles of Development Control are therefore proposed:

For the Goodwood, Daw Park and Mitcham Precincts

- Peak flows from a site post development are not to exceed the flows from the same site in the critical 5 year average recurrence interval event calculated based on an impervious area fraction of 0.25 and the critical 100 year average recurrence interval peak flows calculated based on an impervious area fraction of 0.45.

For the Blackwood Precincts

- Peak flows from a site post development are not to exceed the flows from the same site in the critical 5 year average recurrence interval event calculated based on an impervious area fraction of 0.15 and the critical 100 year average recurrence interval peak flows calculated based on an impervious area fraction of 0.25.

This provision should override the existing requirements for peak flow management in the Development Plan.

3.3 Volume Management

Existing Development Plan Provisions

Council Wide Principle 81 contains provisions for the management of stormwater runoff volumes and describes a range of measures by which runoff volume can be managed.

The current provisions are appropriate but do not include any specific requirement for sizing these measures.

It is understood from advice provided by the City of Mitcham that consideration is being given in the drafting of the Sturt River Urban Catchments Stormwater Management Plan to providing a recommendation for the required volumes of stormwater retention on individual sites. This retention requirement is proposed to be based on one contained in the Coastal Catchments Stormwater Management Plan which suggested a retention requirement sufficient to capture 15 mm of rainfall (or 1.5 kL/ 100m^2 of impervious area).

Separately, the City if Mitcham has undertaken a review of scour along its Hills Face watercourses. This review has suggested that retention of 2 kL / 100 m^2 of impervious area is necessary to provide better watercourse protection.

Proposed Principles of Development Control – Volume Management

The following Principles of Development Control are therefore proposed:

For the Goodwood, Daw Park and Mitcham Precincts

- In addition to the requirements set out in Council Wide Principle of Development Control 81, the volume of the retention systems should be sufficient to contain 1.5 kL / 100 m^2 of impervious area on the site and should be located to intercept outflows from any detention system provided on the site.

For the Blackwood Precincts

- In addition to the requirements set out in Council Wide Principle of Development Control 81, the volume of the retention systems should be sufficient to contain 2 kL / 100 m^2 of impervious area on the site and should be located to intercept outflows from any detention system provided on the site.

3.4 Quality Management

Existing Development Plan Provisions

Council Wide Principle 82 contains provisions for the management of stormwater quality from new development.

The provisions describe a range of measures that can be applied and targets runoff from paved areas.

It is considered that the current provisions are appropriate.