

17 HORNSBY OVERLAND FLOW STUDY REPORT AND DRAFT FLOOD PLANNING MAPS

EXECUTIVE SUMMARY

The NSW Government has introduced a Flood Prone Land Policy that affects all local Government areas of the State. The Policy aims to improve the protection of life and property from the threat of flood. It requires all councils to identify and map flood prone land within their local government area using guidelines set out in the Floodplain Development Manual (2005). Section 733 of the Local Government Act also requires Council to provide information regarding flood liable land and land in coastal zone. This clause provides exemption from liability to Council in respect of any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding as well as any land in the coastal zone being affected by a coastline hazard.

Council is also in the midst of preparing the Hornsby Shire Comprehensive Local Environmental Plan (LEP). One of the clauses in the Standard Instrument LEP is Natural Resource Management relating to Flood Planning. This clause relates to development on flood prone land and councils are first encouraged to complete their flood studies and risk assessment, where practicable, and to translate the information regarding flood planning areas.

Council has completed its flood study using a two-dimensional computer model, TUFLOW, to model the overland flows across the entire LGA using a fine 5 metre by 5 metre grid. The study has identified, based on Criterion 2, 4,879 properties as being affected by overland flooding. An overland flow/flood depth in excess of 150mm during a 100 year average recurrence interval (ARI) design storm event has been selected as the critical depth for the Hornsby study due to the relatively steep terrain of the Shire and taking cognisance that, in conjunction with the steep terrain, the velocity of the overland flow is relatively high as to cause storm damage and create a hazard for the community. The adopted overland flow depth of 150mm is less than the 300mm depth given in the Department of Planning guidelines for the preparation of Flood Planning Maps and as a result will identify more potential flood prone properties that would not be able to benefit from the NSW Government's complying development provisions than if the 300mm flow depth were used. The adopted Study flow depth in excess of 150mm has however been discussed and endorsed by the Hornsby Shire Floodplain Risk Management Committee as being appropriate for the Shire.

In addition to overland flooding, flood extent maps for mainstream flooding have also been prepared for the Hawkesbury River as well as properties impacted by projected sea level rise for the river settlements and Dangar Island.

The Hornsby Overland Flow Study (OFS) Report and the accompanying draft Flood Planning Maps (FPMs) based on Criterion 2 are presented in Appendix 1. The draft FPMs will, following public exhibition and adoption by Council, be an addendum to the Hornsby Shire Comprehensive LEP to control development in the flood prone areas of the Shire. Properties identified by the study as potentially flood liable are shown in the draft FPMs.

Overland Flow Maps identified by the OFS and based on all three criteria considered have also been prepared and are presented in Appendix 2 to provide stormwater management information to the community.

The Hornsby Overland Flow Study Report and the draft Hornsby Shire Flood Planning Maps as well as the draft Overland Flow Maps and are presented for Council's consideration and recommended for endorsement for public exhibition for a period of 28 days.

To enable the owners of the 4,879 properties identified in the draft FPMs to be appropriately notified, it will be necessary to contact each property owner/s by mail and provide sufficient information so that the owner would be able to understand how the identification of the property affects them. The proposed letter to be sent to affected property owners and the attached FAQs leaflet are presented in Appendix 3 and recommended for Council's approval.

PURPOSE/OBJECTIVE

This report presents the Hornsby Overland Flow Study (OFS) Report and accompanying draft Hornsby Shire Flood Planning Maps (FPMs) as well as the draft Overland Flow Maps for Council's consideration and endorsement for public exhibition.

The draft FPMs, following the public exhibition and subsequent adoption by Council, will be submitted to the Department of Planning as an addendum to the Hornsby Shire Comprehensive Local Environmental Plan (LEP).

The Hornsby Shire OFS Report and Overland Flow Maps, following the public exhibition and subsequent adoption by Council, will be placed on Council's website to provide flood management information to the community.

BACKGROUND

The recognition and management of flood risk is an essential requirement to enable the protection of existing and future occupants of flood prone land from the ramification of floods. The management of flood prone land is the responsibility of Local Government.

The NSW Government has developed a Flood Prone Land Policy (FPLP) to support this management role. It is aimed at providing management options to existing flood problems in developing areas and ensuring that new developments are compatible with the flood hazard and does not create additional flooding problems in other areas.

To assist in implementing this policy, the NSW Government has prepared the Floodplain Development Manual (FDM). This document is intended to guide councils in developing and implementing their Flood Risk Management Plans (FRMPs). These plans are intended to address three key issues:

1. Safety of people.
2. Management of potential damage to property and infrastructure.
3. Management of the cumulative impacts of development.

