

12.5 Robertson Village Overland Flow Study Report

Reference: 8100/14

Report Author: Floodplain and Stormwater Engineer

Authoriser: Manager Assets

Link to Delivery Program: Encourage creativity in utilisation of our community assets

PURPOSE

The purpose of this report is to advise Council on the outcomes of the Robertson Village Overland Flow Study and recommend its adoption.

RECOMMENDATION

1. **THAT** the Robertson Village Overland Flow Study Report be adopted.
2. **THAT** Council proceed with the implementation of the proposed measures identified in the report in stages.
3. **THAT** a planning proposal be prepared to include the adopted Overland flow study in the Wingecarribee Local Environmental Plan 2010.

REPORT

BACKGROUND

NSW Government's Flood Prone Land Policy, as outlined in the 'Floodplain Development Manual 2005', highlights that primary responsibility for floodplain risk management rests with councils, which are provided with financial and technical support by the State Government. Council has completed nine flood studies and seven flood risk management plans to date and has secured approximately \$750,000 in the last five years for flood studies and risk management plans from the NSW Government.

The floodplain management process as outlined in the Floodplain Development Manual consists of the following four stages:

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Stage	Description
1. Flood Study	Determines the nature and extent of the flooding problem
2. Floodplain Risk Management Study	Evaluates management options for existing and future development of the floodplain, taking into consideration the social, economic and environmental costs and benefits
3. Floodplain Risk Management Plan	Management plan for the risks identified in the risk management study
4. Plan Implementation	Implementation of actions identified in the plan

The NSW Government provides 2/3rd funding for undertaking studies and preparing plans for stages 1, 2 and 3, subject to a competitive grant application process. It also provides 2/3rd funding for undertaking remedial works identified from stage 3 that qualify for grant funding, subject to a competitive grant application process. Funds allocated for remedial works and probability of securing funds for remedial works are limited.

Flooding in various locations in Robertson has been experienced for many years and Council decided to undertake an Overland Flow Study. This study includes stages 1, 2 and 3 of the floodplain management process.

REPORT

Council commissioned J Wyndham Prince to undertake Robertson Village Overland Flow Study. The study was prepared in consultation with the residents and property owners, Council's Floodplain Risk Management Advisory Committee (WFRMAC), Council staff and the Office of Environment and Heritage.

In accordance with the recommendations of the WFRMAC the draft report was publicly exhibited from 15 July to 22 August 2016 for a period of 38 days. Two submissions were received during the exhibition period and the main issues raised in the submissions were:

- Flooding of Shackleton Way
- Emergency Access (along Illawarra Highway)
- Flooding of Upper Caalong Street properties
- Charlotte Street and Armstrong Street flooding
- Areas outside of the study area (Old Kangaloon Road and Wilson Lane)
- Frequency of drainage maintenance by Council
- Flooding of the open channel on Meryla Street
- Open Channel between Caalong Street, Wallagunda Street and Conjewoi Street and associated maintenance works required.

The catchment plan is shown in **Attachment 1**.

The submissions related to the study were addressed in detail and are included in the final report. The executive summary of the Robertson Village Overland Flow Study is included in **Attachment 2** and a full copy of the report has been made available in the Councillors'

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Room. A separate overland flow study was undertaken to address flooding issues in upper Caalong Street and remedial works are in progress.

IMPACT ON COUNCIL'S FIT FOR THE FUTURE IMPROVEMENT PLAN

Robertson Village Overland Flow Study meets the objectives of Council's Fit For the Future implementation plan.

CONSULTATION

Community Engagement

Community engagement was undertaken in two stages.

Stage 1: At the beginning of the study, written questionnaires were sent to everyone living in the study area. A total of 52 responses were received.

Stage 2: The draft report was publicly exhibited for a period of 38 days from 15 July to 22 August 2016. The draft report was made available in Council libraries at Bowral, Moss Vale and Civic Centre as well as at the Technology Centre on Hoddle Street Robertson. It was also made available through the Council website.

Two responses were received and are described in the 'Report' section above and were addressed in the final study report.

Internal Consultation

Council's Development Services Branch and Assets were consulted.

External Consultation

The Office of Environment and Heritage and Wingecarribee Floodplain Risk Management Advisory Committee were consulted.