Further guidance for preparing the plans is provided by the Department of Planning (DOP) through their Guidelines on Development Controls on Low Flood Risk Areas. In addition, Ministerial Direction No. 15 (under Section 117 of the Environmental Planning and Assessment Act) requires that the plans be consistent with the FDM when preparing the LEP.

To balance the protection of existing and future inhabitants from flood hazard, the FDM advises that lands should be categorised to show where controls will and will not be required to be identified. This will allow development controls under the LEP to be developed. Exempt and Complying Development Codes (the “Codes SEPP”) can then be applied to non-flood planning areas. Only flood planning areas will need to be scrutinised through the Development Application (DA) process.

DISCUSSION

Need for Flood Study

The Hornsby OFS was undertaken to enable properties within its urban areas that are likely to be affected by overland flows from Council’s stormwater drainage systems to be identified.

The study distinguishes between mainstream flooding and overland flow/flooding. Mainstream flooding within Hornsby Shire is generally contained within the National Parks and Reserves and along the Hawkesbury River, and results when the stream flow overtops the banks of a stream or river.

Overland flow/flooding generally affects upper catchment areas and applies to most of the urban areas within the Shire. These overland flows generally follow paths where the natural creeks have been converted into piped systems or through flowpaths in existing developments. FPMs need to be prepared to identify flood prone areas affected by the mainstream and overland flood types.

The mainstream flooding and overland flow areas need to be identified to ensure that inundation and flooding affects are considered as part of the development assessment process, and requiring a DA. All other properties will then benefit from the complying development provisions under the Codes SEPP General Housing Code. Currently, within Hornsby Shire, developments on flood affected land can under the Codes SEPP take place without due consideration by Council of effects of inundation or flooding on the development.

Methodology for Flood Study

To meet the main objective of identifying the urban properties affected by either overland flow or mainstream flooding, it was necessary to identify the areas to be modelled. Once these were defined, the appropriate type of modelling can be applied to each area:

1. Urban areas affected by overland flow/flooding.
2. Urban areas affected by mainstream flooding.

The analysis required for item 1 is a complex task in an urban environment such as Hornsby Shire. Council has engaged a consultant, Cardno Lawson Treloar Pty Ltd., to carry out this work. The technical details of the methodology used are given in the report.

With recent advances in flood and overland flow modelling packages, it has been possible to create a model to define the overland flow behaviour across the entire urban area of the Shire. A two-dimensional computer model, TUFLOW, has been established to model the overland flows across the entire LGA using a fine 5 metre by 5 metre grid. This model has established preliminary overland flow extents across the urban areas.

The identification of properties that would be potentially affected was based on the following criteria:

- Criterion 1 - the property is shown to have a piped or open drainage line through any part of the property as shown in the 'pit and pipe GIS layer' provided by Council;
- Criterion 2 - the property is inundated by overland flow to a depth greater than 150 mm during a 100 year average recurrence interval (ARI) design storm event;
- Criterion 3 - any part of the property lies within 5 metres of a piped or open drainage line identified under Criteria 1, provided the drainage line is not located in a road reserve.

In addition to overland flow, flood extent maps for mainstream flooding covering Criterion 2 above have been prepared for the Hawkesbury River. This mapping is based on flood level information provided by Council, from previous studies of the Hawkesbury River. This data was based on information that was previously provided by Gosford City Council, and provides flood levels at cross sections moving along the River. This mapping was derived from a flood study that was undertaken in 1982 by NSW Public Works.

It is to be noted that an overland flow depth in excess of 150mm has been selected as the critical depth for the Hornsby study due to the relatively steep terrain of the Shire and taking cognisance that, in conjunction with the steep terrain, the velocity of the overland flow is relatively high as to cause storm damage and create a hazard for the community.

The selected study overland flow depth of 150mm is less than the 300mm depth given in the DOP guidelines for the preparation of Flood Planning Maps. As a result of the 150mm overland flow depth selected, the Study has identified more potential flood prone properties that would not be able to benefit from the NSW Government's complying development provisions than if the 300mm flow depth were used.

The adopted Study flow depth in excess of 150mm has however been discussed and endorsed by the Hornsby Shire FRMC as being appropriate for the Shire.

The consultant's Hornsby OFS Report and accompanying draft FPMs based on Criterion 2 are presented in Appendix 1. Overland Flow Maps identified by the Study based on all three criteria considered are presented in Appendix 2.

Council's Floodplain Risk Management Committee (FRMC)

The results of the technical studies have been presented to and were endorsed by the Hornsby Shire FRMC on 5 August 2010. This committee is an essential part of the process as prescribed by the FDM. The Hornsby Shire FRMC consists of the following ten members:

- Two Councillors with one as the Committee Chairperson.
- Three Community Representatives selected from applicants after advertising in the local press and evaluation of submitted expressions of interest.
- Three Council staff, one each representing Council's Works Division, Environment Division and Planning Division.
- One Representative from the Department of Environment, Climate Change and Water (DECCW)
- One Representative from the State Emergency Services (SES)

The Committee met twice on 16 June and 5 August 2010. Committee members were given details of the study and its objectives and provided with copies of the consultant's report and draft maps. The Committee has, at its second meeting, endorsed the study and draft flood maps and has recommended that these be reported to Council with a recommendation that they be placed on public exhibition.