SUSTAINABILITY ASSESSMENT

- **Environment**

There are no environmental issues in relation to this report.

- **Social**

There are no social issues in relation to this report.

- **Broader Economic Implications**

There are no broader economic implications in relation to this report.

- **Culture**

There are no cultural issues in relation to this report.

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- **Governance**

There are no governance issues in relation to this report.

COUNCIL BUDGET IMPLICATIONS

There are budgetary implications in relation to implementation of the risk management measures. Three priority projects have been included in the ten year draft capital works program and are listed below.

- 1) Construct Upper Caalong Street drainage, Estimated cost: \$300,000, Year: 2017-18.
- 2) Construct detention basin and piped drainage at the corner of Caalong and Congewoi Streets- Stage 1, Estimated cost: \$600,000, Year: 2025-26.
- 3) Construct detention basin and piped drainage at the corner with Caalong and Congewoi Streets, Stage 2, Estimated cost: \$900,000, Year: 2026-27.

The following projects identified in the study report at a total cost of \$1.6M will be considered for inclusion in future works program subjected to availability of funding.

- New culvert under Hoddle Street and swale upgrade
- Pit and pipe upgrade and widen Hoddle Street
- Construct new swale and pipe crossing
- Construct new pipe from ponding area and pipe/pit upgrade

As outlined under the 'Background' section above, there is a possibility of securing 2/3rd funding from the NSW Government for some of the above projects, which qualify for grant funding, subjected to a competitive grant application process.

RELATED COUNCIL POLICY

Nil

OPTIONS

The options available to Council are:

Option 1

Council adopt the final report on Robertson Village Overland Flow Study.

Option 2

Council not adopt the final report on Robertson Village Overland Flow Study.

Option 1 is the recommended option to this report.

CONCLUSION

Councils are responsible for determining the extent of flooding within Council areas to determine future works, strategies to minimise the impacts of flooding and also control

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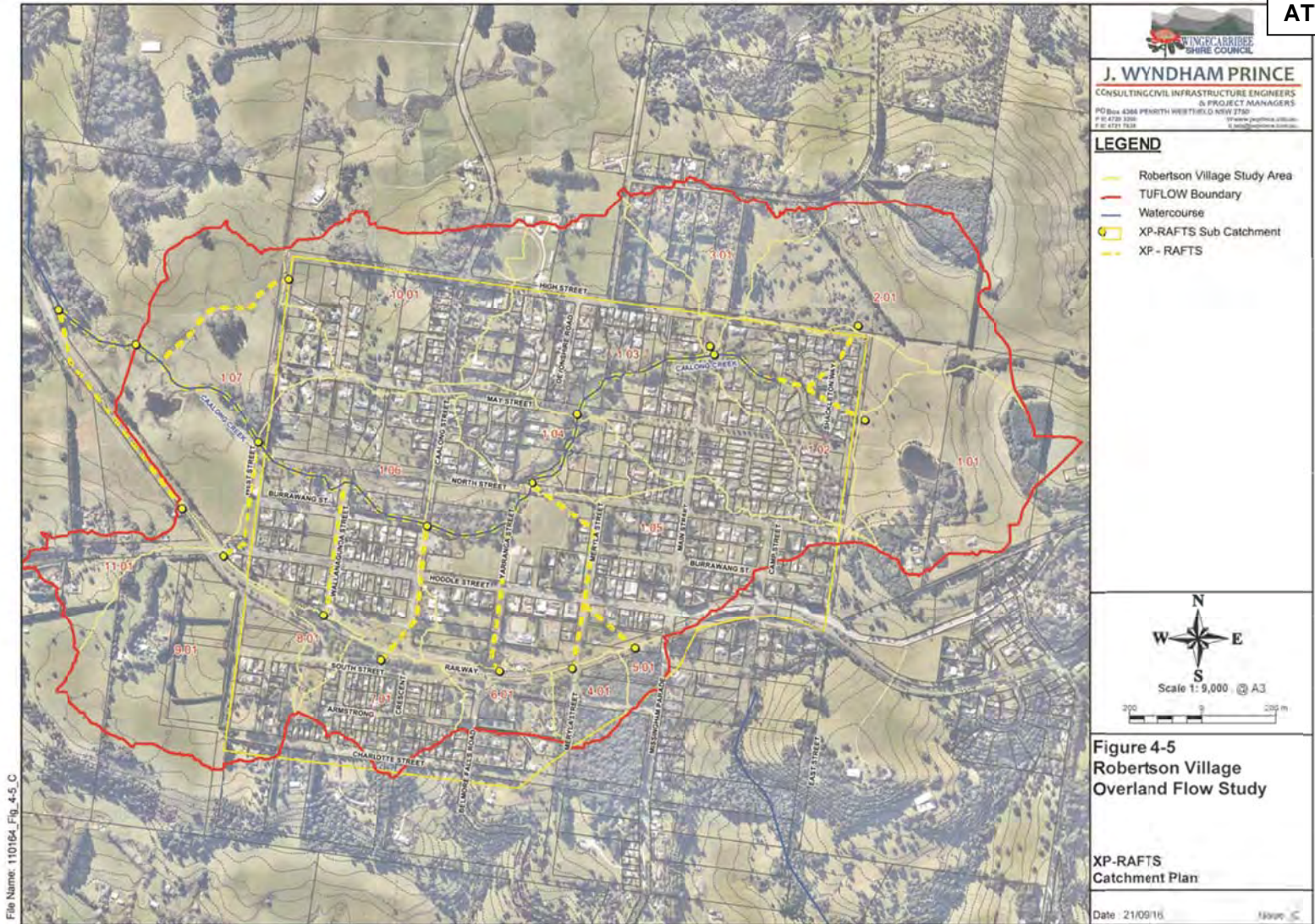
developments on flood affected lands. The Robertson Village Overland Flow Study comprises the flood study, the floodplain risk management study and risk management flood study plan. The identified remedial works once implemented will substantially address the flooding issues in the village.