A Council workshop was also held on 25 August 2010 to brief the Mayor and Councillors, (with the General Manager, Executive Managers and relevant staff in attendance), on the process adopted for the study and the draft flood maps.

Outcomes of Flood Study

The main objective of the Hornsby Study was to identify urban properties that may be affected by overland flow/flooding based on the three criteria given under the study methodology.

A total of 7,815 urban properties out of a total of 45,062 have been identified as properties that may experience flooding due to overland flow (i.e. 17.3% of properties). A summary of the number of properties identified under Criterion 2 and Criteria 1 & 3 is tabulated below. It is to be noted that there are a number of properties which have been identified under both Criteria 1 & 3 and Criterion 2.

Criterion	Number of Properties	Percent of Total Properties
Criteria 1 & 3	6,170	13.7%
Criterion 2	4,879	10.8%
Total	7,815	17.3%

The maps resulting from the assessment for Criterion 2 are presented in Volume 2 of the Study Report and are proposed as the draft Flood Planning Maps for inclusion as an addendum to the new Hornsby Shire Comprehensive LEP. The maps resulting from the assessment for all of the above three criteria are presented in Appendix 2 as Overland Flow Maps to provide general stormwater management information to the community.

Flood Planning Maps

The Flood Study has been used to prepare Flood Planning Maps (FPMs) for inclusion in the Hornsby Shire Comprehensive LEP to control development in the flood prone areas of the Shire. The draft FPMs are presented in Appendix 1 in Volume 2 of the Hornsby OFS Report for Council's consideration.

Impacts on Properties identified in the FPMs

The properties identified in the draft FPMs presented in Appendix 1 will, following the public exhibition and subsequent adoption by Council, be designated as Flood Planning Areas in the Hornsby Shire Comprehensive LEP. A DA will be required for any development in a Flood Planning Area, with a requirement to undertake a hydraulic study in conjunction with the development proposal. Where the extent of overland flow is significant, a more detailed hydraulic study will be required than if the extent of overland flow/flooding were minor and no development were proposed within the area of the lot affected by the overland flow.

Owners of properties identified in the draft FPMs may have concerns with the identification of their properties as flood planning areas. Such concerns may arise from the perception that this would have an adverse impact on the property value as well as the added expense of having to undertake a hydraulic study when undertaking development.

The public exhibition of the draft FPMs will hence need to address these concerns.

RECOMMENDED ACTIONS

Public Exhibition Period

The Hornsby Overland Flow Study Report and accompanying Draft Flood Planning Maps as well as the Overland Flow Maps have been considered and endorsed by the Hornsby Shire FRMC at its meeting held on 5 August 2010. The FRMC has resolved that, following the Council Workshop on 25 August 2010 and if no major changes were required, the draft Hornsby Overland Flow (/Flood) Study Report and Flood Planning Maps, be reported to Council with a recommendation that they be placed on public exhibition. The FRMC also endorsed the proposed public exhibition period of 28 days. It was considered that the public exhibition should also be on a Shire-wide basis.

Future s149 Certificate Notation

The results of the Study have enabled Council to identify those properties that are exempt and meet the conditions for complying development as well as properties that would potentially be affected by overland flows. The 4,879 properties identified as potentially being affected by overland flow will be noted as Flood Control Lots on s149 Certificates. These properties will be shown on the draft FPMs as being affected by overland flow depths in excess of 150mm during a 100 year ARI design storm event and will require a DA to be submitted for any development on them.

Properties identified as experiencing minor drainage inundation are only identified for Council's drainage management purposes and are only shown on the Overland Flow Maps presented in Appendix 2. These properties will not have any notation on the s149 Certificate.

Proposed Management of Public Exhibition

To enable the owners of the 4,879 properties identified in the FPMs to be appropriately notified, it will be necessary to contact each property owner/s by mail and provide sufficient information so that the owner would be able to understand how the identification of the property affects them. An FAQs (frequently asked questions) leaflet relating to the Study Report and FPMs that will be on public exhibition has also been prepared and will be attached to the letter to be sent to affected property owners. The proposed letter to be sent to affected property owners and the attached FAQs leaflet are presented in Appendix 3 under separate cover. This information will also be placed on Council's website.

Council will also need to provide a 'hot-line' to handle the anticipated enquiries concerning the information given in the FPMs.