ATTACHMENTS

1. Catchment Plan
2. Executive Summary



ATTACHMENT 1



File Name: 110164_Fig_4-5_C



ATTACHMENT 2

J. Wyndham Prince

Consulting Civil Infrastructure Engineers & Project Managers

1 EXECUTIVE SUMMARY

J. Wyndham Prince has been commissioned by Wingecarribee Shire Council (Council) to prepare the *"Final Floodplain Risk Management Study and Plan"* for Robertson Village.

The overall objective of this study is to develop a flood study, preliminary floodplain risk management assessment as well as a flood and drainage master plan for Hoddle Street. The study addresses the existing, future and continuing flood problems, taking into account the potential impacts of climate change, in accordance with the NSW Government's Flood Policy. This report represents Phase 2 (Stages 3 and 4) of the "Floodplain Development Manual: the management of flood liable land" (FDM, 2005).

The report builds upon the findings of the Phase 1 works with a particular focus on identifying, reviewing and recommending the most feasible measures which will better manage the risk of flooding and its impact on life and property across the Village.

Recommendations are then made as to how the measures can be implemented, the cost estimated of these measures, and on potential modifications to Council's flood related policies required to ensure these measures fit seamlessly into Council's operation.

The key objectives of this FRMS&P include the following:

- Reduce flooding of Hoddle Street for events up to and including the 1% AEP.
- Reduction of the flood hazard and risk to people and property in the existing community.
- Prioritisation of proposed flood mitigation works in accordance with their importance focussing on those that can provide the greatest flood damage impact for the most economical construction cost.
- Prepare a risk management plan which is in a suitable format to be integrated into Council's existing business and strategic plans, emergency management plan and existing and proposed planning proposals.

Floodplain Risk Management Measures

A range of opportunities to improve the flood hazard and risk (along with the above objectives) have been identified and investigated. Consideration has been given to "flood modification", "property modification" and "response modification" measures.

Flood Modification Measures

The purpose of "flood modification measures" is to modify flood behaviour and to reduce the effects of flooding (i.e flood extents, levels or velocities) through the implementation of physical upgrades.

Due to the size and complexity of the study area, flood modification measures are proposed to be implemented across numerous locations to address historical and ongoing flooding concerns in the Village. Whilst these can be assessed in an overall model, it is important that the FRMS&P also considers each measure individually in order to better inform the decision making process.

The following scenarios have therefore been considered:

- Scenario A - Hoddle Street Option 1 (New Basin)
- Scenario B - Hoddle Street Option 2 (Culvert Crossing)
- Scenario C - Northern and Southern Upgrades
- Scenario D – Combination of Scenarios A, B and C



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Scenario D includes a combination of each of the Scenarios (i.e Scenario A + Scenario B + Scenario C) being run as one management solution. It is noted that whilst Scenarios A and B may not provide the most economical benefits (in terms of the cost benefit analysis), they do target the primary objective of the study which is improving flooding at Hoddle Street.

Property Modification Measures

A review of the 1% AEP "High Hazard" areas within the Floodplain has been undertaken to identify those properties which are flood affected and could form part of a potential "voluntary house purchase" (VHP) scheme.

Preliminary analysis have identified that there are seven (7) dwellings across the study area which are located within 5m of a "High Hazard" during the 1% AEP event. A further three (3) properties have been identified as potential properties which could be acquired and / or property owners negotiated with to obtain an easement in order to address local flood concerns.

There may be an opportunity to purchase those flood liable properties under a VHP scheme. VHP schemes are often expensive and securing a funding source for VHP can be difficult. More detail study and analysis in relation to those properties are required for further consideration of this option.

Response Modification Measures

A review of the *Wingecarribee Local Flood Plan* confirms that Robertson Village lies within the limits of the local flood plan. A specific plan for Robertson Village is however not currently included in the current plan.

Information from the FRMS&P is consequently provided within Section 6.8 (including flood intelligence information, flood maps and summary of affected roads) for review by the NSW SES and for consideration for future updates to the Wingecarribee Local Flood Plan.

Floodplain Risk Management Plan

Results of the FRMS&P demonstrate that by adopting the proposed flood modification measures, the overall objectives of the study will be achieved. In particular, above floor flooding will be removed across fifteen (15) properties whilst Hoddle Street will not overtop during the 1% AEP event.

The capital cost of the FRMS&P is broken up into the following:

- Scenario A - Hoddle Street Option 1 (New Basin) - \$1.64M
- Scenario B - Hoddle Street Option 2 (Culvert Crossing) - \$1.07M
- Scenario C - Northern and Southern Upgrades - \$0.51M
- Scenario D – Combined Upgrades (Scenario A, B and C) - \$2.26M
- Voluntary House Purchase Scheme - (\$3.8 – 4.76M)

By implementing Scenario D (combined upgrades), the damage savings would be around \$4.75M, which results in an overall benefit – cost ratio of 2.11. Results therefore indicate that the costs of not doing the proposed upgrade works are greater than the cost of works across the assumed 50 year life cycle. (Note: Voluntary house purchase not included in the cost-benefit assessment).

Importantly, the upgrades at Hoddle Street also provides benefits by improving the flood affectionation of Hoddle Street, but does not necessarily provide a tangible benefit (i.e removing damages).



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As discussed in Section 10, the cost-benefit ratio for individual Scenarios (A, B and C) provides a further breakdown. For Scenarios A, B and C these include cost-benefit ratios of 0.8, 1.1 and 2.9 respectively in the 1% AEP event.

The implementation of the proposed measures will improve flood affectation and reduce the risks to property and life within the study area. The FRMS&P also provides sufficient technical details to support future funding applications and the required design processes for these mitigation works.

Post Exhibition

Prior to placing the Draft FRMS&P on exhibition, J. Wyndham Prince met with the Floodplain Risk Management Committee (20 June 2016) in Council chambers. The Draft FRMS&P was generally well received and subsequently was accepted to be listed on public exhibition.

Attendees at the meeting included representatives from DPE, NSW SES, Sydney Catchment Authority, multiple divisions of Council and several residents from the wider Wingecarribee community.

Several responses from the community were raised throughout the public exhibition period. Responses are included in Section 12.

Historical Flood Events

During the preparation of the FRMS&P, a heavy rainfall event occurred within the study area which resulted in a number of properties experiencing above floor flooding.

The TUFLOW model has been run for the historical rainfall event under "Existing" conditions with results generally consistent with those areas which have been reported as being flooded by the community. This therefore provides further confidence in the flood modelling and supports the recommendations being made in the FRMS&P.