Endorsement by Council for Public Exhibition

It is now recommended that Council endorse for public exhibition for a period of 28 days, the Hornsby OFS Report with the accompanying draft FPMs presented in Appendix 1, and the

Overland Flow Maps presented in Appendix 2. Appendices 1 and 2 are to remain confidential until the commencement of the public exhibition period.

Council is also requested to endorse the Letter to Affected Property Owners together with the attached FAQs leaflet presented at Appendix 3 under separate cover.

In the event the Council does not proceed with the public exhibition and adoption of the FPMs, it may be exposed to public liability risks as it is aware of potential flood liable properties.

Actions following Public Exhibition

On expiration of the public exhibition period and following receipt and consideration of submissions and comments, a further report will be prepared for Council to consider and, if appropriate, adopt the Study report and Overland Flow Maps and the FPMs.

The adopted FPMs will then be submitted to the DOP as an addendum to the Hornsby Shire Comprehensive LEP.

BUDGET

The main direct cost resulting from this report are the costs associated with the public exhibition and mail out to the owner of properties identified in the draft FPMs as well as the manning of the hot-lines. These have been allowed for in the Works Division's budget.

Additional costs associated with further refinement of the flood study are anticipated to be covered by relevant grants from the State Government.

POLICY

There will be policy implications resulting from this report as the properties identified in the draft FPMs will be required to submit DAs when undertaking development whereas there is currently no legal requirement for them to do so.

In conjunction with the submission of DAs, there will also be a requirement for hydraulic studies to accompany such DAs to ascertain the impact of potential flooding on the development.

CONSULTATION

The preparation of the Hornsby OFS and Draft FPMs has been carried out in consultation with the relevant officers from the Environment, Planning and Works Divisions.

The Hornsby OFS and Draft FPMs have been considered and endorsed by the Hornsby Shire FRMC. A workshop has also been held to brief the Mayor and Councillors with the General Manager, Executive Managers and relevant staff in attendance.

TRIPLE BOTTOM LINE SUMMARY

Triple Bottom Line (TBL) attempts to improve Council's decisions by being more accountable and transparent on social, environmental and economic factors. It does this by reporting upon Council's Strategic Theme.

The TBL assessment summary for the Hornsby Overland Flowpath Study and Draft Flood Planning Maps presented is as follows:

1. Working with our community.

This report is readily available to the community. Social equity will be considered as part of the process for the setting of flood planning controls.

2. Conserving our natural environment.

The Flood Planning Maps will lead to measures that minimise the impacts of stormwater on the natural environment. It is anticipated that the flood planning process will explore various measures, including storage and treatment of stormwater as well as better management of any impacts on bushland and environmentally sensitive areas.

3. Contributing to community development through sustainable facilities and services.

Community consultation is part of the flood planning process and the resulting increased public awareness of flooding issues will contribute to community development. Safety in the public environment will be improved through the identification of flood prone areas and their community participation required. Council will cater for the physical access needs of the community as required.

4. Fulfilling our community's vision in planning for the future of the shire.

The existing built and natural environment and their associated heritage values will be considered as part of the flood planning process. Improved flood management will promote the well-being of the community.

5. Supporting our diverse economy.

Better management of flooding will lead to reduced impacts and financial losses. Any restrictive development controls arising are in the public interest in the long term, although they may have some impacts on locally affected owners. There will be a neutral effect on local employment.

6. Maintaining sound corporate and financial management.

There is a budget allocation in 2010/2011 for the Flood Risk Management Plan process. The implementation of Flood Risk Management Plans over time will involve costs to Council, however, it will provide a substantial benefit to the community.

7. Other Sustainable Considerations.

There are no known negative impacts from this proposal at this stage.

RESPONSIBLE OFFICER

Michael Bickford, Investigations Engineer, on telephone number 9847 6825

RECOMMENDATION

THAT:

1. The Hornsby Overland Flow Study Report and the accompanying Draft Hornsby Shire Flood Planning Maps presented in Appendix 1, and the Overland Flow Maps presented in Appendix 2 be endorsed by Council and placed on public exhibition for a period of 28 days.
2. The Letter to Affected Property Owners and the FAQs leaflet attachment presented in Appendix 3 be approved by Council.
3. A further report is prepared for Council following the expiration of the public exhibition period and addressing the submissions received.

MAXWELL WOODWARD
Executive Manager
Works Division

Attachments:

1. Appendix 1 - Hornsby Overland Flow Study Report and accompanying draft Hornsby Shire Flood Planning Maps (Under separate Cover - CONFIDENTIAL)
2. Appendix 2 - Overland Flow Maps (under separate cover - CONFIDENTIAL)
3. Appendix 3 - Letter to Affected Property Owners and FAQs leaflet attachment

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